

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE GEORGIA STATE COLLEGE OF AGRICULTURE,
ANDREW M. SOULE, PRESIDENT; DAVID D. LONG,
IN CHARGE SOIL SURVEY.

SOIL SURVEY OF PULASKI COUNTY,
GEORGIA.

BY

A. H. MEYER.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1918:]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1920.

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LETTER OF TRANSMITTAL.

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

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Pulaski County, Georgia, and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1918, as authorized by law. This work was done in cooperation with the Georgia State College of Agriculture.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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SOIL SURVEY OF PULASKI COUNTY, GEORGIA.

By A. H. MEYER.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Pulaski County is situated in the south-central part of the State of Georgia, about 40 miles south of Macon. It is one of the smaller counties of the State, having an area of 258 square miles, or 165,120 acres.

Pulaski County includes two geographical divisions—the Dougherty Plain and the Altamaha Upland. The former is confined to the northwestern and northern parts of the county, or that part occupied by the “red lands.” The remainder of the county belongs to the Altamaha Upland, which is occupied mainly by the “gray lands” (Norfolk soils).

The Dougherty Plain is rolling to steeply rolling, with gently sloping areas on the divides. Along the larger stream courses the slopes are steep and dissected. Some lime sinks and other poorly drained, depressed areas occur in this region.

The topography of the Altamaha Upland ranges from gently rolling to rolling. A conspicuous feature of the landscape is the presence of numerous sink holes, ranging from a few feet to 15 feet in depth. In a few cases the sinks are dry and the opening of the underground channel is visible.

The depressions are more numerous in the flat areas. They are of various shapes, and range in size from less than 1 acre to as much as 100 acres. These depressions are the result of the solution of the underlying limestone and consequent subsidence of the land surface. During periods of heavy rainfall many of them contain water, which remains until it passes off through underground channels or is evaporated. Not infrequently these sinks form a series of ponds in which some stream heads.

The county ranges in elevation from about 360 to 500 feet above sea level, and has a general slope southward. It is drained through the Ocmulgee River, which flows in a southerly direction across the central part, and receives the water from a large number of tributaries. The Ocmulgee River has an average width of 250 feet, and is navigable. With the exception of the depressions, the more nearly level areas, and the swamps, all of the county is well drained.

This region in its natural state supported a forest growth of long-leaf yellow pine, oak, hickory, and shortleaf pine. Along the water

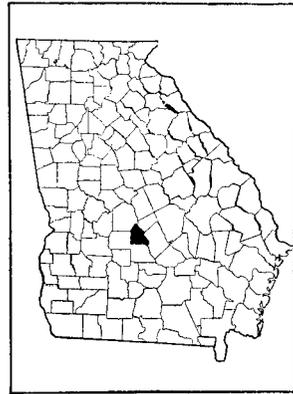


FIG. 1.—Sketch map showing location of the Pulaski County area, Georgia.

courses or swamps white oak, swamp maple, sycamore, ash, tulip poplar, cypress, gum, bay, dogwood, beech, and magnolia thrived, with an undergrowth of water-loving shrubs. Most of the merchantable timber has been cut, and about 65 per cent of the land is now cleared.

Pulaski County was organized in 1804, but since that time has been reduced in size. The first settlers in this region came from North Carolina and older settlements to the north. The present inhabitants include descendants of these early settlers, as well as a large number of farmers from North Georgia. About one-half of the population consists of Negroes. There are no census figures available for the population, as Bleckley County has been formed from part of Pulaski County since 1910. Settlement is quite evenly distributed throughout the county.

Hawkinsville, the county seat, is the largest town, with a population in 1910 of 3,420. It is the business center of the county. Finleyson, with a population of 232, is a trading point in the southern part of the county. Browndale, Coates, Mobleys Crossing, Tippetts, Chauncy, Wallace, Washburn Station, and Millerville are railroad points.

Pulaski County has only fair railroad facilities. No main lines pass through it, but there are several branch lines extending into it. A branch of the Southern Railway extends northeast from Hawkinsville, joining the main line at Cochran, in Bleckley County. The Wrightsville & Tennille Railroad runs east from Hawkinsville, the Hawkinsville & Western Railroad northwest, and the Hawkinsville & Florida Southern Railroad south.

A good system of public roads has been developed throughout the county, and there are about 400 miles of sand-clay roads at the present time. Rural mail delivery routes serve most of the farms.

Hawkinsville is the main distributing point and the principal local market for the agricultural products of the county. Jacksonville, Atlanta, and Macon are the most important outside markets.

CLIMATE.

Pulaski County has a warm, equable climate. The summer is long and hot and the winter mild. It seldom becomes cold enough to form ice, though light frosts are of frequent occurrence. The relative humidity is high.

The mean annual temperature as recorded at Hawkinsville is 64.2° F. January is the coldest month, with a mean temperature of 46.5°, and July the warmest, with a mean temperature of 80.6°. August is only 0.1° lower. The range of monthly means is thus only 34.1°. The lowest temperature recorded is -3° in February and the highest 106° in August, giving an absolute range of 109°. The temperature seldom rises as high as 95° F.

The average date of the last killing frost in the spring is March 20, and that of the first in the fall November 10. The date of the latest killing frost recorded in the spring at Hawkinsville is April 26, and that of the earliest on record in the fall October 21. The average growing season is 235 days, which is long enough to permit the growing of several crops in the same field in a single season.

The mean annual precipitation is 46.31 inches. The precipitation is heaviest in February, March, July, and August, and lightest in April, May, and November. The annual rainfall has varied from 35.14 inches in the driest year on record to 69.76 inches in the wettest year. As a rule the distribution of rainfall is favorable, and long droughts rarely occur.

Snow is uncommon in Pulaski County, though sleet is occasionally recorded. Snow usually melts as it falls.

The winds are prevailingly southerly and seldom high. March and September have the most severe winds.

