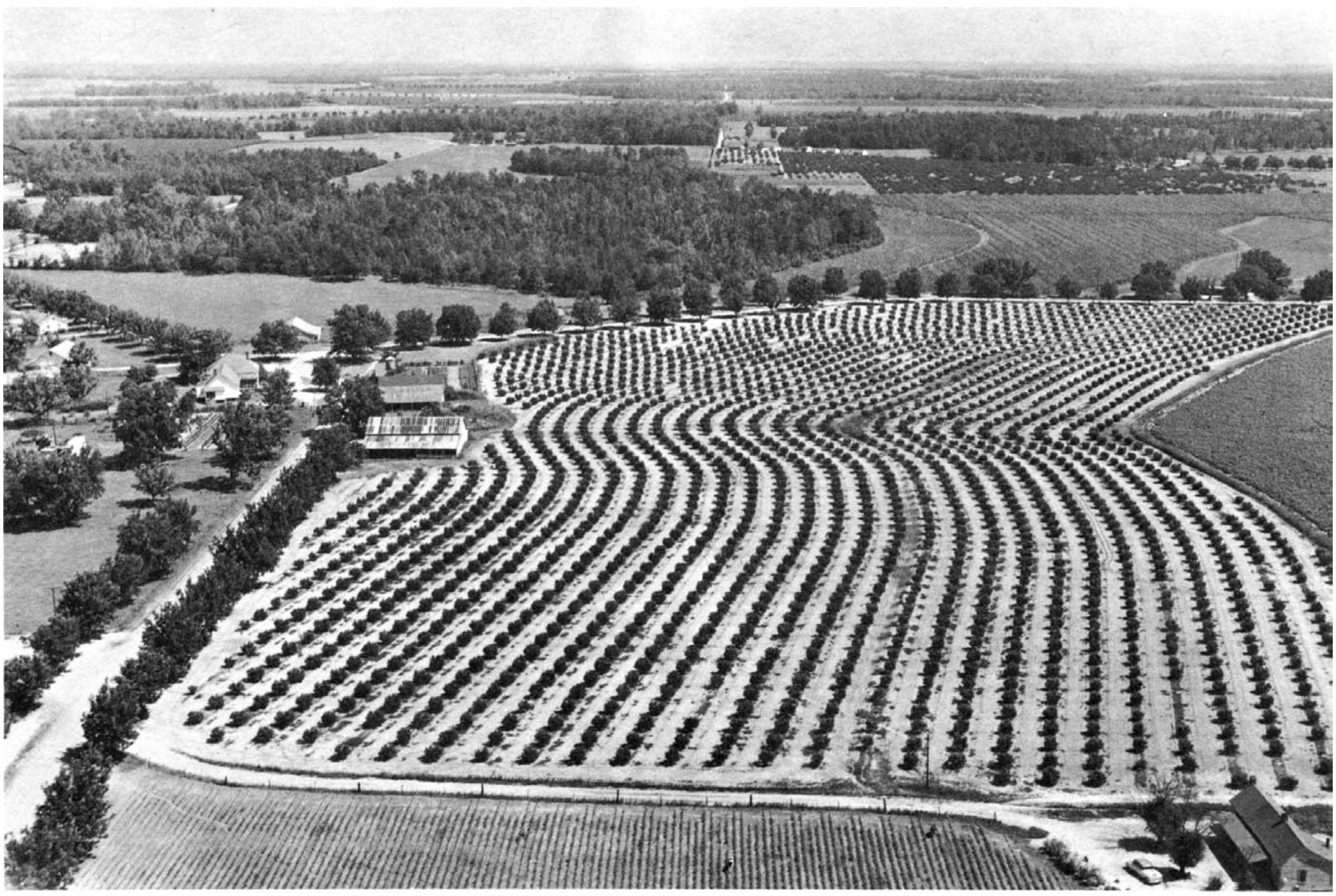
SOIL SURVEY

Houston and Peach Counties Georgia



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

Issued July 1967

Major fieldwork for this soil survey was done in the period 1962–64. Soil names and descriptions were approved in 1965. Unless otherwise indicated, statements in the publication refer to conditions in Houston and Peach Counties in 1964. This survey was made cooperatively by the Soil Conservation Service and the University of Georgia, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Ocmulgee Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Houston and Peach Counties contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in appraising the value of tracts of land for agriculture, industry, or recreation.

Locating Soils

All the soils of Houston and Peach Counties are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the survey. This guide lists all of the soils of the two counties in alphabetic order by map symbol. It shows the page where each kind of soil is described and the page for the capability unit. It also lists the wildlife suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or limitations of soils for many specific purposes can be developed by using the soil map and information in the text. Interpretations not included in the text can be developed by grouping the soils according to their suitability or limitations for a particular use. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils in the soil descriptions and in the discussions of the capability units.

Foresters and others can refer to the subsection "Woodland," where the soils of the two counties are grouped according to their suitability for trees.

Game managers, sportsmen, and others concerned with wildlife will find information about soils and wildlife in the subsection "Use of Soils for Wildlife."

Community planners and others concerned with community development can read about the soil properties that affect the choice of homesites, industrial sites, schools, and parks in the section "Use of Soils in Community Development."

Engineers and builders will find under "Engineering Applications" tables that give engineering properties of the soils in the two counties and that name soil features that affect engineering practices and structures.

Scientists and others can read about how the soils were formed and how they are classified in the section "Formation and Classification of Soils."

Students, teachers, and others will find information about soils and their management in various parts of the text, depending on their particular interest.

Newcomers in Houston and Peach Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the Area," which gives additional information about the county.

***Cover picture.*—Peach orchard on contoured field of class II land; pecan trees are along the roads.**

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Contents

NOTICE TO LIBRARIANS

Series year and series number are no longer shown on soil surveys. See explanation on the next page.

Issued July 1967

EXPLANATION

Series Year and Series Number

Series year and number were dropped from all soil surveys sent to the printer after December 31, 1965. Many surveys, however, were then at such advanced stage of printing that it was not feasible to remove series year and number. Consequently, the last issues bearing series year and number will be as follows:

- Series 1957, No. 23, Las Vegas and Eldorado Valleys Area, Nev.
- Series 1958, No. 34, Grand Traverse County, Mich.
- Series 1959, No. 42, Judith Basin Area, Mont.
- Series 1960, No. 31, Elbert County, Colo. (Eastern Part)
- Series 1961, No. 42, Camden County, N.J.
- Series 1962, No. 13, Chicot County, Ark.
- Series 1963, No. 1, Tippah County, Miss.

Series numbers will be consecutive in each series year, up to and including the numbers shown in the foregoing list. The soil survey for Tippah County, Miss., will be the last to have a series year and series number.

SOIL SURVEY OF HOUSTON AND PEACH COUNTIES, GEORGIA

REPORT BY JOHN C. WOODS, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY JOHN C. WOODS, J. O. MURPHY, AND T. A. RIGDON, SOIL CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

HOUSTON AND PEACH COUNTIES, in the central part of Georgia (fig. 1), have a land area of 530 square miles, or 339,200 acres. The two counties adjoin each other. Houston County has a land area of 379 square miles, or 242,560 acres, and Peach County, a land area of 151 square miles, or 96,640 acres.

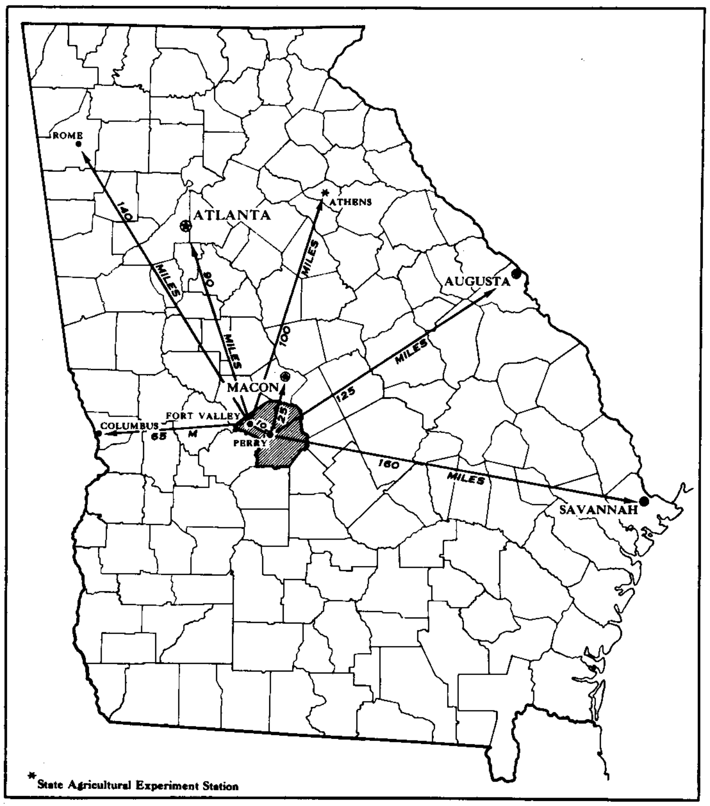

***Figure 1.*—Location of Houston and Peach Counties in Georgia.**

Most of the two counties consists of broad, nearly level or gently sloping uplands, but some areas along small creeks and drainageways are strongly sloping to steep. The flood plains of the rivers and large creeks are level or nearly level.

About 45 percent of the total land area of Houston and Peach Counties is used for cultivated crops and pasture, and about 43 percent is woodland. General farming is the main kind of agriculture in these two counties, but there are several large fruit and nut farms and a few dairy and beef cattle farms. The principal crops are cotton, corn, peanuts, small grain, and soybeans. Peaches and pecans are important cash crops.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Houston and Peach Counties, where they are located, and how they can be used.

They went into the counties knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the counties, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this survey efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Faceville and Greenville, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that go with their behavior in the natural, untouched landscape. Soils of one series can differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Greenville fine sandy loam and Greenville clay loam are two soil types in the Greenville series. The difference in texture of their surface layers is apparent from their names.

Some types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases. The name of a soil phase indicates a feature that affects management. For example, Greenville fine sandy loam, 0 to 2 percent slopes, is one of several phases of Greenville fine sandy loam, a soil type that ranges from nearly level to strongly sloping.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodland, buildings, field borders, trees, and other details that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size that it is not practical to show them separately on the map. Therefore, they show this mixture of soils as one mapping unit and call it a soil complex. Ordinarily, a soil complex is named for the major kinds of soil in it, for example, Boswell-Susquehanna-Oktibbeha complex, 2 to 5 percent slopes, eroded. In some places two or more similar soils are mapped as a single unit, called an undifferentiated soil group, if the differences between the soils are too small to justify separate mapping. An example in these two counties is Chastain and Leaf soils. Also, on most soil maps, areas are shown that are so rocky, so shallow, or so frequently worked by wind and water that they scarcely can be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Gullied land or Mine pits and dumps, and are called land types rather than soils.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil survey reports. On the basis of the yield and practice tables and other data, the soil scientists set up trial groups, and then test these by further study and by consultation with farmers, agronomists, engineers, and others. The scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Houston and Peach Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

In Houston and Peach Counties, soil associations 1, 2, and 3 consist chiefly of well-drained soils on broad, nearly level or gently sloping ridgetops and adjacent side slopes. Soil association 4 is made up of moderately well drained and somewhat poorly drained soils on narrow ridgetops and sloping to steep side slopes. In association 5, the soils are well drained and somewhat excessively drained; they occur mainly on ridgetops, on steep side slopes, and in uneven, choppy areas. Soil association 6 consists of somewhat poorly drained and poorly drained soils and swampy areas along the Ocmulgee and Flint Rivers.

1. Faceville-Greenville-Norfolk Association

Nearly level to steep, well-drained soils that have a loamy surface layer and a sandy clay or sandy clay loam subsoil; on ridgetops and side slopes

This soil association consists of broad, nearly level and gently sloping ridgetops, sloping to steep side slopes, and numerous narrow, winding drainageways (fig. 2). It makes up about 35 percent of the total acreage of Houston and Peach Counties and is distributed in large areas throughout both counties.

The Faceville soils make up about 40 percent of this association; the Greenville soils, about 30 percent; the Norfolk soils, about 15 percent; and minor soils, the remaining 15 percent.

Figure 2.—**Typical landscape in soil association 1. Field of barley on Greenville fine sandy loam, 0 to 2 percent slopes.**

The Faceville, Greenville, and Norfolk soils are on the ridgetops and side slopes. The well-drained Faceville soils, except in severely eroded areas, have a brown to dark grayish-brown fine sandy loam surface layer. Their subsoil is yellowish-red or red, friable sandy clay. In severely eroded areas, the surface layer is sandy clay loam and rills, gall spots, and shallow gullies are common. The Greenville soils are deep and well drained. They commonly have a surface layer of dark reddish-brown or dark-brown fine sandy loam and a subsoil of dark-red, friable sandy clay. In places Greenville soils are severely eroded; their subsoil is exposed, and rills, gall spots, and shallow gullies are common. The Norfolk soils commonly have a dark grayish-brown loamy fine sand surface layer. Their subsoil is yellowish brown and consists of friable sandy clay loam that grades to sandy clay.

Minor soils and land types in this association are the Lucy, the Grady, Local alluvial land, and Alluvial land, wet. The Lucy soils are on ridgetops and side slopes. They are deep, very friable, and well drained to somewhat excessively drained; they have a sandy surface layer more than 20 inches thick. The Grady soils are in depressions and sinks. Local alluvial land lies around the heads of drains and in the narrow, winding drainageways, and Alluvial land, wet, is on the flood plains along the larger drainageways.

Some of the best soils for farming in the two counties are on the broad interstream divides of this association. These soils are generally in good tilth, and they have a thick root zone. Crops on them respond well to management. The range of suitable crops and pasture plants is wide and includes corn, cotton, peanuts, small grain, soybeans, sorghum, millet, lespedeza, Coastal bermudagrass, common bermudagrass, and bahiagrass. Peach and pecan trees grow well. For the most part, the steeper slopes are wooded, though the entire association is suited as woodland.

About 75 percent of this association is in cultivated crops and pasture, and the rest is woodland. The farms average about 300 acres in size and are operated full time by their owners. The farms are mainly of the general type, but there are several large fruit and nut farms and a few dairy and beef cattle farms.

The soils in this association have only slight to moderate limitations for light industry, community development, campsites, picnic areas, and intensive play areas. Limitations to use for highways, airports, and other structures are no more than moderate.

2. Orangeburg-Red Bay Association

Nearly level to steep, well-drained soils that have a sandy or loamy surface layer and a sandy clay loam subsoil; on ridgetops and side slopes

This association consists of broad, nearly level and gently sloping ridgetops, sloping to steep sides of the ridges, and narrow, winding drainageways. It makes up about 30 percent of the counties and is distributed throughout them in fairly large areas.

The Orangeburg soils make up about 60 percent of the association; the Red Bay soils, about 25 percent; and minor soils, about 15 percent.

The Orangeburg soils are on ridgetops and sloping to steep sides of ridges. These well-drained soils are deep and commonly have a surface layer of grayish-brown to dark grayish-brown, very friable loamy fine sand and a yellowish-red, red, or dark-red, friable subsoil. The Red Bay soils are on smooth, level interstream divides and on the very gentle slopes adjacent to drainageways. These well-drained soils have a surface layer of dark-brown to dark reddish-brown, very friable fine sandy loam and a subsoil of dark-red, friable sandy clay loam.

The minor soils and land types in this association are the well-drained to somewhat excessively drained, sandy Lucy soils on ridges and side slopes; Local alluvial land around the heads of drains and in the narrow, winding drainageways; Alluvial land, wet, on flood plains along the larger streams and drainageways; and the poorly drained Grady soils in depressions and sinks.

About 75 percent of this association is used for cultivated crops and pasture (fig. 3), and about 25 percent is woodland. Some of the best soils for farming in the two counties are in the smoother uplands of this association. The soils are generally in good tilth and have a thick root zone. Crops on these soils respond well to good management. Most of the pasture plants and cultivated crops grown in these counties are suited. The main crops are cotton, corn, peanuts, small grain, soybeans, lespedeza,

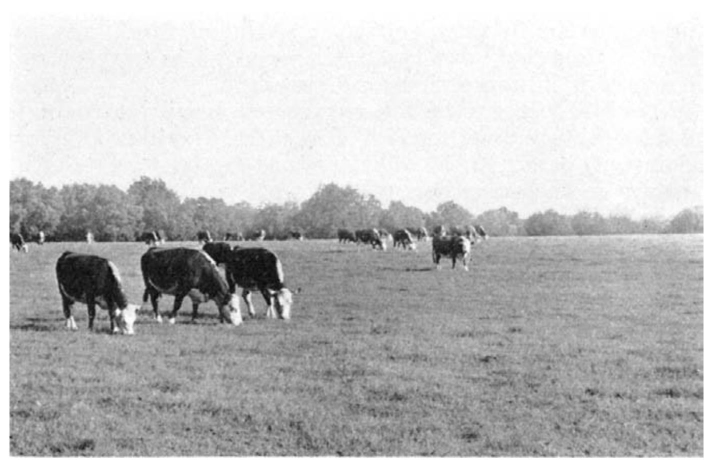

Figure 3.—**Coastal bermudagrass pasture on Orangeburg loamy fine sand, 2 to 5 percent slopes, in soil association 2.**

sorghum, Coastal bermudagrass, and bahiagrass. Vegetables and truck crops are grown both for home consumption and for the market. The steeper slopes are used chiefly as woodland, though all of this association is suited to trees.

The farms in this association average about 250 acres in size, and most of them are operated by the owners. Most farms are of the general type, but some are dairy farms and beef cattle farms. Also, there are several large peach orchards and pecan groves in this association.

Most areas of this association have only slight limitations for community development, campsites, picnic areas, and intensive play areas. Limitations to use for highways, airports, and similar structures are also only slight.

3. Norfolk-Lucy-Orangeburg Association

Nearly level and gently sloping, well-drained or somewhat excessively drained soils that have a sandy surface layer and a sandy clay loam or sandy loam subsoil; on ridgetops and side slopes

This association consists of long, broad, nearly level ridgetops from which gentle slopes extend down to narrow, winding drainageways. The drainageways are numerous. This association makes up about 8 percent of the area mapped and occurs in the southwestern part of Houston County.

The Norfolk soils make up about 60 percent of the association; the Lucy soils, about 15 percent; the Orangeburg soils, about 10 percent; and minor soils, the remaining 15 percent.

The Norfolk, Lucy, and Orangeburg soils are on the ridgetops and side slopes. The Norfolk soils are deep, are well drained, and commonly have a grayish-brown sandy surface layer and a yellowish-brown sandy clay loam subsoil. The Lucy soils are well drained and somewhat excessively drained. They have a sandy surface layer that is 20 to 40 inches thick over yellowish-red or red sandy loam or sandy clay loam. The Orangeburg soils are deep and well drained and commonly have a grayish-brown sandy surface layer. Their subsoil is yellowish-red, red, or dark-red sandy clay loam.

Minor soils and land types in this association are the sandy, excessively drained Lakeland soils on ridges and side slopes; Local alluvial land around the heads of drains and along small drainageways; Alluvial land, wet, on flood plains and along the larger drainageways; and Grady soils in depressions and sinks.

About 75 percent of the association is cultivated or is used as pasture, and about 25 percent is woodland. Some of the best agricultural soils in Houston and Peach Counties are in the smoother upland areas in this association. These soils are easily tilled, have a thick root zone, and are suited to many kinds of cultivated crops and pasture plants. Crops on them respond well to good management. The main crops are cotton, corn, peanuts, small grain, and soybeans. The steeper slopes are used chiefly as woodland, and the rest of this association is suited to this use.

The farms in this association average about 250 acres in size, and most of them are operated by the owners. Most farming is of the general type, but there are several livestock farms.

The soils in this association have only slight limitations for light industry, community development, campsites, picnic areas, and intensive play areas. Also slight are the limitations for highways, airports, and similar structures.

4. Boswell-Susquehanna-Oktibbeha Association

Gently sloping to steep, moderately well drained and somewhat poorly drained soils that have a clayey subsoil, in many places over limestone, marl, or chalk; on ridgetops, side slopes, and flood plains

This association consists of long, narrow, gently sloping ridgetops, steep side slopes, and fairly wide flood plains. Some parts of the ridgetops are fairly broad. The steep slopes extend from the ridgetops to the numerous small, winding streams and drainageways. This association makes up about 12 percent of the two counties. It is in the southern part of Houston County.

The Boswell soils make up about 40 percent of the association; the Susquehanna soils, about 30 percent; the Oktibbeha soils, about 15 percent; and minor soils, the remaining 15 percent.

The Boswell, Susquehanna, and Oktibbeha soils are on ridgetops and side slopes. The moderately well drained Boswell soils commonly have a dark reddish-brown to dark grayish-brown surface layer and a red clayey subsoil that is highly mottled in the lower part. The Susquehanna soils are somewhat poorly drained and generally have a dark-brown to grayish-brown surface layer and a highly mottled clayey subsoil. The Oktibbeha soils are moderately well drained and have a dark-gray surface layer and a red clayey subsoil. The subsoil of the Oktibbeha soils commonly is underlain by limestone, chalk, or marl at a depth of 20 to 48 inches.

The minor soils and land type in this association are the clayey, highly calcareous Sumter soils on ridgetops and side slopes; the deep, well-drained Greenville soils on ridges and side slopes; and Alluvial land, wet, along drainageways.

Most of this association is woodland. The soils are not suited to cultivated crops. Tilth is generally poor, and the root zone is thin. Erosion is severe on the steeper slopes.

The farms in this association are large; most of them are managed tree farms. A few areas are used for pasture. Lime is commercially mined in several large quarries (fig. 4).

The texture and very slow permeability of the soils in this association severely limit use for industrial and community development and recreational facilities. Because these soils have a high shrink-swell potential, they require special engineering practices if they are used for highways, airports, and similar structures.

5. Lucy-Lakeland-Vaucluse-Hoffman Association

Gently sloping to steep, well-drained to excessively drained, sandy soils that in some places have a compact or clayey subsoil; on ridgetops and steep or choppy slopes

This association consists of broad, gently sloping ridgetops, strongly sloping to steep side slopes, numerous small, winding drainageways, and fairly wide flood plains. The

***Figure 4*.—Lime quarry in soil association 4. Most lime deposits are in areas of Oktibbeha and Sumter soils, which are underlain by calcareous marly material.**

side slopes extend from the ridgetops to the drainageways and flood plains. This association makes up about 14 percent of Houston and Peach Counties.

The Lucy soils make up about 35 percent of the association; the Lakeland soils, about 30 percent; the Vaucluse and Hoffman soils, about 25 percent; and minor soils, the remaining 10 percent.

The Lucy and Lakeland soils are on ridgetops and side slopes. The well-drained or somewhat excessively drained Lucy soils have a sandy surface layer 20 to 40 inches thick. This layer is underlain by yellowish-red to red sandy loam or sandy clay loam. The excessively drained, deep Lakeland soils consist of loose sand to a depth of 60 inches or more. The Vaucluse and Hoffman soils are on the steeper slopes and choppy, uneven breaks adjacent to drainageways. These soils are highly variable, and in many places they are overlain by a sandy mantle that ranges from only a few inches to as much as 2 feet in thickness. The Vaucluse soils have a firm, compact, reddish sandy loam or sandy clay loam subsoil that is highly mottled. The Hoffman soils have a highly mottled subsoil of kaolinitic clay. Erosion is severe on the stronger slopes of the Hoffman and Vaucluse soils, and large gullies have formed in some places.

Minor soils and land types in this association are the deep, friable Norfolk and Orangeburg soils in the smoother areas; Local alluvial land around the heads of drains and in narrow, winding drainageways; and Alluvial land, wet, on flood plains along the larger drainageways.

About 80 percent of this association is in scattered pines and low-grade hardwoods. A few of the smoother, less eroded areas are in tilled crops or pasture. Because the soils are sandy and somewhat droughty, crop yields are only fair. Nevertheless, satisfactory yields of Coastal bermudagrass, bahiagrass, and other pasture grasses can be obtained.

The farms in this association are large; most of them are tree farms. Some farms used for general farming and livestock raising average about 300 acres in size.

A large part of this association has only slight or moderate limitations for light industrial and community development, and for highways, airports, and similar structures. In some areas where slopes are uneven and strong, the soils have severe limitations for community and industrial development, campsites, and intensive play areas.

6. Chastain-Leaf-Swamp Association

Somewhat poorly drained and poorly drained soils and swampy areas; on flood plains of the Ocmulgee and Flint Rivers

This association consists of nearly level flood plains along the Ocmulgee River in the eastern part of Houston County and along the Flint River in the southwestern part of Peach County. The acreage of this association totals about 1 percent of the two counties.

The Chastain soils make up about 50 percent of the association; the Leaf soils, about 35 percent; and Swamp, slightly less than 15 percent. Around the outer edges of Swamp are small areas of Alluvial land, wet.

The soils in this association formed in recent alluvium, and most of the areas receive a thin deposit of fresh soil material each time they are flooded. The Chastain soils occupy the highest and better drained positions in the association. They are somewhat poorly drained and commonly have a thick surface layer of reddish-brown silty clay loam or silty clay. Their subsoil is dark grayish-brown silty clay or clay mottled with pale olive, gray, and dark yellowish brown. The poorly drained Leaf soils generally occur on the outer edge of flood plains and are adjacent to soils on uplands. The Leaf soils commonly have a surface layer of very dark grayish-brown silty clay loam and a subsoil of gray to light-gray clay that is highly mottled with yellowish brown and yellowish red.

Swamp is in the lowest, most poorly drained parts of the association. It is likely to be flooded frequently and to remain covered with water for long periods. The soil material is highly variable. It is mixed alluvium that recently washed from upland soils and has not been in place long enough for distinct horizons to form. This material changes with each flood.

Because the soils in this association are subject to flooding, they are not used for cultivated crops or pasture. The entire acreage is wooded. The dominant trees are hardwoods and pines, but the kinds of trees in a given area are determined largely by the degree of wetness or by the way the woodland has been managed. These soils provide excellent habitat for wildlife.

The farms in the association are large and are used entirely for the production of wood products. Most of them are privately owned, but several large tracts are owned by large paper companies.

Because flooding is frequent and the water table is seasonally high, the soils in this association have severe limitations for industrial and community development and for most recreational facilities. Hunting and fishing, however, are good. Limitations to use for highways, airports, or similar structures are severe.

Descriptions of the Soils

In this section each soil series (group of soils) represented in Houston and Peach Counties is described in alphabetic order, and each series is followed by descriptions of the soils in the series. These descriptions are for the soils that were mapped in the counties and that are shown on the large map at the back of the survey. In alphabetic order with the series, the miscellaneous land types (not true soils) in the counties are also described. The approximate acreage and proportionate extent of the soils and land types are given in table 1.

The description of each soil series includes, in fine print, a profile typical of the series. A profile is a record of what the soil scientist saw when he dug into the ground. Those who want only a working knowledge of the soils can omit reading the fine print. But reading the large print of the series description should not be omitted, because it tells about important characteristics common to all the soils in the series but not included in the descriptions of the single soils.

In describing the soils, the scientist frequently assigns a letter symbol, for example, "A1," to the various horizons. These symbols have a special meaning that concerns scientists and others who make a detailed study of soils. Most readers need to remember only that all symbols beginning with "A" refer to the surface soil and subsurface soil; those beginning with "B" refer to the subsoil; and those beginning with "C" refer to the substratum, or parent material. It may be helpful to remember that the small letter "p" indicates a plowed layer and that the small letter "t" indicates an accumulation of clay.

Soil scientists use Munsell notations to indicate the color of a soil precisely, and they provide an equivalent term in words for those not familiar with the Munsell system, for example, "dark brown (10YR 2/3)." Terms such as "fine sandy loam" are used to describe the texture of the soil, which is the content of sand, silt, and clay. The words "weak, fine, granular" and similar words describe kinds of structure, or the way the individual soil particles are arranged in larger grains, or aggregates, and the amount of pore space between the grains. Consistence is described by words such as "hard when dry, friable when moist, plastic when wet." If the degree of wetness is not given, the consistence is for a moist soil.

These and other terms are defined in the Glossary at the back of this report and in the "Soil Survey Manual" (*11*)[1]

Alluvial Land

Alluvial land, wet (0 to 2 percent slopes) (Avp) is made up of poorly drained or very poorly drained, very strongly acid soil material that occurs in drainageways and on flood plains along the larger streams throughout Houston and Peach Counties. The soil material was recently washed from surrounding soils on uplands. It is highly stratified and is constantly changing as new material is deposited or removed by the frequent floods. Water completely covers this land type for long periods during winter.

The soil material is highly variable. A surface layer of dark grayish-brown to black sandy loam or loamy sand, of reddish-brown silt loam or silty clay loam, and of dark-brown silty clay have been seen in a short distance. Underlying the surface layer is light-gray sand or loamy sand interbedded with thin layers of sandy clay loam or of sandy clay and clay. The older soil material generally is at a depth of 2 to 3 feet.

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[1] Italic numbers in parentheses refer to "Literature Cited," p. 71.

TABLE 1.—*Approximate acreage and proportionate extent of soils mapped*

Soil	Houston County		Peach County		Total
	Acres	*Percent*	*Acres*	*Percent*	*Acres*
Alluvial land, wet	22, 195	9. 2	7, 685	8. 0	29, 880
Boswell-Susquehanna-Oktibbeha complex, 2 to 5 percent slopes, eroded	4, 145	1. 7	0	0	4, 145
Boswell-Susquehanna-Oktibbeha complex, 5 to 12 percent slopes, eroded	6, 470	2. 7	0	0	6, 470
Boswell-Susquehanna-Oktibbeha complex, 5 to 12 percent slopes, severely eroded	950	. 4	0	0	950
Chastain and Leaf soils	7, 290	3. 0	820	. 8	8, 110
Faceville fine sandy loam, 0 to 2 percent slopes	13, 110	5. 4	5, 410	5. 6	18, 520
Faceville fine sandy loam, 2 to 5 percent slopes	18, 315	7. 6	7, 410	7. 7	25, 725
Faceville fine sandy loam, 2 to 5 percent slopes, eroded	13, 095	5. 4	6, 040	6. 3	19, 135
Faceville fine sandy loam, 5 to 8 percent slopes, eroded	6, 580	2. 7	3, 325	3. 4	9, 905
Faceville fine sandy loam, 8 to 12 percent slopes	565	. 2	0	0	565
Faceville sandy clay loam, 2 to 5 percent slopes, severely eroded	345	. 1	340	. 4	685
Faceville sandy clay loam, 5 to 8 percent slopes, severely eroded	1, 405	. 6	600	. 6	2, 005
Faceville sandy clay loam, 8 to 12 percent slopes, severely eroded	170	(1)	425	. 4	595
Grady clay loam	1, 410	. 6	785	. 8	2, 195
Grady soils	2, 985	1. 2	775	. 8	3, 760
Greenville clay loam, 2 to 5 percent slopes, severely eroded	995	. 4	460	. 5	1, 455
Greenville clay loam, 5 to 8 percent slopes, severely eroded	3, 540	1. 5	630	. 7	4, 170
Greenville clay loam, 8 to 12 percent slopes, severely eroded	7, 040	2. 9	2, 025	2. 1	9, 065
Greenville fine sandy loam, 0 to 2 percent slopes	4, 200	1. 7	2, 250	2. 3	6, 450
Greenville fine sandy loam, 2 to 5 percent slopes	3, 105	1. 3	2, 005	2. 1	5, 110
Greenville fine sandy loam, 2 to 5 percent slopes, eroded	3, 425	1. 4	2, 500	2. 6	5, 925
Greenville fine sandy loam, 5 to 8 percent slopes, eroded	1, 845	. 8	1, 205	1. 2	3, 050
Greenville fine sandy loam, 8 to 12 percent slopes, eroded	175	(1)	500	. 5	675
Greenville sandy clay loam, 0 to 2 percent slopes	415	. 2	215	. 2	630
Gullied land	50	(1)	20	(1)	70
Henderson cherty sandy loam, 2 to 5 percent slopes, eroded	320	. 1	0	0	320
Henderson cherty sandy loam, 5 to 8 percent slopes, eroded	1, 150	. 5	0	0	1, 150
Henderson cherty sandy loam, 8 to 12 percent slopes, eroded	525	. 2	0	0	525
Hoffman-Vaucluse complex, 12 to 30 percent slopes, eroded	2, 220	. 9	1, 710	1. 8	3, 930
Lakeland fine sand, 0 to 5 percent slopes	2, 460	1. 0	1, 230	1. 3	3, 690
Lakeland fine sand, 5 to 12 percent slopes	7, 445	3. 1	3, 450	3. 6	10, 895
Local alluvial land	6, 080	2. 5	2, 640	2. 7	8, 720
Lucy sand, 0 to 5 percent slopes	12, 900	5. 3	5, 205	5. 4	18, 105
Lucy sand, 5 to 8 percent slopes	5, 265	2. 2	2, 560	2. 6	7, 825
Lucy sand, 8 to 12 percent slopes	3, 130	1. 3	1, 110	1. 1	4, 240
Lynchburg loamy sand, 0 to 3 percent slopes	900	. 4	120	. 1	1, 020
Mine pits and dumps	340	. 1	0	0	340
Norfolk loamy fine sand, 0 to 2 percent slopes	2, 105	. 9	1, 050	1. 1	3, 155
Norfolk loamy fine sand, 2 to 5 percent slopes	13, 235	5. 5	5, 230	5. 4	18, 465
Norfolk loamy fine sand, 2 to 5 percent slopes, eroded	3, 120	1. 3	1, 835	1. 9	4, 955
Norfolk loamy fine sand, 5 to 8 percent slopes, eroded	1, 485	. 6	920	1. 0	2, 405
Orangeburg loamy fine sand, 0 to 2 percent slopes	1, 250	. 5	1, 055	1. 1	2, 305
Orangeburg loamy fine sand, 2 to 5 percent slopes	12, 875	5. 3	5, 220	5. 4	18, 095
Orangeburg loamy fine sand, 2 to 5 percent slopes, eroded	7, 610	3. 1	3, 360	3. 5	10, 970
Orangeburg loamy fine sand, 5 to 8 percent slopes	550	. 2	320	. 3	870
Orangeburg loamy fine sand, 5 to 8 percent slopes, eroded	4, 095	1. 7	2, 120	2. 2	6, 215
Orangeburg loamy fine sand, 8 to 12 percent slopes, eroded	2, 250	. 9	1, 250	1. 3	3, 500
Orangeburg sandy loam, 2 to 5 percent slopes, severely eroded	755	. 3	325	. 3	1, 080
Orangeburg sandy loam, 5 to 8 percent slopes, severely eroded	4, 610	1. 9	2, 330	2. 4	6, 940
Orangeburg sandy loam, 8 to 12 percent slopes, severely eroded	4, 970	2. 0	2, 550	2. 6	7, 520
Red Bay fine sandy loam, 0 to 2 percent slopes	2, 325	1. 0	1, 055	1. 1	3, 380
Red Bay fine sandy loam, 2 to 5 percent slopes	710	. 3	0	0	710
Sumter clay loam, 2 to 8 percent slopes, eroded	645	. 3	0	0	645
Swamp	3, 425	1. 4	340	. 4	3, 765
Vaucluse-Hoffman complex, 2 to 8 percent slopes, eroded	2, 060	. 8	1, 005	1. 1	3, 065
Vaucluse-Hoffman complex, 8 to 12 percent slopes, eroded	7, 930	3. 3	3, 225	3. 3	11, 155
Total	242, 560	100. 0	96, 640	100. 0	339, 200

[1] Less than 0.1 percent.

Because this land type has been wet for a long period, much plant debris has accumulated on the surface in most places. If this land type is drained, however, the accumulated debris quickly decays.

This land type is not used for cultivated crops. If it is cleared of trees, is drained, and flooding is controlled, fair pasture can be produced. Generally, however, trees are a better use. Farm ponds can be constructed in most places where drainageways are narrow and the soil material on the adjacent side slopes is suitable.

236-410—67——2

Boswell Series

The Boswell series consists of moderately well drained, strongly acid soils that formed in noncalcareous clay and sandy clay sediments on the Coastal Plain uplands. Slopes range from 2 to 12 percent. These soils have a surface layer of dark reddish-brown to dark-brown fine sandy loam or sandy clay loam and a red clay subsoil that is highly mottled in the lower part. Natural fertility and the content of organic matter are low.

Profile of a soil representative of the Boswell series (in Houston County on the north side of a dirt road, approximately 1½ miles east of junction of the road and State Route 247, south of Kathleen; in wooded area):

Ap—0 to 3 inches, dark reddish-brown (5YR 3/3) sandy clay loam; weak, fine, granular structure; friable; some organic matter; numerous fine roots; strongly acid; mixed with material from A3 and B1t horizons; clear, smooth boundary; 2 to 5 inches thick.

A3—3 to 6 inches, reddish-brown (5YR 4/4) sandy clay loam; weak, fine, granular structure; friable; numerous fine roots; some material from Ap horizon; strongly acid; gradual, wavy boundary; 2 to 4 inches thick.

B1t—6 to 8 inches, yellowish-red (5YR 4/6) sandy clay; weak, medium, subangular blocky structure; firm when moist, hard when dry; many fine roots; some material from upper horizons in root channels and pores; strongly acid; clear, smooth boundary; 2 to 4 inches thick.

B21t—8 to 18 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; firm when moist, sticky when wet; few clay films on ped faces; few fine roots, root channels, and pores; strongly acid; gradual, wavy boundary; 6 to 10 inches thick.

B22t—18 to 24 inches, dark-red (10R 3/6) clay; few, fine, distinct mottles of light brownish gray (10YR 6/2); weak, medium, subangular blocky structure when wet, massive when dry; very firm when moist, very hard when dry, very sticky when wet; few fine roots; very strongly acid; gradual, wavy boundary; 4 to 8 inches thick.

B23t—24 to 60 inches +, red (2.5YR 4/6) clay; many, medium, prominent mottles of reddish brown (5YR 5/4), light gray (10YR 6/1), and light olive gray (5Y 6/2); weak, medium, subangular blocky structure when wet, massive when dry; extremely firm when moist, very hard when dry, and very sticky when wet; a few patchy clay films on faces of root channels; few fine roots; very strongly acid.

In these counties, Boswell soils occur with Susquehanna and Oktibbeha soils in such an intricate pattern that the three soils are mapped together as soil complexes. The Boswell soils resemble the Oktibbeha soils but are acid throughout, whereas the Oktibbeha soils are alkaline in the lower part of the profiles. Boswell soils are similar to the Susquehanna soils in texture but are better drained and are red and free of mottles in the upper part of the subsoil. A profile typical of the Susquehanna soil and of the Oktibbeha soil is described in this report under the respective series.

In the area mapped, Boswell soils occur only in the Black Belt of Houston County. The native vegetation consists chiefly of mixed pines and hardwoods. In sloping areas, surface runoff is very rapid and the erosion hazard is very severe. Because their root zone is thin and tilth is generally poor, these soils normally are not used for cultivated crops. They are better suited to pasture or trees.

Boswell-Susquehanna-Oktibbeha complex, 2 to 5 percent slopes, eroded (BrB2).—This complex consists of moderately well drained and somewhat poorly drained Boswell, Susquehanna, and Oktibbeha soils on gently sloping uplands. These soils occur in the Black Belt of Houston County and are closely intermingled in such intricate patterns that it is not practical to separate them on the soil map.

The Boswell soils make up about 40 percent of the complex; the Susquehanna soils, about 30 percent; the Oktibbeha soils, about 20 percent; and other soils, the remaining 10 percent. Some areas consist only of the Boswell soil, some consist only of the Susquehanna soil, and some consist only of the Oktibbeha soil. Most areas, however, contain all three soils.

The surface layer of the soils in this complex is fine sandy loam or sandy loam in most places. In the more eroded areas, however, the clay subsoil is exposed. The surface layer ranges from dark reddish brown to dark gray and very dark gray.

The Boswell soils have a red, very firm clay subsoil that is free of mottles in the upper part and is underlain by extremely firm, plastic, highly mottled clay. These soils are strongly acid throughout. The subsoil of the Susquehanna soils is highly mottled red, gray, yellowish-brown, and reddish-brown, extremely firm clay. These soils are strongly acid throughout. Oktibbeha soils have a red, very firm, acid clay subsoil that generally extends to a depth of about 24 inches and is generally underlain by calcareous marly clay.

In places the B horizon of the Oktibbeha soils is only 6 to 12 inches thick. Depth to calcareous material is as much as 48 inches, but generally the range is 20 to 25 inches.

On the soils in this complex, surface runoff is rapid and erosion is a severe hazard. These soils are low in natural fertility, and they contain small amounts of organic matter. They are generally strongly acid, but the Oktibbeha soils are alkaline in the lower part of the profile. Water moves into and through these soils at a slow rate, and the available water capacity is moderate. Tilth is generally poor. In wet periods these soils are very plastic, and they swell. In dry periods they are extremely hard, and they tend to shrink and crack. The water table fluctuates and seasonally is within 30 to 60 inches of the surface for 1 or 2 months each year.

These soils are difficult to till, have a thin root zone, and generally are not used for cultivated crops. They are better suited to trees, though fair pasture can be produced under good management.

