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GEOLOGICAL SURVEY OF ALABAMA

EUGENE ALLEN SMITH, *State Geologist*

SPECIAL REPORT NO. 11.

RESOURCES OF SOUTHERN ALABAMA

A Statistical Guide for Investors and Settlers, with an Exposition
of some of the General Principles of Economic Geography.

By ROLAND M. HARPER

UNIVERSITY, ALABAMA
JULY, 1920

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LETTER OF TRANSMITTAL

*To His Excellency,
Governor Thomas E. Kilby,
Montgomery, Alabama.*

DEAR SIR:—I have the honor to transmit herewith manuscript of a report on the Resources of Southern Alabama, by Dr. Roland M. Harper, with the recommendation that it be printed as Special Report No. 11 of the Geological Survey of Alabama.

The recent agitation for settling discharged United States soldiers on farms has suggested the advisability of presenting to the public some impartial, accurate and specific information about the agricultural and other natural resources of Alabama, in greater detail than has been attempted hitherto. This information should be of service not only to soldiers but also to any other prospective settlers and investors.

To cover the whole State in as much detail as is undertaken in this report would have consumed more time and money than could be spared at present, and we therefore decided to make a beginning with the southern third, the section that has had the greatest agricultural development in recent decades and has been most extensively advertised in the last year or two.

If there is sufficient demand for this sort of information, the other sections of the State may be treated in a similar manner in the near future.

Although the report is based largely on census statistics, the latest of which are now ten years old, it may be two or three years before the complete agricultural returns from this year's census are available, and it seemed best not to wait for them but instead to estimate present conditions as closely as possible from past developments and from recent investigations in the field. Between 1905 and 1913 the author visited every county in the State and prepared a report on the Forests of Alabama, that was published in 1913 as Monograph 8 of this Survey. Since that time he has carried on similar investigations in northern Florida from the Geological Survey of that State, and spent about a year with the U. S. Department of Agriculture in Washington, working on the Agricultural Atlas of the United States,

and devising new statistical methods of analyzing natural resources. He came to us again in January, 1919, since which time he has revisited most of the counties of southern Alabama to study them from the most recent points of view. Some additional improvements in descriptive methods have been developed at the same time.

This report follows approximately the plan of my report on the Agricultural Features of the State, published in 1883, but of course has three or four decades of subsequent history to record, and goes more extensively into history and statistics, the material for which have increased in number and variety with each succeeding census. It seeks to represent not only present conditions, but also the progressive changes of past decades, thus supplying not only much additional detailed information but also the data for predicting future developments.

In my 1883 report the State was described both by regions and by counties, but in this report the county descriptions are omitted to save space, it being often possible to describe several contiguous counties in very similar terms.

The statistical tables in the following pages contain about 2,000 different percentages and other ratios, the great majority of them never published before. These give in the compactest possible form a multitude of fundamental facts about the resources of the area treated and their utilization during the last hundred years. Although statistical tables make rather dry reading, to present the same facts in the form of sentences would probably take ten times as much space; and besides, all the tables are accompanied by enough explanatory text to make their significant features apparent to any interested seeker for information.

While a large part of this report is devoted to agriculture, because that is the leading industry in southern Alabama, it is by no means confined to that topic, but seeks to answer as many as possible of the questions that a prospective settler might ask about this section. The subject is still further illustrated a number of judiciously selected photographs, a few taken from earlier publications, but the majority new.

Very respectfully,

EUGENE A. SMITH,
State Geologist.

University of Alabama,
May, 1920.

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RESOURCES OF SOUTHERN ALABAMA

INTRODUCTION

EVER since the dawn of history men have been migrating from place to place with the hope of bettering their living conditions in one way or another. In the earliest stages they may have known little or nothing of the regions toward which they were traveling, but simply wanted to get away somewhere from overcrowding or persecution. Later some who discovered promising sites in distant lands returned to impart the news to friends and relatives and invite them to share the new discovery. When postal service became established the pioneer settlers could write back to the folks at home without going all the way back themselves. At the present time home-seekers depend mainly on books, pamphlets, periodicals, etc., for information about distant regions that they have never seen, and this gives them a much wider choice than the more primitive means of communication just mentioned.

In an area with absolutely equal advantages of soil, climate, etc., throughout, the population would at first tend to concentrate in the more accessible portions, and would gradually spread from thickly to thinly settled areas until it became uniformly distributed. The earliest settlements in what is now the United States were along the Atlantic coast, because that was most accessible from Europe, and the movement of the center of population has always been westward, as the more remote portions gradually filled up. (It is thought, however, that this year's census will show the westward movement to have halted, indicating that a temporary equilibrium has been reached.)

FACTORS INFLUENCING DISTRIBUTION OF POPULATION.

But every state or larger area exhibits considerable geographical diversity, and the distribution of the inhabitants tends to adjust itself to opportunities. A century or two ago, when agriculture was by far the most important industry, the density of population on the Atlantic slope was pretty closely correlated with soil fertility, except for

an increased concentration in some places along the coast on account of fisheries and commerce. When deposits of valuable minerals were opened up people flocked to them, and the invention of innumerable kinds of labor-saving machinery has caused the development of many large manufacturing centers, which import food and clothing materials from all over the country in exchange for factory products. The discovery of mineral fertilizers in various parts of the world since the middle of the last century has made agriculture profitable on many soils in the South once thought hopelessly sterile, and thus profoundly affected the distribution of population (incidentally placing "the South in the saddle" in national politics in recent years); and the development of dry-farming and irrigation has had a similar effect in the arid regions of the West.

After each new discovery or invention has had time to take effect the advantages of different parts of the earth are pretty nicely balanced; otherwise the population of the less favored regions would be perpetually discontented, and trying to migrate to the more favored regions. But as a matter of fact there are multitudes of successful and contented people in practically every county in the United States, who would rather live in that particular spot than anywhere else. Where natural resources are few the population is usually sparse, but the very fact that the most fertile regions are thickly settled interferes with the fullest enjoyment of life and development of resourcefulness by the inhabitants thereof, and makes competition more intense. City dwellers have to live under all sorts of restraints to avoid conflict with their neighbors, have to take more precautions against epidemics, and have to pay more rent and taxes than the country people. However, many persons have long been accustomed to that sort of life and would be lonesome and dissatisfied in a thinly settled region, and of course there are some at the other extreme and all gradations between. Almost every one has read *Æsop's* fable about the city mouse and country mouse who exchanged visits and were each glad to get back home again, and heard of the pioneer settler who felt crowded when somebody else located within five miles of him, and thought it was time to pull up and move farther west.

There is now no longer any geographical frontier of settlement in the United States, where any one so inclined

can go and prosper by growing up with the country. New opportunities are likely to arise at any time and place; in the city by the building of a new automobile factory or something of the sort, and in the country by the discovery of a new ore deposit or a new use for a supposed worthless kind of tree, the invention of a machine for picking cotton or otherwise expediting agricultural operations, or the development of a more prolific strain of some staple crop.

FITTING NEW SETTLERS TO THEIR ENVIRONMENT.

The degree of success attained by a person who moves to a new location depends mainly on his own efficiency and his ability to adapt himself to the new conditions. Industry and thrift will produce results almost anywhere, if the environment is not too different from what one has been accustomed to. A farmer who had been raising corn and oats on the prairies of Illinois, or wheat on a thousand-acre farm in North Dakota, where the value of crops in 1909-10 was only \$8.80 per acre of improved land, would be likely to feel very much out of place among the mountains of Choctaw County, or on a small sandy truck farm near Mobile, where crops are worth \$41 per acre; and one who had been running a dairy in Wisconsin or among the rocky hills of New Hampshire would be equally at a loss among the cotton, corn and peanut fields of southeastern Alabama.

As a rule a farmer or other person who moves from one state or region to another looks for conditions similar to what he has been accustomed to,* and maintains about the same standard of living as before; it is therefore very desirable for one contemplating a change of location to know beforehand something of the conditions of living in the region where he is going, especially as regards the soil, water supply, climate and timber, the price of land, the average size of farms and cost of buildings, the usual number per farm of domestic animals of various kinds, the principal crops and average yield of each, the prevailing religious denominations, the proportion of settlers from his own state or country, etc., etc.

*This was noticed long ago by Sir Charles Lyell, an eminent English geologist who traveled extensively through the South in the second quarter of the last century. See especially his "Second Visit to the United States" (1849), vol. 2, p. 89.

The aim of this report is to describe conditions in southern Alabama so fully and impartially as to reduce the newcomer's chances of disappointment to a minimum; and it is believed to be more complete than anything previously attempted for an area of that size. Although there is already a large amount of literature on the subject, some published by the State or Federal government and some by private individuals (in newspapers, magazines and elsewhere), railroads, and land companies, it is very scattered, and varies considerably in accuracy and up-to-dateness. Some of the most reliable publications deal only with some special subject in a rather technical manner, and are rather inaccessible and unintelligible to the general reader, while at the other extreme are pamphlets that expatiate with many glittering generalities on the advantages of Alabama or some county or city therein as a place to live, but do not help the home-seeker much in making a decision between Alabama and some other state, or between different sections of this very diversified State; and besides the tone of this "booster" literature is usually so thoroughly optimistic that the cautious reader may become a little skeptical.

The statements in this report are based wherever possible on statistics, which even if not absolutely accurate are at least impartial; and whatever errors may have occurred in gathering, digesting and printing the data are bound to counterbalance each other to some extent, and are not likely to give any one region an advantage over another. A large part of the statistical matter is devoted to showing the size, value, equipment, production, etc., of the *average* farm in each region; and it is well for the prospective settler to bear in mind that even if the average standard of living in a region he is interested in is higher or lower than that to which he has been accustomed, in every community there are many people below the average in wealth, education, efficiency, etc., and a few far above the average, as will be shown graphically in a later chapter; so that one can find neighbors of his own station in life almost anywhere.

SOURCES OF INFORMATION.

The principal sources of information hitherto available for the various geographical features may now be indicated briefly.

Most of the counties in Alabama are now covered by government soil survey reports, which give information about agricultural conditions that is usually impartial and reasonably accurate, but the earlier surveys (published 15 or more years ago) are naturally less satisfactory than the later ones, and furthermore even if one had access to a complete set of them it would be too much of a task for most persons to wade through them all and weigh the advantages and disadvantages of each county.

Government census reports contain a vast amount of valuable information about every county, arranged in such a way that comparisons between any two counties in any one particular can be quickly made, but comparatively few persons have the patience to read statistical tables or the skill to digest and interpret them properly, and the absolute figures of the census returns mean little until they are reduced to ratios or percentages (such as inhabitants per square mile, percentage of whites, value of land per acre, percentage of owners and tenants, etc.).

The previous publications of this office give pretty full information about the soils, mineral resources, underground waters, etc., of all parts of the State, but most of them specialize on one topic, such as stratigraphy, gold, marble, iron, coal, or road materials, and thus do not give a good picture of any region or locality. One exception to this rule is Dr. Smith's agricultural report of 1883, prepared in connection with the Tenth Census of the United States. This, however, has long been out of print, and some of the economic conditions have of course changed considerably in four decades. Our present statistical information is not only more up-to-date but also more complete than that of 1883, for each successive census has given more details than its predecessors. And the invention of the half-tone process, about 1885, has made it possible to illustrate descriptive works much more satisfactorily than could be done at the time of the Tenth Census.

The present publication is a sort of sequel to Dr. Smith's 1883 report, for a portion of the State, and at the same time an experiment in geographical description on a scale perhaps never before attempted. It seeks to answer as many as possible of the questions that a prospective settler might ask, with impartial information based on personal observation in every county and much reading of current newspa-

pers and other publications, backed by trustworthy statistics from the census and other sources. It also brings out many significant correlations between soil, climate, vegetation, population, agriculture, etc., that probably have not been pointed out before, but ought to hold good over much wider areas.

FIG. 1. Map of southern Alabama, showing regions herein described and a few others farther inland. (The present report deals only with those south of the blue marl region.) Scale about 1 to 3,750,000, or 60 miles to the inch.

The dotted areas in the western half represent the Buhrstone mountains.

DIVERSITY OF THE AREA TREATED.

The area treated (shown on the accompanying map) is that part of Alabama underlaid by Tertiary strata, almost exactly a third of the State, or 17,000 square miles. Although it is a part of the coastal plain, it is very diversified, and to treat it as a unit for descriptive and statistical purposes would obscure some very significant facts. On the

other hand, to describe each county separately, as in soil surveys and census reports, would involve tiresome repetition, for adjoining counties are often very much alike. The area is therefore divided into seven or eight essentially homogeneous regions, each differing from its neighbors in one or more important particulars, such as soil or topography.* Four of these, however, are too narrow to include as much as half of any one county (Alabama counties being inconveniently large for statistical refinements), so that we can get little idea of conditions in them from census reports until the counties are made smaller or the census publishes agricultural returns for units smaller than counties.† The small size of such regions, however, does not interfere with getting information about their soils, topography, forests, etc., except that the writer's observations in some of the smallest regions have been too limited for the most accurate results.

PLAN OF REGIONAL DESCRIPTIONS.

The descriptions of each of the larger regions follow approximately the plan outlined for the whole area in the table of contents, while those of the smaller regions are necessarily less complete, on account of the lack of census statistics.

The mineral resources and water supply are discussed rather briefly, for the former are not very important in this part of the State, and the latter is ample and easily accessible nearly throughout. The information about soils is chiefly confined to a study of the texture classification, for we have entirely too few chemical analyses to be representative of any one region. For each region the principal texture classes (such as coarse sand, fine sandy loam, etc.) are listed in order of area as determined from the government soil surveys; and a similar plan is followed with other features that will admit of such treatment, for example, the commonest trees, the leading foreign nationalities and religious denominations, the principal crops, etc.‡

*For a discussion of the principles of geographical classification see Geol. Surv. Ala., Monograph 8, pp. 17-22. 1913.

†The census does give total population (not separated as to race, etc.) for each beat or precinct, but no information about the size or location of the precincts, so that such data are of very little use even for estimating the density of population in any region.

‡For an exposition of the quantitative regional method of geographical description see School Science and Mathematics (Chicago), 18:699-708. Nov., 1918.

The climate of any two adjacent regions as small and devoid of mountains as those here described naturally does not differ very much, so that it is not worth while to say much about it in the regional descriptions. But some of the salient features of the climate of the whole area are outlined in the general discussion.

Vegetation, like soils, is treated quantitatively as far as possible. For each region the commonest trees, shrubs and vines are listed in approximate order of abundance, as determined by counting them repeatedly in the forests. In the three or four northernmost regions here described, where the original forests were rather dense and shady, native herbs are mostly hidden among the trees where a traveler by rail hardly notices them, and they form such a very small fraction of the total bulk of vegetation that it does not seem worth while to list them. Weeds are common enough, but hardly important enough to justify taking up space with long lists of them. In the four southernmost regions, however, there is less cultivated land and consequently fewer weeds, and large areas of open pine forests, savannas, marshes, etc., where trees always have been widely scattered or entirely absent, allowing the development of a luxuriant herbaceous vegetation with many showy flowers, and this vegetation is so characteristic of the several regions that the commoner species are listed after the woody plants.

In the plant lists the technical names of evergreens are printed in heavier type (in the case of the few semi-evergreens only the second half of the name is thus treated), and the percentage of evergreens, which varies considerably in different regions (being highest on the poorest soils) is estimated. Woody vines are listed with the shrubs, but distinguished by prefixing the letter V. Weeds introduced by civilization from other states or countries are put in parentheses.

No satisfactory treatment of the animal life of the area is possible at this time. We know in a general way what mammals, birds and reptiles are common here, but most of them are found in all parts of the State, and we have no data on how much they vary in abundance in different regions, so that lists for the several regions, if reasonably complete as to species, would be very much alike. And the distribution of our fishes, insects, shells, and innumerable

smaller animals has been so little studied that it does not seem worth while to mention them at all.

The information about population and agriculture is based mostly on government census reports, which give no adequate data about the smaller regions, as already explained, but for the larger ones are far more accurate than what might be gathered by one person in many years. The simplest statistical index of the resources of a region, and at the same time one that can be determined most accurately, is density of population. In regions where there is little mining, manufacturing, fishing, or foreign commerce, and the population gets its living pretty directly from the soil, whether through lumbering, grazing, or raising crops, the number of inhabitants is pretty closely correlated with soil fertility.* In Alabama and other southeastern states the soil also influences the percentage of negroes and various other sociological features, as will be made evident farther on.

Where possible the density and racial composition of the population are given all the way back to 1820 (the first census taken after Alabama was admitted to the Union), to show the changes that have taken place since then and give us some idea of what may be expected in the near future. The census of 1870 is disregarded, however, for that having been taken in the days of reconstruction is admittedly inaccurate for most of the southern states.

The information obtainable about agricultural conditions and operations from recent censuses is pretty comprehensive, though still leaving much to be desired. The most significant fact in this line about any region is probably the relative amount of "improved land," i. e., that which is cultivated, pastured (not counting free range and other woodland pasture), or occupied by farm buildings and lots. That has been returned for each county at every census from 1850 to 1910, and is of course a good indication of soil conditions. Every region exhibits some variations in soil fertility, and the richest usually have some spots too poor or wet or rocky to cultivate profitably, and the poorest a few rich spots; so that at a given time the region with the

*Of course in some parts of the world there are fertile soils that cannot support a large population because the climate is too cold or too dry; but there are no such hindrances in Alabama or within several hundred miles thereof.

largest proportion of improved land generally has the highest average fertility.

The ratio of improved land to population indicates roughly the relative importance of agriculture to other industries in a given region, being of course low in newly settled regions where there is considerable hunting, lumbering, and grazing on open ranges, and also in old regions where most of the people get their living from manufactures or commerce.

The average size of farms, which is ascertainable for every census since 1850 by dividing the total farm area by the number of farms,* is correlated with the type of farming that prevails, cotton plantations and stock farms being usually considerably larger than truck farms. The number of improved acres per farm is more significant, however, for some large farms, particularly in the southern tier of counties and the long-leaf pine regions of other states, consist mostly of woodland on which little or no labor or money is expended and which serves mainly as pasturage.

The values of land, buildings, implements, and live-stock (returned at each census since 1850, though land and buildings were combined until 1900) per average farm, vary significantly in different regions, also largely on account of soil differences, and are very important as indicating to the newcomer how much capital he should have in order to start in on the same scale as his neighbors. The proportion of white and colored farmers and of owners and tenants, first returned in 1900, also reflects social and economic conditions. The values of land, buildings, etc., for the two races separately are given in a census volume published late in 1918, and it will be seen that there is a considerable difference in their standards of living.

The number of farm animals of different kinds is given more or less completely by each census since 1850, and the expenditure for fertilizers was first returned in 1880, that for labor in 1890, and for feed in 1900. The yield of different crops in each county has been returned ever since 1840, but usually without going into details of value for

*The number of farms in each county in 1850 is not given in the large quarto volume issued in 1853, which was intended to contain all the published results of that census, but in the small octavo "Compendium," of 1854. For 1860 there are some discrepancies in the returns published in different tables, apparently chiefly because some included farms of less than three acres and some did not.

areas smaller than states, so that it is necessary to do some estimating based on state averages to get the relative importance of different crops in each region. The total value of crops in each county is given by the last census, and by comparing the average crop value per farm with the investment in farm property, expenditures for fertilizers, labor and feed, and making allowance for some minor items not covered by the census, such as interest, taxes, depreciation, grocery bills, and the value of the farmer's own time, one can make a rough estimate of the average farmer's profits in a given region.*

Our information about roads, telephones, schools, banks, lumbering, manufacturing, etc., is not as definite as might be wished, but those things usually develop in proportion to the density of population, and must be taken largely for granted by those who have no personal knowledge of the regions discussed.

Those who live in the area treated will doubtless detect some omissions or even errors in the descriptions of their own neighborhoods, but at the same time they will almost surely discover many facts previously unknown to them, especially about parts of the area they are not familiar with; and they should bear in mind that in trying to cover such a large area in a publication of this size perfection is impossible. Information about shortcomings will be gratefully received, however.

ILLUSTRATIONS.

All but one of the half-tone illustrations are from photographs by the author, and only two (Figs. 21 and 22) have been published before. If a larger number had been used the subject could of course have been illustrated more thoroughly, but it seemed best to restrict the number and also to print them in the text instead of plates, in order to save time and money, and give this preliminary report a wider circulation than it would have if more sumptuously gotten up.

Some readers who have land to sell may be disappointed because the illustrations used to show agricultural conditions

*It should be borne in mind that the prices of most commodities have about doubled since 1910, or in other words that money is now worth only about half as much as it was then, so that all 1910 values should be multiplied by two to approximate present conditions.

are not restricted to the finest houses, tallest crops, fattest hogs, etc., as is customary in "booster" literature. But the aim has been to show neither the best nor the worst, but typical average scenes. It cannot be claimed that an absolutely fair average has been struck in every case, however, for one traveler cannot see everything, and often when a most desirable scene is encountered it cannot be photographed on account of weather conditions, or the position of the sun, or too many trees in the way, or the author being on a moving train, or having no more films on hand. And even when conditions are just right for photographing, accidents sometimes happen in developing, when it is too late to go back and take the picture over again.

IMPORTANT RECENT LITERATURE.

The most important works on the geography of the whole State or any part of it up to the beginning of 1913, as far as known to the writer at that time, were cited in our report on forests (Monograph 8 of this Survey), and do not need to be repeated here, as that publication is easily accessible. There are listed below two earlier publications that contain important information about southern Alabama, and several published since 1913. As in Monograph 8, the names of authors are arranged alphabetically, and the works of each (if more than one) chronologically.

Earlier Works.

Harris, G. D.

The Midway stage.—Bulletins of American Paleontology, No. 4, 157 pp., 17 plates. Ithaca, N. Y., 1896.

Contains valuable descriptions of several southern Alabama localities, particularly in Wilcox County, where the Midway beds are best exposed.

(Waring, George E., Jr., compiler)

(Social statistics of) Mobile.—Tenth Census U. S., 19:191-198, with two inserted single-page maps. 1887.

Publications since 1913.

(Allgood, M. C., Commissioner)

Alabama hand book. Agricultural and industrial resources and opportunities.—445 pp., numerous illustrations in text, and folded political map of the State. 1919.

This contains chapters on a variety of topics by different contributors (not very logically arranged), and sketches of the counties (in alphabetical order) and principal cities, averaging about a page each, but no index.

(Gist, F. W., compiler)

Farm labor, livestock, and crop survey of Alabama.—Ala. Agric. & Industries Dept. Bull. 79. 75 pp. (mostly tables). 1918.

(See comment on this farther on, under the head of crops.)

Hager, Dorsey.

Possible oil and gas fields in the Cretaceous beds of Alabama.—Bull. Am. Inst. Mining Engrs. 134:469-476, fig. 1. Feb., 1918. Also in Trans. A. I. M. E. 59:424-431 (with discussion by E. DeGolyer and I. N. Knapp on pp. 431-434). 1918.

This does not deal with the Cretaceous regions of Alabama so much as with the area covered by this report, where the Cretaceous strata are overlain by Eocene and later formations.

Hall, B. M. & M. R.

Second report on the water powers of Alabama.—Geol. Surv. Ala., Bull. 17. 448 pp., 4 figs., 19 plates. 1916.

Harper, R. M.

1. The "Pocosin" of Pike County, Alabama, and its bearing on certain problems of succession.—Bull. Torrey Bot. Club. 41:209-220, figs. 1-4. May, 1914.

2. The coniferous forests of eastern North America.—Pop. Sci. Monthly 85:338-361, with 16 half-tones in text. Oct., 1914.

Discusses several of the important timber trees that grow in southern Alabama.

3. A forest census of Alabama by geographical divisions.—Proc. Soc. Am. Foresters 11:208-214, with outline map in text. (June) 1916. Also distributed by the Geological Survey of Alabama, with a special title-page.

4. Development of agriculture in the pine-barrens of the southeastern United States.—Jour. Geog. 15:42-48, with outline map in text. Oct., 1916.

5. Some movements of state centers of population and their significance.—Jour. Geog. 15:227-231. March, 1917.

6. A preliminary soil census of Alabama and West Florida.—Soil Science 4:91-107, fig. 1 (outline regional map). Aug., 1917.

7. Pronunciation of certain place-names.—Jour. Geog. 16:255-258. March, 1918.

Includes a few cases in southern Alabama.

8. The American pitcher-plants.—Jour. Elisha Mitchell Sci. Soc. 34:110-125, pl. 2-6. (Oct.) 1918.

Includes two pictures taken in southern Alabama.

9. (Distribution of illiteracy in Alabama.)—Montgomery Advertiser, Vol. 90, No. 152. June 1, 1919. Reprinted privately as a 12-page octavo pamphlet, with the title, "Illiteracy in Alabama: where and why?"

Contains statistics of racial composition and illiteracy of the population in most of the regions here described.

10. (Some relations between) political parties and farm building values in Alabama.—Montgomery Advertiser, Vol. 90, No. 301, p. 4. Oct. 28, 1919. Also reprinted privately as a 4-page octavo leaflet.

Contains a statistical table showing average value of buildings of white farmers in different regions, among other things.

11. A graphic method of measuring civilization, and some of its applications.—Scientific Monthly 10:292-305. March, 1920.

Contains a graph with four occupation curves for different population groups in Mobile, based on the 1913 directory.

Hodges, P. W.

Alabama supplement (to Tarr & McMurry's World Geographies, second book).—Small quarto, 64 pp., with colored map and numerous half-tone illustrations. New York (Macmillan Co.) 1918.

The illustrations are excellent, but the text is marred by numerous misstatements, exaggerations, and conspicuous omissions. There is also a more elementary edition to go with the first book of geography, with a different set of illustrations.

Hopkins, Oliver B.

Oil and gas possibilities of the Hatchetigbee anticline, Alabama.—U. S. Geol. Surv. Bull. 661:281-313, pl. 26-29. Dec., 1917.

Matson, G. C., & Berry, E. W.

The Pliocene Citronelle formation of the Gulf coastal plain and its flora.—U. S. Geol. Surv. Prof. Paper 98:167-208, figs. 15-17, plates 32-44. Sept., 1916.

Smith, Eugene A.

Concerning oil and gas in Alabama.—Geol. Surv. Ala., Circular 3. 18 pp., 8 text-figures, and 1 double-page inserted map. 1917.

Contains maps of the Hatchetigbee and Jackson anticlines and adjacent territory, on a larger scale than geological maps of the same area previously published.

The U. S. Bureau of Soils has published surveys of several additional Alabama counties since 1913, so that all the counties in the area under consideration are now mapped except Choctaw, Crenshaw, Geneva, Houston, and Marengo; and the field work on some of those is already done.

REGIONAL DESCRIPTIONS

1. The post oak flatwoods.

The northernmost of the regions to be described is a belt six or eight miles wide extending into Alabama from the west about fifty miles. It is more extensive in Mississippi, where it curves northward and nearly reaches the Tennessee line, keeping approximately the same width all the way. It is underlaid by a non-calcareous stratified clay of Lower Eocene age, the Sucarnochee or Black Bluff formation, which commonly weathers into a stiff clayey soil. The topography is comparatively level, with gentle slopes near streams, a few shallow ponds, and almost no springs.

Less than half the area is covered by recent soil surveys, so that accurate statistics of soils are not possible, but it appears that the principal texture classes are clay, fine sandy loam, loam, and silt loam. Chemically the soil seems to be moderately fertile, but it contains a rather excessive amount of magnesia, which is detrimental to some plants; and its stiffness in most places is an obstacle to profitable agriculture. The fine sandy loam areas, about one-third of the total, are relatively free from the latter drawback, however.

The average temperature is about 65°, with a growing season of about 240 days. The annual rainfall is about 50 inches, pretty evenly distributed through the year, except for a deficiency in late summer and fall.

The whole area, as far as we know, was originally covered with forests, mostly rather dry and open except along streams, and about three-fourths of it is still wooded, though a great deal of the best timber has been cut out. As long as so much remains uncultivated, however, the forests will renew themselves pretty rapidly, and the timber promises to remain an important resource of this region for a long time.

The commonest woody plants are about as follows:

Commonest woody plants of post-oak flatwoods.

TIMBER TREES.