The following table is compiled from records of the Weather Bureau station at Hawkinsville:

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

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1912).
	^{°F.}	^{°F.}	^{°F.}	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
December.....	47.0	81	13	3.50	1.76	3.94
January.....	46.5	81	4	3.96	3.45	9.13
February.....	47.0	84	- 3	4.96	5.88	4.81
Winter.....	46.8	84	- 3	12.42	11.09	17.88
March.....	58.2	96	16	5.22	1.28	8.40
April.....	64.1	95	28	2.76	.69	6.88
May.....	73.3	102	36	2.69	1.45	6.06
Spring.....	65.2	102	16	10.67	3.42	21.34
June.....	78.7	105	45	4.12	4.00	8.12
July.....	80.6	105	55	5.20	3.53	6.62
August.....	80.5	106	57	5.51	9.23	3.72
Summer.....	79.9	106	45	14.83	16.76	18.46
September.....	75.8	105	41	2.98	.45	5.34
October.....	64.6	95	26	2.92	.15	3.84
November.....	54.5	89	18	2.49	3.27	2.90
Fall.....	65.0	105	18	8.39	3.87	12.08
Year.....	64.2	106	- 3	46.31	35.14	69.76

AGRICULTURE.

Pulaski County is, from an agricultural standpoint, a new county, for only 30 years ago nearly the entire region was heavily forested with longleaf pine. Before this time the chief income was from the raising of cattle, sheep, and hogs, which were allowed to run at large in the woods. About 1890 sawmills were established, and the lumbering and turpentine industries became the chief sources of income. The county was quickly cut over, cleared, and put under cultivation, and at present sawmills and stills are only operated on a small scale, nearly all the merchantable timber having been cut.

Cotton and corn have been the principal crops since farming was begun. Oats, peanuts, and cowpeas rank next in importance. As a rule, enough sweet potatoes are produced for table use. Vegetables and sugar cane are grown to some extent, and a small acreage is devoted to hay, wheat, and rye. There is a tendency toward the more extensive growing of subsistence crops, which is gradually placing the agriculture on a more self-sustaining basis.

As Pulaski County included Bleckley County when the last census was taken, there are no census statistics available for the present area.

Cotton ranks first in acreage and is the main cash crop. The methods used in its culture do not differ from those usually employed in Georgia and neighboring States. Watleys Prolific is the most popular variety. Some Wanamaker and other varieties also are grown. The boll weevil made its appearance in this county during the season of 1917 and did considerable damage in some fields in the southwestern and western part. As a result of the advent of the weevil the agriculture is likely to change, less dependence being placed on cotton. This has been the experience in other sections invaded by the weevil. Only a small proportion of the cottonseed products is used locally, the greater part being shipped to outside markets. A few farmers use the whole seed as fertilizer, which is a wasteful practice, as the oil in the seed, a valuable human food, can not be used by plants.

Corn ranks second in acreage. About one-third of the improved farm land is devoted to corn. The average yield for the county is about 10 bushels per acre. White dent varieties are generally grown. The corn is used for feeding work stock, cattle, and hogs, and to supply meal. The quantity grown in 1917 was apparently more than sufficient to meet the demands of the county.

The acreage of oats, as well as of corn, has increased greatly within the last two years. Oats are grown mainly as feed for work stock, but a small proportion of the crop is cut green for hay, in which case vetch is frequently sown with it. Appler and Fulghum are the most popular varieties of oats.

The growing of peanuts is becoming more important each year. The crop is profitable and should supersede cotton to some extent. At present it is mainly grown for hog pasture and for hay. A small part of the crop is harvested, the nuts being used for home consumption and for sale on the local markets.

Cowpea hay is the most important of the forage crops. The seed is generally sown broadcast on land which has been used for oats, wheat, or rye, but fields which are idle on account of scarcity of labor also are used for this crop. Some Bermuda grass and Johnson grass hay is harvested.

Cowpeas are often planted in cornfields just before the "laying by" of the corn. Some of the seed is picked, but the greater part of the crop is used as pasturage for hogs. Cowpeas form an important part of the food supply of the county. Unknown, Whippoorwill, Iron, and Brabham are the most popular varieties. The Brabham and Iron should be grown wherever wilt and rootsmut are prevalent, as they are practically immune to these diseases.

The velvet bean, which does well on the sandy soils of southern Georgia, has become an important crop in Pulaski County. As a rule the crop is planted in or between the rows of corn, but some farmers plant it along woven-wire fences. The crop is generally grazed in the field by various kinds of live stock, principally cattle, but in some cases the seed is picked by hand and either fed to live stock or sold. A small part of the seed is ground and used as a nitrogenous fertilizer.

Owing to the great demand for breadstuffs, the acreage of wheat has been greatly increased in the last few years. The farmers are endeavoring to supply their own needs and the demands of the towns. Ordinarily wheat yields 8 to 12 bushels per acre. The crop is not well adapted to the sandy soils of the county, but should be grown with success on the heavier types, such as the Greenville loam and clay loam. A few small fields are devoted to rye, which does better than wheat on the sandy soils.

Some sweet potatoes are produced, mainly for home consumption. The crop is sometimes grown for hog feed. A small quantity of Irish potatoes is produced for spring use. Nearly every farmer grows enough sugar cane to supply the family with sirup the year around, and there is often a surplus which finds a ready sale in the towns. Some sorghum is also grown for the manufacture of sirup.

Vegetables are grown for home use on almost every farm, and farmers near the towns supply vegetables for the local markets. Cantaloupes, watermelons, asparagus, onions, lettuce, peppers, mustard, cucumbers, tomatoes, cowpeas, beans, Irish potatoes, sweet potatoes, and other vegetables are grown, and invariably do well.

Scarcely any attention has been given to orcharding. Peaches, the most extensively grown tree fruit, do very well. There is one commercial orchard of several hundred acres in the extreme northern part of the county. Pears succeed if not injured by blight, to which they are very susceptible. Plums thrive, but are grown to only a small extent. Figs do very well. The fruit is well suited to the manufacture of preserves.

Small fruits receive almost no attention. The wild blackberry grows luxuriantly along roadsides and in uncultivated tracts throughout the county. Some strawberries are grown in gardens for home use. A few farmers are beginning to set out pecan trees.