Boswell-Susquehanna-Oktibbeha complex, 5 to 12 percent slopes, eroded (BrD2).—This complex consists of moderately well drained and somewhat poorly drained, clayey soils on short, choppy and uneven slopes adjacent to streams and drainageways. The Boswell, Susquehanna, and Oktibbeha soils occur together in the Black Belt of Houston County and are closely intermingled in such intricate patterns that it is not practical to map them separately.

The Boswell soils make up about 40 percent of the complex; the Susquehanna soils, about 30 percent; the Oktibbeha soils, about 20 percent; and other soils, the remaining 10 percent.

The soils in this complex have a fine sandy loam, sandy clay loam, or sandy clay surface layer 3 to 5 inches thick. In the more eroded areas their clay subsoil is exposed.

The Boswell soils are strongly acid and moderately well drained. They have a dark reddish-brown to dark-brown surface layer. Their subsoil is red, very firm, plastic clay in the upper 6 to 10 inches, and below this is highly mottled, extremely firm, dense clay. The Susquehanna soils have a dark-brown to dark grayish-brown surface layer. Their subsoil is highly mottled red, gray, or reddish-brown, extremely firm, dense clay. The mottles occur directly under the surface layer and increase with depth. The Susquehanna soils are somewhat poorly drained and are strongly acid. The Oktibbeha soils are similar to the

Boswell soils but, at a depth of about 20 to 26 inches, are underlain by moderately alkaline, calcareous marly material.

The soils of this complex are low in natural fertility and in organic-matter content. Surface runoff is very rapid, and the erosion hazard is very severe. Water moves through these soils very slowly, and the available water capacity is moderate. Tilth is generally poor, and the root zone is too thin for many kinds of cultivated crops. The water table is within 30 to 60 inches of the surface for 1 or 2 months each year.

These soils are not suited to cultivated crops. They are better suited to trees, but they can be used for pasture if grazing is limited and the pasture is otherwise well managed.

Boswell-Susquehanna-Oktibbeha complex, 5 to 12 percent slopes, severely eroded (BrD3).—This complex consists of moderately well drained and somewhat poorly drained, clayey soils on short, choppy and uneven slopes of the uplands. These soils are in the Black Belt of Houston County and occur in such intricate patterns on the landscape that it is not practical to separate them on the soil map.

The Boswell soils make up about 40 percent of the complex; the Susquehanna soils, about 30 percent; the Oktibbeha soils, about 20 percent; and other soils, the remaining 10 percent.

The soils in this complex have a surface layer that is variable in color and texture and consists mostly of subsoil material. In some less severely eroded areas, however, the surface layer is a mixture of the original surface soil and the upper part of the subsoil. Shallow gullies, rills, and gall spots are common.

The Boswell soils are moderately well drained. The upper 6 to 10 inches of their subsoil is red, very firm, dense clay that is underlain by extremely firm, plastic, highly mottled clay. These soils are strongly acid throughout. The Susquehanna soils are somewhat poorly drained and are strongly acid. Their subsoil is highly mottled red, gray, and reddish-brown, extremely firm, plastic clay. The Oktibbeha soils have a red, very firm, plastic, acid clay subsoil that extends to a depth of about 20 to 26 inches and is underlain by moderately alkaline, calcareous marly material.

The soils in this complex are very low in natural fertility and in organic-matter content. Surface runoff is very rapid, and the erosion hazard is very severe. Water moves into and through these soils very slowly, and the available water capacity is moderate. The root zone is too thin to accommodate many kinds of crops, and tilth is generally poor. The water table fluctuates and is within 30 to 60 inches of the surface for 1 or 2 months each year.

The soils in this complex are not suited to cultivated crops. They are better suited to trees, though under good management they can provide limited grazing.

Chastain Series

The Chastain series consists of poorly drained soils on flood plains. These soils have a surface layer of reddish-brown silty clay loam that is 1 to 12 inches thick and consists of recent overwash. The subsoil is dark grayish-brown silty clay or clay that is highly mottled with pale olive, dark yellowish brown, and strong brown in the lower part. Chastain soils are moderately low in natural fertility, contain medium to small amounts of organic matter, and are very strongly acid.

Profile of a soil representative of the Chastain series (in Houston County on south side of State Route 96 in a wooded area just west of bridge crossing the Ocmulgee River):

A1—0 to 9 inches, reddish-brown (5YR 4/4) silty clay to silty clay loam; moderate, medium, subangular blocky structure; friable; few, fine, faint mottles of light gray (10YR 6/1) in lower part; many large and small roots and pores; very strongly acid; gradual, wavy boundary; 1 to 12 inches thick.

B1—9 to 25 inches, grayish-brown (2.5Y 5/2) silty clay; many, fine, distinct mottles of pale olive (5Y 6/3); weak, medium, subangular blocky structure; friable; few soft black concretions; numerous pores filled with material from the A1 horizon; very strongly acid; gradual, wavy boundary; 8 to 16 inches thick.

B2—25 to 36 inches, mottled light olive-gray (5Y 6/2) and dark yellowish-brown (10YR 4/4) silty clay; weak, medium, subangular blocky structure; friable; few black specks; very strongly acid; gradual, wavy boundary; 8 to 14 inches thick.

C—36 to 50 inches +, mottled light olive-gray (5Y 6/2), dark yellowish-brown (10YR 4/4), and strong-brown (7.5YR 5/6) clay; massive; firm when moist, sticky when wet; very strongly acid.

Chastain soils occur with the Leaf soils but occupy higher positions on the flood plain. In Houston and Peach Counties, Chastain soils are mapped only in an undifferentiated unit with the Leaf soils. A profile typical of the Leaf soil is described in this report under the Leaf series.

The Chastain soils are subject to overflow and are covered by water for long periods. The native vegetation consists chiefly of water oak, sweetgum, blackgum, and a few scattered pines. These soils are not used for cultivated crops or pasture. All of the acreage is woodland in which the principal trees are low-grade hardwoods and a few scattered pines.

Chastain and Leaf soils (0 to 2 percent slopes) (Cls).—This mapping unit consists of Chastain and Leaf soils that occur in intricate patterns on flood plains along the Ocmulgee River in Houston County and the Flint River in Peach County. These soils are poorly drained.

The Chastain soil makes up about 60 percent of each mapped area; the Leaf soil, about 30 percent; and other soils, the remaining 10 percent.

The surface layer of the Chastain soil is recent reddish-brown overwash material that ranges from silty clay loam to silt loam. Near the stream channels this layer is commonly sandier than it is elsewhere. Flooding is frequent, and the floods last for long periods in winter.

The Leaf soil has a silty clay loam surface layer that ranges from dark grayish brown to grayish brown, or to dark reddish brown in spots. On the surface in many places there is a thin layer of material that has been washed in recently.

The Chastain and Leaf soils are moderately low to low in natural fertility, contain small to medium amounts of organic matter, and are very strongly acid. The water table is within 15 inches of the surface for more than 2 months each year.

These soils are not used for cultivated crops, but they can be used as woodland and for pasture on which grazing is limited.

Faceville Series

The Faceville series consists of deep, friable, well-drained soils of the Coastal Plain uplands. These soils developed over thick beds of unconsolidated sandy clay and clay. Slopes range from 0 to 12 percent. In uneroded areas, the surface layer commonly is brown to dark grayish-brown fine sandy loam, and the subsoil is red to yellowish-red sandy clay. The subsoil extends to a depth of more than 60 inches. These soils are moderate to low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid.

Profile of a soil representative of the Faceville series (in Peach County approximately 1¼ miles north of airport farm, ¾ mile north of paved county road, and ¼ mile east of field road; in a cultivated field) (for laboratory data refer to site 2 in table 11):

Ap—0 to 9 inches, brown to dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; abundant roots; many fine root channels and pores; strongly acid; abrupt, smooth boundary; 6 to 10 inches thick.

B21t—9 to 15 inches, red (2.5YR 4/6) sandy clay loam to sandy clay; weak, medium, subangular blocky structure; friable; some material from Ap horizon; common roots, root channels, and pores; strongly acid; gradual, smooth boundary; 5 to 12 inches thick.

B22t—15 to 41 inches, red (2.5YR 4/8) sandy clay; weak, medium, subangular blocky structure; friable or firm when moist, hard when dry; some material from upper horizons in root channels and pores; many fine roots and root channels; strongly acid; clear, smooth boundary; 15 to 30 inches thick.

B23t—41 to 50 inches, red (2.5YR 4/6) sandy clay; common, medium, distinct mottles of yellowish brown (10YR 5/8) and pale brown (10YR 6/3); weak, medium, subangular blocky structure; firm; few patchy clay films on ped faces; few fine roots; strongly acid; clear, smooth boundary; 8 to 16 inches thick.

B24t—50 to 84 inches, red (2.5YR 4/6) sandy clay to clay; massive in place, breaking to weak, medium, subangular blocky structure under pressure; friable when moist, hard when dry; few patchy clay films on ped faces; strongly acid.

The Faceville soils commonly occur with the Greenville, Red Bay, Orangeburg, and Norfolk soils. They are generally less red in the subsoil than Greenville and Red Bay soils and are finer textured in the subsoil than the Red Bay soils. The Faceville soils resemble the Orangeburg soils in color but contain more clay in the subsoil. In contrast with the Norfolk soils, Faceville soils have a redder subsoil and are finer textured in both the surface layer and subsoil.

The Faceville soils are extensive in Houston and Peach Counties and are among the better soils for farming. Most of the acreage is cultivated or pastured. The native vegetation consists chiefly of mixed pines and hardwoods. These soils are suited to most crops commonly grown in the area, and to peaches and pecans. Also, they produce good trees and pasture.

Faceville fine sandy loam, 0 to 2 percent slopes (FoA).—This deep, well-drained soil is on uplands. It is the soil described for the series. Its surface layer ranges from brown to dark grayish brown and dark brown. The subsoil is predominantly yellowish red or red but ranges to dark red in some places. Included in areas mapped as this soil are small areas that have a loamy fine sand or sandy loam surface layer. In some areas, the subsoil has only a few mottles.

This soil is medium acid to strongly acid, is low to moderate in natural fertility, and contains small amounts of organic matter. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. The depth to the water table is more than 5 feet. Tilth is generally good, and the root zone is thick.

This soil is suited to most crops commonly grown in the area, and crops on it respond well to good management. The main crops are cotton, corn, small grain, soybeans, and peanuts. This soil is also suited to peaches, pecans, pasture, and hay.

Faceville fine sandy loam, 2 to 5 percent slopes (FoB).—This deep, friable, well-drained soil is on uplands. The surface layer is dark grayish-brown fine sandy loam 4 to 7 inches thick. Beneath this layer, and extending to a depth of more than 60 inches, is yellowish-red to red, friable sandy clay that has moderate subangular blocky structure.

This soil is low to moderate in natural fertility, is low in organic-matter content, and is medium acid to strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. The depth to the water table is more than 5 feet. Tilth generally is good, and the root zone is thick.

This soil can be safely cultivated, but moderate conservation practices should be used to control erosion. Most locally grown crops, including peaches and pecans, are suited. Also suited are pasture plants and pine trees.

Faceville fine sandy loam, 2 to 5 percent slopes, eroded (FoB2).—This friable, well-drained soil is on uplands. The surface layer is grayish-brown fine sandy loam 2 to 4 inches thick. The subsoil, to a depth of 60 inches or more, is yellowish-red to red, friable sandy clay that has moderate subangular blocky structure. Included in places mapped as this soil are some severely eroded areas that have a yellowish-red sandy clay loam surface layer. A few shallow gullies and rills are in many areas.

This soil is medium acid to strongly acid, is low to moderate in natural fertility, and contains small amounts of organic matter. Permeability and available water capacity are moderate. The depth to the water table is more than 5 feet. Tilth is generally good, and the root zone is thick.

This soil is suited to most crops commonly grown in the area, but erosion is a moderate hazard. Most of the acreage is in tilled crops or orchards. In recent years, however, the acreage in pasture has increased.

Faceville fine sandy loam, 5 to 8 percent slopes, eroded (FoC2).—This deep, well-drained soil is on uplands. It is dark grayish-brown fine sandy loam in the uppermost 3 to 5 inches. The subsoil is yellowish-red to red, friable sandy clay that has moderate subangular blocky structure. Included in areas mapped as this soil are some severely eroded areas that have a yellowish-red sandy clay loam surface layer. A few shallow gullies and rills are in many areas.

This soil is low to moderate in natural fertility, contains a small amount of organic matter, and is medium acid to strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. The depth to the water table is more than 5 feet. Tilth is generally good, and the root zone is thick.

This soil is suited to most locally grown crops, but runoff is rapid enough to create a severe hazard of erosion. A considerable acreage is in pasture and pine trees.

Faceville fine sandy loam, 8 to 12 percent slopes (FoD).—This deep, well-drained soil is on sloping uplands. It is dark grayish-brown fine sandy loam in the uppermost 3 to 5 inches. The subsoil is yellowish-red, friable sandy clay that has moderate subangular blocky structure. Included in places mapped as this soil are severely eroded areas that have a yellowish-red sandy clay loam surface layer. A few shallow gullies and rills are in many areas.

This soil has low to moderate natural fertility, contains little organic matter, and is medium acid to strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. The depth to the water table is more than 5 feet. Tilth generally is good, and the root zone is thick.

This soil is suited to most locally grown crops, but runoff is rapid enough to create a severe hazard of erosion. A considerable acreage is used for pasture and pine trees, for which this soil is suited.

Faceville sandy clay loam, 2 to 5 percent slopes, severely eroded (FtB3).—This deep, well-drained soil is on very gently sloping uplands. The plow layer of yellowish-red sandy clay loam consists mostly of subsoil material, but in some places it contains a considerable amount of the original surface soil. The subsoil is yellowish-red to red sandy clay that has moderate subangular blocky structure. Included in areas mapped as this soil are patches that are not severely eroded. Small gullies, rills, and gall spots are common.

This soil is low in natural fertility and organic-matter content. It is medium acid to strongly acid. Tilth is generally poor. The root zone is thick. Water moves into the soil at a moderate rate, and the available water capacity is moderate. The depth to the water table is more than 5 feet. Runoff is rapid enough to create a severe hazard of erosion.

This soil is suited to most crops commonly grown in the area, but yields are only fair. Fair pasture can be produced under good management, but trees generally are better suited.

Faceville sandy clay loam, 5 to 8 percent slopes, severely eroded (FtC3).—This is a deep, well-drained soil on uplands. Its plow layer of yellowish-red sandy clay loam consists of remnants of the original surface soil mixed with material from the subsoil. The subsoil is yellowish-red to red sandy clay that has moderate subangular blocky structure. In many areas the subsoil is exposed at the surface, and many small gullies and rills have formed (fig. 5).

This soil is low in natural fertility and organic-matter content. It is medium acid to strongly acid. Tilth is generally poor; the root zone is thick. Water moves into the soil at a moderate rate, and the available water capacity is moderate to low. The depth to the water table is more than 5 feet. Runoff is rapid enough to create a severe hazard of erosion.

This soil is suited to most crops commonly grown in the area, though it is better suited to pasture or pine trees. Crop yields are only fair.

Faceville sandy clay loam, 8 to 12 percent slopes, severely eroded (FtD3).—This is a deep, well-drained soil on sloping uplands. The plow layer of yellowish-red sandy clay loam is mostly subsoil material, but in places it contains a considerable amount of the original surface soil. The subsoil is yellowish-red to red sandy clay that has moderate subangular blocky structure. Small gullies, rills, and gall spots are common. A few gullies are deep. Included in mapped areas are a few patches that are not severely eroded.

***Figure 5.*—Pasture on Faceville sandy clay loam, 5 to 8 percent slopes, severely eroded. Erosion is a very severe hazard on this soil.**

This soil is low in natural fertility and organic-matter content. It is medium acid to strongly acid. Tilth is generally poor, and the root zone is thick. The depth to the water table is more than 5 feet. Water moves into the soil at a moderate rate, and the available water capacity is moderate to low. Because slopes are strong and runoff is rapid, erosion is a very severe hazard.

This soil is not suited to cultivated crops. A few areas are in pasture, but most areas are in pine trees, for which this soil is better suited.

Grady Series

The Grady series consists of poorly drained or very poorly drained soils of the Coastal Plain uplands. These soils are in low, saucerlike depressions and sinks, where they developed over thin beds of unconsolidated, acid sandy loam and clay. Slopes range from 0 to 2 percent. In many places the surface layer is black to very dark-gray clay loam to sandy loam, and the subsoil is light-gray clay. Distinct and prominent mottles occur at a depth of 30 to 40 inches. These soils are low to moderate in natural fertility and organic-matter content and are very strongly acid.

Profile of a soil representative of the Grady series (in Houston County, approximately one-fourth mile east of U.S. Highway No. 41 on south side of Centerville road) (for laboratory data, refer to site 4 in table 11):

Ap—0 to 6 inches, black (10YR 2/1) to very dark gray (10YR 3/1) clay loam; weak or moderate, fine, granular structure; friable when moist, slightly hard when dry; numerous fine and medium roots; very strongly acid; abrupt, smooth boundary; 6 to 10 inches thick.

B21tg—6 to 11 inches, gray (5Y 6/1) to light-gray (N 7/0) clay; weak, medium, subangular blocky structure; firm when moist, hard when dry, sticky when wet; material from Ap horizon in root channels and pores; many fine roots; very strongly acid; gradual, smooth boundary; 4 to 10 inches thick.

B22tg—11 to 39 inches, light-gray (N 7/0) clay; weak, medium, subangular blocky structure; very firm when moist, very hard when dry, very sticky when wet; material from upper horizons in root channels and pores; very strongly acid; gradual, wavy boundary; 10 to 20 inches thick.

B23tg—39 to 45 inches, gray (N 6/0) clay; common, medium, prominent mottles of light yellowish brown (10YR 6/4), yellowish brown (10YR 5/8), and red (2.5YR 4/6); weak, medium, subangular blocky structure; very firm when moist, very hard when dry, very sticky when wet; few fine roots; very strongly acid; gradual, wavy boundary; 4 to 8 inches thick.

B24tg—45 to 50 inches +, light-gray (N 7/0) sandy clay loam containing almost white pockets of sandy loam and fine sand; massive, breaking to weak, fine, subangular blocky structure; friable when moist, hard when dry, slightly sticky when wet; very strongly acid.

The Grady soils commonly occur with the Faceville, Greenville, Orangeburg, and Norfolk soils but are in saucerlike depressions and sinks and are not so well drained as those soils. The subsoil of the Grady soils is finer textured than that of the associated soils, and their surface layer generally contains more organic matter.

These soils occupy a small total acreage that is fairly well distributed throughout Houston and Peach Counties. The native vegetation is chiefly scattered pines, and there are a few cypress, sweetgum, and other low-grade hardwoods. The understory is generally gallberry, myrtle, and wiregrass. Many of the wetter areas are idle or in native grasses, vines, and shrubs. Because the Grady soils are poorly drained, they are not well suited to cultivated crops. Most of the acreage is idle or is wooded.

Grady clay loam (0 to 2 percent slopes) (Gcl).—This is the soil described for the series. It occurs in depressions and sinks and is very poorly drained. Its clay loam surface layer ranges from dark gray to black.

Included in areas mapped as this soil are areas that have a fine sandy loam or sandy clay loam surface layer. Also included are areas where the surface is covered with several inches of soil material that washed from surrounding uplands and is variable in texture.

Grady clay loam is very strongly acid, is low to moderate in natural fertility, and contains small to medium amounts of organic matter. Water moves into and through the soil at a very slow rate, and the available water capacity is high. The water table is at a depth of less than 15 inches for more than 2 months each year, and water commonly stands on the surface for long periods during wet weather.

Most of this soil is woodland, but drained areas can be used for pasture. The only outlets available for water are underground, and the cost of drainage is high.

Grady soils (0 to 2 percent slopes) (Grd).—These poorly drained soils are in depressions and sinks. Their surface layer commonly is fine sandy loam, sandy loam, or sandy clay loam and ranges from dark gray to black. In many places the surface layer is alluvium, less than 18 inches thick, that has washed from surrounding soils on uplands. Generally, the finer textured surface material occurs in the lower positions, or at the center of depressions, and is wetter than the coarser textured material at the rim. The subsoil is firm clay and is generally mottled in the lower part.

These soils are low to moderate in natural fertility, contain small to medium amounts of organic matter, and are very strongly acid. Water moves into and through these soils slowly or very slowly, and the available water capacity is high. The water table is at a depth of less than 15 inches for more than 2 months each year, and water covers the surface for long periods during wet weather.

Most of the acreage is in native pasture or is wooded. Drained areas can be cultivated from time to time, but suitable crops are limited. Very little of the acreage is drained because these soils are in small areas and the cost of drainage is high.

Greenville Series

The Greenville series consists of deep, friable, well-drained soils of the Coastal Plain uplands. These soils developed in thick beds of sandy loam, sandy clay loam, and sandy clay that overlie siliceous limestone in places. Slopes range from 0 to 12 percent. In uneroded areas these soils have a surface layer of dark-brown to dark reddish-brown fine sandy loam and a subsoil of dark-red to dusky-red sandy clay or clay. The dark-red color of the subsoil is uniform and generally extends to a depth of more than 8 feet. In the more eroded areas the surface layer is redder and finer textured than that in the soils described. Greenville soils are moderate to low in natural fertility, low in organic-matter content, and medium acid to strongly acid.

Profile of a soil representative of the Greenville series (in Peach County half a mile east of railroad crossing on south side of State Route 96 across from Shiloh Church at the eastern city limits of Fort Valley) (for laboratory data, refer to site 6 in table 11):

Ap—0 to 7 inches, dark-brown (7.5YR 3/2) to dark reddish-brown (5YR 3/3) fine sandy loam; weak, fine, granular structure; very friable; numerous fine roots; strongly acid; abrupt, smooth boundary; 6 to 8 inches thick.

B21t—7 to 11 inches, dark-red (2.5YR 3/6) to dark reddish-brown (2.5YR 3/4) sandy clay grading to sandy clay loam; weak, medium, subangular blocky structure; some material from Ap horizon; friable; fine roots, root channels, and pores common; strongly acid; clear, smooth boundary; 3 to 7 inches thick.

B22t—11 to 58 inches, dark-red (2.5YR 3/6) sandy clay; weak, medium, subangular blocky structure; friable; fine roots, root channels, and pores common in upper part; a very few iron and manganese concretions that decrease in number with depth; patchy clay films on ped faces in lower part of horizon; strongly acid; diffuse, smooth boundary; 30 to 60 inches thick.

B23t—58 to 94 inches +, dark-red (2.5YR 3/6) clay; massive, breaking to weak, fine, subangular blocky structure; friable; patchy clay films on ped faces; few fine roots; strongly acid.

The Greenville soils commonly occur with the Red Bay, Faceville, and Orangeburg soils. They closely resemble the Red Bay soils but contain more clay in their surface layer and subsoil. The Greenville soils are similar to the Faceville soils in texture, but they have a darker colored surface layer and a redder subsoil. They have a darker colored surface layer than have the Orangeburg soils, and a redder, finer textured subsoil.

The Greenville soils are very extensive in Houston and Peach Counties. The largest areas are in the northwestern part of Houston County and the central and eastern parts of Peach County. The native vegetation consists of mixed pines and hardwoods, and the understory is native shrubs and grasses. These soils are among the best soils in the two counties for farming. They are suited to most crops grown locally and to peaches and pecans. Crops on these soils respond well to good management. Most of the acreage is used for cultivated crops or pasture, but some of the steeper areas are wooded.

Greenville clay loam, 2 to 5 percent slopes, severely eroded (GpB3).—This severely eroded soil is on uplands and is deep and well drained. The plow layer of dark-red clay loam is mostly subsoil material, but in places it contains a considerable amount of material from the original surface layer. The subsoil extends to a depth of several feet and consists of dark-red, friable to firm sandy clay to clay. Shallow gullies, rills, and gall spots are common.

This soil is low in natural fertility and organic-matter content. It is medium acid or strongly acid. Infiltration and permeability are moderate, and the available water capacity is moderate. Tilth is generally fairly good, the root zone is thick, and the depth to the water table is more than 10 feet.

Because the erosion hazard is severe, this soil is not used extensively for cultivated crops. It is suited to pasture and to trees.

Greenville clay loam, 5 to 8 percent slopes, severely eroded (GpC3).—This deep, well-drained, severely eroded soil is on gently sloping uplands. The plow layer is dark-red to dark reddish-brown clay loam that is mostly subsoil material but in some places contains a considerable amount of the original surface layer. The subsoil extends to a depth of several feet and consists of dark-red sandy clay to clay. Shallow gullies, rills, and gall spots are common.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid or strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. Tilth is generally poor, the root zone is thick, and the water table is at a depth of more than 10 feet. Runoff is rapid enough to create a severe hazard of erosion.

Most of the acreage is in trees, for which the soil is suited. Only a small acreage is used for cultivated crops and pasture.

Greenville clay loam, 8 to 12 percent slopes, severely eroded (GpD3).—This deep, well-drained, severely eroded soil is on sloping uplands. The plow layer is dark-red to dark reddish-brown clay loam, and the subsoil is dark-red sandy clay to clay that has moderate subangular blocky structure. In some areas mapped as this soil, the plow layer is entirely subsoil material, but there are patches where the plow layer is a mixture of the original surface layer and the upper part of the subsoil. Shallow gullies, rills, and gall spots are common.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid or strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. Tilth is generally poor. The root zone is thick, and the water table is at a depth of more than 10 feet. Because slopes are strong and runoff is rapid, erosion is a very severe hazard.

Nearly all of this soil is used to produce wood products. Because of strong slopes and the severe hazard of erosion, only a small acreage is used for pasture.

Greenville fine sandy loam, 0 to 2 percent slopes (GsA).—This is a deep, friable, well-drained soil on uplands. It is the soil described for the series. Its fine sandy loam surface layer ranges from dark brown to dark reddish brown. Included in mapped areas are small areas that have a loamy fine sand, sandy clay loam, or clay loam surface layer.

This soil is moderate to low in natural fertility, contains medium to small amounts of organic matter, and is medium acid or strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. Surface runoff is very slow, and erosion is not a problem. The water table is at a depth of more than 10 feet. The root zone is thick, and tilth generally is good.

This soil is one of the better soils in the two counties for farming. It is suited to most crops commonly grown in this area. The main crops are small grain, corn, cotton, peanuts, soybeans, and truck crops. Crops on this soil respond well to good management. Satisfactory yields of peaches, pecans, and other orchard crops are obtained. Pasture and hay plants and trees, especially pines, also grow well.

Greenville fine sandy loam, 2 to 5 percent slopes (GsB).—This deep, friable, well-drained soil is on very gently sloping uplands. Its surface layer is dark-brown to dark reddish-brown fine sandy loam 4 to 8 inches thick. The subsoil extends to a depth of several feet and consists of dark-red, friable sandy clay to clay. A few small hard, rounded concretions of iron are on the surface in some places.

This soil is moderate to low in natural fertility, low in organic-matter content, and medium acid to strongly acid. Water moves into and through the soil at a moderate rate. Tilth is generally good, and the root zone is thick. The available water capacity is moderate, and the water table is at a depth of more than 10 feet. Runoff is rapid enough to create a moderate hazard of erosion.

This soil is suited to most crops commonly grown in the area. The main crops are small grain, corn, cotton, peanuts, soybeans, truck crops, peaches, and pecans. This soil is also suited to pasture and to pine trees.

Greenville fine sandy loam, 2 to 5 percent slopes, eroded (GsB2).—This deep, friable, well-drained soil is on very gently sloping uplands. The plow layer of dark-brown to dark reddish-brown fine sandy loam is underlain by dark-red, friable sandy clay to clay that extends to a depth of several feet and has subangular blocky structure.

Normally, the plow layer extends into the upper subsoil, but in places it is entirely in the original surface layer. In other places the sandy clay subsoil is exposed. A few shallow gullies and rills have formed in many areas.

This soil is moderate to low in natural fertility, low in organic-matter content, and medium acid to strongly acid. Permeability and the available water capacity are moderate. Tilth is generally good, the root zone is thick, and the water table is at a depth of more than 10 feet. Runoff is rapid enough to create a moderate hazard of erosion.

This soil is suited to most crops commonly grown in the area and is extensively used for small grain, corn, cotton, peanuts, soybeans, and truck crops. It is also suited to peaches, pecans, pasture plants, and trees.

Greenville fine sandy loam, 5 to 8 percent slopes, eroded (GsC2).—This deep, friable, well-drained soil is on gently sloping uplands. Its plow layer of dark-brown to dark reddish-brown fine sandy loam is underlain by dark-red sandy clay to clay that extends to a depth of several feet and has subangular blocky structure. Normally, the plow layer extends into the upper subsoil, but in some places it is entirely in the original surface layer, and in others the subsoil is exposed. A few shallow gullies and rills have formed in some areas.

This soil is moderate to low in natural fertility, low in organic-matter content, and medium acid to strongly acid. Permeability and available water capacity are moderate. Tilth is generally good, the root zone is thick, and the water table is at a depth of more than 10 feet.

This soil is suited to most crops grown locally. Although the erosion hazard is severe, this soil can be safely cultivated if conservation practices are used. Use for pasture or trees generally is more suitable than use for cultivated crops.

Greenville fine sandy loam, 8 to 12 percent slopes, eroded (GsD2).—This deep, friable, well-drained soil is on sloping uplands. Slopes are generally short, choppy, and uneven. The plow layer is dark-brown to dark reddish-brown fine sandy loam. The subsoil is dark-red, friable sandy clay to clay that has moderate subangular blocky structure. The plow layer normally extends into the upper subsoil, but there are some patches where the plow layer is entirely in the original surface layer, and others where the subsoil is exposed. In many places a few shallow gullies and rills have formed.

This soil is low to moderate in natural fertility, low in organic-matter content, and medium acid to strongly acid. Permeability and available water capacity are moderate. Tilth is generally good, the root zone is thick, and the water table is at a depth of more than 10 feet. Because slopes are strong and runoff is rapid, erosion is a very severe hazard.

This soil is better suited to pasture and trees than to cultivated crops, though it can be cultivated occasionally.

Greenville sandy clay loam, 0 to 2 percent slopes (GqA).—This is a deep, well-drained soil on level and nearly level uplands. The surface layer is dark reddish-brown sandy clay loam 6 to 10 inches thick. It is underlaid by dark-red or dusky-red, friable sandy clay that extends to a depth of several feet and has moderate subangular blocky structure.

This soil is medium acid to strongly acid, is low to moderate in natural fertility, and contains small amounts of organic matter. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. This soil is generally in good tilth, has a thick root zone, and has a water table at a depth of more than 10 feet.

This soil is one of the better soils in the area for farming. It is suited to most crops grown locally. Some of the main crops are cotton, corn, peanuts, small grain, and soybeans. Crops respond well to good management. This soil is also suited to peaches, pecans, truck crops, pasture, hay, and trees.

Gullied Land

Gullied land (GuI) consists of areas in which large and small, deep and very deep gullies are interspersed with remnants of uneroded or less eroded soil. It is fairly well distributed throughout the northern part of Houston and Peach Counties, but the total acreage is small. Areas smaller than 3 acres in size are shown on the soil map by the symbol for gullies. Slopes are generally more than 5 percent. The original soil material is generally sandy and highly erosive.

This land type is not suited to crops or pasture (fig. 6), but it may be used for recreational areas or wildlife habitat. Some areas have been seeded to kudzu, and some have reforested naturally. Other areas can be replanted to trees. Keeping all areas in vegetation helps to control runoff and to prevent the silting of streams and lakes. Any kind of vegetation is satisfactory, but trees are preferable where practical.

Henderson Series

The Henderson series consists of well-drained cherty soils of the Coastal Plain uplands. These soils developed from thin beds of acid clay over siliceous limestone or pure limestone. Slopes range from 2 to 12 percent. In the less eroded areas, the surface layer is very dark gray to very dark grayish-brown cherty sandy loam. The subsoil is yellowish-red to strong-brown, firm sandy clay or clay that is underlain by partly disintegrated siliceous limestone at a depth of about 25 inches. These soils are low in natural fertility, contain small amounts of organic matter, and are strongly acid. On the surface and throughout the profile are numerous large and small siliceous fragments that are angular, subrounded, or rounded. In addition, iron crusts are on the surface, and iron concretions are on and in the soils.

Profile representative of the Henderson series (in Houston County, approximately 2½ miles south of Grovania on dirt road):

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) cherty sandy loam; weak, fine, granular structure; very friable; many large and small rock fragments on surface; mass of fine roots; strongly acid; clear, smooth boundary; 2 to 5 inches thick.

A3—3 to 7 inches, brown to dark-brown (10YR 4/3) cherty sandy loam; weak, medium, subangular blocky structure; very friable; some material from A1 horizon; fine roots common; many pores and root channels; few small fragments of chert; strongly acid; clear, smooth boundary; 2 to 7 inches thick.

B1t—7 to 10 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; very friable; many fine roots; fine pores common; some material from A3 horizon; few small fragments of

***Figure 6.*—An area of Gullied land so severely eroded that reclaiming it for crops or pasture would be difficult.**

chert; strongly acid; gradual, irregular boundary; 2 to 6 inches thick.

B21t—10 to 25 inches, red (2.5YR 4/6) clay containing siliceous fragments that make up 25 to 30 percent of horizon; moderate, medium, subangular blocky structure; firm; patchy clay films on ped faces; many soft disintegrated fragments; very strongly acid; gradual, irregular boundary; 10 to 20 inches thick.

C—25 to 56 inches +, yellowish-red (5YR 4/6) clay and hard and soft siliceous fragments ranging from boulder to pebble size; fragments make up about 55 percent of horizon; massive; firm when wet, hard when dry; very strongly acid; few fine roots.

Henderson soils occur with the Oktibbeha, Boswell, and Susquehanna soils in many places, and with the Faceville, Greenville, and Norfolk soils in some places. In contrast with the Oktibbeha soils, Henderson soils lack a calcareous marly subsoil. They are somewhat similar to Boswell and Susquehanna soils in texture but, unlike them, they have throughout the profile siliceous fragments that are angular, subrounded, and rounded. Henderson soils are not so friable as the Faceville, Greenville, and Norfolk soils and have a thinner solum and a more clayey subsoil. The numerous angular, subrounded, and rounded rock fragments that are common in Henderson soils are lacking in the Faceville, Greenville, and Norfolk soils.

In the area mapped, the Henderson soils occur only in the southern part of Houston County. Generally they are on breaks and slopes adjacent to drainageways. The native vegetation consists chiefly of mixed pines and hardwoods. Because these soils are difficult to till, they are not used for cultivated crops. Crops do not respond well to management. Most of the acreage is in trees.

Henderson cherty sandy loam, 2 to 5 percent slopes, eroded (HdB2).—This well-drained, very gently sloping soil is on uplands. Its surface layer is very dark gray to very dark grayish-brown cherty sandy loam 2 to 6 inches thick. The subsoil is yellowish-red to strong-brown, firm sandy clay to clay to a depth of about 20 inches and is underlain by a mixture of siliceous limestone, ironstone, iron crusts, and soil material from upper horizons. In most places many large and small siliceous rocks are on the surface and throughout the profile. Included in areas mapped as this soil are some areas that have a cherty sandy clay loam surface layer.

This soil is strongly acid and is low in natural fertility and organic-matter content. Water enters this soil at a moderate rate and moves through it moderately slowly. The available water capacity is low. Tilth is generally fair, and the root zone is thin.

This soil can be used for cultivated crops, but it is better suited to pasture or trees because the root zone is thin and the hazard of erosion is severe.

Henderson cherty sandy loam, 5 to 8 percent slopes, eroded (HdC2).—This well-drained, gently sloping soil is on uplands. Its surface layer is 2 to 6 inches thick and consists of very dark gray to very dark grayish-brown cherty sandy loam. The subsoil is yellowish-red to strong-brown sandy clay to clay that extends to a depth of about 20 inches and is underlain by a mixture consisting of ironstone, iron crusts, soil material from the surface layer, and partly disintegrated siliceous limestone. Included in areas mapped as this soil are some areas that lack the cherty fragments and some areas that have a cherty sandy clay loam surface layer.

This soil is low in natural fertility, contains small amounts of organic matter, and is strongly acid. Water enters this soil at a moderate rate and moves through it moderately slowly. The available water capacity is low. Tilth is generally poor, and the root zone is thin. Surface runoff is rapid, and the erosion hazard is very severe.

This soil can be used occasionally for cultivated crops, but yields are generally poor. A better use is for pasture or trees.

Henderson cherty sandy loam, 8 to 12 percent slopes, eroded (HdD2).—This well-drained soil is on uplands. It is the soil described for the series. Its surface layer is very dark grayish brown to brown or dark brown. The siliceous and cherty rocks on the surface and in the subsoil vary in number and size. Depth to disintegrated cherty material ranges from 20 inches to several feet, but in a few places rock crops out at the surface. Included in mapping were some areas that have a loamy sand surface layer and some small areas that lack the cherty fragments.

This soil is low in natural fertility, contains small amounts of organic matter, and is strongly acid. Water moves into and through the soil at a slow rate, and the available water capacity is low. Because slopes are strong and runoff is rapid, erosion is a very severe hazard. In many places rills and slightly scoured areas mark the surface. The root zone is thin, and tilth is generally poor. This soil is not suited to cultivated crops, but it can be used for pasture and as woodland.

Hoffman Series

The Hoffman series consists of well-drained, very strongly acid soils of the Coastal Plain uplands. These soils formed in unconsolidated beds of sand, loamy sand, silt, and kaolinitic clay. They are mainly on broken, choppy slopes and on breaks along streams and drainageways. Slopes range from 2 to 30 percent. In the less eroded areas, the surface layer is very dark gray to dark grayish-brown loamy sand 4 to 6 inches thick. Below a depth of 9 inches, the subsoil is highly mottled, generally firm, silty clay or clay.

Profile of a soil representative of the Hoffman series (in Houston County, approximately 10 miles north of Perry on east side of U.S. Highway No. 41):

A1—0 to 3 inches, very dark gray (10YR 3/1) loamy sand; weak, fine, granular structure; loose; mixed with material from Bt horizon; numerous fine roots; medium amounts of organic matter; very strongly acid; clear, smooth boundary; 2 to 5 inches thick.

Bt—3 to 9 inches, reddish-yellow (5YR 6/8) clay loam; weak, medium, subangular blocky structure; friable; many fine roots; very strongly acid; gradual, wavy boundary; 2 to 10 inches thick.

C—9 to 50 inches, reddish-yellow (7.5YR 7/6) silty clay; few, fine, faint mottles of pinkish white (7.5YR 8/2); massive; firm when moist; some material from A1 horizon; very strongly acid; gradual, wavy boundary.

In these counties, Hoffman soils occur with Vaucluse soils in such an intricate pattern that they are mapped with them as soil complexes. A profile typical of the Vaucluse soils is described in this report under the Vaucluse series. Hoffman soils also occur with Lakeland soils and are finer textured in the subsoil than those soils. They contain more kaolinitic clay than Vaucluse soils, and they have a lighter colored subsoil.

Most of the acreage of Hoffman soils is in the northern parts of Houston and Peach Counties, but small areas are scattered throughout both counties. The native vegetation consists of mixed pines and hardwoods and an understory of vines, shrubs, and grasses. These soils are not used for cultivated crops; most of the acreage is in trees.

Hoffman-Vaucluse complex, 12 to 30 percent slopes, eroded (HfF2).—This mapping unit consists of well-drained Hoffman and Vaucluse soils on steep, choppy, uneven slopes and breaks along streams and drainageways. These soils are intermingled in such intricate patterns that it is not practical to map them separately.

The Hoffman soils make up about 55 percent of this complex; Vaucluse soils, about 35 percent; and other soils, the remaining 10 percent.

In most places the surface layer of the Hoffman soils is very dark gray to dark gray loamy sand 2 to 5 inches thick, but in the more eroded areas, the surface layer is chiefly subsoil material. The subsoil is highly mottled white, yellow, red, very pale brown, and purple, firm and compact silty clay or clay. In some places the B horizon is discontinuous and the overlying sandy material is more than 2 feet thick. In other places the clayey subsoil is underlain by compact, varicolored sand. These soils are generally high in kaolin. Numerous shallow gullies, rills, and gall spots are common in eroded areas.

The Vaucluse soils commonly have a surface layer of brown to dark grayish-brown loamy sand 2 to 5 inches thick, but in the more eroded areas the subsoil is exposed. The subsoil is variable but generally consists of firm, compact, highly mottled yellowish-red, red, or reddish-yellow sandy clay loam. In some areas the B horizon is discontinuous and the overlying sandy material is more than 2 feet thick. In many places the subsoil contains small pockets and balls of whitish kaolinitic clay. Numerous small gullies, rills, and gall spots are common in eroded areas.

The soils in this mapping unit are very low in natural fertility, contain small amounts of organic matter, and are very strongly acid. Water enters these soils at a moderately rapid rate, but permeability is slow because the subsoil is compact and clayey. The available water capacity is low, and the water table is at a depth of more than 5 feet. Surface runoff is very rapid, and the erosion hazard is very severe. The root zone is thin, and tilth is generally poor.