<i>Pinus Taeda</i>	Short-leaf pine	Various situations.
<i>Pinus echinata</i>	Short-leaf pine	Dry woods.
<i>Liquidambar Styraciflua</i>	Sweet gum	Various situations.
<i>Quercus stellata</i>	Post oak	Dry woods.
<i>Quercus falcata</i>	Red oak	Dry woods.
<i>Pinus palustris</i>	Long-leaf pine	Sandy spots.
<i>Quercus nigra</i>	Water oak	Low grounds.
<i>Quercus Phellos</i>	Willow oak	Low grounds.
<i>Quercus pagodaefolia</i>	Red oak (?)	Bottoms.
<i>Pinus glabra</i>	Spruce pine	Hammocks.
<i>Acer rubrum</i>	Red maple	Branch-swamps.
<i>Fagus grandifolia</i>	Beech	Hammocks and bottoms.
<i>Hicoria ovata</i>	Scaly-bark hickory	Bottoms.
<i>Magnolia grandiflora</i>	Magnolia	Hammocks and bottoms.
<i>Quercus Michauxii</i>	Swamp chestnut oak	Bottoms.
<i>Populus deltoides</i>	Cottonwood	River-banks and bottoms.
<i>Liriodendron Tulipifera</i>	Poplar	Branch-swamps, etc.
<i>Platanus occidentalis</i>	Sycamore	Creek and river banks.
<i>Betula nigra</i>	Birch	Creek and river banks.
<i>Ulmus Americana</i>	Elm	Creek and river banks.
<i>Quercus alba</i>	White oak	Hammocks and bottoms.
<i>Fraxinus Americana</i>	(White) ash	Bottoms, etc.
<i>Taxodium distichum</i>	Cypress	Swamps and bottoms.
<i>Acer Negundo</i>	Box elder	River and creek banks.
<i>Nyssa sylvatica</i>	Black gum	Upland woods.

SMALL TREES.

<i>Salix nigra</i>	Willow	Along streams.
<i>Carpinus Caroliniana</i>	Ironwood	Bottoms.
<i>Morus rubra</i>	Mulberry	Hammocks and bottoms.
<i>Cornus florida</i>	Dogwood	Dry woods.
<i>Magnolia glauca</i>	(White) bay	Branch-swamps.

SHRUBS AND VINES.

<i>Arundinaria macrosperma</i>	Reed	Along rivers and creeks.
<i>Cephalanthus occidentalis</i>		Low grounds.
(<i>Prunus angustifolia</i>)	Wild plum	Roadsides and old fields.
<i>Aesculus Pavia</i>	Buckeye	Rich woods.
<i>Phoradendron flavescens</i>	Mistletoe	On deciduous trees.
<i>Sambucus Canadensis</i>	Elder	Low grounds.
<i>V Bignonia crucigera</i>	Cross-vine	Woods.
<i>Rhus copallina</i>	Sumac	Dry woods, etc.
<i>V Brunnichia cirrhosa</i>		Banks of creeks and rivers.
<i>Adelia acuminata</i>		River-banks.
<i>V Tecoma radicans</i>	Cow-itch	Various situations.

About 45 per cent of the trees and shrubs are evergreen, which is near the average for the State, but below the average for southern Alabama. The pines are important sources of lumber, and the sweet gum and some of the oaks are also utilized. Lumbering is probably the most important industry, and in 1912 there were more sawmills in this region in proportion to its area than in almost any other part of the State.

The region is too narrow for any statistics of population and agriculture, but the density of population and amount of improved land are evidently below the average, on account of unfavorable soil conditions and scarcity of good water. The relative importance of the different crops is probably much the same as in the region next to be described.

There are no towns of any consequence in the flatwoods, but Livingston, York and Linden are close to its edges. The belt is crossed by five lines of railroad, namely, the A. T. & N., the L. & N., and three branches of the Southern (including the A. G. S.).

2. Southern red hills, western division.

(Figures 2-9; tables 1-4.)

The Eocene region of Alabama, extending all the way across the State, has hitherto commonly been treated as a geographical unit, except for the post-oak flatwoods on the north and the lime hills on the southwest. But recent statistical studies have brought out striking differences in soil, climate, vegetation, population and agriculture between the western and eastern portions of this belt, which was designated the southern red hills in Monograph 8. The transition from one to the other is not abrupt, however, and the line between them on the map is located somewhat arbitrarily.

On the other hand, the lime hills, formerly separated on geological grounds, are so similar in soil, topography and vegetation to the western division of the red hills, which they closely adjoin, that they may for most purposes be combined therewith. If there are any noteworthy differences in population and agriculture the census figures would not disclose them anyway, for the lime hills belt does not cover as much as half of any county, and most of the counties traversed by it are among those used to illustrate the western red hills.

The area of the western division is about 4,400 square miles, or 5,700 with the lime hills. It continues into Mississippi for a considerable distance, with the soils gradually becoming more silty northwestward, but the lime hills subdivision at or about the State line passes into a sort of prairie region.

GEOLOGY.

The geological formations comprise several different horizons, most of them with no very striking lithological characteristics. There are some exceptions to the last state-

FIG. 2. Old field or weedy pasture on strongly calcareous soil (Midway formation) near eastern edge of Wilcox County. Trees in background nearly all cedars. June 12, 1919.

ment, however, the most notable of which is the Buhrstone or Tallahatta formation, a sort of sandstone which is quite resistant to erosion and forms some high ridges, known locally as mountains. This crops out in a belt a little north of the center of the region (shown on the map), and again in a shorter parallel belt in the Hatchetigbee anticline,* in the midst of the lime hills. The underlying stratum of the lime hills, exposed in a number of bluffs and hillside ledges, is mainly a soft whitish limestone, easily cut with a saw

*See chapter on stratigraphy, under General Features, farther on (page 93).

when freshly quarried, but hardening and turning gray on prolonged exposure. That and the Buhrstone are used extensively for chimneys and pillars in the areas where they occur, as is a rock somewhat similar to the Buhrstone outcropping a little farther north, for example near Greenville. Another mineral product, that seems to have become a source of considerable revenue in the last year or two, is a pyritous earth occurring in the Hatchetigbee and (less abundantly) in other formations, which has been made the basis of several patent medicines.

There are several mineral springs of diverse composition, particularly in the Hatchetigbee anticline, and some

FIG. 3. Looking north across cultivated valley of Cedar Creek, from the Ridge, over 100 feet above it, between Manningham and Ridgeville, Butler County. June 11, 1919.

of them have had considerable reputation as watering-places. Some of the underground water is decidedly briny, and where that comes to the surface in springs, as in southern Clarke County, salt was manufactured during the Civil War, the natural springs being supplemented by bored wells. In southern Choctaw County some of the water that seeps out in low places contains an alkali, sodium carbonate, which has a stunting effect on the surrounding vegetation. Some deep wells have yielded besides hot brine a little natural gas and some indications of oil.

SOILS.

The soils seem to be mainly residual from the Eocene strata, and range from black sticky calcareous clay to sand and rocky slopes. Although few chemical analyses are available, the fertility seems to be a little above the average, phosphorus for one thing being usually present in ample amounts. Some shade of red is the prevailing color. The predominating texture classes, in the western red hills and lime hills together, are fine sandy loam (making a little over half the total), clay, sandy loam, fine sand, sand, gravelly sandy loam, meadow, silt loam, and stony clay.

FIG. 4. Looking about northeast from brow of Lookout Hill, one of the Buhrstone ridges, said to be the highest elevation in Monroe County. Horizon probably 10 or 12 miles away. Oct. 28, 1919.

TOPOGRAPHY AND DRAINAGE.

The topography varies from rolling to almost mountainous, and in some portions is decidedly rugged as compared with most other parts of the coastal plain. The steep Buhrstone ridges attain a height of over 500 feet above sea-level, or perhaps 200 feet above the neighboring valleys, in Choctaw and Monroe Counties, and some of those in the Hatchetigbee anticline cannot be much lower. The only railroad tunnel in southern Alabama—and perhaps the southernmost one in the United States—pierces one of the Buhrstone ridges near Tunnel Springs in Monroe County.

(For many years this ridge and others near it formed a barrier between the Selma and Flomaton divisions of the L. & N. R. R., which terminated at Pine Apple and Repton respectively, and were not connected until about 25 years ago.)

The two large muddy rivers, the Alabama especially, have steep banks and little or no swamp, meander through broad alluvial bottoms, and are navigable for steamboats most of the year. In the early history of the State, when their drainage basins were mostly heavily wooded, naviga-

FIG. 5. South end of tunnel on L. & N. R. R., in a Buhrstone ridge about two miles north of Tunnel Springs, Monroe County. Photographed by Dr. Eugene A. Smith, July 21, 1905.

tion was seldom interrupted, but the clearing of the land allows the rainfall to run off rapidly instead of soaking into the leaf-mold and soil to reappear later in springs, with the result that in the long dry spells of late summer and fall the volume of water in the rivers may be insufficient. Within the last ten or twelve years this difficulty has been overcome on the Tombigbee by the construction of several locks and dams for slack-water navigation, which by the way are practically the only such structures in the whole coastal plain of the United States up to the present time. The

smaller streams are clear much of the time, and usually bordered by strips of swamp of varying width.

The remarks on climate in the chapter on the post oak flatwoods will apply pretty well to this region also. The amount of summer rain increases a little toward the south-east, but fall is still the driest season.

VEGETATION.

The forests are mostly mixed pine and hardwoods, as in many other parts of the South. Some of the extreme types are rather open forests of long-leaf pine on the high Buhrstone ridges, the usual bottom-land hardwoods on the rich flood-plains, and cedar, walnut, redbud, and other supposed lime-loving trees on and around the limestone outcrops. About 65 per cent of the area is wooded at the present time.

The commonest woody plants are about as follows:

Commonest woody plants of western red hills (including the Buhrstone mountains and the lime hills).

TIMBER TREES.

<i>Pinus Taeda</i>	Short-leaf pine	Various situations.
<i>Pinus echinata</i>	Short-leaf pine	Uplands.
<i>Pinus palustris</i>	Long-leaf pine	Ridges and poor soils.
<i>Liquidambar Styraciflua</i>	Sweet gum	Various situations.
<i>Pinus glabra</i>	Spruce pine	Hammocks, etc.
<i>Magnolia grandiflora</i>	Magnolia	Hammocks and bluffs.
<i>Fagus grandifolia</i>	Beech	Ravines and bluffs.
<i>Liriodendron Tulipifera</i>	Poplar	Ravines and branches.
<i>Quercus alba</i>	White oak	Ravines and bluffs.
<i>Quercus nigra</i>	Water oak	Low grounds mostly.
<i>Quercus falcata</i>	Red oak	Uplands.
<i>Quercus Marylandica</i>	Black-jack oak	Dry ridges.
<i>Acer rubrum</i>	Red maple	Branch-swamps.
<i>Nyssa biflora</i>	Black gum	Branch-swamps, etc.
<i>Quercus laurifolia</i>		Hammocks.
<i>Quercus stellata</i>	Post oak	Dry uplands.
<i>Quercus Michauxii</i>	Swamp chestnut oak	Bottoms.
<i>Tilia heterophylla?</i>	Lin	Rich woods.
<i>Juniperus Virginiana</i>	Cedar	Limestone outcrops.
<i>Populus deltoides</i>	Cottonwood	River-banks.
<i>Platanus occidentalis</i>	Sycamore	River-banks.
<i>Nyssa sylvatica</i>	Black gum	Rich woods.
<i>Fraxinus Americana</i>	Ash	Rich woods.
<i>Taxodium distichum</i>	Cypress	Swamps and sloughs.
<i>Betula nigra</i>	Birch	Along rivers and creeks.
<i>Ulmus alata</i>	Elm	Rich woods.
<i>Quercus Phellos</i>	Willow oak	Bottoms, etc.
<i>Hicoria alba</i>	Hickory	Rich woods.

<i>Acer saccharinum</i>	Silver maple	River-banks.
<i>Acer Negundo</i>	Box elder	River-banks, etc.
(<i>Diospyros Virginiana</i>)	Persimmon	Old fields, etc.
<i>Celtis occidentalis</i> ?	Hackberry	Low grounds.
<i>Magnolia acuminata</i>	Cucumber tree	Ravines and bluffs.
<i>Ulmus Americana</i>	Elm	Rich woods.
<i>Castanea dentata</i>	Chestnut	High ridges.
<i>Quercus borealis max-</i> <i>ima</i> ?		Cool rich woods.
<i>Quercus velutina</i>	Black oak	Rich uplands.

SMALL TREES.

<i>Salix nigra</i>	Willow	Along streams.
<i>Magnolia glauca</i>	Bay	Branch-swamps, etc.
<i>Cornus florida</i>	Dogwood	Dry woods.
<i>Magnolia macrophylla</i>	Cucumber tree	Rich slopes.
<i>Ilex opaca</i>	Holly	Hammocks and ravines.
<i>Carpinus Caroliniana</i>	Ironwood	Bottoms.
<i>Oxydendrum arboreum</i>	Sourwood	Hammocks, bluffs, etc.
<i>Morus rubra</i>	Mulberry	Rich woods.
<i>Cercis Canadensis</i>	Redbud	Limestone outcrops, etc.
<i>Ostrya Virginiana</i>		Hammocks and bluffs.
<i>Quercus cinerea</i>	Turkey oak	Dry ridges.
<i>Osmanthus Americana</i>		Hammocks.
<i>Quercus Catesbaei</i>	Black-jack oak	Dry ridges.
<i>Magnolia pyramidata</i>	Cucumber tree	Ravines.
<i>Planera aquatica</i>		River-banks.

SHRUBS AND VINES.

<i>Alnus rugosa</i>	Alder	Along branches, etc.
<i>Myrica cerifera</i>	Myrtle	Hammocks and bluffs.
<i>Illicium Floridanum</i>	Stink-bush	Low hammocks.
<i>Rhus copallina</i>	(Black) sumac	Dry woods, etc.
<i>Kalmia latifolia</i>	Ivy	Ravines and bluffs.
<i>Sabal glabra</i>	Palmetto	Swamps.
<i>V Bignonia crucigera</i>	Cross-vine	Low woods.
<i>V Decumaria barbara</i>		Damp woods.
<i>V Rhus radicans</i>	Poison ivy	Bottoms, etc.
<i>Phoradendron flavescens</i>	Mistletoe	On deciduous trees.
<i>Aesculus Pavia</i>	Buckeye	Rich woods.
<i>Aralia spinosa</i>	Prickly ash	Ravines and bluffs.
<i>V Berchemia scandens</i>	Rattan vine	Bottoms, etc.
<i>V Parthenocissus quinquefolia</i>	Virginia creeper	Rich woods.
<i>Arundinaria tecta</i>	Reed	Damp woods.
<i>Cyrilla racemiflora</i>	Tyty	Branch-swamps, etc.
<i>Rhus glabra</i>	(Red) sumac	Roadsides, etc.
<i>Callicarpa Americana</i>	French mulberry	Rich upland woods.
<i>Batodendron arboreum</i>	Sparkleberry	Dry woods.
<i>Hamamelis Virginiana</i>	Witch-hazel	Hammocks and bluffs.
(<i>Prunus angustifolia</i>)	Wild plum	Roadsides and old fields.
<i>V Tecoma radicans</i>	Cow-itch	Various situations.
<i>Cephalanthus occidentalis</i>		Low grounds.

<i>Arundinaria macro-</i>		
<i>sperma</i>	Reed	River-banks, etc.
<i>Azalea nudiflora</i>	Honeysuckle	Woods.
<i>Rubus nigrobaccus</i> ?	Blackberry	Various situations.
<i>Vitis rotundifolia</i>	Muscadine	Various situations.
<i>Sassafras variifolium</i>	Sassafras	Old fields, etc.
<i>Sambucus Canadensis</i>	Elder	Low grounds.
<i>Rubus cuneifolius</i>	Blackberry	Roadsides, etc.
<i>Cornus stricta</i> ?		Swamps.
<i>Gelsemium semper-</i>		
<i>virens</i>	Yellow jessamine	Various situations.
<i>Smilax laurifolia</i>	Bamboo vine	Branch-swamps.

FIG. 6. Ravine in lime hills in Clarke County, about 7 miles northwest of Claiborne, with some of the dense forest recently deadened to make room for corn and cotton. Sept. 27, 1912.

About 70 per cent of the trees are evergreen. Oaks are relatively scarce, the commonest one ranking ninth in the list if the above sequence is correct as far as that; and hickories seem to be quite rare. Cedar, hackberry, post oak, black-jack oak and black oak are less abundant than one might expect from their occurrence in neighboring regions. The pines are important sources of lumber, and the long-leaf one is tapped for turpentine in many places. In 1912 there were 48 sawmills reported in this region, with an average capacity of 18,480 board feet a day. Gathering evergreens for decorative purposes is an important industry in Conecuh and Monroe Counties.

FIG. 7. A planter's two-story residence at Mt. Moriah, near the northwestern corner of Butler County, about ten miles by road from the nearest railroad. June 12, 1919. Most of the houses in the village of Furman (Old Snow Hill), a few miles to the northwestward, are as good as this. (Compare with Figures 8, 9 and 14.)

FIG. 8. Home of a white farmer, with Buhrstone chimneys, among the "mountains" about a mile north of Needham, Choctaw County. April 17, 1913.

POPULATION.

In pre-historic times this region must have been the happy hunting-ground of the Choctaw Indians, as shown by the many geographical names of Choctaw origin (such as Bogue Loosa, Fluctabunna, Hatchetigbee, Kintabish, Naheola, Nanafalia, Pushmataha, Satilpa, Souwilpa, Tallahatta, Tickabum, Tombigbee, Tuscahoma, and Yantayabba). The fertile soils, mild climate, and easy access by navigable rivers attracted white settlers early in the history of the United States. In 1820, when Alabama first appeared in the census returns, there were nearly five inhabitants per square mile in this division. The salient features of the population are shown in Table 1.

TABLE 1.
Population statistics of western red hills.

	1910	1900	1890	1880	1860	1850	1840	1830	1820
Inhabitants per sq. mi.....	29	27	23	21	17	12	10	8	5
Per cent white	37	37	39	38	45	47	50	56	63
Per cent negro.....	63	63	61	62	55	53	50	44	37

Only 2.4 per cent of the population is classed in the 1910 census as urban, i. e., living in cities with over 2,500 inhabitants. It will be noticed that in 1820, when the land was mostly covered with primeval forest and agriculture was comparatively undeveloped, there were nearly twice as many whites as negroes; but as the cotton planters gradually superseded the pioneer woodsmen the proportion of negroes steadily increased, up to 1880, since which time it has remained almost stationary. The number of foreign whites and of Indians is almost too small to count, only a fraction of one per cent.

In 1880 the average resident of this region, counting all races and all ages, lived about 38 miles from his birthplace, and about nine-tenths of them were born in Alabama. Immigration from outside the State had been principally from South Carolina, Georgia, North Carolina, Virginia, Mississippi, Florida, Tennessee and Maryland, in the order named. (No information of this sort is available from later censuses, the returns not having been published in sufficient detail.)

In 1906 the leading religious denominations among the white population were Baptist, M. E. South, Methodist Protestant, Presbyterian, Primitive Baptist, and Disciples of Christ; and among the negroes, Baptist, African Methodist, A. M. E. Zion, Colored Methodist, Primitive Baptist, and Cumberland Presbyterian.

The largest towns, with their population in 1910, are Greenville, with 3,377 inhabitants; Evergreen, with 1,582;

FIG. 9. Group of negro farm houses, with sandstone chimneys, remote from any white man's house, on the Ridge a few miles east of Ridgeville, Butler County. June 11, 1919.

Jackson, 1,379; Thomasville, 1,181; Georgiana, 999; York, 710, Cuba, 650; Camden, 648; Pineapple, 627; and Monroeville, 616. Together they increased in population about 30 per cent between 1900 and 1910, and it is safe to assume that this year's census will show a similar increase for most of them in the last ten years.

Every county is served by one or more railroads, though Choctaw had none up to about ten years ago, on account of its rather mountainous topography. The leading systems, in order of mileage, are the Louisville & Nashville; Alabama, Tennessee & Northern; Southern; Gulf, Florida & Alabama; and Alabama Great Southern.

In 1910 the percentage of illiteracy among the white population over 10 years old was 7.6, and among the negroes of corresponding age 44.2. These figures, especially

the latter, are rather high, but easily explained by the sparse and predominantly rural population, which makes schools rather far apart. But educational conditions are better in the towns, and are improving steadily with the increase in population. In Greenville, the only city in the region for which such data are given by the last census, the illiteracy figures were 0.34 per cent for whites and 7.9 per cent for negroes, or 4.5 per cent for the total population, which is a better showing than that of New York City and almost equal to that of Boston.

AGRICULTURE.

Agriculture has long been the leading industry. In 1850, when the area of farm land was first returned by the census, nearly one-tenth of the land was in cultivation, and in the next decade the amount nearly doubled. The salient features of agriculture at the censuses of 1850, 1860, and 1880 to 1910 are shown in Tables 2 to 4.

TABLE 2.

Farm equipment in western red hills, 1850-1910.

	1910	1900	1890	1880	1860	1850
Percentage of land in farms.....	64	67	66	57	66	36
Percentage of land improved.....	26	24	22	17	18	10
Improved acres per inhabitant.....	5.8	5.6	6.1	5.0	6.5	5.4
Average number acres per farm.....	84	105	131	134	514	415
Average improved acres per farm.....	34	38	44	39	134	113
Av. value of land per farm (\$).....	613	351	534	403	4480	1630
Av. value of buildings per farm.....	248	141				
Av. value implem'ts & machinery.....	53	33	23	21	173	128
Average value of livestock.....	223	151	180	158	996	633
Number of slaves per farm.....					11.3	10.8
Number of horses.....	0.6	0.7	0.8	0.7	2.5	3.4
Number of mules.....	0.7	0.7	0.7	0.7	2.7	1.7
Number of dairy cows.....	1.7	1.3	1.9	2.0	5.6	7.7
Number of work oxen.....	2.8	0.5	0.7	0.7	2.1	2.1
Number of other cattle.....		2.2	3.7	3.8	12.7	18.1
Number of sheep.....	0.3	0.7	1.6	1.5	7.4	12.2
Number of goats.....	0.4	0.7				
Number of hogs.....	6.4	6.8	9.8	9.4	42	60
Number of chickens.....	17	21	33	15		
Number of other poultry.....		2.4	3.3	3.0		
Number of colonies of bees.....	0.6	1.2				

TABLE 3.

Farm expenditures, receipts, etc., in western red hills, 1880-1910.

	1910	1900	1890	1880
Percentage of white farmers.....	37	39		
Percentage of negro farmers.....	63	61		
Percentage of farms operated by owners and part owners.....	36	38	44	
Expenditure for fertilizers, per farm (\$)...	27	7	11	3
Expenditure for labor per farm.....	23	21		
Expenditure for feed per farm.....	20			
Expenditure for fertilizers, per acre im- proved.....	.80	.20	.24	.07
Expenditure for labor, per acre improved.....	.68	.56		
Expenditure for feed, per acre improved.....	.58			
Average annual value of crops per farm.....	488	338	415	395
Average annual value of animal products.....	64			
Value of crops per acre improved.....	14.40	9.05	9.43	10.20
Value of animal products per a. imp.....	1.88			
Value of farm land per acre.....	7.35	3.34		

TABLE 4.

Agricultural statistics of western red hills by race and tenure, 1910.

	Whites	Negroes	Owners	Tenants
Percentage of white farmers.....			66	20
Percentage of negro farmers.....			34	80
Percen'ge of owners and part owners.....	64	19		
Percentage of tenants.....	35	81		
Average number of acres per farm.....	152	43	166	35
Average improved acres per farm.....	47	26	50	25
Value of farm land per acre (\$)... ..	6.95	8.12		
Value of farm land per farm.....	1057	350	1565	444
Value of buildings per farm.....	468	118		
Value of implements and machinery..	98	26		
Number of dairy cows per farm.....	2.5	1.2		
Number of work horses per farm.....	0.8	0.4		
Number of work mules per farm.....	0.9	0.5		
Acres of cotton per farm.....	13.5	14.8		
Bales per acre.....	0.34	0.27		
Acres of corn per farm.....	9.7	5.8		
Bushels per acre.....	11.1	11.3		

Most of these figures can be left to tell their own story, as it would take too much space to discuss each one. The increase in the magnitude of farming operations just before the Civil War and the sudden decline at that period need no comment.* Since that time the average size of farms has gradually decreased with the increasing efficiency and specialization of the farmers, as has been the case in practically all the eastern states. The increases in apparent values between 1850 and 1860 and between 1900 and 1910 were due largely to discoveries of gold, in California in 1849 and in the Klondike, South Africa and elsewhere in 1896 and subsequent years, which affected the whole country in much the same way.

The amount of improved land is slowly increasing here, as in most other parts of the world. The number of animals per farm has declined, but the number per acre has changed little in recent decades. But since the last census the boll-weevil has arrived and caused a reduction in cotton acreage, which is believed to have resulted in increased attention being given to livestock.

Negroes are in the majority as farmers, as in the total population, but the total area and value of farm property occupied by them is less than that belonging to the whites. About four-fifths of the negro and one-third of the white farmers are tenants. The expenditure for fertilizers in this fertile region is below the State average, but is increasing.

The leading crops in 1909, in order of value, were cotton (over half the total), corn, "vegetables,"† sweet potatoes, sugar-cane, hay, oats, cowpeas, peanuts, Irish potatoes, and peaches. The indications are that cotton has declined in importance since then, though still leading, and that peanuts and other food crops have taken a higher rank.

*It should be borne in mind that negroes did not become farm proprietors until after the war, and that alone would make a considerable difference in the average size of farms between 1860 and 1880.

†"Vegetables" in the census reports means quite a variety of things. See chapter on crops, near the end of this report. Greenville is quite an important shipping point for radishes.

3. Southern red hills, eastern division.

(Figures 10-15; tables 5-8.)

This type of country covers about 3,600 square miles in Alabama, and extends in a northeasterly direction across Georgia and South Carolina. It is nearly all underlaid by Eocene strata, mostly argillaceous or siliceous and not much indurated. At the northern edge, however, a strip a few miles wide mapped by geologists in recent years as "Providence sand," and regarded as uppermost Cretaceous, resembles the neighboring blue marl region much less than it does the red hills, and is here treated as belonging to the latter.

FIG. 10. Red level uplands about four miles north of Abbeville, Henry County, with peanuts, corn, and a patch of woods. July 26, 1919.

Limestone is not a prominent constituent of the underlying strata, but there are small areas of it near Clayton and Rutledge, and a large limestone spring in the southern part of Barbour County, with some sinks and ponds near by, presumably indicates the same kind of rock not far below the surface. The fossiliferous formations are in most places covered by a structureless red sandy clay several feet thick, which is remarkably uniform in appearance for hundreds of miles, and may be of Pliocene or later age, though the modern tendency is to regard it as a mere product of weathering. That in turn is often overlaid by a few inches or feet of loose or somewhat loamy sand, particularly in the more level areas.

A yellowish siliceous rock (pseudo-buhrstone) is used locally for chimneys in Henry and Coffee Counties, and a limestone of uncertain age, scarcely distinguishable from that in the lime hills already mentioned, is used in a similar manner in Crenshaw County. The water supply is excellent. Pure water can be obtained from shallow wells almost anywhere in the region, and a larger supply from artesian wells, which however do not overflow but have to be pumped.

TOPOGRAPHY.

The topography is nearly everywhere moderately hilly, with broad ridges and narrow valleys, so that roads and

FIG. 11. White Pond, in southern part of Barbour County, July 25, 1919.

railroads are located mostly on the uplands. The inland edge of the region is a northward-facing escarpment, from which extensive views may be had near Troy and Clayton and doubtless elsewhere. The highest uplands are about 600 feet above sea-level, but there is nothing corresponding to the mountains of the western division. The general elevation of the uplands slopes gently southward, at the rate of about ten feet per mile. Creeks, branches, and small springs are numerous. There is no large navigable river in this part of the State except the Chattahoochee on its eastern border. That has high banks and practically no swamp, and the same is true of the Pea River, a much smaller

stream, for several miles near Elba at least. All the streams other than the Chattahoochee River rise in the coastal plain south of the black belt, and are not very muddy or calcareous, and most of them are bordered by swamps. (The Chattahoochee passes considerably to the eastward of the black belt, and washes comparatively few calcareous strata.) There are a few small water-powers, chiefly grist-mills, and a large hydro-electric plant on the Pea River four or five miles below Elba.

SOILS.

The soils are more sandy than in the western division, partly on account of the nature of the strata and (probably)

FIG. 12. Dam at hydro-electric plant on Pea River about four miles below Elba, Coffee County. Strata in foreground are of the Wood's Bluff formation. July 28, 1919.

partly on account of a certain climatic difference mentioned below, and this causes important differences in vegetation, population and agriculture. The prevailing texture classes are sandy loam, sand, fine sandy loam, fine sand, loamy sand, meadow, swamp, and coarse sand. The average texture is evidently coarser than in the western division, and there can be little doubt that representative chemical analyses would show the fertility to be less eastward.

CLIMATE.

There are no weather stations in this region established long enough to give reliable records, but it is evident from

observations in neighboring regions that the principal climatic difference between this and the western division is that there is a little more rain in the hottest part of the year, late summer, which therefore has a greater leaching effect on the soil than the cooler rains of winter and spring. Tornadoes are probably less frequent than in the western division.*

VEGETATION.

The general aspect of the forests is much like that in the western division, except that there are more dry pine and oak woods and fewer rich ravines, hammocks and bluffs. The "pocosin" of Pike County (Fig. 15) is a forest composed mostly of evergreen hardwoods, unlike anything else known in Alabama, but not very different from many sandy hammocks in Florida.† The commonest woody plants in the region are about as follows:

Commonest woody plants of eastern red hills.

TIMBER TREES.