The raising of hogs is the most important live-stock industry in this county. Ordinarily from 10 to 15 hogs per farm, and sometimes as many as 100, are fattened each year. Most of the hogs, as well as other live stock, are kept on farms operated by the owner. Cholera is still a serious obstacle to the development of hog raising, but this disease is being rapidly put under control. The Hampshire and Duroc-Jersey are the chief breeds of hogs, but there are a few herds of Berkshire, Poland-China, and Chester White, besides the native hog.

A considerable number of cattle and a few sheep and goats are slaughtered or sold annually. The dairy cows average one for each farm.

Poultry constitutes a valuable asset on most farms. Nearly every farmer keeps 25 to 50 chickens, and ducks, geese, turkeys, and guinea fowls are raised on many farms.

Some attention is given to crop rotation. Cotton is grown for one or two years and followed by corn for one year. Oats are sown in the late fall, harvested in May or June, and followed by cowpeas, which are cut for hay, after which the land is returned to cotton.

There is little recognition of the adaptation of the soils to certain crops. Cotton and corn occupy the largest acreage on each farm without respect to soil type. As a rule, the farmers plant sugar cane in low places, where there is a larger accumulation of organic matter and a higher moisture content.

Only a small amount of barnyard manure is used, but commercial fertilizers are used extensively on all the soil types. Most of the fertilizer is purchased ready mixed, and consists of acid phosphate and cottonseed meal. Some farmers buy the acid phosphate and cottonseed meal and mix them. Owing to the high price of potash at present (1918) very little is used.

As a whole, the farm improvements in Pulaski County are good. On farms operated by owners the buildings are usually well kept, but on the smaller farms they are not nearly so substantial, and the tenant houses are usually small and uncomfortable. Most of the fields

are fenced with barbed wire, but on the better farms woven wire is coming into use. There are a few rail fences.

Negroes are depended upon for labor over most of the county. When employed by the month they receive from \$20 to \$30, with board. Day laborers are ordinarily paid \$1.25 to \$1.50 a day. Cotton pickers are paid a certain rate per hundred pounds, usually \$1 or more.

According to the census, the average size of farms in 1910 was 80.9 acres. Large tracts of land are still held by persons living in the towns, only 25 per cent of the farms being operated by owners in 1910 as compared with 74.6 per cent operated by tenants. Farms are rented either on a cash or share basis. Cash rents range from \$2 to \$7 an acre. On a share basis the landlord furnishes the stock, feed, implements, and one-half the fertilizer and receives one-half the crop. Considerable land is rented for a definite amount of cotton.

The average assessed value of farm land in Pulaski County in 1910, including what is now Bleckley County, was \$18.29 an acre, which is an increase of \$11.40 over the assessed value in 1900. Of the total value of all farm property, 66.3 per cent is represented by the land, 15.8 per cent by buildings, 4 per cent by implements and machinery, and 13.9 per cent by domestic animals. At present land values range from \$1 to \$50 an acre, depending on the soil, improvements, and location.

As a whole the agriculture of Pulaski County is in a prosperous condition. The advantages of diversified farming over the one-crop system are realized, and systematic rotations are gradually being introduced by the more progressive farmers, who are beginning to make more general use of the waste products of the farm in meat production. Nitrogen-gathering plants, such as cowpeas, velvet beans, vetch, and peanuts, are much more generally grown for their renovating effect on the soil than formerly. There is on the whole room for improvement in the methods of cultivation, particularly as regards plowing and handling the soil to conserve moisture.

SOILS.

Pulaski County lies in the Coastal Plain province of the United States. The upland soils are derived from unconsolidated sands, clay, and marl, and are correlated in the Norfolk, Ruston, Orangeburg, Greenville, Susquehanna, Plummer, and Grady series. Alluvial soils occupy the terraces and flood plains along the streams. The second-bottom soils along the larger streams are derived from the Piedmont and Appalachian uplands, with considerable wash from the Coastal Plain uplands. Along the smaller streams the alluvium is entirely from the Coastal Plain soils. The first-bottom soils consist of sediments washed from the Piedmont and Appalachian

uplands, and they contain a high percentage of mica. The second-bottom soils are classed with the Kalmia series, and the first-bottom soils with the Congaree series and Swamp.

The soil over most of the upland is a sandy loam, while the bottom-land types are prevailingly of silt loam to silty clay loam texture. Limestone is exposed on slopes adjoining streams and in deep road cuts, and it occurs generally at depths of 10 to 15 feet below the surface. Limestone is found chiefly in the northern and northwestern part of the county, or in association with the Greenville soils. Owing to the excessive leaching to which the material has been subjected, the influence of limestone on the surface soil is negligible, and the upland soils are all acid, according to the litmus test. Chert, a residue of the original limestone, remains on the surface in sufficient quantities in places to form a stony soil.

The surface soils of the types classed in the Norfolk series are gray and the subsoils yellow, the material being friable sandy clay. These contain a low percentage of organic matter.

The Orangeburg series is characterized by gray to reddish-brown, open-structured surface soils and red, friable sandy clay subsoils.

The surface soils of members of the Ruston series are gray, and the subsoil consists of reddish-yellow, friable sandy clay. This series occurs largely in the Altamaha Uplands, in close association with the Norfolk.

The types included in the Greenville series have red to reddish-brown surface soils and red, sandy clay or clay subsoils.

The surface soils of the types classed in the Susquehanna series are gray, and the subsoils consist of mottled gray and red, or gray, red, and yellow, plastic, heavy clay. This series is closely associated with the Norfolk. It usually occurs at the head of streams and along stream courses.

The surface soils of the types grouped in the Plummer series are dark gray, and the subsoil, in texture a friable sandy clay, is gray, mottled with yellow and yellowish brown.

The Grady series includes types with gray surface soils and mottled gray, bluish-gray, yellow, and red, tough, heavy clay subsoils. The soils of this series occupy lime sinks or depressions. They are poorly drained and higher in organic matter than the surrounding upland soils.

The types included in the Kalmia series are characterized by gray to grayish-yellow surface soils and a yellow friable sandy clay subsoil. The members of this series are developed in the second bottoms of streams. They occupy flat areas and usually have good drainage.

The Congaree soils are brown to reddish brown, and high in mica. The subsoil is a brown to yellowish-brown, friable silty clay. In poorly drained positions yellow, mottled faintly with bright red and

light gray, is the predominant color of the subsoil. The Congaree soils have a flat topography and are frequently overflowed.