The soils in this complex are not used for cultivated crops. They are better suited to trees, though under good management they can provide limited grazing.

Lakeland Series

The Lakeland series consists of deep, somewhat excessively drained and excessively drained sandy soils of the Coastal Plain uplands. These soils developed in thick beds of acid sand that overlie finer textured sediments in places. Slopes range from 0 to more than 12 percent. In most places loose sand extends from the surface to a depth of 60 inches or more. These soils are strongly acid, very low in natural fertility, and low to very low in organic-matter content.

Profile of a soil representative of the Lakeland series (in Houston County on U.S. Highway No. 41, south of Big Indian Creek in Perry):

Ap—0 to 6 inches, brown to dark-brown (10YR 4/3) fine sand; weak, fine, granular structure; loose; numerous fine roots; strongly acid; gradual, smooth boundary; 4 to 10 inches thick.

A12—6 to 12 inches, brown to dark-brown (7.5YR 4/3) fine sand; weak, fine, granular structure; loose; some material from Ap horizon; strongly acid; many fine roots; gradual, wavy boundary; 4 to 8 inches thick.

C1—12 to 70 inches, strong-brown (7.5YR 5/6) sand; weak, fine, granular structure; loose; few fine roots; strongly acid; gradual, wavy boundary; 30 to 60 inches thick.

C2—70 to 80 inches +, yellowish-red (5YR 5/8) loamy sand; weak, fine, granular structure; loose to very friable; strongly acid.

Lakeland soils commonly occur with Norfolk, Orangeburg, Vaucluse, Hoffman, and Lucy soils. They are coarser textured throughout the profile than the Norfolk and Orangeburg soils, and unlike them, do not have a textural B horizon. In contrast with the Vaucluse and Hoffman soils, Lakeland soils are much deeper and sandier and lack a firm, compact, clayey subsoil. They are sandy to a greater depth than Lucy soils.

The Lakeland soils are fairly well distributed throughout Houston and Peach Counties; the largest acreage is in the northern part of both counties. Most of the smoother areas have been cultivated but now are idle or are in trees. The native vegetation consists chiefly of mixed pines, hardwoods, and an understory of various shrubs, vines, and grasses. Because these soils are droughty, sandy, and contain very small amounts of organic matter, crop yields are low to fair. Generally, pasture plants or trees are better suited than cultivated crops.

Lakeland fine sand, 0 to 5 percent slopes (LqB).—This deep, somewhat excessively drained sandy soil is on uplands. It has a profile like the one described for the series. The surface layer ranges from light yellowish brown to grayish brown in some places and from dark grayish brown to brown in others. The subsoil ranges from light yellowish brown to pale brown and from yellowish red to red. In most areas sandy loam or sandy clay loam is generally at a depth of more than 60 inches, but in some areas it is at a depth of 42 to 60 inches.

This soil is very low in natural fertility, contains very little organic matter, and is strongly acid. Water moves into and through the soil at a very rapid rate, and the available water capacity is low. Tilth is generally good, the root zone is thick, and depth to the water table is more than 10 feet.

Most crops common in the area can be grown, but yields are generally only fair to poor because this sandy soil is highly permeable, sandy, and droughty. Crops respond fairly well to good management, but trees or improved pasture is a better use than crops.

Lakeland fine sand, 5 to 12 percent slopes (LqD).—This deep, excessively drained sandy soil is on strongly sloping uplands. The surface layer is light grayish-brown, grayish-brown, or dark grayish-brown, loose fine sand 3 to 5 inches thick. The subsoil of light yellowish-brown, strong-brown, yellowish-red, or red loose sand is generally underlain by finer textured material at a depth of more than 60 inches. In some places the finer textured material is at a depth of about 42 inches.

This soil is very low in natural fertility, contains very small amounts of organic matter, and is strongly acid. Permeability is very rapid, and the available water capacity is very low. Depth to the water table is more than 10 feet. This soil is fairly easy to conserve, except in areas where runoff is rapid enough to cause a severe hazard of gully erosion (fig. 7).

Because this sandy soil is strongly sloping, very rapidly permeable, and droughty, it is not used for cultivated crops. It is better suited to trees, especially pines, though it can be used for limited grazing.

Leaf Series

The Leaf series consists of poorly drained soils on flood plains along the larger streams in Houston and Peach Counties. These soils developed in acid clay and sandy clay. Slopes range from 0 to 2 percent. These soils have a very dark grayish-brown silty clay loam surface layer 4 to 8 inches thick and a light-gray to gray plastic clay subsoil mottled with yellowish brown and yellowish red. In many places a thin layer of recently deposited material is on the surface. These soils are low in natural fertility, contain small amounts of organic matter, and are very strongly acid.

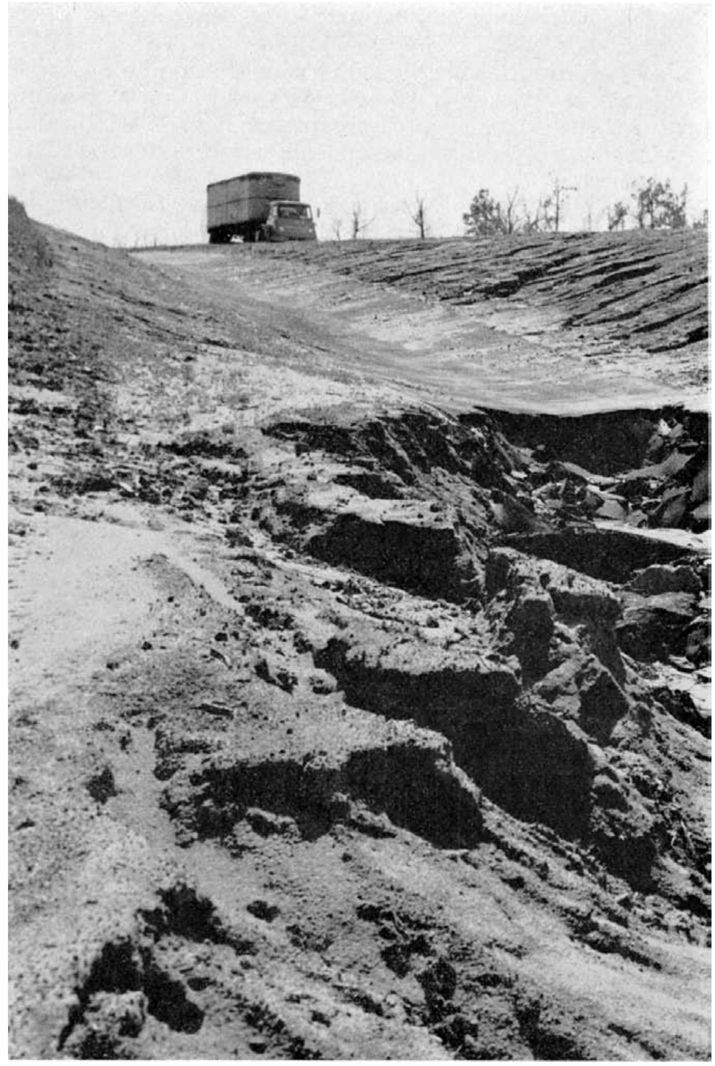

***Figure 7.*—Lakeland fine sand, 5 to 12 percent slopes, on which an attempt to control erosion by lining the ditch with asphalt has failed.**

Profile of a soil representative of the Leaf series (in the east-central part of Houston County approximately half a mile west of the Ocmulgee River):

A—0 to 5 inches, very dark grayish-brown (10YR 3/2) silty clay loam; weak, fine and medium, subangular blocky structure; friable; numerous fine and medium roots; strongly acid; gradual, wavy boundary; 4 to 8 inches thick.

B1tg—5 to 9 inches, light-gray (10YR 6/1) and yellowish-brown (10YR 5/4) silty clay; moderate, medium, subangular blocky structure; firm when moist, sticky when wet; few patchy clay films; fine and medium roots, root channels, and pores common; very strongly acid; clear, smooth boundary; 3 to 8 inches thick.

B21tg—9 to 19 inches, light-gray (10YR 6/1) clay; common, medium, distinct mottles of yellowish brown (10YR 5/4); moderate, medium and fine, subangular blocky structure; firm when moist, slightly plastic when wet; few patchy clay films; very strongly acid; gradual, irregular boundary; 6 to 12 inches thick.

B22tg—19 to 58 inches +, gray to light-gray (5Y 6/1) clay; many, fine, distinct mottles of yellowish brown (10YR 5/4) in upper part and yellowish red (5YR 4/8) in lower part; massive, breaking to weak, coarse, angular blocky structure; firm when moist, slightly plastic when wet; strongly acid.

In these counties Leaf soils occur on the flood plains with Chastain soils in such an intricate pattern that they are mapped with them as a soil complex. A profile typical of the Chastain soil is described in this report under the Chastain series.

Leaf soils occur only on flood plains along the Ocmulgee River in the eastern part of Houston County and along the Flint River in the southwestern part of Peach County. The native vegetation is chiefly blackgum, sweetgum, water oak, and a few scattered pines. Because they are poorly drained and are flooded periodically, these soils are not used for cultivated crops or pasture. All of the acreage is woodland that consists mainly of low-grade hardwoods.

Local Alluvial Land

Local alluvial land (0 to 2 percent slopes) (LcM) occurs in natural depressions, drains, and drainageways. Although it is flooded periodically, it dries out quickly, and crops are seldom damaged.

The soil material of this land type is variable. The surface layer ranges from dark reddish-brown clay loam, silty clay loam, sandy clay, or silty clay to reddish-brown sandy loam and dark-brown silty clay loam. In places older soil material is covered by 2 or 3 feet of material that has recently washed from soils on surrounding uplands. The subsoil is commonly dark-brown, yellowish-brown, or dark reddish-brown sandy clay loam, sandy loam, or sandy clay several feet thick.

Local alluvial land is used in about the same way as are soils on the adjacent uplands. Areas in suitable positions may be used as vegetated waterways to carry away excess water from furrows and terrace outlets. This land type is also suited to pasture plants and trees.

Lucy Series

The Lucy series consists of deep, well-drained to somewhat excessively drained soils on the Coastal Plain uplands. These soils developed in thick beds of sand over finer textured sediments. Slopes range from 0 to 12 percent. The surface layer is grayish-brown, dark grayish-brown, or very dark grayish-brown sand. It is underlain by yellowish-brown, strong-brown, yellowish-red, or red loamy sand. Finer textured material is at a depth between 20 and 40 inches. These soils are low to very low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid.

Profile of a soil representative of the Lucy series (in Peach County in pasture about 2½ miles west of Houston County line, on south side of paved county road that intersects State Route 96 approximately 1 mile east of Fort Valley city limits) (for laboratory data, refer to site 13 in table 11):

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) sand; weak, fine, granular structure; loose; numerous fine roots; abrupt, smooth boundary; 4 to 8 inches thick.

A21—6 to 16 inches, brown or dark-brown (7.5YR 4/4) to yellowish-red (5YR 5/6) loamy sand; very weak, fine, granular structure; loose; some material from Ap horizon; numerous fine roots; gradual, smooth boundary; 4 to 10 inches thick.

A22—16 to 24 inches, yellowish-red (5YR 5/6) loamy sand; massive in place, breaking to weak, fine and medium, granular structure; loose to very friable; many fine roots; gradual, smooth boundary; 6 to 8 inches thick.

A23—24 to 32 inches, yellowish-red (5YR 4/8) loamy sand; massive in place, breaking to very weak, fine and medium, granular structure under pressure; very friable; fine roots common; gradual, smooth boundary; 4 to 8 inches thick.

B1—32 to 42 inches, yellowish-red (5YR 4/6) fine sandy loam; massive in place, breaking to very weak, medium, subangular blocky structure under pressure; very friable; fine roots common; clear, smooth boundary; 8 to 10 inches thick.

B21t—42 to 54 inches, red (2.5YR 4/8) sandy clay loam; weak, medium, subangular blocky structure; very friable; fine roots common; clear, smooth boundary; 10 to 24 inches thick.

B22t—54 to 64 inches, red to dark-red (2.5YR 4/6–3/6) fine sandy loam grading to sandy clay loam; weak, medium, subangular blocky structure; very friable; few fine roots; gradual, smooth boundary; 8 to 12 inches thick.

B23t—64 to 77 inches, red to dark-red (2.5YR 4/6–3/6) fine sandy loam to light sandy loam; weak, medium, subangular blocky structure; very friable; few fine roots; gradual, smooth boundary; 10 to 20 inches thick.

B24t—77 to 86 inches +, red to dark-red (2.5YR 4/6–3/6) loamy sand grading to fine sandy loam; weak, medium, subangular blocky structure; very friable.

Lucy soils commonly occur with Norfolk, Orangeburg, and Vaucluse soils. They resemble Orangeburg soils in color but contain less clay in both the surface layer and the subsoil. In contrast with the Vaucluse soils, Lucy soils are deeper, are sandier, and lack a firm, compact subsoil.

These soils are fairly well distributed throughout the two counties. The smoother slopes are mostly cultivated, and the steeper slopes are wooded. The native vegetation is chiefly mixed pines and hardwoods. Native vines, shrubs, and grasses cover the ground where there is an opening in the canopy.

A wide range of locally adapted crops can be grown, but crops yields are only fair because the soils are somewhat droughty. A better use is pasture, hay, or trees.

Lucy sand, 0 to 5 percent slopes (LcB).—This deep, well-drained and somewhat excessively drained soil is on uplands. Its surface layer ranges from grayish brown to very dark grayish brown and is underlain by yellowish-brown, strong-brown, yellowish-red or red loamy sand. Sandy loam or sandy clay loam generally is at a depth between 30 and 40 inches, but in some areas it is between 20 and 30 inches. Included in the mapping were areas that have a loamy sand surface layer.

This soil is low to very low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water enters and moves through the upper part of the soil rapidly. The available water capacity is low. Runoff is moderate to slow, and the erosion hazard is slight to moderate. Tilth generally is good, and the root zone is thick. The depth to the water table is more than 10 feet.

Most crops commonly grown in the area can be grown on this soil, but crop yields are only fair because the soil is sandy and somewhat droughty. Cultivated crops respond fairly well to good management, but pasture, hay, and trees, especially pines, are better suited.

Lucy sand, 5 to 8 percent slopes (LcC).—This is a deep, well-drained and somewhat excessively drained soil on gently sloping uplands. The surface layer is dark grayish-brown sand 4 to 6 inches thick. Next in the profile is yellowish-red, loose to very friable loamy sand that is underlain by finer textured material at a depth of 20 to 40 inches.

This soil is low to very low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil rapidly and moves through it at a moderately rapid rate. The available water capacity is low. The slope is strong enough to create a moderate hazard of erosion in cultivated areas. Tilth generally is good, the root zone is thick, and the depth to the water table is more than 10 feet.

This soil is suited to most locally grown crops, but crop yields are only fair because the soil is sandy and droughty. It is suited to pasture, hay, and trees.

Lucy sand, 8 to 12 percent slopes (LcD).—This deep, well-drained to somewhat excessively drained soil occurs on sloping uplands. The 4- to 6-inch surface layer is dark grayish-brown, loose sand. Below this is yellowish-red, loose to very friable loamy sand that is underlain by sandy loam or sandy clay loam between a depth of 20 and 36 inches.

This soil is very low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves through the soil rapidly, and the available water capacity is low. Erosion is a moderate to severe hazard in unprotected areas. This soil generally is in good tilth, is easy to work, and has a thick root zone. The depth to the water table is more than 10 feet.

This soil is suited to most crops grown locally, but it is generally better suited to pasture or trees because it is sandy, droughty, and sloping.

Lynchburg Series

The Lynchburg series consists of deep, friable, somewhat poorly drained soils of the Coastal Plain uplands. These soils developed in beds of acid loamy sand, sandy loam, sandy clay loam, and sandy clay. Slopes range from 0 to 3 percent. These soils commonly have a surface layer of dark gray to very dark gray loamy sand 8 to 12 inches thick. The subsoil is light sandy clay loam that is yellowish brown in the upper part and is mottled gray, light yellowish brown, pale yellow, and yellowish red in the lower part. The gray color increases with depth. The lower part of the subsoil is friable. These soils are low in natural fertility, contain small to medium amounts of organic matter, and are very strongly acid.

Profile of a soil representative of the Lynchburg series (in the southern part of Houston County):

Ap—0 to 8 inches, very dark gray (10YR 3/1) to dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; loose; numerous fine roots; very strongly acid; gradual, wavy boundary; 8 to 12 inches thick.

A2—8 to 12 inches, pale-brown (10YR 6/3) loamy sand; weak, fine, granular structure; loose; very strongly acid; few fine roots; gradual, wavy boundary; 2 to 8 inches thick.

B1t—12 to 17 inches, light yellowish-brown (10YR 6/4) light sandy clay loam to sandy loam; weak, fine, subangular blocky structure; very friable; few fine roots; very strongly acid; gradual, wavy boundary; 4 to 10 inches thick.

B21tg—17 to 28 inches, light yellowish-brown (10YR 6/4) sandy clay loam; few, fine, faint mottles of yellowish brown (10YR 5/8) and gray (10YR 6/1); weak, medium, subangular blocky structure; friable; few fine roots; very strongly acid; gradual, wavy boundary; 12 to 20 inches thick.

B22tg—28 to 34 inches, gray (10YR 6/1) sandy clay loam; many, medium, prominent mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary; 4 to 10 inches thick.

B23tg—34 to 56 inches +, gray (N 5/0) sandy clay; common, medium, prominent mottles of yellowish brown (10YR 5/8) and yellowish red (5YR 5/8); massive; friable to firm; very strongly acid.

Lynchburg soils occur with Grady, Norfolk, and Lakeland soils. They are better drained than the Grady soils and contain less clay in the subsoil. They are more poorly drained than the Norfolk and Lakeland soils.

The Lynchburg soils are not extensive in the area mapped. Most of the acreage is in the southern part of Houston County. The native vegetation is chiefly pine, oak, sweetgum, hickory, and an understory of gallberry and myrtle. Most of the acreage is in trees, but small areas are in cultivated crops and pasture. If adequately drained, these soils are suited to many kinds of plants, but their suitability for some plants is limited in undrained areas. These soils generally are better suited to improved pasture or trees than to cultivated crops.

Lynchburg loamy sand, 0 to 3 percent slopes (LvA).—This is a deep, somewhat poorly drained soil of the uplands. It is the soil described for the series. Its surface layer is very dark gray or dark gray in uncultivated areas and is lighter gray in cultivated areas. It ranges from sandy loam to loamy fine sand. In some areas the lower part of the subsoil is light sandy clay.

This soil is low in natural fertility, contains medium to small amounts of organic matter, and is very strongly acid. Water moves into and through the upper part of the soil at a rapid rate, but it moves through the lower part at a moderately slow rate. The available water capacity is moderate, and the water table is at a depth of less than 30 inches for more than 2 months each year. Tilth is generally good, and the root zone is thick.

If adequately drained, this soil is suited to many kinds of cultivated crops, though it is generally better suited to pasture or trees (fig. 8).

Mine Pits and Dumps

Mine pits and dumps (Mpd) are large open pits from which limestone has been mined and areas where the spoil material has been dumped. This land type occupies about 350 acres and occurs south of Perry.

This land type is not suited to crops or pasture, but it can be used as a recreational area or wildlife habitat. Some areas have reforested naturally, and other areas can be replanted to trees.

Norfolk Series

The Norfolk series consists of deep, friable, well-drained soils of the Coastal Plain uplands. These soils developed in thick beds of acid sandy loam, sandy clay loam, and sandy clay. Slopes range from 0 to 8 percent. In the less eroded areas, the surface layer is dark grayish-brown loamy fine sand 6 to 10 inches thick. The subsoil is yellowish-brown, friable sandy clay loam that grades to light sandy clay. Mottles generally occur between a depth of

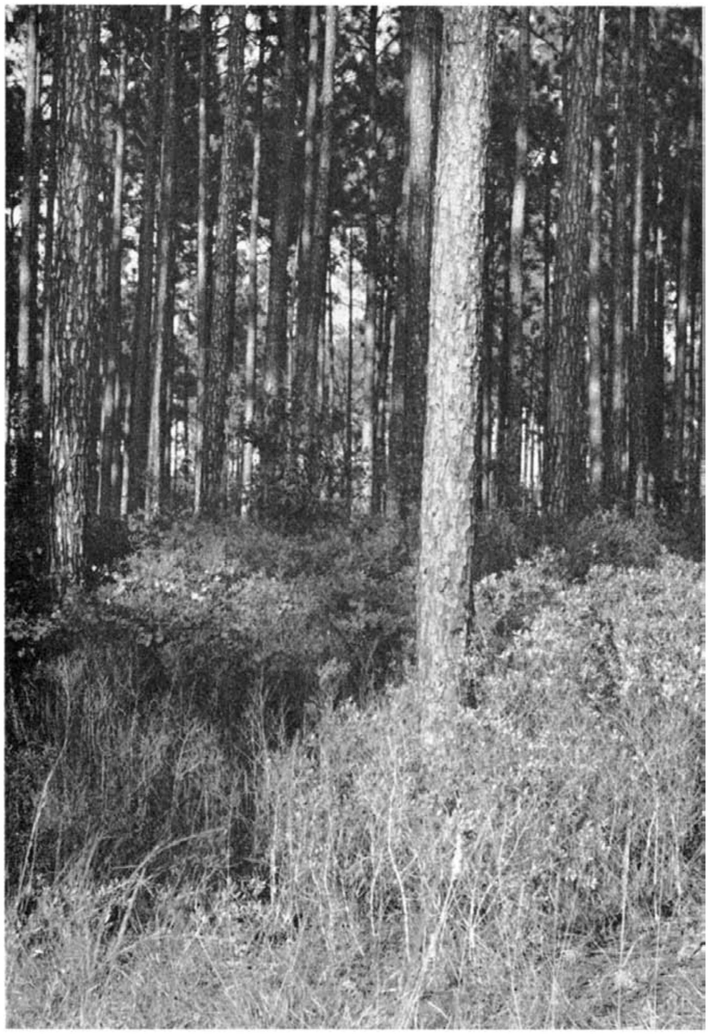

Figure 8.—**A stand of pines on Lynchburg loamy sand, 0 to 3 percent slopes.**

30 and 40 inches. These soils are low in natural fertility and organic-matter content and are medium acid to strongly acid.

Profile of a soil representative of the Norfolk series (in Houston County in a cultivated field, approximately three-fourths mile west of U.S. Highway No. 41 and north of paved road that serves as the Houston-Dooly County line) (for laboratory data, refer to site 10 in table 11):

Ap—0 to 6 inches, dark grayish-brown (2.5Y 4/2) loamy fine sand; weak, fine, granular structure; very friable; many fine roots; few small, rounded concretions of iron; strongly acid; clear, smooth boundary; 6 to 10 inches thick.

A2—6 to 10 inches, light yellowish-brown (10YR 6/4) to yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; very friable; few, small, rounded concretions of iron; some material from Ap horizon in root channels; many fine roots; strongly acid; clear, smooth boundary; 2 to 8 inches thick.

A3—10 to 14 inches, yellowish-brown (10YR 5/8) sandy loam; weak, fine, subangular blocky structure; very friable; fine roots, root channels, and pores common; some organic matter in root channels; strongly acid; gradual, wavy boundary; 4 to 8 inches thick.

B21t—14 to 20 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, fine to medium, subangular blocky structure; very friable to friable; fine roots, root channels, and pores common; strongly acid; diffuse, irregular boundary; 4 to 10 inches thick.

B22t—20 to 33 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable when moist, slightly hard when dry; fine roots, root channels, and pores common; strongly acid; gradual, wavy boundary; 10 to 30 inches thick.

B23t—33 to 39 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, medium, distinct mottles of strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; friable when moist, hard when dry; few fine roots, strongly acid; gradual, wavy boundary; 6 to 12 inches thick.

B24t—39 to 58 inches +, yellowish-brown (10YR 5/8) sandy clay loam; many, medium, distinct mottles of strong brown (7.5YR 5/8) and light gray (10YR 7/1); weak, medium, subangular blocky structure; friable when moist, hard, compact, and weakly cemented when dry; strongly acid.

Norfolk soils commonly occur with the Orangeburg, Faceville, Lucy, and Lakeland soils. They lack the yellowish-red to dark-red subsoil that is common in the Orangeburg soils, and they are not so fine textured nor so red as the Faceville soils. Norfolk soils are finer textured throughout the profile than Lucy and Lakeland soils. Unlike the Lakeland soils, Norfolk soils have a textural B horizon.

Most of the acreage of Norfolk soils is in the southeastern part of Houston County, but small areas are scattered throughout both counties. The native vegetation consists of mixed pines and hardwoods and an understory of shrubs, vines, and grasses. Crops on these soils respond well to good management. The main crops are cotton, corn, peanuts, small grain, soybeans, peaches, and pecans. Most of the steeper, eroded areas are in pasture or trees.

Norfolk loamy fine sand, 0 to 2 percent slopes (NgA).—This is a deep, well-drained soil of the uplands. It is the soil described for the series. The surface layer ranges from grayish brown to dark gray. Included in mapping were small areas that have a sandy loam to loamy sand surface layer and some areas that have a sandy clay subsoil.

This soil is moderate to low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water enters the soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate, and depth to the water table is more than 5 feet. Tilth is generally good, and the root zone is thick.

This soil is among the best soils for farming in the two counties. Crops on it respond well to management. The range of suitable crops is wide and includes cotton, corn, peanuts, small grain, and soybeans. Peach and pecan trees, pasture grasses, and legumes also grow well. Most of the acreage is in tilled crops or orchards, but small areas are in pasture or trees.

Norfolk loamy fine sand, 2 to 5 percent slopes (NgB).—This deep, friable, well-drained soil is on very gently sloping uplands. The surface layer is dark grayish-brown loamy fine sand 6 to 10 inches thick. The subsoil is yellowish-brown, friable sandy clay loam that has moderate subangular blocky structure. Included in areas mapped as this soil are some areas that have a sandy clay subsoil.

This soil is low in natural fertility and organic-matter content and is medium acid to strongly acid. Infiltration is moderately rapid, and permeability and available water capacity are moderate. The depth to the water table is more than 5 feet. Tilth is generally good, and the root zone is thick. Runoff is rapid enough to cause a moderate hazard of erosion.

This soil can be safely cultivated if moderate conservation practices are used. It is suited to most of the locally grown crops, which respond well to management. It is also suited to peaches, pecans, pasture and hay plants, and pine trees. Most of the total acreage is in cultivated crops.

Norfolk loamy fine sand, 2 to 5 percent slopes, eroded (NgB2).—This deep, eroded soil is on gently sloping uplands. Its surface layer is dark grayish-brown loamy fine sand 3 to 5 inches thick. The subsoil is yellowish-brown, friable sandy clay loam that has moderate subangular blocky structure. Included in mapping were some severely eroded areas that have a yellowish-brown sandy loam to sandy clay loam surface layer. Many areas have a few shallow gullies and rills.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into this soil at a moderately rapid rate, permeability is moderate, and available water capacity is moderate. Depth to the water table is more than 5 feet. Tilth is generally good except in the more eroded spots. The root zone is thick. Runoff is rapid enough to create a moderate hazard of erosion.

This soil is suited to most locally grown crops, which respond well to management. Most of this soil is used for tilled crops, but pasture, hay, and trees are also suitable.

Norfolk loamy fine sand, 5 to 8 percent slopes, eroded (NgC2).—This is a deep, well-drained soil on gently sloping uplands. The surface layer is dark grayish-brown loamy fine sand 3 to 5 inches thick. The subsoil is yellowish-brown, friable sandy clay loam that has moderate subangular blocky structure. In most areas the plow layer extends into the upper part of the subsoil, but there are some areas where the plow layer is entirely in the original surface soil, and others where the subsoil is exposed. Where the subsoil is exposed, the surface layer in the areas adjoining is yellowish brown and somewhat finer than it is in the less eroded areas. Also, a few gullies and rills have formed in these areas.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil moderately rapidly, and through it at a moderate rate, and the available water capacity is moderate. The water table is at a depth of more than 5 feet. Tilth is generally fair to good, and the root zone is thick.

This soil is suited to most crops commonly grown in the area, but runoff is rapid enough to create a moderate to severe hazard of erosion. Cultivated crops can be grown, but pasture, hay, or trees generally are better suited.

Oktibbeha Series

The Oktibbeha series consists of moderately well drained soils that occur on uplands, where they developed in beds of clay that are less than 4 feet deep to marl, chalk, or limestone. Slopes range from 2 to 12 percent. The surface layer is very dark gray fine sandy loam or sandy clay loam in the less eroded areas, but it is redder and finer textured in the more eroded areas. The subsoil is red, plastic clay. These soils are acid in the upper part but are underlain by calcareous marly material at a depth of 20 to 40 inches. They are low in natural fertility, contain medium to small amounts of organic matter, and are strongly acid in the upper part and alkaline in the lower part.

Profile of a soil representative of the Oktibbeha series (in Houston County, approximately 3 miles south of Perry at the edge of the Georgia Limerock Company mine):

A1—0 to 2 inches, very dark gray (10YR 3/1) fine sandy loam grading to sandy clay loam; weak, fine, granular structure; very friable; some organic matter; numerous roots; strongly acid; clear, smooth boundary; 2 to 5 inches thick.

B1t—2 to 4 inches, yellowish-red (5YR 4/6) sandy clay; weak, fine, subangular blocky structure; friable; some material from A1 horizon in root channels; fine roots common; strongly acid; clear, smooth boundary; 2 to 4 inches thick.

B21t—4 to 16 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; firm when moist, hard when dry, plastic when wet; few root channels and pores; few fine roots; strongly acid; gradual, wavy boundary; 8 to 22 inches thick.

B22t—16 to 24 inches, yellowish-red (5YR 4/6) clay; few, fine, faint mottles of red (2.5 YR 4/6); moderate, medium, subangular blocky structure; firm when moist, very hard when dry, plastic when wet; few fine roots, root channels, and pores; strongly acid; clear, smooth boundary; 4 to 19 inches thick.

IIC1—24 to 28 inches, strong-brown (7.5YR 5/6) sandy clay; common, medium, distinct mottles of yellowish brown (10YR 5/6) and white (10YR 8/1); moderate, medium, subangular blocky structure; firm when moist, hard when dry; some lime nodules; moderately alkaline; gradual, wavy boundary; 4 to 10 inches thick.

IIC2—28 to 46 inches +, pale-yellow (2.5Y 7/4) and white (N 8/0) calcareous marl; yellow color increases with depth; massive; moderately alkaline; few fine roots.

In these counties, Oktibbeha soils occur with Boswell and Susquehanna soils in such an intricate pattern that they are mapped with them as soil complexes. They also occur with the Sumter soils. Oktibbeha soils are somewhat better drained than the Sumter and Susquehanna soils, and unlike them, have a red B horizon. Unlike the Sumter soils, they lack an alkaline surface layer. Oktibbeha soils are underlain by calcareous marly material at a depth of 20 to 40 inches, whereas the Boswell and the Susquehanna soils are acid throughout. A profile of the Boswell soil and of the Oktibbeha soil is described in this report under the appropriate series name.

In the area mapped, Oktibbeha soils occur only in the Black Belt of Houston County. The native vegetation consists chiefly of mixed pines and hardwoods. Because they are shallow and tilth is generally poor, these soils are not suited to cultivated crops. Most of the acreage is in trees, though fair pasture can be produced under good management.

Orangeburg Series

The Orangeburg series consists of deep, friable, well-drained soils of the Coastal Plains. These soils developed over thick beds of unconsolidated acid loam and sandy clay loam that, in a few places, contained layers of finer or coarser sediments. Slopes range from 0 to 12 percent. The surface layer is dark grayish-brown loamy fine sand in uneroded areas, and it is redder and finer textured in the more eroded areas. The subsoil is red to yellowish-red sandy clay loam. These soils are low in natural fertility and organic-matter content and are medium acid to strongly acid.

Profile of a soil representative of the Orangeburg series (in Peach County in a peach orchard on the east side of the old Byron road, approximately 1¼ miles north of State Route 49):

Ap—0 to 8 inches, grayish-brown (10YR 5/2) loamy fine sand; weak, fine, granular structure; very friable; fine roots common; strongly acid; clear, smooth boundary; 6 to 10 inches thick.

A2—8 to 12 inches, light-brown (7.5YR 6/4) loamy fine sand; weak, fine, granular structure; very friable; few fine roots; strongly acid; gradual, wavy boundary; 2 to 6 inches thick.

B1—12 to 16 inches, yellowish-red (5YR 5/8) fine sandy loam; weak, fine, granular structure; very friable; fine roots common; strongly acid; gradual, wavy boundary; 4 to 6 inches thick.

B21t—16 to 22 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, fine, subangular blocky structure; very friable; few fine roots; strongly acid; gradual, wavy boundary; 6 to 10 inches thick.

B22t—22 to 38 inches, yellowish-red (5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; few fine roots; strongly acid; gradual, wavy boundary; 12 to 24 inches thick.

B3t—38 to 58 inches, red (2.5YR 4/6) sandy clay loam; few, medium, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable when moist, hard when dry; few fine roots; strongly acid; gradual, wavy boundary; 10 to 25 inches thick.

C—58 to 64 inches, red (2.5YR 4/8) sandy clay loam; many, coarse, prominent mottles of reddish yellow (7.5YR 6/6); massive; friable or firm when moist, hard when dry; few fine roots, root channels, and pores; strongly acid.

The Orangeburg soils commonly occur with the Red Bay, Faceville, Greenville, and Lakeland soils. They have a lighter colored surface layer than Red Bay soils. The Orangeburg soils resemble Faceville soils in color but contain less clay in the subsoil. They have a lighter colored surface layer than the Greenville soils and contain less clay throughout the profile. They are redder than Lakeland soils and are finer textured throughout the profile.

The Orangeburg soils are extensive in Houston and Peach Counties. The largest areas are in the northern and northeastern parts of Houston County and the northwestern part of Peach County. The native vegetation consists chiefly of mixed pines and hardwoods and an understory of shrubs, vines, and grasses.

These soils are among the best soils for farming in the two counties. They are suited to most locally grown crops, which respond well to good management. Peach and pecan trees grow well. Most of the smoother areas are used for cultivated crops or pasture, and the steeper areas are wooded.

Orangeburg loamy fine sand, 0 to 2 percent slopes (OgA).—This is a deep, well-drained, friable soil on nearly level uplands. The surface layer is dark grayish-brown loamy fine sand 6 to 10 inches thick. The subsoil commonly is red or yellowish-red, friable sandy clay loam that has weak subangular blocky structure, but in a sizable acreage the subsoil is dark red.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into this soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate, and the depth to the water table is more than 10 feet. Tilth is generally good, and the root zone is thick. Surface runoff is very slow, and erosion is not a hazard.

This soil is among the better soils for farming in the two counties. It is suited to most crops commonly grown in the area, and crops on it respond well to management. It is used extensively for small grain, soybeans, cotton, corn, peanuts, and truck crops. Also suited are peaches, pecans, pasture, hay, and trees, especially pines.

Orangeburg loamy fine sand, 2 to 5 percent slopes (OgB).—This deep, friable, well-drained soil is on uplands. It is the soil described for the series. Its surface layer ranges from light grayish brown to dark grayish brown. In some areas the subsoil is red throughout, and in a sizable acreage it is dark red. In other areas it is yellowish red in the upper part and red in the lower part. In many places mottles of strong brown and reddish yellow occur at a depth of about 40 inches, but in other places they occur at a greater depth. Included in mapped areas are small areas that have a loamy sand or sandy loam surface layer.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate, and the water table is at a depth of more than 10 feet. Tilth is generally good, and the root zone is thick. The erosion hazard is slight to moderate if row crops are grown.

This soil is among the better soils for farming in the area. It is suited to a wide range of locally grown crops and is intensively used for small grain, soybeans, cotton, corn, peanuts, and truck crops. Crops respond well to management (fig. 9). This soil is also suited to improved pasture, hay, and trees, especially pine trees. Peach and pecan orchards are productive.

Orangeburg loamy fine sand, 2 to 5 percent slopes, eroded (OgB2).—This deep, eroded soil is on very gently sloping uplands. Its surface layer is dark grayish-brown loamy fine sand 4 to 6 inches thick. The plow layer normally extends into the upper subsoil. The subsoil is yellowish-red to red, friable sandy clay loam that has weak subangular blocky structure. In many areas the subsoil is dark red. Included in areas mapped as this soil are some severely eroded areas that have a reddish sandy loam to sandy clay loam surface layer. A few shallow gullies and rills are in many places.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into this soil at a moderately rapid rate, and permeability and the available water capacity are moderate. The depth to the water table is more than 10 feet. Tilth generally is good except in the more eroded spots. The root zone is thick.

This soil is suited to most crops commonly grown in the area, but erosion is a moderate hazard. Crops respond well to good management. Most of the acreage is in cultivated crops, but pasture, hay, and trees are also suitable.

Orangeburg loamy fine sand, 5 to 8 percent slopes (OgC).—This is a deep, well-drained soil on gently sloping uplands. The surface layer is dark grayish-brown loamy fine sand 6 to 10 inches thick. The subsoil is yellowish red or red, friable sandy clay loam that has weak subangular blocky structure. The subsoil is dark red.

Figure 9.—**An area of Orangeburg loamy fine sand, 2 to 5 percent slopes, where cornstalks and residues from native grasses provide a cover in winter.**

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water enters this soil at a moderately rapid rate, and permeability and the available water capacity are moderate. The depth to the water table is more than 10 feet. Tilth generally is good, and the root zone is thick.

This soil is suited to most locally grown crops, but conservation practices are needed if areas are cultivated intensively. Runoff is rapid enough to create a moderate to severe hazard of erosion. Permanent pasture or trees generally are more suitable than cultivated crops.

Orangeburg loamy fine sand, 5 to 8 percent slopes, eroded (OgC2).—This is a deep, well-drained, eroded soil on gently sloping uplands. The surface layer is dark grayish-brown loamy fine sand 4 to 6 inches thick. In most places the subsoil is red to yellowish-red, friable sandy clay loam, but in a sizable acreage it is dark red. The structure of the subsoil is subangular blocky. The plow layer normally extends into the upper subsoil, but there are some patches where it is entirely in the original surface layer and others where the subsoil is exposed. Where the subsoil is exposed, the surface layer is red to dark red, is somewhat finer textured than normal, and is marked by a few gullies and rills.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium to strongly acid. Water moves into the soil at a moderately rapid rate, and permeability and the available water capacity are moderate. Depth to water table is more than 10 feet, tilth is generally good except in the more eroded spots, and the root zone is thick.

This soil is suited to most of the crops commonly grown in this area, but conservation practices are needed in extensively cultivated areas because the erosion hazard is moderate to severe. Generally, this soil is better suited to pasture, hay, or trees than to cultivated crops.

Orangeburg loamy fine sand, 8 to 12 percent slopes, eroded (OgD2).—This deep, well-drained soil is on sloping uplands. Its surface layer is dark grayish-brown loamy fine sand 4 to 6 inches thick. The subsoil is friable sandy clay loam that has weak subangular blocky structure. In most places it is red to yellowish red, but in several areas it is dark red. The plow layer normally extends into the upper part of the subsoil, but there are some patches where it is entirely in the original surface layer and others where the subsoil is exposed. A few shallow gullies and rills have formed in many areas.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the upper part of the soil at a moderately rapid rate and moves through the soil at a moderate rate. The available water capacity is moderate. Depth to the water table is more than 10 feet, tilth is generally fair or good, and the root zone is thick.

This soil is suited to most crops commonly grown in the area, but most of the acreage is used for pasture or trees because slopes are strong, runoff is rapid, and the erosion hazard is severe or very severe.

Orangeburg sandy loam, 2 to 5 percent slopes, severely eroded (OcB3).—This deep, well-drained soil has a surface layer of red to yellowish-red sandy loam 2 to 4 inches thick. Its subsoil is mostly yellowish-red to red, friable sandy clay loam that has weak subangular blocky structure. In some areas, the subsoil is dark red. The plow layer is mostly subsoil material, but there are patches where it is a mixture of the original surface soil and the upper part of the subsoil. Shallow gullies, gall spots, and rills are common.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate, and depth to the water table is more than 10 feet. Tilth is generally fair, and the root zone is thick.

This soil is suited to most crops commonly grown in the area, but only a few small areas are used for tilled crops. Pasture and trees are more suitable than tilled crops because runoff is rapid and the hazard of erosion is severe. Most areas are in pasture or trees.

Orangeburg sandy loam, 5 to 8 percent slopes, severely eroded (OcC3).—This deep, well-drained, severely eroded soil occurs on gently sloping uplands. Its surface layer is red to yellowish-red sandy loam 2 to 4 inches thick. The subsoil is friable sandy clay loam that has weak subangular blocky structure. In most places it is red to yellowish red, but in some areas it is dark red. The plow layer is chiefly subsoil material, but there are patches where it is a mixture of the original surface soil and the upper subsoil. In many places shallow gullies, gall spots, and rills are common.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate, and depth to the water table is more than 10 feet. Tilth is generally fair, and the root zone is thick.

This soil is suited to most crops commonly grown in the area, but crop yields are only fair. Because the hazard of erosion is severe, pasture and trees generally are more suitable than cultivated crops.

