

PART V
GEORGIA THE EMPIRE STATE
OF TODAY

CHAPTER I

GEORGIA'S COMMERCE AND MANUFACTURE

TRADE RELATIONS WITH THE INDIANS STARTED BY OGLETHORPE—SILK AND INDIGO INDUSTRIES—EARLY COMMERCE BETWEEN SAVANNAH AND AUGUSTA—TRADE WITH ENGLAND FORBIDDEN BY CONTINENTAL CONGRESS—AN INCIDENT OF THE REVOLUTION—THE INVENTION OF THE COTTON GIN—ITS EFFECT UPON COMMERCE—EARLY CANALS AND WATER-WAYS—WILLIAM LONGSTREET'S EXPERIMENTS WITH THE STEAMBOAT—THE ADVENT OF THE IRON HORSE—AN ERA OF RAILROAD BUILDING—PIONEER COTTON MILLS AND IRON-WORKS—PRESENT DAY STATISTICS—GEORGIA FIRST IN THE MANUFACTURE OF FERTILIZERS—RIVERS AND HARBOUR—GEORGIA'S STATE CHAMBER OF COMMERCE—WATER-POWERS—THE COTTON-SEED OIL INDUSTRY IN GEORGIA—AUTOMOBILES—GOOD ROADS—MAIL ROUTES.

[This chapter has been prepared with great care from the annual reports of Hon. Harris M. Stanley, Commissioner of Commerce and Labor, made to the Governor of Georgia for the years 1913 and 1914, with supplementary additions.]

When General Oglethorpe, in 1733, began at Yamacraw Bluff to lay the foundation of Savannah and the colony of Georgia, he sought by treaties with the Indians to secure their esteem and friendship and to plant the germ of a future rich commerce for English traders. Georgia was to be a place of refuge for the oppressed, but was also to serve as a defense to South Carolina against the Spaniards, who had twice invaded that colony. Nothing was better calculated to establish and strengthen Georgia, the "Sentinel Colony," than to win the Indians to the side of the English by supplying them with such articles as they prized most highly. Therefore trading posts were established, of which Augusta stood at the northern part of the settlement and Savannah at the southern. It was to give impetus to the commerce of Georgia that a prize was offered to the first vessel that should land a cargo at the wharf of Savannah. This prize, a gold cup, was won by Captain Yoakley, who in 1734, discharged at the dock supplies of tools, clothing and provisions.

It was intended that some of the settlers of Georgia should cultivate the indigo plant, while others should cultivate mulberry groves for the supplying of food for the silk worms. Great hope was entertained of the success of silk production in Georgia, when a silk dress made in the new colony was presented to the Queen of England. But after experiments of this kind conducted by Swiss experts had failed to produce satisfactory results, this scheme was abandoned. The experiments in indigo cultivation met with a like fate. The Georgians then turned to rice, Indian corn, cotton and other things common to their neighbor colonies.

Augusta was laid out in 1735. There a garrison was established in the following year and several warehouses built and furnished for trade with the Indians. The best of facilities were already at hand in the Savannah River and down this stream boats impelled by long poles made four, or five voyages annually to the coast whence their cargoes were transferred to vessels for Charleston. Gradually Savannah grew in importance until it became Georgia's seaport and the voyages to Charleston were no longer necessary.

Vessels of different sizes unloaded their cargoes at the wharves of Savannah and were loaded with the products of the colony and the wares furnished by the Indian trade and brought down the river from Augusta in the long pole boats. Savannah was already giving promise of her future importance as a seaport, when Georgia joined the other American colonies in the struggle for independence.

An indirect proof of the progress of Georgia's commerce in those early days of the commonwealth is given by the following incident:

In March, 1776, some loyalist planters had loaded eleven merchant vessels in the Savannah River, which vessels were preparing for a sea voyage. This trade with England had been forbidden by the Continental Congress, which the united colonies, in their struggle for the defense of their chartered rights, had made their agent for the conduct of all that pertained to the common interest. Although independence had not yet been declared, Georgia had, after the battle of Lexington, allied herself with the other twelve colonies. The Georgia authorities considered it their duty to break up this commercial scheme for violating the orders of that body, which all the colonies had jointly constituted the supreme power over them all, in the crisis so dangerous to their rights and liberties, therefore a band of Georgians led by Col. Lachlan McIntosh, aided by South Carolinians under Colonel Bull, in defiance of several British war vessels that were threatening Savannah, made a sudden raid upon the merchant vessels, burned three of them and rendered six others unfit for service. Two only out of the eleven escaped. The infant state was thus ready to sacrifice its commerce for the common good.

The invention of the cotton gin by Eli Whitney, in 1793, gave to the agricultural South the means of handling to the best advantage large crops of cotton, and thus furnished that section with the sure foundation for great manufactures and a rich commerce. The export of cotton from the entire United States in 1793 was 975 bales or 478,500 pounds, and in Liverpool doubts were expressed about the possibility of raising that much cotton in the United States. But in 1911, the largest crop of record, there were raised in the United States more than 16,000,000 bales, aggregating \$125,140,000 pounds. Of this amount more than 2,000,000 bales or about 1,000,000,000 pounds were exported from Savannah, Georgia's chief seaport. The value of Savannah's exports has reached \$16,000,000 in a single month.

The cotton of Georgia has been for a hundred years the chief staple of export. Naval stores come second. To the lint cotton have been added during the last twenty-five years the products obtained from the cotton seed. The fertilizer factories have taken rank among the fore-

most of the state's manufactories and help to swell the foreign exports of Savannah and Brunswick and the trade of the many flourishing and enterprising cities and towns of Georgia.

Before the coming of the railroads, rivers were the great highways of commerce, and a town without water communications to the sea had little chance to grow commercially. In those days Savannah was the chief city of Georgia and Augusta next. Brunswick, Darien and St. Marys being on the coast were regarded as coming great cities. Columbus, Macon and Rome were thought to possess superior advantages to any inland town.

But when in the '30s of the last century the construction of Georgia's splendid system of railroads was begun, it soon became evident that seaport and river towns must accept as rivals those that were springing up all along the railroad lines and forging to the front as centers of manufactures and commerce.

All the flourishing and rapidly growing interior towns of Georgia, and even those upon the rivers and coast that have maintained to a large extent their pre-eminence among their sisters, owe their high stand as centers of manufactures and commerce to the wisdom of the men who in the very dawn of railroad construction in the United States determined that Georgia should keep pace with the foremost. Those plans they perfected and our enterprising citizens continued the work so well begun, when on December 24, 1825, our General Assembly chartered the Savannah, Ogeechee and Altamaha Canal and at the same time provided for the building of a railroad.