The type mapped as Swamp occupies wet bottom lands along drainage ways. The surface material is usually brown and the subsoil is light gray mottled with yellow and yellowish brown. The material is predominantly a silt loam, but there are included areas of different textures.

The various soils mapped in Pulaski County are discussed in detail in the following pages of this report. The table below gives the name and the actual and relative extent of each :

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sandy loam.....	58,176	35.2	Greenville clay loam.....	3,904	2.4
Ruston sandy loam.....	20,160	12.2	Norfolk sand.....	3,328	2.0
Plummer sandy loam.....	16,896	10.2	Susquehanna sandy loam.....	3,264	2.0
Congaree silty clay loam.....	11,712	7.1	Grady clay loam.....	2,496	1.5
Orangeburg sandy loam.....	11,136	6.7	Kalmia fine sandy loam.....	2,240	1.4
Norfolk loamy sand.....	9,216	5.6	Greenville loam.....	2,112	1.3
Greenville sandy loam.....	7,360	4.5	Greenville loamy sand.....	768	0.5
Ruston loamy sand.....	6,912	4.1			
Swamp.....	5,440	3.3	Total.....	165,120

NORFOLK SAND.

The Norfolk sand consists of a light-gray, loose, incoherent sand, 6 to 8 inches deep, underlain by a pale-yellow, loose sand which extends to a depth of more than 3 feet.

This type occurs in widely scattered areas throughout the county. The largest area lies about 2 miles south of Madison School, and another important area immediately southeast of Hartford. The former is not typical in color, being not unlike the Ruston in this one characteristic.

The topography varies from undulating to gently rolling. Drainage is excessive and the soil is leachy. The characteristic vegetation consists of scrubby oaks with scattered longleaf pine.

Only a small percentage of the Norfolk sand is under cultivation. Yields are low unless large quantities of fertilizer are used. Land of this type sells for \$5 to \$10 an acre.

NORFOLK LOAMY SAND.

The Norfolk loamy sand consists of a light-gray loamy sand, underlain at about 6 inches by a pale-yellow loamy sand. The material becomes brighter in color with depth. In many places there is very little change in texture within the 3-foot section, but ordinarily the

subsoil is slightly heavier below a depth of 20 inches. The soil is low in organic matter.

A distinct variation of this type occurs southeast of Hawkinsville, between the town and Big Creek. This soil is a light-gray sand to loamy sand, passing at about 6 inches into a pale-yellow loamy sand. This layer usually continues to a depth of 30 inches, where yellow, friable sandy clay is encountered. This variation occupies rather level to undulating upland and does not occur along stream courses in the position characteristic of the typical soil.

The Norfolk loamy sand occurs in small areas along gentle slopes to stream courses. It covers approximately 15 square miles. The soil is not subject to erosion, but drainage is excessive and crops frequently suffer from lack of moisture.

About 70 per cent of this type is under cultivation, largely to corn and cotton. Yields average only about half as large as on the Norfolk sandy loam. Farm land of this type is held at prices ranging from \$10 to \$30 an acre.

The suggestions made for the improvement of the Norfolk sandy loam are applicable as well to this type.

NORFOLK SANDY LOAM.

The surface soil of the Norfolk sandy loam is a light-gray to brownish-gray loamy sand, grading at about 6 inches into a yellow loamy sand to light sandy loam, which usually extends to a depth of 10 to 18 inches below the surface. The subsoil is a yellow, friable sandy clay. Occasionally the lower subsoil shows slight mottlings of gray, particularly in the flatter areas. This type is locally known as "gray land."

Included with this soil are patches of Tifton sandy loam which would have been mapped separately had they been larger. The soil in these patches is a grayish-brown to brown loamy sand passing at 6 to 8 inches into bright-yellow sandy loam and this into a bright-yellow to slightly reddish-yellow, friable sandy clay. Such soil is known as "pebbly land" or "pimply land." It differs essentially from the Norfolk sandy loam in that the surface soil carries a large percentage of small, round iron concretions or accretions, which in many places have been beaten out on the surface and give a brown, gravelly appearance. A few of these pebbles are found in areas of the Norfolk sandy loam.

The Norfolk sandy loam is by far the most extensive and most important soil in Pulaski County. It covers practically one-half of its area to the south of Hawkinsville and occurs in broad, continuous tracts southeast of Hawkinsville along the Dodge County line.

In general the surface is undulating to gently rolling, or even rolling, as near some of the main drainage ways. All the type has

a surface favorable for agriculture and the use of improved farm machinery. Most of the land is naturally well drained, and only the flatter areas require ditching. Some of the more rolling slopes are terraced in order to prevent erosion.

Probably 75 or 80 per cent of this type is cleared and under cultivation. The remainder supports a growth mainly of longleaf or old-field pine.

Cotton is the principal crop. It ranges in yield from about one-fourth to 1 bale per acre, depending upon the methods of cultivation, the rotations, and the amount of commercial fertilizer or barnyard manure applied to the land. This is the best cotton soil of the county. Corn, where the land has been manured or fertilized, yields 15 to 30 bushels per acre. Oats, cowpeas, peanuts, wheat, rye, and velvet beans are grown to a small extent and give good yields.

The selling price of this land ranges from about \$30 to \$50 an acre, depending upon the location, the improvements, and the general condition of the soil.

The Norfolk sandy loam is easily tilled and can be worked under a wide range of moisture conditions. It responds readily to the application of commercial fertilizers and barnyard manure or to the turning under of green-manuring crops such as cowpeas and crimson clover. The good effects of turning under a green crop are noticeable for three to five years. Considerable acid phosphate and cottonseed meal are used for cotton and to a less extent for corn. Peanuts and velvet beans can be grown profitably. In fact, this soil will produce any crop common to this section of southern Georgia. It can readily be built up to a high state of productiveness by the proper rotation of crops, including a legume in one year out of three. The few areas of pebbly land require the same cultural methods and fertilizer practices as the typical Norfolk sandy loam.

RUSTON LOAMY SAND.