Orangeburg sandy loam, 8 to 12 percent slopes, severely eroded (OcD3).—This deep, well-drained, severely eroded soil is on sloping uplands. The surface layer is red to yellowish-red sandy loam 2 to 4 inches thick. The subsoil is sandy clay loam that has weak subangular blocky structure. In most places the subsoil is red to yellowish red, but in some areas it is dark red. The plow layer is chiefly subsoil material, but there are patches where it is a mixture of the original surface soil and the upper subsoil. In many areas small gullies, gall spots, and rills are common.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate. Depth to the water table is more than 10 feet. Tilth is generally fair, and the root zone is thick, but slopes are strong, runoff is rapid, and the hazard of erosion is very severe.

This soil is not suitable for cultivated crops, but it can be used for trees and for pasture on which grazing is limited. All of the acreage is wooded.

Red Bay Series

The Red Bay series consists of deep, friable, well-drained soils of the Coastal Plain uplands. These soils developed in thick beds of unconsolidated sand and sandy clay. Slopes range from 0 to 5 percent. The surface layer of these soils is dark reddish-brown fine sandy loam in the less eroded areas, but it is redder and somewhat finer textured in the more eroded areas. The subsoil is dark-red sandy clay loam. These soils are low in natural fertility and organic-matter content and are medium acid to strongly acid.

Profile of a soil representative of the Red Bay series (in Houston County in a cultivated field on east side of dirt road, approximately half a mile south of Centerville) :

Ap—0 to 8 inches, dark reddish-brown (5YR 3/4) to very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, wavy boundary; 6 to 10 inches thick.

A3—8 to 12 inches, dark reddish-brown (5YR 3/4) fine sandy loam; weak, fine, granular structure; some organic matter; numerous fine roots; very friable; strongly acid; clear, wavy boundary; 3 to 6 inches thick.

B1t—12 to 17 inches, dark-red (2.5YR 3/6) fine sandy loam to light sandy clay loam; very weak, medium, subangular blocky structure; friable; many fine roots; some organic matter in root channels and pores; strongly acid; clear, smooth boundary; 4 to 10 inches thick.

B21t—17 to 38 inches, dark-red (2.5YR 3/6) sandy loam; weak, medium, subangular blocky structure; friable; organic stains in root channels and pores; fine roots common; few thin, patchy clay films on ped faces; strongly acid; gradual, smooth boundary; 10 to 25 inches thick.

B22t—38 to 71 inches +, dark-red (10R 3/6) sandy clay loam; weak, medium, subangular blocky structure; friable or firm; thin, patchy clay films are on ped faces and increase with depth; few fine roots, root channels, and pores that decrease with depth; strongly acid.

Red Bay soils commonly occur with Greenville, Orangeburg, Faceville, and Lakeland soils. They closely resemble Greenville soils in color but are less clayey in the subsoil. They are less clayey than Faceville soils and have a darker colored surface layer and a redder subsoil. Red Bay soils are similar to Orangeburg soils but have a darker colored surface layer. They are redder than Lakeland soils and contain more clay throughout the profile.

The Red Bay soils are fairly extensive in the two counties. The largest acreage is in the central part of Houston County and the central and western parts of Peach County. The native vegetation consists chiefly of mixed pines and hardwoods and an understory of various shrubs, vines, and grasses.

These soils are well suited to most crops commonly grown in the area. Crops respond well to management. Peaches, pecans, and truck crops also produce well on these soils. Most of the acreage is cultivated or in pasture, but some of the steeper areas are wooded.

Red Bay fine sandy loam, 0 to 2 percent slopes (RhA).—This is a deep, friable, well-drained soil on uplands. It is the soil described for the series.

The surface layer is dark brown, dark reddish brown, and very dark grayish brown, and the subsoil is red or dark red. Included in areas mapped as this soil are small areas that have a loamy sand, loamy fine sand, or sandy loam surface layer.

This soil is medium acid to strongly acid, is low in natural fertility, and contains small amounts of organic matter. Water enters the soil at a moderately rapid rate and moves through it at a moderate rate. A moderate amount of water is available to plants. Surface runoff is very slow, and erosion is not a hazard. The root zone is thick, tilth is generally good, and the depth to water table is more than 10 feet.

This soil is among the better soils for farming in the two counties. It is suited to most crops commonly grown in the area and is extensively used for small grain, soybeans, cotton, corn, peanuts, and truck crops. Also suited are peaches (fig. 10), pecans, hay, pasture plants, and trees. Crops respond well to management.

Red Bay fine sandy loam, 2 to 5 percent slopes (RhB).—This deep, well-drained soil is on very gently sloping uplands. The surface layer is dark reddish-brown fine sandy loam 6 to 8 inches thick. The subsoil is dark-red or red, friable sandy clay loam that has moderate subangular blocky structure.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil at a moderately rapid rate and moves through it at a moderate rate. The available water capacity is moderate. Tilth generally is good, the root zone is deep, and depth to the water table is more than 10 feet.

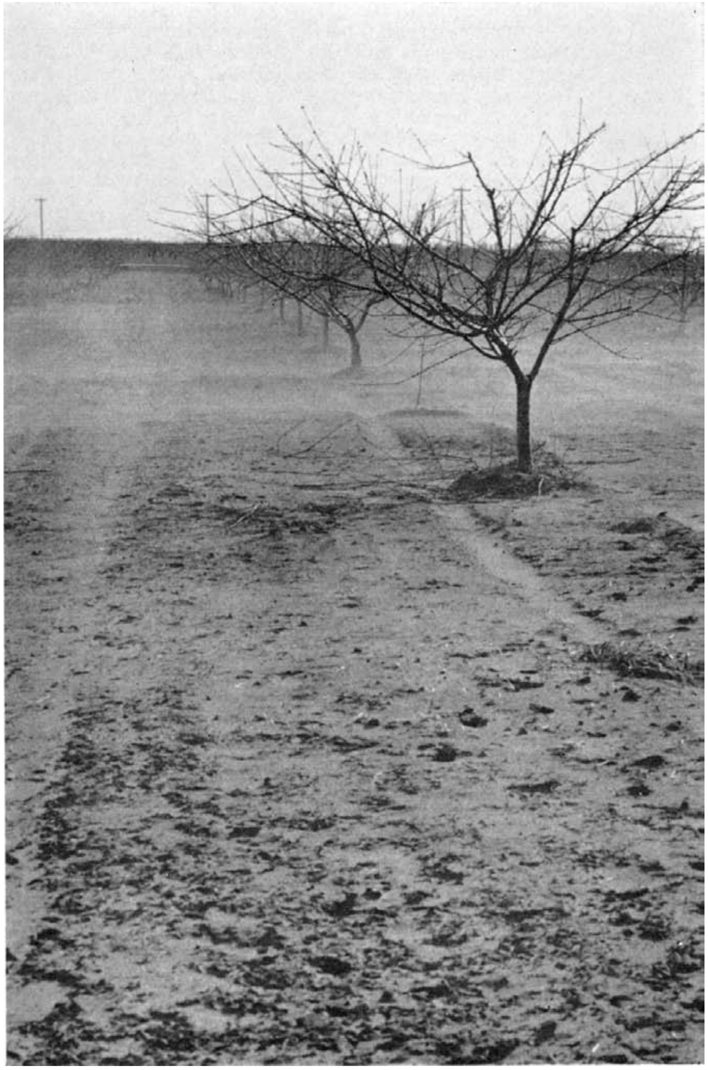

Figure 10.—**Peach orchard on Red Bay fine sandy loam, 0 to 2 percent slopes. Windbreaks are needed to help control wind erosion.**

This soil is suited to most locally grown crops, including peaches and pecans, but runoff is rapid, and the hazard of erosion is moderate. Most of the acreage is in cultivated crops, but pasture plants, hay crops, and trees are also suitable.

Sumter Series

The Sumter series consists of shallow, firm, moderately well drained, alkaline soils that developed on marl, chalk, or limestone in the Black Belt of Houston County. Slopes range from 2 to 8 percent. The surface layer is very dark gray to black clay loam to clay, and the subsoil is pale yellow to light gray and is marly. These soils are alkaline throughout and are low in natural fertility and organic-matter content. They are high in montmorillonite clay minerals.

Profile of a soil representative of the Sumter series (in Houston County in mining area on the east side of Elko road, approximately 2½ miles south of Perry):

A1—0 to 4 inches, very dark gray (10YR 3/1) clay loam; weak, fine, granular structure; friable; many fine roots; alkaline; clear, smooth boundary; 3 to 6 inches thick.

B2—4 to 12 inches, pale-yellow (2.5Y 7/4) silty clay to clay; few, fine, faint mottles of brownish yellow (10YR 6/6); weak, fine, subangular blocky structure; firm; few fine roots; alkaline; few white fragments of chalk; gradual, wavy boundary; 6 to 10 inches thick.

B3—12 to 20 inches, pale-yellow (2.5Y 7/4) clayey marl; common, medium, distinct mottles of brownish yellow (10YR 6/8); small white fragments of marl; weak, medium, subangular blocky structure; firm when moist, hard when dry, plastic when wet; few fine roots; strongly alkaline; gradual, wavy boundary; 6 to 12 inches thick.

C1—20 to 36 inches +, light-gray (2.5Y 7/2) marl streaked and mottled with white (10YR 8/1) and brownish yellow (10YR 6/6).

Sumter soils commonly occur with Oktibbeha, Boswell, and Susquehanna soils. They lack the red, strongly acid B horizon that is common in Oktibbeha soils. Sumter soils are alkaline throughout the profile, whereas the Boswell and Susquehanna soils are strongly acid.

In the area mapped, Sumter soils are not extensive and occur only in the Black Belt of Houston County. The native vegetation is sparse and consists chiefly of mixed pines and hardwoods. These soils are not productive, and crops on them do not respond well to management. All of the acreage is in trees. In some areas these soils have been removed through mining operations.

Sumter clay loam, 2 to 8 percent slopes, eroded (SHC2).—This alkaline soil is on uplands. It is the soil described for the series. Its surface layer is very dark gray or black. Included in places mapped as this soil are small areas that have a clay surface layer.

This soil is low in natural fertility, contains small amounts of organic matter, and is medium alkaline to strongly alkaline. Water moves into the soil at a moderately slow rate and moves through it at a very slow rate. The available water capacity is low, and the water table is within 30 to 60 inches of the surface for 1 or 2 months each year. Tilth is generally poor, and the root zone is thin. The shrink-swell potential is high. Runoff is rapid, and the hazard of erosion is severe.

This soil is difficult to manage and is not suited to cultivated crops. It is better suited to trees, but the less eroded areas can be used for pasture if grazing is limited and the pasture is otherwise properly managed.

Susquehanna Series

The Susquehanna series consists of somewhat poorly drained, clayey soils that formed in thick beds of acid clay on the Coastal Plain uplands. Slopes range from 2 to 12 percent. In the less eroded areas, the surface layer is dark grayish-brown to dark-brown sandy loam to sandy clay loam. The subsoil is highly mottled, dense clay. These soils are low in natural fertility, contain small amounts of organic matter, and are strongly acid.

Profile of a soil representative of the Susquehanna series (in Houston County south of Kathleen in wooded area on north side of dirt road that is about 1¼ miles east of State Route 247):

Ap—0 to 4 inches, dark-brown (10YR 3/3) sandy clay loam; weak, fine, subangular blocky structure; friable to firm; some organic matter; many fine roots; very strongly acid; clear, smooth boundary; 2 to 4 inches thick.

B21t—4 to 10 inches, red (2.5YR 4/6) clay; common, medium, distinct mottles of light brownish gray (10YR 6/2) and reddish brown (5YR 4/4); moderate, medium, subangular blocky structure; very firm when moist, very hard when dry, sticky when wet; few fine roots; very strongly acid; gradual, wavy boundary; 6 to 10 inches thick.

B22t—10 to 60 inches +, gray to light-gray (10YR 6/1) clay; many, medium, prominent mottles of red (2.5YR 4/6) and yellowish brown (10YR 5/6); massive in place, but breaking to weak, medium, subangular blocky structure; extremely firm when moist, plastic when wet, and very hard when dry; very strongly acid; few fine roots, root channels, and pores.

In these counties, Susquehanna soils occur with Boswell and Oktibbeha soils in such an intricate pattern that they are mapped with them as soil complexes. The Susquehanna soils are very similar to the Boswell soils in texture but are more poorly drained and lack a thin, red, unmottled B horizon. The Susquehanna soils are strongly acid throughout, whereas the Oktibbeha soils are alkaline in the lower part of the profile. A profile typical of the Boswell soil and of the Oktibbeha soil is described under the respective series.

The Susquehanna soils are not extensive in the two counties. Most of their acreage is in the Black Belt of Houston County. The native vegetation consists chiefly of mixed pines and hardwoods. In the sloping areas runoff is very rapid, and the erosion hazard is very severe. These soils are not used for cultivated crops, because their root zone is thin, tilth is generally poor, and they have a heavy, dense, clayey subsoil. Trees are more suitable than crops, but some areas can be pastured.

Swamp

Swamp (Swa) is along the Ocmulgee River and other large streams throughout Houston and Peach Counties. It is likely to be flooded frequently and is covered with water for long periods. This land type consists of mixed alluvium that washed from the surrounding soils on uplands; distinct soil layers have not formed. Swamp contains a large amount of decomposed and partly decomposed plant debris. The vegetation consists of hardwoods and an understory of vines, ferns, shrubs, and other water-tolerant plants. Because this land type is frequently flooded, it is not suited to cultivated crops. It is suited as woodland and as a habitat for wildlife.

Vaucluse Series

The Vaucluse series consists of well-drained soils that developed in beds of unconsolidated acid sandy clay and clay on the Coastal Plain uplands. Slopes range from 2 to 30 percent. In the less eroded areas, the surface layer is dark grayish-brown to brown loamy sand. The subsoil is mottled, compact sandy clay loam. In some areas the B horizon is discontinuous, and reticulate mottles are almost at the surface. In other places these soils are capped by a sandy layer that is underlain by mottled, highly stratified sandy and clayey material. These soils are very low in natural fertility, contain small amounts of organic matter, and are strongly acid.

Profile of a soil representative of the Vaucluse series (in Peach County, on east side of old Byron road):

A1—0 to 2 inches, brown (10YR 4/3) to yellowish-brown (10YR 5/4) loamy sand; weak, fine, granular structure; loose; numerous fine roots; mixed with material from A2 and B1t horizons; small amounts of organic matter; very strongly acid; gradual, irregular boundary; 1 to 3 inches thick.

A2—2 to 7 inches, strong-brown (7.5YR 5/6) loamy sand; weak, fine, granular structure; loose or very friable; many fine roots; very strongly acid; gradual, wavy boundary; 4 to 10 inches thick.

B1t—7 to 11 inches, yellowish-red (5YR 5/6) sandy clay loam; many coarse sand grains; massive; slightly compact and brittle; few mica flakes and quartz grains; few white kaolin particles; few fine roots; very strongly acid; gradual, wavy boundary; 3 to 6 inches thick.

Bx—11 to 24 inches, red (2.5YR 4/6) sandy clay loam; massive; compact, brittle, and cemented; few mica flakes and quartz grains; few white kaolin particles; few fine roots; very strongly acid; gradual, wavy boundary; 8 to 16 inches thick.

C—24 to 60 inches +, mottled red (2.5YR 4/6), white (10YR 8/2), strong-brown (7.5YR 5/6) sandy clay loam; many coarse sand grains; pockets of clay; massive; firm and compact in place, breaking to a loose mass; many kaolin pockets that increase with depth; many mica flakes and quartz grains; a few iron crusts and concretions; very strongly acid.

In these counties, Vaucluse soils occur with Hoffman soils in such an intricate pattern that they are mapped with them as soil complexes. A profile typical of the Hoffman soils is described in this report under the Hoffman series. Vaucluse soils also occur with Lakeland and Orangeburg soils. Unlike the Orangeburg soils, Vaucluse soils have a distinct, hard, compact, variable subsoil. Vaucluse soils are similar to Hoffman soils but have a redder subsoil and contain less kaolinitic clay.

Most of the acreage of Vaucluse soils is in the Sandhills of Houston and Peach Counties, but small areas are scattered throughout both counties. The native vegetation consists chiefly of mixed pines and hardwoods and an understory of various vines, shrubs, and grasses. These soils are unproductive, and most of the acreage is in trees.

Vaucluse-Hoffman complex, 2 to 8 percent slopes, eroded (VOC2).—This mapping unit consists of well-drained Vaucluse and Hoffman soils on short, choppy, uneven slopes. These soils occur in such intricate patterns on the landscape that it is not practical to separate them on the soil map.

The Vaucluse soils make up 50 percent of the complex; the Hoffman soils, about 40 percent; and other soils, the remaining 10 percent.

The Vaucluse soils commonly have a surface layer of brown to dark grayish-brown loamy sand 2 to 5 inches thick, but in the more eroded areas the sandy clay loam subsoil is exposed. The subsoil is variable, but it is commonly firm, compact, highly mottled yellowish-red, red, or reddish-yellow sandy clay loam. In some areas are sandy spots where the B horizon is discontinuous. In other areas the subsoil contains small pockets and balls of whitish kaolinitic clay. Gall spots, shallow gullies, and rills are common in the eroded areas.

In most places the surface layer of the Hoffman soils is very dark gray to dark gray loamy sand 2 to 5 inches thick. In the eroded areas, however, the surface layer is mostly subsoil material. Shallow gullies, rills, and gall spots are common in the eroded areas. The subsoil is highly mottled white, yellow, red, very pale brown, and purple, firm and compact silty clay or clay. In some areas the B horizon is discontinuous, and the overlying sandy material is more than 2 feet thick. In other places the clayey subsoil is underlain by compact, varicolored sand.

The soils in this mapping unit are very low in natural fertility, contain small amounts of organic matter, and are strongly acid. Water enters these soils at a moderately rapid rate, but it moves through the soil at a slow rate because the subsoil is compact and clayey. The available water capacity is low, and the water table is at a depth of more than 5 feet. Surface runoff is rapid, and the erosion hazard is very severe. The root zone is thin, and tilth is generally poor.

The soils in this complex are generally not used for cultivated crops. Most of the acreage is in trees, but a few areas are used for pasture.

Vaucluse-Hoffman complex, 8 to 12 percent slopes, eroded (VOD2).—This mapping unit consists of well-drained Vaucluse and Hoffman soils on short, choppy, uneven sloping uplands. These soils are intermingled in such intricate patterns that it is not practical to map them separately.

The Vaucluse soils make up about 50 percent of the complex; Hoffman soils, about 40 percent; and other soils, the remaining 10 percent. Some areas consist only of Vaucluse soils, and some consist only of Hoffman soils. Most areas, however, contain both soils.

The surface layer of the Vaucluse soils is brown to dark grayish-brown loamy sand 2 to 5 inches thick. The subsoil is mottled red, reddish-yellow, grayish-white, and strong-brown sandy clay loam and is firm, compact, and cemented. In some areas the overlying sandy material ranges from 2 inches to as much as 2 feet in thickness. A few deep sandy spots occur in some places.

In most places the Hoffman soils have a surface layer of very dark gray to very dark grayish-brown loamy sand 2 to 5 inches thick. In a few areas the surface layer is almost black. The subsoil is mottled white, yellow, very pale brown, and purple silty clay to clay that is high in kaolin. In some small areas the surface layer is sandy loam or loamy coarse sand. In some places the subsoil is underlain by compact varicolored sand, and in other places the sand and clay are interbedded in thin layers.

The soils in this mapping unit are very low in natural fertility, contain small amounts of organic matter, and are very strongly acid. In the less eroded areas water enters these soils at a moderately rapid rate, but permeability is slow, because the subsoil is compact and clayey. The available water capacity is low, and the water table is at a depth of more than 5 feet. Surface runoff is very rapid, and the erosion hazard is very severe. The root zone is thin, and tilth is generally poor. In many places gall spots, shallow gullies, and a few deep gullies mark the surface of these soils.

The soils in this complex are not used for cultivated crops. Most of the acreage is in trees, though a few areas provide limited grazing.

Use and Management of Soils

The soils of Houston and Peach Counties are used mainly for cultivated crops, pasture, and trees. This section explains how the soils can be used for these purposes, and it also gives the estimated yields of the principal crops and pasture grasses and a rating for the suitability of the soils for peaches and pecans. Also discussed are providing for wildlife; building highways, farm ponds, and other engineering structures; and developing community areas.

In presenting information about the use of soils for crops and pasture, as woodland, and for wildlife habitat, the procedure is to describe groups that are made up of similar soils that are suitable for those purposes and to suggest use and management for those groups. In the subsection on engineering, the soils are not grouped but are placed in tables so that properties significant to engineering work can be readily given. In the subsection on community development, the soils are rated according to their limitations for community development.

Capability Groups of Soils

The capability classification is a grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In this capability system, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability Classes, the broadest grouping, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I. Soils have few limitations that restrict their use.

Class II. Soils have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III. Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV. Soils have very severe limitations that restrict the choice of plants or require very careful management, or both.

Class V. Soils subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife food and cover.

Class VI. Soils have severe limitations that make them generally unsuited to cultivation and that limit their use largely to pasture, woodland, or wildlife food and cover.

Class VII. Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII. Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. There are no soils in class VIII in Houston and Peach Counties.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, *or c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artifical drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in some parts of the United States but not in Houston and Peach Counties, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only subclasses indicated by *w*, *s*, and *c*, because the soils in it are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–2, or IIIe–4. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation, and the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph. The Arabic numeral specifically identifies the capability unit within each subclass.

In Houston and Peach Counties about 11 percent of the land area is in class I, about 26 percent is in subclass IIe, about 3 percent is in subclass IIw, and 6 percent is in subclass IIs. About 13 percent of the land area is in subclass IIIe, 1 percent is in subclass IIIw, 9 percent is in subclass IVe, 2.5 percent is in subclass IVw, and 1.5 percent is in subclass IVs. Subclass Vw accounts for about 10 percent of the land area. About 12 percent of the land area is in subclass VIe, about 3.5 percent is in subclass VIs, about 0.5 percent is in subclass VIIe, and 1 percent is in subclass VIIw.

Management by capability units [2]

The soils in Houston and Peach Counties have been placed in 29 capability units. The soils in each unit have about the same limitations, are subject to similar risks of damage, need about the same kind of management, and respond to management in about the same way.

About 11 percent of the acreage of the two counties has only slight limitations to use and needs only ordinary management practices to maintain productivity and good tilth.

Erosion is the dominant hazard on about 61 percent of the acreage of the two counties, and on about 13 percent, this hazard is so severe that the soils generally are not suitable for cultivation. The degree of erosion determines the kind of management practices needed. Soils on the more gentle slopes may need only contour cultivation and a cropping system that includes medium or high residue producing crops. Soils on steeper slopes or on long slopes need a combination of straight-row farming, terracing, or stripcropping and a cropping system that includes annual close-growing crops, high residue producing crops, or perennial crops. Regardless of the practices used, grassed waterways are essential.

On about 17 percent of the acreage, where excess water is a hazard, some kind of water control system is needed. The kind of system used depends on the extent of the problem and on the crop grown.

About 11 percent of the acreage is sandy and has low or very low available water capacity. The management practices that return organic matter and increase the available water holding capacity are most important on sandy soils. Crop residue management is essential in cultivated areas.

In the following pages each capability unit is described and management suited to the soils in each unit is suggested. The soil conservationist assisting the local Soil and Water Conservation District can help in evaluating the problems of management and in planning a program of soil and water conservation.

CAPABILITY UNIT I–1

This capability unit consists of deep, well-drained, nearly level soils on uplands. These soils have a very friable loamy fine sand or fine sandy loam surface layer 6 to 10 inches thick. The subsoil is friable sandy clay loam.

The soils in this unit are low in natural fertility, contain small amounts of organic matter, and are medium acid or strongly acid. Water moves into these soils at a moderately rapid rate and moves through them at a moderate rate. The available water capacity is moderate. The root zone is thick, and tilth is generally good.

About 70 percent of the acreage is cultivated, 20 percent is pastured, and the rest is wooded or is in some other use.

Some of the important crops grown on the soils in this unit are cotton, corn, peanuts, small grain, and soybeans. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, crimson clover, sericea lespedeza, sorghum, Starr millet, and browntop millet. Peaches, pecans, truck crops, and nursery crops are also productive. Cultivated crops, pasture plants, and orchard crops respond well to good management.

The soils in this unit have very few limitations to use. They can be cropped intensively without losing soil through erosion, if management, including fertilization, is good. Also, these soils do not crust or clod if they are worked within their wide range of favorable moisture content. These soils are suitable for sprinkler irrigation.

One example of a suitable cropping system is corn grown each year. After the corn is harvested, the residue is mowed, chopped, or disked and is left on or near the surface through winter. Another example is cotton or a similar row crop grown each year and, in alternate years, followed by a winter cover crop.

CAPABILITY UNIT I–2

This capability unit consists of deep, well-drained, nearly level soils on uplands. These soils are finer textured than those in capability unit I–1. Their surface layer is very friable fine sandy loam to sandy clay loam 6

[2] J. N. NASH, agronomist, Soil Conservation Service, assisted in writing this subsection.

to 8 inches thick. The subsoil is friable or firm, yellowish-red to dark-red sandy clay.

The soils in this unit are moderate to low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid. Water moves into and through the soils at a moderate rate, and the available water capacity is moderate. Soil structure and tilth generally are good, and the root zone is thick.

About 75 percent of the acreage is cultivated, 15 percent is pastured, and the rest is wooded or is in some other use.

Some of the important crops grown on the soils in this unit are small grain, corn, cotton, peanuts, and soybeans. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, sorghum, crimson clover, sericea lespedeza, and millet. Peaches, pecans, truck crops, and nursery crops are also productive.

The soils in this unit have few limitations to use, and they can be cropped intensively if management is good. Good management includes fertilization and other practices that help to maintain soil fertility and structure. These soils can be worked throughout a fairly wide range of moisture content. If the soils are plowed when wet, however, they clod. When the soils dry, the surface layer hardens and crusts. These soils are suitable for sprinkler irrigation.

An example of a suitable cropping system is corn grown each year. After the corn is harvested, the residue is mowed, chopped, or disked and is left on or near the surface through winter.

CAPABILITY UNIT IIe-1

This capability unit consists of deep, well-drained, very gently sloping soils on uplands. The surface layer of these soils is very friable loamy fine sand or fine sandy loam 4 to 10 inches thick. The subsoil is friable sandy clay loam. In many areas erosion has removed 2 to 4 inches of the original surface soil.

The soils in this unit are low in natural fertility, contain small amounts of organic matter, and are medium acid or strongly acid. Water moves into these soils at a moderately rapid rate, and permeability is moderate. The available moisture capacity is also moderate. In uneroded areas these soils are generally in good tilth, but in the more eroded areas material from the upper part of the subsoil has been mixed with the surface soil. In the eroded areas tilth is only fair. Surface runoff is medium to slow, but slopes are strong enough to create a moderate hazard of erosion. The soils in this unit have a thick root zone and good structure.

About 60 percent of the acreage is cultivated, 20 percent is pastured, and the rest is wooded or is in some other use.

The soils in this unit are suited to oats, wheat, rye, corn, cotton, peanuts, and soybeans. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, crimson clover, sericea lespedeza, sorghum, Starr millet, and browntop millet. Peach trees, pecan trees, truck crops, and nursery crops also grow well. Row crops, pasture plants, and orchard crops respond well to good management that provides fertilizer.

These soils should be managed in such a way that soil losses from erosion are held within allowable limits. An example of a suitable cropping system is 2 years of cotton, peanuts, or another row crop and 4 years of bahiagrass or another close-growing crop.

CAPABILITY UNIT IIe-2

This capability unit consists of deep, well-drained, very gently sloping soils on uplands. These soils are eroded in many places. Their surface layer is very friable fine sandy loam 2 to 8 inches thick. The subsoil is friable to firm sandy clay to clay.

The soils in this unit are moderate to low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid. Water moves into and through the soil at a moderate rate, and the available water capacity is moderate. Erosion is a moderate hazard. Tilth is good in uneroded areas but is generally only fair in the more eroded spots. The root zone is thick.

About 65 percent of the acreage is cultivated, 20 percent is pastured, and the rest is wooded.

The soils in this unit are suited to a wide range of crops. Under good management, oats, wheat, rye, corn, cotton, peanuts, and soybeans grow well. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, common lespedeza, sericea lespedeza, Pensacola bahiagrass (fig. 11), sorghum, browntop millet, and

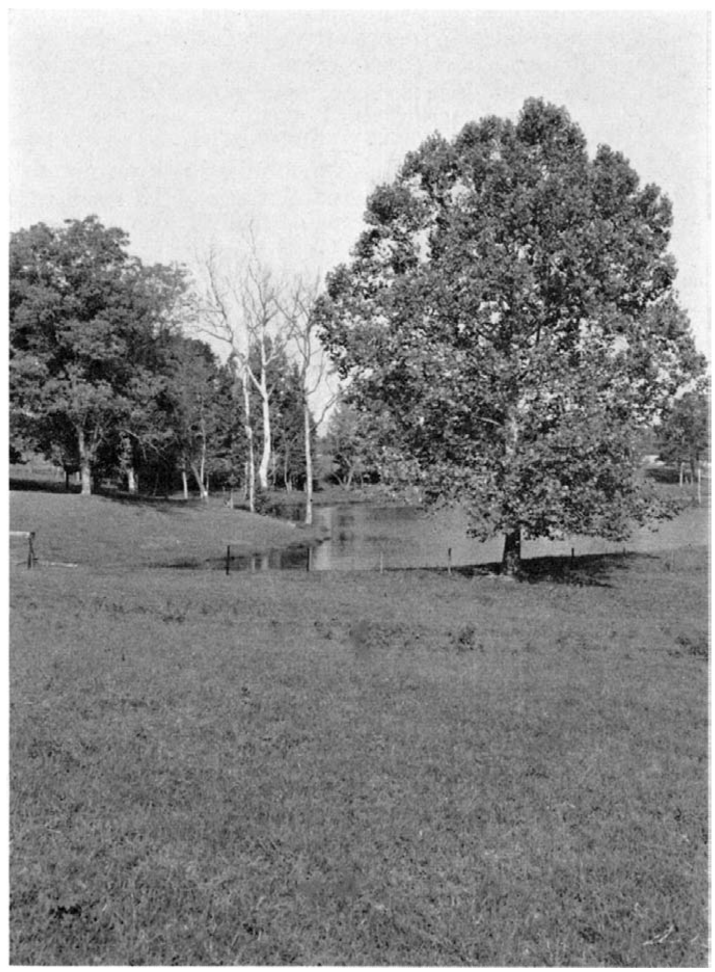

Figure 11.—**A bahiagrass pasture on soils in capability units IIe-2 and IVe-2. The pond is on Alluvial land, wet.**

Starr millet. Peach trees, pecan trees, truck crops, and nursery crops also grow well. Crops on these soils respond well to fertilization and generally produce satisfactory yields.

Surface runoff and the hazard of erosion are the main limitations to using the soils for cultivated crops. Corn or another row crop can be grown year after year if the seed is mulch planted and if all crop residue is mowed and left on the surface through winter.

CAPABILITY UNIT IIw-1

Only one mapping unit—Local alluvial land—is in this capability unit. It occurs in natural depressions and drainageways. The soil material ranges from clay loam, silty clay loam, and sandy clay to sandy loam. In places alluvial material from adjoining areas covers this land.

The soil in this unit is low to medium in natural fertility and contains medium amounts of organic matter. It is strongly acid. The root zone is thick. The permeability and available water capacity are variable because the texture of the soil material is variable.

Most local crops can be grown on this land type, but because of its size, shape, and position, it is generally planted to the same kinds of crops and managed as are adjacent soils. Yields are usually good when moderate amounts of fertilizer are applied. Drainage is needed in places because, during winter and spring, the water table comes within about 15 inches of the surface and some areas are flooded for a short time. In addition to locally grown crops, this soil is suited to pasture and pine trees.

CAPABILITY UNIT IIw-2

Only one mapping unit—Lynchburg loamy sand, 0 to 3 percent slopes—is in this capablity unit. This soil is on nearly level uplands and is deep, friable, and somewhat poorly drained. Its surface layer is very friable loamy sand 8 to 12 inches thick. The subsoil is mottled, friable sandy clay loam.

The soil in this unit is low in natural fertility, contains small to medium amounts of organic matter, and is very strongly acid. Water moves into the soil at a moderately rapid rate and moves through it at a moderately slow rate. The water table is generally high, and the available water capacity is moderate. The root zone is thick, and tilth is generally good.

About 20 percent of the acreage is cultivated, 30 percent is pastured, and the rest is wooded.

The soil in this unit is suited to many kinds of crops, but drainage is needed before cultivated crops can be grown. If this soil is drained, and management, including fertilization, is good, corn, oats, wheat, rye, vegetables, and soybeans produce fair yields. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, dallisgrass, white clover, ladino clover, sericea lespedeza, sorghum, and millet.

Soil loss through erosion is not likely. Cropping systems that help to maintain the organic-matter content and improve soil structure are suitable. One such system is corn or another row crop grown continuously. Another system is 3 years of corn or another row crop and 1 year of a truck crop or a small grain followed by soybeans. After the corn or other row crop is harvested, the residue is mowed, chopped, or disked and is left to provide a surface cover.

CAPABILITY UNIT IIs-1

The only soil in this capability unit is Lucy sand, 0 to 5 percent slopes, a deep, well-drained or somewhat excessively drained soil on uplands. The surface layer is loose or very friable sand 8 to 12 inches thick. The upper subsoil is very friable loamy sand that grades to sandy loam or sandy clay loam at a depth between 20 and 40 inches.

The soil in this unit is low or very low in natural fertility, contains small amounts of organic matter, and is strongly acid. The available water capacity is low. Water moves into and through the upper part of this soil at a moderately rapid or rapid rate. Tilth is generally good, and the root zone is thick.

About 30 percent of the acreage is cultivated, 25 percent is pastured, 40 percent is wooded, and the rest is in some other use.

This soil is suited to cotton, corn, peanuts, small grain, and soybeans. Under good management crop yields are fair. Crops do not respond well to additions of fertilizer. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, sericea lespedeza, common lespedeza, sorghum, Starr millet, and browntop millet. Peach trees, pecan trees, truck crops, and nursery crops produce fairly well.

This soil generally can be cultivated intensively without losing large amounts of soil material through erosion. Exceptions are those places where there is uncontrolled runoff from road ditches, diversion ditches, rooftops, feedlots, and the like. In these places vegetated waterways are needed to dispose of excess water. Because this soil is leached rapidly and its available water capacity is low, large amounts of plant residue should be returned to the soil.

An example of a suitable cropping system for farming in straight rows is 3 years of bahiagrass and 2 years of corn. After the corn is harvested, the residue is mowed, chopped, or disked and is left on the surface. A suitable cropping system for contour farming is 1 year of mulch-planted corn followed by mulch-planted soybeans. All crop residue is mowed and left on the surface to provide a cover.

CAPABILITY UNIT IIIe-1

This capability unit consists of deep, well-drained, sloping soils on uplands. These soils are moderately eroded to severely eroded. Their surface layer is very friable loamy fine sand to sandy loam 2 to 8 inches thick. The subsoil is friable sandy clay loam. In many places erosion has removed from 2 to 7 inches of the original surface soil.

The soils in this unit are low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid. Tilth is generally good in uneroded areas, but it is only fair in the more eroded spots. Water moves into these soils at a moderately rapid rate and moves through them at a moderate rate. The available water capacity is moderate. Surface runoff is moderate, but slopes are strong enough to create a moderate to severe hazard of erosion. The soils in this unit have a thick root zone and good structure.

About 30 percent of the acreage is cultivated, 40 percent is pastured, 25 percent is wooded, and the rest is in some other use.

Some of the more important crops grown on these soils are cotton, corn, peanuts, oats, wheat, rye, cowpeas, and soybeans. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, crimson clover, sericea lespedeza, common lespedeza, sorghum, Starr millet, and browntop millet. Many truck crops and nursery crops grow well. Crops on these soils respond well to fertilization and under good management produce satisfactory yields.

The soils in this unit need management that reduces runoff and controls erosion. The steepness and length of the slopes determine the cropping systems needed. If terraces and contour tillage are used, a suitable cropping system is 2 years of peanuts, cotton, or another row crop and 3 years of bahiagrass.

CAPABILITY UNIT IIIe-1 (B)

The only soil in this capability unit is Sumter clay loam, 2 to 8 percent slopes, eroded. This soil is on uplands and is shallow, firm, and moderately well drained. Its surface layer is friable clay loam 3 to 6 inches thick. The subsoil is firm, clayey marl.

The soil in this unit is low in natural fertility, contains small amounts of organic matter, and is medium alkaline to strongly alkaline. Water moves into the soil at a moderately slow rate and moves through it at a very slow rate. The available water capacity is low. The root zone is thin, and tilth generally is poor. Surface runoff is rapid, and erosion is a severe hazard.

All of this soil is wooded. Cultivated crops are not suited. Although fair to medium pasture can be established, this soil should be kept in trees unless pasture is particularly needed. Plants suitable for pasture and hay are bahiagrass, common bermudagrass, sericea lespedeza, white clover, and ladino clover. Pastures should not be overgrazed. Hardwood trees can be grown on this soil, but pine trees are poorly suited.

CAPABILITY UNIT IIIe-2

This capability unit consists of deep, well-drained soils on gently sloping uplands. Most of the acreage has been cultivated and is moderately eroded to severely eroded. The surface layer is very friable or friable fine sandy loam, sandy clay loam, and clay loam. The subsoil is friable or firm sandy clay to clay.

These soils are moderate to low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid. Water moves into and through these soils at a moderate rate, and the available water capacity is moderate. In the less eroded areas, tilth is generally good and the root zone is thick. In the severely eroded areas, the plow layer consists mostly of subsoil material, tillage is difficult, and the soils can be worked within only a moderate range of moisture content. If the soils are plowed when wet, they clod. When the soils dry, the surface layer hardens and crusts. Runoff is rapid enough to create a severe hazard of erosion.

About 25 percent of the acreage is cultivated, 30 percent is pastured, and the rest is wooded or idle.

The soils in this unit are suited to many kinds of crops. Under good management, corn, cotton, peanuts, small grain, cowpeas, and soybeans produce satisfactory yields. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, crimson clover, sericea lespedeza, sorghum, Starr millet, and browntop millet. Peach trees, pecan trees, truck crops, and nursery crops grow well. Cultivated crops, pasture plants, and orchard crops respond well to good management that provides fertilizer.

The soils in this unit need management that reduces runoff and controls erosion. The steepness and length of slopes determine the cropping system needed to reduce runoff and control erosion. An example of a suitable cropping system is 3 years of Coastal bermudagrass and 1 year of corn.

CAPABILITY UNIT IIIe-4

The only soil in this capability unit is Henderson cherty sandy loam, 2 to 5 percent slopes, eroded. This soil occurs on gently sloping uplands and is well drained. Its surface layer is cherty sandy loam 2 to 6 inches thick. The subsoil is firm sandy clay or clay. In many places numerous large and small siliceous fragments are on the surface and in the subsoil. The fragments generally increase in number with depth.

This soil is low in natural fertility and in organic-matter content and is strongly acid. Water enters the soil at a moderate rate and moves through it at a moderately slow rate. The available water capacity is low. Tilth is generally fair, but tillage is difficult because of the rocks and cobbles. The root zone is thin, and erosion is a severe hazard in unprotected areas.

This soil is mostly in trees or pasture. Coastal bermudagrass, common bermudagrass, bahiagrass, and other pasture plants produce fair yields, but grazing needs to be limited. Woodland is a better use than pasture. Most locally grown crops common in these counties can be grown, but yields are generally poor.

CAPABILITY UNIT IIIe-5

Only one mapping unit—Lucy sand, 5 to 8 percent slopes—is in this capability unit. This soil is on uplands and is gently sloping, deep, and well drained or somewhat excessively drained. The surface layer is very friable to loose sand 4 to 6 inches thick. The subsoil is very friable loamy sand that is underlain by sandy loam or sandy clay loam at a depth of 20 to 42 inches.

This soil is low and very low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into the soil at a rapid rate and moves through it at a moderately rapid rate. The available water capacity is low. Tilth is generally good, and the root zone is thick.

About 15 percent of the acreage is cultivated, 20 percent is pastured, and most of the rest is wooded.

Some of the important crops grown on this soil are cotton, corn, peanuts, small grain, soybeans, and cowpeas. Suitable grasses and legumes are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, sorghum, sericea lespedeza, Starr millet, and browntop millet. Peach trees, pecan trees, vegetable crops, and nursery crops produce fair yields.

Surface runoff is moderate to slow in most places. Erosion is a moderate hazard except in those places where there is uncontrolled runoff from road ditches, diversion ditches, rooftops, feedlots, and the like. In these places vegetated waterways are needed to dispose of excess water.

Because the soil in this unit leaches rapidly, is somewhat droughty, and is subject to erosion, it should be managed so that organic-matter content is maintained and soil losses from erosion are held within allowable limits. An example of a suitable cropping system in a terraced field that is cultivated on the contour is 1 year of cotton or peanuts, 1 year of a small grain followed by mulch-planted soybeans, 1 year of mulch-planted corn, and 1 year of a small grain followed by mulch-planted grain sorghum.