When at last in 1833 they were ready to begin the work of construction, not merely one single road, but a system of roads was begun destined to center at what was then a forest and where now stands Atlanta, the child of railroads.

Georgia, since the early '30s of the last century has been styled the "Empire State of the South." But she did not receive this title on account of area or population. Virginia at that time excelled Georgia in both these particulars, for Virginia and West Virginia then formed one state. Although Georgia was recognized as an agricultural state, her enterprising citizens were already diversifying her industries, and commerce and manufactures were receiving much attention.

William Longstreet, a resident of Augusta, and a citizen of Georgia, had as early as 1787 begun experiments on a boat to be propelled by steam. Without the backing and financial aid of influential men such as aided Robert Fulton, he patiently toiled, and in 1806, with a few friends who were willing to risk their lives upon the new and untried craft, he took his steamboat several miles down the Savannah River and back again to Augusta, and landed amid the cheers of those who had formerly ridiculed his folly. Delaying another year, perfecting his invention, just as his friends were starting to Washington to secure his patent, the news came of Fulton's successful voyage in his steamboat, the Clermont, up the Hudson to Albany and back to New York City. Had Longstreet acted with more promptness, he might have won the

honor that fell to Fulton; who, however, was preceded by John Fitch, by several years. Fitch did not have the means to push his invention.

But Georgia finds compensation in the fact that William Scarborough, of Savannah, an enterprising merchant and a planter of large means first proved that steamships could safely sail the stormy Atlantic. It was Scarborough who sent from Savannah, in 1819, the Steamship Savannah, which touched at Liverpool, Copenhagen and St. Petersburg, exciting wonder and admiration in every port.

On the 24th of December, 1825, an act of the Georgia Legislature was approved by the governor, which granted a charter for the construction of a central canal or railway, starting at the Savannah River. The great Erie Canal in New York had been recently completed and George Stephenson, in England, had on September 27th, 1825, proved to his incredulous countrymen that a locomotive could safely draw a train on rails at the rate of fifteen miles an hour.

Therefore Georgia, in that same year, December 24th, having resolved to keep pace with the rest of the world, determined to have either a canal or a railway, whichever should prove most feasible. A year before that, Ebenezer Jencks, had been empowered to construct a canal from Savannah to the Ogeechee River. The act of 1825 chartered the Savannah, Ogeechee and Altamaha Canal and also provided for the building of a railroad. The Brunswick Canal Company was chartered on December 26, 1826, for the purpose of connecting the Altamaha and Turtle rivers.

George Stephenson's improved engine, the Rocket, first ran in 1829 upon the Liverpool and Manchester Railroad in England. By that time several short railroads had been built in the United States, but the cars for either passengers or freight were drawn by horses. The first steam locomotive was brought from England in 1829, but it proved a failure. Peter Cooper, in 1831, built the first American locomotive, the "Tom Thumb," for the Baltimore and Ohio Railroad. The "Best Friend," built for the South Carolina Railroad, was the first steam locomotive successfully operated in America. This was in 1831 and this same South Carolina railroad from Charleston to Hamburg on the Savannah River, opposite Augusta, a distance of 134 miles, when completed in 1834, was the first long railroad in the world.

The first charter for the Georgia Railroad from Augusta to the westward was granted December 27, 1831, altered and approved December 31, 1833. The Central Railroad Company was chartered December 27, 1833, for the building of a railroad from Savannah to Macon, and on December 23d of the same year the Monroe Railroad Company was chartered for the building of a railroad from Macon to Forsyth. The work on these roads was at once begun and Georgia, quickly springing to the front in railroad construction and the building up of cotton mills and other manufactures, was hailed as the "Empire State of the South."

In 1837, the southeastern terminus of the Western and Atlantic (or State) Railroad, chartered December 21, 1836, was located near where

the Union Passenger Depot of Atlanta now stands. This was selected as the meeting point of the roads from Augusta and from Savannah (via Macon) through branch roads to Madison and Forsyth, and of other roads to Athens, Milledgeville and Columbus. This meeting point, until 1843, had no other name than Terminus. At that time the little settlement received the name of Marthasville, as a compliment to the daughter of Ex-Governor Lumpkin, who had been one of the most zealous promoters of railroad enterprise in Georgia. When the town had reached a population of about 500 and was giving every evidence of rapid growth, the Legislature incorporated it as the "City of Atlanta," (December 29, 1847), this name having been suggested by Mr. J. Edgar Thomson, chief engineer of the Georgia Railroad, in a letter written sometime in 1846 to Mr. Richard Peters, also an engineer of the same road. By 1850 Atlanta had a population of 2,572 inhabitants and by 1860 contained in its corporate limits in round numbers 10,000 people.

In 1850, with 643 miles of railroad, Georgia stood in the front rank, and with 7,300 miles of track at the present time she still excels all Southern States except Texas, and excels even that great empire, if mileage in proportion to area is considered. She also compares favorably with the great states of the North and West.

Georgia's 400 miles of electric railway, and her system of good roads for automobiles, greatly improved and more widely extended each year, add to her reputation for activity in every line of enterprise. The commercial interests of Georgia have been built up by agriculture, manufactures, and railroads, as evidenced by the growth of her cities and towns and their great volume of exports and imports through the ports of Savannah and Brunswick. The volume of business of Savannah for the past five years averages \$249,820,000 yearly. The bank clearings of Atlanta increased from \$60,753,911.13 in 1893 to \$691,941,254.20 in 1914. The bank clearings of Macon, Augusta, Columbus, and the other cities and towns of the state show a like increase and indicate the volume of business annually transacted in Georgia.

So soon as Morse, in 1844, first demonstrated the practicability of the electric telegraph, Georgia began establishing telegraph lines. With the same promptness Georgia accepted the telephone and has extended its lines in every direction. Everything that indicates enterprise and push is familiar to Georgians.

The oldest cotton mill of which we have any record in Georgia was located in Wilkes County, near the site of the present Town of Washington. It was chartered by an act approved December 13, 1810, and the original charter of this pioneer establishment may be found in Clayton's Compendium. The incorporators named in the charter were: Matthew Talbot, Bolling Anthony, Benjamin Sherrod, John Bolton, Frederick Ball, Gilbert Hay, and Joel Abbot. Matthew Talbot afterwards became a governor of the state, and Joel Abbot at a later period served in Congress.

It was in 1827 that Augustin S. Clayton, Thomas Moore, Asbury Hall, James Johnson and W. A. Carr began the erection of a cotton mill

which was incorporated in 1828 as the Georgia Factory, located at Whitehall, near Athens. John White became superintendent and his descendants to this day own this mill, known as the Georgia Manufacturing Company.