The Ruston loamy sand consists of a brownish-gray or gray loamy sand underlain at about 10 inches by a reddish-yellow, yellowish-red, or yellowish-brown loamy sand. This becomes heavier in the lower part of the 3-foot section and may contain enough clay or silt to have the texture of a sandy loam or friable sandy clay.

In a few places, particularly along Big Creek and along the Ocmulgee River, about 4 miles southeast of Hawkinsville, the surface soil is a red loamy sand. Such areas are typical Orangeburg loamy sand, and would have been mapped separately had their extent warranted it.

The Ruston loamy sand is developed quite extensively throughout the eastern half of the county. The largest areas are mapped on the high lands east of the Ocmulgee River. Some of the most

prominent lie immediately east of Hawkinsville, in the vicinity of Cooks Chapel, and to the west of Mount Zilla Church.

The type occupies gently rolling to rolling areas, and owing to its favorable topography and the loose, open character of both soil and subsoil is well drained. In places the drainage is excessive.

Most of the type is under cultivation, being devoted primarily to the production of cotton and corn. Yields of these crops are comparatively low, except where the soil has been heavily fertilized or manured.

The Ruston loamy sand ranges in selling value from about \$10 to \$20 an acre.

This soil is easily tilled and can be worked immediately after a rain. It is decidedly deficient in organic matter, and this in large measure accounts for its low productiveness and lack of moisture at certain seasons of the year. It would be greatly benefited by the addition of coarse manures or by turning under vegetable matter in any form. Peanuts, rye, and soy beans can be profitably grown on this soil and their production should be extended.

RUSTON SANDY LOAM.

The surface soil of the Ruston sandy loam is a gray sandy loam, about 8 inches deep, grading into a reddish-yellow sandy loam which extends to a depth of 10 or 15 inches. In many places the gray surface layer has been removed by erosion, and the surface color is reddish yellow. The subsoil is a reddish-yellow to reddish-brown, friable sandy clay, usually heavier in texture than the subsoil of the Norfolk sandy loam. In places the lower subsoil is exposed and forms "clay galls." Iron concretions are present in small amounts throughout the soil section, and in a few places, on the crest of slopes, the type contains as much as 25 per cent of such material.

The Ruston sandy loam is developed mainly in the western and northern parts of the county, though small areas occur throughout all sections. It occupies the slopes and tops of ridges and in a few places rolling upland. The natural drainage is good, and the run-off is so rapid on the steeper slopes that terracing is necessary.

Originally this soil supported a forest of longleaf and shortleaf pine, with some oak and hickory. About 75 per cent of it has been cleared and is now in farms. The soil is fairly productive. Cotton and corn are the main crops, with oats and cowpeas of secondary importance. Cotton ordinarily yields from one-fourth to three-fourths bale, corn 8 to 20 bushels, and oats 10 to 20 bushels per acre. Under favorable conditions the yields are considerably higher.

The surface soil is easily handled where the subsoil is not too close to the surface, as the latter forms a hard crust which is difficult to

break. Commercial fertilizers are extensively used in the production of corn and cotton.

The price of farm land of the Ruston sandy loam varies from \$15 to \$30 an acre.

On most farms on this type deeper and more thorough tillage would lessen erosion and increase the water-holding capacity of the soil. Leguminous crops should be grown more extensively to keep up the content of organic matter.

ORANGEBURG SANDY LOAM.

The surface soil of the Orangeburg sandy loam is a gray or brown sandy loam or loamy sand, passing at 6 inches into reddish-yellow sandy loam. The upper subsoil, which usually continues to a depth of 12 or 18 inches, rests on a bright-red, friable sandy clay. In places the surface material rests immediately upon the red, friable sandy clay subsoil, the intermediate layer of reddish-yellow sandy loam being absent. In some places the surface soil is dark brown, approaching in color the Greenville sandy loam. These two soils grade imperceptibly into each other, although where they are typically developed there is a distinct difference between them.

Relatively large areas of Orangeburg sandy loam are found in the northwestern and northern parts of the county, and small areas are scattered throughout the remainder. The surface is undulating to rolling, and drainage is thorough. In places the soil is subject to destructive erosion.

Practically all of this type has been cleared of the native forest, which consisted of longleaf and shortleaf pine, oak, and hickory, and it is now devoted mainly to the production of the staple crops. Ordinarily about one-half bale of cotton, 20 bushels of corn, 25 bushels of oats, or 1 ton of peavine hay per acre is obtained.

Large quantities of commercial fertilizers are used. Organic matter is applied in the form of cottonseed meal, and phosphorus in the form of acid phosphate. The high price of potash at present (1918) practically prohibits its use, except in very small amounts.

This soil, owing to its open, loose structure, is easy to handle, and little difficulty is experienced in obtaining a good, mellow seed bed. It is considerably easier to till than the Greenville sandy loam.

Areas of the Orangeburg sandy loam are valued at \$20 to \$40 an acre, depending on the improvements and location.

The incorporation of organic matter, the rotation of crops, including a legume, and deep breaking are necessary for best results on this type.

GREENVILLE LOAMY SAND.

The Greenville loamy sand is a dark-brown to reddish-brown loamy sand, about 10 inches deep, underlain by a dark yellowish red or dull-red loamy sand. Occasionally a sandy clay layer is encountered below the depth of 30 inches.

This type is inextensive. It is developed in close association with the other Greenville soils, usually on gentle slopes along stream courses. The open structure and favorable situation result in ample drainage.

The native forest is composed mainly of oak, which is mostly scrubby, and a stunted growth of longleaf and shortleaf pine. Most of the type is under cultivation, but owing to the smallness of the areas it is generally farmed with other types. Cotton and corn are the principal crops. The type has a slightly higher selling value than the Ruston sand.

GREENVILLE SANDY LOAM.

The soil of the Greenville sandy loam consists of a brownish-red to red sandy loam, extending to an average depth of 6 to 8 inches. This is underlain by a red, friable clay. The subsoil carries a few black and yellow iron concretions, which give it a slightly mottled appearance. The surface soil is friable and open, while the subsoil is more dense, though friable under favorable moisture conditions. The clay of the subsoil does not stick to the fingers, but rolls up in small bodies, and it does not scour on the auger. When dry it is hard and compact.