<i>Pinus palustris</i>	Long-leaf pine	Sandy uplands.
<i>Pinus Taeda</i>	Short-leaf pine	Various situations.
<i>Pinus echinata</i>	Short-leaf pine	Dry uplands.
<i>Quercus Marylandica</i>	Black-jack oak	Dry uplands.
<i>Quercus falcata</i>	Red oak	Dry uplands.
<i>Liriodendron Tulipifera</i>	Poplar	Branch-swamps, etc.
<i>Liquidambar Styraci-</i> <i>flua</i>	Sweet gum	Various situations.
<i>Magnolia grandiflora</i>	Magnolia	Hammocks.
<i>Pinus glabra</i>	Spruce pine	Hammocks.
<i>Nyssa biflora</i>	Black gum	Branch-swamps.
<i>Quercus laurifolia</i>		Hammocks.
<i>Quercus alba</i>	White oak	Rich woods.
<i>Quercus nigra</i>	Water oak	Low grounds.
<i>Quercus stellata</i>	Post oak	Dry uplands.
<i>Acer rubrum</i>	Red maple	Swamps.
<i>Fagus grandifolia</i>	Beech	Ravines and bottoms.
<i>Hicoria alba</i>	Hickory	Dry woods.
<i>Pinus Elliottii</i>	Slash pine	Shallow ponds.
(<i>Melia Azedarach</i>)	Chinaberry	Roadsides, etc.
<i>Betula nigra</i>	Birch	River-banks.
<i>Tilia heterophylla</i> ?	Lin	Rich woods.
<i>Quercus velutina</i>	Black oak	Uplands.
<i>Hicoria glabra</i>	(Pignut) hickory	Hammocks, etc.
<i>Pinus serotina</i>	Black pine	Sandy swamps.

*See Science II. 48:208-211, Aug. 30, 1918.

†For descriptions and illustrations of this interesting spot see Monograph 8, pp. 99-100, 160-161, and a botanical paper cited in the bibliography of the present report (page 21).

SMALL TREES.

<i>Magnolia glauca</i>	(White) bay	Swamps.
<i>Quercus Catesbaei</i>	Black-jack oak	Sandy uplands.
<i>Cornus florida</i>	Dogwood	Dry woods.
<i>Salix nigra</i>	Willow	Along streams.
<i>Quercus cinerea</i>	Turkey oak	Sandy uplands.
<i>Osmanthus Americana</i>		Hammocks.
<i>Oxydendrum arboreum</i>	Sourwood	Hammocks, etc.
<i>Ilex opaca</i>	Holly	Ravines and hammocks.
<i>Quercus Margaretta</i>	Post oak	Sandy uplands.
<i>Crataegus Michauxii</i>	(Red) haw	Sandy uplands.
<i>Ostrya Virginiana</i>		Ravines and hammocks.
<i>Carpinus Caroliniana</i>	Ironwood	Bottoms.
<i>Persea Borbonia</i>	Red bay	Hammocks and bot- toms.
<i>Symplocos tinctoria</i>	Sweet-leaf	Hammocks.
<i>Magnolia pyramidata</i>	Cucumber tree	Ravines.

SHRUBS AND VINES.

<i>Alnus rugosa</i>	Alder	Along streams.
<i>Myrica cerifera</i>	Myrtle	Hammocks, etc.
<i>(Prunus angustifolia)</i>	Wild plum	Old fields and roadsides.
<i>(Rubus cuneifolius)</i>	Blackberry	Old fields and roadsides.
<i>Batodendron arboreum</i>	Sparkleberry	Dry woods and ham- mocks.
<i>V Smilax laurifolia</i>	Bamboo vine	Branch-swamps.
<i>Ilex vomitoria</i>	Yaupon	Along Pea River mostly.
<i>Ilex glabra</i>	Gallberry	Damp sand.
<i>Kalmia latifolia</i>	Ivy	Hammocks and bluffs.
<i>V Vitis rotundifolia</i>	Muscadine	Hammocks, etc.
<i>Cyrilla racemiflora</i>	Tyty	Branch and creek swamps.
<i>V Gelsemium semper- virens</i>	Yellow jessamine	Hammocks, roadsides, etc.
<i>(Sassafras variifolium)</i>	Sassafras	Old fields and roadsides.
<i>Arundinaria tecta</i>	Reed	Damp woods.
<i>Ceanothus Americanus</i>	Red-shank	Dry woods.
<i>Callicarpa Americana</i>	French mulberry	Hammocks, etc.
<i>(Sambucus Canadensis)</i>	Elder	Low grounds.
<i>Aralia spinosa</i>	Prickly ash	Hammocks.
<i>Rhus copallina</i>	Sumac	Dry woods, etc.
<i>Hydrangea quercifolia</i>	Seven-bark	Hammocks, etc.
<i>Asimina parviflora</i>	Pawpaw	Hammocks.
<i>Phoradendron flaves- cens</i>	Mistletoe	On deciduous trees.
<i>Hamamelis Virginiana</i>	Witch-hazel	Hammocks and ravines.
<i>V Vitis aestivalis</i>	Wild grape	Roadsides, etc.
<i>V Smilax lanceolata</i>	Wild smilax	Hammocks.
<i>Viburnum semitomen- tosum</i>		Edges of swamps.
<i>Illicium Floridanum</i>	Stink-bush	Edges of swamps.
<i>V Bignonia crucigera</i>	Cross-vine	Woods.
<i>Clethra alnifolia</i>		Edges of swamps.
<i>Hypericum fascicula- tum</i>		Shallow ponds.

About 65 per cent of the forest is evergreen. If a census of the forests could have been taken before the country was settled, say 100 years ago, the differences in composition between the eastern and western divisions would doubtless have been greater than they are now, for the forests that have been destroyed to make room for crops in the western division are mostly those of fertile valleys, and in the eastern division those of dry uplands. So in listing the species in order of present abundance we are in a sense contrasting the rocky ridges of the western division with the valleys of the eastern.

Herbs other than Spanish moss and weeds are rather inconspicuous, as explained in the introduction. Long-leaf

FIG. 13. Typical rural scene about six miles south of Luverne, Crenshaw County, showing moderately hilly topography, cotton and corn, white farmer's home (unpainted, with the far end of logs) and barn. July 30, 1919.

pine, poplar, black-jack oak, red oak, black gum and hickory are more abundant here than in the western division, while the reverse is true of sweet gum, spruce pine, beech, water oak, and most river-bank trees. The forest industries are much the same as in the western division. In 1912 there were 39 sawmills in this division, with an average capacity of 10,280 board feet per day. (But if similar data were obtainable for a generation ago, when the western division had more cleared land than the eastern, the mills of the eastern division would probably have shown up the larger.) The abundance of yaupon (*Ilex vomitoria*) along the Pea

River in Coffee County suggests the possibility of utilizing it as a source of caffeine (of which its leaves contain about half as much as the best tea).

POPULATION.

This region was settled up more slowly at first than the western division, on account of the less fertile soil and greater distance from markets, but overtook it in density of population about 1889. The principal changes in density and composition of population since 1820 are shown in Table 5.

FIG. 14. One of the better class of farm houses in the eastern red hills, about three miles north of Capps, Henry County. July 26, 1919.

TABLE 5.

Population statistics of eastern red hills.

	1910	1900	1890	1880	1860	1850	1840	1830	1820
Inhabitants per sq. mi.....	38	33	24	18	13	8	7	5	1
Per cent white.....	68	71	74	75	79	83	84	76	76
Per cent negro.....	32	29	26	25	21	17	16	24	24

The ratio of whites to negroes has varied from about 5 to 1 in 1840 and 1850 to 2 to 1 in 1910, indicating quite different social and economic conditions from those in the

western division. An interesting feature of the rural population is that the two races tend to congregate in different neighborhoods in the same counties, without any noticeable differences in soil. Only 5.4 per cent of the population was

FIG. 15. Road through the Pocosin, Pike County. Soil very sandy, and trees and shrubs mostly evergreen. March 27, 1913.

classed as urban in 1910, and the proportion of foreigners was about 1 in 3,000.

In 1880 the immigration from other states had been mostly from Georgia, South Carolina, North Carolina, Flor-

ida, Virginia, Mississippi and Tennessee, in the order named, and the average resident lived about 49 miles from his birthplace.

In 1906 the leading religious denominations among the white population were Baptist, M. E. South, Primitive Baptist, Church of Christ, and Methodist Protestant; and among the negroes, Baptist, A. M. E., A. M. E. Zion, and Cumberland Presbyterian.

In 1910 the percentage of illiteracy for the whole population over 10 years old was 21.2, or a little less than the State average.

The largest cities, with their population in 1910, are as follows. Troy, 4,961; Enterprise, 2,322; Ozark, 2,229; Luverne, 1,384; Abbeville, 1,141; Clayton, 1,130; Headland, 1,090; Elba, 1,079. All these have electric lights, waterworks, newspaper, etc., and together they increased in population over 50 per cent between 1900 and 1910.

The leading railroad is the Atlantic Coast Line (formerly Alabama Midland, Abbeville Southern, Southwest Alabama, etc.), and the only other of importance in this region is the Central of Georgia. At the present time there are several lines of automobiles making regular trips from Luverne, Elba and Dothan to other towns with which they are not directly connected by rail.

AGRICULTURE.

In ante-bellum days agriculture was comparatively undeveloped here, as already shown by the sparse population and small proportion of negroes. In 1850 about 6 per cent of the area was under cultivation, but this more than doubled in the next decade, and reached 43 per cent in 1910. The progress of agriculture in 60 years and its status in 1910 are shown by Tables 6 to 8.

As in the western division, the scale of farming operations was increasing rapidly just before the Civil War, and since then the tendency has been in the opposite direction. The percentage of improved land in the total area (and therefore the number of farms) has increased more rapidly than in the western division, this increase being due largely to discoveries of fertilizing materials in Germany, Chile, South Carolina, Florida, etc., since the middle of the last century, as will be explained farther on.

TABLE 6.

Farm equipment in eastern red hills, 1850-1910.

	1910	1900	1890	1880	1860	1850
Percentage of land in farms.....	83	81	78	55	53	16
Percentage of land improved.....	43	35	26	15	13	6
Improved acres per inhabitant.....	7.2	6.7	6.8	6.5	6.4	5.2
Average number acres per farm...	89	109	149	158	350	153
Average improved acres per farm	45	47	49	43	84	57
Ave'ge value of land per farm (\$)	850	371	615	353	1620	571
Av. value buildings, per farm.....	272	136				
Av. value implements and mach'y	63	38	20	17	80	77
Average value of livestock.....	237	151	177	175	554	366
Number of slaves per farm.....					2.7	1.8
Number of horses.....	0.2	0.3	0.4	0.6	1.7	2.1
Number of mules.....	1.1	1.0	0.9	0.7	0.9	0.3
Number of dairy cows.....	1.1	1.0	1.7	2.2	4.9	6.8
Number of work oxen.....	1.4	0.2	0.6	0.8	1.1	1.3
Number of other cattle.....						
Number of sheep.....	.02	0.3	1.8	3.5	5.6	5.8
Number of goats.....	.05	0.4				
Number of hogs.....	8	10	13	14	32	41
Number of chickens.....	19	25	37	15		
Number of other poultry.....						
Number of colonies of bees.....	0.71	1.6				

TABLE 7.

Farm expenditures, receipts, etc., in eastern red hills, 1880-1910.

	1910	1900	1890	1880
Percentage of white farmers.....	72	82		
Percentage of negro farmers.....	28	18		
Percentage of farms operated by owners and part owners.....	41	53	70	
Expenditure for fertilizers, per farm (\$)	66	27	38	16
Expenditure for labor, per farm.....	27	18		
Expenditure for feed, per farm.....	8			
Expenditure for fertilizers, per acre improved	1.45	.58	.78	.39
Expenditure for labor, per acre imp.	.59	.39		
Expenditure for feed, per acre imp.	.18			
Average annual value of crops, per farm (\$)	740	440	475	382
Average annual value of animal products, per farm.....	108			
Value of crops per acre improved.....	16.30	9.50	9.72	8.95
Value of animal products, per a. imp.	2.40			
Value of farm land per acre.....	9.62	3.44		

TABLE 8.

Agricultural statistics of eastern red hills by race and tenure, 1910.

	Whites	Negroes	Owners	Tenants
Percentage of white farmers.....			88	60
Percentage of negro farmers.....			12	40
Percentage, owners and part owners.....	50	16		
Percentage of tenants.....	49	84		
Average number of acres per farm.....	99	62	137	54
Average improved acres per farm.....	46	43	54	39
Value of farm land per acre (\$).....	9.45	10.21		
Value of farm land per farm.....	933	636	1685	727
Value of buildings per farm.....	322	141		
Value of implements and machinery per farm.....	74	33		
Number of dairy cows per farm.....	1.2	0.8		
Number of work horses per farm.....	0.2	0.1		
Number of work mules per farm.....	1.1	1.0		
Acres of cotton per farm.....	16.9	21.2		
Bales per acre.....	0.37	0.34		
Acres of corn per farm.....	14.4	12.4		
Bushels per acre.....	11.5	10.0		

The number of horses per farm, and per acre, has declined considerably, and that of mules has increased correspondingly. The number of sheep has declined rapidly with the increase of cultivated land and consequent passing away of the free range. In 1850 the average farm was a two-horse farm (as compared with the four-horse farms of the western division), and now it is a one-mule farm, although there are nearly three times as many white as negro farmers.* About half of the white farmers and five-sixths of the colored ones are tenants; and over seven-eighths of the owners and three-fifths of the tenants are white.

The leading crops in 1909, in order of value, were cotton, corn, peanuts, "vegetables," sweet potatoes, sugar-cane, oats, hay, cowpeas, and Irish potatoes. Peanuts, which ranked third then, have increased enormously since the boll-

*This illustrates what seems to be a universal principle in the South; namely, in regions or counties where whites are in the majority the negroes tend to concentrate in the towns, and vice versa. Or in other words, the numbers of the two races, no matter which predominates, are more nearly equal in any town than in the surrounding country.

†In the amount of labor required per acre peanuts and cotton are almost exactly equal, which facilitates the change from one crop to the other.

weevil came to interfere with the cotton crop,† and they may be first now; and the raising of hogs has increased correspondingly. These changes have proved so profitable to the farmers that plans have been made to erect a monument to the boll-weevil in the town of Enterprise.

4. The lime-sink region.

(Figures 16-18; tables 9-12.)

The lime-sink region, which extends from Southwest Georgia to West Florida, covers about 1,300 square miles in Alabama, where its typical features are not so well displayed as in the other two states, however. A small area in Washington County, extending westward into Mississippi, which cannot very well be combined with the regions north and south of it, is also referred to this region provisionally. The southeastern corner of Alabama is often called the "wire-grass country," from the fact that wire-grass is more abundant there than elsewhere in Alabama; but this name cannot be appropriately used for the whole lime-sink region in three states, for wire-grass is still more abundant farther east in Georgia and farther south in Florida, in quite different regions.

GEOLOGY.

The underlying strata are mostly of the Vicksburg formation (uppermost Eocene), probably chiefly limestone when first deposited, but now very largely silicified, perhaps on account of the overlying sandy soil and copious summer rain. A reddish or yellowish, often mottled, sandy clay several or many feet thick usually overlies the rock, and is paler and sandier at the surface, making prevailingly acid soils, with very little indication of the limestone beneath. The limestone contains many subterranean channels into which a good deal of the surface water finds its way, so that running water is scarcer than in most other parts of Alabama, and in some places wells have to be dug fifty feet or more to reach water for domestic purposes. Good artesian water can be had almost anywhere from a depth of a few hundred feet, but the wells do not overflow. There are a few large limestone springs, and Healing Springs, a small spring in the western division, is noted for its supposed medicinal virtues.

TOPOGRAPHY.

The topography is mostly gently undulating. The streams are small (except the Chattahoochee River) and usually sluggish, and there are many small shallow ponds, some of them with open water, but most of them full of cypress, black gum, May-haw, or various shrubs. Caves and lime-sinks occur in a few places, but less commonly than in the corresponding parts of the two adjoining states. Omussee Creek, which enters the Chattahoochee River a little below Columbia, is an exception to the general sluggishness of the streams, for it has some rocky shoals which have recently been dammed up to generate electricity for Dothan.

FIG. 16. Scene in badly cut-over long-leaf pine forest about six miles west of Healing Springs, Washington County, with comparatively level country in foreground and low hills about half a mile away. July 20, 1911.

SOILS.

Exact information about the soils is rather meager, for the soil surveys of Geneva and Houston Counties are not published yet. But from the reports on Covington County and part of a county in West Florida it appears that the prevailing texture classes are fine sandy loam, sandy loam, swamp, sand, and fine sand. Generally speaking, there are

two principal types of upland soil. One, which is widespread in eastern Geneva County, is a brownish sandy loam, passing into clay usually within a few inches of the surface, and it is quite fertile, so much so that over many square miles something like three-fourths of it is now cultivated. The natural vegetation remaining on it is a moderately dense forest of pine and oak mixed. The other soil type, common in Covington County, is a paler and deeper sand, evidently less fertile, for it is hardly one-tenth cultivated, and one can still find whole sections covered with unbroken long-leaf pine forests. Unimproved roads through this sand are rather "heavy" in dry weather, but it is a comparatively simple matter to dig down a few feet in suitable spots and get clay, which makes an excellent road-surfacing material when mixed with the proper amount of sand.

CLIMATE.

Although there are no weather stations in this region established long enough to give reliable records, it is evident that the climate must be a little warmer than in the regions previously described, and the summers a little wetter, which accounts in large measure for the leached condition of the soil.

VEGETATION.

Unlike most of the regions farther inland (but like most of Florida), the prevailing type of vegetation is, or was, open park-like forests of long-leaf pine, with a great variety of narrow-leaved herbaceous undergrowth and many bright-colored flowers in summer, all subject to ground-fires every few years, which keep other trees from getting the best of the fire-resistant but sun-loving pine. On the richer soils the vegetation approaches that of the neighboring red hill belt, having many oaks and other hardwoods and short-leaf pines mixed with the long-leaf pine, and much less herbaceous undergrowth than in the pure pine forests. Such places are less subject to fire than the open pine woods, on account of having less grass and pine straw to carry the flames. There are also many ponds, swamps, and bays, with still denser vegetation, practically exempt from fire.

About half the area is now cleared and cultivated. In the following list of plants the commoner herbs are includ-

ed, on account of being much more abundant and conspicuous than in the regions previously described, as explained in the introduction.

Commonest plants of lime-sink region.

TIMBER TREES.

<i>Pinus palustris</i>	Long-leaf pine	Sandy uplands.
<i>Pinus Elliottii</i>	Slash pine	Ponds and swamps.
<i>Pinus Taeda</i>	Short-leaf pine	Richer soils, especially near streams.
<i>Taxodium imbricarium</i>	(Pond) cypress	Ponds and swamps.
<i>Nyssa biflora</i>	Black gum	Ponds and swamps.
<i>Quercus falcata</i>	Red oak	Richer uplands.
<i>Magnolia grandiflora</i>	Magnolia	Hammocks.
<i>Pinus echinata</i>	Short-leaf pine	Richer uplands.
<i>Liriodendron Tulipifera</i>	Poplar	Branch-swamps.
<i>Liquidambar Styraciflua</i>	Sweet gum	Richer soils.
<i>Pinus glabra</i>	Spruce pine	Hammocks.
<i>Quercus laurifolia</i>		Hammocks.
<i>Pinus serotina</i>	Black pine	Sandy bogs.
<i>Hicoria alba</i>	Hickory	Rich uplands.
<i>Quercus nigra</i>	Water oak	Low grounds.
<i>Taxodium distichum</i>	Cypress	Swamps.
<i>Acer rubrum</i>	Red maple	Swamps.

SMALL TREES.

<i>Magnolia glauca</i>	Bay	Swamps.
<i>Ilex myrtifolia</i>	Yaupon	Shallow ponds.
<i>Quercus Marylandica</i>	Black-jack oak	Clayey uplands.
<i>Quercus cinerea</i>	Turkey oak	Sandy uplands.
<i>Quercus Catesbaei</i>	Black-jack oak	Sandy uplands.
<i>Cornus florida</i>	Dogwood	Richer uplands.
<i>Crataegus aestivalis</i>	May haw	Shallow ponds.
<i>Salix nigra</i>	Willow	Along streams.
<i>Oxydendrum arboreum</i>	Sourwood	Hammocks.

SHRUBS AND VINES.

<i>Ilex glabra</i>	Gallberry	Low pine lands.
<i>Cyrilla racemiflora</i>	Tyty	Swamps.
<i>V Smilax laurifolia</i>	Bamboo vine	Swamps.
<i>Myrica pumila</i>	Myrtle	Pine woods.
<i>Hypericum fasciculatum</i>		Shallow ponds.
<i>Clethra alnifolia</i>		Edges of swamps.
(<i>Rubus cuneifolius</i>)	Blackberry	Roadsides, etc.
<i>Myrica cerifera</i>	Myrtle	Hammocks.
<i>Alnus rugosa</i>	Alder	Along branches and creeks.
<i>Phoradendron flavescens</i>	Mistletoe	On black gum mostly.
<i>Pieris nitida</i>	Hurrah bush	Swamps and bays.
<i>Ceanothus microphyllus</i>		High pine land.
<i>Chrysobalanus oblongifolius</i>		High pine land.
(<i>Diospyros Virginiana</i>)	Persimmon	Various situations.

<i>Gaylussacia dumosa</i>	High pine land.
<i>Ceanothus Americanus</i> Red-shank	Dry woods.
<i>V Bignonia crucigera</i> Cross-vine	Swamps and hammocks.
<i>Vaccinium nitidum</i> Huckleberry	Pine woods.

HERBS.

<i>(Helenium tenuifolium)</i> Bitter-weed	Roadsides, etc.
<i>Campulosus aromaticus</i> (A grass)	Low pine land.
<i>Eupatorium rotundifolium</i>	Low pine land.
<i>Eriocaulon decangulare</i>	Low pine land.
<i>Vernonia angustifolia</i>	High pine land.
<i>Pteris aquilina</i> (A fern)	High pine land.
<i>Rhexia Alifanus</i>	Low pine land.
<i>Sarracenia flava</i> Pitcher-plant	Low pine land.
<i>(Acanthospermum australe)</i>	Running cocklebur
<i>Helianthus Radula</i> (A sunflower)	Roadsides, etc.
<i>Dichromena latifolia</i> (A sedge)	Pine woods.
<i>Eupatorium compositifolium</i>	Wet pine land.
..... Dog-fennel	Roadsides, old fields, etc.
<i>Rhynchospora axillaris</i> (A sedge)	Low pine land.
<i>Sarracenia Drummondii</i> Pitcher-plant	Low pine land.
<i>Stillingia sylvatica</i> Queen's delight	High pine land.
<i>Eryngium synchaetum</i>	Pine woods.
<i>Polygala cymosa</i>	Ponds and swamps.
<i>(Erigeron ramosus)</i>	Roadsides, etc.
<i>Aristida stricta</i> Wire-grass	High pine land.
<i>(Ambrosia artemisiifolia)</i>	Ragweed
..... Ragweed	Roadsides, etc.
<i>Chrysopsis graminifolia</i> Silver-grass	High pine land.
<i>Trilisa odoratissima</i> Deer-tongue	Pine woods.
<i>Cracca Virginiana</i> Devil's shoestring	High pine land.
<i>Chondrophora nudata</i>	Low pine land.
<i>Eupatorium album</i>	High pine land.
<i>Eriogonum tomentosum</i>	High pine land.
<i>Rhexia lutea</i>	Low pine land.
<i>Tofieldia racemosa</i>	Low pine land.
<i>Chamaecrista fasciculata</i>	Partridge-pea
..... Partridge-pea	High pine land.
<i>(Lepidium Virginicum)</i> Pepper-grass	Roadsides, etc.
<i>Rhynchospora Grayii</i> (A sedge)	High pine land.
<i>Sabbatia decandra</i>	Shallow ponds.
<i>(Lespedeza striata)</i> Japan clover	Roadsides, etc.
<i>Osmunda cinnamomea</i> (A fern)	Swamps.
<i>Polygala ramosa</i>	Low pine land.

About three-fourths of the trees and shrubs are ever-green. Woody vines, being sensitive to fire, are relatively scarce and chiefly confined to swamps and hammocks. The two pines at the head of the list are important sources of lumber and turpentine, and until quite recently, say about 1900, a greater area was devoted to these industries than to agriculture. The rapid extension of farms has almost

put the lumbermen out of business in Houston County and the eastern part of Geneva, however. Some of the shrubs and herbs, such as the gallberry and tyty, are excellent honey plants.

POPULATION.

No accurate estimates of population previous to the 1910 census are possible, because Houston County was not established until 1903, and it is difficult to identify in the reports of previous censuses the beats that lie in the lime-sink region, and especially to get any information

FIG. 17. Small new farms in pine woods about $2\frac{1}{2}$ miles north of McRae, Covington County. June 10, 1919.

about their areas, which the census does not attempt to give. It is very evident, though, that the increase in population in recent decades has been very rapid. In 1910 there were in the two counties used to typify this region—Geneva and Houston—over fifty inhabitants per square mile, a remarkable density for such a sandy region half covered with forest, and with little manufacturing; and this apparently indicates either pretty intensive farming or rather low standards of living among the rural population. The salient features of the 1910 population of the region and its largest city are shown in Table 9.

TABLE 9.

Population statistics of lime-sink region, 1910.

	Total	Native White	Foreign White	Negro
Inhabitants per square mile.....	50.7	38.6	0.05	12.0
Percentage of total.....	100.0	76.2	0.1	23.7
Same for Dothan.....	100.0	49.8	0.5	49.6
Per cent urban.....	11.9	7.8	62.6	25.0
Per cent illiterate (over 10 years).....	19.3	13.9	3.6	37.0
Same for Dothan.....	4.2	0.2	0	8.5

FIG. 18. White farmer's house and barn about three miles south of Dothan, Houston County. July 27, 1919.

The metropolis of the Alabama wire-grass is Dothan, with 3,375 inhabitants in 1900, 7,016 in 1910, and probably nearly twice as many now. Next in order are Hartford, with 1,159; Columbia, 1,122; Geneva, 969, and Slocomb, 896. Together these trebled in population between 1890 and 1900 and doubled between 1900 and 1910, and they have probably gained at least 50 per cent since then.

The principal railroads are the Central of Georgia, Atlantic Coast Line, Atlanta & St. Andrew's Bay, and Alabama & Florida.

The percentage of illiteracy in the aggregate population in 1910 was a little lower than in the regions previously described, probably mostly because a large part of the popu-

lation has come in from other regions and states, and one has to have a little education in order to read real-estate advertisements and railroad time-tables preparatory to moving to a new home. The illiteracy percentage for Dothan (total population over 10 years old, including nearly as many negroes as whites) is actually lower than in Boston, Mass., which was once regarded as the center of all culture in the western hemisphere.

The leading white churches in 1906 were Southern Baptist, Southern Methodist, Freewill Baptist, Methodist Protestant, Northern Methodist, and Primitive Baptist. The leading denominations among the negroes were Baptist, African Methodist, and A. M. E. Zion.

AGRICULTURE.

Information about farming operations in this region previous to 1910 is still harder to get than in the case of population, for the census does not return farm statistics by beats as it does population. At that time "improved land in farms" constituted 42.7 of the total area of Geneva and Houston Counties (a little more than in any of the other regions), or 5.39 acres per inhabitant. The general conditions of agriculture in 1909-10 are shown in Tables 10 to 12, which are arranged differently from the others on account of being based on only one census. Table 10 gives certain statistics for the two races separately as well as combined, and Table 12 gives the value of animal products per farm and per acre in more detail than is attempted elsewhere in this report.

The proportion of white farmers is a little larger than in any other region in southern Alabama. The number of owners and tenants, taking both races together, is almost exactly equal, but as usual there are more owners among the whites than among the negroes, and owners had considerably larger farms than tenants. The animals slaughtered were presumably mostly hogs, which are raised in large numbers here, as in other peanut-growing regions.

The leading crops in 1909 were cotton, corn, peanuts, "vegetables" (probably meaning mostly watermelons in this case), sweet potatoes, sugar-cane, oats, hay, and Irish potatoes. Since the coming of the boll-weevil, about 1912,

cotton has declined in importance and peanuts and hogs increased, as in the neighboring red hills.

TABLE 10.

Farm equipment in lime-sink region, 1910, by races.