One of the early cotton mills was the Princeton Manufacturing Company, also near Athens, finished and at work in 1837. Another was the factory at High Shoals in a part of Clarke, now Oconee County, finished in 1845. At Long Shoals on the Oconee River, in Greene County was the property of the Cutright Manufacturing Company, consisting of a cotton factory reporting 4,000 spindles and looms; also flouring and saw mills and an elegant stone bridge. The property of this company, which covered a large tract of land, was returned as \$140,000.

About the same time there were factories in operation at Milledgeville, in Augusta, and within three miles of Eatonton.

The Milledgeville Manufacturing Company's building was of brick, four stories high, with a capital of \$83,000, and equipped with 3,136 spindles and 53 looms. The Putnam factory, three miles from Eatonton, had a capital of \$70,000, and was equipped with 1,836 spindles and 36 looms. It turned out daily 100 bundles of yarn and 1,000 yards of osnaburghs. About 100 yards of bagging were daily made from waste and inferior cotton. A quantity of rope was also made. The number of hands employed was 97. The wages were from \$12.00 to \$20.00 a month. The annual expense of the hands was \$7,000. The factory village had a Union Church, where a flourishing Sunday School was kept up the year round, and in which there was preaching nearly every Sunday. Since many of the hands were young men and young women, who had never had a chance for an education, the studies of an ordinary day school were combined with the study of the Holy Scriptures. A well attended night school gave additional opportunities for an elementary education. The young children of the factory operatives were also afforded the chance for an education in a day school.

Within a quarter of a mile of the Putnam Factory were a grist mill and a saw mill. The Augusta Cotton Factory, which began to be operated in 1847, had two mills: mill No. 1 with 8,160 spindles and 312 looms, for cotton goods; mill No. 2 with 6,280 spindles and 200 looms, for cotton and woolen goods. The product of the two mills, when in full operation, was more than 125,000 yards a week. There were, in Richmond County, two other cotton factories, the Richmond factory on Spirit Creek, 10 miles south of Augusta, with 1,500 spindles and 40 looms, and Bellville factory, eight miles from Augusta, the equipment of which is unknown. This last mill was the property of Mr. George Schley. There were also in and near Augusta, Cunningham's Flour Mills, with a building five stories high, and Warren and Colman's Mill, three stories high. These buildings were of stone and granite.

There were also in Augusta, Goodrich's Manufactory, where doors, blinds, sashes and almost all kinds of carpentry were manufactured; Osmand and Gray's American Iron Foundry, manufacturing iron and brass castings, railroad car and engine wheels, mill and gin gearing,

plows, water pipes, etc.; also a machine factory on Butler's Creek, seven miles from Augusta.

At Columbus, the Eagle Mills, (now the Eagle and Phoenix), were erected in 1851, with a building four stories high and a basement. The capital was started at \$140,000; hands employed, 240; consumption of cotton, 1,500 bales per annum; consumption of wool, 100,000 pounds per annum; spermaceti oil used, 1,000 gallons per annum; lard, 500 pounds per annum; 200 cords of wood per annum; 350 barrels of flour per annum. Average pay of males \$20.00 per month; of females, \$10.00 a month.

Other cotton factories were Coweta Falls factory, with a capital of \$80,000, and at a distance of three miles from the city was the Columbus factory, with a capital of \$50,000. There were also the Howard Manufacturing Company, with \$85,000 capital, Winter's Merchant Mill, eight stories high and costing \$30,000, and the Rock Island Paper Mill, two and a half miles above Columbus, partly in Georgia and partly in Alabama, with \$50,000 capital, capable of manufacturing 2,500 pounds of paper a day and consuming 3,000 pounds of rags daily.

In Macon there was, by 1850, the Macon Cotton Factory, with a capital of \$125,000, the equipment at that time not now being known. There were also two extensive foundries; first Findley's, with a capital of \$30,000, employing seventy hands and turning out steam engines with the necessary outfit of boilers, pipes, etc., also making machinery for saw and grist mills of every description, whether operated by steam or water power; second, Nesbet & Levy's, manufacturing steam engines and boilers, rice thrashers, bark and sugar mills, gin and mill gearing, water wheels, castings and machinery in general. Hands employed, 60; capacity 25 to 30 stationary engines per annum.

In and near Savannah were rice mills and foundries.

In the young and growing City of Atlanta there were by 1853: three carriage and wheelwright shops, two large tanneries, one iron foundry and machine shop, turning out products valued at \$20,000, one large shoe making establishment, two more large tanneries and shoe establishments in course of construction.

There were cotton factories in Butts, Campbell, Chatooga, Gwinnett, Hancock, Morgan, Newton and Cobb counties. The woolen mill at Roswell, established in 1839, was already winning a reputation for good products.

In Cass, now Bartow County, three miles from Camtersville, on the Etowah River, were the Cooper Iron Works, established and owned by Mark A. Cooper, who was born in Hancock County, April 29, 1830. This important manufactory, celebrated throughout the South in the '50s, embraced a rolling mill and a nail factory. It had houses for 500 laborers and under the same management was a stone mill, with a capacity of 300 barrels of flour per day. The war between the states wrought havoc with this fine property and large trees now grow inside the ruins of the once extensive buildings.

In the whole State of Georgia there were, in 1850, manufacturing establishments to the number of 1,522, including a large list of enterprises that minister to the needs of every civilized community. Among these were thirty-five cotton mills, several of which produced woolen fabrics, for the exclusive manufacture of which there were only three mills. The total value of all manufactures in the state at that time was \$7,082,075. Of this total, the cotton goods manufactured were valued at \$2,135,044.

There had been a steady increase of textile manufactures in Georgia from the first cotton mill in 1810 to the close of the nineteenth century. Each decade, even the one including the war between the states, showed an increase in capital invested, the cost of materials and value of products. There have been changes in the character and number of the mills. There was a decrease in the total number of textile mills from 1870 to 1880, but a large increase in the cost of materials and value of products.

Again, the total number of mills was one less in 1890 than in 1880, but the cost of materials and value of products showed a very great increase. There was an uninterrupted increase in the number of spindles and looms during each decade. The majority of the mills were out of the path of Sherman's desolating march and during almost the whole period of the war many of them were in operation.

Since 1900 there has been a gratifying growth in the textile manufactures of Georgia. The most rapid increase for any decade was from 1850 to 1860. Although there were fewer manufacturing establishments reported in 1910 than in 1900, there was not really any falling off. Many of the establishments, operated on a very small scale, were omitted. It sometimes happens that a textile factory changes its machinery, thereby increasing its producing power, and yet showing a less number of spindles and looms than at a previous report.

So far back as 1850 Savannah with barely 16,000 inhabitants was, on account of her exports of cotton, classed as one of the important cities of the United States. That city's importance as a seaport has steadily increased, and for the past fifty years she has ranked, sometimes as third and sometimes as the second cotton exporting city of the Union. The volume of her trade for the season of 1913 and 1914 was \$293,700,000, of which approximately \$117,000,000 is foreign commerce.