The Greenville sandy loam is derived from the weathering of sandy and argillaceous limestone and beds of unconsolidated marine material. Fragments of chert are occasionally found on the surface.

The type is confined mainly to the western and northwestern parts of the county, but small areas are scattered throughout all sections. The topography varies from undulating in the interstream areas to gently sloping along streams, and the relief is sufficient to insure adequate drainage. On the steeper slopes terracing is necessary to protect the surface soil from erosion. Large quantities of the original surface material have been removed in places and the underlying clay exposed.

In common with the other members of the Greenville series the original forest growth on the Greenville sandy loam was mainly hardwoods, oak, hickory, and dogwood, with some longleaf and shortleaf pine. The greater part of the type is now devoted to the production of the staple crops, principally cotton and corn. A small acreage is used for oats, cowpeas, velvet beans, and wheat. Yields

depend on the fertilization and the efficiency of the farm management. Ordinarily cotton yields one-third to three-fourths bale per acre, and corn 8 to 20 bushels. Oats yield 20 to 30 bushels, and peavine hay 1 ton per acre.

Owing to the open, sandy texture of the surface soil the Greenville sandy loam can be plowed under a reasonably wide range of moisture conditions, although if it is worked when too wet it forms hard clods upon drying, especially where the subsoil is reached in cultivation. Commercial fertilizers are extensively used.

Improved farm land of this type has a selling price of \$30 to \$50 an acre, and unimproved land a value of \$15 to \$20 an acre.

This soil should be plowed more deeply in order to increase the moisture-holding capacity and to prevent erosion. Large amounts of green manure should be incorporated with the soil to increase the productiveness.

GREENVILLE LOAM.

The Greenville loam consists of a dark-red, friable loam, underlain at 8 or 10 inches by a dark-red, friable loam to heavy sandy loam which extends to a depth of 36 inches with very little change except in the color, which becomes lighter with depth. The dark-red color of the surface soil distinguishes the type from any other in the county. The soil appears to be higher in organic matter than the other members of the Greenville series in Pulaski County.

This type occurs mainly in the northeastern part of the county, but small areas are scattered throughout the whole northern section. It occupies interstream uplands and the slopes bordering streams. In the former case it occurs on the smoothest and most plateaulike areas in the county, while in the latter it ordinarily occupies moderately to gently sloping areas, though in a few places the slope is rather steep. The type has good drainage.

About 90 per cent of this type is under cultivation. The returns are higher than on any other soil in the county. Cotton ordinarily yields one-half to three-fourths bale and corn 15 to 30 bushels per acre. Legumes and grasses do well, but truck crops are less satisfactory owing to the rather heavy texture of the soil.

Although it is mellow, the type is difficult to plow, as the soil sticks to the moldboard and does not scour. This is a characteristic feature of all the heavier members of the Greenville series. Commercial fertilizers are not extensively used on account of the high natural productiveness of the type.

The selling price of land of this type ranges from \$30 to \$75 an acre, depending on the location and topographic position.

The suggestions made for the improvement of the Greenville clay loam are applicable also to this type.

GREENVILLE CLAY LOAM.

The surface soil of the Greenville clay loam consists of a red to dark-red clay loam, with an average depth of 6 inches. A surface layer of sandy material, ranging from 1 to 4 inches, occurs in many places, but where the soil is plowed to a depth of about 6 inches the resultant mixture is a clay loam. The surface soil passes gradually into the subsoil, which consists of a deep-red to dark-red, friable clay. Frequently at a depth of 30 inches or more there are found yellowish-red mottlings, which become more plentiful and distinct in the lower substratum. The subsoil material has the peculiar property of rolling up in small aggregates when rubbed between the fingers, and it does not scour on the auger. When dry it becomes compact and hard. Erosion has been sufficiently active in places to expose the clay subsoil. Iron concretions are found on knolls and on some slopes, but not in quantities sufficient to warrant the mapping of the soil as a separate type. Chert fragments are sometimes found over the surface, and fragments of chert and limestone may be encountered in the subsoil.

The Greenville clay loam, which is largely developed in the northern part of the county, covers about 7 square miles. It mainly occupies steep slopes along drainage ways, though areas also extend over the smooth divides. Drainage is adequate, and in places erosion is serious.

Owing to the steep topography, only a small percentage of the type is under cultivation. Cotton, corn, small grains, and grasses do well. Cotton yields one-fourth to one-half bale per acre, corn 8 to 20 bushels, oats 15 to 30 bushels, and peavine hay from one-fourth to three-fourths ton. The soil is too heavy for trucking.

This is the most difficult soil in the county to handle. It can be worked only under a very small range of moisture conditions. If cultivated when too wet, it bakes and forms intractable clods, and when dry it is too hard to plow. Heavy teams and strong equipment are necessary to stir the soil properly. Commercial fertilizers are used, but not as extensively as on the sandy soils.

Land values range from \$10 to \$50 an acre, depending largely on the topography.

For its improvement, this soil requires deeper and more thorough cultivation and the growing of leguminous crops to increase the supply of organic matter.

SUSQUEHANNA SANDY LOAM.

The soil of the Susquehanna sandy loam is a gray sandy loam or loamy sand, about 6 inches deep. The subsoil is variable within short distances. Ordinarily the soil is underlain by a pale-yellow

sandy loam which passes abruptly at 10 to 12 inches into a light-gray or bluish-gray, plastic, tough clay, mottled with light red, red, and yellow. In general the brighter colors become less conspicuous with depth, and gray or bluish gray becomes more pronounced. In numerous spots the intermediate layer is lacking and the surface soil rests directly on the heavy clay. Where erosion has removed the surface soil the heavy clay is exposed and forms what are locally known as "gall spots." Black iron concretions are present in the subsoil. Some patches of Norfolk sandy loam and Ruston sandy loam, differing from the Susquehanna mainly in subsoil characteristics, are included with the type.

The Susquehanna sandy loam is inextensive. It is found chiefly on slopes, especially around stream heads and along drainage ways throughout the more broken sections of the Norfolk sandy loam. The best development of the type is in the vicinity of Midway School, in the southeastern part of the county. The surface drainage is good, but the heavy subsoil prevents the free movement of underground water, resulting in a saturated condition on the lower slopes during wet weather.