	Total	White	Colored
Percentage of farmers, white and colored.....	100	84	16
Percentage of owners and part owners.....	49	93	7
Percentage of tenants.....	50	74	26
Percentage of land in farms.....	82		
Percentage of land improved.....	43		
Improved acres per inhabitant.....	5.4	6.1	3.3
Average number of acres per farm.....	78	83	53
Average improved acres per farm.....	42	43	38
Average value of farm land per acre (\$).....	12.90	12.80	13.81
Average value of farm land per farm.....	1011	1065	728
Average value of buildings per farm.....	302	328	154
Average value of implements and machinery per farm.....	71	77	40
Average value of livestock, poultry, etc.....	259		
Number of horses (all ages) per farm.....	0.3		
Number of mules (all ages) per farm.....	1.0		
Number of work horses per farm.....		0.3	0.2
Number of work mules per farm.....		1.0	0.8
Number of dairy cows per farm.....	1.3	1.4	0.9
Number of other cattle.....	2.1		
Number of sheep.....	0.5		
Number of goats.....	0.3		
Number of hogs.....	12.0		
Number of poultry.....	20		
Number of colonies of bees.....	0.6		
Acres of cotton per farm.....	16.3	16.1	18.1
Bales per acre.....	0.39	0.39	0.37
Acres of corn per farm.....	13.5	13.7	12.1
Bushels per acre.....	14.0	14.3	12.3

TABLE 11.

Statistics of owner and tenant farmers in lime-sink region, 1910.

	Owners & part owners	Tenants
Whites, per cent.....	54	45
Negroes, per cent.....	21	79
Average number of acres per farm.....	110	47
Average improved acres per farm.....	47	36
Value of land and buildings per farm (\$).....	1750	856

TABLE 12.

*Miscellaneous farm expenditures and receipts in lime-sink region,
1909-1910.*

	Per farm	Per acre impr'd
Expenditure for fertilizers.....	\$ 69	\$ 1.68
Expenditure for labor.....	27	.66
Expenditure for feed.....	6	.14
Value of all crops.....	800	19.30
Value of dairy products (excluding milk used at home)	17	.40
Value of poultry and eggs produced.....	24	.58
Value of animals sold on the hoof.....	14	.34
Value of animals slaughtered.....	73	1.76
Value of all animal products.....	128	3.10

5. The southwestern pine hills.

(Figures 19-25; tables 13-17.)

This very distinct region extends with some variations and interruptions from Georgia to Louisiana, and includes about 5,000 square miles in Alabama. Besides the literature previously cited, the soil survey of Baldwin County, by Tharp, Jennings and Waldrop, of the U. S. Department of Agriculture, and Lett, Avary and Cantrell representing the State, published in November, 1911, deserves special mention. It is a pamphlet of 74 pages, containing a large amount of useful and interesting information about the soils, topography and agriculture of this region, in much more detail than can be attempted in this report.

GEOLOGY.

It is underlaid throughout by nearly horizontal non-calcareous strata of sand and clay in various mixtures, usually pinkish or yellowish in color, several hundred feet thick, and in age probably not older than Pliocene. On top of these in many places is a few feet of essentially homogeneous brick-red or yellow loam, or loose grayish sand, or both (the sand always uppermost if both are present), and it is not yet settled whether these surface materials have been derived from the underlying strata by some process of weathering, or are water-laid deposits of later age. A coarse blackish ferruginous sandstone formed by local ce-

mentation of sand and pebbles by iron oxide is a characteristic feature of the more hilly portions, but is by no means confined to this region, as it occurs in many other non-calcareous regions in the coastal plain from New Jersey to Florida, Arkansas and Texas. Quartz pebbles from the underlying strata or from more recent river terraces abound on some hillsides, especially in the neighborhood of rivers, and on the red loam uplands small ferruginous nodules usually half an inch or less in diameter may be strewn thickly over the surface, making what is commonly known as "pimply land."

FIG. 19. Scene on top of high ridge with steep slopes (covered with ferruginous pebbles) about six miles northwest of Bay Minette, looking northeast through cut-over long-leaf pine forests and across valley of Rains Creek. October 31, 1919.

The sandstone is used locally for pillars, chimneys, etc., the purer clay for bricks, the sandy clay and pebbles for road material, and the sand for various purposes. An abundance of pure soft water can be had without much trouble almost anywhere in the region, from either deep or shallow wells and small streams.

SOILS.

The soils are prevailingly sandy, so that there is very little mud or dust at any season of the year. The principal soil texture classes, in order of area, are fine sandy loam,

sand, sandy loam, fine sand, loamy sand, swamp, gravelly sand, and gravelly sandy loam. Clay and silt loam (two of the best types of soil as far as texture is concerned) together make up less than 1 per cent, and with few exceptions the soils are below the average in fertility. This is partly compensated, however, by the fact that they can be plowed immediately after a rain, unlike the stiffer soils further inland, and they retain fertilizers well on account of the clayey subsoil not far from the surface.

FIG. 20. Smooth graded road through almost uninhabited cut-over land on high uplands about $5\frac{1}{2}$ miles northwest of Bay Minette, Baldwin County. October 31, 1919.

TOPOGRAPHY AND DRAINAGE.

The topography varies from quite hilly near streams and on narrow divides to nearly flat on the broader divides and near tide-water, particularly on the west side of Mobile Bay. On the average it is undulating, with well-developed valleys something like 25 feet deep and half a mile apart. Some of the smaller valleys are rather narrow and V-shaped, while another type, commonest in Washington County and southeastern Baldwin, is broad and savanna-like, with gentle slopes perpetually moist. The hills are smooth and rounded, except where rocks or pebbles occur, and the highest elevations are at least 350, perhaps 400 feet above sea-level.

In some places, perhaps not as much in Alabama as in other states, though, the inland edge of the region is

marked by a bold escarpment facing inland. (The outlying areas are higher than the surrounding country, too.) This is especially conspicuous about four miles southwest of Monroeville, where one journeying northward on the Gulf, Florida & Alabama Railway would pass suddenly out of a flattish piney woods country and descend into a hilly oak and short-leaf pine country, the railroad making a loop two miles long and only about a quarter of a mile across the neck to get down the slope 100 feet or so. (The government soil survey of Monroe County, published in 1919, shows the location of this loop but gives very little idea of the topography.)

FIG. 21. Desolate cut-over land with no young pines, about four miles southeast of Grand Bay, on road to Bayou La Batre, Mobile County. June 15, 1912. Much of the land sold to farmers in this region in recent years is in this condition, but it requires very little preparation for planting the first crop.

From the point just mentioned one could follow the divide between the Escambia and Perdido Rivers on one side and the streams flowing into Mobile Bay on the other, southwest to Bay Minette and thence approximately south to the coast, and imagine himself in a level plain most of the way, so uniform is the seaward slope of this smooth divide, along which a part of the "Federal Road" was located about 100 years ago.

This region is also remarkable for the high elevations close to tide-water. The steep bare bluffs facing the bays on both sides of Baldwin County are about 65 feet high in

places, and St. Elmo, in the southern part of Mobile County, is said to be 160 feet above sea-level.

Along some of the rivers and especially on the west side of Mobile Bay there are extensive flat areas one to several miles wide, probably to be classed as river terraces. Both in these areas and on the level uplands there are many shallow ponds much like those in the lime-sink region, except that they are less likely to hold water throughout the year or to be devoid of trees.

FIG. 22. Flat wet savanna with scattered cypress and slash pine, innumerable pitcher-plants in foreground, and tyty bays in background, about three miles north of Bayou La Batre, Mobile County. June 15, 1912.

Excluding the large muddy rivers, the Alabama and Tombigbee and their distributaries, which hardly belong to this region at all, the streams may be divided into two or three classes. First, such rivers as the Conecuh, Yellow, Pea and Choctawhatchee, which rise in the red hills or farther inland and always carry a little mud in suspension and lime in solution, and fluctuate a few feet with the rainfall. Second, the smaller streams, few of them large enough to be called rivers (e. g., the Escatawpa, Perdido and Escambia), which originate within the pine hills, and are usually coffee-colored from peaty matter in solution and suspension. These are practically free from lime, mud, and other mineral sub-

stances, and flow pretty steadily throughout the year. They might be again subdivided into creeks which run all the time, and small branches which go dry in early summer. The water of the smallest branches and a few of the creeks is almost as clear as crystal and perfectly good to drink. There are no large springs, most of the streams taking their rise in small swamps. Nearly all the streams are bordered by more or less swamp, the width of which is roughly proportional to the size of the stream.

CLIMATE.

This region has an average temperature of about 67° F. and a growing season of about 270 days, varying of course with altitude, distance from the coast, etc. In the extreme northern portion the rainfall is necessarily much like that in the western red hills near by, but toward the coast it is heavier than in other parts of Alabama, about 59 inches annually, and at the same time the greater part of the precipitation comes in the warmest months. This tends to balance the evaporation and keep the ground-water level and the flow of streams constant, but at the same time it leaches the soil and retards those processes of weathering that are expedited by alternate wet and dry conditions.

VEGETATION.

This is the principal pine region of Alabama. Half a century ago it was covered from end to end, except in swamps, with magnificent park-like forests of long-leaf pine, with very little shrubby undergrowth, and a carpet of grasses and other narrow-leaved herbs in great variety. On high rocky or sandy ridges the pines are somewhat stunted, and accompanied by a few species of scrubby oaks, which become more abundant when the pines are cut off, allowing the soil to dry out a little more. In savannas and other damp soils the pines are likewise stunted and scattered, but unaccompanied by oaks. The swamps of all sizes are full of shrubs and vines and hardwood trees, and the slopes near the larger streams have hammock vegetation, which owes its presence mainly to the protection from fire given by the swamp or water on one side and the downward slope on the other. For the pine forests are fre-

quently swept by fire, as in the lime-sink region (and doubtless have been for thousands of years), but fire does not run down hill readily, and a swamp or stream forms a pretty effective barrier on the other side.*

At the present time the pine forests have been pretty thoroughly exploited for lumber and naval stores, and present in most places a scene of desolation, the so-called cut-over lands. But the long-leaf pine reproduces itself readily when given a chance, and millions of young trees are springing up, to be ripe for the lumberman in another generation if farmers and turpentine men do not interfere too much, so that the complete exhaustion of the forests, which was looked for by some prominent writers on forestry 25 or 30 years ago, is not yet in sight, and the supply of timber is still ample for local needs at least.

The following list of the commoner plants is based on hundreds of miles of travel by rail and on foot, at all seasons of the year except spring, and the sequence ought to be reasonably accurate:

Commonest plants in southwestern pine hills.

TIMBER TREES.

<i>Pinus palustris</i>	Long-leaf pine	Uplands mostly.
<i>Pinus Elliottii</i>	Slash pine	Swamps, ponds, savannas, etc.
<i>Nyssa biflora</i>	Black gum	Swamps and ponds.
<i>Taxodium imbricarium</i>	(Pond) cypress	Ponds and shallow swamps.
<i>Pinus Taeda</i>	Short-leaf pine	Richer soils.
<i>Quercus falcata</i>	Red oak	Loamy uplands.
<i>Liriodendron Tulipifera</i>	Poplar	Branch-swamps.
<i>Acer rubrum</i>	Red maple	Swamps.
<i>Magnolia grandiflora</i>	Magnolia	Hammocks.
<i>Chamaecyparis thyoides</i>	Juniper	Sour swamps.
<i>Liquidambar Styraciflua</i>	Sweet gum	Richer soils.
<i>Pinus echinata</i>	Short-leaf pine	Richer soils.
<i>Quercus nigra</i>	Water oak	Creek swamps, etc.
<i>Pinus glabra</i>	Spruce pine	Hammocks.
<i>Pinus serotina</i>	Black pine	Sandy bogs, eastward.
<i>Quercus laurifolia</i>		Hammocks.
<i>Taxodium distichum</i>	Cypress	River swamps.
<i>Fagus grandifolia</i>	Beech	Hammocks.
<i>Quercus stellata</i>	Post oak	Loamy uplands.

*For a fuller discussion of this point see Bull. Torrey Bot. Club, 38:515-525. 1911.

SMALL TREES.

<i>Magnolia glauca</i>	(White) bay	Swamps.
<i>Quercus Marylandica</i>	Blackjack oak	Loamy uplands.
<i>Quercus cinerea</i>	Turkey oak	Sandy uplands.
<i>Quercus Catesbaei</i>	Black-jack oak	Sandy uplands.
<i>Cornus florida</i>	Dogwood	Loamy uplands.
<i>Ilex myrtifolia</i>	Yaupon	Ponds.
<i>Ilex opaca</i>	Holly	Hammocks.
<i>Cliftonia monophylla</i>	Tyty	Sour swamps.
<i>Quercus Margaretta</i>	Post oak	Sandy uplands.
<i>Persea pubescens</i>	Red bay	Sour swamps.
<i>Osmanthus Americana</i>		Hammocks.

SHRUBS AND VINES.

<i>Ilex glabra</i>	Gallberry	Low pine land, etc.
<i>Cliftonia monophylla</i>	Tyty	Sour swamps and bays.
<i>Cyrilla racemiflora</i>	Tyty	Branch and creek swamps.
<i>V Smilax laurifolia</i>	Bamboo vine	Swamps and bays.
<i>Hypericum fasciculatum</i>		Shallow ponds, etc.
<i>Myrica pumila</i>	Myrtle	Pine forests.
<i>Myrica cerifera</i>	Myrtle	Hammocks and swamps.
<i>Clethra alnifolia</i>		Edges of swamps.
<i>Alnus rugosa</i>	Alder	Loamy branch-swamps, etc.
<i>Phoradendron flavescens</i>	Mistletoe	On black gum mostly.
<i>Arundinaria tecta</i>	Reed	Edges of swamps.
<i>Chrysobalanus oblongifolius</i>		High pine land.
<i>Myrica Carolinensis</i>	Myrtle	Sour swamps.
<i>Viburnum nudum</i>	Possum haw (?)	Branch-swamps, etc.
<i>Serenoa serrulata</i>	Saw palmetto	Low pine land, etc.
<i>Ilex coriacea</i>		Sour swamps.
<i>Rhus Vernix</i>	Poison sumac	Branch-swamps, etc.
<i>Batodendron arboreum</i>	Sparkleberry	Sandy hammocks, etc.
<i>Myrica inodora</i>		Sour swamps.
<i>Gaylussacia dumosa</i>	Gopher-berry	High pine land.
<i>Illicium Floridanum</i>	Stink-bush	Edges of swamps.
<i>Ceanothus Americanus</i>	Red-shank	Uplands.
<i>Stillingia aquatica</i>		Shallow ponds near coast.
<i>V Smilax Walteri</i>	Bamboo vine	Swamps.
<i>Magnolia glauca</i>	Bay	Low pine land.
<i>Pieris nitida</i>	Hurrah bush	Sour swamps, etc.

HERBS.

<i>Eriocaulon decangulare</i>		Low pine land.
<i>Sarracenia Drummondii</i>	Pitcher-plant	Low pine land.
<i>Rhexia Alifanus</i>		Low pine land.
<i>Eupatorium rotundifolium</i>		Low pine land.
(<i>Eupatorium compositifolium</i>)	Dog-fennel	Roadsides, old fields, etc.

<i>Campulosus aromaticus</i>(A grass)	Low pine land.
<i>Trilisa odoratissima</i>Deer-tongue	Pine woods.
<i>Dichromena latifolia</i>(A sedge)	Low pine land.
<i>Lophiola aurea</i>	Low pine land.
<i>Helianthus Radula</i>	Pine woods.
<i>Vernonia angustifolia</i>	High pine land.
(<i>Helenium tenuifolium</i>) Bitter-weed	Roadsides, etc.
<i>Tofieldia racemosa</i>	Low pine land.
<i>Aletris aurea</i>	Low pine land.
<i>Chondrophora nudata</i>	Low pine land.
<i>Polygala ramosa</i>	Low pine land.
<i>Helianthus angustifolius</i>	(A sunflower).....Low pine land.
<i>Osmunda cinnamomea</i>(A fern)	Edges of swamps, etc.
<i>Aristida stricta</i>Wire-grass	High pine land.
<i>Chrysopsis graminifolia</i>	High pine land.
<i>Oxypolis filiformis</i>	Low pine land.
<i>Sarracenia flava</i>	Pitcher-plant
<i>Sabbatia macrophylla</i>	Low pine land.
<i>Sarracenia Sledgei</i>	Pitcher-plant
<i>Orontium aquaticum</i>	Small creeks mostly.
<i>Polygala cymosa</i>	Ponds and swamps.
<i>Habenaria ciliaris</i>	(An orchid)
<i>Ludwigia virgata</i>	Low pine land.
<i>Pteris aquilina</i>	(A fern)
<i>Kuhnistera pinnata</i>	Summer farewell
<i>Rhynchospora axillaris</i>(A sedge)	Low pine land.
<i>Zygadenus glaberrimus</i>	Low pine land.
<i>Sorghastrum secundum</i>Wild oats	Low pine land.
<i>Cracca Virginiana</i>	Devil's shoe-string

About 75 per cent of the trees and still more of the shrubs are evergreen, presumably indicating soils low in available potassium. Woody vines are even scarcer than in the lime-sink region, for the same reason given under that head. Many of the herbs, especially in the low pine lands or savannas, have conspicuous white, yellow, or pink-purple flowers, and the leaves of the pitcher-plants (white with red veins in the commonest species, bright yellow in the next) add a dash of brilliant color to the summer landscape.

Lumbering was for a long time, and may be yet, the leading industry of this region, with naval stores second. Both reached their maximum probably about 25 years ago. In 1912 there were about 60 sawmills in operation, with an average capacity of 37,000 feet of lumber a day. Pine wood is the universal domestic fuel, and it was used for motive power on some of the railroads until quite recently. It is still used at ice-factories, power-houses, etc., in the smaller cities. Near Mobile charcoal for domestic use in the city is still made from the smaller or defective pines, as it has been for generations. Several of the shrubs, particularly the

gallberry and the two kinds of tyty, are important sources of honey. The herbaceous vegetation furnishes pasturage most of the year for thousands of cattle, which have free range on all unfenced land. (The same is true also of the lime-sink region, but not now of many other places in Alabama.)

ANIMALS.

Two characteristic animals deserve to be mentioned here. At many places in the long-leaf pine forests on the more sandy uplands, east of the Tombigbee River, one can see at any time of the year, but especially in early spring after the burning of the grass, small mounds of sand averaging a foot or two in diameter and a few inches high. These are made by the "salamander," a rodent, *Geomys Tuza Mobiliensis*, which travels underground, feeding on roots, and gets rid of the sand excavated from its tunnels by pushing it out from below without leaving an opening. In areas where it is abundant it keeps the soil pretty well stirred up and must counteract the leaching effect of the summer rain to a considerable extent. It ranges eastward with some variations to the Savannah River, but has never managed to cross the Tombigbee. It is rare in the red hills and unknown in the black belt, but reappears on the pine hills in the central part of the State. Open burrows with mounds of sand of about the same size at their mouths are made in the same general region by a turtle known as the gopher, *Testudo* or *Gopherus Polyphemus*, but that is much less abundant in Alabama.

POPULATION.

On account of the sandy soil not being very favorable to agriculture by the older methods, this region has always been sparsely settled. Previous to the Civil War the settlements were practically all either on the edges of the alluvial bottoms of the Mobile delta, where there were a number of large plantations, or along the shores of Mobile Bay, where fishing and commerce furnished a livelihood. The building of railroads, beginning shortly before the war, stimulated the lumber industry, which brought considerable wealth to some sections and some persons; and as the timber was removed, ways for making the soil more pro-

ductive were developed, so that farmers took possession of the cut-over lands quite rapidly.

Mobile was founded about 200 years ago, and has long been an important seaport, being at the mouth of a system of several hundred miles of navigable rivers traversing some very fertile territory; and it would probably be nearly as large as it is even if the country within fifty miles of it was an absolute desert. For this reason Mobile County is treated separately in most of the tables that follow, for to include it with the others in the region in computing the density of population would give very misleading results. And in some of the population tables separate calculations have been made for the city of Mobile and the rest of the county, which it will be seen does not differ much from Baldwin and Escambia; the other two counties used in the statistics of the southwestern pine hills.*

Table 13 shows the development of population in this region in somewhat more detail than was done for previous regions, mainly by adding two classes that are negligible in the other regions, namely, free negroes (up to 1860, soon after which all slaves became free) and foreign-born whites (first returned in 1850). For most of the census periods separate figures for the city of Mobile are available, and those have been utilized in the manner indicated. (The apparent decrease in population of the city between 1860 and 1880 is due to a reduction of its area in 1870.)

The large percentage of negroes in Baldwin County in ante-bellum days (there was no Escambia County until 1868) is doubtless due to the fact that the population was then largely concentrated on plantations situated on the edge of the Mobile River bottoms (which belong more properly to the region next to be described). Since the Civil War white farmers have steadily invaded the once despised sandy pine lands, cultivating the soil on a small scale with little or no hired labor, and the proportion of negroes has decreased considerably, as shown in Table 13 and also in Fig. 26. The percentage of foreigners in this region is and always has been far above the State average, probably mainly on account of its nearness to our principal seaport.

*Although the greater part of the area of Washington County is in this region, the population and agriculture are chiefly concentrated in the more fertile regions in the northern and eastern portions, so that census returns for the whole county tell us very little about conditions in either part.

TABLE 13.
Population statistics of southwestern pine hills.

	1910	1900	1890	1880	1860	1850	1840	1830	1820
BALDWIN AND ESCAMBIA COUNTIES:									
Inhabitants per square mile.....	15	9.7	7.0	5.7	4.0	2.3	1.5	1.2	0.8
Per cent native white.....	68	67	65	61	43	45	}		
Per cent foreign white.....	3.5	1.5	1.0	1.9	5.7	2.8	39	41	37
Per cent free colored.....	29	31	34	37	2.0	2.0	2.8	4.1	3.6
Per cent slaves.....					49	50	58	54	59
MOBILE COUNTY (excluding city):									
Inhabitants per square mile.....	24	19	16	15	9.5	5.7	4.9	2.5	
Per cent native white.....	57	51	52	48	}				
Per cent foreign white.....	2.2	2.9	3.4	4.6	65	61			
Per cent free colored.....	41	46	45	47	3.2	3.2			
Per cent slaves.....					32	36			
MOBILE COUNTY (total):									
Inhabitants per square mile.....	66	49	40	38	33	22	14	5.0	2.0
Per cent native white.....	53	50	50	48	50	44	}		
Per cent foreign white.....	3.5	4.4	5.4	8.0	18.8	17.8	62	55	62
Per cent free colored.....	43	45	44	44	2.9	3.4	4.2	8.7	6.9
Per cent slaves.....					28	34	33	36	31
CITY OF MOBILE:									
Total population.....	51521	38469	31076	29132	29258	20515	12672	3194	
Per cent native white.....	52	50	49	48	}				
Per cent foreign white.....	4.3	5.3	6.8	10.1	71	63			
Per cent free colored.....	44	44	44	42	2.8	3.5			
Per cent slaves.....					26	33			

The greater density of population in Mobile County outside of the city than in Baldwin and Escambia is due partly to suburbs belonging geographically but not politically to the city, partly perhaps to better railroad facilities, and partly to a perceptible concentration of population near the coast, which seems to be characteristic of all continents—where the coasts are not too precipitous or marshy or otherwise forbidding—on account of the fishing industries.

An interesting feature of the population, not well brought out by the above statistics on account of the way the county boundaries are drawn with respect to natural regions, is the presence of several hundred Indians, mostly in southwestern Monroe County, northern Baldwin, and western Escambia. The number returned at different censuses varies considerably, presumably because they have a considerable admixture of white blood and are not always recognized as Indians by the enumerators.* Some statistics of Indian farmers are given a few pages farther on.

Some fragmentary statistics for two classes of people not recognized at all by the census have been dug out of a Mobile directory for 1913. As nearly as one can judge by their family names, Jews constitute about 2 per cent of the white population or a little more than 1 per cent of the total population of Mobile. There are a few in the smaller cities, probably only a fraction of 1 per cent, and almost none in the rural districts, except for a few Russian Jews who have settled in recent years near Bay Minette.

Creoles are distinguished by a special symbol (but not defined) in the Mobile directory, and can therefore be counted pretty accurately. They constitute a little less than 1 per cent of the population of the city, and there are said to be quite a number of them in the southwestern part of Baldwin County, near Weeks's Bay and Bon Secour. They perhaps belong rather to the coast strip than to the pine hills, though.

In the last half century this region, presumably on account of the abundance of cheap cut-over lands, has been the scene of many colonization schemes, some of which have been very successful. Its population is probably the most cosmopolitan of any part of the State, outside of the larger cities. As long ago as 1880 the average American-

*The remarkable variations in number of Indians returned at different censuses since 1860 are shown in Table 26.

born resident of Baldwin and Escambia Counties lived 61 miles and of Mobile County 89 miles from his birthplace; and if we had similar figures for later censuses they would doubtless be higher, for the immigration from other regions and states in recent years has been very noticeable. (It would probably be safe to say that the majority of the adult inhabitants of the southern half of Baldwin County at the present time were born outside of Alabama.)*

In Baldwin and Escambia Counties in 1880 the immigration from outside of the State had been mainly from Florida, North Carolina, Georgia, South Carolina, Virginia and Mississippi, in the order named, while in Mobile County at the same period, as far as the census returns show, the order was Mississippi, Virginia, South Carolina, Georgia, Florida, North Carolina, Tennessee, Maryland, Kentucky. (No figures were given for Louisiana, because in the state of Alabama as a whole natives of Louisiana do not figure very prominently; but there can be little doubt that in Mobile County they were more numerous than some of the others just listed.)

The census of 1900 gives similar data for the city of Mobile (not the county), and for the two races separately, with the following results: Whites from Mississippi, Louisiana, Florida, Georgia, New York, Tennessee, Illinois, Kentucky, Ohio, Virginia, South Carolina, Missouri, North Carolina, Indiana, Texas. Negroes from Mississippi, Virginia, Georgia, Louisiana, North Carolina, Florida, South Carolina, Tennessee, Kentucky, Maryland, Texas, Missouri. In 1910 the races were not separated for this purpose, and the results for Mobile are as follows: Mississippi, Louisiana, Georgia, Florida, Illinois, Tennessee, New York, South Carolina, Ohio, Kentucky, North Carolina, Texas, Indiana, Missouri, Pennsylvania, Michigan, Wisconsin.

An interested reader can draw many curious deductions from these data, which must be passed over for lack of space. But attention should be called to the preponderance of North Carolinians over South Carolinians in Baldwin and Escambia Counties in 1880. The same state of affairs existed at the same time in the corresponding parts of

*A gentleman thoroughly familiar with Baldwin County estimates that the population of the southern half of the county consists of about 40% Southern whites, 40% Northerners, 5% foreigners, and 15% negroes. The Northerners are mostly from the north central states.

Georgia, and is probably correlated with the fact that the soils of North Carolina are a little poorer on the average than those of South Carolina, and a farmer moving to another state is apt to look for soils similar to what he has been accustomed to.

The principal foreign nationalities in 1910 in Baldwin, Escambia, and the rural districts of Mobile County were German, Swedish, Hungarian, English, Canadian, Irish, Italian, Austrian, Danish, Norwegian, Scotch, Greek, and Russian (the last probably mostly Jews). In the city of Mobile the order was German, Irish, English, Russian, Greek, Canadian, Norwegian, "Turkish" (probably mostly Syrian), Swedish, French, Scotch, Italian, Austrian, Danish, Hungarian. The Syrians seem to be mostly merchants, and there are a few of them in Bay Minette also.

The leading religious denominations in 1906 among the whites in Baldwin and Escambia Counties were Baptist, M. E. South, Catholic (mostly foreigners?), Episcopalian, Northern Methodist, Church of Christ, Disciples of Christ, and Presbyterian; and among the negroes Baptist, A. M. E. Zion, A. M. E., Primitive Baptist, and Colored Methodist. The corresponding data for the city of Mobile are quite different, certain denominations having their greatest strength in cities and others in rural districts, throughout the United States. Among the white churches in Mobile the largest are Catholic, Episcopalian, M. E. South, Baptist, Presbyterian, Jewish, Greek Orthodox, and Lutheran; and among the negroes, Baptist, A. M. E. Zion, A. M. E., C. M. E., and Catholic.

Cities, towns, etc.—The only city in this region specially treated as such by the census is Mobile, with 51,521 inhabitants in 1910.* The others all had less than 2,500 inhabitants then and were classed with the rural population, but they are growing rapidly, and several of them will doubtless be well over this arbitrary limit in this year's census. In order of population in 1910 the largest were Andalusia, with 2,480 inhabitants; Florala, with 2,439; Brewton, 2,185; Samson, 1,350; Atmore, 1,060; Citronelle, 935; Opp, 863; River Falls, 760; Bay Minette, 749; Pollard, 599; Fairhope, 590, and Flomaton, 539. Florala and Flomaton are partly

*The total population of Mobile for 1920 has been announced recently (May 15) as 60,124; but details of race, nativity, etc., may not be available for several months yet.

in Florida, as the names indicate, and if the population south of the State line was counted in it would swell the figures considerably.