CAPABILITY UNIT IIIw-2

Only one mapping unit—Grady soils—is in this capability unit. These soils occur in sinks or saucerlike depressions and are deep and poorly drained. The surface layer is 8 to 16 inches thick and is variable in texture but is very friable fine sandy loam, sandy loam, or sandy clay loam. The subsoil is firm clay.

These soils are low to moderate in natural fertility, contain small to medium amounts of organic matter, and are very strongly acid. Water moves slowly or very slowly through these soils, and the available water capacity is high. Tilth is generally good, and the root zone is thick. During wet seasons water stands on the surface for long periods.

Except for a few cultivated fields, all of the acreage is pastured or wooded. Drainage is necessary before cultivated crops can be grown.

These wet soils are suited to only a narrow range of crops. In drained areas corn can be grown, but yields are only fair. Bahiagrass, dallisgrass, common bermudagrass, fescue, white clover, and ladino clover can be grown, but generally, trees are more suitable.

These soils can be effectively drained, if a large main ditch and small laterals are dug. Because water moves very slowly through the subsoil, drainage by tile generally is not effective.

Cropping systems that leave crop residue on or near the surface are helpful in maintaining tilth. Corn grown year after year is suitable if all crop residue is left on the surface for improving the soil.

CAPABILITY UNIT IVe-1

This capability unit consists of deep, well-drained, moderately eroded to severely eroded soils on gently sloping to strongly sloping uplands. These soils have a surface layer of very friable loamy fine sand or sandy loam 2 to 6 inches thick. The subsoil is friable sandy clay loam. In the severely eroded areas the plow layer is chiefly subsoil material, but there are patches where it is a mixture of the original surface soil and the upper part of the subsoil.

These soils are low in natural fertility, contain very small amounts of organic matter, and are medium acid to strongly acid. Water moves into these soils at a moderately rapid rate and moves through them at a moderate rate. The available water capacity is moderate. Runoff is moderate to moderately rapid, and the erosion hazard is severe and very severe. The root zone is thick and, except in the severely eroded areas, tilth is generally good.

About 10 percent of the acreage is cultivated, 15 percent is pastured, 70 percent is wooded, and the rest is in some other use.

The soils in this unit are generally better suited to pasture or trees than to cultivated crops. Some of the crops grown are corn, cotton, peanuts, small grain, soybeans, and cowpeas. Crops respond fairly well to additions of fertilizer, but yields are only fair. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, crimson clover, sericea lespedeza, sorghum, Starr millet, and browntop millet. Many truck crops and nursery crops are productive.

If these soils are cultivated, intensive conservation practices are needed to reduce runoff and to hold erosion within allowable limits. An example of a suitable cropping system on a terraced field that is cultivated on the contour is 2 years of Coastal bermudagrass and 1 year of corn.

CAPABILITY UNIT IVe-2

This capability unit consists of deep, well-drained soils on gently sloping or sloping uplands. These soils are moderately eroded or severely eroded. Their surface layer is fine sandy loam, sandy clay loam, or clay loam. The subsoil is friable to firm sandy clay to clay.

The soils in this unit are low to moderate in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid. Water moves into and through the soils at a moderate rate, and the available water capacity is moderate to low. The root zone is thick. Tilth is generally good in the less eroded areas but it is poor in the severely eroded spots. The plow layer consists mostly of subsoil material, and the soils can be cultivated within only a narrow range of moisture content. These soils clod if they are plowed when wet. When the soils dry, the surface hardens and crusts.

About 5 percent of the acreage is cultivated, 15 percent is pastured, and most of the rest is wooded.

Row crops can be grown occasionally under good management, but these soils are better suited to permanent pasture and trees than to cultivated crops. Crops respond fairly well to additions of fertilizer and under good management produce fair yields. The main crops are cotton, corn, small grain, soybeans, and cowpeas. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, crimson clover, sericea lespedeza, sorghum, browntop millet, and Starr millet. Peach trees, pecan trees, truck crops, and nursery crops produce fair yields, but only a small acreage is planted to these crops because runoff is rapid enough to create a severe hazard of erosion.

The soils in this unit should be managed so that runoff is reduced and soil losses are held within allowable limits. If these soils are terraced and tilled on the contour, a suitable cropping system is 2 years of Coastal bermudagrass and 1 year of corn.

CAPABILITY UNIT IVe-3

This capability unit consists of moderately well drained and somewhat poorly drained soils of the uplands. The surface layer of these soils commonly is sandy clay loam 2 to 4 inches thick, and the subsoil is mottled clay that is very firm when moist and plastic when wet.

The soil in this unit is low in natural fertility, contains small amounts of organic matter, and is strongly acid. Water enters and moves through the soil at a slow rate, and the available water capacity is moderate. Surface runoff is very rapid, and the erosion hazard is severe. The root zone is thin, and tilth generally is poor. This soil can be worked within only a narrow range of moisture content. The surface layer clods if it is plowed when wet, and it hardens and crusts when it dries. Because the content of clay is high, this soil tends to shrink and crack when it is dry and to swell when it is wet.

About 5 percent of the soil is pastured, and most of the rest is wooded. The soil in this unit has very severe limitations to use for cultivated crops, but it can be used for pasture or hay. Fair pasture can be produced under careful management. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, bahiagrass, crimson clover, sericea lespedeza, sorghum, and browntop millet. Because surface runoff is very rapid and the erosion hazard is severe, it is important that pastures are not overgrazed and that hay is not cut too often.

If this soil is cultivated, a suitable cropping system is one that reduces surface runoff and holds soil losses from erosion within allowable limits. In such a system sod crops or close-growing crops that produce much residue are grown most of the time.

CAPABILITY UNIT IVe-4

This capability unit consists of well-drained, compact, cherty soils on short, gentle and abrupt slopes in the uplands. The Henderson soil in this unit has many large and small siliceous fragments on the surface. Its surface layer is cherty sandy loam 2 to 6 inches thick. The subsoil also contains fragments and is firm sandy clay or clay loam. The Vaucluse soil has a loamy sand surface layer and a subsoil of firm, compact sandy loam or sandy clay loam. The Hoffman soil has a loamy sand surface layer 2 to 5 inches thick and a subsoil of highly mottled white, yellow, red, brown, and purple, firm silty clay or clay.

The soils in this unit are low in natural fertility, contain small amounts of organic matter, and are strongly acid. Water moves into these soils at a moderately rapid or moderate rate and moves through them at a moderately slow or slow rate. The available water capacity is low. Tilth is generally poor, and the root zone is thin. Surface runoff is rapid, and erosion is a severe or very severe hazard.

About 5 percent of the acreage is pastured, and most of the rest is wooded.

The soils in this unit are poorly suited to row crops, though fair pasture can be produced under careful management. Plants suitable for pasture are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, sericea lespedeza, and common lespedeza. These soils are generally better suited to trees than to pasture.

CAPABILITY UNIT IVe-5

Lucy sand, 8 to 12 percent slopes, is the only soil in this capability unit. It is a deep, well-drained or somewhat excessively drained soil on uplands. The surface layer is very friable to loose sand 4 to 6 inches thick. The subsoil is loamy sand that is underlain by sandy loam or sandy clay loam at a depth of 20 to 42 inches.

This soil is very low in natural fertility, contains small amounts of organic matter, and is medium acid to strongly acid. Water moves into and through this soil rapidly, and the available water capacity is low. Tilth is generally good, and the root zone is thick.

About 5 percent of the acreage is cultivated, 10 percent is pastured, and most of the rest is wooded.

The soil in this unit is fairly well suited to most crops grown locally. Because the soil is sandy, somewhat droughty, and sloping, pasture or trees are more suitable than cultivated crops. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, sericea lespedeza, common lespedeza, sorghum, browntop millet, and Starr millet.

Erosion is a severe hazard where the runoff from road ditches, diversion ditches, rooftops, and feedlots is not controlled. In these places vegetated waterways are needed to carry away accumulated water.

If this soil is cultivated, management is needed to conserve moisture, reduce surface runoff, and hold soil losses within allowable limits. An example of a cropping system suitable for a field that is cultivated on the contour is 4 years of bahiagrass and 2 years of mulch-planted corn.

CAPABILITY UNIT IVw-2

Only one mapping unit—Chastain and Leaf soils—is in this capability unit. These somewhat poorly drained or poorly drained soils are on flood plains and are covered by water for long periods during winter. The Leaf soil has a surface layer of friable silty clay loam 4 to 8 inches thick and a subsoil of firm, slightly plastic, mottled clay. The surface layer of the Chastain soil is variable but commonly consists of recent deposits of friable silty clay loam, silty clay, or clay 2 or 3 feet thick. The subsoil is older material and is mottled, friable or firm silty clay or clay.

The soils in this unit are low or moderately low in natural fertility, contain small or medium amounts of organic matter, and are very strongly acid. Water moves into and through these soils at a very slow rate, and the available water capacity is moderate to high. Tilth is generally good, and the root zone is moderately thick.

All of the acreage is wooded. Drainage is necessary before cultivated crops or pasture can be grown. Even in drained areas, only grain sorghum and a few other row crops are suited. Corn is only moderately well suited. Suitable pasture plants are Pensacola bermudagrass, dallisgrass, ryegrass, fescue, and browntop millet, but generally trees are better suited than pasture.

CAPABILITY UNIT IVs-1

This capability unit consists of Lakeland fine sand, 0 to 5 percent slopes, a deep, somewhat excessively drained, sandy soil of the uplands. The surface layer is loose fine sand 4 to 6 inches thick. The subsoil is also sandy and, at a depth of 42 to 72 inches or more, is underlain by finer textured sediments.

The soil in this unit is very low in natural fertility, contains very small amounts of organic matter, and is strongly acid. Water moves into and through this soil at a very rapid rate, and the available water capacity is very low. This soil is easy to work, is generally in good tilth, and has a thick root zone, but it leaches rapidly and is droughty. Surface runoff is very slow, and erosion is not likely.

About 15 percent of the acreage is cultivated, 25 percent is pastured, and most of the rest is wooded.

Under good management, many kinds of crops can be grown, but yields are fair to poor. Corn, peanuts, small grain, soybeans, and cowpeas can be grown. Plants suitable for pasture and hay are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, sericea lespedeza, common lespedeza, sorghum, and millet.

The soil in this unit should be managed so as to conserve moisture and return large amounts of plant residue to the soil. An example of a suitable cropping system is 4 years of bahiagrass and 2 years of peanuts. Terraces are not suitable, but contour tillage is needed.

CAPABILITY UNIT Vw-1

Grady clay loam is the only soil in this capability unit. This deep, very poorly drained soil is in small depressions and sinks. The surface layer is friable clay loam 6 to 10 inches thick, and the subsoil is very firm, plastic clay.

This soil is low to moderate in natural fertility, contains small to medium amounts of organic matter, and is very strongly acid. Water moves into and through this soil at a very slow rate, and the available water capacity is high. Water stands on the surface for long periods during wet weather.

Most of the acreage is wooded or is idle, and a small acreage is pastured.

Because this soil is wet and the penetration of roots is somewhat restricted, tilled crops are not suitable. Drained areas can be used for pasture or hay, but drainage is generally difficult, and yields are only fair (fig. 12). Plants suitable for pasture are Pensacola bahiagrass, ryegrass, fescue, common bermudagrass, white clover, and ladino clover.

***Figure 12.*—An area of Grady clay loam that has been drained and is used for pasture.**

This soil is suited to trees, but drainage is needed to encourage natural reproduction and to insure the maximum growth of planted trees.

CAPABILITY UNIT Vw-3

Alluvial land, wet, is the only mapping unit in this capability unit. This land type occurs in drainageways and on flood plains and is made up of deep, wet, highly stratified soil material that is highly variable in color and texture. Water completely covers this land type for long periods during winter.

This land type is low in natural fertility, contains considerable amounts of organic matter and plant debris, and is very strongly acid. Surface runoff is very slow, and erosion is not a problem. Both infiltration and permeability are retarded by the high water table.

All of the acreage is wooded. Hardwoods are the most common trees (fig. 13). Because the soil material is waterlogged and flooding is frequent, cultivated crops are not grown. Fair pasture can be produced if trees and brush are cleared, flooding is controlled, and the land is drained. Plants suitable for pasture are dallisgrass, bahiagrass, tall

***Figure 13.*—Blackgum growing on Alluvial land, wet.**

fescue, white clover, and ladino clover. Generally, this land type is better suited to trees than to pasture. Slash pine and loblolly pine are more desirable than hardwoods. Clearing and draining the stream channels would permit the production of pines and would also help the natural restocking of desired trees. Most of the farm ponds in the two counties are on this land type.

CAPABILITY UNIT VIe-1

This capability unit consists of deep, well-drained, severely eroded soils on sloping uplands. The surface layer of these soils is sandy clay loam, clay loam, or sandy loam. The subsoil of the Faceville and Greenville soils is friable to firm sandy clay to clay, and that of the Orangeburg soil is friable sandy clay loam.

The soils in this unit are low in natural fertility, contain small amounts of organic matter, and are medium acid to strongly acid. Water moves into and through these soils at a moderate rate, and the available water capacity is low to moderate. Tilth is generally fair to poor, and the soils can be cultivated within only a narrow range of moisture content. The root zone is thick. If these soils are plowed when wet, they clod. When the soils dry, the surface hardens and crusts.

About 15 percent of the acreage is pastured, and most of the rest is wooded.

Because the soils in this unit are strongly sloping, severely eroded, and difficult to work, they are not suited to cultivated crops. They are generally better suited to pasture or trees. Plants suitable for pasture are Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, ryegrass, crimson clover, sericea lespedeza, and common lespedeza. Pasture plants respond fairly well to additions of fertilizer.

CAPABILITY UNIT VIe-2

This capability unit consists of well-drained to somewhat poorly drained, eroded clayey soils on short and choppy slopes of the uplands. The surface layer of these soils is generally loamy sand, sandy loam, sandy clay loam, and clay. The subsoil ranges from firm, compact sandy clay loam to dense, plastic clay. On the surface and throughout the subsoil of the Henderson soil are numerous large and small siliceous fragments. The Oktibbeha soil is underlain by calcareous marly clay at a depth of 20 to 48 inches.

The soils in this unit are low to very low in natural fertility, contain small amounts of organic matter, and generally are strongly acid. The Oktibbeha soil, however, is alkaline in the lower part of the subsoil. Water moves through these soils at a slow to very slow rate, and the available water capacity is moderate to low. Surface runoff is rapid or very rapid, and the erosion hazard is very severe. The root zone is thin, and tilth is generally poor.

Except for a few small areas that are used for pasture, most of the acreage is wooded.

Because the soils in this unit are difficult to work and are susceptible to very severe erosion, they are not suited to cultivated crops. They are generally better suited to trees. Under careful management, they provide limited grazing. Although fair pasture of Coastal bermudagrass, common bermudagrass, Pensacola bahiagrass, sericea lespedeza, or kudzu can be established, these soils should be kept in trees unless they are especially needed for pasture.

CAPABILITY UNIT VIs-2

Lakeland fine sand, 5 to 12 percent slopes, is the only soil in this capability unit. This deep, excessively drained, sandy soil is on sloping uplands. Its surface layer is loose fine sand 4 to 6 inches thick. The subsoil is also sandy and, at a depth of 42 to 60 inches or more, is underlain by finer textured sediments.

The soil in this unit is very low in natural fertility, contains very small amounts of organic matter, and is strongly acid. Water moves into and through this soil at a very rapid rate, and the available water capacity is very low. Surface runoff is slow to very slow, and erosion is no problem. The root zone is thick, tilth is generally good, and the soil is easy to work.

Except for a few pastured areas, most of this soil is wooded.

Because it is strongly sloping and extremely droughty, this soil is not suited to cultivated crops. Although fair to medium pasture of deep-rooted plants can be established, this soil should be kept in trees unless it is particularly needed for pasture. If this soil is used for pasture, Pensacola bahiagrass generally provides higher yields than the other locally adapted pasture plants.

CAPABILITY UNIT VIIe-2

This capability unit consists of well-drained to somewhat poorly drained, eroded, clayey soils. These soils are on short, steep, choppy slopes of the uplands. Their surface layer is loamy sand, sandy loam, or sandy clay 2 to 5 inches thick. The subsoil ranges from firm, compact sandy clay loam to dense, plastic clay.

The soils in this unit are very low or low in natural fertility, contain small amounts of organic matter, and are strongly acid. Water moves through the soil at a slow to very slow rate, and the available water capacity is low. Surface runoff is very rapid, and the erosion hazard is very severe. The root zone is thin, and tilth is generally poor.

All of the acreage is wooded. The soils in this unit have severe limitations for cultivated crops. They are better suited to trees, but they can be used for pasture if grazing is limited. Plants suitable for pasture are Pensacola bahiagrass, common bermudagrass, sericea lespedeza, and kudzu.

CAPABILITY UNIT VIIe-4

This capability unit consists of Gullied land and Mine pits and dumps. Gullied land is fairly well distributed throughout the northern part of both counties, but the total acreage is small. Slopes are generally more than 5 percent. Mine pits and dumps occupy a small total acreage and occur in an area south of Perry in Houston County.

The land types in this unit are not suited to cultivated crops or pasture, but they can be used as woodland and as wildlife habitat. A few areas have been seeded to kudzu, and some areas have reforested naturally. Many other areas could be planted to trees. The vegetation helps to slow runoff and to control losses of soil material from erosion.

All areas should be kept in some kind of vegetation; trees should be planted where practical. Also helpful in stabilizing these areas are vegetated waterways, diversion ditches and terraces in adjacent fields, and close-growing vegetation around the heads of gullies. Debris basins or other structures may be necessary to protect streams and lakes from silt.

CAPABILITY UNIT VIIw-1

This capability unit consists only of Swamp, which is a very poorly drained land type on flood plains of the larger streams. It is frequently flooded for long periods. The soil material is highly variable in color and texture. It is constantly changing as material is deposited or removed by the floods.

The entire acreage is wooded. Because Swamp is wet and difficult to drain, it is not suited to cultivated crops or pasture. It is suited to trees and as a habitat for wildlife.

Estimated Yields

In table 2 are estimated yields of the principal crops and pasture grasses on the soils of the two counties under improved management, or management at a level higher than that commonly followed. Under the practices generally used in the two counties, yields are generally 20 to 25 percent lower than those shown in table 2.

The estimates are based on observations made during the survey, records of farmers, experiments made by experiment stations, and information from agricultural workers who are familiar with the soils in the two counties. It is assumed that the soils are not irrigated but that rainfall is average and that adequate drainage has been provided.

To obtain the yields in table 2, the farmer can use the practices suggested in the subsection "Management by Capability Units." In addition these general practices of good management are needed: (1) adequate preparation of the seedbed; (2) planting and seeding by suitable methods and at suitable rates; (3) careful choice of the kind of crop to be grown and the cropping system to be used; (4) use of high-yielding crop varieties suited to the soils; (5) control of weeds, insect pests, and diseases; (6) adequate drainage; (7) where needed, vegetated waterways, contour tillage, and terraces; and (8) additions of lime and fertilizer in amounts indicated by soil tests.

TABLE 2.—*Estimated acre yields of principal crops and the suitability of the soils for peaches and pecans*

[Yields are expected under the best practical management that does not include irrigation. Absence of yield indicates crop is not suited to the soil specified or is not commonly grown on it]

Soil	Cotton	Corn	Peanuts	Oats	Soybeans	Coastal bermudagrass for—		Bahiagrass for—	Suitability for peaches and pecans
						Pasture	Hay	Pasture	
	Lb.	*Bu.*	*Lb.*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Tons*	*Cow-acre-days* [1]	
Alluvial land, wet									Not suited.
Boswell-Susquehanna-Oktibbeha complex, 2 to 5 percent slopes, eroded:									
Boswell soil	350	35	1, 200	30	25	225	2. 8	200	Not suited.
Susquehanna soil	200					200		195	Not suited.
Oktibbeha soil	350	35	1, 200	30	25	225	2. 0	200	Not suited.
Boswell-Susquehanna-Oktibbeha complex, 5 to 12 percent slopes, eroded:									
Boswell soil						200	2. 0	190	Not suited.
Susquehanna soil									Not suited.
Oktibbeha soil						200	2. 0	185	Not suited.
Boswell-Susquehanna-Oktibbeha complex, 5 to 12 percent slopes, severely eroded:									
Boswell soil						180	1. 5	170	Not suited.
Susquehanna soil									Not suited.
Oktibbeha soil						180	1. 5	170	Not suited.
Chastain and Leaf soils									
Faceville fine sandy loam, 0 to 2 percent slopes	800	85	2, 000	85	35	395	7. 5	250	Well suited.
Faceville fine sandy loam, 2 to 5 percent slopes	800	80	1, 900	80	32	380	7. 0	235	Well suited.
Faceville fine sandy loam, 2 to 5 percent slopes, eroded.	700	75	1, 700	70	30	375	6. 5	225	Well suited.
Faceville fine sandy loam, 5 to 8 percent slopes, eroded.	650	70	1, 500	60	25	355	5. 0	215	Marginal.
Faceville fine sandy loam, 8 to 12 percent slopes	500	50	1, 400	40	20	340	3. 5	215	Not suited.
Faceville sandy clay loam, 2 to 5 percent slopes, severely eroded.	500	55	1, 300	50	25	340	3. 8	180	Marginal.
Faceville sandy clay loam, 5 to 8 percent slopes, severely eroded.	400	40	1, 100	35	20	325	3. 0	170	Not suited.
Faceville sandy clay loam, 8 to 12 percent slopes, severely eroded.						300	1. 5	160	Not suited.
Grady clay loam								150	Not suited.
Grady soils		40			20			165	Not suited.
Greenville clay loam, 2 to 5 percent slopes, severely eroded.	500	55	1, 300	50	25	325	3. 0	185	Marginal.
Greenville clay loam, 5 to 8 percent slopes, severely eroded.	400	40	1, 100	35	20	300	1. 5	170	Not suited.

See footnote at end of table

TABLE 2.—*Estimated acre yields of principal crops and the suitability of the soils for peaches and pecans—Continued*

Soil	Cotton	Corn	Peanuts	Oats	Soybeans	Coastal bermudagrass for— Pasture	Coastal bermudagrass for— Hay	Bahiagrass for— Pasture	Suitability for peaches and pecans
	Lb.	*Bu.*	*Lb.*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Tons*	*Cow-acre-days* [1]	
Greenville clay loam, 8 to 12 percent slopes, severely eroded.						150	1.0	130	Not suited
Greenville fine sandy loam, 0 to 2 percent slopes	800	85	2,000	85	35	395	7.5	250	Well suited.
Greenville fine sandy loam, 2 to 5 percent slopes	800	80	1,900	80	32	380	7.0	235	Well suited.
Greenville fine sandy loam, 2 to 5 percent slopes, eroded.	700	75	1,700	70	30	375	6.5	225	Well suited.
Greenville fine sandy loam, 5 to 8 percent slopes, eroded.	650	70	1,500	60	25	355	5.0	215	Marginal.
Greenville fine sandy loam, 8 to 12 percent slopes, eroded.	500	50	1,350	40	20	340	3.5	215	Not suited.
Greenville sandy clay loam, 0 to 2 percent slopes.	800	80	2,000	80	35	395	7.5	250	Well suited.
Gullied land									Not suited.
Henderson cherty sandy loam, 2 to 5 percent slopes, eroded.						170	2.5	200	Not suited.
Henderson cherty sandy loam, 5 to 8 percent slopes, eroded.						150	1.5	150	Not suited.
Henderson cherty sandy loam, 8 to 12 percent slopes, eroded.						100	1.0	100	Not suited.
Hoffman-Vaucluse complex, 12 to 30 percent slopes, eroded.									Not suited.
Lakeland fine sand, 0 to 5 percent slopes	250	25	1,000	30		185	3.0	185	Marginal.
Lakeland fine sand, 5 to 12 percent slopes						170	2.5	170	Marginal.
Local alluvial land									
Lucy sand, 0 to 5 percent slopes	475	65	1,600	65	20	315	5.5	220	Marginal.
Lucy sand, 5 to 8 percent slopes	400	60	1,400	60	18	290	5.0	210	Marginal.
Lucy sand, 8 to 12 percent slopes	300	45	1,100	35	12	275	3.8	200	Not suited.
Lynchburg loamy sand, 0 to 3 percent slopes	450	75	1,350	60	30	340	5.2	230	Marginal.
Mine pits and dumps									Not suited.
Norfolk loamy fine sand, 0 to 2 percent slopes	750	85	2,200	75	35	375	6.5	250	Well suited.
Norfolk loamy fine sand, 2 to 5 percent slopes	725	80	2,100	70	32	355	6.0	230	Well suited.
Norfolk loamy fine sand, 2 to 5 percent slopes, eroded.	650	70	1,900	60	30	350	6.0	230	Well suited.
Norfolk loamy fine sand, 5 to 8 percent slopes, eroded.	600	65	1,600	55	25	340	5.6	220	Well suited.
Orangeburg loamy fine sand, 0 to 2 percent slopes.	750	85	2,200	75	35	375	6.5	250	Well suited.
Orangeburg loamy fine sand, 2 to 5 percent slopes.	725	80	2,100	70	32	355	6.0	230	Well suited.
Orangeburg loamy fine sand, 2 to 5 percent slopes, eroded.	650	70	1,900	60	30	350	6.0	230	Well suited.
Orangeburg loamy fine sand, 5 to 8 percent slopes.	675	75	1,900	65	25	350	7.0	230	Marginal.
Orangeburg loamy fine sand, 5 to 8 percent slopes, eroded.	600	65	1,600	55	25	340	5.6	220	Not suited.
Orangeburg loamy fine sand, 8 to 12 percent slopes, eroded.	500	50	1,400	50	15	325	5.0	200	Not suited.
Orangeburg sandy loam, 2 to 5 percent slopes, severely eroded.	475	55	1,400	50	20	285	3.6	185	Marginal.
Orangeburg sandy loam, 5 to 8 percent slopes, severely eroded.	400	45	1,200	45	15	270	3.3	165	Not suited.
Orangeburg sandy loam, 8 to 12 percent slopes, severely eroded.						250	3.0	150	Not suited.
Red Bay fine sandy loam, 0 to 2 percent slopes	750	85	2,300	80	35	375	6.5	250	Well suited.
Red Bay fine sandy loam, 2 to 5 percent slopes	725	80	2,200	75	30	355	6.0	230	Well suited.
Sumter clay loam, 2 to 8 percent slopes, eroded						200	2.0	185	Not suited.
Swamp									Not suited.
Vaucluse-Hoffman complex, 2 to 8 percent slopes, eroded:									
Vaucluse soil	350	40		35	20	260	4.0	180	Not suited.
Hoffman soil						225	3.0	180	Not suited.
Vaucluse-Hoffman complex, 8 to 12 percent slopes, eroded.						210	2.5	165	Not suited.

[1] Cow-acre-days is the number of days 1 acre will support 1 animal unit (1 cow, steer, or horse; 5 hogs; or 7 sheep or goats) without injury to the pasture.

The rates of fertilization and seeding that are required vary according to the yield estimated. Generally, more seed and more fertilizer are required for the higher yields. Given in the following paragraphs are the rates of seeding and fertilization that are required to obtain yields listed in table 2.

COTTON.—Soils for which 600 pounds of cotton lint or more is estimated require, per acre, 80 to 120 pounds of nitrogen (N), 60 to 90 pounds of phosphoric acid (P_2O_5), and 70 to 110 pounds of potash (K_2O). The planting rate is 40,000 to 60,000 plants per acre. Soils for which 300 to 600 pounds of cotton lint or more is estimated require, per acre, 45 to 80 pounds of nitrogen, 35 to 60 pounds of phosphoric acid, and 45 to 70 pounds of potash. The planting rate is 20,000 to 40,000 plants per acre. Soils for which the estimate is 250 to 300 pounds require, per acre, 45 to 80 pounds of nitrogen, 35 to 60 pounds of phosphoric acid, and 45 to 70 pounds of potash. The planting rate is 20,000 to 40,000 plants per acre.

CORN.—Soils for which 65 to 85 bushels of corn is estimated require, per acre, 110 to 150 pounds of nitrogen, 80 to 100 pounds of phosphoric acid, and 80 to 100 pounds of potash. The planting rate is 12,000 to 18,000 plants per acre. Soils for which 25 to 65 bushels of corn is estimated require, per acre, 50 to 110 pounds of nitrogen, 40 to 80 pounds of phosphoric acid, and 40 to 80 pounds of potash. The planting rate is 8,000 to 12,000 plants per acre.

PEANUTS.—Soils for which between 1,800 and 2,300 pounds of peanuts is estimated require, per acre, 12 to 20 pounds of nitrogen, 36 to 60 pounds of phosphoric acid, and 36 to 60 pounds of potash, as well as a side dressing or top dressing of 400 to 500 pounds of gypsum. The seeding rate is 90 to 130 pounds of seed per acre. Soils for which 1,400 to 1,800 pounds of peanuts is estimated require, per acre, 8 to 12 pounds of nitrogen, 20 to 36 pounds of phosphoric acid, and 20 to 36 pounds of potash. A top dressing of 300 to 400 pounds of gypsum is also needed. The seeding rate is 60 to 90 pounds of seed per acre. Soils for which the estimate is less than 1,400 pounds require, per acre, 4 to 8 pounds of nitrogen, 14 to 20 pounds of phosphoric acid, 14 to 20 pounds of potash, and 200 to 300 pounds of gypsum. The planting rate is 40 to 60 pounds of seed per acre.

OATS.—Soils for which more than 70 bushels of oats is estimated require, per acre, 20 to 30 pounds of nitrogen, 40 to 60 pounds of phosphoric acid, and 50 to 90 pounds of potash at planting time and 40 to 60 pounds of nitrogen late in winter or early in spring. Soils for which 40 to 70 bushels of oats is estimated require, per acre, 15 to 20 pounds of nitrogen, 30 to 40 pounds of phosphoric acid, and 35 to 50 pounds of potash at planting time and 20 to 40 pounds of nitrogen late in winter or early in spring. Soils for which the estimate is 30 to 40 bushels require, per acre, 8 to 15 pounds of nitrogen, 20 to 30 pounds of phosphoric acid, and 25 to 35 pounds of potash at planting time and 10 to 20 pounds of nitrogen late in winter or early in spring.

SOYBEANS.—Soils for which 25 to 35 bushels of soybeans is estimated require, per acre, 0 to 25 pounds of nitrogen, 50 to 60 pounds of phosphoric acid, and 100 to 120 pounds of potash. Soils for which 15 to 25 bushels of soybeans is estimated require, per acre, 0 to 15 pounds of nitrogen, 40 to 50 pounds of phosphoric acid, and 75 to 100 pounds of potash. Regardless of the estimate in table 2, lime should be applied on acid soils at 3-year intervals and at least 3 months before planting time. A pH of 6.5 is suggested for best yields.

TABLE 3.—*Productivity, hazards, and suitable*

Woodland group [1]	Commercial trees	Average productivity	
		Site index [2]	Yearly growth [3]
			Bd. ft. per acre
Group 1: Deep, well-drained soils that have a moderately permeable subsoil (FoA, FoB, FoB2, FoC2, FoD, FtB3, FtC3, FtD3, GpB3, GpC3, GpD3, GqA, GsA, GsB, GsB2, GsC2, GsD2, NgA, NgB, NgB2, NgC2, OcB3, OcC3, OcD3, OgA, OgB, OgB2, OgC, OgC2, OgD2, RhA, RhB).	Slash pine	88	500
	Loblolly pine	87	520
	Shortleaf pine	75	430
	Longleaf pine	72	260
Group 2: Deep, moderately well drained and somewhat poorly drained soil that has moderate to moderately slow permeability in the subsoil (LvA).	Slash pine	91	530
	Loblolly pine	87	520
	Longleaf pine	71	240
Group 3: Soils that have a firm to very firm, slowly permeable sandy clay loam to clay subsoil (BrB2, BrD2, BrD3, HdB2, HdC2, HdD2, SHC2[4], VOC2, VOD2, HfF2).	Loblolly pine	82	460
	Shortleaf pine	71	360
	Longleaf pine	66	180
Group 4: Somewhat poorly drained to poorly drained soils in depressions, sinks, and drainageways (Avp, Cls, Gcl, Grd).	Loblolly pine	91	570
	Slash pine	87	490
	Longleaf pine	67	200
Group 5: Deep, well-drained to excessively drained, sandy soils that have a moderately fine textured to coarse-textured subsoil (LqB, LqD, LcB, LcC, LcD).	Slash pine	83	430
	Loblolly pine	81	420
	Shortleaf pine	71	360
	Longleaf pine	68	210

[1] The land types, Swamp (Swa), Gullied land (Gul), Local alluvial land (LcM), and Mine pits and dumps (Mpd), are not placed in a woodland group.

[2] Average height of trees 50 years of age.

Coastal Bermudagrass.—All soils for which yields of Coastal bermudagrass are listed in table 2 require, per acre, 25 to 30 pounds of nitrogen, 50 to 60 pounds of phosphoric acid, and 75 to 90 pounds of potash at planting. Also needed the first year is a topdressing of 100 to 200 pounds of nitrogen in split applications. The planting rate is about 14,000 sprigs per acre.

Bahiagrass.—All soils for which yields of bahiagrass are listed in table 2 require, per acre, 24 to 30 pounds of nitrogen and 48 to 60 pounds of phosphoric acid at planting, as well as a topdressing of 60 to 100 pounds of nitrogen in split applications. For maintenance an annual application of about 25 pounds of nitrogen, 50 pounds of phosphoric acid, and 75 pounds of potash is required, as well as 60 to 100 pounds of nitrogen in split applications. The planting rate is 15 pounds of broadcast seed per acre.

Woodland [3]

Loblolly pine, shortleaf pine, and longleaf pine originally covered the uplands of Houston and Peach Counties, and yellow-poplar, gum, oak, maple, and ash grew on the bottom lands. By 1900, however, most of the original timber had been cut, though the uplands reseeded naturally to loblolly pine and shortleaf pine. The second-growth pine was cut heavily in the 1930's and 1940's. Hardwood trees of a high grade have been harvested periodically from most stands since 1900. Loblolly pine and shortleaf pine are now the dominant trees on the uplands, and low-grade hardwoods are dominant on the bottom lands. Most of the soils in the two counties are well suited to trees. Farmers and foresters are restocking some of the sparse stands.

Approximately 55 percent of the total land area in Houston and Peach Counties is woodland. Of this woodland, about 80 percent is owned by farmers and other individuals, and the rest is owned by companies.

In Houston and Peach Counties, the industries that use wood are small, but there are good markets for lumber and for veneer products in nearby counties. For several years pulpwood has been important in the economy of the two counties because two large pulpmills are in adjoining Bibb County. A market is needed for low-grade hardwoods that cannot be used for lumber and veneer.

Woodland suitability groups

Management of woodland can be planned more easily if soils are grouped according to those characteristics that affect growth of trees and management of the stands. For this reason, the soils of Houston and Peach Counties have been placed in five woodland suitability groups. Each group consists of soils that have about the same suitability for trees, that require about the same management, and that have about the same potential productivity.

Listed in table 3 are the woodland groups in which the soils of the two counties have been placed. For each group, a brief description of the soils is given and the symbols of the soils in the groups are listed. Site indexes and yearly growth are shown for slash, loblolly, shortleaf, and longleaf pines. Also listed in table 3 are trees to favor in existing stands and trees suitable for planting. Ratings of slight, moderate, and severe are given for equipment limitations, seedling mortality, and plant competition. Some of the terms used in table 3 require explanation.

[3] N. E. Sands, woodland conservationist, Soil Conservation Service, assisted in preparing this subsection.

trees for woodland suitability groups

Equipment limitation	Seedling mortality	Plant competition	Suitable species: Favor in stand	Suitable species: Planted trees
Slight	Slight	Moderate	Slash pine, loblolly pine, and shortleaf pine.	Slash pine and loblolly pine.
Slight or moderate	Slight	Moderate	Slash pine, loblolly pine, and longleaf pine.	Slash pine and loblolly pine.
Moderate or severe	Moderate	Moderate or severe	Loblolly pine and shortleaf pine.	Loblolly pine and slash pine.
Severe	Severe	Severe	Loblolly pine, slash pine, and sweetgum.	Loblolly pine and slash pine.
Slight	Severe or moderate	Moderate	Slash pine and loblolly pine.	Slash pine and loblolly pine.

[3] Average yearly growth (Scribner Rule) to age 50, in a well-stocked stand without intensive management. Adapted from data in USDA, Misc. Pub. 50 (*13*) and Southeast Forest Service Experiment Station Occas. Paper 54 (*12*).

[4] Sumter soils are generally poorly suited to pines.

Productivity is expressed in table 3 as *site index* and as yearly growth. Site index is the average height, in feet, that the best (dominant and codominant) trees of a given species, growing on the specified soil, will reach in 50 years. The average site indexes given are based on measurements of trees of different species and on published and unpublished records. Average yearly growth is given in board feet (Scribner rule).

Equipment limitations are rated according to the degree that drainage, slope, soil texture, and other soil characteristics restrict or prohibit the use of ordinary equipment in planting, harvesting, constructing roads, controlling unwanted vegetation, controlling fires, and other woodland management. The limitation is *slight* if there is little or no restriction on the type of equipment, or on the time of the year that equipment can be used. It is *moderate* if the use of equipment is moderately restricted by slope, stones, seasonal wetness, instability, the risk of injury to roots of trees, and other unfavorable characteristics. The limitation is *severe* if special equipment is needed and the use of such equipment is severely restricted by one or more unfavorable soil characteristics.

Seedling mortality refers to the expected loss of seedlings as a result of unfavorable soil characteristics or topographic features, not as a result of plant competition. Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the planted seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places replanting to fill open places will be necessary. Mortality is *severe* if more than 50 percent of the seedlings die, or if trees do not ordinarily reseed naturally in places where there is enough seed. Even when healthy seedlings of suitable species are correctly planted or occur naturally in adequate numbers, some seedlings will not survive if conditions are unfavorable.

Use of Soils for Wildlife[4]

Most of the soils in Houston and Peach Counties are suited to, and support, one or more kinds of wildlife. Some species frequent woodland; others prefer farmland; and many require a water habitat.

As the acreage in row crops decreases in the counties, deer, turkeys, squirrels, and other animals that live in woods are benefited by an increase in the acreage of woodland. But enough large farms remain in the two counties to provide excellent habitat for bobwhite, mourning doves, rabbits, squirrels, and other animals that prefer farmland or a combination of farmland and woods. The number of bobwhite in the counties has increased because food and cover for these birds have been increased by planting suitable plants to add to the native grasses and legumes. Mourning doves thrive best in areas where there are much millet, corn, grain sorghum, peanuts, and peas. Dove hunting is popular in both counties.

Deer and turkeys have always lived in fairly large numbers on the bottom lands along the Ocmulgee River in Houston County and along the Flint River in Peach County. The population of both deer and turkeys is increasing because wildlife management has improved in recent years and these animals have been protected. Fish are plentiful in the rivers, the many other streams, and the constructed ponds. Many of the soils in the counties are suitable for constructing other ponds, which will increase the number of fish and waterfowl. Muskrats, beavers, and ducks are common along the many streams and around ponds.

[4] P. D. SCHUMACHER, biologist, Soil Conservation Service, assisted in writing this subsection.

Following is a summary of the food and habitat needs of the important kinds of wildlife in Houston and Peach Counties.

BEAVER.—Beavers eat only vegetation, mainly bark, roots, and green foliage. Their principal foods from trees are the tender bark of alder, ash, birch, cottonwood, hornbeam, maple, pine, sweetgum, and willow. Beavers also eat the tender shoots of elder, honeysuckle, grasses, and weeds. Acorns and corn are choice foods. The chief feeding areas are within 150 feet of water.

BOBWHITE.—Choice foods are acorns, beechnuts, blackberries, blueberries, browntop millet, corn, cowpeas, dewberries, annual lespedeza, bicolor lespedeza, mulberries, partridgepeas, pecans, common ragweed, tickclover, and the seeds of the wild black cherry, flowering dogwood, pine, sweetgum, and woolly croton. Bobwhite also eat many insects. The food must be close to vegetative cover that provides shade and protection from predators and bad weather.

DEER.—Choice foods are acorns, bahiagrass, blueberries, clover, cowpeas, greenbrier, honeysuckle, annual lespedeza, bicolor lespedeza, oats, rescuegrass, ryegrass, and wheat. Cover requirements generally are met in wooded areas of 500 acres or more.

DOVE, MOURNING.—Choice foods are browntop millet, corn, Japanese millet, common ragweed, and the seeds of pine, sweetgum, and woolly croton. Doves do not eat insects, green leaves, or fruit. They drink water daily.

DUCK.—Choice foods are acorns, beechnuts, browntop millet, corn, Japanese millet, and seeds of smartweed. These foods must be covered with water to be readily available to ducks, though occasionally ducks eat acorns and corn on dryland.

RABBIT.—Choice foods are clover, winter grasses, and other succulent vegetation. Cover, such as a blackberry or plum thicket, is a requirement in habitat for rabbits.