The bank clearings of Atlanta in 1893 were \$60,753,911.30. By 1913 they had grown to \$691,941,254.20, and by December 31, 1914, to \$702,410,026.00.

Giving the figures in round numbers, of Georgia's 2,700,000 inhabitants there are 1,200,000 engaged in gainful employments. Agriculture claims 735,000 of these, manufactures and mechanical industries, 145,000; transportation, 46,000, and commerce and trade 62,000.

Of Atlanta's 76,000 workers, manufactures and mechanical industries claim 22,000; transportation, about 8,000, and trade and commerce, 13,000. Of Augusta's 22,000 workers, about 8,000 are engaged in manufactures and mechanical trades; 1,800 in transportation, and 3,200 in commerce and trade. Of Macon's 19,500 employed, 6,000 in round num-

bers work in factories or mechanical trades. Transportation gives employment to 2,600 and commerce and trade, 3,000. Of Savannah's 34,000 employed, 8,500 are working in manufactures or in mechanical trades, 6,000 in transportation and 5,000 in commerce and trade. Still counting in round numbers, of Georgia's 62,000 engaged in commercial pursuits the four largest cities furnish 24,000.

In the manufacture of fertilizers Georgia is first, leading all of the other states. In the value of products from the cotton seed Georgia leads every state but Texas, and in turpentine and rosin is second only to Florida. In the manufacture of cotton goods Georgia stands fifth in the Union, being excelled by Massachusetts, Rhode Island, North Carolina and South Carolina, but being far in the lead of Pennsylvania and New York. In the value of food preparations Georgia yields to but five other states, viz.: New York, Michigan, Ohio, Illinois, and Iowa, but surpasses states like California, Pennsylvania and Massachusetts. In the manufacture of brick and tile Georgia ranks fifteenth, as she does also in the output of her wagon and carriage shops.

Previous to the war between the states Georgia led every southern state in textile manufactures, having made her start in that line in 1828, when the Georgia Factory, the first successful Georgia cotton mill, was incorporated at Whitehall, near Athens.

Previous to this, or in 1811, the first cotton factory in Georgia was built on Upton Creek, nine miles southeast of Washington. It had two stories, basement and attic, and was built of stone quarried in the neighborhood. The hinges, hooks and nails were made in a neighboring blacksmith shop. This factory did not pay and was closed. Later, the machinery was purchased by Thomas Talbot, who started a small factory on his plantation to furnish clothing for his slaves and those of his neighbors.

In addition to her many railroads, Georgia has several fine harbors from which sail to every port in the world large merchant vessels and passenger steamers to various ports, and a number of rivers navigable for steamboats. The Savannah is navigable from Augusta to the sea, the Chattahoochee from Columbus to its confluence with the Flint and then on to Apalachicola and the gulf, the Flint from Albany and Bainbridge to its confluence with the Chattahoochee and then on to the gulf, the Coosawatee from Carters in Murray County to its confluence with the Oostanaula and then on to Rome, the Coosa from where it receives the waters of the Oostanaula and the Etowah at Rome to its confluence with the Alabama and then on to the gulf, the Oconee from Dublin, a greater portion of the year from the Central Railroad bridge and frequently from Milledgeville to its confluence with the Ocmulgee and then on to the sea, the Ocmulgee from Hawkinsville and a greater portion of the year from Macon to its confluence with the Oconee and then on to the sea, the Altamaha from where it receives the waters of the Oconee and the Ocmulgee to the sea, the St. Marys and the Satilla for a considerable portion of their length and then there are other navig-

able rivers around Savannah, Darien, Brunswick, and St. Marys, mostly salt, furnishing an inland route from Savannah to points in Florida.

The freight steamships that carry the produce of Georgia to every quarter of the globe from our ports of Savannah, Brunswick, Darien and St. Marys and the coast line steamers that sail with freight and passengers to northern ports, all coming back with imports worth millions of dollars, have given a mighty impetus in Georgia to every kind of industry including a greater variety of manufactories than ever before.

The Georgians who are now in the middle period of their lives will yet see Georgia at the head in a variety of manufactures, passing even the rank she has held for many years as an agricultural state, sometimes standing fifth and sometimes fourth in the value of her crops.

Georgia stands at the door that opens into a great future; with enterprise and alertness she will enter in and possess her inheritance.

For the purpose of further advancing the interest of Georgia and making her title forever unassailable, the Georgia Chamber of Commerce was organized during the year.

While many progressive citizens of Georgia aided in the formation of this State Chamber of Commerce, the greater credit is due to Hon. Chas. J. Haden, of Atlanta, and Hon. Chas. D. McKinney, of Decatur. These two citizens labored earnestly and zealously not only to perfect this organization, but to put it upon a firm and lasting footing after the organization had been an accomplished fact.

The following are the officers of the organization:

President—C. J. Haden, Atlanta.

First Vice President—E. W. Stetson, Macon.

Second Vice President—I. A. Bush, Camilla.

Third Vice President—R. F. Maddox, Atlanta.

Fourth Vice President—W. A. Winburn, Savannah.

Executive Committee—L. R. Akin, Brunswick; P. M. Atkinson, Madison; E. Y. Clarke, Quitman; R. D. Cole, Newnan; J. A. Davis, Albany; B. H. Groover, Reidsville; H. G. Hastings, Atlanta; L. P. Hillier, Macon; C. J. Hood, Commerce; St. Elmo Massengale, Atlanta; Wilmer L. Moore, Atlanta; Geo. M. Napier, Decatur; W. H. Shippen, Ellijay; R. P. Spencer, Columbus; Crawford Wheatley, Americus; Albert M. Smith, Atlanta, secretary-manager.

It is the opinion of the commissioner that no movement of recent years means more for Georgia than the formation of the Georgia Chamber of Commerce, and far-reaching results can be expected. Particular attention will be paid to the development of the agricultural and industrial interests of the state.

Many things have contributed to Georgia's success, but nothing more so than her famous newspapers, daily and weekly. The daily newspapers of Georgia are among the most influential of the whole country and the weekly newspapers are easily, as a class, better, more influential, more progressive, more public spirited than the same class of publications to

be found anywhere. There has been a great improvement in recent years in all newspaper lines in Georgia and our papers easily take front rank.

Georgia has always kept abreast of the age with every useful discovery. Worthy of mention is the following extract from an address delivered in Atlanta some years ago, on the occasion of his visit to one of the expositions held in that city, by Governor Hastings, of Pennsylvania:

"Georgia's versatility of climate and soil induced her lawmakers to establish the first State Department of Agriculture in the land.