Nearly all of these towns have a neat and prosperous appearance, owing largely to their comparative newness, and are supplied with electric lights, waterworks, banks, newspapers, etc. Brewton was once (and may be yet) reputed to be the richest town of its size in the State. Its wealth has sprung mostly from the lumber business. Fairhope, founded in 1894 by some Socialists and single-taxers from Iowa, has prospered greatly, and is said to be the most noted single-tax colony in the world. Besides the agricultural interests in the vicinity, it is beautifully located on a 40-foot bluff overlooking Mobile Bay, and is a popular sum-

FIG. 23. Comparatively new farm-house about two miles northwest of Bay Minette, with water-tank supplied by a gasoline engine, sweet potato field in foreground, and bananas near the house. October 31, 1919.

mer resort for Mobile people and a winter resort for northern people. Mobile has the usual industries and attractions of a seaport of that size, together with a balmy climate that makes it a favorite winter resort. The recent world war greatly stimulated the shipbuilding industry there.

Besides the well-developed towns, there are quite a number of interesting colonies of foreigners which may ultimately become important municipalities. Nearly all of these are in the southern half of Baldwin County, and their interests are mainly agricultural. One of the oldest and

largest is Elberta, settled by Germans. Next in importance is Silver Hill, settled in 1894 by Swedes, most of whom seem to have come not direct from Sweden but from the north central states. Newer and smaller colonies are those of Italians and of Greeks near Daphne, Russian Jews near Bay Minette, and Croatians near Perdido; and this probably does not exhaust the list. Quite recently it has been proposed to complicate matters still further by bringing to the same county some Russian Doukhobors from Canada, but this has met with some opposition. The development of these colonies in the next few decades should present some interesting sociological problems.

FIG. 24. Business portion of Stockton, an old settlement near the Tensaw River in northern Baldwin County. The large oaks give some idea of the age of the village. October 31, 1919.

The principal railroads are the Louisville & Nashville; Mobile & Ohio; Southern; Alabama, Tennessee & Northern; Gulf, Florida & Alabama; and Gulf, Mobile & Northern (formerly N. O., M. & C., and before that M. J. & K. C.)

The public roads are pretty good considering the sparse population, for sand and clay in the right amounts for surfacing them can be found nearly everywhere. The roads run mostly on divides, but in the southern part of Baldwin County, where the relief is slight, and the number of settlers from the prairie states considerable, there is a marked tendency to locate them on section lines, as in the plains and prairies of the West. This arrangement may save a little mental exertion in laying them out, but is regrettable because it makes any two places at opposite corners of a sec-

tion or township over 40 per cent farther apart than they would be in a straight line, and requires that much more expense for construction and maintenance of the roads.

AGRICULTURE.

The development of agriculture in this region makes one of the most interesting chapters in the economic history of Alabama, though it would not figure very prominently in an ordinary text-book of history, on account of the lack of striking events and of noted personages.

The poverty of the soil has already been mentioned. As late as 1880 only about 12 per cent of the area was included in farms, and a little over 1 per cent was in cultivation.

FIG. 25. Business portion of Silver Hill, a Swedish settlement in southern Baldwin County. (A much newer place than Stockton. Note the difference in number and size of shade trees.) November 1, 1919.

Raising cattle and sheep on open ranges was then the principal pursuit of the farmers, as indicated by the figures for live-stock in the following tables; and this region still leads the rest of the State in the number per farm of most kinds of animals. In recent decades the average size of farms has decreased rapidly, but the number of improved acres per farm has remained nearly stationary. The number of improved acres per inhabitant is very low, indicating at first the predominance of lumbering, fishing, grazing, etc., and latterly, especially in Mobile County, intensive farming. It reached a minimum about 1890, which is probably about the

time the lumber industry attained its maximum relative importance.

In ante-bellum days the only land that could be cultivated with profit for any length of time was river and creek bottoms, some of the more clayey uplands, and limited areas near cow-pens, where barnyard manure was available. Some farming was indeed attempted on the sandier soils, but such fields were usually exhausted and abandoned in a few years, and their owners moved away to new clearings. But in the last fifty or sixty years the discovery of valuable deposits of mineral fertilizers in various parts of the world, such as potash salts in Germany, phosphate rock in South Carolina, Florida and Tennessee, and sodium nitrate in Chile, has revolutionized agriculture on sandy soils throughout the world, and caused some phenomenal developments which are still in progress.* The total area cultivated in the southwestern pine hills, and in similar areas in neighboring states, about trebled in the thirty years from 1880 to 1910, and the returns from this year's census will doubtless show a still further increase, despite the shortage of fertilizers caused by the recent war. (Even without fertilizers it ought to be possible to produce crops that take little or nothing from the soil, like turpentine, huckleberries, honey, butter and sugar.)

The main features of agricultural development in this region are shown in Tables 14 to 16, in which conditions in Baldwin and Escambia Counties are contrasted with those in Mobile County, to illustrate the influence of a large city on farming. In Table 15, unlike the preceding ones, the percentage of foreign white farmers is given. It should be borne in mind that the figures for Baldwin County at the earlier censuses are not very representative, because most of the farms in that county at first belonged to the region next to be described.

Especially noteworthy here are the small number of cultivated acres per farm, the farm building values considerably above the State average (indicating prosperity and progressiveness), the numerous domestic animals, the preponderance of horses over mules (even among the negro farmers), the rather large percentage of foreign-born farmers and of farm owners, the high expenditures for fertili-

*For details see the article on development of agriculture in the pine-barrens, cited in the introduction (page 21).

TABLE 14.
Farm equipment in southwestern pine hills, 1850-1910.

BALDWIN AND ESCAMBIA COUNTIES	1910	1900	1890	1880	1860	1850
Percentage of land in farms.....	17	10	10	15	7	4
Percentage of land improved.....	4.6	2.2	1.1	1.0	0.8	0.5
Improved acres per inhabitant.....	2.0	1.5	1.0	1.2	1.3	1.4
Av. number of acres per farm.....	80	94	171	370	443	382
Av. improved acres per farm.....	22	22	19	24	54	50
Av. value of land per farm (\$)	1109	430	720	630	2500	995
Av. value buildings per farm.....	436	253				
Av. value implem'ts & mach'y.....	74	48				
Average value of livestock.....	312	318	365	505	1570	1259
Number of slaves per farm.....					19.7	18.3
Number of horses.....	1.0	1.4	1.5	1.5	2.7	3.8
Number of mules.....	0.4	0.3	0.3	0.3	3.1	4.0
Number of dairy cows.....	2.7	3.4	6.2	9.9	28.3	32.3
Number of work oxen.....	6.8	2.4	1.6	2.6	2.1	3.1
Number of other cattle.....		9.8	15.4	18.7	55.4	79.5
Number of sheep.....	7.2	19.4	33.1	33.5	19.7	34.6
Number of goats.....	1.7	3.6				
Number of hogs.....	10.9	11.4	18.2	19.8	47.3	49.5
Number of chickens.....	24.4	31.5	41.1	22.4		
Number of other poultry.....		2.8	5.5	6.1		
Number of colonies of bees.....	0.8	1.3				
MOBILE COUNTY	1910	1900	1890	1880	1860	1850
Percentage of land in farms.....	18	13	12	9	18	6
Percentage of land improved.....	2.8	2.2	1.5	1.3	1.3	0.6
Av. number of acres per farm.....	113	121	177	128	383	178
Av. improved acres per farm.....	17	20	23	20	28	20
Av. value land per farm (\$)	1745	1032	1215	908	3220	1990
Av. value buildings per farm.....	763	575				
Av. value implem'ts & mach'y.....	101	95				
Average value of livestock.....	449	326	367	345	1059	950
Number of horses per farm.....	1.4	1.7	1.8	1.4	2.6	3.8
Number of mules.....	0.3	0.4	0.5	0.5	1.6	1.3
Number of dairy cows.....	3.6	2.9	5.6	5.1	10.9	9.7
Number of work oxen.....	13.0	0.8	1.1	0.9	2.2	0.9
Number of other cattle.....		6.5	11.0	5.8	22.3	27.2
Number of sheep.....	8.4	11.0	17.6	6.6	13.9	3.9
Number of goats.....	3.7	5.5				
Number of hogs.....	8.2	6.4	13.2	9.4	28.4	20.6
Number of chickens.....	32.6	32.9	38.2	20.8		
Number of other poultry.....		1.3	2.5	2.5		
Number of colonies of bees.....	0.9	1.2				

TABLE 15.

Farm expenditures, receipts, etc., in southwestern pine hills, 1880-1910.

	BALDWIN AND ESCAMBIA COUNTIES				MOBILE COUNTY			
	1910	1900	1890	1880	1910	1900	1890	1880
Per cent white farmers { native foreign	71.5	80.0			69.0	88.8		
Per cent negro farmers	11.1				8.7			
Per cent of farms operated by owners and part owners	17.3	20.0			22.3	11.0		
Expenditure for fertilizers, per farm (\$)	80.9	86.5	88.0		87.0	89.0	88.9	
Expenditure for labor per farm	45	20	23	9	102	80	137	65
Expenditure for feed per farm	30	19			98	55		
Expend. for fertilizers per acre improved	28				108			
Expend. for labor per acre improved	2.09	0.88	1.25	0.35	5.92	3.99	6.00	3.21
Expend. for feed per acre improved	1.37	0.84			5.65	2.76		
Average value of crops, per farm	1.30				6.24			
Average value of animal products, per farm	416	278	327	509	710	487	910	548
Value of crops per acre improved	106				195			
Value of animal products per acre improved	19.20	12.45	17.60	20.30	41.00	24.20	39.70	27.10
Value of farm land per acre	4.90	4.58			11.30	8.53		
	13.80				15.40			

TABLE 16.
Agricultural statistics of southwestern pine hills by race and tenure, 1910.

	BALDWIN AND ESCAMBIA COUNTIES				MOBILE COUNTY			
	Whites	Negroes	Owners	Tenants	Whites	Negroes	Owners	Tenants
Percentage of native white farmers.....			71.8	70.3			68.5	72.2
Percentage of foreign white farmers.....			12.9	3.6			8.9	5.8
Percentage of negro farmers.....			15.3	26.0			22.6	21.9
Percentage of owners and part owners.....	82.8	71.3			86.6	88.1		
Percentage of tenants.....	17.0	28.5			12.2	11.9		
Average number of acres per farm.....	88	40	87	40	128	62	113	105
Average improved acres per farm.....	23	16	22	21	20	8	16	17
Value of farm land per acre (\$)	14.00	11.80			16.15	10.53		
Value of farm land per farm.....	1237	468			{ 2061	652		
Value of buildings per farm.....	478	233		1027	{ 910	252	2275	3080
Value of implements and machinery per farm.....	82	33	1552		119	40		
Number of dairy cows per farm.....	2.8	1.8			4.1	1.8		
Number of work horses per farm.....	1.0	0.8			1.5	0.8		
Number of work mules per farm.....	0.4	0.2			0.4	0.2		
Acres of cotton per farm.....	6.0	5.7			0.8	0.2		
Bales per acre.....	0.34	0.30			0.42	0.45		
Acres of corn per farm.....	6.9	4.7			5.0	2.1		
Bushels per acre.....	13.3	11.4			21.1	17.4		

zers, labor and feed (indicating intensive farming), and the value of crops per acre. The value of livestock per farm has decreased, but only in about the same ratio as the size of farms. In the preponderance of horses over mules this region differs from those previously described, but resembles most parts of Florida; probably chiefly on account of the large extent of free range.

The percentage of foreigners is larger among the farmers than among the total population, which is a little unusual, while the reverse is true of the negroes, in accordance with the general principle already pointed out, that the numbers of the two races are more nearly equal in town than in the country. The large percentage of owners is doubtless correlated with the cheapness of the land, as may be observed in many other states.

The separate tables for Mobile County bring out some significant facts. The existence of a large local market encourages truck farming and dairying, and makes the farms smaller but more valuable than in the other counties. Raising early vegetables for northern markets is also favored by the existence of a considerable area of nearly level and easily tilled land close to the Bay, with milder winters than in any part of the State farther inland. The intensity of the farming around Mobile is well shown by the high expenditures and the correspondingly high crop values in Mobile County. But like most other Alabama counties, this is inconveniently large for geographical statistics, and if we only had separate returns for the southern or the eastern half of it the contrasts would be still greater.

Statistics for Indian farmers are too fragmentary to put in the tables, but on subtracting the returns for negro farmers in 1910 from those for total colored in Clarke, Monroe, Escambia and Covington Counties it appears that in 1910 there were in those counties 50 Indian farmers,* with an average of 145 acres owned or rented and 27 improved, land worth \$1,112 per farm, buildings \$354, and implements and machinery \$165. The figures for buildings and machinery seem rather high, but may indicate errors in the census.

The leading crops in Baldwin and Escambia Counties in 1909, in order of value, were cotton, corn, sweet potatoes, "vegetables," hay, Irish potatoes, strawberries, oats, tobac-

*The census credits Washington County with 172 Indians but no Indian farmers, strange to say.

co, peanuts, peaches, and figs. In Mobile County the order was quite different, namely, "vegetables," Irish potatoes, corn, sweet potatoes, hay, sugar-cane, cotton, pears, tobacco, strawberries, figs, cowpeas, pecans. The leading "vegetables" in that county, in order of *acreage*, according to unpublished census data obtained in Washington, were cabbage, green beans, watermelons, sweet corn, tomatoes, green peas, cantaloupes, onions, and asparagus.

There are many groves of Satsuma oranges in the southern parts of both coast counties, and the acreage devoted to this crop seems to have increased considerably since 1910. Numerous other crops are being experimented with by new settlers, and there is no telling which ones may become of considerable importance hereafter.

A fact worth mentioning here is that two of the sixteen creameries operating in Alabama in 1919 were in the southern part of Baldwin County. Along some of the roads leading to Fairhope nearly every farm has a stand or receptacle for milk-cans at its gate.

TABLE 17.

Census returns of manufacturing in Mobile, 1909.

INDUSTRIES.	Number.	Persons engaged.	Horse-power used.	Capital.	Value added by mfg.
Printing and publishing.....	20	278	218	\$ 271,047	\$ 308,925
Lumber and timber.....	18	558	2319	1,031,993	443,741
Bakeries	12	122	88	86,191	100,709
Tobacco	10	122	0	67,999	86,781
Foundries and machine shops.....	6	230	471	401,179	201,889
Copper, tin and sheet iron.....	6	?	?	?	?
Mineral and soda waters.....	5	?	?	?	?
Ice	5	45	834	279,549	63,443
Flour and grist mills.....	5	44	258	265,829	113,978
Wagons and carriages.....	4	46	38	43,249	38,152
Coffee roasting and grinding.....	4	?	?	?	?
Confectionery	3	14	0	9,305	12,599
Marble and stone work.....	3	33	103	52,314	31,585
Ship and boat building.....	3	?	?	?	?
All others	22	?	?	?	?
Total.....	126	2828	5845	5,250,102	2,490,043

MANUFACTURING.

In recent censuses there are returns of manufacturing for each state, and for cities of 25,000 inhabitants or more, but not for counties. Mobile is the only city of that class in southern Alabama, and Table 17 indicates the condition of its manufactures in 1909, as far as can be ascertained from the census. Of course some of these industries, such as printing and baking, are not manufacturing in the proper sense of the word, but necessary adjuncts of every city; but the census is here taken literally. The shipbuilding industry has grown considerably in recent years, as stated previously.

6. The Mobile Delta

From the confluence of the Alabama and Tombigbee Rivers to the head of Mobile Bay, a distance of about 40 miles in a straight line, extends a swampy region covering some 200 square miles, which is essentially a delta, though by no means a typical one in shape, being hemmed in on both sides by high land. It is almost entirely surrounded by the pine hills just described, and if it was a little smaller it might be regarded merely as a river-swamp within that region. But it has some peculiarities that are due more to its proximity to the coast than to the nature of the adjacent country, so that it seems best to treat it separately.

The whole areas of course lies close to sea-level, but the banks of the channels, which are the highest points, may be 15 or 20 feet above sea-level at the upper end of the delta. The Mobile River on the west side and the Tensaw on the east are both navigable (the former is preferred by river steamboats to and from the interior of the State), and they are connected by a labyrinth of smaller channels. The water is always muddy, but it cannot fluctuate much with the seasons, on account of the nearness of the Gulf of Mexico. The influence of the daily tide is perceptible the whole length of the delta, except perhaps in very rainy seasons.

The soil is all alluvial in origin, and very fertile in the upper part of the delta, but toward the bay, where the water-level varies little and the soil or muck is perpetually saturated, there is a considerable proportion of evergreens in the forest, indicating unfavorable soil conditions, such as

relatively unavailable potash. The principal soil texture classes are swamp, clay, silt loam, clay loam and fine sandy loam.

VEGETATION.

Nearly the whole area is covered with dense forests, except near the bay, where the water is a little brackish and open marshes prevail. The writer's observations have been limited to the vicinity of the L. & N. R. R., which crosses the delta as near as possible to its lower end. The commonest plants along there seem to be as follows:

Commonest plants in Mobile delta.

TIMBER TREES.

Nyssa biflora	Black gum
Magnolia glauca	Bay
Taxodium distichum	Cypress
Liquidambar Styraciflua	Sweet gum
Acer rubrum	Red maple
Nyssa uniflora	Tupelo gum
Fraxinus sp.	Ash

SMALL TREES.

Salix nigra	Willow
Populus heterophylla	Cottonwood

SHRUBS AND VINES.

Cephalanthus occidentalis	
Myrica cerifera	Myrtle
V Smilax laurifolia	Bamboo vine
Sabal glabra	Palmetto
Phoradendron flaves-	
cens	Mistletoe
Itea Virginica	
V Ampelopsis arborea	
V Smilax Walteri	Bamboo vine

HERBS.

Phragmites communis	Reed-grass
Cladium effusum	Saw-grass
Spartina polystachya	(A grass)
Tillandsia usneoides	Spanish moss
Sagittaria latifolia	
Scirpus validus	Bulrush
Oxypolis filiformis	
Panicum virgatum	(A grass)
Typha latifolia	Cat-tail
Pontederia cordata	Wampee?
Sium cicutaefolium	
Zizania aquatica ?	Wild rice
Nymphaea fluviatilis	Bonnets

Sagittaria lancifolia
Osmunda regalis(A fern)
Saururus cernuusLizard's tail
Vigna luteola
Cicuta Curtissii
Eupatorium purpureum
Scirpus virens
Scirpus Eriophorum
Dryopteris Thelypteris...(A fern)
Mikania scandens
Eryngium Virginianum?
Mesosphaerum rugosum
Onoclea sensibilis(A fern)
Triadenum petiolatum
Commelina hirtella
Boehmeria cylindrica
Panicum gymnocarpon....(A grass)

Many of the trees, especially the black gum, have rather crooked trunks, presumably indicating slow growth. The herbs are chiefly confined to the marshes. Farther upstream the conditions doubtless approach those of ordinary alluvial swamps, with larger and straighter trees representing more species, and more vines and fewer shrubs and herbs. The cypress and some of the other trees furnish the basis for a considerable lumber industry, which bids fair to continue a long time, for most of the area seems unsuited for any other purpose than growing timber. A bung factory near Tensaw, a veneer mill near Stockton, and several large sawmills on the outskirts of Mobile, get their timber supply from this delta.

POPULATION AND AGRICULTURE.

The ancient river-bottom farms of Baldwin County have been mentioned already, and considerable additional information about them can be found in the soil survey of that county, mainly under the head of "Ocklocknee clay." Much of the land formerly cultivated toward the head of the delta is said to have been abandoned, however. There has never been any population worth mentioning, for the owners of the alluvial farms lived on the neighboring uplands. Hal's Lake, near the head of the delta in Clarke County, is said to have been the refuge for a time of a small band of fugitive slaves. In addition to cultivating some of the bottoms, farmers can reap a little additional profit from the delta by letting their hogs range the swamps in search of acorns, etc.

7. The coast strip.

(Table 18.)

Along the Gulf coast from the mouth of the Ocklocknee River in Middle Florida to the Pearl River in Mississippi is a narrow and more or less interrupted strip of islands, beaches, dunes and marshes, which together with the shores of the neighboring mainland forms a region differing notably in soil, vegetation, and economic features from anything in the interior. The shores of Mobile Bay at least as far up as Point Clear should be put in the same category. The inland boundary of the coast strip is ill-defined, but the region covers something like 100 square miles in Alabama.

A large part of the area above tide-level is occupied by beaches and dunes of quartz sand, most of which is now stationary, i. e., not shifted perceptibly by the wind. The dunes do not reach any great height on our coast, fifteen or twenty feet being perhaps a maximum. The soil of the oldest stationary dunes is extremely sterile, dazzling white in the sunlight, nearly all the soluble matter having been leached out long ago by the copious warm summer rains. In the moving dunes close to the outer beaches the sand has a pale buff color, not having had so much time to leach since it was thrown up by the waves, and it contains a small proportion of shell fragments and other impurities. On the shores of some of the bays and estuaries are mounds of oyster shells, supposed to represent the "kitchen middens" of some prehistoric race of men. In shallow bays well protected from wind and fresh water there are small areas of salt marsh.

CLIMATE.

Being adjacent to the pine hills the climate does not differ much from that of that region, but on account of its being immediately adjacent to the Gulf of Mexico and only a little more than 30° from the equator, this is the warmest part of Alabama, especially in winter. Snow and ice are almost unknown. It happens to be also the rainiest part of the State, especially in late summer, and also the windiest, being on the coast.

VEGETATION.

The outer or moving dunes, as well as the salt marshes, are essentially treeless, and the vegetation of both consists

largely of coarse grasses, sedges and rushes. The stationary dunes nearest the sea have little or no grass, but instead a sparse growth of gnarled evergreen small trees and shrubs, while some that lie a mile or so inland and are more protected from the wind have a more luxuriant vegetation of the hammock type. Damp sandy flats among and behind the dunes are sometimes wooded with slender slash pines, among which in places supplied with fresh water may be a dense growth of tyty and other tall evergreen shrubs. On the loamy shores of bays and estuaries, and on and near shell mounds, are a few trees that prefer richer soil, such as cedar and sweet gum, and often a few leguminous plants (which are generally conspicuous by their absence on the white sand of the old dunes). Fire is a negligible factor in the coast strip, partly because in most places there is not enough grass to carry a fire, and partly because the area is so cut up by waterways that even if a fire should start it would not have a chance to spread very far.

It is hard to draw a sharp line between the coast strip and the pine hills, and also to determine the relative abundance of the different species of plants in such a small and diversified area; but the following list is based on the dunes, salt marshes and shell mounds, and a few hammocks, swamps, and pine flats mingled with them. The writer's observations in this strip have been chiefly confined to Baldwin County, but the corresponding part of Mobile County probably differs very little.

Commonest plants of coast strip.

TIMBER TREES.

Pinus Taeda	Short-leaf pine	Bay shores mostly.
Pinus Elliottii? *	Slash pine	Damp flats.
Nyssa biflora	Black gum	Swampy spots.
Quercus Virginiana	Live oak	Bay shores mostly.
Magnolia grandiflora	Magnolia	Hammocks.
Juniperus Virginiana	Cedar	Bay shores and shell mounds.
Quercus nigra	Water oak	Low woods.
Liquidambar styraciflua	Sweet gum	Bay shores mostly.
Hicoria glabra	Hickory	Hammocks.
Taxodium distichum	Cypress	Swampy spots.
Quercus laurifolia		Hammocks.
Acer rubrum	Red maple	Swampy spots.
Pinus clausa	Spruce pine	Stationary dunes.
Taxodium imbricarium	Cypress	Swampy spots.
Magnolia glauca	(White) bay	Swampy spots.

*P. Caribaea probably occurs here also, if that is a distinct species.

SMALL TREES.

<i>Cornus florida</i>	Dogwood	Hammocks.
<i>Ilex opaca</i>	Holly	Hammocks.
<i>Persea pubescens</i>	Red bay	Swampy spots.
<i>Osmanthus Americanus</i>		Hammocks.
<i>Viburnum rufidulum</i>	Black haw	Hammocks.

LARGE SHRUBS AND VINES.

<i>Ilex vomitoria</i>	Yaupon	Hammocks, etc.
<i>Myrica cerifera</i>	Myrtle	Marshes, swamps, hammocks.
<i>Callicarpa Americana</i>	French mulberry	Hammocks, etc.
<i>Quercus myrtifolia</i>	(Scrub) oak	Stationary dunes.
<i>Cyrilla racemiflora</i>	Tyty	Bay shores, etc.
<i>V Smilax laurifolia</i>	Bamboo vine	Swampy spots.
<i>Quercus geminata</i>	(Scrub) live oak	Stationary dunes.
<i>Batodendron arboreum</i>	Sparkleberry	Hammocks.
<i>Rhus copallina</i>	Sumac	Hammocks, etc.
<i>V Vitis rotundifolia</i>	Muscadine	Hammocks, etc.
<i>Hamamelis Virginiana</i>	Witch hazel	Hammocks.
<i>Baccharis angustifolia</i>		Marshes.
<i>V Smilax auriculata</i>		Dune thickets.
<i>Cliftonia monophylla</i>	Tyty	Swampy spots.
<i>Alnus rugosa</i>	Alder	Swampy spots.

SMALLER SHRUBS.

<i>Serenoa serrulata</i>	Saw palmetto	Stationary dunes.
<i>Chrysoma paucifloscu-</i> <i>losa</i>		Dry sands.
<i>Pieris nitida</i>	Hurrah bush	Swampy spots.
<i>Sabal glabra</i>	Palmetto	Miry shores, etc.
<i>Ilex glabra</i>	Gallberry	Damp sand.
<i>Clinopodium coccineum</i>		Dry sands.
<i>Ceratiola ericoides</i>	Rosemary	Stationary dunes.
<i>Conradina canescens</i>		Stationary dunes.
<i>Batis maritima</i>		Marshes.
<i>Vaccinium nitidum</i>	Huckleberry	Dune hollows.
<i>Hypericum aspalath-</i> <i>oides</i>		Dune hollows.
<i>Polygonella sp.</i>		Stationary dunes.
<i>Vaccinum virgatum?</i>	Huckleberry	Hammocks.

HERBS.

<i>Cladium effusum</i>	Saw-grass	Fresh marshes.
<i>Juncus Roemerianus</i>	Round rush	Brackish marshes.
<i>Tillandsia usneoides</i>	Spanish moss	Hammocks, etc.
<i>Sagittaria lancifolia</i>		Fresh marshes.
<i>Scirpus validus</i>	Bulrush	Fresh marshes.
<i>Uniola paniculata</i>	Sea oats	Shifting dunes.
<i>Spartina polystachya</i>	(A grass)	Brackish marshes.
<i>Oenothera humifusa</i>		Drifting sands.
<i>Cyperus dentatus?</i>	(A sedge)	Damp sand.
<i>Typha latifolia</i>	Cat-tail	Fresh marshes.
<i>Eryngium yuccifolium</i>		Fresh marshes.
<i>Spartina juncea</i>	(A grass)	Salt marshes.
(<i>Diodia teres</i>)	Poor Joe	Bay shores, etc.

Hydrocotyle Bonariensis		Bay shores.
Osmunda regalis	(A fern)	Swampy spots.
Saururus cernuus		Swampy spots.
Elephantopus tomentosus		Hammocks.
Cenchrus tribuloides	Sand-spur	Bay shores.
Polypodium polypodioides	(A fern)	On trees in hammocks.
Opuntia Pes-Corvi	Prickly pear	Stationary dunes.
Actinospermum angustifolium		Stationary dunes.
Rhynchospora dodecandra	(A sedge)	Sandy hammocks.
Fimbristylis spadicea	(A sedge)	Dune hollows, etc.

At least nine-tenths of the woody plants and most of the herbs are evergreen, presumably because they cannot get enough food from the sandy soil to make a complete new set of leaves every year, as most plants in fertile soils do.* The trees are mostly too small and crooked for lumber, though a few of them from their very crookedness and toughness find a limited use for boat knees, etc. Before the days of iron ships the live oak was especially sought after by shipbuilders. The grass furnishes a small amount of forage for cattle, and some of the shrubs have flowers that yield honey.

POPULATION AND INDUSTRIES.

There is no way of estimating the population without an actual count, and even then one would encounter great difficulties in determining the boundaries of the region and allowing for seasonal migrations. But it can be safely asserted that the population is much denser than that of the pine hills. Along the eastern shore of Mobile Bay the number of houses probably averages at least a dozen to the mile, and they are nearly as numerous on some other parts of the coast. The amount of agriculture is insignificant, and the principal occupations of the people seem to be fishing and oystering and catering to the wants of summer and winter visitors. There are a few gardens in favorable spots, though, and small herds of cattle graze on some of the islands.

*Some might ascribe the large proportion of evergreens to the mild winters; but evergreens are equally abundant in the far north, where the soil is frozen most of the year, and on sterile soils in all climates.

Some idea of the size of the fishing industry may be gathered from a special report on fisheries published by the Census Bureau in 1911, and covering the year 1908. In that Alabama is divided into two districts, the Tennessee River and the Gulf of Mexico district. The latter includes the Alabama and Tombigbee Rivers as well as Mobile Bay and the neighboring Gulf, but the value of the river fisheries is probably much less than that of the coastal waters, and anyway we can omit from the returns the strictly fresh-water species. Some of the results of the investigation are shown in Table 18.

TABLE 18.

Census returns of fisheries of the Gulf district of Alabama, 1908.