SQUIRREL.—Choice foods are acorns, beechnuts, corn, hickory nuts, mulberries, pecans, and the seeds of blackgum, black cherry, flowering dogwood, magnolia, and pine.

TURKEY, WILD.—Turkeys survive only in wooded areas that are generally 1,000 acres or more in size. They need surface water to drink each day, and they often roost in large trees over or near water. Choice foods are insects, acorns, beechnuts, blackberries, blueberries, dewberries, browntop millet, clover leaves, corn, cowpeas, wild grapes, hackberries, mulberries, oats, wheat, pecans, and the seeds of bahiagrass. Turkeys also feed on rescuegrass and ryegrass, and they eat the seeds of flowering dogwood and pine.

NONGAME BIRDS.—Different species of nongame birds have different food requirements. Several species eat only insects; a few eat insects and fruit; and others eat insects, nuts, and fruits.

FISH.—The principal game fish in the two counties are bluegill, bass, and channel catfish. The choice foods of bluegill are mostly aquatic worms and insects and their larvae. Bass and channel catfish feed on small fish, insects, and other animals. The amount of food depends on the fertility of the water, the kinds of soils in the watershed and, to some extent, on the soils at the bottom of the pond. Because most of the soils are low in natural fertility and are strongly acid, most ponds need to be fertilized and limed so that enough food is produced to insure an adequate supply of fish.

The county unit of the Soil Conservation Service maintains up-to-date, technical guides for each important kind of wildlife and fish, and for each significant plant that provides food or cover for wildlife. It also has specifications for establishment and maintenance of soil and water conservation practices that are adaptable to the soils and waters in the county. Thus, any landowner can obtain practical help in planning and establishing food supply and habitat for the kinds of wildlife or fish he wishes to favor.

Wildlife suitability groups

The soils in Houston and Peach Counties have been placed in wildlife suitability groups on the basis of their suitability as habitat for specified kinds of wildlife. The soils in each group are somewhat similar and generally produce the same kinds of food plants and protective cover for game birds and animals.

Instead of attempting to relate the suitability of specified kinds of wildlife directly to kinds of soils, perhaps it is better to relate each food plant to the kind of animal and then to relate the kind of plant to the groups of soils well suited to it. In table 4 plants are rated *choice*, *fair*, and *unimportant* as food for the main kinds of wildlife in the county, except beavers. Beavers are not included because most of their food is bark, roots, and green plants. The plants listed in table 4 are also listed in table 5, but in table 5 they are rated *suited*, *marginal*, and *poorly suited* according to their suitability. Thus, to get full information, one must refer to table 4 to find the plant suitable for the kinds of wildlife, and then refer to table 5 to find the wildlife suitability group or groups suitable for those plants.

In the following pages the wildlife suitability groups in the two counties are described. To find the soils in each wildlife group, refer to the "Guide to Mapping Units" at the back of this soil survey.

WILDLIFE SUITABILITY GROUP 1

This group consists of deep, well-drained, medium acid to strongly acid soils on uplands. Slopes range from 0 to 12 percent. These soils have a surface layer of loamy fine sand, fine sandy loam, sandy loam, sandy clay loam, and clay loam. The subsoil is chiefly sandy clay loam or sandy clay.

The soils in this group have moderate to low available water capacity. In the uneroded areas, these soils are easily worked and can be cultivated within a wide range of moisture content. In eroded areas, however, tillage is difficult, and the soils can be worked within only a narrow range of moisture content. In the steeper areas surface runoff is moderately rapid and the erosion hazard is very severe. Some of the best land for farming in the two counties is in the smoother areas of the soils of this group.

The soils in this group occupy about 63 percent of the two counties. Most of the acreage is cultivated or pastured. The wooded areas are generally on the steeper slopes and along drainageways. Many of the drainageways are favorable sites for ponds.

WILDLIFE SUITABILITY GROUP 2

This group consists of well-drained to excessively drained sandy soils on uplands. Slopes range from 0 to 12 percent. In many places sand extends to a depth of more than 5 feet, and in some places the sandy material is underlain by permeable sandy loam or sandy clay loam at a depth of 20 to 42 inches.

The soils in this group are low to very low in natural fertility, contain small to very small amounts of organic matter, and are medium acid to strongly acid. The available water capacity is low. Surface runoff is very slow, and erosion is no problem.

The soils in this group occupy about 13 percent of the two counties. Most of the acreage is wooded. Because these soils are sandy, are droughty, and have low available water capacity, their suitability for plants is limited. Although small drains and waterways are numerous, sites suitable for farm ponds are few, and the soils cannot be flooded to provide duck fields.

WILDLIFE SUITABILITY GROUP 3

This group consists of somewhat poorly drained to very poorly drained soils on uplands, in depressions, and on flood plains. The surface layer is variable in texture and ranges from loamy sand to clay loam. The subsoil ranges from sand to clay.

The soils in this group are low to moderate in natural fertility, contain small to medium amounts of organic matter and plant debris, and are very strongly acid. Except for the Lynchburg soil, these soils are subject to flooding and, in wet periods, are covered by water for a few days to more than 2 months. The Lynchburg soil is not flooded, but it has a moderately high water table.

The soils in this group comprise about 14 percent of the two counties. Because of poor drainage and flooding, most of the soils are suited to only a limited number of plants that provide cover and choice food for wildlife. Many kinds of plants grow well on the Lynchburg soil because its water table is moderately high, but plants that require a well-drained soil do not. Some areas of the soils of this group can be flooded for use as duck fields, and many areas are suitable sites for ponds.

WILDLIFE SUITABILITY GROUP 4

This group consists of well-drained to somewhat poorly drained soils on short, choppy, uneven slopes of the uplands. Slopes range from 2 to 30 percent. The surface layer ranges from loamy sand to sandy clay loam. The subsoil ranges from sandy clay loam to clay. In a few areas the soils are underlain by clayey marl, and in some places numerous large and small siliceous fragments are on the surface and in the subsoil.

The soils in this group are low to very low in natural fertility and contain small amounts of organic matter. Most of the soils are strongly acid to very strongly acid, but some are alkaline throughout, and some are alkaline in the lower part of the subsoil. On the steeper slopes, surface runoff is rapid and the erosion hazard is very severe.

The soils in this group occupy about 10 percent of the two counties. Most of the acreage is wooded. Because

TABLE 4.—*Suitability of plants as food for wildlife*

[The figure 1 indicates that the plant is choice (attractive and nutritious for a given kind of wildlife); the figure 2, fair (eaten when choice foods are unavailable); the figure 3, unimportant (eaten only in small amounts)]

Plant	Part of plant eaten	Bob-white	Deer	Dove	Duck	Rabbit	Squirrel	Turkey	Nongame birds [1]		
									Fruit eaters	Grain and seed eaters	Nut and acorn eaters
Bahiagrass	Foliage	3	1	3	3	3	3	3	3	3	3
	Seed	2	3	2	3	3	3	1	3	2	3
Beech	Nuts	1	2	3	1	3	1	1	3	3	1
Blackberry	Fruit	1	3	3	3	3	2	1	1	3	3
	Foliage	3	2	3	3	3	3	3	3	3	3
Blackgum	Fruit	2	3	3	3	3	1	2	1	3	2
Blueberry	Fruit	1	1	3	3	1	2	1	1	3	3
	Foliage	3	1	3	3	3	3	2	3	3	3
Browntop millet	Seed	1	3	1	1	3	3	1	3	1	3
Buttonclover	Foliage	2	1	3	3	1	3	1	3	3	3
Cherry, black	Fruit	1	3	3	3	3	1	2	1	3	2
Chufa	Nuts	3	3	3	1	3	1	1	3	3	3
Corn	Seed	1	1	1	1	1	1	1	3	1	2
Cowpeas	Seed	1	1	2	3	1	3	1	3	1	3
Crimson clover	Foliage	2	1	3	3	1	3	1	3	3	3
Dewberry	Fruit	1	3	3	3	2	2	1	1	3	3
Grapes, wild	Fruit	3	3	3	3	3	2	1	1	3	3
Greenbrier (Smilax)	Foliage	3	1	3	3	1	3	3	3	3	3
Hackberry	Fruit	2	3	3	3	3	2	1	1	3	3
Hickory	Nuts	3	3	3	3	3	1	2	3	3	1
Honeysuckle	Foliage	3	1	3	3	2	3	3	3	3	3
Japanese millet	Seed	1	3	1	1	3	3	2	3	1	3
Lespedeza, annual	Foliage	3	1	3	3	2	3	3	3	3	3
	Seed	1	3	2	3	3	3	2	3	3	3
Lespedeza, bicolor	Foliage	3	1	3	3	2	3	3	3	3	3
	Seed	1	3	3	3	3	3	3	3	3	3
Lespedeza, sericea	Seed	3	3	3	3	3	3	3	3	3	3
Mulberry	Fruit	1	2	3	3	3	1	1	1	3	3
Oak	Acorns	1	1	3	1	3	1	1	3	3	1
Oats	Foliage	3	1	3	3	1	3	1	3	3	3
Pecan	Nuts	1	2	3	3	3	1	1	3	3	1
Pine	Seed	1	3	1	3	3	1	1	3	1	1
Partridgepea	Seed	1	3	3	3	3	3	3	3	2	3
Ragweed, common	Seed	1	3	1	3	3	3	3	3	1	3
Rescuegrass	Foliage	3	1	3	3	1	3	1	3	3	3
Ryegrass	Foliage	3	1	3	3	1	3	1	3	3	3
Smartweed	Seed	3	3	3	1	3	3	3	3	3	3
Sorghum, grain [2]	Seed	1	1	1	1	1	1	1	3	1	3
Sweetgum	Seed	1	3	1	3	3	2	2	3	1	3
Tickclover (beggarlice)	Seed	1	3	3	3	3	3	2	3	3	3
Wheat	Foliage	3	1	3	3	1	3	1	3	3	3
	Seed	1	3	1	1	1	1	1	3	1	3
White clover	Foliage	2	1	3	3	1	3	1	3	3	3
Woolly croton	Seed	1	3	1	3	3	3	3	3	1	3

[1] Fruit eaters include bluebirds, catbirds, mockingbirds, and waxwings. Among the grain and seed eaters are blackbirds, cardinals, meadowlarks, sparrows, and towhees. Nuts and acorns are eaten by chickadees, grackles, bluejays, titmice, and woodpeckers.

[2] Grain sorghum is a choice food of most birds that feed on grain, but the blackbirds, cowbirds, and sparrows rob the game species of most of the seed, or the humid climate causes the seed to rot.

these soils have a thin root zone and are low in available moisture capacity, this suitability for plants is somewhat limited.

Use of Soils in Community Development

In recent years the population of both Houston and Peach Counties has increased. This increase has been greater in Houston County, where several thousand people are employed at the Warner Robins Air Force Base. The increase in population has increased the need for additional housing, schools, churches, shopping centers, and other buildings. Also, there is a need for new roads or for relocating existing roads, and for planned recreational areas, such as campsites, picnic areas, and playgrounds.

In table 6 the soils of the two counties are rated *slight*, *moderate*, and *severe*, according to the degree of their limitations for dwellings, recreational facilities, structures for light industry, and trafficways. If the rating is moderate or severe, the main limitation is given along with the rating. Table 6 and the soil map at the back of the report can be used as guides to the selection and use of soils as sites for community development, but an investigation on the site of a planned development is needed.

DWELLINGS.—In this report dwellings refer to houses of three stories or less (fig. 14). The limitations are rated for soils used as sites for dwellings served by community sewage systems and for dwellings that require septic tank filter fields. The soil properties that affect use for dwellings most are shrink-swell potential, depth to the seasonally high water table, hazard of flooding, slope, and depth to hard rock. The hazard of flooding is a major limiting factor. A high water table and a slow rate of percolation severely limit the use of soils for septic tank filter fields.

TABLE 5.—*Suitability of plants for the soils, by wildlife suitability groups*

[A rating of 1 means that the plant is suited to the soils in the specified wildlife group, 2 means marginal, and 3 means poorly suited or not suited]

Plants	Wildlife suitability groups—			
	1	2	3	4
Bahiagrass	1	1	3	2
Beech	2	3	1	2
Blackberry	1	2	3	2
Blackgum	2	3	1	2
Blueberry	2	2	1	2
Browntop millet	1	2	1	2
Buttonclover	1	3	3	2
Cherry, black (wild)	1	2	3	3
Chufa	1	2	3	3
Corn	1	1	3	3
Cowpeas	1	1	3	3
Clover, crimson	1	3	3	3
Dewberry	1	1	3	2
Grapes (wild)	1	2	1	2
Greenbrier (Smilax)	1	2	1	2
Hackberry	1	3	3	3
Hickory	1	2	3	2
Honeysuckle	1	3	1	2
Japanese millet	1	3	1	2
Lespedeza, annual	1	3	1	2
Lespedeza, bicolor	1	2	3	2
Lespedeza, sericea	1	2	3	3
Mulberry	1	3	1	2
Oak [1]	1	1	3	2
Oats	1	1	3	3
Pecan	1	2	3	3
Pine	1	1	1	1
Partridgepeas	1	1	3	3
Ragweed, common	1	1	3	2
Rescuegrass	1	2	3	3
Ryegrass	1	2	3	3
Smartweed	3	3	1	2
Sorghum, grain [2]	3	3	3	3
Sweetgum	2	3	1	1
Tickclover (beggarlice)	1	2	3	2
Wheat	1	2	3	3
Woolly croton	1	2	3	3
White clover	3	3	1	2

[1] Suitable oak trees include black oak, blackjack oak, live oak, pin oak, post oak, sawtooth oak, scarlet oak, Shumard oak, water oak, white oak, and willow oak.

[2] Because grain sorghum attracts blackbirds, sparrows, and other undesirable birds, and because it rots quickly in the humid climate, it is rated poorly suited although it is grown on many of the soils in the two counties.

Figure 14.—**A housing development on Greenville fine sandy loam. This soil has only slight limitations as sites for houses.**

RECREATION.—The recreational facilities considered in table 6 are campsites, intensive play areas, and picnic areas. Areas used for campsites should be suitable, without much preparation of the site, for tents and for outdoor living for at least a week. Intensive play areas include playgrounds, baseball diamonds, tennis courts, and other areas used for organized games. These areas are subject to much foot traffic and generally require a nearly level, firm surface and good drainage. They should be free of coarse fragments and outcrops of rock.

The properties important in evaluating soils for campsites, intensive play areas, and picnic areas are slope, erodibility, and trafficability. Trafficability is affected by the water table and the hazard of flooding. In intensive play areas, the depth to hard rock is also important.

STRUCTURES FOR LIGHT INDUSTRY.—These structures include buildings that are used for stores, offices, and small industries. These buildings are not more than three stories high. It is assumed that sewage disposal facilities are available. The properties important in evaluating the soils for this use are slope, depth to the water table, hazard of flooding, shrink-swell potential, and corrosion potential.

TRAFFICWAYS.—This term refers to low-cost roads and residential streets that can be built without much cutting, filling, and preparation of subgrade. The properties important in evaluating the soils for trafficways are slope, depth to hard rock, depth to the water table, hazard of flooding, erodibility, and traffic-supporting capacity.

Engineering Applications [5]

Soil engineering is becoming more important in Houston and Peach Counties because the need for developing industrial, business, residential, and recreational sites is increasing. New highways are being built, and others are in the planning stages. On the farms many farm ponds, irrigation systems, drainage ditches, and terracing systems are being constructed. Many of the larger streams throughout both counties need channel improvement and possibly flood retarding structures. In carrying out these projects, it is essential that engineering properties of the soil be known.

[5] P. F. DOMINY, agricultural engineer, Soil Conservation Service, assisted in writing this subsection.

Soil engineering is a part of structural engineering and deals with soils used as foundations on which structures rest and with soils used as structural material. Generally, soil is used in the locality and in the condition in which it occurs. A large part of soil engineering concerns the locating of various soils, determining their engineering properties, correlating these properties with the requirements of the job, and selecting the best soil material or site for each job.

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. Among these properties are permeability, shear strength, compaction characteristics, soil drainage, shrink-swell potential, grain size, plasticity, and acidity. Also important are topography, the depth to bedrock, and the depth to the water table.

This survey contains information that can be used by engineers and others who work with soils to—

1. Make studies of soil and land use that aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the soil properties that are important in planning agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, airports, pipelines, and cables and in planning detailed investigations at the selected locations.
4. Locate sources of sand and other construction material.
5. Correlate performance of engineering structures with soil mapping units to develop information that will be useful in designing and maintaining engineering.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement the information obtained from other published maps and reports and from aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

With the use of the soil map for identification, the engineering interpretations in this subsection can be useful for many purposes. It should be emphasized, however, that the interpretations may not eliminate the need for

TABLE 6.—*Limitations of soils*

Soil series, land types, and map symbols	Dwellings—	
	With public or community sewage systems	With septic tank filter fields
Alluvial land, wet (Avp)	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Boswell (BrB2, BrD2, BrD3)	Severe; high shrink-swell potential.	Severe; percolation rate is slower than 75 minutes per inch; high shrink-swell potential.
Chastain (Cls)	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Faceville (FoA, FoB, FoB2)	Slight	Moderate; percolation rate is 45 to 75 minutes per inch.
Faceville (FoC2, FoD)	Slight	Moderate; percolation rate is 45 to 75 minutes per inch.
Faceville (FtB3, FtC3, FtD3)	Slight	Moderate; percolation rate is 45 to 75 minutes per inch.
Grady (Gcl, Grd)	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Greenville (GqA, GsA, GsB, GsB2)	Slight	Slight
Greenville (GsC2, GsD2)	Slight	Slight
Greenville (GpB3, GpC3, GpD3)	Slight	Slight
Gullied land (Gul)	Severe	Severe
Henderson (HdB2, HdC2, HdD2)	Slight	Severe; percolation rate is slower than 75 minutes per inch.
Hoffman (HfF2)	Moderate to severe: 12 to 30 percent slopes.	Severe; percolation rate is slower than 75 minutes per inch; 12 to 30 percent slopes.
Hoffman (VOC2, VOD2)	Slight	Severe; percolation rate is moderately slow.

sampling and testing at the site of specific engineering works where loads are heavy and where the excavations are deeper than the depths of layers here reported. Even in these situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Most of the information in this subsection is given in tables 7, 8, and 9. Table 7 gives the engineering test data obtained when the samples of selected soil series were tested. Estimates of the physical properties of the soils in Houston and Peach Counties are listed in table 8, and interpretations of these properties are given in table 9. Other parts of this report may be useful to engineers, particularly the sections "Descriptions of the Soils" and "Formation and Classification of Soils."

Many of the terms in this survey apply to agriculture, and their meaning may differ from similar terms used by engineers. Most of the terms are defined in the Glossary at the back of the report.

Engineers of the Soil Conservation Service collaborated with soil scientists of the Soil Conservation Service in preparing this subsection.

Engineering classification systems

Two systems of classifying soils are in general use among engineers. Both are used in this report.

Most highway engineers classify soil material according to the system approved by the American Association of State Highway Officials (AASHO) (*2*). In this system, classification is based on physical properties of the soil material and the field performance of the soils in highways. The soil material is classified in seven principal groups. Groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. The group index number is shown in parentheses following the soil subgroup symbol; for example, A–6(4).

Some engineers prefer to use the Unified Classification system established by the Waterways Experiment Station, Corps of Engineers (*14*). This system is based on identification of soils according to their performance as engineering construction material. Soil material is put into 15 classes that are designated by pairs of letters. These classes range from GW, consisting of well-graded gravel, gravel and sand mixtures, and a little fine material, to Pt, consisting of peat and other highly organic soil material. Well-graded gravel and sand are made up of particles that are within the size of range of sand and gravel but are well distributed in size within that range.

used in community development

Recreational facilities: Campsites and intensive play areas	Recreational facilities: Picnic areas	Structures for light industries	Trafficways
Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Moderate; fair trafficability;[1] 2 to 12 percent slopes.	Moderate; fair trafficability	Severe; high shrink-swell potential; 2 to 12 percent slopes.	Severe; poor traffic-supporting capacity.[2]
Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Slight	Slight	Moderate; moderate shrink-swell potential.	Moderate; fair traffic-supporting capacity.
Moderate; 5 to 12 percent slopes.	Slight	Moderate; 5 to 12 percent slopes; moderate shrink-swell potential.	Moderate; fair traffic-supporting capacity.
Moderate; fair trafficability; 2 to 12 percent slopes.	Moderate; fair trafficability	Moderate; moderate shrink-swell potential; 2 to 12 percent slopes.	Moderate; fair traffic-supporting capacity.
Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Slight	Slight	Moderate; moderate shrink-swell potential.	Moderate; fair traffic-supporting capacity.
Moderate; 5 to 12 percent slopes.	Slight	Moderate; moderate shrink-swell potential; 5 to 12 percent slopes.	Moderate; fair traffic-supporting capacity.
Moderate; fair trafficability; 2 to 12 percent slopes.	Moderate; fair trafficability	Moderate; moderate shrink-swell potential; 2 to 12 percent slopes.	Moderate; fair traffic-supporting capacity.
Severe	Severe	Severe	Severe.
Moderate; fair trafficability; 2 to 12 percent slopes.	Moderate; fair trafficability	Moderate; moderate shrink-swell potential.	Moderate; fair traffic-supporting capacity.
Severe; 12 to 30 percent slopes	Moderate; 12 to 30 percent slopes.	Severe; 12 to 30 percent slopes	Moderate; fair traffic-supporting capacity; 12 to 30 percent slopes.
Moderate; 2 to 12 percent slopes	Slight	Moderate; moderate shrink-swell potential; 2 to 12 percent slopes.	Moderate; fair traffic-supporting capacity.

See footnotes at end of table.

TABLE 6.—*Limitations of soils used in*

Soil series, land types, and map symbols	Dwellings— With public or community sewage systems	Dwellings— With septic tank filter fields
Lakeland (LqB, LqD)	Moderate; very low available water capacity and productivity.	Moderate; poor filtering action; nearby water supply may be contaminated.
Leaf (Cls)	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Local alluvial land (LcM)	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Lucy (LcB)	Slight; sandy; low available water capacity.	Slight; low available water capacity
Lucy (LcC, LcD)	Slight; sandy; low available water capacity.	Slight; sandy; low available water capacity.
Lynchburg (LvA)	Moderate; seasonally high water table.	Severe; seasonally high water table; percolation rate is slower than 75 minutes per inch.
Mine pits and dumps (Mpd)	Severe	Severe
Norfolk (NgA, NgB, NgB2)	Slight	Slight
Norfolk (NgC2)	Slight	Slight
Oktibbeha (BrB2, BrD2, BrD3)	Severe; high shrink-swell potential	Severe; percolation rate is slower than 75 minutes per inch; high shrink-swell potential.
Orangeburg (OgA, OgB, OgB2, OcB3)	Slight	Slight
Orangeburg (OgC, OgC2, OgD2, OcC3, OcD3)	Slight	Slight
Red Bay (RhA, RhB)	Slight	Slight
Sumter (SHC2)	Severe; high shrink-swell potential	Severe; percolation rate is slower than 75 minutes per inch; high shrink-swell potential.
Susquehanna (BrB2, BrD2, BrD3)	Severe; high shrink-swell potential	Severe; percolation rate is slower than 75 minutes per inch; high shrink-swell potential.
Swamp (Swa)	Severe; water table at or near the surface most of the time.	Severe; water table at or near the surface most of the time.
Vaucluse (VOC2, VOD2)	Slight	Severe; percolation rate is moderately slow.
Vaucluse (HfF2)	Moderate to severe; 12 to 30 percent slopes.	Severe; percolation rate is slower than 75 minutes per inch; 12 to 30 percent slopes.

[1] Trafficability refers to the ease or difficulty with which people can move about over the soil on foot, on horseback, or in a small vehicle, such as a golfcart.

Soil test data

To help evaluate the soils for engineering purposes, samples were taken from the soils of three extensive series and were tested according to standard procedures. The test data obtained are given in table 7. Because only a few samples of each soil series were tested, the data probably do not show the maximum variation in the horizons of each soil series. Because the samples were obtained at a depth of 6 feet or less at most sites, the test data may not be adequate for estimating the characteristics of soil material in deep cuts.

The engineering soil classifications in table 7 are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. Mechanical analyses were made by the combined sieve and hydrometer methods. The percentage of clay obtained by the hydrometer method should not be used in naming textural classes of soils. The pipette method should be used if textural classes are to be named.

The tests for liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Soil properties

In table 8 are estimates of important physical properties that affect engineering work on the soils in Houston and Peach Counties. Estimates of properties significant to engineering are given by layers. The layers are fewer and generally thicker than those of the profiles given in the section "Descriptions of the Soils."

community development—Continued

Recreational facilities: Campsites and intensive play areas	Recreational facilities: Picnic areas	Structures for light industries	Trafficways
Moderate; sandy; fair trafficability; 2 to 12 percent slopes.	Moderate; sandy; fair trafficability.	Moderate; sandy; very low available water capacity; 2 to 12 percent slopes.	Moderate; fair traffic-supporting capacity.
Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.	Severe; seasonally high water table; flooding.
Slight; sandy; low available water capacity.	Slight; sandy	Slight; sandy	Slight.
Moderate; 5 to 12 percent slopes; sandy; low available water capacity.	Slight; sandy	Moderate; 5 to 12 percent slopes.	Slight.
Moderate; fair trafficability	Moderate; fair trafficability	Moderate; seasonally high water table.	Moderate; seasonally high water table; fair traffic-supporting capacity.
Severe	Severe	Severe	Severe.
Slight	Slight	Slight	Slight.
Moderate; 5 to 8 percent slopes	Slight	Moderate; 5 to 8 percent slopes	Slight.
Moderate; fair trafficability; 2 to 12 percent slopes.	Moderate; fair trafficability	Severe; high shrink-swell potential; 2 to 12 percent slopes.	Severe; poor traffic-supporting capacity.
Slight	Slight	Slight	Slight.
Moderate; 5 to 12 percent slopes	Slight	Moderate; 5 to 12 percent slopes	Slight.
Slight	Slight	Slight	Slight.
Moderate; fair trafficability; 2 to 8 percent slopes.	Moderate; fair trafficability	Severe; high shrink-swell potential; 2 to 8 percent slopes.	Severe; poor traffic-supporting capacity.
Moderate; fair trafficability; 2 to 12 percent slopes.	Moderate; fair trafficability	Severe; high shrink-swell potential; 2 to 12 percent slopes.	Severe; poor traffic-supporting capacity.
Severe; water table at or near the surface most of the time.	Severe; water table at or near the surface most of the time.	Severe; water table at or near the surface most of the time.	Severe; water table at or near the surface most of the time.
Moderate; 2 to 12 percent slopes	Slight	Moderate; moderate shrink-swell potential; 2 to 12 percent slopes.	Moderate; fair traffic-supporting capacity.
Severe; 12 to 30 percent slopes	Moderate; 12 to 30 percent slopes.	Severe; 12 to 30 percent slopes	Moderate; fair traffic-supporting capacity; 12 to 30 percent slopes.

[2] Traffic-supporting capacity refers to the ability of an undisturbed soil to support moving loads.

The depth to a seasonally high water table is indicated in table 8. Soils that have a high water table are limited in their use for highways and other construction.

Table 8 also shows the USDA textural classification of the soil layers and the estimates of the Unified and the AASHO classifications. Also listed are the estimated percentages of material that will pass sieve Nos. 4, 10, and 200.

Permeability is estimated for each layer in place, without compaction. These estimates are based on the texture, structure, and consistency of the soils and on field observations.

Available water capacity, estimated in inches per inch of soil depth, is the approximate amount of capillary water in a soil that is wet to field capacity. When the soil is air dry, this amount of water will wet the soil material to a depth of 1 inch without deeper percolation.

The pH value shown in table 8 in the column headed "Reaction" indicates the degree of soil acidity.

The rating for shrink-swell potential indicates how much the soil material changes in volume when its moisture content changes. It is estimated primarily on the basis of the amount and kind of clay in the soil layers. In general, soils classified CH and A–7 have a high shrink-swell potential. Soils having a low shrink-swell potential are clean sand and gravel, soils that contain small amounts of nonplastic and slightly plastic fines, and most other nonplastic to slightly plastic soils.

Engineering interpretations of soils

Table 9 rates the soils of Houston and Peach Counties according to suitability as sources of topsoil and road fill and material for road subgrade. It also names the soil features that affect engineering practices and structures and that, therefore, must be considered in planning practices and in designing, constructing, and maintaining structures. The ratings of suitability and the features or characteristics are evaluated on the basis of estimates given in table 8, on test data shown in table 7, and on observations of soils in the field.

TABLE 7.—*Engineering test data* [1] *for*

Soil name and location	Parent material	SCS report No.	Depth	Horizon	Moisture-density [2]	
					Maximum dry density	Optimum moisture
			Inches		*Lb. per. cu. ft.*	*Percent*
Faceville fine sandy loam:						
Peach County: 2.25 miles southeast of horticulture station on county road (ortho).	Coastal Plain sediments (Clayton formation).	S62Ga-111-17-4	18-60	B22	115	15
Peach County: 3 miles southeast of Fort Valley (ortho).	Coastal Plain sediments (Clayton formation).	S62Ga-111-18-4	11-50	B2	113	16
Norfolk loamy fine sand:						
Peach County: 1 mile west of Houston County line on U.S. Highway No. 341 (ortho).	Coastal Plain sediments (Clayton formation).	S62Ga-111-16-3 S62Ga-111-16-5	10-25 29-50	B2 C	110 102	16 20
Peach County: 0.25 mile south of Clopine (iron concretions).	Coastal Plain sediments (Clayton formation).	S62Ga-111-15-2 S62Ga-111-15-4	8-40 48-60	B2 C	112 107	16 18
Orangeburg loamy fine sand:						
Peach County: 1 mile north of Mossy Creek and 0.5 mile west of U.S. Highway No. 41 (ortho).	Coastal Plain sediments (Clayton formation).	S62Ga-111-19-4	15-70	B2	116	14
Peach County: 0.37 mile north of Mossy Creek on west side of U.S. Highway No. 41 (toward Faceville series).	Coastal Plain sediments (Clayton formation).	S62Ga-111-20-5	20-60	B22	112	16
Orangeburg loamy fine sand:						
Houston County: 0.5 mile west of Kersey's peach packing shed near Lake Houston (ortho).	Coastal Plain sediments (Clayton formation).	S62Ga-76-8-2 S62Ga-76-8-4	5-22 27-60	A3 B2	122 114	10 16
Norfolk loamy fine sand:						
Houston County: North Henderson city limits on U.S. Highway No. 41 (some iron concretions).	Coastal Plain sediments (Flint River formation).	S62Ga-76-4-4 S62Ga-76-4-6	13-27 32-50	B22 C	110 107	18 18
Houston County: 1 mile north and 0.75 mile west of Elko (some iron concretions).	Coastal Plain sediments (Flint River formation).	S62Ga-76-5-4 S62Ga-76-5-6	13-49 54-70	B2 C	112 113	16 14

[1] Tests performed by the State Highway Department of Georgia, in cooperation with the U.S. Department of Commerce, Bureau of Public Roads. The tests, except those for volume change (see footnote 3), were performed in accordance with standard test procedures of the American Association of State Highway Officials (AASHO) (*2*).
[2] Based on AASHO Designation: T 99-57, Method A (*2*).
[3] Based on "A System of Soil Classification" by W. F. Abercrombie (*1*).
[4] According to the AASHO Designation: T 88-57 (*2*). Results by this procedure frequently may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 milli-

soil samples taken from 9 soil profiles

Volume change [3]			Mechanical analysis [4]									Liquid limit	Plasticity index	Classification	
			Percentage passing sieve—					Percentage smaller than—							
Shrinkage	Swell	Total volume change	¾ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [5]
Percent	*Percent*	*Percent*													
7. 7	4. 4	12. 1	------	------	100	95	50	42	41	37	34	23	11	A-6(3)	SC.
11. 0	1. 0	12. 0	------	------	100	94	52	47	45	41	38	25	12	A-6(4)	CL.
12. 3	2. 7	15. 0	------	------	100	97	52	48	47	40	36	27	16	A-6(6)	CL.
11. 0	3. 1	14. 1	------	------	100	98	56	52	52	50	47	36	15	A-6(6)	CL.
7. 2	5. 0	12. 2	100	96	93	90	48	46	44	39	36	29	15	A-6(4)	SC.
5. 3	5. 4	10. 7	100	98	97	93	45	42	40	36	33	30	9	A-4(2)	SM-SC.
10. 0	4. 6	14. 6	------	------	100	90	45	40	39	35	32	25	14	A-6(3)	SC.
6. 6	3. 2	9. 8	------	100	99	86	43	40	40	38	36	27	14	A-6(3)	SC.
1. 8	3. 7	5. 5	------	100	99	90	27	24	22	18	15	[6] NP	[6] NP	A-2-4(0)	SM.
4. 1	5. 0	9. 1	------	100	99	91	38	35	33	32	31	27	13	A-6(1)	SC.
7. 4	4. 5	11. 9	100	95	91	79	43	43	43	42	41	28	14	A-6(3)	SC.
9. 0	2. 3	11. 3	------	100	97	81	42	42	41	41	37	34	16	A-6(3)	SC.
6. 5	1. 3	7. 8	100	99	97	87	45	42	40	38	36	30	12	A-6(3)	SC.
2. 3	4. 8	7. 1	100	99	96	80	35	33	32	28	26	27	13	A-2-6(0)	SC.

meters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses data used in this table are not suitable for use in naming textural classes for soil.

[5] Based on the Unified Soil Classification System, Technical Memorandum No. 3-357, v. 1, Corps of Engineers (*14*). SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of the A-line are to be given a borderline classification. An example of a borderline classification obtained by this use is SM-SC.

[6] Nonplastic.

TABLE 8.—*Estimated*

Soil series and map symbols	Depth to seasonally high water table	Depth from surface	Classification
			USDA texture
	Inches	*Inches*	
Alluvial land, wet (Avp) (Most properties are so variable that they were not estimated.)	[1] 0–15		
Boswell (BrB2, BrD2, BrD3) (For properties of the Susquehanna and Oktibbeha soils in these mapping units, refer to the Susquehanna and the Oktibbeha soil series, respectively.)	30–60	0–8	Sandy clay loam
		8–60	Clay
Chastain (Cls) (For properties of the Leaf soil in this mapping unit, refer to the Leaf soil series.)	[2] <15	0–12	Silt loam or silty clay loam
		12–50	Silty clay or clay
Faceville (FoA, FoB, FoB2, FoC2, FoD, FtB3, FtC3, FtD3)	>60	0–9	Fine sandy loam
		9–50	Sandy clay
		50–84	Sandy clay to clay
Grady (Grd, Gcl)	[3] <15	0–12	Sandy loam to clay loam
		12–50	Clay
Greenville (GpB3, GpC3, GpD3, GsA, GsB, GsB2, GsC2, GsD2, GqA)	>120	0–7	Fine sandy loam
		7–58	Sandy clay
		58–94	Clay
Gullied land (Gul). (Properties are so variable that they were not estimated.)			
Henderson (HdB2, HdC2, HdD2)	>60	0–7	Cherty sandy loam
		7–56	Clay
Hoffman (HfF2, VOC2, VOD2) (For properties of the Vaucluse soil in mapping units VOC2 and VOD2, refer to the Vaucluse soil series.)	>60	0–6	Loamy sand
		6–50	Silty clay to clay
Lakeland (LqB, LqD)	>120	0–12	Fine sand
		12–60	Sand to fine sand
Leaf (Cls)	[2] <15	0–5	Silty clay loam
		5–58	Clay
Local alluvial land (LcM) (Most properties are so variable that they were not estimated.)	[4] <15		
Lucy (LcB, LcC, LcD)	>120	0–6	Sand
		6–42	Loamy sand to sandy loam
		42–60	Sandy clay loam
Lynchburg (LvA)	<30	0–12	Loamy sand
		12–34	Sandy clay loam
		34–56	Sandy clay
Mine pits and dumps (Mpd). (Properties are so variable that they were not estimated.)			
Norfolk (NgA, NgB, NgB2, NgC2)	>60	0–14	Loamy fine sand
		14–58	Sandy clay loam
Oktibbeha (BrB2, BrD2, BrD3)	30–60	0–4	Sandy clay loam
		4–28	Clay
		28–46	Clayey marl
Orangeburg (OgA, OgB, OgB2, OgC, OgC2, OgD2, OcB3, OcC3, OcD3)	>120	0–12	Loamy fine sand
		12–64	Sandy clay loam
Red Bay (RhA, RhB)	>120	0–12	Fine sandy loam
		12–70	Sandy clay loam

See footnotes at end of table.

engineering properties of the soils

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	
SC, CL	A-4, A-6	90–100	90–100	45–65	0. 63–2. 0	0. 14	4. 5–5. 5	Moderate.
CH	A-7	90–100	90–100	80–95	<0. 02	. 15	5. 0–5. 5	High.
ML	A-4	100	90–100	70–80	0. 2–0. 63	. 16	4. 5–5. 5	Low to moderate.
CL	A-6, A-7	100	90–100	80–90	<0. 2	. 15	4. 5–5. [illegible]	High.
SM	A-4	90–100	90–100	35–50	2. 0–6. 3	. 12	4. 5–5. 5	Low.
SC, CL	A-6	90–100	90–100	45–60	0. 63–2. 0	. 15	4. 5–5. 5	Moderate.
CL, MH	A-6, A-7	90–100	90–100	55–75	0. 63–2. 0	. 12	4. 5–5. 0	Moderate or high.
SM, CL	A-4, A-6	90–100	90–100	40–65	0. 63–2. 0	. 12	4. 5–5. 5	Low.
CH	A-7	90–100	90–100	55–85	<0. 2	. 16	4. 0–5. 0	High.
SM	A-4	90–100	90–100	35–50	2. 0–6. 3	. 10	5. 0–5. 5	Low.
SC, CL	A-6	90–100	90–100	45–65	0. 63–2. 0	. 15	4. 5–5. 5	Moderate.
CL	A-6, A-7	90–100	90–100	50–80	0. 63–2. 0	. 12	4. 5–5. 5	Moderate.
SM	A-4	70–90	70–90	35–45	2. 0–6. 0	. 10	4. 5–5. 5	Low.
MH, CH	A-7	70–90	70–90	65–85	<0. 2	. 12	4. 5–5. 5	Moderate or high.
SM	A-2	90–100	90–100	15–30	2. 0–6. 3	. 08	4. 5–5. 5	Low.
MH, CH	A-7	90–100	90–100	60–85	<0. 63	. 14	4. 0–5. 0	Moderate or high.
SM, SP-SM	A-2	90–100	90–100	10–25	>6. 3	. 05	4. 5–5. 5	Low.
SM, SP-SM	A-2, A-3	90–100	90–100	5–30	>6. 3	. 05	4. 5–5. 0	Low.
CL	A-6	90–100	90–100	70–90	0. 2–0. 63	. 15	4. 5–5. 0	Moderate.
CH	A-7	90–100	90–100	80–90	0. 2	. 15	4. 5–5. 0	High.
SM, SP-SM	A-2	90–100	90–100	10–25	>6. 3	. 06	5. 0–5. 5	Low.
SM, SC	A-2, A-4	90–100	90–100	15–45	2. 0–6. 3	. 08	4. 5–5. 5	Low.
SC, CL	A-6	90–100	90–100	45–55	0. 63–2. 0	. 12	4. 5–5. 5	Low.
SM	A-2	90–100	90–100	15–30	>6. 3	. 08	4. 5–5. 5	Low.
SC	A-6	90–100	90–100	35–50	0. 63–2. 0	. 12	4. 0–5. 0	Low.
CL	A-6, A-7	90–100	90–100	50–60	0. 2–0. 63	. 14	4. 0–5. 0	Moderate.
SM	A-2	85–100	85–100	15–30	>6. 3	. 10	5. 0–5. 5	Low.
SC, CL	A-6	85–100	85–100	40–60	0. 63–2. 0	. 14	4. 5–5. 5	Low.
SC, CL	A-6	90–100	90–100	40–60	0. 63–2. 0	. 12	4. 5–5. 5	Moderate.
CH	A-7	90–100	90–100	80–95	<0. 05	. 14	5. 0–5. 5	High.
CH	A-7	90–100	90–100	85–95	<0. 05	. 05	7. 5–8. 5	High.
SM	A-2	90–100	90–100	18–35	>6. 3	. 10	5. 0–5. 5	Low.
SC	A-6	90–100	90–100	35–50	0. 63–2. 0	. 14	4. 5–5. 5	Low.
SM, SC	A-2, A-4	90–100	90–100	30–45	2. 0–6. 3	. 12	5. 0–5. 5	Low.
SC, CL	A-6	90–100	90–100	40–60	0. 63–2. 0	. 14	4. 5–5. 5	Low.

TABLE 8.—*Estimated engineering*

Soil series and map symbols	Depth to seasonally high water table	Depth from surface	Classification: USDA texture
	Inches	*Inches*	
Sumter (SHC2)	30–60	0–4 4–36	Clay loam Clayey marl
Susquehanna (BrB2, BrD2, BrD3)	30–60	0–4 4–60	Sandy clay loam Clay
Swamp (Swa) (Most properties are so variable that they were not estimated.)	[1] 0–15		
Vaucluse (VOC2, VOD2)	>60	0–7 7–60	Loamy sand Sandy clay loam

[1] Covered with water for long periods.
[2] Flooded for more than 1 month each year.