"Georgia's code of laws of 1790 was so wise and symmetrical that it was afterwards approved and to some extent grafted upon the venerable body of English jurisprudence.

"The first female college in the world, Wesleyan Female College, was established at Macon.

"The cotton gin was invented in 1793 by Eli Whitney on the plantation of General Greene, of Revolutionary War fame, near Savannah.

"The first sewing machine was invented by a Georgia preacher, F. R. Goulding.

"Georgia is the second State in the production of cotton and the first in the South in all general lines of manufacture."

The water powers, afforded by the many rivers and smaller streams, that traverse every section of Georgia, give to our state advantages equalled by few and surpassed by no other commonwealth of our Union.

The most extensive water powers in Georgia occur at or above what is known as the southern fall line, running from Augusta through Macon, to Columbus and on the western fall line, running through Polk, Bartow, Gordon and Murray counties.

The minimum horse powers of Georgia aggregate 500,000 in round numbers or 800,000 during six high water months. It has been estimated that more than 1,000,000 horse powers are possible for Georgia.

Even before 1840 manufacturers in almost every part of Georgia had been using water power for running flour and grist mills, saw mills and cotton mills. Augusta and Columbus soon came to the front in enterprises of this kind, and in textile manufactures stood easily above any other places in the whole South.

In Augusta a committee of nine persons, elected by the city council as a board of commissioners, began in 1845 and completed in 1847 a canal from a point in the Savannah River about seven miles above the city to its upper part, the purpose being to secure better manufacturing facilities and also to provide an abundant supply of water for other uses of the city.

After a few years it became evident that the canal was too small to supply the demand for water power and the increasing demand for fire, domestic and other purposes. Temporary expedients were tried from time to time, but failed to meet the demand. At length, it was decided to greatly enlarge the canal. The work of enlargement was begun in 1872 and was completed in 1875. Augusta had now 14,000 horse powers besides an abundant supply of water for all other needed purposes.

Such a wonderful impetus did this great work give to textile manufactures that Augusta received the title "Lowell of the South." For the past eighteen years the Geological Survey of Georgia in co-operation with the United States Geological Survey, has been engaged in collecting useful information in regard to our streams. Within the past ten years somewhere near \$20,000,000 has been expended in developing the immense water power of Georgia. Great storage dams and other necessary plants have been installed on the Ocmulgee near Jackson, in Butts County, at Tallulah Falls in Rabun County, at Columbus and Augusta. The new 40,000 horse power hydro-electric plant at Augusta was constructed by the J. G. White Co., claiming to be one of the two largest constructing firms in the whole world, and is controlled by the Georgia-Carolina Power Co. Augusta, which had fallen behind some of the great power plants, again ranks with the first and will have a fresh revival of great manufacturing plants.

Columbus stands in the same class with her new hydro-electric plant adding vastly to her already splendid water powers and to her possibilities as a rival to Augusta in manufacturing enterprises. The Central of Georgia Power Company of Jackson, and the Georgia Railway and Power Company of Tallulah Falls are transmitting electric power to run the machinery of factories, the street cars of Atlanta and Macon, and to give light to the streets of many Georgia cities.

When hydro-electric power shall have supplanted steam in our factories, money that now goes out of the state for coal can be used to better purposes and the smoke evil can be eliminated from the problems of pleasant existence in our large cities.

As early as 1840 Georgia was in the front rank of the states in railroad construction, just as now she is among the foremost in construction of good roads. Already tourists can ride rapidly from city to city upon roads, over the greater part of which it is delightful to travel.

Preliminary estimates made by the State Department of Commerce and Labor from figures now in hand for 1915 show that manufacture is now on the increase in Georgia, not only in the total value of material used and finished output, but in the increased number of separate and distinct articles manufactured. Many hundreds of different kinds of finished articles and products are being turned out today by Georgia mills, shops and factories.

The textile mills come first in importance. According to Commissioner H. M. Stanley, they will show about 2,200,000 active spindles, 42,000 looms, 4,436 cards for mills manufacturing cotton, woolen and silk goods; for knitting mills approximately 4,200 knitting machines, 650 sewing machines, 380 loopers, and 600 ribbers. There are upwards of 165 cotton mills in Georgia.

There are ten mills that bleach their goods and thirty-two that dye and finish.

Approximately 90,000 horse power is used today by the textile mills of this state. The total amount of raw material used in Georgia's textile

mills is between 250,000,000 and 350,000,000 pounds of cotton, and about 1,700,000 pounds of wool. The value of this raw material is about \$40,000,000.

The manufactured products amount to about 500,000,000 yards of cloth, 4,000,000 dozens of hose, and 500,000 dozens of knitted underwear. The total value of the products is between \$60,000,000 and \$70,000,000.

The salaries of officers and clerks in the textile mills approximate \$1,300,000, and the amount paid to wage earners is close to \$9,500,000. Sundry other expenses amount to about \$3,800,000.

The lumber industry in Georgia amounts annually to \$25,000,000. There are over 1,800 sawmills in active operation with 15,000 to 20,000 men in constant service. The annual cut amounts to something like 1,000,000,000 feet.

Of Georgia's 34,000,000 acres, about 24,000,000 are in forests, and these embrace in varying quantities practically all kinds of timber indigenous to the eastern states. The chief hard woods are oak, hickory, ash, dogwood, black gum, and persimmon; the chief soft woods are long and short leaf pine, poplar and cypress.

Pine is the most important as commercial timber. The long leaf pine region is estimated to cover 17,000 square miles and to contain over 20,000,000,000 feet of merchantable lumber.

The extensive pine forests have made Georgia one of the leading states in the Union in the production of naval stores, turpentine and rosin. Savannah annually exports 834,800 barrels of rosin and 35,576 casks of spirits of turpentine, and is the most important naval stores port in the world. Brunswick is also an important exporter of naval stores. The total value of Georgia's naval stores amounts annually to about \$7,000,000.

Fertilizer factories in Georgia for the year ending December 31, 1914, had a capital invested of over \$40,000,000, and spent near \$12,500,000 for raw material. The manufactured products were 1,282,098 tons of fertilizer, valued at \$33,000,000.

The cotton seed oil mills, with an investment of about \$14,000,000, used some 535,000 tons of cotton seed, and about 90,000 tons of fertilizer material, costing \$12,500,000, and turned out 148,281 tons of cotton seed meal products besides 17,000,000 gallons of oil with a total value of \$31,000,000.

Brick, tile, stone, terra cotta and similar industries, with a capital stock of about \$4,000,000, and total expenses of \$1,250,000, turn out annually products amounting to \$2,400,000.