Persons engaged:	
Proprietors and independent fishermen.....	747
Wage-earners	221
Salaried employees	4
<hr/>	
Expenses:	
Salaries	\$5,200
Wages (including rations).....	95,000
<hr/>	
Capital invested:	
Vessels and outfits (61).....	\$120,000
Boats (581)	33,000
Tackle	19,000
Shore and accessory property.....	63,000
Cash	17,000
<hr/>	
Value of products:	
Fish	\$177,000
Oysters (590,000 bu.).....	173,000
Crabs and shrimp.....	7,300
Turtles	600
<hr/>	
Total.....	\$357,900

The principal species of fish, in order of value, were red snapper (from the deep sea only), mullet (mostly along shore), squeteague, channel bass, and catfish.

GENERAL DISCUSSION

In the following pages the various kinds of resources will be taken up one after another for the area as a whole, and illustrated as far as possible by graphs and tables which will serve to facilitate comparison between different regions and bring out some fundamental general principles. Most of the facts will be the same as have already been presented in the regional descriptions, but being arranged in an entirely different order, the repetition involved probably will not be objectionable. In most of the tables from here on the highest number in each line is printed in heavy type, so that one can run down the columns and see at a glance what each region leads in. (But for the typographical impracticability of using three kinds of type in the same line, the lowest figures would have been printed in italics, for a similar reason.)

Stratigraphy.

The area under consideration includes strata ranging in age from late Cretaceous to Recent, lying one above another in the order shown in the following synopsis.

Geological formations of southern Alabama, in descending order.

Recent.	Dunes, marshes, alluvium, etc.				
Quaternary. Pleistocene.	River terraces and second bottoms.				
Tertiary	{	Pliocene?	Citronelle or Grand Gulf clays and sands.		
		Miocene	(Some marine Miocene penetrated in deep wells, but not recognized at the surface.)		
		Oligocene?	St. Stephens white limestone.		
			(Lower part now referred to Jackson division of the Eocene.)		
	{	Eocene	{	Claiborne	{ Gosport (greensand)
					{ Lisbon
					{ Tallahatta (Buhrstone)
			{	Wilcox, or Chickasaw (Lignitic)	{ Hatchetigbee
					{ Bashi, or Wood's Bluff
					{ Tuscahoma, or Bell's Landing
				{ Nanafalia	
				{ Naheola, or Matthews Landing	
				{ Sucarnochee, or Black Bluff	
				{ Clayton limestone, including "Nautilus rock" and "Turritella rock."	
Cretaceous?				Providence sand	

The Tertiary strata dip southward at an average rate of about 30 feet per mile (an important point to remember when drilling for water or oil), so that the oldest ones crop out farthest inland. A notable exception to the general southward dip is found in the Hatchetigbee anticline, a gentle fold or uplift in the region of the lime hills, which brings to the surface strata as low down as the Hatchetigbee, several miles south of their main outcrop, where they would normally be a few hundred feet below the surface. This fold makes an outlying range of small "mountains," with several mineral springs, salt wells, and other curiosities. There are less conspicuous anticlines, accompanied by a little faulting, and causing some irregularities of outcrop, near Lower Peach Tree on the Alabama River and Jackson on the Tombigbee.

The outcrops of coastal plain strata in Alabama that are recognizable by their fossils or lithological characters are very limited in extent, the greater part of the surface being covered by thoroughly weathered residual material, which looks much the same over many different formations, or by non-fossiliferous beds like the Citronelle, Lafayette and Columbia (the existence of the two last is now questioned by some geologists), and second-bottom deposits, so that the exact boundaries of the different formations between the rivers must always remain more or less hypothetical, and several points are still in dispute. For this reason no attempt has been made to provide a geological map for this report; but on comparing the regional map herein with various geological maps hitherto published by this Survey, a pretty close correspondence will be observed, except in a few of the southernmost counties, where rock outcrops are very scarce.

Economic Geology.

The Pleistocene and Recent formations contain an abundance of sand and clay suitable for mortar, brick, road material, etc., and in some places pebbles which can be used for concrete or on roads. The ferruginous sandstone extensively used for chimneys and pillars in the rural districts may represent material of almost any age, but it is essentially a surface phenomenon, formed in comparatively recent (perhaps Pleistocene) time by the action of ground water containing iron compounds which cement the sand

grains together. It seems to be entirely absent from calcareous regions. The St. Stephens limestone is believed to be good for cement making, but its principal use is for chimneys. It is easily sawn into blocks of any desired size, and lasts indefinitely in our mild climate. The Buhrstone and a few other kinds of Eocene rock are also used for chimneys and pillars, wherever they occur at the surface in sufficient quantity. In the lime-sink region the St. Stephens formation is mostly transformed into a chert-like rock, which ought to be good road material.

Some of the Tertiary formations, particularly in the western half of the State, contain more or less lignite, pyrite, iron sulphate, alum, greensand, marl, and other useful minerals, but not usually in sufficient quantity to make their exploitation profitable. In the last two years or so, however, a company in Demopolis has built up a large business in medicines made from a ferruginous deposit in the Hatchetigbee formation, at Hatchetigbee Bluff on the Tombigbee River.

There are several mineral springs and salt wells and springs in the neighborhood of the Hatchetigbee anticline, as already stated, and small quantities of natural gas have been obtained from deep wells there, and also farther south, even near Mobile. The best known mineral springs are Cullom, Bladen, and Healing Springs, all within a few miles of each other in Choctaw and Washington Counties. During the Civil War considerable salt was made from brine springs and wells in the southern part of Clarke County.

The important artesian water-bearing strata are the Pliocene, Claiborne, Hatchetigbee and Nanafalia; and deep wells near the inland edge of the area obtain water from the Cretaceous beds. Flowing wells can be obtained almost anywhere near the coast and larger rivers, but not usually on the uplands. The surface sands furnish many small springs of pure water, one of which constitutes part of Mobile's water supply. The best surface water is found in the southern and eastern parts of the area, where the summer rain is heaviest and the soils poorest.

Soils.

Our knowledge of the chemical composition of the soils is rather meager, because making soil analyses is a tedious process. The best analyses available are those made by

Hilgard's five-day acid digestion method, and published in Dr. Smith's agricultural report of 1883 (and also about the same time in the sixth volume of the Tenth Census, pp. 81-83). They represent only a few localities in each region, and none at all in some. The descriptions of the samples are given below, and the results of the analyses (omitting a few of the less important constituents) in Table 19.

Post oak flatwoods.

1. Flatwoods soil 4 miles west of Livingston, Sumter County. Vegetation post oak, red oak, hickory, and short-leaf pine.

2. Flatwoods clay 6 miles south of Linden, Marengo County. Depth 10 inches. Vegetation mostly post oak.

Red hills, western division.

3. "Lime hills" 10 miles west of Lower Peach Tree, Wilcox County. Depth 8 inches. Vegetation mostly beech, hickory, short-leaf pine, oaks, ash, poplar, sweet and sour gum, holly, etc.

4. Alabama River second bottoms near Lower Peach Tree, Wilcox County. Depth 9 inches. Vegetation sweet gum, short-leaf pine, poplar, Spanish, red and white oaks, haw, and hackberry.

Lime hills.

5. Black shell-prairie, in Sec. 9, T. 8 N., R. 3 W., Washington County. Depth 8 inches. Vegetation dogwood, white and black oaks, sweet gum, ash, short-leaf pine, etc.

6. Upland brown loam 6 miles north of Gosport, Clarke County. Depth 10 inches. Vegetation post, red, black and Spanish oaks, short and long-leaf pine, and hickory.

7. Second bottom of Murder Creek, 2 miles west of Evergreen, Conecuh County. Depth 12 inches. Vegetation sweet gum, magnolia, white and water oaks, and short-leaf pine.

Red hills, eastern division.

8. Cultivated sandy upland near Clayton, Barbour County. Depth 1 foot. Original vegetation post oak, black-jack, hickory, dogwood, and short-leaf pine.

9. Sandy loam upland near Lawrenceville, Henry County. Depth 10 inches. Vegetation red, Spanish and post

TABLE 19.
Chemical analyses of eleven South Alabama soils.

	Post oak flatwoods.		Western red hills.		Lime hills.					Eastern red hills.			
	1	2	3	4	5	6	7	8	9	10	11		
Insoluble matter	67.02	72.75	75.55	86.51	21.66	87.75	89.87	95.09	95.11	91.97	90.82		
Soluble silica	10.05	8.93	1.13	3.27	1.75	3.09	1.59	1.91	1.16	1.91	1.58		
Potash (K ₂ O)	0.29	0.42	0.17	0.17	0.55	0.14	0.14	?	0.21	0.08	0.17		
Soda (Na ₂ O)	0.13	0.11	?	0.07	0.19	0.01	0.02	0.01	0.10	0.01	0.04		
Lime (CaO)	0.20	0.08	0.18	0.22	29.19	0.10	0.09	0.01	0.06	0.11	0.09		
Magnesia (MgO)	0.61	0.69	0.01	0.06	0.49	0.07	0.02	0.06	0.04	0.09	0.03		
Brown oxide of manganese (Mn ₂ O ₄)	0.11	0.11	0.03	0.18	0.11	0.05	0.07	0.13	0.13	0.04	0.11		
Ferric oxide (Fe ₂ O ₃)	6.54	12.41	5.55	1.78	5.42	2.00	2.38	0.60	0.80	1.43	1.14		
Alumina (Al ₂ O ₃)	10.20	2.47	7.77	2.29	5.16	3.40	3.35	1.39	0.70	1.84	3.02		
Phosphoric acid (P ₂ O ₅)	0.21	0.10	0.23	0.20	0.37	0.12	0.12	0.03	0.10	0.11	0.11		
Sulphuric acid (SO ₃)	0.03	0.06	0.06	0.07	0.46	0.01	0.01	Tr.	0.02	0.01	0.07		
Volatile matter	5.03	1.91	8.92	4.51	12.84	3.08	2.48	0.44	2.01	2.14	2.77		
Total	100.42	100.03	99.62	99.34	100.38	99.81	100.16	99.67	100.43	99.75	99.94		

(The numbers in bold face type are the highest in each line, as explained on page 92.)

oaks, black-jack, hickory, chestnut, (black?) gum, short-leaf pine, with some long (or Spanish) moss.

10. Brown loam uplands 5 miles southeast of Troy, Pike County. Depth 8 inches. Vegetation red oak and a few short-leaf pines.

11. Upland pine woods 13 miles east of Andalusia. Depth 10 inches. Vegetation long-leaf pine, post, Spanish, black-jack and upland willow oaks, and hickory.

The amounts of potash, lime and phosphoric acid are probably the most significant, and are greatest in the most fertile soils. Sulphur is also important, especially to leguminous plants. Nos. 5 and 8 represent the two extremes of fertility in this table.

The table of soil texture classes, by percentages (Table 20) has been compiled from the existing government soil surveys. When the few remaining counties are surveyed and some of the older surveys revised the results can be made more accurate. The only regions for which we have sufficient data to attempt percentages are the red hills (both divisions), lime hills, and southwestern pine hills.

TABLE 20.

Percentages of soil texture classes in four regions.

REGIONS—	Western red hills.	Lime hills.	Eastern red hills.	Pine hills.
SOILS:				
Gravelly sand			0.9	2.2
Coarse sand			1.6	0.2
Sand, sand-hill, etc.....	4.0	5.1	30.6	16.0
Fine sand	7.4	2.6	5.9	7.8
Loamy sand (including fine and coarse).....			4.7	7.1
Stony and gravelly sandy loam.....	4.1	8.3	0.8	2.0
Stony and gravelly loam.....			0.1	
Coarse sandy loam.....			0.2	
Sandy loam	5.2	10.1	31.1	12.1
Gravelly and stony fine sandy loam.....	1.1			
Fine sandy loam.....	51.0	54.0	17.1	43.3
Very fine sandy loam.....	2.0			0.4
Loam	0.8	2.3	0.7	1.3
Silt loam	2.5	3.1		0.2
Silty clay loam.....	1.2	1.2		0.3
Clay loam	1.2	0.8	0.2	
Stony clay	2.4	1.9	0	
Clay	12.7	3.9	0.6	0.5
Swamp, meadow, muck, etc.....	4.1	6.7	5.5	6.7

Topography and drainage.

The topography of southern Alabama is very diversified, ranging from the steep and rugged Buhrstone ridges, some of which are over 200 feet above the nearest creeks or rivers, to the comparatively smooth post-oak flatwoods, the gently undulating lime-sink region with its numerous undrained depressions, the flood-plain of the Mobile River with its intricate network of channels, and the low flat country on the west shore of Mobile Bay.

Most of the surface features seem to be the result of normal erosion, and the ridges are generally determined by hard strata or by gravel beds. On account of the prevailing southward dip of the strata the north slopes of the ridges are usually steeper than the south slopes, forming prominent inland-facing escarpments (*cuestas*) in many places. The effects of solution of underlying limestone are seen in several caves (one of which is near the southeastern corner of Covington County) and a few large springs, and in some of the ponds and sinks of the eastern red hills and the lime-sink region. Wave work is well exhibited in the cliffs facing the bays on both sides of southern Baldwin County, and wind work in the dunes along the coast. Some if not most of the ponds in the southwestern pine hills may represent mere irregularities in the surface when it was originally deposited beneath the sea, for there is no limestone or other soluble rock within several hundred feet of the surface there, as far as known. The larger rivers are bordered in many places by flat terraces a mile or more in width, presumably representing ancient flood-plains.

STREAMS.

The larger streams take fairly direct courses to the Gulf of Mexico. Only two of the rivers cross the black belt before entering the area here described. The westernmost, the Tombigbee, traverses it for 100 miles or so, and one of its branches drains a large area of the coal fields, too. The other, the Alabama, has its head-waters partly in the Appalachian Valley and partly in the Piedmont, and probably carries down nearly as much fertility as the Tombigbee. The Chattahoochee, on the eastern border of the State, originates entirely in the Piedmont, and on the southern slopes of the Blue Ridge, and passes very little limestone anywhere

on its course. These three rivers are always muddy, and navigable all the way across the area under consideration and some distance farther inland.

The Pea and Conecuh Rivers and Patsaliga Creek head on the south slopes of Chunnennuggee Ridge just south of the black belt, and gather considerable fertility from the soil of the blue marl region before entering the pine hills, and evidences of that are plainly seen far down into the pine hills. These streams are too small to be navigated by any craft but skiffs and launches.

The remaining streams all rise in the red hills or farther south, and are still smaller, and free from mud at least part of the time. A few in the southeastern part of the State that come from limestone springs have the clear bluish color characteristic of such conditions. Those that are wholly confined to the pine hills are commonly blackish from dissolved and suspended peaty matter, but the smallest branches are perfectly clear.

WATER-POWER.

Many of the creeks have been dammed up to furnish power for sawmills and grist-mills, and on the Pea River in Coffee County there is a hydro-electric plant with a dam 28 feet high, developing about 2,500 horse-power, and furnishing electricity for Elba and Troy. More recently a similar plant has been built on Omussee Creek near Columbia, to supply Dothan with electricity.

The following table of water-power utilized in southern Alabama (Table 21) has been compiled from Bulletin 17 of this Survey, a second report on the water-powers of Alabama, by B. M. and M. R. Hall (1916). The location of several of the dams near the line between two regions, with no more exact information in the published list than the name of the nearest post-office, introduces an element of error, but such errors tend to balance each other. It is also very likely that a number of dams built in recent years have not been listed, but that should not materially affect the comparisons between different regions.

Nearly half the total power included in this table is at the Pea River dam near Elba. Before that was built the average power per dam was 19 horse-power in the eastern division of the red hills and 21 in the whole area.

TABLE 21.

Water-power statistics of southern Alabama, 1916.

REGIONS	Dams.	Horse-power developed.		
		Total.	Per dam.	Per sq. mi.
Western red hills.....	37	731	19.8	0.13
Eastern red hills.....	63	3669	58.3	1.02
Lime-sink region.....	17	322	18.9	0.25
Southwestern pine hills.....	14	495	35.4	0.10
Total.....	131	5217	39.9	0.32

Climate.

The average or mean temperature ranges from about 65° F. (supposed to be the most comfortable temperature for civilized mankind) at the inland edge of our area to 68° on the coast; the mean January temperature from 47° to 52°; July temperature from 80° to 81°; the average length of growing season from about 240 to 280 days; and the annual rainfall from about 48 inches in Wilcox County to 63 on the coast. The proportion of the rain that falls in the warmer months increases southward and eastward. At Pushmataha, in Choctaw County, 31.8 per cent of the rain falls in the four warmest months (June to September), and 45.8 per cent in the six warmest months (May to October), and that for April to June exceeds that for August to October by about 5 inches. At Mobile the early and late summer rain are just about equal, and 40 per cent of the total comes in the four warmest months, and 51.6 per cent in the six warmest months. At Eufaula, near the northeastern corner of the area under consideration, the four and six months' percentages are just about intermediate between those for Pushmataha and Mobile, and the late summer excess over early summer is about half an inch. This difference in seasonal distribution of rainfall, concurrent with the increase in the total amount toward the coast, must be one of the chief causes of the differences in soil fertility that have been mentioned, for the warm rains of late summer, which presumably have not varied much from one decade

to another for thousands of years, must have had a marked influence in leaching the soils of the southern and eastern counties (and at the same time making the ground-water purer and more constant there than in the northwestern portions).

In the late summer rain area most of the rain falls in the daytime, while in the rest of the State, where there is more winter and spring rain, a larger proportion of it falls during the night. Tornadoes are most frequent in those parts of the country that have the greatest excess of early over late summer rain (such as Kansas), and hurricanes at the other extreme, typified by southern Florida; but neither kind of windstorm is as common in southern Alabama as it is farther from the line of equilibrium, which passes through our area.*

Vegetation.

This whole area, except for bodies of water, marshes, dunes, and a few prairie spots, was presumably originally covered with forests, with pines of various species predominating and oaks next in abundance. The percentage of evergreens increases as the soil fertility diminishes, from about 45 per cent in the northwestern portions to 95 per cent in the coast strip.

The percentage of forest now remaining likewise varies in different regions with soil fertility (for naturally the richer soils are cleared first by the farmers), ease of tillage, etc., from about 50 per cent to nearly 100 per cent. In the more fertile areas land was cleared faster than the timber could be utilized, and millions of fine trees were girdled and left to die standing, or else cut down, rolled into heaps and burned. This practice has also prevailed even in the poorer regions, in places remote from railroads and navigable streams by which the timber could be gotten to market (evidences of it can now be seen especially in the southern part of Monroe County), but as a rule in the long-leaf pine country the lumberman has preceded the farmer and laid

*For a discussion of the relations of the ratio between early and late summer rain to soil, vegetation, water-power, floods, tornadoes, hurricanes, and a few other things see Science II, 48:208-211. Aug. 30, 1918.

waste the forests, leaving the desolate cut-over lands, of which Fig. 21 shows an extreme condition.

On account of the combined activities of farmers and lumbermen, and a few other influences of less magnitude, the present stand of timber is doubtless less than half of what it was originally; but with the increasing use of substitutes for wood and the consequent decreasing *per capita* consumption, it may be that the minimum has nearly been reached and that our forest wealth will soon increase again, as happened in New England (and in lesser degree in other northeastern states) about forty years ago.*

Table 22 shows the estimated relative abundance of the timber trees in each region at the present time. As some of the regions are too small for the greatest precision, and none of them have been explored as thoroughly as they should be, a system of letters is used instead of percentage figures, according to the following easily remembered scheme:†

Over 10%—A (abundant).

3% to 10%—C (common).

1% to 3%—F (frequent).

0.1 to 1%—O (occasional).

.01% to 0.1%—R (rare).

Species whose occurrence in a given region is probable but not proved are indicated by a question mark. The letters corresponding to the highest percentages in each line are underlined, instead of being printed in heavier type as in most of the tables following. This enables one to pick out the characteristic species of each region very quickly.

As in most works on systematic botany in the last quarter of a century, the species are arranged in systematic sequence, beginning with the pines, which according to the evolutionists are our most primitive trees. Both technical and common names are given, and evergreens indicated by heavy type, as in the separate regional lists, but the habitats are omitted. At the beginning of the table there is indicated the approximate percentage of forest remaining and of evergreens in the existing forest.

*For statistics on this point see Journal of Forestry (Washington, D. C.) 16:442-452. 1918.

†This method is discussed more fully in the Journal of Forestry 17:553, 1919.

TABLE 22.

Census of timber trees of southern Alabama.

	Post-oak flat woods.	Western red hills.	Eastern red hills.	Lime hills.	Lime-sink region.	Pine hills.	Mobile delta.	Coast strip.
Percentage of forest.....	75	65	50	60	53	91	96	75
Percentage of evergreens.....	45	70	65	70	75	78	10	95
SPECIES								
<i>Pinus palustris</i> Long-leaf pine.....	0	A	A	A	A	<u>A</u>	.	0
<i>Elliottii</i> Slash pine.....	.	0	0	.	A	<u>A</u>	.	<u>A</u>
<i>Taeda</i> Short-leaf pine.....	A	<u>A</u>	A	A	C	C	.	A
<i>serotina</i> Black pine.....	.	.	R	.	<u>F</u>	O	.	.
<i>echinata</i> Short-leaf pine.....	<u>A</u>	C	C	C	O	R	.	.
<i>glabra</i> Spruce pine.....	0	C	C	<u>C</u>	F	O	.	.
<i>clausa</i> Spruce pine.....	.	.	.	.	.	.	.	<u>F</u>
<i>Taxodium distichum</i> Cypress.....	0	0	0	0	0	0	<u>A</u>	.
<i>imbricarium</i> (Pond) cypress.....	.	.	.	.	<u>C</u>	C	.	0
<i>Chamaecyparis thyoides</i> Juniper.....	.	.	.	.	.	<u>C</u>	.	.
<i>Juniperus Virginiana</i> Cedar.....	R	0	R	0	0	R	.	<u>F</u>
<i>Juglans nigra</i> Black walnut.....	.	R	.	R	.	.	.	.
<i>Hicoria aquatica</i> Swamp hickory.....	.	R	.	<u>O</u>	.	.	?	.
<i>ovata</i> Scaly-bark hickory.....	<u>F</u>	R	.	.	.	.	.	.
<i>alba</i> (White) hickory.....	0	R	<u>O</u>	0	R	R	.	.
<i>glabra</i> (Pignut) hickory.....	.	?	<u>O</u>	?	?	R	.	R
<i>Populus deltoides</i> Cottonwood.....	F	0	R	<u>F</u>	.	.	?	.
<i>Betula nigra</i> Birch.....	0	<u>F</u>	0	0	?	R	?	.
<i>Fagus grandifolia</i> Beech.....	F	<u>C</u>	0	C	0	0	?	.
<i>Castanea dentata</i> Chestnut.....	.	<u>R</u>	R	?	.	.	.	.
<i>Quercus alba</i> White oak.....	F	<u>F</u>	F	<u>F</u>	?	?	?	.
<i>stellata</i> Post oak.....	<u>C</u>	0	0	0	?	0	.	.
<i>Durandii</i>	.	R	.	<u>O</u>	.	.	.	.
<i>lyrata</i> Swamp post oak.....	.	<u>R</u>	?	.	.	R	?	.
<i>Muhlenbergii</i> Chinquapin oak.....	.	<u>O</u>	.	R	R	.	.	.
<i>Michauxii</i> Swamp chesn't oak.....	0	<u>O</u>	R	0	?	?	?	.
<i>Virginiana</i> Live oak.....	.	.	.	.	0	R	.	<u>C</u>
<i>falcata</i> Red oak.....	<u>C</u>	F	C	F	F	F	.	.
<i>pagodaefolia</i> (Swamp) red oak.....	<u>F</u>	R	.	.	.	.	?	.
<i>velutina</i> Black oak.....	R	?	0	.	.	.	.	.

TABLE 22—Continued.

		Post-oak flat woods.	Western red hills.	Eastern red hills.	Lime hills.	Lime-sink region.	Pine hills.	Mobile delta.	Coast strip.
<i>Quercus borealis maxima</i> (North'n) red oak.....		•	O	?	R	•	R	•	•
<i>Schneekii</i>		R	R	?	R	?	•	•	•
<i>coccinea</i>	Spanish oak.....	R	R	R	•	•	R	•	•
<i>Marylandica</i>	Black-jack oak.....	R	O	C	F	F	O	•	•
<i>nigra</i>	Water oak.....	C	C	F	F	O	O	?	O
<i>laurifolia</i>		R	O	F	O	F	O	•	C
<i>Phellos</i>	Willow oak.....	C	O	?	O	?	R	?	•
<i>Ulmus Americana</i>	Elm.....	O	O	•	O	•	•	•	•
<i>alata</i>	Elm.....	R	O	•	O	•	R	•	•
<i>Celtis occidentalis</i> ?.....	Hackberry.....	O	R	•	O	•	•	?	•
<i>Magnolia grandiflora</i>	Magnolia.....	O	C	C	C	C	F	?	C
<i>acuminata</i>	Cucumber tree.....	•	R	•	O	•	•	•	•
<i>Liriodendron Tulipifera</i>	Poplar.....	O	C	C	C	F	C	•	•
<i>Liquidambar Styraciflua</i>	Sweet gum.....	C	C	C	C	F	F	C	O
<i>Platanus occidentalis</i>	Sycamore.....	F	O	R	F	R	R	?	•
<i>Acer Floridanum</i>	Sugar maple.....	•	O	R	?	•	R	•	•
<i>saccharinum</i>	Silver maple.....	O	O	R	O	•	•	?	•
<i>rubrum</i>	Red maple.....	F	F	F	O	O	C	F	O
<i>Negundo</i>	Box elder.....	O	O	?	O	?	•	?	•
<i>Tilia heterophylla</i> ?.....	Lin.....	R	O	O	O	•	•	•	•
<i>Nyssa sylvatica</i>	Black gum.....	O	O	O	O	•	R	•	•
<i>biflora</i>	Black gum.....	?	F	F	O	C	A	A	F
<i>uniflora</i>	Tupelo gum.....	R	?	?	O	R	R	C	•
<i>Fraxinus Americana</i>	Ash.....	O	O	R	O	•	•	?	•
<i>sp.*</i>	Ash.....	R	O	?	O	•	•	O	•
<i>Catalpa bignonioides</i>	Catalpa.....	•	R	•	O	•	•	?	•

*Probably more than one species. The ashes are rather difficult to distinguish without close examination.

The small trees, shrubs, vines and herbs which have been listed in the regional descriptions have not been tabulated here, because it is impracticable to compare their bulk with that of the timber trees, and being less conspicuous their relative abundance cannot be determined so accurately.

POPULATION

EARLY SETTLEMENTS.

The first permanent white settlement in the area under consideration was made by the French at Mobile in 1711. At that time most of the country was occupied by the Choctaw Indians, who seem to have been chiefly concentrated in the most fertile portion, the western division of the red hills, if we may judge by the frequency of Indian geographical names there. The Indians made comparatively little use of the soil, however, and in any whole county there was probably never more than one Indian to the square mile.

Later in the same century, while the population of European origin was still very sparse, Mobile and vicinity were successively under the jurisdiction of England and Spain. About the time of the Revolution settlers pushed inland along the rivers, and gradually took possession of the lands in approximate order of fertility, combined with accessibility to navigable waters. Others came overland a little later from Georgia, the Carolinas, and Virginia, some settling in the black belt to the north and some gradually pushing southward into the less fertile regions.

In 1820, when the first United States census subsequent to Alabama's admission to the Union was taken, the western division of the red hills had about four inhabitants per square mile and the other regions about one. As the forests were cleared away and agriculture followed the pioneer hunting stage the population increased rapidly, and likewise the proportion of slaves.

DEVELOPMENTS FROM 1850 TO 1900.

The status of the population in 1850 and 1860 is shown by Table 23, in which the post-oak flatwoods, lime-sink region, Mobile delta and coast strip are omitted for lack of data (these regions not covering as much as half of any one county), the lime hills combined with the western red hills for a similar reason, and Baldwin and Mobile Counties separated (there was no Escambia County then) to show the influence of the seaport. A column for the whole State is added for comparison.

TABLE 23.

Population statistics of southern Alabama, 1850 and 1860.

	Western red hills.	Eastern red hills.	Baldwin County.	Mobile County.	Whole State.
1850					
Inhabitants per square mile.....	12	8	2.3	22	15.0
Per cent white.....	47	83	47	62	55.3
Per cent free colored.....	0.1	0	2.0	3.4	0.23
Per cent slaves.....	52	17	50	34	44.4
1860					
Inhabitants per square mile.....	17	13	4.0	33	18.8
Per cent white.....	45	79	49	69	54.8
Per cent free colored.....	0.2	0.1	2.0	2.9	0.28
Per cent slaves.....	55	21	49	28	45.2

As already pointed out in the description of the southwestern pine hills, the percentage of white and colored in Baldwin County in the early days is by no means representative of that region, for the population was then chiefly in and near the alluvial bottoms of the Mobile delta. Bearing this in mind, and also the concentration of population at Mobile on account of the shipping interests, it will be seen that the densest population and largest proportion of negroes generally went with the most fertile soils, and vice versa.