TABLE 9.—*Interpretations of engineering*

[Gullied land (Gul), Mine pits and dumps (Mpd), and Swamp (Swa)

Soil series, land types, and map symbols	Suitability as source of—: Topsoil	Suitability as source of—: Material for road subgrade	Suitability as source of—: Road fill	Soil features affecting—: Highway location
Alluvial land, wet (Avp)	Fair to poor	Poor; material of variable texture.	Poor to fair; material of variable texture.	High water table; frequent flooding.
Boswell (BrB2, BrD2, BrD3) (Interpretations for the Susquehanna and the Oktibbeha soils in these mapping units are the same as for Boswell.)	Poor	Poor; high content of clay.	Poor; unstable	Highly plastic material; sloughs or slips when wet; unstable slopes.
Chastain (Cls) (Interpretations for the Leaf soil in this mapping unit are the same as for Chastain.)	Fair to poor	Poor; material of variable texture.	Poor to fair	Periodic flooding; high water table.
Faceville (FoA, FoB, FoB2, FoC2, FoD, FtB3, FtC3, FtD3).	Fair	Good	Fair	Steeper slopes are erodible.
Grady (Gcl, Grd)	Fair to poor	Poor	Poor; plastic clay	High water table; unstable subsoil.
Greenville (GpB3, GpC3, GpD3, GqA, GsA, GsB, GsB2, GsC2, GsD2).	Fair	Good	Fair; material compacts readily.	Steeper slopes highly erodible.
Henderson (HdB2, HdC2, HdD2)	Poor	Poor	Poor to fair; plastic subsoil; many large and small siliceous rocks.	Unstable, plastic subsoil; many large and small rocks; slow permeability.

properties of the soils—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					Inches per hour	*Inches per inch of soil*	*pH*	
CL, CH	A-6, A-7	90–100	90–100	55–75	0. 63–2. 0	0. 10	7. 0–7. 5	Moderate.
CH	A-7	90–100	90–100	85–95	<0. 2	. 04	7. 5–9. 0	High.
CL	A-6	90–100	90–100	50–70	0. 63–2. 0	. 14	4. 5–5. 5	Moderate.
CH	A-7	90–100	90–100	80–95	<0. 02	. 15	4. 5–5. 5	Very high.
SM	A-2	90–100	90–100	15–30	>6. 3	. 08	4. 5–5. 0	Low.
SC, CL	A-6	90–100	90–100	40–55	0. 63–2. 0	. 10	4. 5–5. 0	Moderate.

[3] Covered with water from 1 to 6 months each year.
[4] Flooded occasionally, but dries out quickly.

properties of soils

are so variable that interpretations for them were not made]

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Variable texture	Low to moderate strength and stability; variable.	Variable texture; slow permeability in places.	Not needed	Not needed	Naturally stabilized.
Slow seepage in subsoil; highly plastic; high shrink-swell potential.	Difficult to dry and compact; unstable; high shrink-swell potential.	Slow permeability in subsoil; difficult to drain.	Slow intake rate; very slow permeability.	High erodibility	High erodibility.
Variable texture	Low to moderate strength and stability; variable texture.	Slow permeability	Not needed	Not needed	Not used.
Slow to moderate seepage in subsoil.	Moderate to high strength and stability.	Not needed	Moderate infiltration; moderate water-holding capacity.	No undesirable features on smoother slopes.	Erodibility on stronger slopes.
Slow permeability; slow seepage.	Moderate to high strength and stability; slow permeability.	Poor; slow or very slow permeability; outlets difficult to develop.	Slow to moderate intake rate; slow permeability in subsoil; moderate to high water-holding capacity.	Not needed	Not used because of topographic position.
Slow to moderate seepage in subsoil.	Moderate to high strength and stability; moderate permeability.	Not needed	Deep soil with moderately rapid intake rate; moderate water-holding capacity; moderate permeability.	No undesirable features on smoother slopes; high erodibility on stronger slopes.	High erodibility.
Slow permeability; excessive seepage.	Rocky; unstable; low strength and stability.	Not needed	Poor agricultural soil; slow permeability.	Stoniness to a depth of 5 feet.	High erodibility.

TABLE 9.—*Interpretations of engineering*

Soil series, land types, and map symbols	Suitability as source of—			Soil features affecting—
	Topsoil	Material for road subgrade	Road fill	Highway location
Hoffman (HfF2, VOC2, VOD2) (For interpretations of the Vaucluse soil in these mapping units refer to the Vaucluse soil series.)	Poor to fair	Poor	Poor to fair; clayey subsoil.	Unstable, plastic subsoil; unstable slopes.
Lakeland (LqB, LqD)	Poor	Poor; good if confined.	Fair	Unstable slopes; rapid or very rapid internal drainage.
Leaf (Cls)	Fair to poor	Poor; material of variable texture.	Poor to fair	Periodic flooding; high water.
Local alluvial land (LcM)	Variable	Variable	Variable	Variable
Lucy (LcB, LcC, LcD)	Good to fair	Fair	Good if confined	Unstable slopes
Lynchburg (LvA)	Fair	Fair	Fair to good	High water table; moderately slow permeability in subsoil.
Norfolk (NgA, NgB, NgB2, NgC2)	Fair	Good	Good	Stronger slopes erodible
Oktibbeha (BrB2, BrD2, BrD3)	Poor	Poor; high content of clay.	Poor; unstable material.	Highly plastic material; sloughs or slips when wet; unstable slopes.
Orangeburg (OcB3, OcC3, OcD3, OgA, OgB, OgB2, OgC, OgC2, OgD2).	Fair	Good	Good	Steeper slopes erodible
Red Bay (RhA, RhB)	Fair	Good	Good	Steeper slopes erodible
Sumter (SHC2)	Poor	Poor	Poor	Highly plastic; subsoil shrinks and swells; unstable.
Susquehanna (BrB2, BrD2, BrD3)	Poor	Poor; high content of clay.	Poor; unstable material.	Highly plastic material; sloughs or slips when wet; unstable slopes.
Vaucluse (VOC2, VOD2, HfF2)	Fair to poor	Poor	Fair	Unstable slopes

properties of soils—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Slow permeability	Moderate to high strength and stability; slow permeability.	Not needed	Poor agricultural soil; slow permeability.	High erodibility	High erodibility.
Very rapid permeability; very rapid seepage.	Low strength and stability; very rapid permeability.	Not needed	Low water-holding capacity; high infiltration.	Not needed	High erodibility; low water-holding capacity; difficult to maintain vegetation.
Variable texture	Low to moderate strength and stability; variable texture.	Slow permeability	Not needed	Not needed	Not used.
Variable	Variable	Variable	Variable	Not needed	Vegetation easily established.
Rapid permeability; excessive seepage.	Low strength and stability.	Not needed	Rapid intake rate; low water-holding capacity.	High erodibility	High erodibility.
Moderately slow permeability.	Moderate strength and stability.	Seasonally high water table; moderately slow permeability.	Moderately slow permeability; moderate water-holding capacity.	Not needed	Not used because of topography.
Moderate permeability; compacts well.	Moderately high strength and stability; compacts well.	Not needed	Moderate permeability; moderate water-holding capacity.	No undesirable features on smoother slopes; erodibility on stronger slopes.	Erodibility on stronger slopes.
Slow seepage in subsoil; highly plastic material; high shrink-swell potential.	Compaction and drainage difficult; unstable material, high shrink-swell potential.	Slow permeability in the subsoil; drainage difficult.	Slow intake rate; very slow permeability.	High erodibility	High erodibility.
Moderate permeability; compacts well.	Moderately high strength and stability; compacts well.	Not needed	Moderate permeability; moderate water-holding capacity.	No undesirable features on smoother slopes; erodibility on stronger slopes.	Erodibility on stronger slopes.
Moderate permeability; compacts well.	Moderately high strength and stability; compacts well.	Not needed	Moderate permeability; moderate water-holding capacity.	No undesirable features on smoother slopes; erodibility on stronger slopes.	Erodibility on stronger slopes.
Poor; excessive seepage in some areas.	Unstable material; shrinks when dry, swells when wet; highly plastic.	Very slow permeability in subsoil.	Not suited for cultivation; very slow permeability.	Not suited	Not used.
Slow seepage in subsoil; highly plastic material; high shrink-swell potential.	Compaction and drying difficult; unstable material; high shrink-swell potential.	Slow permeability in the subsoil; drainage difficult.	Slow intake rate; very slow permeability.	High erodibility	High erodibility.
Poor; moderate to rapid seepage.	Moderate to low strength and stability.	Not needed	Poor agricultural soil.	High erodibility	High erodibility.

Topsoil is needed to grow vegetation on road shoulders, ditches, and slopes. In table 9 the ratings are for surface soil material only.

The suitability of soil material for road subgrade and road fill depends largely on the texture of the soil material and its natural water content. Most soils in the county are suitable for fill material. Exceptions are heavy clayey soils and the highly organic, mucky soils. Material used for subgrade, however, should be better than that used for fill. Clayey soils are poor subgrade material. Good material for subgrade contains enough clay for easy compaction, but not enough to impart high shrink-swell potential. Also, this material should be well drained and free from seepage. A good sandy loam is excellent subgrade material.

Plastic soils that have a high shrink-swell potential are rated poor for road subgrade and poor or fair for road fill, depending on the water content and the ease or difficulty of handling, drying, and compacting the soil material. Fine sands, silts, and other highly erodible soils are rated poor or fair for road fill. To prevent the fills from washing away, fine sands and silts require gentle slopes, close control of moisture during compaction, and fast-growing vegetation on the side slopes. Generally, the rating of the soils in the two counties for road fill is somewhat better than that for road subgrade.

Table 9 shows soil features affecting the location of highways. Detrimental features to be considered are high water table, flooding, seepage, unstable slopes, and the presence of highly plastic soil material, muck and peat, boulders, rocks, and material that is susceptible to frost. Where possible highways should be planned so that soils having these detrimental features are bypassed (fig. 15).

Also listed in table 9 are the soil features affecting suitability for farm pond reservoir areas and embankment material, agricultural drainage, irrigation systems, terraces and diversions, and waterways.

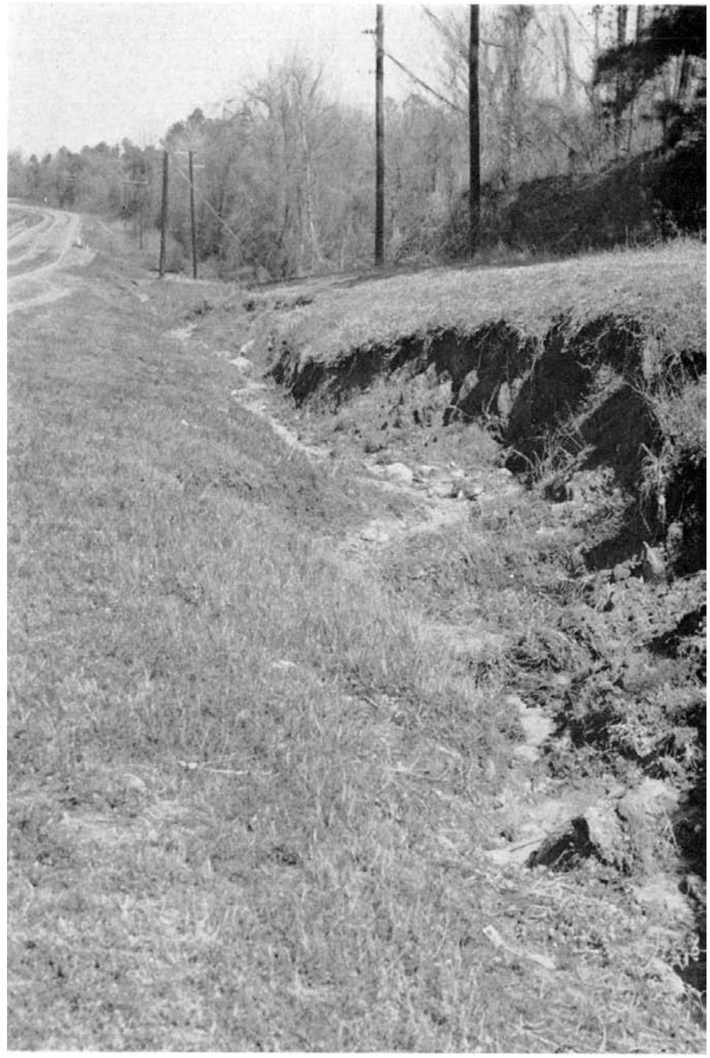

***Figure 15.*—Roadside erosion on Henderson cherty sandy loam, 8 to 12 percent slopes, eroded. This clayey soil has unstable slopes and moderate shrink-swell potential and is plastic.**

Formation and Classification of Soils

This section consists of three main parts. The first part tells how the factors of soil formation affected the development of soils in Houston and Peach Counties. In the second part, the current system of soil classification is explained and the soil series in the counties are placed in higher categories. The third part discusses chemical and mechanical analyses and gives the results of the analyses of selected soils. The soil series in the counties, including a profile representative of the series, are described in the section "Descriptions of the Soils."

Formation of Soils

Soil is produced when parent material, topography, climate, and living organisms interact for a period of time. These factors, including time, determine the nature of the soil that develops at any point on the earth. All of these factors affect the formation of each soil, but the relative importance of each factor differs from place to place. In some areas one factor may be more important than the others, and in few places one factor may dominate in the formation of a soil and determine most of its properties, as is common where the parent material consists of pure quartz sand. Quartz sand strongly resists weathering, and soils formed in it usually have faint horizons. The Lakeland soils developed from quartz sand and have only faint horizons. Even in quartz sand, however, distinct horizons can be formed under certain kinds of vegetation if the topography is low and flat and the water table is high.

Parent material

Parent material is the unconsolidated mass from which soils develop. It is largely responsible for the chemical and mineralogical composition of soils. In Houston and Peach Counties the parent material of all the soils is sedimentary, for it has been deposited by water.

In both counties differences in the parent material are largely the result of the manner in which the sands, silts, and clays were sorted and deposited. Different kinds of soils have developed because of these differences in sorting and deposition. In most soils profile development is strong because the parent material has been above water and exposed to the soil-forming forces for a long time.

The parent material of the soils in the two counties weathered from the seven geologic formations that are shown in figure 16 (*3*). From the oldest to the youngest, these formations are Cusseta sand, Providence sand, Clayton formation, Ocala limestone, Cooper marl, Flint River formation, and alluvial and undifferentiated terrace deposits along the Flint and Ocmulgee Rivers.

The Cusseta sand is in the extreme northern part of both counties and makes up about 5 percent of their area. The principal soils developed from this formation, which was laid down in the Upper Cretaceous epoch, are the deep, excessively drained Lakeland soils, the well-drained to somewhat excessively drained Lucy soils, the firm, compact Vaucluse soils, and the clayey Hoffman soils.

The Providence sand occurs in the northeastern part of Houston County and along the larger creeks in both Houston and Peach Counties. It makes up about 10 percent of the two counties. The principal soils developed from this formation, which is of the Upper Cretaceous epoch, are about the same as those formed in the Cusseta sand.

The Clayton formation occurs throughout the central and northern parts of Houston County and throughout most of Peach County. This formation makes up about 50 percent of the two counties and is of the Paleocene epoch. The dark-red, highly weathered Greenville, Red Bay, and Orangeburg soils formed in material from the Clayton formation. They are among the best soils for farming in the two counties.

The Ocala limestone and Cooper marl occur south and southeast of Perry in Houston County. These formations make up about 3 percent of the area of the two counties and are of the Eocene epoch. Derived from these formations is the parent material of the clayey Boswell, Susquehanna, Oktibbeha, and Sumter soils. In many places these soils are underlain by chalk, marl, or limestone.

The Flint River formation is mostly in the southern and eastern parts of Houston County. This formation makes up about 24 percent of the two counties and is of the Oligocene epoch. The main soils formed in material derived from this formation are the Norfolk, Orangeburg, and Faceville.

Alluvial and undifferentiated terrace deposits are on the flood plains and terraces along the Ocmulgee River in the eastern part of Houston County and along the Flint River in the southwestern part of Peach County. These deposits were laid down in the Recent epoch, and they make up about 8 percent of the two counties. They are the parent material of the fine-textured Chastain and Leaf soils.

Topography

The topography of Houston and Peach Counties was determined by their geologic history. Most important were the dissection of streams and the underlying formations of bedrock. Topography influences soil formation through its effect on moisture relations, erosion, temperature, and plant cover.

In Houston and Peach Counties slopes range from 0 to 30 percent. In upland areas, soils generally are deeper and horizons are more distinct where slopes are less than about 12 percent. Where the slopes are more than 12 percent, geologic erosion removes the soil material almost as fast as it forms. As a result, many of the soils on the steeper slopes have a thin, weakly expressed profile.

In the central and southern parts of both counties where the slopes are less than 5 percent, the soils are deep and have a strongly developed profile. Examples of such soils are the Norfolk, Orangeburg, Red Bay, and Greenville. In these soils the soil-forming factors have been very active, and the influence of each factor generally is evident.

The soils in alluvium are level and are continually receiving fresh deposits from surrounding soils on uplands. Because the soils in alluvium are young, topography, as well as other factors, does not have time to appreciably affect the development of soil.

Time

The length of time required for a soil to develop depends largely on the intensity that the other factors affect soil formation. Less time is required for a soil to develop in humid, warm regions that have luxuriant vegetation than is required in dry or cold regions that have scanty vegetation. Also, less time is required for the formation of a distinct profile in coarse-textured deposits than in fine-textured deposits.

The soils in Houston and Peach Counties range from those that have been forming on uplands for thousands of years to those that have been in place in alluvium on first bottoms for only a few days. Intermediate in age are soils that developed on stream terraces in old alluvium. Horizons are strongly developed in the oldest soils but are absent in the youngest. Horizon development ranges from slight to strong in the soils of intermediate age.

Climate

Climate, particularly temperature and rainfall, largely determines the rate and nature of the physical, chemical, and biological processes that affect the weathering of soil material. Rainfall, freezing, thawing, wind, and sunlight have much to do with the breakdown of rocks and minerals, the release of chemicals, and other processes that affect the development of soils. The amount of water that percolates through the soil depends on rainfall, relative humidity, length of the frost-free period, soil permeability, and physiographic position. Temperature influences the kinds and growth of organisms and the speed of physical and chemical reactions in the soils.

The warm, humid climate of Houston and Peach Counties is characterized by long, hot summers and short, mild winters. The average rainfall is about 48 inches per year. Much of the time during the period from the first part of December through July, the soils are moist and subject to leaching. They are moderately dry or dry much of August, September, October, and the first half of November. Because the surface soil is frozen for only short periods, freezing and thawing have little effect on the development of the soils. The climate throughout the two counties is uniform and has had about the same effect on soil development in all parts. As is normal in this climate, most of the soils on uplands in Houston and Peach Counties are highly weathered, leached, strongly acid, and low in natural fertility.

Living organisms

The kinds and numbers of plants and animals that live on and in the soil depend, in large part, on climate and, to varying degrees, on parent material, topography, and the age of the soil.

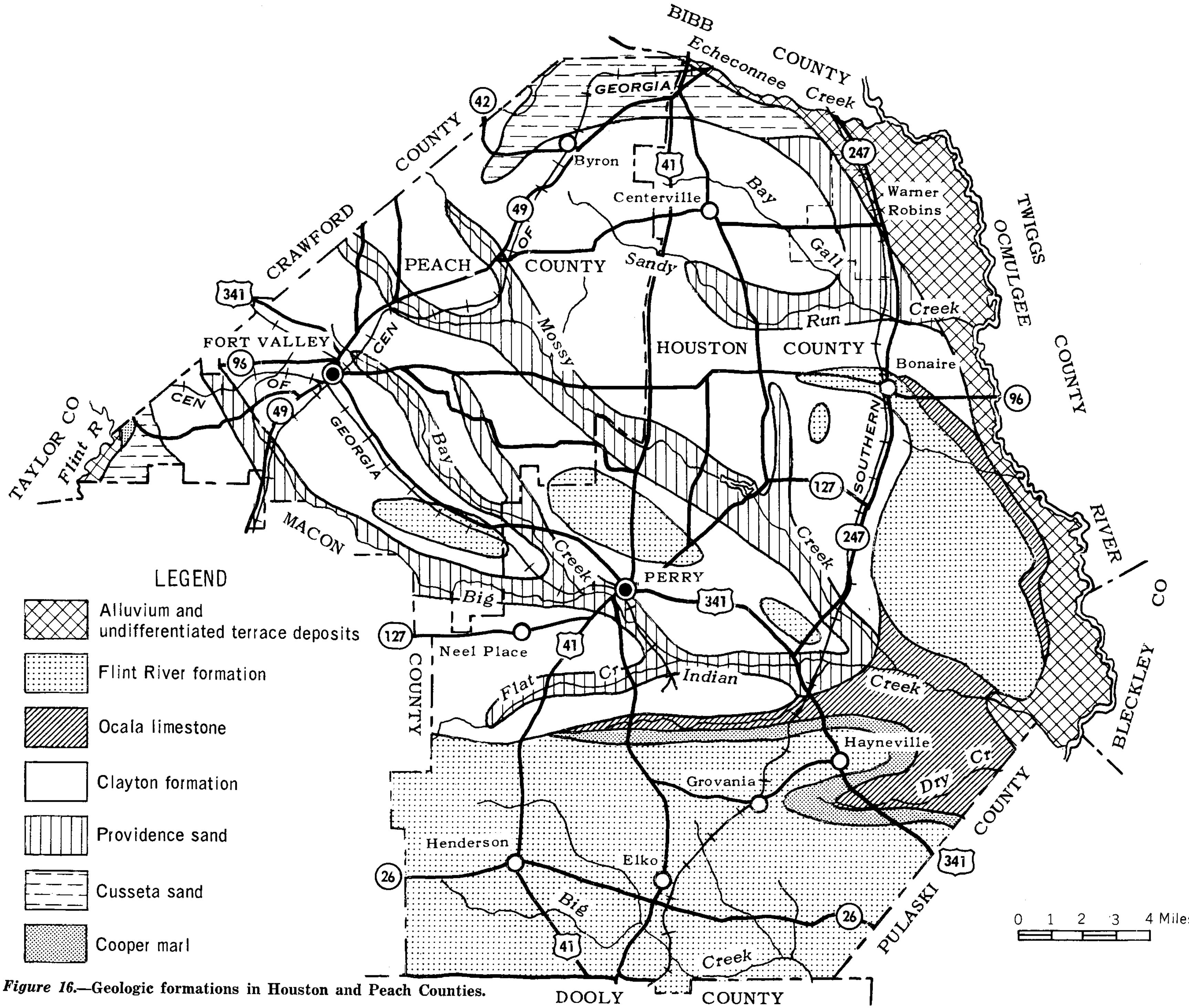

Figure 16.—**Geologic formations in Houston and Peach Counties.**

Larger plants return organic matter to the soils and are responsible for supplying most of the organic matter. They also transfer elements from the subsoil to the surface soil by assimilating these elements into their tissue and then depositing this tissue on the surface in the form of fallen fruit, leaves, or stems. Where trees are uprooted, soil material is brought to the surface by upturned roots.

Micro-organisms, insects, small plants, and small animals exert a continual effect on the physical and chemical properties of the soils. Bacteria, fungi, and other micro-organisms speed the weathering of rock and the decomposition of organic matter. Earthworms and other small invertebrates carry on a slow but continual cycle of soil mixing. Soil inhabited by earthworms may be altered chemically.

In the two counties, the native vegetation was chiefly oak and pine on uplands and yellow-poplar, sweetgum, willow, and water-loving oaks in the low, swampy areas. These trees returned large amounts of organic material to the soils over a long period.

Man has disturbed the direction and rate of soil development in many areas by clearing, cultivating, draining, and irrigation. Probably the greatest effects of man's activity have been a sharp reduction in the content of organic matter and a sharp increase in the rate of erosion. Also apparent are effects of artificial drainage and irrigation. Although not apparent, man has caused drastic changes in the kinds and numbers of living organisms that affect soil formation.

Classification of Soils

Classification consists of an orderly grouping of defined kinds of soils into classes in a system designed to make it easier to remember soils, including their characteristics and interrelationships. Classification also helps to organize and apply the results of experience and research to areas ranging in size from plots of several acres to large bodies of millions of square miles. The defined kinds of soils are placed in narrow classes for use in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped in progressively fewer and broader classes in successively higher categories so that information can be applied to large areas.

The current system of classifying soils was placed in general use by the Soil Conservation Service in 1965. The reader who is interested in the current system should search the literature (*9*, *10*). Modifications in the system are made as knowledge of soils increases. In this report some of the classes in the current system are given in table 10.

The current system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series (*10*). In this system the criteria used as a basis for classification are soil properties that are observable or measurable. The properties are chosen, however, so the soils of similar genesis, or mode of origin, are grouped together.

ORDER: In the order of the current system of classification, soils are grouped according to common properties that seem to be the result of the same kinds of processes acting to about the same degree on soil material and forming horizons. Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. Entisols, Inceptisols, Alfisols, and Ultisols were mapped in Houston and Peach Counties.

Entisols are recent mineral soils that do not have genetic horizons or have only the beginnings of such horizons.

Inceptisols are mineral soils in which genetic horizons have started to develop. They generally form on young but not recent land surfaces.

Alfisols are mineral soils that have an illuvial horizon in which significant amounts of clay minerals have accumulated and in which base saturation is more than 35 percent 50 inches below the top of the clay enriched horizon.

TABLE 10.—*Soil series classified according to current system of classification*

Series	Current classification		
	Family	Subgroup	Order
Boswell	Fine, montmorillonitic, thermic	Vertic Paleudalfs	Ultisols.
Chastain	Fine, mixed, acid, thermic	Fluventic Haplaquepts	Inceptisols.
Faceville	Clayey, koalinitic, thermic	Typic Paleudults	Ultisols.
Grady	Clayey, kaolinitic, thermic	Typic Ochraquults	Ultisols.
Greenville	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Henderson	Clayey, kaolinitic, thermic	Typic Paleudults	Ultisols.
Hoffman [1]	Clayey, kaolinitic, thermic	Entic Hapludults	Ultisols.
Lakeland	Siliceous, acid, thermic, coated	Typic Quartzipsamments	Entisols.
Leaf	Clayey, mixed, thermic	Typic Ochraquults	Ultisols.
Lucy	Loamy, siliceous, thermic	Arenic Paleudults	Ultisols.
Lynchburg	Fine loamy, siliceous, thermic	Aquic Paleudults	Ultisols.
Norfolk	Fine loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Oktibbeha	Fine, montmorillonitic, thermic	Vertic Hapludalfs	Alfisols.
Orangeburg	Fine loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Red Bay	Fine loamy, siliceous, thermic	Typic Rhodudults	Ultisols.
Sumter [1]	Fine, mixed, thermic	Rendollic Eutrochrepts	Inceptisols.
Susquehanna	Fine, montmorillonitic, thermic	Vertic Paleudalfs	Alfisols.
Vaucluse [1]	Fine loamy, siliceous, thermic	Typic Fragiudults	Ultisols.

[1] Mottling in soil does not reflect wetness.

Ultisols are mineral soils that have a clay enriched horizon that has base saturation of less than 35 percent at a depth of 50 inches below the top of the clay enriched horizon.

SUBORDER: Each order is subdivided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the order. The soil properties used to separate suborders mainly reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation.

GREAT GROUP: Soil suborders are separated into great groups according to the presence or absence of genetic horizons and the arrangement of these horizons. The great groups in the two counties are Quartzipsamments, Haplaquepts, Eutrochrepts, Ochraquults, Rhodudults, Paleudults, and Hapludults. The great group is not shown separately in table 10, because it is the last word in the name of the subgroup.

SUBGROUP: Great groups are subdivided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. The subgroups in Houston and Peach Counties are Typic Paleudults, Entic Hapludults, Arenic Paleudults, Aquic Paleudults, Fluventic Haplaquepts, Typic Ochraquults, Typic Rhodudults, Typic Quartzipsamments, Vertic Paleudalfs, Vertic Hapludalfs, Rendollic Eutrochrepts, and Typic Fragiudults.

Typic Paleudults have a horizon of clay accumulation more than 50 inches thick with a chroma of 6 or more in all parts and sandy and loamy textures within the upper 20 inches. The Faceville, Henderson, Norfolk, and Orangeburg soils are in this subgroup.

Entic Hapludults are the Hapludults that have a horizon of clay accumulation less than 10 inches thick. The Hoffman soils are in this subgroup.

Arenic Paleudults have surface horizons more than 20 inches thick where the texture is coarser than loamy fine sand, have no mottles with a chroma of 2 or less in the upper 20 inches of the horizon of clay accumulation, and have textures finer than loamy sand in some part of the horizon of clay accumulation. The Lucy soils are in this subgroup.

Aquic Paleudults have mottling with a chroma of 2 or less within the upper 10 inches of their horizon of clay accumulation, have textures finer than loamy sand in some part of the horizon of clay accumulation, and lack surface horizons thicker than 20 inches if these horizons are coarser than loamy fine sand. The Lynchburg soils are in this subgroup.

Fluventic Haplaquepts have a light-colored A horizon and a weakly developed B horizon that shows no evidence of clay accumulation. In a typical profile the organic-matter content decreases irregularly with depth. The Chastain soils are in this subgroup.

Typic Ochraquults are naturally saturated with water for part of the year. Below the A1 or Ap horizon, chroma is less than 2 when the soil is moist. The horizon of clay accumulation is dominantly gray. Plinthite makes up less than 10 percent of any horizon within 65 inches of the surface. The Leaf and Grady soils are in this subgroup.

Typic Rhodudults have a horizon of clay accumulation that is continuous vertically and horizontally and that has a hue redder than 5 YR and a texture finer than loamy sand in some part. The Greenville and Red Bay soils are in this subgroup.

Typic Quartzipsamments have no mottles with a chroma of 2 or less within 40 inches of the surface. The chroma and value increase with depth, and within 40 inches of the surface, a moist soil has a chroma of as much as 6 and a value of as much as 5. Plinthite makes up less than 5 percent of all horizons to a depth of 40 inches. The Lakeland soils are in this subgroup.

Rendollic Eutrochrepts have more than 40 percent calcium carbonates equivalent in the C horizon but lack mottles with a chroma of 2 or less within 30 inches of the surface. The Sumter soils are in this subgroup.

Vertic Paleudalfs have an argillic, or clay enriched, horizon that is thicker than 50 inches. The clay in this horizon shrinks when dry, and cracks form that extend at least 20 inches below the soil surface. Boswell and Susquehanna soils are in this subgroup.

Vertic Hapludalfs are like Vertic Paleudalfs, but have a clayey argillic horizon that is less than 50 inches thick. Oktibbeha soils are in this subgroup.

Typic Fragiudults have a cemented layer, or fragipan, overlain by a horizon of clay accumulation. The most strongly cemented subhorizon in the fragipan has a brittle matrix in at least 90 percent of its cross-section. The upper 10 inches of the horizon of clay accumulation has no mottles with a chroma of 2 or less. Vaucluse soils are in this subgroup.

FAMILIES: Families are separated within a subgroup primarily on the basis of properties important to plant growth. Some of the properties considered are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons. An example of a family is the clayey, mixed, thermic family of Typic Ochraquults.

Physical and Chemical Analysis [6]

The physical and chemical analysis reported in table 11 were made of selected soils in Houston and Peach Counties at the Soil Survey Laboratory, Beltsville, Maryland. The samples of these soils were taken at one site of Lucy soil, two sites each of Faceville, Grady, and Norfolk soils, and four sites of Greenville soils. These soils were selected, described, and sampled by genetic horizons according to methods described in the "Soil Survey Manual" (*11*). In some soils the B22t or B24t horizons, or both, were so thick that these horizons were subdivided by sampling several consecutive parts of them. Consequently, for some soils, more than one layer is called the B22t, the B24t horizon, or both in table 11. The samples were fumigated in sealed

[6] H. J. BYRD, soil scientist, Soil Conservation Service, assisted in the preparation of this subsection.

rubber containers by using methyl bromide ampules as prescribed in quarantine restrictions for soil transported from infested areas.

The profiles of some of the soils analyzed are described in the section "Descriptions of the Soils." References in that section indicate the soils analyzed, and references in table 11 indicate the soils described.

Laboratory methods

In preparing the soil material for laboratory analysis, air-dry samples were crushed with a rolling pin so that the material would pass through a sieve having round holes 2 millimeters in diameter. Care was taken to avoid fragmenting the nonsoil material.

Analysis for particle-size distribution reported in table 11 was made by the pipette method as described by Kilmer and Alexander (*6*) and Kilmer and Mullins (*7*).

Bulk density and values were obtained by the coated clod technique as outlined by Brasher.[7]

The values for pH were determined by using a glass electrode in solution of one part soil to one part water and a solution of one part soil to one part of molar KCl. Organic carbon was determined by wet combustion; the procedure was a modification of the Walkley-Black method as outlined by Peech (*8*).

Total manganese was determined on ground samples by X-ray spectrography. The percentage was calculated by comparing the manganese intensities from the sample with those from a ground sample of known manganese content and similar matrix composition.

Free iron oxide was obtained by a modification of the Debs method, using sodium hydrosulfite for extraction as suggested by Kilmer (*5*).

Exchangeable calcium, magnesium, and hydrogen were determined by methods suggested by Peech (*8*). Exchangeable sodium and potassium were determined by flame spectrophotometry. Cation exchange capacity was obtained by summation of the exchangeable cations, and percent base saturation was calculated. Extractable aluminum was determined by leaching the soil with normal KCl following the method used by Yuan (*15*).

Clay minerals were identified by X-ray diffraction and differential thermal analysis. The values for X-ray diffraction were obtained by using oriented samples placed on glass slides in a Geiger counter diffractometer. Magnesium-saturated samples, with and without ethylene glycol solution, and potassium-saturated samples were X-rayed at room temperature. After heating the samples to 100°, 250°, and 500° C., differential thermal analysis curves were obtained by using the apparatus described by Hendricks and Alexander (*4*). The relative percentages of vermiculite were estimated from recorder areas representing the intensity of first-order basal plane X-ray reflections. The vermiculite present is indicated as 5 to 15 percent, 15 to 30 percent, and 30 to 60 percent. Percentages of kaolinite and gibbsite were estimated from the size of the endotherms on the differential thermal analysis pattern.

[7] Unpublished Master of Science Thesis, University of Tennessee, 1963.

Interpretation of laboratory data

The particle-size data obtained from the analysis of the surface layer and subsoil of the soils sampled indicate that sand and clay are the chief constitutents of the soils in the two counties. In the surface layer of the Lucy soil, the content of sand was highest, 92.4 percent, and that of clay was lowest, 2.6 percent. The content of clay in the subsoil of the Grady soils was highest, 62.3 percent, and that of sand was lowest, 17.4 percent.

Below the Ap horizon there is a marked increase in the content of clay (see table 11). The content of clay is highest in the subsoil. Except for the Lucy soil and at one site of the Grady soil, clay remained high as depth increased or it increased slightly. This suggests that the clay enriched horizons are quite thick. The clay occurs mainly as coatings on sand grains or as bridging between the grains.

The content of silt was relatively low in most of the soils analyzed. Except in the upper part of the Grady soil and in one profile of the Greenville soil, the content of silt was less than 20 percent. These soils containing more silt are in slight depressions. Fine sand and very fine sand are major constituents among sand-sized particles in the soils. This is reflected in the soil types mapped in the two counties. Fine sand, loamy fine sand, and fine sandy loam are the principal types occurring on the broad, level plateaus that occupy large areas in these counties.

The mineralogical data on the clay fraction in the soils sampled show that kaolinite is the dominant clay mineral, though significant amounts of vermiculite-type clay mineral and gibbsite are present. The content of kaolinite ranges from 30 to 46 percent of the clay fraction in these soils (table 11). In some of the Greenville soils, the clay fraction is 6 to 8 percent gibbsite, though gibbsite decreases with depth in all the soils studied. The content of vermiculite-type clay is low (5 to 15 percent) in the Greenville soils. Vermiculite-type clay is abundant (30 to 60 percent) in the surface layer of the Faceville soils, but is moderate (15 to 30 percent) below the surface layer and, in this respect, has a content similar to that in other soils studied. The vermiculite reported as occurring in the Greenville and Faceville soils does not behave as does vermiculite derived from mica. When saturated with potassium, the treated samples produce X-ray patterns like those of amorphous material, rather than collapsing to a 10-angstrom basal plane spacing. The clay fraction of all the soils sampled contains poorly crystalline and amorphous components, but a quantitative determination of them was not made.

The data indicate that, generally, soils with a high clay content have a higher cation exchange capacity than do soils with a less clayey subsoil. This relationship is less evident in surface soils that contain appreciably more organic matter than in subsoils that contain less organic matter. The cation exchange capacity is highest in the surface layer of Grady soils, which have a value of 27.5 or 28.4 milliequivalents per 100 grams of soil. The surface layer of the Grady profiles contains 4.28 to 4.31 percent organic carbon. The subsoil of the Greenville and Grady soils contains about 45 to 55 percent clay, and the cation exchange capacity ranges from 7.6 to 14.7 milliequivalents per 100 grams of soil.