Most of this type is under cultivation, being farmed in connection with the Norfolk sandy loam. Cotton and corn do well, but the yields are moderate in comparison with those obtained on the Norfolk sandy loam. Land of this type is valued at \$20 to \$25 an acre.

PLUMMER SANDY LOAM.

The soil of the Plummer sandy loam consists of a gray to dark-gray loamy sand or sandy loam, with an average depth of 12 inches. It carries a rather high percentage of organic matter in comparison with the other upland soils. The upper subsoil is a light-gray or pale yellowish gray sandy loam, which at any depth from 15 to 18 inches passes into a light-gray, friable sandy clay, mottled with yellow, reddish yellow, and red. The type as mapped includes small areas of Plummer loamy sand and sand.

This type is developed largely next to small streams, at the base of slopes where there is seepage water, and in poorly drained flats. It also occurs in small depressions. The drainage is naturally poor, the type being covered with water the greater part of the year. The characteristic vegetation consists of sedge grass, gallberry, switch cane, gum, cypress, and some pine. The timber growth is being removed and the land ditched. Only a very small percentage of the type is under cultivation at present. Sugar cane seems to do especially well. When properly drained, this should prove a valuable farming soil.

GRADY CLAY LOAM.

The Grady clay loam consists of a gray to dark-gray clay loam passing gradually at about 6 inches into a light-gray, friable clay loam. At any depth from 18 to 24 inches the subsoil changes abruptly to a light-gray, tough, plastic clay, mottled with yellowish red, red, and yellow. The lower stratum is very compact and hard. There are included some small areas of Grady sandy loam, occurring mainly where the type merges into the surrounding soils. In the small depressions there is about an equal area of clay loam and sandy loam.

The main difference between the Grady and Plummer series is the subsoil, that of the former being a heavy, tough, plastic clay, while that of the latter is light-textured and friable sandy clay.

The Grady clay loam is developed throughout the county in small, scattered areas. It occupies irregular, shallow depressions, locally called lime sinks or lakes. The topography is flat, and water stands on the surface during the winter months and often during the entire year. Artificial drainage is provided in some places by means of ditches.

Only a very small percentage of this type is under cultivation. Most of it is covered with a forest of cypress, gum, and water oak, with an undergrowth of gallberry and some switch cane. Where the soil is reclaimed good yields of corn and sugar cane are obtained.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Grady clay loam:

Mechanical analyses of Grady clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
255535.....	Soil.....	1.5	6.0	4.3	19.4	11.2	27.4	30.1
255536.....	Subsoil.....	2.1	6.4	4.7	19.0	10.4	17.4	40.2

KALMIA FINE SANDY LOAM.

The surface soil of the Kalmia fine sandy loam consists of a gray or yellowish-gray fine sandy loam or loamy fine sand passing at about 6 inches into a pale-yellow fine sandy loam which extends downward to 15 or 18 inches. The subsoil is a yellow, friable fine sandy clay. In some of the more poorly drained areas the lower part of the 3-foot section shows considerable mottling of gray or brown, and the texture is more nearly a compact, friable clay. Included with the type along Big, Tennile, and Bluff Creeks are patches of yellowish-gray loamy sand underlain by bright-yellow loamy sand. In a few spots along the Ocmulgee River and Big

Creek the soil is a gray fine sandy loam overlying a gray, slightly plastic clay subsoil, which is mottled with yellow or brown. Locally, red or reddish-yellow mottlings may occur in the lower part of the subsoil.

The Kalmia fine sandy loam is developed on the second bottoms or terraces along the Ocmulgee River and Big Indian Creek. The largest area occurs along the Houston County line and south of the junction of Mossy Creek and the Ocmulgee River. Small areas are found throughout the high bottom lands of the county.

The type has a level to undulating surface, and lies 6 to 15 feet above the first bottoms or present flood plains. It is overflowed at times of exceptionally high water, but most of it is sufficiently well drained for farming purposes. Some depressions and swales need artificial drainage to fit them for cultivation.

Probably not more than 15 or 20 per cent of this type is under cultivation. The rest is in forest consisting principally of oak, gum, elm, magnolia, and pine.

Land of this type is rarely sold except with areas in the adjoining uplands, and no definite price can be placed upon it.

The Kalmia fine sandy loam is farmed and fertilized in about the same manner as the Norfolk sandy loam of the uplands, and the same methods can be used to increase its productiveness.

CONGAREE SILTY CLAY LOAM.

The soil of the Congaree silty clay loam consists of a rich-brown to reddish-brown silty clay loam, 6 to 8 inches deep, grading into a brown or brownish-yellow, very compact, friable silty clay. At 30 inches the subsoil becomes less compact. Minute mica flakes are present throughout the 3-foot section. In the sloughs and lower lying places the subsoil is not as well drained as elsewhere, and consequently is more or less mottled. In such places the soil is about 4 inches deep, and is underlain by pale-yellow or yellow, compact silty clay which is faintly mottled with gray. At 24 inches the subsoil changes to yellow, mottled with gray, and reddish yellow, the gray becoming more prominent with depth. Along the banks of the Ocmulgee River the soil is a brown sandy loam 36 inches deep, and would be classed as the Congaree sandy loam did it not occur in strips too narrow to be separated on the map.

The Congaree silty clay loam is confined to the first bottoms of the Ocmulgee River, and is locally known as "swamp." Drainage is very poor, and none of the type is under cultivation. It is subject to frequent overflow. The timber growth consists of oak, gum, cypress, hickory, dogwood, elm, beech, holly, magnolia, and a few pines, with an undergrowth of palmetto and switch cane. A large

part of the type is used as pasture for stock, hogs running at large in the "swamps." The soil is naturally strong, and if drained would produce large yields of corn. It is also an excellent soil for the grasses suited to the moister soils of the region.

SWAMP.

Swamp includes low-lying, wet areas along the streams. The material varies considerably in texture and structure, but the soil is usually a brown silt loam, and the subsoil a light-gray silty material mottled with yellow and yellowish brown. In places the soil is sandy and the type resembles the Plummer sandy loam.