Foundry, machine and general repair shops in Georgia have a total capital of nearly \$10,000,000. They spend for repairs, new machinery and raw material about \$3,000,000, and pay out to officers, clerks and wage earners about \$2,500,000. They turn out annually products valued at between \$7,000,000 and \$8,000,000.

The marble and granite quarries and marble yards, with a capital of nearly \$3,500,000, and money paid for new machinery, repairs, raw

material and incidentals amount to some \$900,000, and salaries paid to officers and clerks \$180,000, and to wage earners \$1,200,000—turn out products valued annually at \$3,500,000.

The bottlers and brewers have a total capital of about \$3,000,000. Their total expenses will approximate \$3,000,000, including the pay of officers, clerks and wage earners. The value of their manufactured products is in excess of \$3,500,000.

The electric light plants have a capital of some \$10,000,000, expenses of \$3,500,000. There is no definite statement available as to their earnings.

The gas plants have an investment of over \$7,000,000, with expenses of over \$1,000,000, and sales amounting to \$2,000,000.

Flour and grist mills, with a capital of over \$2,500,000, and expenses approximating \$7,000,000, manufacture products worth about \$8,250,000.

Buggy, carriage and wagon shops, with a capital of over \$2,000,000, and expenses amounting to over \$1,500,000, show manufactured products valued at some \$2,500,000.

In the manufacture of leather goods there is an investment of \$2,800,000, with expenses of nearly \$2,000,000, and manufactured products worth somewhat over \$2,700,000.

These figures are all based on sales, and it must be remembered that the value of manufactured products will sometimes largely exceed the amount of sales.

A compilation of figures and estimates shows that the total annual value of manufactured products in Georgia is between \$225,000,000 and \$250,000,000.

Among the other specific manufacturing industries which are carried on profitably in Georgia are: Agricultural implements, brick and tile, paper boxes, bakery products, confectionery, cars and shop construction, men and women's clothing, including shirts and underwear, cooperage and wooden goods, furniture and refrigerators, leather goods, mattresses and spring beds, drugs and patent medicines, pottery and terra cotta, printing and publishing, slaughtering and meat packing, tobacco and cigars, woolen goods and wool hats, copper, tin and sheet iron products, artificial stone, brooms, kerosene, mineral and soda waters, commercial engraving.

The manufacturing opportunities offered in Georgia, both for large capital and for the investor of limited means, are unsurpassed by any spot on the face of the earth.

In addition to opportunities along general manufacturing lines, there are especially attractive openings for the manufacture of furniture, shoes, prepared foods, jams, marmalades, carriages, wagons, automobiles, paper mills, novelty works, ship building, toy factories, electrical machinery, electric cars, iron casting foundries, steel casting foundries, brass casting foundries, cotton oil mills, cotton spinning mills. Specific information will be furnished free on request by the Georgia

Department of Agriculture, at the state capitol. Prompt attention will be given all letters.

Georgia occupies a strategic position as regards the world's markets, commanding the West Indies and Central and South America, toward which American trade is growing with special rapidity.

Georgia, though comparatively young as a manufacturing state, already has passed every state in the southeastern group in value of manufactures. Georgia today ranks seventeenth among all the states in manufacturing.

Natural advantages have offered encouragement beyond the power of most localities to give. Cheap and unlimited supplies of raw material are available, coupled with the best railroad and shipping facilities, and the tremendous hydro-electric development in various sections of the state makes power abundant and cheap.

Illustrating the growth of Georgia manufactures, the following figures will be of interest:

The capital invested in Georgia manufacturing in 1880 was \$20,672,000. In 1900 it was \$89,790,000, and today it is in excess of \$225,000,000.

The value of products manufactured in Georgia in 1880 was \$36,441,000. In 1900 it was \$106,665,000, and today, as previously stated, it is between \$225,000,000 and \$250,000,000.

In 1880 the number of separate manufacturing industries in Georgia was 3,600 and today it is between 5,000 and 6,000. The number of persons employed in manufactures in 1880 was 24,875, and today it is between 125,000 and 150,000.

In 1880 the total available horse power in Georgia, including both hydro-electric and steam, was 51,169. Today the developed hydro-electric horse power alone amounts to about 175,000, and these figures do not include the horse power developed and used at the water's edge by a great many mills of all sizes.

The undeveloped horse power in the state owned by hydro-electric companies totals 315,000. This figure does not include the available undeveloped horse power in Georgia streams held by various other owners. The grand total is believed to reach practically 1,000,000.

A number of large separate hydro-electric companies are now operating in Georgia, and very large developments have been made around Atlanta, Columbus, Macon, Augusta and other points. The largest single power plant is at Tallulah, where 96,000 horse power is generated, and distributed on towers to manufacturing plants all over the northern section of the state.

Steam and gasoline power are also used extensively in manufacture and on the farms.

None of the above figures take into account the many municipal electric plants, and individual factory and hotel plants, or those operated by the state or Federal Government, which consume their own current.

As early as 1770 some Moravians, at Bethlehem, Pennsylvania, exhibited specimens of oil from cotton seed. But their discovery made no serious impression at that time. The invention of the cotton gin in 1794 turned the attention of the world to the production and manufacture of the lint.

The use of cotton seed as a fertilizer was known many years before the war between the states, and some farmers, after selecting seed for replanting, used the remainder for fertilizing the soil. The average farmer, however, in the early days of cotton culture, discarded the seed as valueless. Hon. James Callaway, of Macon, one of the best informed historians and writers in the state, is authority for the statement that Henry C. Fuqua, of Laurens County, Georgia, was the first person of record to discover the value of cotton seed as a fertilizer. The discovery was by accident.

There are complete and exact records of an oil mill erected in 1802, at Columbia, South Carolina, by Benjamin Warring and operated for a while. According to a statement in the *Hammond Hand Book of South Carolina*, an official publication, issued in 1882, Mr. Warring obtained one gallon of oil from one bushel of cotton seed.

But the first cotton seed oil mill in the United States to be operated as a real commercial proposition, was begun about 1834, at Natchez, Mississippi, and began to turn out its products in 1836. Its originator and proprietor was James Hamilton Couper, of a noted Georgia family, and his father sleeps in the cemetery at Frederica, St. Simon's Island, on the Georgia coast. Mr. Couper also had a mill at Mobile, Alabama.

None of these enterprises were remunerative enough to place them upon a firm basis and insure their continuance. They had, however, given a hint of what might some day be accomplished.

Mr. Edward Atkinson, of Brookline, Massachusetts, who was born in 1827 and died in 1905, and who was the author of many pamphlets and some extensive works upon economic subjects, declared in 1861 that cotton seed would alone, upon proper trial, prove to be worth millions of dollars.