TABLE 11.—*Physical and chemical*

[Determinations made by Soil Survey Laboratory, Soil Conservation Service,

Soil name and site	Depth	Horizon	Particle size distribution: Very coarse sand (2.0 to 1.0 mm.)	Coarse sand (1.0 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (less than 0.002 mm.)	Textural class	Bulk density
Faceville fine sandy loam (Peach County):	*Inches*		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*Gm./cc.*
Site 1	0–8	Ap	1. 1	8. 3	9. 0	29. 9	28. 1	17. 6	6. 0	Fine sandy loam.	1. 56
	8–14	B1t	. 7	7. 0	7. 4	27. 7	25. 7	12. 4	19. 1	Fine sandy loam to sandy clay loam.	1. 68
	14–18	B21t	. 7	5. 6	6. 0	23. 8	21. 6	12. 6	29. 7	Sandy clay loam.	1. 70
	18–26	B22t	. 7	5. 5	6. 5	22. 6	21. 7	11. 8	31. 2	Sandy clay loam.	1. 69
	26–34	B23t	1. 3	5. 4	6. 5	22. 5	21. 4	10. 0	32. 9	Sandy clay loam	1. 72
	34–40	B24t	1. 1	5. 6	6. 2	21. 9	20. 3	7. 9	37. 0	Sandy clay	1. 76
	40–63	B25t	. 8	5. 2	5. 8	21. 9	20. 4	6. 7	39. 2	Sandy clay	1. 78
Site 2 [2]	0–9	Ap	1. 4	6. 2	6. 4	29. 4	33. 9	16. 4	6. 3	Loamy fine sand to very fine sandy loam.	1. 67
	9–15	B21t	. 9	3. 8	3. 9	20. 0	22. 9	13. 8	34. 7	Sandy clay loam to sandy clay.	1. 72
	15–26	B22t	. 7	4. 2	4. 1	19. 1	22. 9	13. 6	35. 4	Sandy clay to sandy clay loam.	1. 64
	26–41	B22t	. 6	4. 0	4. 2	19. 7	22. 8	12. 1	36. 6	Sandy clay	1. 70
	41–50	B23t	. 6	3. 7	3. 9	18. 0	20. 6	10. 7	42. 5	Sandy clay	1. 74
	50–58	B24t	. 6	3. 5	3. 7	17. 7	19. 6	7. 9	47. 0	Sandy clay to clay.	1. 74
	58–84	B24t	. 8	3. 7	3. 5	17. 6	18. 5	6. 4	49. 5	Clay to sandy clay.	
Grady clay loam (Peach County):											
Site 3	0–5	Ap	. 4	2. 1	3. 8	23. 8	8. 5	22. 5	38. 9	Clay loam	1. 06
	5–10	B21tg	. 1	1. 5	2. 4	19. 8	9. 0	19. 1	48. 1	Clay	1. 48
	10–19	B22tg	. 4	2. 0	3. 1	24. 2	11. 2	14. 8	44. 3	Clay	1. 64
	19–38	B31g	. 4	2. 3	3. 9	33. 8	16. 1	9. 4	34. 1	Sandy clay loam to sandy clay.	1. 76
	38–44	B32tg	. 5	1. 5	2. 6	21. 8	9. 7	10. 1	53. 8	Clay	
	44–62	B33tg	. 3	1. 6	2. 8	22. 9	9. 5	10. 2	52. 7	Clay	
Grady clay loam (Houston County):											
Site 4 [2]	0–6	Ap	. 5	1. 4	2. 4	16. 0	5. 0	36. 2	38. 5	Clay loam	1. 16
	6–11	B21tg	. 5	. 9	1. 4	11. 4	4. 8	28. 3	52. 7	Clay	1. 60
	11–18	B22tg	. 4	. 8	1. 4	13. 6	5. 7	27. 7	50. 4	Clay	1. 57
	18–29	B22tg	. 1	. 5	1. 3	11. 7	3. 8	20. 3	62. 3	Clay	1. 68
	29–39	B22tg	. 3	1. 6	2. 8	24. 5	6. 7	18. 4	45. 7	Clay	1. 68
	39–45	B23tg	. 4	1. 6	3. 1	24. 9	7. 3	12. 3	50. 4	Clay	1. 82
	45–50	B24tg	. 4	2. 7	4. 4	39. 1	11. 3	10. 4	31. 7	Sandy clay loam.	1. 66

See footnotes at end of table.

properties of selected soils

USDA, Beltsville, Md. Absence of data indicates value is not determined]

pH in—		Organic carbon	Total manganese	Free iron	Cation exchange capacity (sum)	Exchangeable cations					Base saturation (sum)	Extractable aluminum	Mineral composition of clay fraction		
Water 1:1	1 M KCl 1:1					Calcium	Magnesium	Sodium	Potassium	Hydrogen			Vermiculite X-ray	Kaolinite (DTA)	Gibbsite (DTA)
		Percent	Percent	Percent	Meq./100 gm.	Meq./100 gm.	Meq./100 gm.	Meq./100 gm.	Meq./100 gm.	Meq./100 gm.	Percent	Meq./100 gm.	Percent	Percent	Percent
4.8	3.8	0.64	0.04	0.4	4.3	0.4	<0.1	<0.1	0.1	3.8	12	0.82	30–60	30	1
4.9	3.9	.20	--------	1.0	4.2	.6	.1	<.1	.1	3.4	19	.94	--------	--------	--------
5.2	4.1	.12	--------	1.7	6.2	2.0	.3	<.1	.1	3.8	39	.63	15–30	30	1
5.6	4.5	.08	--------	2.0	6.1	2.3	.5	<.1	.1	3.2	48	.31	--------	--------	--------
5.6	4.5	.10	--------	2.4	5.9	2.1	.6	<.1	<.1	3.2	46	.21	15–30	40	(1)
5.7	4.2	.08	--------	2.7	6.1	1.6	.7	<.1	<.1	3.8	38	.49	--------	--------	--------
4.8	4.0	.04	--------	2.8	5.7	.8	.7	<.1	<.1	4.2	26	.93	15–30	37	(1)
4.9	4.1	.81	.02	.8	5.4	1.1	.3	<.1	.2	3.8	30	.52	--------	--------	--------
5.4	4.5	.18	--------	2.1	7.3	2.4	.6	<.1	.1	4.2	42	.26	--------	--------	--------
5.8	5.0	.10	--------	2.4	6.8	2.5	.6	<.1	.1	3.6	47	.22	--------	--------	--------
5.5	4.8	.08	--------	2.7	6.4	1.7	1.0	<.1	.1	3.6	44	.11	--------	--------	--------
5.2	4.0	.06	--------	3.7	6.5	.4	.4	.1	.1	5.5	15	1.17	--------	--------	--------
5.2	3.9	.02	--------	4.0	6.8	.2	.7	.1	.1	5.7	16	1.56	--------	--------	--------
5.4	3.9	.02	--------	4.2	6.7	.1	.6	.1	<.1	5.9	12	1.75	--------	--------	--------
5.1	4.0	4.31	.02	.1	28.4	1.0	.5	<.1	.2	26.7	6	3.4	15–30	45	1
4.8	4.0	.60	--------	<.1	12.4	.5	.1	.1	.1	11.6	6	4.1	--------	--------	--------
4.9	3.8	.15	--------	.2	8.1	--------	.2	<.1	<.1	7.9	2	3.3	15–30	35	2
5.1	3.9	.06	--------	.2	5.5	<.1	.1	<.1	<.1	5.4	2	2.0	15–30	40	1
4.5	3.9	.06	--------	.7	9.4	<.1	.2	<.1	<.1	9.2	2	4.3	--------	--------	--------
4.7	3.9	.06	--------	2.0	9.6	<.1	.2	<.1	<.1	9.4	2	4.0	30–60	30	(1)
4.7	3.8	4.28	.007	.1	27.5	2.9	.3	.1	.2	24.0	13	3.1	--------	--------	--------
4.5	3.5	.30	--------	.2	11.2	1.1	.2	.1	.1	9.7	13	4.0	--------	--------	--------
4.8	3.6	.22	--------	.2	9.7	1.4	.2	.1	.1	7.9	19	2.6	--------	--------	--------
5.2	4.0	.12	.004	<.1	7.6	2.0	.6	.1	<.1	4.9	36	.81	--------	--------	--------
5.1	3.7	.18	--------	.3	10.8	2.4	.6	.1	.1	7.6	30	1.58	--------	--------	--------
5.4	3.9	.06	.004	.4	8.7	2.6	.8	.1	<.1	5.2	40	.79	--------	--------	--------
5.5	3.9	.02	--------	<.1	5.6	1.7	.6	.1	<.1	3.2	43	.58	--------	--------	--------

TABLE 11.—*Physical and chemical*

Soil name and site	Depth	Horizon	Particle size distribution: Very coarse sand (2.0 to 1.0 mm.)	Coarse sand (1.0 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (less than 0.002 mm.)	Textural class	Bulk density
Greenville fine sandy loam: (Peach County):	*Inches*		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*Gm./cc.*
Site 5	0–7	Ap	1. 9	8. 9	8. 6	35. 5	18. 4	11. 2	15. 5	Fine sandy loam.	1. 92
	7–11	B21t	. 9	5. 2	5. 1	21. 6	13. 1	11. 9	42. 2	Sandy clay to clay.	1. 62
	11–23	B22t	1. 0	5. 4	5. 2	20. 4	12. 2	11. 7	44. 1	Clay	1. 56
	23–34	B23t	1. 4	6. 0	5. 4	23. 3	13. 7	10. 0	40. 2	Sandy clay	1. 66
	34–48	B24t	1. 7	5. 9	5. 8	23. 7	13. 8	9. 4	39. 7	Sandy clay	1. 78
	48–61	B25t	1. 7	6. 2	5. 9	23. 2	13. 7	7. 2	42. 1	Sandy clay	1. 75
	61–97	B26t	1. 6	6. 6	6. 0	23. 0	13. 0	6. 3	43. 5	Sandy clay	
Site 6 [2]	0–7	Ap	. 9	5. 3	7. 1	31. 0	26. 4	16. 1	13. 2	Fine sandy loam.	1. 70
	7–11	B21t	. 7	3. 6	4. 8	22. 1	18. 8	15. 0	35. 0	Sandy clay to sandy clay loam.	1. 68
	11–21	B22t	. 7	3. 9	4. 8	21. 4	18. 2	13. 6	37. 4	Sandy clay	1. 66
	21–33	B22t	1. 0	3. 6	4. 7	21. 6	18. 5	11. 6	39. 0	Sandy clay	1. 64
	33–44	B22t	1. 0	3. 6	4. 3	21. 3	18. 2	9. 2	42. 4	Sandy clay	1. 65
	44–58	B22t	. 6	3. 2	4. 0	19. 9	16. 8	6. 8	48. 7	Clay to sandy clay.	1. 70
	58–94	B23t	. 6	2. 9	3. 5	19. 8	16. 8	5. 0	51. 4	Clay	
Greenville sandy clay loam: (Peach County):											
Site 7	0–6	Ap	1. 0	5. 8	6. 1	26. 5	16. 2	19. 8	24. 6	Sandy clay loam.	1. 88
	6–12	B1t	1. 0	4. 7	4. 7	20. 6	14. 2	14. 6	40. 2	Sandy clay to clay.	1. 73
	12–17	B21t	1. 0	4. 0	4. 6	20. 6	14. 4	14. 3	41. 1	Clay to sandy clay.	1. 70
	17–24	B22t	. 7	4. 4	4. 3	19. 8	14. 0	13. 2	43. 6	Clay	1. 70
	24–33	B23t	. 7	4. 2	4. 4	19. 8	12. 9	12. 9	45. 1	Clay	1. 72
	33–43	B24t	1. 0	3. 9	4. 5	20. 0	13. 4	9. 7	47. 5	Clay	1. 62
	43–53	B25t	. 9	4. 1	4. 1	18. 9	12. 9	9. 5	49. 6	Clay	1. 64
	53–81	B26t	1. 0	4. 4	4. 4	19. 9	13. 0	1. 9	55. 4	Clay	
Site 8	0–9	Ap	1. 8	7. 8	6. 4	21. 0	8. 7	28. 5	25. 8	Sandy clay loam.	1. 64
	9–16	B21t	. 8	6. 0	6. 1	17. 7	9. 0	18. 1	42. 3	Clay	1. 49
	16–22	B22t	1. 6	6. 8	5. 8	17. 0	9. 0	16. 0	43. 8	Clay	1. 46
	22–30	B23t	2. 0	6. 7	5. 5	17. 0	9. 2	12. 6	47. 0	Clay	1. 54
	30–38	B24t	1. 6	6. 5	5. 5	17. 2	8. 7	13. 4	47. 1	Clay	1. 49
	38–56	B25t	2. 0	6. 7	5. 8	16. 9	8. 5	12. 1	48. 0	Clay	1. 56
	56–84	B26t	2. 0	8. 5	7. 0	19. 1	8. 4	9. 2	45. 8	Sandy clay to clay.	
Norfolk loamy fine sand (Peach County):											
Site 9	0–8	Ap	1. 8	7. 4	7. 8	36. 8	21. 3	19. 6	5. 3	Loamy fine sand	1. 72
	8–12	A3	. 8	6. 4	7. 4	33. 2	19. 5	19. 5	13. 2	Fine sandy loam	
	12–21	B21t	. 9	5. 3	5. 8	25. 5	15. 0	15. 7	31. 8	Sandy clay loam	1. 64
	21–29	B22t	1. 6	5. 4	6. 0	26. 4	15. 7	14. 9	30. 0	Sandy clay loam	1. 68
	29–36	B23t	1. 4	5. 9	5. 9	27. 6	16. 4	14. 2	28. 6	Sandy clay loam	1. 74
	36–44	B24t	1. 2	6. 0	6. 1	28. 8	16. 7	13. 6	27. 6	Sandy clay loam	1. 72

See footnotes at end of table.

properties of selected soils—Continued

pH in— Water 1:1	pH in— 1 M KCl 1:1	Organic carbon	Total manganese	Free iron	Cation exchange capacity (sum)	Exchangeable cations: Calcium	Exchangeable cations: Magnesium	Exchangeable cations: Sodium	Exchangeable cations: Potassium	Exchangeable cations: Hydrogen	Base saturation (sum)	Extractable aluminum	Mineral composition of clay fraction: Vermiculite X-ray	Mineral composition of clay fraction: Kaolinite (DTA)	Mineral composition of clay fraction: Gibbsite (DTA)
		Percent	*Percent*	*Percent*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Percent*	*Meq./100 gm.*	*Percent*	*Percent*	*Percent*
4.9	4.1	0.54	0.07	1.0	5.9	1.1	0.2	<0.1	0.2	4.4	25	0.60	15–30	42	8
5.2	4.2	.24	--------	2.4	8.9	2.2	.6	<.1	.1	6.0	33	.55	15–30	38	6
5.2	4.3	.10	--------	2.7	7.4	1.4	.6	<.1	.1	5.3	28	.53	--------	--------	--------
5.1	4.0	.08	.02	2.6	5.6	.4	.3	<.1	<.1	4.9	12	.78	15–30	40	6
5.1	3.9	.06	--------	2.6	5.5	.3	.2	.1	<.1	4.9	11	1.23	--------	--------	--------
5.0	3.9	.02	--------	2.4	5.2	<.1	.1	<.1	<.1	5.1	2	1.44	15–30	40	2
5.3	3.9	.04	.02	4.1	5.0	.1	.2	<.1	<.1	4.7	6	1.17	--------	--------	--------
4.8	4.0	.88	.08	.9	7.7	1.4	.2	<.1	.2	5.9	23	.74	--------	--------	--------
5.3	4.4	.26	--------	2.1	8.4	2.4	.6	<.1	.2	5.2	38	.28	--------	--------	--------
5.6	4.8	.18	--------	2.4	7.4	2.5	.6	.1	.2	4.0	46	.17	--------	--------	--------
5.7	5.0	.12	--------	2.7	6.9	2.5	.5	<.1	.1	3.8	45	.05	--------	--------	--------
6.2	5.2	.02	--------	3.0	6.3	2.4	.5	<.1	<.1	3.4	46	.03	--------	--------	--------
5.0	4.0	.04	--------	3.5	7.6	1.3	.8	.1	<.1	5.4	29	.84	--------	--------	--------
4.9	4.0	.04	--------	4.1	6.3	.8	.5	.1	<.1	4.9	22	.92	--------	--------	--------
5.2	4.2	.94	.18	1.4	11.7	2.3	.4	<.1	.3	8.7	26	.70	--------	--------	--------
5.8	4.8	.19	--------	1.7	9.6	2.7	.9	.1	.3	5.6	42	.76	--------	--------	--------
5.9	4.9	.16	--------	2.5	9.0	2.6	1.0	<.1	.3	5.1	43	.17	--------	--------	--------
5.9	4.9	.11	.03	2.5	8.9	3.0	.8	<.1	.2	4.9	45	.09	--------	--------	--------
6.0	5.1	.06	--------	3.0	9.1	3.3	.7	<.1	.1	5.0	45	.04	--------	--------	--------
6.1	5.1	.06	--------	3.2	8.9	3.2	.8	<.1	.1	4.8	46	.02	--------	--------	--------
6.1	5.4	.04	.02	3.3	8.8	3.1	.9	<.1	.1	4.7	47	.01	--------	--------	--------
5.1	4.4	.04	--------	3.9	8.6	1.7	.9	<.1	.1	5.9	31	.23	--------	--------	--------
5.7	4.6	1.55	.36	1.7	16.8	4.3	.7	<.1	.7	11.1	34	.13	5–15	30	3
5.9	4.8	.54	--------	1.5	14.7	3.9	.9	.1	.5	9.3	37	.10	--------	--------	--------
5.8	4.9	.26	--------	2.1	11.5	3.2	.7	.1	.4	7.1	38	.10	5–15	30	2
5.9	5.0	.17	--------	1.8	10.3	3.0	.7	.1	.3	6.2	40	.06	--------	--------	--------
5.5	4.6	.10	--------	2.4	10.3	2.4	.9	<.1	.2	6.8	34	.19	5–15	36	1
5.3	4.0	.08	--------	2.4	10.5	1.5	.9	<.1	.1	8.0	24	.97	--------	--------	--------
5.0	3.0	.02	--------	2.6	8.4	.3	.3	<.1	.1	7.7	8	2.5	5–15	46	(1)
4.6	4.1	.69	--------	.4	5.4	.8	.3	<.1	.1	4.2	22	.76	--------	--------	--------
5.0	3.9	.25	--------	.7	4.7	1.1	.3	<.1	.1	3.2	32	.57	--------	--------	--------
5.3	4.5	.18	--------	1.7	7.5	2.5	.5	<.1	.1	4.4	41	.38	--------	--------	--------
5.5	4.5	.10	--------	1.7	6.5	1.8	.5	<.1	<.1	4.2	35	.36	--------	--------	--------
5.1	4.3	.04	--------	1.7	5.6	.6	.7	.1	<.1	4.2	25	.46	--------	--------	--------
5.2	4.1	.04	--------	1.7	4.6	<.1	.3	.1	<.1	4.2	9	.69	--------	--------	--------

TABLE 11.—*Physical and chemical*

Soil name and site	Depth	Horizon	Particle size distribution: Very coarse sand (2.0 to 1.0 mm.)	Coarse sand (1.0 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (less than 0.002 mm.)	Textural class	Bulk density
Norfolk loamy fine sand (Houston County):	*Inches*		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*Gm./cc.*
Site 10 [2]	0–6	Ap	4. 2	14. 7	16. 3	34. 3	16. 8	10. 6	3. 1	Loamy sand to fine sand.	1. 76
	6–10	A2	3. 0	14. 4	15. 3	29. 3	12. 1	15. 0	10. 9	Sandy loam	1. 76
	10–14	A3	4. 5	14. 7	14. 7	26. 1	11. 5	12. 9	15. 4	Sandy loam	1. 78
	14–20	B21t	3. 2	11. 9	13. 0	24. 9	11. 4	12. 4	23. 2	Sandy clay loam	1. 80
	20–33	B22t	3. 1	11. 1	11. 8	23. 8	11. 2	9. 6	29. 4	Sandy clay loam	1. 73
	33–39	B23t	4. 3	12. 0	11. 7	22. 6	10. 4	8. 6	30. 4	Sandy clay loam	1. 78
	39–48	B24t	4. 5	13. 5	11. 8	21. 5	10. 1	8. 1	30. 5	Sandy clay loam	1. 80
	48–58	B24t	5. 2	16. 2	12. 8	18. 6	8. 7	8. 3	30. 2	Sandy clay loam	1. 82
Lucy sand (Peach County):											
Site 13 [2]	0–6	Ap	1. 6	13. 5	16. 4	42. 2	18. 7	5. 0	2. 6	Sand	
	6–16	A3	1. 0	12. 1	15. 4	40. 2	17. 4	6. 3	7. 6	Loamy sand	
	16–24	A21	1. 2	13. 2	16. 0	37. 7	16. 5	6. 3	9. 1	Loamy sand	1. 56
	24–32	A22	1. 6	12. 0	14. 9	39. 4	16. 5	6. 3	9. 3	Loamy sand	1. 59
	32–42	B1	2. 0	13. 4	15. 4	37. 4	15. 0	3. 8	13. 0	Loamy sand to fine sandy loam.	1. 59
	42–54	B21t	. 8	10. 4	13. 7	34. 8	14. 5	4. 0	21. 8	Sandy clay loam.	1. 57
	54–64	B22t	1. 0	9. 7	13. 5	36. 0	17. 2	3. 5	19. 1	Fine sandy loam to sandy clay loam.	1. 58
	64–77	B31t	1. 1	9. 8	14. 0	37. 6	16. 9	3. 6	17. 0	Fine sandy loam.	1. 63
	77–86	B32	1. 7	11. 5	13. 8	40. 1	17. 2	3. 2	12. 5	Loamy sand to fine sandy loam.	1. 68

[1] Trace.

The values for specific exchange capacity of the clay were calculated for the parts of the B2t horizon of the soils sampled. These values are shown in table 12. The values range from 16 to 24 milliequivalents per 100 grams of soil and average about 19 milliequivalents. The values were determined by the following:

$$\frac{\text{Cation exchange capacity}}{\text{Percent clay}} \times 100 = \text{Specific exchange capacity}$$

The values obtained are estimates of the cation exchange capacity of the clay alone and seem rather low when vermiculite-type clay, which usually has a very high exchange capacity, is a moderate component of the clay fraction. It is assumed that vermiculite in the soils that were sampled has a much lower cation exchange capacity, along with the other atypical properties noted.

All of the soils tested were found to be acid in all horizons and, based on pH values in water suspsension, range from moderately acid to strongly acid. The pH values in one molar KC1 suspensions were lower than in water in all instances and in many samples were as much as 1 pH unit lower.

Base saturation is as much as 66 percent in the surface layer of the Lucy soil (site 13), and it commonly ranges from about 30 to 50 percent in the upper subsoil of soils on the uplands. Base saturation drops sharply in the lower subsoil of samples at sites 1, 2, 5, 6, 8, 9, and 10. Hydrogen was the dominant cation in all the soils tested, and calcium was second in importance. Calcium is the chief basic cation in the Ap horizon and the upper part of the subsoil. Potassium is also concentrated in the upper horizons of the soils tested. This pattern of base saturation in the upper horizons reflects the use of fertilizers and lime over a long period.

In the samples examined, extractable free iron increases with depth and is highest in the subsoil. Values exceeding 2 percent were common. In the Faceville soil (site 2) *properties of selected soils*—Continued

pH in—		Organic carbon	Total manganese	Free iron	Cation exchange capacity (sum)	Exchangeable cations					Base saturation (sum)	Extractable aluminum	Mineral composition of clay fraction		
Water 1:1	1 M KCl 1:1					Calcium	Magnesium	Sodium	Potassium	Hydrogen			Vermiculite X-ray	Kaolinite (DTA)	Gibbsite (DTA)
		Percent	*Percent*	*Percent*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Meq./100 gm.*	*Percent*	*Meq./100 gm.*	*Percent*	*Percent*	*Percent*
5.4	4.6	0.40	--------	0.3	3.7	1.3	0.2	<0.1	0.1	2.1	43	0.10	--------	--------	--------
5.6	4.6	.11	--------	.6	3.5	1.2	.3	<.1	.2	1.8	49	.07	--------	--------	--------
5.0	4.2	.10	--------	1.6	5.0	1.3	.4	<.1	.1	3.2	36	.49	--------	--------	--------
5.2	4.3	.08	--------	1.3	6.6	2.0	.5	<.1	.1	4.0	39	.33	--------	--------	--------
5.3	4.5	.08	--------	1.7	7.0	1.9	.6	<.1	<.1	4.5	36	.22	--------	--------	--------
5.1	4.6	.06	--------	2.2	6.9	1.4	.8	<.1	<.1	4.7	32	.12	--------	--------	--------
5.1	4.5	.02	--------	2.5	6.4	.9	.8	<.1	<.1	4.7	27	.16	--------	--------	--------
5.2	4.4	.02	--------	3.0	6.1	.8	.6	<.1	<.1	4.7	23	.21	--------	--------	--------
5.8	5.4	.58	.02	.2	3.8	2.2	.2	<.1	.1	1.3	66	.03	--------	--------	--------
5.3	4.1	.12	--------	.6	2.7	.5	.2	<.1	.1	1.9	30	.37	--------	--------	--------
5.3	4.3	.11	--------	.6	2.5	.5	<.1	<.1	.1	1.9	24	.31	--------	--------	--------
5.3	4.3	.04	--------	.7	2.4	.6	.2	<.1	.1	1.5	38	.16	--------	--------	--------
5.6	4.5	.04	--------	.9	2.9	1.0	.3	<.1	.1	1.5	48	.09	--------	--------	--------
5.7	4.8	.06	--------	1.7	3.5	.8	.3	<.1	.1	2.3	34	.03	--------	--------	--------
5.8	5.0	.06	--------	1.4	3.8	1.4	.3	<.1	<.1	2.1	45	.03	--------	--------	--------
5.8	4.8	.04	--------	1.3	3.0	1.0	.3	<.1	<.1	1.7	43	.06	--------	--------	--------
5.6	4.7	.04	--------	1.0	2.3	.6	.4	<.1	<.1	1.3	43	.04	--------	--------	--------

[2] See section "Descriptions of the Soils" for description of profile.

and the Greenville soils (sites 5 and 6), values exceeded 4 percent. The poorly drained Grady soils are lowest in free iron and generally contain less than 1 percent. Soils that have good drainage and a dark-red subsoil contain about the same amount of free iron as the soils that have a yellowish-brown subsoil. Extractable aluminum is highest in the Grady soils and is as much as 4.3 milliequivalents per 100 grams of soil (site 3). In the other soils studied, the content of aluminum was much lower, though no pattern is noted in the data.

Organic carbon is higher in the surface layer of the poorly drained Grady soils than in the other soils sampled. It is 4.31 percent in the sample taken from site 3 and is 4.28 in the sample taken from site 4. All of the other soils studied have good drainage and are much lower in organic carbon. The data for organic carbon as reported may be converted to figures representing organic matter by multiplying each figure by a conversion factor of 1.724. For example, Faceville fine sandy loam (site 1) contains 0.64 percent organic carbon or 0.64 x 1.724=1.10 percent organic matter.

Total manganese ranges rather widely in the surface horizon of the samples studied. It ranges from 0.007 percent in the Grady soil (site 4) to 0.08 percent in the surface soil of the Greenville soil. The samples of well-drained soils that were studied show that in the surface layer the color of the soil and the manganese content are related. Soils classified as Rhodudults (Greenville soils) that have a color value of 3 or lower have a significantly higher content of total manganese than soils classified as Paleudults that have a color value of 4 or higher. In recent years researchers have shown that soils now classified as Rhodudults tend to revert dilute acid soluble phosphates to an insoluble form.

TABLE 12.—*Selected properties of Bt horizons of soils sampled*

Soil name and site	Horizon	Clay	Cation exchange capacity	Specific exchange capacity
Faceville fine sandy loam (Peach County):		*Percent*	*Meq./100 gm.*	*Meq./100 gm.*
Site 1	B24t	37.0	6.1	17
Site 2	B22t	35.4	6.8	19
Grady clay loam (Peach County):				
Site 3	B22tg	44.3	8.1	18
Grady clay loam (Houston County):				
Site 4	B22tg	50.4	9.7	19
Greenville fine sandy loam (Peach County):				
Site 5	B22t	44.1	7.4	19
Site 6	B22t	37.4	7.4	17
Greenville sandy clay loam (Peach County):				
Site 7	B21t	43.6	8.9	20
Site 8	B21t	47.0	10.3	22
Norfolk loamy fine sand (Peach County):				
Site 9	B22t	30.0	6.5	22
Norfolk loamy fine sand (Houston County):				
Site 10	B22t	29.4	7.0	24
Lucy sand (Peach County):				
Site 13	B21t	21.8	3.5	16

General Nature of the Area

This section tells about climate, physiography, industries, and other subjects of general interest that should be helpful to those unfamiliar with the county. Information on agriculture is also provided.

Houston County, originally much larger than it is today, took its present form in 1822, when four new counties were created from it. The county was named for John Houston, a revolutionary patriot who later became Governor of Georgia. Perry, the county seat, was named for Commodore Oliver H. Perry. Warner Robins, the largest town in the county, had a population of 18,633 in 1960. It is just west of Robins Air Force Base.

Peach County, the last county to be organized in Georgia, was created in 1924. It was named for the fruit that grows there abundantly. Fort Valley, the county seat, is in the west-central part of the county.

The population of both Houston and Peach Counties has increased considerably since 1930. According to the census, Houston County had 11,280 people in 1930 and 39,154 in 1960. The population of Peach County increased from 10,268 in 1930 to 13,846 in 1960.

Climate [8]

The climate of Houston and Peach Counties is determined mainly by latitude; by the Gulf of Mexico, less than 200 miles to the south; by the Atlantic Ocean, less than 200 miles to the southeast; and by the Appalachian Mountains, about 200 miles to the northwest. Moisture from the warm waters of the Gulf of Mexico is the source of the

[8] HORACE S. CARTER, State climatologist, U.S. Weather Bureau, Athens, Ga., assisted in preparing this subsection.

TABLE 13.—*Temperature and precipitation data for Houston and Peach Counties, Ga., 1931–60*

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	2 years in 10 will have at least 4 days with— Maximum temperature equal to or higher than—	2 years in 10 will have at least 4 days with— Minimum temperature equal to or lower than—	Average	1 year in 10 will have— Less than—	1 year in 10 will have— More than—
	°F.	*°F.*	*°F.*	*°F.*	*Inches*	*Inches*	*Inches*
January	58.8	38.0	74	23	3.70	1.3	7.3
February	61.2	39.1	77	23	4.57	1.4	7.8
March	67.4	44.4	83	30	5.36	2.9	9.2
April	76.5	52.2	86	39	4.26	1.7	7.6
May	84.8	60.8	94	50	3.44	1.5	6.8
June	90.4	68.3	98	60	4.32	2.0	7.1
July	90.6	70.6	99	66	5.57	2.7	9.9
August	90.7	70.0	98	63	3.94	1.7	6.5
September	86.0	65.0	96	54	3.39	.9	6.5
October	77.3	53.9	88	40	2.58	.2	5.2
November	66.4	42.7	80	27	2.69	.6	7.0
December	58.6	37.7	74	24	4.21	1.5	7.5
Year	75.8	53.6	100	18	48.03	39.3	59.7

precipitation of these counties, and this moisture also causes the high humidity that generally prevails. The Appalachian Mountains form a partial barrier to masses of cold air that move southward during winter.

Data on temperature and precipitation for the two counties are given in table 13. Tables 14, 15, and 16 provide supplementary data on the amount and distribution of rainfall. The probabilities of the last freezing temperatures in spring and the first in fall are given in table 17.

Summers in the two counties are warm and humid. Temperatures of 90°F. or higher can be expected on 3 out of 4 days in June, July, and August, and temperatures of

TABLE 14.—*Average number of days per year (by months) with rainfall equal to or greater than the stated amounts*

[Based on the 10-year period 1953 through 1962]

Rainfall equal to or greater than—	Average number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Inches													
0.10	6	7	7	5	6	7	9	7	6	4	4	5	73
.25	4	5	5	4	4	5	6	4	4	3	3	4	51
.50	3	3	3	3	2	4	4	2	3	2	1	3	33

TABLE 15.—*Total number of days in 10 years (by months) with rainfall equal to or greater than the stated amounts*

Rainfall equal to or greater than—	Total number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10-year period
Inches													
1.00	9	16	16	15	9	17	24	5	17	6	5	9	148
2.00	1	5	5	6	2	3	4	1	4	2	0	2	35
3.00	1	1	1	1	1	0	1	0	1	0	0	0	7
4.00	1	0	0	1	1	0	0	0	0	0	0	0	3

TABLE 16.—*Total number of 2-week, 4-week, and 6-week periods in 10 years with no day having 0.25 inch or more o precipitation*

Periods equal to or greater than—	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10-year period
2 weeks [1]	3	3	4	6	5	3	4	3	7	10	9	6	63
4 weeks [1]	0	0	1	0	3	0	0	0	1	4	4	1	14
6 weeks [1]	0	0	0	0	0	0	0	0	0	3	1	1	5

[1] Periods are listed in the month during which the greater part occurred.

TABLE 17.—*Probabilities of the last freezing temperatures in spring and the first in fall*

Probability	Dates for given probability at temperature of—		
	24° F.	28° F.	32° F.
Spring:			
1 year in 10 later than	March 6	March 22	April 9.
2 years in 10 later than	February 28	March 16	March 29.
5 years in 10 later than	February 2	March 3	March 17.
Fall:			
1 year in 10 earlier than	November 20	November 11	October 28.
2 years in 10 earlier than	November 24	November 18	November 1.
5 years in 10 earlier than	December 11	November 27	November 9.

100° or higher occur at an average of 5 to 7 days each summer. The hottest weather usually occurs in several short periods rather than in one long continuous period. After the early part of September, there is usually a gradual decrease in temperature; by October the days are mild and the nights are cool.

Winters are generally mild in the two counties, but several short periods of moderately cold weather can be expected each year. Temperatures of 32° or below occur on an average of about 35 days each winter. Most of these low temperatures occur from December through February, but freezing temperatures have been recorded late in October and early in April. The average growing season is about 250 days. The last freeze in spring occurs about the middle of March, and the first freeze in fall occurs about the middle of November. Temperatures of 20° or lower occur on an average of two or three times each winter. During the day, the temperature is generally well above freezing even during the coldest weather. The average maximum temperature in the three coldest months is almost 60°.

The average yearly rainfall in different parts of Houston and Peach Counties ranges from about 45 to 48 inches. March and July, normally the wettest months, each average more than 5 inches. Fall is the driest part of the year, but no month has an average of less than 2 inches. Variations, however, are considerable from month to month and from year to year. Monthly extremes range from no rain at all to almost 20 inches, and the wettest year of record had almost three times as much rain as the driest year. Much of the warm-season rain occurs as brief local showers and as thunderstorms that occur chiefly in the afternoons. In winter, the precipitation is usually associated with large storm systems, and rains commonly continue for a period of several hours. A measurable amount of snow occurs about 1 year out of every 4 years, but snowfalls are generally light.

Though several tornadoes have occurred in the two counties, tornadoes are infrequent. Some of the more severe local thunderstorms are accompanied by damaging winds.

The average relative humidity ranges from 80 to 90 percent early in the morning and from 43 to 63 percent early in the afternoon. Generally, humidity is lowest in spring and highest in summer and fall.

Physiography, Relief, Drainage, and Water Supply

Houston and Peach Counties are made up of two broad physiographic areas. From north to south these areas are the Sandhills and the southern Coastal Plain. The soils of both areas are sedimentary and were transported from other areas by the ocean or streams and were deposited in their present position.

The northern part of both Houston and Peach Counties is in the Sandhills area. This area makes up about 10 percent of the land area of the two counties; it is part of a continuous belt that runs across the entire width of the State. This area is rolling to hilly and is dissected by many narrow valleys and drainageways. Most of the Sandhills area is woodland; very little of it is farmed.

The southern Coastal Plain is south of the Sandhills and makes up about 90 percent of the two counties. In this area ridges are broad and very gently sloping, and the hilltops have steep side slopes extending from them. Many streams and drainageways dissect the area. The upland divides are smoother and broader than the Sandhills, and the streams and their flood plains between the divides are broader and farther apart. This area is suited to mechanized farm equipment and to full-scale farming operations. Much of the acreage that is used for peach orchards and pecan groves is in this area.

The elevation at Perry is about 340 feet above sea-level, and it is about 525 feet at Fort Valley. Other approximate elevations are: Warner Robins, 239 feet; Grovania, 427 feet; Elko, 419 feet; and Byron, 505 feet.

The Ocmulgee River, which eventually empties into the Atlantic Ocean, flows along the eastern boundary of Houston County and, with its tributaries, drains all of Houston County and most of Peach County except the extreme southwestern part. The Flint River, which flows into the Gulf of Mexico, drains the southwestern part of Peach County. Important tributaries of the Ocmulgee River are Echeconnee, Sandy Run, Mossy, Big Indian, and Big Creeks. Echeconnee and Sandy Run Creeks drain the northern part of Houston County; Mossy and Big Indian Creeks drain the central part; and Big Creek drains the southern part. Each of these creeks has its own small tributaries that branch into all of the county and form a well-defined trellis pattern.

The northern part of Peach County is drained by Echeconnee and Sandy Run Creeks; the central part by Mossy Creek; and the southern part by Big Indian and Bay Creeks. These creeks and their tributaries drain approximately 90 percent of the county. They flow generally in a southeasterly direction and empty into the Ocmulgee River outside of the county.

Except for the flood plains and drainageways, both counties are well drained. In some areas, sediments from the uplands have filled the stream channels, and excess water drains away slowly.

In both Houston and Peach Counties water for household use and for livestock is adequate except in periods of extremely dry weather. Generally, a well 40 to 60 feet deep will furnish a dependable supply of water throughout the year. These wells, as well as springs, supply the farm homes. Springs, branches, farm ponds, and streams are the main sources of water for livestock. Wells more than 300 feet deep supply water for city pressure systems in Perry, Warner Robins, Fort Valley, and several of the smaller towns.

Industries

Houston and Peach Counties are chiefly agricultural, but industries at Warner Robins, Fort Valley, and Perry employ several thousand people. Most of these people are at the Robins Air Force Base in Houston County. Many people who work in the industries live on farms and do part-time farming, or they rent their land to other operators.

Textile plants in Perry and Fort Valley make bedspreads and draperies. In an area south of Perry, lime is mined for agricultural use and to supply a cement plant in Clinchfield. A plant in Fort Valley produces bodies for schoolbuses.

Forestry in the two counties provides employment for several hundred people. Saw logs, pulpwood, firewood, and fenceposts are the main products. Several mobile sawmills are operating in the counties. The pulpwood industry is increasing in importance in the two counties because there are two large pulpmills in Macon, Bibb County.

Agriculture

Agriculture has long been one of the main sources of income for both Houston and Peach Counties. In recent years farming has become more diversified. The soils, climate, and growing season are suited to a wide range of crops. In Houston County, farming is mostly of the general type, and both crops and livestock are produced. The production of fruits and nuts is most important in Peach County, and general farming is secondary. In the past several years, the income from the raising of livestock has steadily increased in both counties, but the increase has been greater in Houston County. In the past 20 years, income from the sale of forest products has increased in both counties.

Number and size of farms

In both Houston and Peach Counties, the number of farm units has decreased since 1954, but the average size of farms has increased. The census of agriculture shows that in 1954, there were 625 farms in Houston County and that the average size was 271 acres. The number of farms had decreased to 451 in 1959, but the average size had increased to 310 acres. In 1954 there were 316 farms in Peach County, and they averaged 279 acres in size. The number of farms had decreased to 255 in 1959, but the average size had increased to 294 acres.

Crops

In both Houston and Peach Counties, cotton, peanuts, and corn were the principal field crops, but in recent years the acreage in each of these crops has steadily decreased and the acreage in small grain and soybeans has increased.

The Georgia Crop Reporting Service reported that in Houston County 77,961 acres was planted to cotton in 1909, compared to only 3,610 acres in 1959. In 1943, 19,290 acres was planted to peanuts, but in 1959, only 5,025 acres was planted. In 1909, 52,860 acres was planted to corn, compared to 18,592 acres in 1959. In 1959, 8,136 acres of soybeans and 14,909 acres of small grain were planted in Houston County.

In Peach County, 13,244 acres was planted to cotton in 1929, compared to 1,532 acres in 1959. In 1942, 6,000 acres was planted to peanuts, but in 1959, only 548 acres. In 1934, 17,439 acres was planted to corn, compared to only 9,022 acres in 1959. In 1959, 4,266 acres of soybeans and 7,751 acres of small grain were planted in Peach County.

In Houston County the number of peach trees of bearing age decreased from 407,193 in 1949 to 289,559 in 1954, and to 202,475 in 1959. Pecan trees of bearing age totaled 43,112 in 1949, 35,441 in 1954, and 29,741 in 1959.

In Peach County peach trees of bearing age decreased from 499,997 in 1949 to 468,994 in 1954, but by 1959 the number of peach trees had increased to 792,056. On the other hand, pecan trees of bearing age decreased from 55,809 in 1949 to 42,569 in 1954, and to 39,576 in 1959.

Land use

The Georgia Crop Reporting Service reports that in 1939, 45.7 percent of the farmland in Houston County was harvested cropland; 37.3 percent was woodland; 7.6 percent was idle; 6.3 percent was pastured; and 3.1 percent was used for other purposes. In 1959, 39.4 percent of the farmland was used for harvested crops; 42.8 percent was woodland; 5.1 percent was idle; 6 percent was pastured; and 6.7 percent was classified as other land.

In 1939, 57.8 percent of the farmland in Peach County was in harvested crops; 29.9 percent was woodland; 4.2 percent was idle; 5.3 percent was pastured; and 2.8 percent was classified as other land. In 1959, 49.5 percent of the farmland in Peach County was in harvested crops; 30.8 percent was woodland; 6.9 percent was idle; 6.2 percent was pastured; and 6.6 percent was classified as other land.

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Glossary

Acidity. See Reaction.

Alluvium, soil. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available moisture capacity. The capacity of a soil to hold water in a form available to plants. The difference between the amount of moisture held in a soil at field capacity and the amount in the same soil at permanent wilting point. Commonly expressed as inches per inch of soil.

Black Belt. A narrow belt of soils that have a dark-colored surface layer and a dense, plastic clayey subsoil and are underlain by chalk, marl, or limestone in many places.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Cobble (cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches in diameter.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A mapping unit consisting of different kinds of soils that occur in such small individual areas or in such an intricate pattern that they cannot be shown separately on a publishable soil map.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Cemented.—Hard and brittle; little affected by moistening.

Firm.—When moist, soil crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Friable.—When moist, soil crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Hard.—When dry, soil is moderately resistant to pressure and is difficult to break between the thumb and forefinger.

Loose.—Noncoherent; soil does not hold together in a mass.

Plastic.—When wet, soil is readily deformed by moderate pressure but can be pressed into a lump; will form a wire when rolled between thumb and forefinger.

Soft.—When dry, soil breaks into powder or individual grains under very slight pressure.

Sticky.—When wet, soil adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Galled spots. Small areas that are bare of vegetation because erosion has removed the soil.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottles caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes and that differs in one or more ways from adjacent horizons in the same profile.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material and organic matter removed from horizons above. Since part of the fine clay in the B horizon (or subsoil) of many soils has moved into the B horizon from the A horizon above, the B horizon is called an illuvial horizon.

Leaching, soil. The removal of soluble materials from soils or other material by percolating water.

Mottled, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A symbol for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 designates a color with a hue of 10YR, a value of 6, and a chroma of 4.

Natural drainage. Refers to the conditions that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets.

Parent material (soil). The weathered rock or partly weathered soil material from which a soil has formed; the C horizon.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. See Horizon, soil.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values and in words as follows:

	pH		pH
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff (hydraulics). The part of the precipitation upon a drainage area that is discharged from the area in stream channels. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments 0.05 to 2.0 millimeters in diameter. Most sand grains consist of quartz, but they may be of any mineral composition. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Silica. An important soil constituent composed of silicon and oxygen. The essential material in the mineral called quartz.

Silt. As a soil separate, individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Solum, soil. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in a mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *angular blocky* (prisms with sharp corners), *subangular blocky* (prisms with mostly rounded corners), *granular* (granules relatively nonporous), *crumb* (similar to granular but very porous). Structureless soils are (1) *single grain* (each grain by itself, as in dune sand), or (2) *massive* (the particles adhering without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; commonly that part of the profile below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportion of sand, silt, and clay particles in a mass of soil (see also Clay, Sand, and Silt). The basic textural classes, in order of increasing proportions of fine particles are: *Sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Accessibility Statement