Swamp is found along the larger streams throughout the county. The largest areas occur along Big, Cedar, Tenmile, Bluff, Jordan, Limestone, Mosquito, and Tucsa-whatchee Creeks.

Swamp supports a forest of black gum, sweet gum, magnolia, cypress, and other water-loving trees, with an undergrowth of yellow jasmine, dogwood, and switch cane. It is largely used for pasture. It is subject to frequent overflow, and can not be used for crop production in its present condition.

SUMMARY.

Pulaski County is situated in the south-central part of the State of Georgia in the Coastal Plain region. It has an area of 258 square miles, or 165,120 acres. The topography prevailing is gently rolling to rolling.

The county is drained by the Ocmulgee River. The general direction of stream flow is to the south, and in general the drainage is fairly good.

Pulaski County was organized in 1804. The first settlers came from North Carolina and older settlements to the north.

Hawkinsville, county seat, is located in the north-central part of the county. It is the largest town, with a population in 1910 of 3,420.

The railroad facilities in Pulaski County are only fair. There are no main railroad lines, but several branch lines traverse it. A good system of public roads has been developed.

The climate is warm and equable. The annual precipitation averages 46.31 inches, and the mean annual temperature is 64.2°. The normal growing season is 235 days in length.

Corn and cotton are the principal crops. The production of pork and beef is becoming more important.

Crop rotation receives a little attention, but the adaptation of soils to crops is scarcely taken into consideration.

Excluding Swamp, 15 soil types, representing 9 series, are recognized in Pulaski County.

The Norfolk sandy loam is the most extensive type. It is devoted principally to the production of cotton and corn.

The Norfolk loamy sand is an important soil, largely under cultivation to the staple crops.

The Norfolk sand is very inextensive. It is a poor soil and scarcely any of it is under cultivation.

The Ruston sandy loam, the second most extensive type, is considered a moderately good soil. It is largely devoted to cotton and corn.

The Ruston loamy sand occurs in a number of small areas scattered throughout the county. Corn and cotton are the chief crops.

The Orangeburg sandy loam is a gray soil, with a red, friable sandy clay subsoil. It is well suited to cotton and corn, to which it is largely devoted.

The Greenville clay loam is the heaviest of the upland soils. It is well suited to cotton, corn, and small grains.

The Greenville loam appears to be the most productive soil in Pulaski County. It is characterized by a dark-red surface soil. Cotton, corn, and oats give good yields.

The Greenville sandy loam is well adapted to general farming. It is fairly easy to handle, and can be worked into a state of high productiveness. Cotton and corn are the principal crops grown.

The Greenville loamy sand occurs in very small areas. It is used for general farm crops, of which it gives light yields.

The Susquehanna sandy loam usually occurs on stream slopes. Most of the type is under cultivation, but yields are not as high as on the Norfolk sandy loam.

The Plummer sandy loam is a low-lying, poorly drained soil, occurring along practically all the drainage ways. It is not farmed, and can not be until reclaimed by drainage ditches.

The Grady clay loam occurs in sinkholes and other depressions, and is poorly drained. Little of the type is cultivated.

The Kalmia fine sandy loam is an alluvial soil occupying narrow stream terraces. Most of the type is sufficiently well drained for use as farm land, but not more than 15 or 20 per cent is under cultivation.

The Congaree silty clay loam occupies the first bottoms along the Ocmulgee River. It is poorly drained, and none of it is under cultivation.

Swamp comprises the low, wet bottoms along stream courses. It is frequently overflowed and can not be farmed in its present condition.

[PUBLIC RESOLUTION—No. 9.]

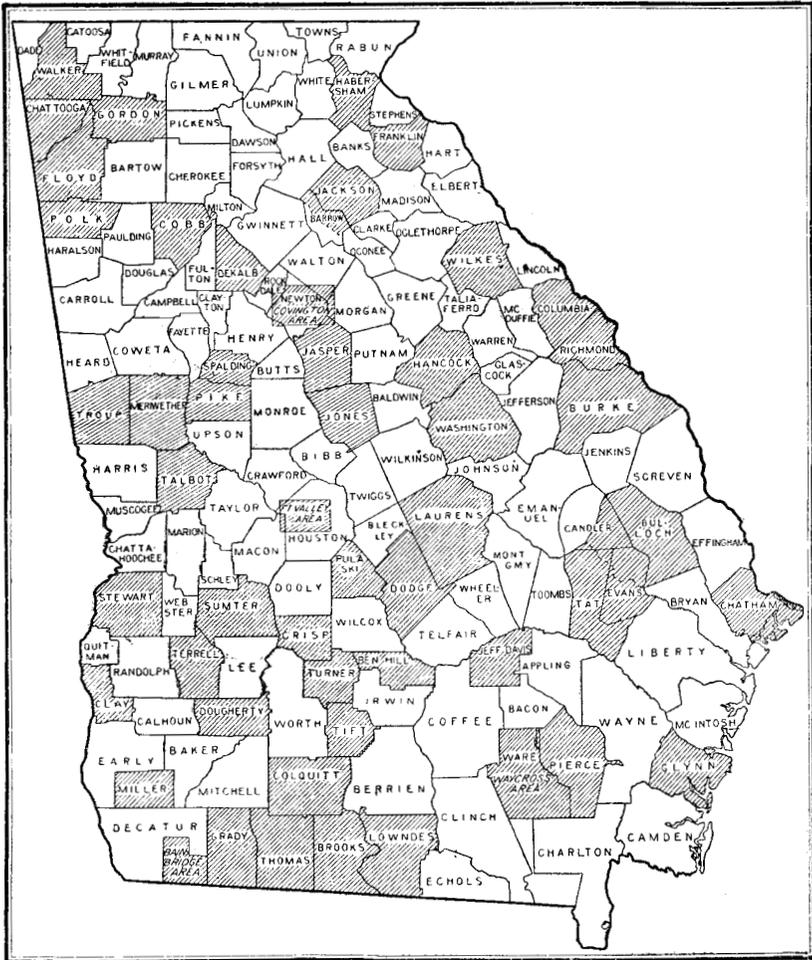
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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

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

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]



Areas surveyed in Georgia.

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