The census of 1870 is not considered very reliable, for obvious reasons, and we may pass next to that of 1880. By that time Escambia County had been established, and that is combined with Baldwin in the statistics. And separate figures for the city of Mobile are available for that date, so that statistics for Mobile County both with and without the city are given in Table 24, which covers three census periods, 1880 to 1900. For 1880 it is possible to give the approximate average migration distance of the population in each region, obtained by multiplying the number of natives of each state by the distance between its center of population and Alabama's, adding the products, and dividing by the total population. Unfortunately no such data are available at later censuses for areas smaller than states, except a few of the larger cities.

TABLE 24.

Population statistics of southern Alabama, 1880-1900.

	Western red hills.	Eastern red hills.	Baldwin & Escambia counties.	Mobile Co.		Whole State.
				Rural.	Total.	
1880						
Inhabitants per square mi.	21	18	5.7	15	38	24.6
Per cent white.....	38	75	63	53	56	52.5
Per cent negro.....	62	25	37	47	44	47.5
Average migration distance (miles)	38	49	61	?	89	57.0
1890						
Inhabitants per square mi.	23	24	7.0	16	40	29.5
Per cent white.....	39	74	66	55	55	55.3
Per cent negro.....	61	26	34	45	44	44.7
1900						
Inhabitants per square mi.	27	33	9.7	19	49	35.7
Per cent white.....	37	71	69	54	54	54.7
Per cent negro.....	63	29	31	46	45	45.3

The same relations between population density, negro percentage and soil fertility already pointed out are apparent here, except that about 1889 the eastern division of the red hills overtook the western division in density of population, presumably with the aid of commercial fertilizers, as explained in the regional description. The average migration distance is naturally greatest where the population increases most rapidly.

CONDITIONS IN 1910.

For 1910 (Table 25) an extra column is added for the lime-sink region, and extra lines for urban population, foreigners, and the red and yellow races; and an extra section for illiteracy statistics.

Foreigners are much more abundant in the two coast counties than elsewhere, for more or less obvious reasons, but even there their numbers are not conspicuous. The "other races" are Indians, Chinese and Japanese, the first

FIG. 26. Graph showing percentage of negroes and number of inhabitants per square mile (the same numbers being used for both) in the several regions and in the whole State, from 1820 to 1910.

being the most numerous and the last least, but the figures for Indians are not very accurate, partly because many of those in the area under consideration are in the pine hills portion of Clarke and Monroe Counties, which were used in the statistics to represent another region. Again, the number of Indians returned at successive censuses varies so much as to suggest that a good many of them are sometimes counted as whites. (These irregularities are brought out by Table 26, which shows the number of Indians reported from each county in the area treated at each census from 1860 to 1910. Where the Indian population of a given county is not returned separately, but combined with "all other counties," question marks are used.)

TABLE 25.

Population and illiteracy statistics of southern Alabama, 1910.

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile Co.		Whole State.
					Rural.	Total.	
Inhabitants per square mi....	29	38	51	15	24	66	41.7
Per cent urban.....	2.4	5.4	11.9	0	0	63.9	17.3
Per cent native white....	37	68	76	68	57	53	56.6
Per cent foreign white.....	0.2	0	0.1	3.5	2.2	3.5	0.9
Per cent negro.....	63	32	24	29	41	43	42.5
Per cent. illit. (over 10):							
Native white	7.6	13.1	13.9	9.4	6.1	3.0	9.9
Foreign white	6.9	3.5	3.6	4.2	8.0	5.3	11.3
Negro	44.2	39.8	37.0	35.0	35.2	28.9	40.1
All classes	30.3	21.4	19.3	16.8	18.6	14.4	22.9

TABLE 26.

Indian population of southern Alabama by counties, 1860-1910.

COUNTIES	1860	1870	1880	1890	1900	1910
Baldwin	91	0	38	0	?	?
Clarke	0	0	2	0	9	11
Covington	0	0	0	0	0	118
Crenshaw	?	0	0	1	10	0
Escambia	?	43	23	173	122	163
Mobile	1	9	19	402	5	7
Monroe	38	17	77	3	21	291
Washington	0	0	2	0	0	172
Whole area	130	69	161	579	167?	762?
Whole state	160	98	213	1143	177	909

ILLITERACY.

A glance at the illiteracy statistics shows that where negroes are most numerous the contrast between the two races in education is greatest. This is partly because where negroes predominate they are chiefly concentrated in the rural districts, where school facilities are comparatively

poor, while the whites mostly live in town. But there are other factors involved, for the values of farm buildings vary in a similar manner, as can be seen from the agricultural tables. Judging by education alone, the foreign whites are a little superior to the natives in agricultural communities, and inferior in manufacturing cities, seaports, and mining communities. (This may not hold true throughout the United States, however.) The aggregate illiteracy depends chiefly on density of population, percentage of urban, proportion of whites, and average migration distance, as can be readily understood.

NATIVITY.

In 1880 about 83 per cent of the persons living in this area were born in Alabama, and we may guess that 75 per cent of them were born in this part of the State and 60 per cent in the counties in which they lived. (If we had separate returns for adults, however, all these figures would be reduced somewhat, for adults of course migrate more than children do.) The other states which had furnished the most settlers were Georgia, South Carolina, North Carolina, Mississippi, Virginia, Florida, and Tennessee, in the order named, except that Louisiana should doubtless appear somewhere in the list, as explained in the description of the pine hills. No later data of this kind are available, unfortunately, but in recent decades there seems to have been considerable immigration from the northern central states, such as Michigan and Illinois, to the southwestern pine hills.

The leading foreign nationalities represented in this area in 1880 were Irish, German, English, French, Scotch, Canadian, Swedish (including Norwegian), and Swiss; and in 1910 the sequence was German, English, Irish, Swedish, Russian (including most of the Poles, if there were any in these parts, but probably more Semitic than Slavonic), Canadian, Austrian, Hungarian, Greek, Norwegian, Italian, Scotch, "Turkish" (probably mostly Syrian), Danish, French, and Dutch. Similar data for the southwestern pine hills, which has the most foreigners, have been given on an earlier page (74).

CITIES AND TOWNS.

The largest cities and towns have already been listed by regions, and they are here brought together for the whole

area, with some additional data. The census gives very little information about those with less than 2,500 inhabitants—not even separating the races in them in recent decades—and there are only four which exceeded that figure in 1910. Table 27 gives the total population of each of these four from 1880 to 1910, and some statistics of sex, race, nativity, and illiteracy for 1910, together with the number of newspapers in 1917 and railroad outlets in 1919.*

TABLE 27.

Statistics of four largest cities of southern Alabama.

	Mo- bile.	Do- than.	Troy.	Green- ville.
Total population, 1880.....	29,132		2,294	2,471
Total population, 1890.....	31,076	247	3,449	2,806
Total population, 1900.....	38,469	3,375	4,097	3,162
Total population, 1910.....	51,521	7,016	4,961	3,377
Per cent male, 1910.....	47.1	49.9	46.2	46.4
Per cent native white.....	51.5	49.8	48.0	42.6
Per cent foreign white.....	4.3	0.5	0.7	0.6
Per cent negroes.....	44.2	49.7	51.3	56.8
Percentage illiterate, 1910 (over 10 yrs.):				
Native white.....	0.8	0.2	2.1	0.3
Foreign white.....	4.5	0	6.0	0
Negro.....	25.9	8.6	40.6	7.9
All classes.....	12.3	4.2	21.4	4.5
Newspapers, 1917.....	7	3	2	2
Railroad outlets, 1919.....	5	5	4	2

The illiteracy figures for Troy—which is somewhat of an educational center—seem much too high in comparison with Dothan and Greenville, and may be due to errors in the census reports.

Table 28 gives the population of the 17 cities next in rank from 1880 to 1910, and the number of newspapers and railroads as before. The names of those that are county-seats are printed in capitals.

*By railroad outlet is meant a line of railroad connecting with the large cities, etc. A town on a main line of one railroad has two outlets, whether or not it is the junction point for a spur line, but one located on a spur, whether at its end or some intermediate point, has only one outlet.

TABLE 28.

Numerical facts about 17 smaller cities of southern Alabama.

	POPULATION				Newspapers 1917.	Railroads 1919.
	1910	1900	1890	1880		
ANDALUSIA	2480	551	270	596	2	3
Florala	2439	?	?	?	1	3
Enterprise	2322	610	?	?	2	1
OZARK	2229	1570	1195	512	2	3
BREWTON	2185	1382	1115	?	2	2
EVERGREEN	1582	1277	1783	985	2	2
LUVERNE	1384	731	451	?	2	1
Jackson	1379	1039	?	?	1	2
Thomasville	1181	686	291	?	1	2
Hartford	1159	382	?	?	1	2
ABBEVILLE	1141	889	465	?	1	1
CLAYTON	1130	998	997	761	1	2
Columbia	1122	1132	960	290	0	2
Headland	1090	602	?	?	1	1
ELBA	1079	635	285	?	2	1
Atmore	1060	?	?	?	1	4
Georgiana	999	567	456	277	0	3
Total	25,961	13,051	8,268	3,421	22	

All these have electric lights, waterworks, banks, etc.

RELIGIOUS DENOMINATIONS.

In 1906, the latest year for which we have any such statistics, the leading religious denomination among both races was Baptist, and the next Methodist, but the others varied in relative importance in different regions, and especially in Mobile, which being an old seaport with a considerable foreign population, differs considerably in social conditions from the agricultural districts. The relative importance of the different denominations, for the two races separately, has already been indicated for separate regions. Table 29 gives the percentage of the total church membership belonging to each denomination in each region, with certain limitations.

First, the white (Southern) and colored (National) Baptists are not separated in the returns by counties, but have been estimated in the light of the fact that in the whole

State 60.8 per cent of the Baptists are negroes and 69.4 per cent of the negro church members are Baptists. Second, the Catholics often count in their membership whole families, with persons of all ages, so that their figures should be divided by about two to be comparable with those for Protestants; while the Jews count only heads of families, so that their figures should be multiplied correspondingly. These corrections have not been attempted in the table, however, the census returns being taken literally. The lesser denominations have been omitted from the table.

TABLE 29.

Percentage statistics of religious denominations in southern Alabama, 1906.

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	City of Mobile.	Whole State.
WHITE CHURCHES						
Baptist (Southern)	47.5	52.5	44.3	37.5	6.4	38.0
Freewill Baptist	0	0.1	9.2	0	0	0.5
Primitive Baptist	2.0	6.6	1.7	1.5	0	2.3
Methodist Episcopal, South	35.6	27.6	36.5	23.9	10.8	29.4
Methodist Protestant	2.4	1.9	2.5	0	0	1.3
Presbyterian (in U. S.)	2.2	0.9	1.2	2.4	5.9	3.5
Protestant Episcopal	0.8	0	0	2.7	11.4	2.0
Lutheran	0	0	0	?	1.1	0.3
Roman Catholic	2.7	1.7	0	17.7	59.0	9.9
NEGRO CHURCHES						
Baptist (National)	69.0	75.0	65.0	58.0	50.8	65.3
Colored Primitive Baptist	2.4	0	0	2.0	0	3.7
African Methodist Episcopal	11.4	14.0	30.6	13.8	15.0	10.0
A. M. E. Zion	9.0	7.0	0.5	15.0	25.7	9.2
Colored M. E.	6.1	0	0	0.7	1.7	5.2

No attempt has been made to estimate the ratio of church members to total population, partly because we have no exact data for the population in 1906, and partly because the religious census is made not by asking each individual what church he belongs to (as seems to be done in some European countries), but by correspondence with church officials, so that the results are not as accurate as a house-to-house enumeration would be, and comparisons might be misleading.

It is not easy or altogether safe to make any correlations between religion and soil, but it appears that in southern Alabama, if not elsewhere, the Baptists and Methodists are strongest in the rural districts, Presbyterians in cities, Episcopalians where white illiteracy is low (mostly in cities), and Catholics where foreigners are most numerous.

TABLE 29 A.

*Statistics of religious denominations in southern Alabama, 1916.
(Percentages of total membership of each race.)*

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	City of Mobile.	Whole State.
WHITE CHURCHES						
Baptist (Southern)	47.9	49.0	56.2	35.3	8.5	38.9
Freewill Baptist	0	3.4	1.0	0	0	1.1
Primitive Baptist	1.0	1.6	0.1	1.2	0	1.4
Church of Christ	2.9	4.6	2.1	3.6	0.1	3.9
Disciples of Christ	0.3	0.6	0	2.2	1.0	1.2
Mormon (two branches)	4.5	1.7	0	5.9	0.3	0.7
Methodist Episcopal (Northern) ..	0.7	1.5	3.2	3.9	2.2	2.3
Methodist Episcopal, South	32.2	32.7	32.6	28.2	11.5	31.5
Methodist Protestant	3.9	1.0	1.1	0	0	1.3
Presbyterian in U. S. (Southern) ..	1.8	0.9	1.8	3.6	7.0	3.7
Protestant Episcopal	0.4	0	0.4	2.6	10.5	1.8
Roman Catholic	0.2	0	0.2	9.1	52.0	6.4
Jewish	0	0	0	0	3.7	0.6
NEGRO CHURCHES						
Baptist (National)	68.1	65.4	62.4	55.0	50.5	65.4
Colored Primitive Baptist	0.5	0	0	0	0	0.7
African Methodist Episcopal	11.4	21.5	30.2	9.3	11.5	9.0
A. M. E. Zion	10.7	11.7	4.5	31.4	32.1	10.8
Colored M. E.	8.0	0.3	0.2	1.8	2.8	7.3
Colored Cumberland Presbyterian ..	1.0	0	0	0	0	1.7

Since the manuscript of this report was turned over to the printers the government census returns of religious denominations for 1916 have become available, and the results as far as they apply to southern Alabama (with the omission of a few of the smaller denominations) are shown in Table 29 A. This religious census goes into a little more detail than the preceding one, and separates the white and colored Baptists, which had to be estimated before. There is still some uncertainty about the number to be allotted to

the two races in the case of a few denominations which include both whites and negroes, especially the northern Methodist.* The exact definition of church membership varies even more in different denominations than was formerly supposed, but the census figures are taken literally, as before.†

Of course some of the denominations have changed in relative importance in ten years, but the changes are in most cases comparatively small, and there is no telling how much of the difference may be due to incomplete returns, so that it would be rather hazardous for an outsider to attempt to explain the variations. But readers familiar with conditions in the different denominations in the area treated may be able to draw some interesting conclusions.

POLITICAL PARTIES.

As it might be of some interest to prospective settlers to know the prevailing political faith of their future neighbors, some political statistics have been taken from the article in the Montgomery Advertiser of October 28, 1919, referred to in the bibliography. The percentage of Democratic and Republican votes at the presidential election of 1916—which is probably typical enough of national elections in the last decade or two, except that of 1912, when the interjection of a new party complicated matters somewhat—is given for each region, and some statistics of illiteracy, farm building values and racial composition of the population which have already been given in other tables are put in adjoining columns for purposes of comparison. The vote of minor parties, such as Prohibitionist and Socialist, is too small to be of any significance, except that the Socialists polled nearly 13 per cent of the total vote in Baldwin County, probably mostly in and around Fairhope. It must be borne in mind that very few negroes are qualified to vote in Alabama according to present regulations, so that these figures do not represent the total adult male population, but practically only the whites; which is fortunate for statistical purposes.

*In the whole State of Alabama nearly 55% of the Northern Methodists in 1916 were negroes, but it would be difficult to guess the number of negroes belonging to that denomination in any one county or region.

†If only adult members were counted we would have a fairer basis of comparison.

TABLE 30.

Democratic and Republican vote in 1916, with percentage of white illiteracy, value of buildings of white farmers, and percentage of negroes in 1910, for southern Alabama.

REGIONS.	Democratic.	Republican.	White Illiterates.	Farm bldg. values (white).	% Negroes.
Western red hills.....	97	3	7.6	468	63
Eastern red hills.....	80	19	13.1	322	32
Lime-sink region	70	28	13.9	328	24
Baldwin and Escambia counties.....	78	14	9.4	478	29
Mobile county	77	21	3.3	910	43
Whole state	76	21	9.9	372	43

It will hardly be necessary to point out the interesting correlations in this table, for the reader can easily make them himself, and draw whatever conclusions he wishes. Similar relations are believed to obtain pretty generally throughout the "Solid South" or cotton belt of the United States.

AGRICULTURE

FARM EQUIPMENT AND OPERATIONS.

Information about agriculture in the United States has become more and more complete with each succeeding census, beginning with that of 1840, which gave the yields of various crops in each county, but told nothing about the number, size, and value of the farms. The next graph (Fig. 27) shows the progressive increase of farm land and improved land since 1850. The first table below (No. 31) gives statistics for 1850 and 1860, for three regions (separating Baldwin and Mobile Counties as in the population tables), and for the whole State.

The most noteworthy features of ante-bellum agriculture in southern Alabama are about as follows: The individual farms increased in size from 1850 to 1860, which was about the culmination of the southern plantation system. The largest plantations, especially when measured in number of improved rather than total acres, were in the most fertile region. Those in Baldwin County were nearly as large in total acreage, but there about 85 per cent of the land owned by farmers in the decade before the Civil War was pine woods and river swamps, used chiefly for range for livestock. The most valuable land and buildings in 1850 (as now) were in Mobile County, where the proximity of the port influenced the price of real estate, but by 1860 the western division of the red hills had taken the lead in that respect, which it probably held until the outcome of the war made many of the former slaves farm proprietors. The increase in all values between 1850 and 1860 is noteworthy, and was probably due mostly to the discovery of gold in California in 1849, which increased the circulation of that standard of value.

In 1850 Baldwin County was far in the lead in all kinds of livestock per farm, except horses, in which Mobile equaled it, and hogs, in which the western red hills surpassed it. At that time horses were more numerous than mules in most parts of Alabama, but the latter have gained considerably since, as the amount of free range decreased.

TABLE 31.
Agricultural statistics for southern Alabama, 1850 and 1860.

	1850					1860				
	Western red hills.	Eastern red hills.	Baldwin County.	Mobile County.	Whole State.	Western red hills.	Eastern red hills.	Baldwin County.	Mobile County.	Whole State.
Percentage of land in farms.....	36	16	4	6	37.0	66	53	7	18	58.0
Percentage of land improved.....	10	6	0.5	0.6	13.5	18	13	0.8	1.3	19.4
Improved acres per inhabitant.....	5.4	5.2	1.4	0.2	5.7	6.5	6.4	1.3	0.3	6.7
Average number of acres per farm.....	415	153	382	178	290	514	350	443	383	382
Average improved acres per farm.....	113	57	50	20	106	134	84	54	28	127
Value of land and buildings per farm.....	1630	571	995	1990	1532	4480	1620	2500	3220	3510
Value of implements and machinery.....	128	77	95	94	122	173	80	109	111	148
Value of livestock.....	633	366	1259	950	519	996	554	1570	1059	865
Number of slaves per farm.....	10	2	18	?	8	11	3	19	?	7
Number of horses.....	3.4	2.1	3.8	3.8	3.1	2.5	1.7	2.7	2.6	2.5
Number of mules.....	1.7	0.3	4.0	1.3	1.4	2.7	0.9	3.1	1.6	2.2
Number of milch cows.....	7.7	6.8	32.3	9.7	5.4	5.6	4.9	28.3	10.9	4.6
Number of work oxen.....	2.1	1.3	3.1	0.9	1.6	2.1	1.1	2.1	2.2	1.8
Number of other cattle.....	18.1	12.8	79.5	27.2	10.3	12.7	8.3	55.4	22.3	9.0
Number of sheep.....	12.2	5.8	34.6	3.9	8.9	7.4	5.6	19.7	13.9	7.4
Number of hogs.....	60	41	49	21	45.6	42	32	47	28	34.8

The Civil War broke up many of the old plantations, and left the owners "land poor." (Compare the farm land values of 1880 with those of 1860.) The former slaves generally remained where they were, but their social and economic status having been changed, it was difficult for the census enumerators in 1870 to determine which ones were farm owners or tenants and which were hired laborers, and

FIG. 27. Graph showing ratios of total and improved farm land to the total area of each region large enough to get statistics for, and the same for the whole State; 1850 to 1910. The numbers at the sides are percentages.

TABLE 32.
Agricultural statistics of southern Alabama, 1880 and 1890.

	1880					1890				
	Western red hills.	Eastern red hills.	Baldwin & Escambia.	Mobile County.	Whole State.	Western red hills.	Eastern red hills.	Baldwin & Escambia.	Mobile County.	Whole State.
Percentage of land in forest.....	77	75	98	96	74	66	78	10	12	60.5
Percentage of land in farms.....	57	55	15	9	59.2	}	}	}	}	}
Percentage of land tilled.....	16	14	0.9	1.1	19.2					
Percentage of pastures and orchards.....	0.9	0.8	0.1	0.2	0.8	24	26	1.1	1.5	23.4
Improved acres per inhabitant.....	5.0	6.4	1.2	0.2	5.1	6.1	6.8	1.0	0.2	5.1
Average number of acres per farm.....	134	158	370	128	139	131	149	171	177	126
Average improved acres per farm.....	39	43	24	20	47	44	49	19	23	49
Value of land and buildings per farm.....	403	353	630	908	580	534	615	720	1215	706
Value of implements and machinery.....	21	17	27	55	28	23	20	28	58	29
Value of livestock.....	158	175	505	345	175	180	177	365	367	195
Number of horses per farm.....	0.7	0.6	1.5	1.4	0.8	0.8	0.4	1.5	1.8	0.8
Number of mules.....	0.7	0.7	0.3	0.5	0.9	0.7	0.9	0.3	0.5	0.8
Number of work oxen.....	0.7	0.8	2.6	0.9	0.6	0.7	0.6	1.6	1.1	0.6
Number of milch cows.....	2.0	2.2	9.9	5.1	2.0	1.9	1.7	6.2	5.6	1.9
Number of other cattle.....	3.8	3.7	18.7	5.8	3.0	3.7	3.2	15.4	11.0	3.1
Number of sheep.....	1.5	3.5	33.5	6.6	2.6	1.6	1.8	33.1	17.6	2.5
Number of hogs.....	9.4	14.1	19.8	9.4	9.2	9.8	12.7	18.2	13.2	9.1
Number of chickens.....	15	15	22	21	15.4	33	37	41	38	39.6
Number of other poultry.....	3.0	8.9	6.1	2.5	6.7	2.3	3.8	5.5	2.5	4.2
Expenditure for fertilizers per farm (\$)	3	16	9	65	8.5	11	38	23	137	15.38
Expenditure fertilizers per acre improved.....	.07	.39	.35	3.21	.19	.24	.78	1.25	6.00	0.31
Value of products per farm.....	395	382	509	548	418	415	475	327	910	420
Value of products per acre improved.....	10.20	8.95	20.30	27.10	8.90	9.43	9.72	17.60	39.70	8.62

consequently the farm statistics of that period are of little value for our purposes, on account of the uncertainty as to the total number of farms and the ignorance of the negro proprietors. Another difficulty is that currency values in 1870 were inflated about 25 per cent as a result of the war a few years before. We may therefore pass on to the census of 1880. Statistics for 1880 and 1890 are given in Table 32, in the same manner as before, except that in 1880 tilled land was separated from pastures and orchards, and the number of chickens, the expenditures for fertilizers, and the value of products are given for the first time.

Here we see the eastern division of the red hills overtaking the western in percentage of farm land, both improved and unimproved, indicating that the pioneer days of lumbering and grazing are passing. The most valuable farms are in Mobile County again, but Baldwin and Escambia still lead in most kinds of livestock. The expenditure for fertilizers and the value of products are highest on the poorest soils, and especially in Mobile County, where intensive farming is stimulated by the proximity of a city. Although there is no record of the expenditure for fertilizers previous to 1879-80, it was undoubtedly less at earlier periods, for the sources of the principal commercial fertilizers that we now use, such as potash, phosphoric acid and nitrates, hardly began to be exploited until after the Civil War. (Before that time the impoverishment of soils in the South by continued cultivation was a source of much anxiety, and the usual way of getting around it was to abandon old fields and clear new ones.)

In 1900 the farmers were divided according to race and tenure in some of the statistics, and the value of buildings was first returned separately from that of land, which was a distinct improvement. And by 1910 the establishment of Houston County (by the Legislature of 1903) made possible for the first time some statistics of farming in the lime-sink region. Expenditures for farm labor were first returned in 1900 and for stock feed in 1910. Tables 33 and 34 illustrate conditions in 1900; the former being similar to the next preceding with a few additions, and the latter giving some data on race and farm tenure.

TABLE 33.

Agricultural statistics of southern Alabama, 1900.

	Western red hills.	Eastern red hills.	Baldwin & Escambia.	Mobile County.	Whole State.
Percentage of land in farms.....	67	81	10	13	63.0
Percentage of land improved.....	24	35	2.2	2.2	26.0
Improved acres per inhabitant.....	5.6	6.7	1.5	0.3	4.7
Per cent of farm owners and part owners	38	53	86	89	41.5
Per cent of farmers white.....	39	82	80	89	57.9
Average number of acres per farm	105	109	94	121	93.0
Average improved acres per farm	38	47	22	20	38.8
Value of farm land per acre.....	3.34	3.44	4.58	8.53	4.84
Value of farm land per farm.....	351	371	430	1032	449
Value of buildings per farm.....	141	136	253	575	154
Value implements and machinery..	33	38	48	95	39
Value of livestock.....	151	151	318	326	162
Number of dairy cows per farm....	1.3	1.0	3.4	2.9	1.3
Number of work oxen per farm.....	0.5	0.2	2.4	0.8	0.3
Number of other cattle per farm....	2.2	1.7	9.8	6.5	2.0
Number of horses per farm.....	0.7	0.3	1.4	1.7	0.7
Number of mules per farm.....	0.7	1.0	0.3	0.4	0.9
Number of sheep per farm.....	0.7	0.3	19.4	11.0	1.4
Number of goats per farm.....	0.7	0.4	3.6	5.5	0.5
Number of hogs per farm.....	6.8	10.4	11.4	6.4	6.4
Number of chickens per farm.....	21	25	32	33	21
Number of other poultry per farm	2.4	2.6	2.8	1.3	2.2
Number of colonies of bees per farm	1.2	1.6	1.3	1.2	0.9
Expend. for fertilizer per farm.....	7	27	20	80	11.63
Expend. for labor per farm.....	21	18	19	55	19.37
Expend. for fertilizer, per acre.....	.20	.58	.88	3.99	0.30
Expend. for labor per acre.....	.56	.39	.84	2.76	0.50

TABLE 34.

Farm tenure statistics for white and colored farmers in southern Alabama, 1900. (All figures are percentages.)

	Western red hills.	Eastern red hills.	Baldwin & Escambia.	Mobile County.	Whole State.
Owners and part owners.....	38.5	53.6	86.5	89.0	41.5
Per cent white.....	71	91	82	89	85
Per cent colored.....	29	9	18	11	15
Tenants (cash and share).....	60.9	45.9	13.1	9.9	57.7
Per cent white.....	20	72	70	90	38
Per cent colored.....	80	28	30	10	62
WHITE FARMERS	39	82	80	89	57.9
Owners and part owners.....	68.6	59.2	88.0	88.7	60.7
Cash tenants	20.7	12.7	7.9	6.8	14.0
Share tenants	9.6	27.3	3.5	3.1	23.8
COLORED FARMERS	61	18	20	11	42.1
Owners and part owners.....	18.6	26.7	79.8	88.7	14.8
Cash tenants	60.4	25.3	10.6	9.3	59.3
Share tenants	19.7	48.0	9.6	0	25.3

The information given by the 1910 census is sufficient to justify three tables, one of a general nature as before, one for owners and tenants separately, and one for white and negro farmers separately, besides those for crops and animal products which appear farther on.

TABLE 35.

Agricultural statistics of southern Alabama, 1909-1910.

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile County.	Whole State.
Per cent of land in forest.....	70	50	53	91	92	65
Per cent of land in farms.....	64	83	82	17	18	63.1
Per cent of land improved.....	26	43	43	4.6	2.8	29.5
Improved acres per inhabitant	5.8	7.2	5.4	2.0	0.3	4.5
Av. number acres per farm.....	84	89	78	80	113	79.0
Av. improv. acres per farm.....	34	45	42	22	17	36.8
Value farm land per acre.....	7.35	9.62	12.90	13.80	15.40	10.50
Value farm land per farm.....	613	850	1011	1109	1745	826
Value of buildg's per farm.....	248	272	302	436	763	271
Value implm'ts and mach'y.....	53	63	71	74	101	62
Value of livestock, poultry and bees	223	237	259	312	449	250
No. dairy cows per farm.....	1.7	1.1	1.3	2.7	3.6	1.6
No. other cattle per farm.....	2.8	1.4	2.1	6.8	13.0	2.1
Number horses per farm.....	0.6	0.2	0.3	1.0	1.4	0.5
Number mules per farm.....	0.7	1.1	1.0	0.4	0.3	1.0
Number sheep per farm.....	0.3	.02	0.5	7.2	8.4	0.6
Number goats per farm.....	0.4	.05	0.3	1.7	3.7	0.3
Number hogs per farm.....	6.4	8.0	12.0	10.9	8.2	5.0
Number poultry per farm.....	17	19	20	24	33	19.9
Number colonies of bees.....	0.6	0.7	0.6	0.8	0.9	0.5
Expenditure for fertilizers per farm	27	66	69	45	102	29
Expenditure for labor, per farm	23	27	27	30	98	23
Expenditure for feed, per farm	20	8	6	28	108	15
Annual value of products, per farm	552	848	929	522	905	649
Expenditure for fertilizers per acre	0.80	1.45	1.68	2.09	5.92	0.79
Expenditure for labor, per acre	.68	.59	.66	1.37	5.65	0.62
Expenditure for feed, per acre	.58	.18	.14	1.30	6.24	0.42
Annual value of products, per acre	16.28	18.70	22.40	24.10	52.30	17.59

TABLE 36.