Southern people were too busy, however, between 1861 and 1865, to give much attention to anything new. Then during the Reconstruction period and several following years, they had neither the means nor the inclination to take up any untried enterprises. They had to get firmly upon their feet, before they could again go forward in the race of progress. There was in 1880 one oil mill in Georgia, but none in South Carolina. Before the working season of 1882 began, five new oil mills had been established in Georgia and three in South Carolina. From this time on the progress of the cotton oil industry was rapid and its profits secure.

Georgia could show, by 1890, a list of seventeen cotton oil mills, whose combined capital was \$992,101. These mills paid for material at that time \$1,298,421, and yielded products valued at \$1,670,196. Six years later there were twenty of these mills, paying for seed \$1,400,000, and giving a product of \$1,800,000 value. The number of active cotton seed oil mills in Georgia in 1900 was fifty-two, with a capital of \$2,500,000, paying \$5,000,000 for cotton seed and turning out products worth \$14,-

000,000. According to the census of 1910 Georgia had 142 cotton seed oil mills, with a capital amounting to \$12,720,146, paying about \$11,000,000 for seed and turning out products valued at \$23,640,779. By 1912 the number of cotton seed oil mills in Georgia had reached 170, with a capital of \$13,614,000, paying near \$12,000,000 for seed and having manufactured products worth \$26,368,934.

The total expense of the 142 cotton seed oil mills in 1910, including all cotton seed and other materials, the salaries of officials and clerks, the pay of wage earners, cost of fuel and rent of power, rent of factory, taxes, including internal revenue, contract work and other items, amounted to \$21,979,655. The like expense of the 170 oil mills in 1912 approximated \$23,000,000.

From another source of information is derived the following account of how the cotton seed oil industry in the Southern states originated: On a Morgan County plantation originated an economic process which today underlies one of the greatest industrial activities of the world—the manufacture of cotton seed oil. As the result of this marvelous invention an industry of vast proportions has been created and what was formerly considered a waste product has been the means of putting millions of dollars into the pockets of the Southern farmer. The first successful effort ever made to extract oil from cotton seed was made by Launcelot Johnstone, Esq., within a quarter of a mile from the courthouse in Madison. Mr. Johnstone was an extensive antebellum planter, whose scientific experiments in practical agriculture placed him at least half a century in advance of his times. The records of the patent office in Washington, District of Columbia, will show that between 1830 and 1832 Mr. Johnstone was granted an exclusive patent for a cotton-seed huller, the first device of its kind ever constructed; and, in operating his patent he made large quantities of cotton seed oil, some of which he used with white lead for house painting. "Shingles which he saturated in cotton seed oil remained on his house for more than sixty years." Mr. Johnstone is buried just in the rear of the old homestead, where, in a modest way, he began to lay the foundations of what has since developed into one of the most colossal industries of our age. His crude experiments marked an epoch in the history of manufacture by wresting from nature a secret worth untold millions; and though he has long slept the deep sleep from which no pean of earthly praise can ever wake him, it is not too late to accord him the distinction to which he is rightfully entitled as the real father of the cotton seed oil industry of the United States.*

Hon. James D. Price, commissioner of agriculture, is our authority for the following data on the subject of good roads, introduced by a few figures relative to automobiles.

It is estimated that there are today more than 25,000 automobiles

* "Georgia's Landmarks, Memorials, and Legends," Vol. II, p. 885, by Lucian Lamar Knight.

in Georgia, of which approximately 7,250 are owned in Atlanta, Savannah, Macon and Augusta, the four large cities of the state, while the remaining 17,750 are owned in the smaller cities, towns, rural communities and on the farms.

The number of autos owned in Georgia is being increased at the rate of approximately 2,500 to 3,000 per year, and a large proportion of these cars are being placed in the smaller towns and directly on the farm.

Many Georgia farmers are learning the value of the auto not merely as a convenience for the family and a pleasure vehicle, but as an aid in actual work as well, and as an economical and rapid means of transporting lighter farm produce to nearby markets.

Georgia has today approximately 85,000 miles of public roads. She has over 10,000 miles of roads paved with sand-clay, and several thousand miles of road paved with macadam, chert, stone or gravel. Highway improvement is going forward at the rate of 1,500 to 2,000 miles per year.

Tremendous impetus has been given the improvement of roads in Georgia since 1908 by the employment of practically all Georgia's convicts on road building. Under the present law all the felony convicts are apportioned among the various counties of the state, to be worked on good roads in connection with their own misdemeanor convicts. Under this system there are today 2,760 felony convicts and 2,550 misdemeanor convicts, or over 5,300 convicts in all, working on highways in 126 counties of the state. For the benefit of the counties the state prison commission now has an expert road building engineer whose sole duty it is to travel around among them and aid the local commissioners in solving their road-building problems. In addition, the State Geological Department, of which S. W. McCallie is head, issues extensive bulletins on roads and road building materials.

The working of convicts on the roads has been a success. The expense of maintaining the present force of over 5,300 is about \$2,000,000 a year, and their labor on the roads is estimated to be worth more than double this amount.

This system is giving Georgia a magnificent network of improved highways in all parts of the state, and while most of the counties are using principally the sand and clay mixtures alone, the roads show a vast improvement over the old dirt roads, and generally speaking are superior to those of other states in the South. The United States Good Roads Bureau of the Department of Agriculture has called attention to the fact that Georgia has recently made more progress in road improvement than any other state in the Union.

Georgia's postal facilities, both city and rural, are keeping adequate pace with the state's development, and are the equal of any in the United States.

On January 1, 1915, there were in operation in Georgia 1,706 rural

routes, the total length of which amounted to 40,759 miles, representing an annual travel of 12,385,915 miles.

This service is operated at an annual cost to the Government for regular carriers of \$1,824,596, or at the rate of 14.77 cents for each mile of travel.

The many railroad trunk lines touching every section of the state give rapid mail service in all directions in and out of Georgia. Handsome new postoffice buildings have been recently constructed by the Federal Government in Atlanta and other cities.

CHAPTER II

GEORGIA'S BANKING, FINANCE, TAXATION AND BUSINESS

GEORGIA'S CREDIT UNEXCELLED—HELP GIVEN TO FARMERS BY BANKERS—STANDING OF STATE BANKS—GEORGIA'S NATIONAL BANKS—THE FEDERAL RESERVE BANK—GEORGIA'S TAX RATE LIMITED—RATE REDUCED BELOW THE LIMIT—GEORGIA'S NATIONAL GUARD—BUSINESS CONDITIONS—COMMERCIAL HEADQUARTERS—PORTS—CHIEF CITIES—SEA COAST ISLANDS—GAME.

[For this chapter, we are indebted chiefly to Hon. James D. Price, Commissioner of Agriculture, whose booklet, "The Empire State of the South," is a mine of condensed, practical, up-to-date information relative to Georgia. Acknowledgments are also made to State Treasurer Wm. J. Speer and to Comptroller-General Wm. A. Wright.]