Farm tenure statistics for southern Alabama, 1910.

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile County.	Whole State.
OWNERS' FARMS						
Per cent of total.....	36.0	41.0	49.9	80.9	87.0	39.5
Average size (acres).....	166	137	110	87	113	128
Improved acres	49.2	54.2	46.8	21.5	16.5	44.5
Value land and bldgs. (\$)...	1565	1685	1750	1552	2275	1605
Per cent of owners white:						
Native	66.3	88.8	93.2	71.8	68.5	82.5
Foreign				12.9	8.9	1.1
Per cent of owners colored	33.7	11.2	6.8	15.3	22.6	16.4
TENANT FARMS						
Per cent of total.....	63.5	58.8	49.8	19.1	12.1	60.4
Average size (acres).....	35	54	47	40	105	44.6
Improved acres	25.6	39.0	35.5	21.1	16.8	31.3
Value land and buildings.....	444	727	856	1027	3080	722
Per cent of tenants white:						
Native	20.4	60.8	74.6	70.3	72.2	40.9
Foreign				3.6	5.8	0.8
Per cent of tenants colored	79.6	39.2	25.2	26.0	21.9	58.8

TABLE 37.

Statistics of white and negro farmers in southern Alabama, 1910.

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile County.	Whole State.
WHITE FARMERS						
Per cent of total.....	37	72	84	83	78	58.0
Per cent owners and part owners	64	50	54	83	87	56.9
Per cent tenants.....	35	49	45	17	12	42.7
Av. number acres per farm	152	99	83	88	128	102.6
Av. impro'd acres per farm	47	46	43	23	20	40.2
Value of farm land per acre (\$)	6.95	9.45	12.80	14.00	16.15	10.08
Value farm land per farm...	1057	933	1065	1237	2061	1031
Value buildings per farm.....	468	322	328	478	910	372
Value imp'm'ts and mach'y	98	74	77	82	119	85
No. dairy cows per farm.....	2.5	1.2	1.4	2.8	4.1	1.7
No. work horses per farm.....	0.8	0.2	0.3	1.0	1.5	0.6
No. work mules per farm.....	0.9	1.1	1.0	0.4	0.4	1.0
Acres of corn per farm.....	9.7	14.4	13.7	6.9	5.0	11.5
Acres of cotton per farm.....	13.5	16.9	16.1	6.0	0.8	11.6
Bushels of corn per acre.....	11.1	11.5	14.3	13.3	21.1	12.6
Bales of cotton per acre.....	0.34	0.37	0.39	0.34	0.42	0.35
NEGRO FARMERS						
Per cent of total.....	63	28	16	17	22	42.0
Per cent of owners and part owners	19	16	21	71	88	15.9
Per cent tenants.....	81	84	79	29	12	84.0
Av. number acres per farm	43	62	53	40	62	46.0
Av. impro'd acres per farm	26	43	38	16	8	32.2
Value of farm land per acre (\$)	8.12	10.21	13.81	11.80	10.53	11.65
Value farm land per farm...	350	636	728	468	652	535
Value buildings per farm.....	118	141	154	233	252	132
Value imp'm'ts and mach'y	26	33	40	33	40	30
No. dairy cows per farm.....	1.2	0.8	0.9	1.8	1.8	1.14
No. work horses per farm.....	0.4	0.1	0.2	0.8	0.8	0.33
No. work mules per farm.....	0.5	1.0	0.8	0.2	0.2	0.79
Acres of corn per farm.....	5.8	12.4	12.1	4.7	2.1	7.4
Acres of cotton per farm.....	14.8	21.2	18.1	5.7	0.2	17.7
Bushels of corn per acre.....	11.3	10.0	12.3	11.4	17.4	10.5
Bales of cotton per acre.....	0.27	0.34	0.37	0.30	0.45	0.26

As before, the eastern division of the red hills leads in the amount of land cultivated, per square mile, per farm, and per inhabitant, probably because so much of the area is comparatively smooth, moderately fertile and easily tilled. The western division has more fertile soils but rougher topography, and the regions farther south have poorer or more swampy soils. The largest investments in farm property are in Mobile County, for reasons already given, and the pine hills region still leads in all sorts of animals except mules and hogs. It is the only region that has more horses than mules, as previously indicated. (In 1910 there were very few automobiles or tractors on Alabama farms, but now they are gradually taking the place of horses and mules, and they will have to be reckoned with in future censuses.) The pre-eminence of the lime-sink region in hogs is doubtless correlated with the large peanut crop.

The apparent value of nearly everything in these tables just about doubled between 1900 and 1910. This is partly because of actual improvements, and the "unearned increment" of land values caused by increasing population, but mostly because of the shrinkage of money values, which was due primarily to discoveries of gold in the Klondike region and elsewhere since 1896. This shrinkage during the decade amounted to about 60 per cent, making a two-thirds increase in apparent values of commodities. At the present time the inflation of currency, and other conditions resulting from the recent war, have still further boosted prices, so that those of 1920 are just about double those of 1910 on the average; a fact which must be borne in mind in trying to estimate present conditions from past developments.

TENURE OF FARMS.

Tables 34 and 36 show the conditions of farm tenure in the several regions in 1900 and 1910. The former is in two parts, the first classifying owners and tenants according to race, and the second dividing white and colored farmers into three tenure classes. The census recognized five tenure classes, namely, owners, part owners, managers, cash tenants and share tenants, but in order to simplify matters the owners and part owners are here combined, and the managers, who constitute usually less than 1 per cent, omitted. (The difference between 100 and the sum of the

tenure class percentages in any column represents the percentage of managers.) The percentages for white and colored add up to 100 in each case, "colored" here including a small fraction of Indians and Mongolians.

Without going into tiresome details, it will be readily seen that there is practically everywhere a larger proportion of owners among the white farmers than among the negroes, and if tenancy is taken as an indication of inefficiency, the negroes are least efficient where they are most numerous, as already indicated by the statistics of illiteracy and farm building values. (But tenancy may also be correlated with high land values, for tenants are very numerous in some of the fertile north central states.) The proportion of owners is high among both races in the southwestern pine hills, presumably because the cheapness of the cut-over land makes it easy to own a farm there. The farmer who first clears a given piece of land usually owns it, and many of the farms in this region are still in the possession of those who first carved them out of the wilderness. Share tenants are (or were) more numerous than cash tenants in the eastern division of the red hills, but the reason for that is not at present apparent.

The farm tenure table for 1910 (No. 36) is arranged differently from that for 1900, on account of more complete data being available than in previous censuses. The upper half is for owners and part owners and the lower for tenants, managers being omitted as before. In the last three columns native and foreign whites are separated.

Tenant farms are everywhere smaller than those operated by their owners, but have a larger proportion of the land improved, for a tenant is not likely to pay rent on much wild land. A tenant's buildings are usually decidedly inferior to an owner's in the same region, but in Mobile County we find an exception, the tenant farms having a little more land in cultivation and being much more valuable than the owner's farms. The reason for this is not very plain, but it may be that the rented farms are mostly truck farms near the city, which are too valuable for the average individual to own outright.

Apparently the same rule holds with tenants as with negroes (and indeed the two classes are largely identical), namely, where they are most numerous they are least efficient. The large proportion of foreign farm owners in

the pine hills is noteworthy, and indicates a condition rather rare in the typical South, but common enough in the truck-farming districts of New Jersey, perhaps because Europeans are more accustomed to intensive farming than Americans are.

COLOR OF FARMERS.

The 1910 census is the only one that gives farm values and related details for the two races separately by counties, and even then the data are much less complete than for the two races combined. Table 37 gives practically everything of importance on this subject for southern Alabama that can be extracted from the census, and from the special volume on negro population published in 1918.

White farmers naturally have larger farms and better buildings and more machinery than the negroes, but the latter usually have more valuable land and cultivate a larger proportion of it, for the reason already indicated under tenants. The largest holdings of white farmers are in the most fertile region, where they are in the minority, while negroes seem to do best in the lime-sink region, where they are least numerous and therefore have the most white neighbors to set them the example. (In traveling through that region one cannot always distinguish a negro's house from a white man's without seeing some of the occupants, but there is seldom any uncertainty on that point in the western red hills, except among the "mountains.") The best buildings for both races are in Mobile County, on account of the influence of the city there.

The average negro in this part of the world is a "one-horse" farmer, and his horse is usually a mule, except in the pine hills; while the white man averages about half a horse and a mule besides. Among both races the mule is decidedly the favorite work animal in the southeastern part of the State and the horse in the southwestern (as in most parts of Florida), as already observed. The white farmer has over twice as many cows as his black neighbor in the western red hills, and about $1\frac{1}{2}$ times as many in the other regions. Cows are most numerous per farm in the pine hills.

Negroes specialize on cotton here more than the whites do (and this seems to be the case throughout the cotton belt), but do not usually make quite so much per acre in spite of having more fertile soil on the average, the difference being perhaps due to the use of less prolific varieties or less fertilizer. In corn, one of the simplest and most widespread of all American crops, there is not much difference between the two races.

VARIATIONS IN SIZE OF FARMS.

The figures for average size, value, equipment, expenses and products of farms in the foregoing tables, obtained by dividing the regional totals by the number of farms, tell nothing about how many farms rank above and below the average and how far the extremes depart from the average. But we have data on this point for *size* of farms at several different censuses. Those of 1860 and 1870 grouped all farms in each county and state according to whether the number of *improved* acres was below or above 3, 10, 20, 50, 100, 500 and 1,000 acres. In 1880 and 1890 the same numbers were used, but for *total* acreage instead of improved acreage (although improved acreage seems the more significant). In 1900 two additional divisions were inserted between 100 and 500, namely at 175 and 260 acres; and in 1910 the same grouping was used, and given for white and colored farmers separately in the South ("colored" including a few Indians, etc., which however do not materially affect the results).

The results for 1910 are probably typical enough to illustrate the general principles at least, and from them have been constructed for each of the regions here treated statistically a series of curves showing the range of size of farms for white and colored farmers separately. (Fig. 28.) In this diagram vertical distances represent acres and horizontal distances percentages, and the distance from any point on any curve to the right-hand edge corresponds with the percentage of the total number of farms that are of the size indicated or larger. The space between each curve and the base-line may be regarded as filled with a multitude of narrow columns, one for each farm, with lengths proportional to the size of farms, and arranged *in order of length*.

The two curves for the whole State are shown in full; but to treat those for all the regions in the same way, on a scale small enough to bring them within the limits of a page, would crowd them too close together. The regional curves are therefore plotted on a scale about twice as large, and their extremities left off. On each curve the point corresponding to the regional average is marked by a cross, and this shows that about one-fourth of the farms are above the average in size and three-fourths below.

FIG. 28. Graph showing gradations of farm sizes for white and colored farmers in different parts of southern Alabama and in the whole State, 1910.

It will be noticed that in the State as a whole about 8 per cent of the colored farmers had larger farms (whether owned or rented) than the average white farmer. In the eastern red hills this figure rises to 16 per cent, while in the western division it sinks to about 5 per cent, which is a minimum as far as the area treated is concerned, but probably not as low as in the near-by black belt. This again agrees perfectly with what has already been brought out about the relation between the numerical strength and efficiency of the two races.

If similar data were only available for number of improved acres, value of farm land and buildings, number of domestic animals, etc., the resulting curves would doubtless have the same general form, being steepest in the highest portions, and this seems to be a fundamental relation for

many kinds of statistics, such as size of cities, ages of the population, and *per capita* wealth and education, too, if we could get any information on those points.

CROPS.

Relative importance.

The relative importance of different crops of course varies from year to year, but it will probably suffice for present purposes to give statistics of the crops of 1909 only, as returned to the census enumerators in the spring of 1910. (Earlier censuses do not give the desired information about the lime-sink region, on account of the non-existence of Houston County, or enough data about crop values to enable us to determine the aggregate value of each crop.)

Value is made the basis of comparison rather than acreage, partly because the census does not give the acreage of orchard crops, but chiefly because an acre of vegetables or strawberries requires much more labor and fertilizer and brings a much larger return than an acre of corn or cotton. The value of each crop in each county is not given by the United States census (as it is by some states, such as Florida), so that we have to estimate it by dividing the total value for the State by the number of acres, pounds, bushels, etc., and assuming that the same value prevails in each county.

Tomatoes, onions, cucumbers, watermelons, cabbage, lettuce, sweet corn, etc., are all lumped together by the census under the head of "vegetables," which is rather disappointing, and gives that category a much higher rank than it would have if its components were separated. But taking southern Alabama as a whole, the most important "vegetable" (other than potatoes, which are returned separately) is probably the watermelon.

There are some later crop returns in Bulletin 79 of the State Department of Agriculture and Industries (1918), which embodies the results of a farm survey of Alabama made in 1917 by school children under the direction of F. W. Gist; but on close inspection of the tables it appears that the inquiries must have been made chiefly of the more progressive white farmers, so that the results cannot be taken as typical of the whole situation. (The inferior tenants were indeed expressly excluded from the investigation, al-

though their crops are not separated from the rest in the markets; but there is no statement as to whether any negro farmers were interviewed or not.) That bulletin indicates with reasonable certainty, however, a decline in the relative importance of cotton and an increase of most other crops, especially peanuts and hay.

Table 38 lists all but the least important crops, in approximately the same order as in the census reports, with the estimated percentage that each makes of the total crop values of each region and the whole State. The percentages are given only to the nearest tenth, so that all below .05 are represented by 0.

TABLE 38.

Relative importance (with percentages to the nearest tenth) of different crops in the several regions of southern Alabama, 1909.

	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile County.	Whole State.
Cotton (lint)	57.1	57.9	52.6	31.8	2.7	51.4
Cottonseed	9.8	9.9	9.0	5.5	0.5	8.9
Corn	15.6	19.5	22.2	19.0	11.9	19.8
Oats	1.1	0.9	1.1	1.1	0.1	1.5
Rice	0	0	0	0.3	0	0
Dry peas (cowpeas?)	0.6	0.4	0.1	0.3	0.1	0.5
Dry beans	0	0	0	0	0.1	0
Peanuts	0.6	4.5	6.9	0.5	0.1	1.0
Irish potatoes	0.3	0.2	0.3	4.0	12.2	0.6
Sweet potatoes	2.7	2.0	2.9	12.2	11.5	2.5
Other "vegetables"	3.3	2.5	4.4	5.7	20.3	3.7
Tobacco	0	0	0	0.6	0.8	0
Hay and forage	1.4	0.5	0.7	5.3	6.6	2.3
Sugar-cane (syrup)	1.7	1.8	2.6	3.8	4.0	1.1
Sorghum (syrup)	0.1	0	0	0.1	0	0.3
Apples	0.1	0	0	0.1	0	0.4
Peaches	0.2	0.1	0	0.4	0.1	0.7
Pears	0.1	0	0	0.2	0.8	0
Grapes	0	0	0	0.1	0.3	0.1
Figs	0.1	0.1	0.1	0.3	0.4	0.1
Oranges	0	0	0	0.2	0.1	0
Strawberries	0	0	0	1.2	0.5	0.1
Pecans	0	0	0	0.2	0.4	0

As can be quickly ascertained by picking out the bold-face figures, cotton is (or was) most important in the red hills and lime-sink region and almost unknown near the

coast (partly because the late summer rains there interfere with picking the crop), rice in Baldwin County, cowpeas in the western red hills, beans in Mobile County, peanuts in the eastern red hills and lime-sink region, Irish and sweet potatoes in the pine hills, other vegetables in Mobile County (for details see page 83), sugar-cane in the pine hills, sorghum in the western red hills (but still more so farther north), and pecans and all kinds of fruits in the pine hills. (Strawberries may be an exception to the last statement, for the great strawberry center of southern Alabama is Castleberry, at the southern edge of the lime hills, in a county which has not been used in the statistics because it is nearly equally divided between three regions.) Radishes, which the census does not mention, are said to be shipped mostly from Greenville, in the western red hills.

Average yields.

In the regional descriptions and in Table 37 the average yield of cotton and corn per acre for white and colored farmers in 1909 has been given. Table 39 shows the yield at the same period, for all farmers combined, in each region large enough to get statistics for, of all crops for which the census gives both acreage and yield by counties, omitting the less important crops as before. As compared with Table 38 this leaves out "vegetables," because they cannot all be measured in the same units, and tree crops, because the census gives for them the number of trees instead of the acreage. Where the acreage of a given crop is very small in some regions the corresponding yield is omitted because the chances of error in enumeration are too great. The computed yield of cowpeas, velvet beans, peanuts and sorghum syrup of course does not fairly represent the possibilities, on account of a considerable part of those crops being used for forage.

One who had not looked into the matter might suppose that the yield per unit area of any crop would depend largely on soil fertility; and although that may have been the case in the early days, it is hard to discover any such relation in the above table. The yield varies much less from one region to another than does the soil fertility, percentage of improved land, etc., and sometimes the variation is in the opposite direction. It is easy to understand why no region

TABLE 39.

Yield per acre of certain crops in southern Alabama, 1909.

CROPS AND UNITS	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile County.	Whole State.
Cotton (bales)	.295	.373	.389	.339	.420	.300
Corn (bushels)	11.2	11.1	14.0	12.9	20.7	11.9
Oats (bushels)	12.5	12.8	14.8	16.5	19.4	12.6
Rice (bushels)				18.9		18.5
Dry peas (cowpeas?) (bushels)	5.95	5.65	7.50	6.72	9.20	4.91
Dry (velvet?) beans (bushels)		9.65	5.90			9.80
Irish potatoes (bushels)	60.0	81.8	100.5	84.7	107.9	78.0
Sweet potatoes (bushels)	70.7	89.6	97.2	96.9	101.8	79.8
Hay and forage (tons)	1.22	0.89	0.82	1.11	1.19	1.05
Sugar cane (tons)	8.53	9.55	11.55	10.60	10.20	8.33
Cane syrup (gallons)	102	125	158	181	230	113
Sorghum cane (tons)	5.42	6.05				4.06
Sorghum syrup (gallons)	35.0	44.4				45.3
Strawberries (quarts)	1080			1230	1973	1580

is likely to have an average yield of any crop much below the State average, for obviously where the crop in question does not do well it is not likely to be raised in measurable quantities, and other crops better adapted to the locality will be raised instead.

And although the yield may fluctuate from year to year with the weather, prevalence of certain insect pests, etc., there is probably little change from one decade to another, except a gradual upward tendency as the population becomes denser and farming more intensive. The differences that exist between different regions in this respect can be correlated with density of population about as well as anything else. (That in turn indeed depends somewhat on soil fertility, but not as much now as it did before commercial fertilizers came into use.) For example, the natural fertility of the soil is unquestionably greater on the average in the red hills than in the lime-sink region, and yet the latter has higher yields of most crops; which harmonizes very well with what was said on page 56 about its denser population indicating intensive farming. And Mobile County, which has some of the poorest soil in the State, has the highest yield of most crops, even cotton.

The simplest explanation of the correlation of high crop yields with dense population is that (other things being equal) land in a thickly settled region is worth more than where people are fewer, and farmers working such land, in order to pay the higher taxes or rent, naturally have to produce more per acre, by selecting prolific varieties or spending more for labor or fertilizers, or both. In any part of the United States the yield of any common crop, such as corn, can easily be ascertained from census reports to be generally greater in thickly settled regions than elsewhere, though of course there are other factors that enter into the problem, such as its relative importance compared with other crops; and soil fertility is not without some influence. (Many or most crops that are raised in both hemispheres have a larger yield in Europe than with us, for similar reasons.)

The race of the farmer seems to have little to do with crop yields, as can be seen in the case of cotton and corn in Table 37. But it should be borne in mind that for any given crop the yield per acre probably varies much like the size of farms discussed a few pages back; namely, in every region there must be many farmers whose yield is below the average, and a few far above. However, those who get the largest yields do not necessarily make the most profit, for according to the economic law of diminishing returns there is always a point beyond which further efforts or expenditures do not pay.

ANIMAL PRODUCTS.

In the foregoing regional descriptions and general agricultural tables there has been given the number of useful animals of various kinds per farm, but nothing about the meat, milk, eggs, wool, honey, etc., produced by them, except for the lime-sink region. Such information is needed to complete the account of agricultural operations. It was gathered more completely by the 13th census (1910) than by any previous one, but that still leaves much to be desired. In the case of crops the aim seems to have been to return the total yield, without deducting the portion consumed on the farms, but for animal products sometimes the total production, sometimes the surplus sold, and sometimes both are given.

Table 40 shows for the average farm in each region for which we have statistics (separating Mobile County from Baldwin and Escambia as before) for 1909 the number of cattle, horses, sheep, hogs, etc., sold or slaughtered, the number of chickens and eggs produced and sold, the amount of wool, milk, butter and honey produced, and the value of each, with certain additions and limitations as indicated. The total value of animal products cannot be given very exactly, for the census does not give the value of milk and cream consumed on farms; but probably most of that either reappears as butter or is fed to live-stock, so that the omission does not make much difference. The census makes no returns of hides and feathers, or of fish, rabbits and other game occasionally sold by farmers, and apparently none of animals killed and paid for by railroads, automobilists, etc., but those items are relatively insignificant in this part of the country.

The data in the table are given *per farm*, but not *per acre*, for most of the animals are raised on free range or in woodland pastures, so that they bear little relation either to the amount of improved land or to the total farm acreage. The difference between the quantity produced and the quantity sold, where both figures are given, gives some idea of how much of that particular kind of food the average farm family consumes in a year, and some interesting differences between different regions in that respect can be noted.

The total value of animal products in any region is roughly proportional to the urban population, for milk and butter, chickens and eggs—especially milk—are marketed chiefly in near-by cities. For this reason Mobile County is far ahead of other parts of southern Alabama in most animal products; and in amount of milk sold per farm its average is over twenty times the State average. The animal products also vary inversely with the degree of specialization in cotton, the western red hills and the southwestern pine hills representing nearly the two extremes within the area treated. There is abundant testimony—which will doubtless be corroborated when the agricultural results of this year's census are published—to the effect that cotton has declined in importance in the last decade and live-stock increased correspondingly; and this has led to the establishment of a meat-packing plant at Andalusia. The lime-sink region leads in the production of pork, and in animals

TABLE 40.

Selected animal products per farm, in southern Alabama, 1909.

QUANTITIES.	Western red hills.	Eastern red hills.	Lime-sink region.	Baldwin & Escambia.	Mobile County.	Whole State.
Animals sold or slaughtered:						
Cattle (including calves)	0.96	0.76	0.71	1.17	1.53	1.06
Horses, mules, etc.	.04	.07	.06	.04	.03	.08
Hogs	2.06	5.20	8.26	3.17	2.40	2.80
Sheep and goats	.66	.61	.06	.27	.72	.15
Wool, fleeces shorn	.15	0	.33	5.82	2.38	.33
Gallons of milk produced	197	213	202	294	547	300
Gallons of milk sold	0.85	2.36	4.18	7.36	266	12.9
Pounds of butter produced	64.2	83.5	76.5	76.4	57.8	112.4
Pounds of butter sold	2.8	4.1	4.8	9.1	13.9	10.7
Number of poultry raised	34.5	39.6	41.8	44.8	50.4	42.1
Number of poultry sold	5.7	6.5	8.3	12.6	15.6	10.2
Dozens of eggs produced	52.0	71.0	74.5	96.2	140.5	74.7
Dozens of eggs sold	12.1	18.7	23.4	31.4	67.6	29.2
Pounds of honey produced	3.9	3.9	3.3	5.3	7.3	3.4
VALUES (in dollars)						
Animals sold on the hoof	13.72	17.37	14.15	17.15	21.35	21.04
Animals slaughtered	19.55	51.10	72.80	26.80	16.20	29.00
Wool and mohair produced	.10	0	.17	5.05	1.91	0.23
Dairy products (excluding home milk and cream)	13.50	17.70	16.87	22.95	99.55	24.30
Dairy products sold	.73	1.35	1.73	5.64	88.00	5.16
Poultry and eggs produced	16.44	21.12	23.96	33.40	54.65	23.33
Poultry and eggs sold	3.46	4.62	6.18	10.51	23.75	7.67
Honey and beeswax produced	.42	.40	.35	.65	.95	.38
All animal products listed	64	108	128	106	195	98

slaughtered (which are doubtless mostly hogs), evidently on account of its large peanut crop, as already pointed out. In horses and mules and butter no region in southern Alabama comes up to the State average.

By comparing the number of animals of various kinds raised in a year with the number living on the average farm at the time of the census, as shown in Table 35, we can get the approximate birth and death rate for each species. Assuming that all animals were raised on the farms where found, and none bought, and that all animals raised are ultimately sold or slaughtered, (which of course is a rather faulty assumption), the average annual birth-rate for the

whole State ranges from about 5% for horses and mules and 29% for cattle to 56% for hogs and 110% for poultry.

The amount of milk, butter, poultry and eggs consumed by the average farm family in a year, obtainable by subtracting the amount sold from the amount produced, is a crude index of the standard of living, and is roughly proportional to the value of farm buildings. Eggs are perhaps the most reliable indicator for this purpose, though of course it would be easy to point out discrepancies when different states or regions are compared. The average farm family in the eastern division of the red hills consumes more of all these things than in the western division, but that difference is probably due almost entirely to the different racial composition of the population, and if separate data for the two races were available the whites in the western division would doubtless be found to rank higher than in the eastern in this respect, as they do in literacy, value of farm buildings, etc. The consumption of butter on farms in all parts of southern Alabama is below the State average, which suggests a temperature relation, for dwellers in the tropics eat much less fat than the Eskimos do. (The average consumption of butter per farm in 1909 was nearly 102 pounds in Alabama, 115 in Kentucky, 28 in Florida, and less than 4 in Dade County, one of the southernmost counties in Florida.)

ADDITIONS AND CORRECTIONS

Page

14. The initials L.-S. and P. H. on the map indicate small disconnected areas of the lime-sink region and southwestern pine hills.
- 18 (and 121). The fact that the number of farm owners and tenants was given by the census of 1890 was overlooked when these pages were written, though taken advantage of in Tables 3, 7 and 15.
19. In line 33, before *plates* read *on*.
22. A paper on the relations of soil, climate and civilization in the southern red hills of Alabama is being published in the South Atlantic Quarterly (Durham, N. C.), vol. 19, no. 3, almost simultaneously with this report.
48. In line 16, for *newspaper* read *newspapers*.
51. The boll-weevil monument in Enterprise is said to have been unveiled on Dec. 11, 1919.
57. The 1920 population of Dothan was announced on June 10 as 10,034.
63. Fig. 21 is from the same photograph used in Monograph 8, fig. 47.
64. Fig. 22 is from a photograph previously published in the Journal of the Elisha Mitchell Scientific Society (Chapel Hill, N. C.), October, 1918. (See title no. 8, page 22 of this work.)
69. For notes on the distribution of the southeastern "salamanders" see Science II. 35:115-119. Jan. 19, 1912. (To this day the writer has never seen one of the animals.)
72. The "Creoles" of Mobile are said to differ from the better-known ones of New Orleans and vicinity in having a perceptible amount of negro blood.
74. Revised figures for the 1920 population of Mobile issued by the Census Bureau on June 15 place the total at 60,151.
93. Some of the Eocene formations of Alabama, particularly the Claiborne at the bluff of that name on the Alabama River in Monroe County, are noted for the abundance and variety and excellent state of preservation of their fossil shells.
99. Electricity from the Pea River power plant is said to be used also at Enterprise.

INDEX

This index includes both plant names and miscellaneous subjects, with a number of synonyms and cross-references for the benefit of persons who may know some of the plants or other things better under different names from those used herein. Where a given item, like negroes, foreigners, farms, tenants, horses, or value of buildings, is treated in the same way in each of several regional descriptions or statistical tables references to such places are usually omitted. Numbers in parentheses refer to pages where the items in question are mentioned indirectly or under different names. Technical names are italicized and common names of plants put in quotations, to facilitate the finding of names belonging to either of these classes. In cases where a genus of plants is represented by only one species in southern Alabama the specific name is usually omitted in the index to save space.

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