There is no state in the Union whose credit ranks higher than does that of Georgia. With total property values as returned for taxation of approximately \$1,000,000,000, the state's outstanding bonded debt is only \$6,540,000, back of which as an asset is, also, the Western and Atlantic Railroad, 138 miles long, from Atlanta to Chattanooga, owned wholly by the state and estimated to be worth not less than \$12,000,000, without a dollar of encumbrance. This railroad now brings the state an annual rental of \$420,012, which will be considerably increased under a new lease soon to be made.

The credit of Georgia's counties, cities and towns is maintained in an equally sound basis, the state constitution prohibiting the issuance of bonds above 7 per cent of the taxable value, while strict laws regarding bond validations afford still further protection to the investor.

Georgia's banks, conservative in management and successful in operation, have always been characterized by a liberal policy toward agriculture and general business, and the man who maintains a good credit has no trouble in financing his efforts. As an illustration of this it may be recalled that when the European war temporarily tied up cotton shipments, it was the Georgia bank that carried the Georgia farmer and the Georgia merchant through the crisis.

A quarter of a century ago state banks were few and far between; today there are 692 state banks and 114 national banks, a total of 806 banks in 152 counties, or an average of more than five to each county.

Here is how Georgia's 692 state banks stood at the close of December, 1914, compared with the year previous as shown in the report of State Treasurer and State Bank Examiner W. J. Speer:

GEORGIA AND GEORGIANS

1799

Resources—	Dec., 1913.	Dec., 1914.	Increase.	Decrease.
Loans and discounts..	\$ 98,348,400.11	\$106,078,901.06	\$ 7,730,500.95	
Overdraft	1,145,916.16	1,777,387.76	631,471.60	
Bonds and stocks.....	6,360,692.37	6,006,454.68		\$ 354,237.69
Banks' furniture, fixtures	7,033,662.74	5,618,451.94		
Other real estate	(*)	1,897,733.04	482,522.24	
Due from banks	23,595,223.16	13,837,504.63		9,757,718.53
Cash and cash items.....	12,418,139.19	6,442,397.46		5,975,741.73
Other resources	712,863.41	737,894.57	25,031.16	
Total	\$149,614,897.14	\$142,396,725.14		\$ 7,218,172.00
Liabilities—				
Capital stock	28,895,513.67	29,077,067.65	181,553.97	
Surplus and net profits	16,514,360.65	16,691,555.74	177,195.09	
Due to banks.....	7,491,153.68	3,881,615.47		\$ 3,609,538.21
Unpaid dividends	47,386.72	27,008.05		20,378.67
Deposits	91,441,535.27	71,066,043.54		20,375,491.73
Bills payable	31,771.37	20,964,098.80	16,162,327.43	
Other liabilities	413,175.78	689,335.90	276,160.12	
Total	\$149,614,897.14	\$142,396,725.14		\$ 7,218,172.00

*Included in above.
†Net.

Under strict state supervision and subject to state examination twice yearly, Georgia's banks keep well within the limit of the law and a bank failure is a rarity.

For soundness and conservative liberality in dealing, Georgia's 114 national banks are the equal of those found anywhere in the country. Under strict Government supervision, they are a series of financial institutions as safe as are to be found in the world. For movements of the crops their assistance is ready and available to the full limit of good credit.

The combined capital of Georgia's national banks is \$14,756,000, with aggregate surplus and profits of \$12,770,155.45; deposits, \$48,599,026.35; national bank notes outstanding, \$17,315,727.50; loans and discounts, \$59,954,576.39; while the total of their resources and their liabilities each aggregates \$107,745,824.37.

One of the twelve federal reserve or "regional" banks established under the new currency law is located in Atlanta. It was opened November 1, 1914, to serve the territory of the Sixth Reserve District, including Georgia, Alabama, Florida, and parts of Louisiana, Mississippi and Tennessee.

It has already proven of inestimable value to this section, in giving a more elastic currency, helping the local banks at the seasons when a great deal of money is needed for the cotton crops, and making it generally easier to obtain money for legitimate purposes.

The Atlanta Federal Reserve Bank is headed by Hon. Joseph A. McCord, as governor. In its weekly statement at the close of business on March 26, 1915, the bank showed total resources of \$12,010,000.

Georgia's tax rate is limited by the constitution of the state to a maximum rate of 4½ mills; that is, \$4.50 on each \$1,000 of property returned. The average rate of taxation in the counties of the state is 8 mills, or \$8 on each \$1,000. These rates will compare favorably with

those of any state in the Union, and are less than prevail in many of them.

Property generally is taxed on a basis of approximately 60 per cent of its market value. Georgia's municipal tax rates are, comparatively speaking, below the average of those in most other states.

As the result of a new tax equalization law which went into effect in Georgia last year, taxable values were increased approximately \$86,000,000, enabling the State Tax Commission to reduce the state rate from \$5 to \$4.50 on each \$1,000. The total taxable values as returned to the state now aggregate \$953,531,254. One effect of this law was to reduce the valuation on much Georgia property and raise it on others, thus bringing about equalization in the tax burden.

State Tax Commissioner Jno. C. Hart expresses the opinion that under the operation of the equalization act the state rate should be still further materially reduced and says that in fact, if all property was returned and at a fair valuation, a rate of approximately \$2 on each \$1,000 would give the state all the revenue necessary to support the public institutions.

As a striking instance of development and growth, the Georgia tax reports for 1914 show an increase of more than \$40,000,000 in the value of improved farm lands as compared with 1913, bringing the total valuation up to \$235,628,438.

Investors have learned that there is no better security for loans in the world than Georgia farm lands. Hence loans, where needed, are easily obtainable, and the farms themselves are soon made to pay them off. Of ten large insurance, trust and bonding companies which have loans in Georgia aggregating \$16,000,000, they have placed more than 60 per cent of the amount on farm lands. With a record of Georgia loans since 1889, more than a quarter of a century, nine of these companies write that they have never had a farm loan overdue, which means they have never lost a dollar, while one of the ten suffered a small loss admittedly through its own ignorance of conditions, in the entire twenty-five-year period. There is never a time when any honest farmer is unable to get the money he needs for the making of crops or for extending and increasing his farm facilities.

Georgia has a very efficient and well-officed National Guard which has proven a valuable supplement to the police system of the state. It comprises 259 commissioned officers and 2,845 men, a total of 3,104, organized into one brigade of infantry with three regiments of twelve companies each, the headquarters of these regiments being located respectively at Savannah, Macon and Atlanta; one detached battalion of infantry with headquarters at Elberton; one battalion of field artillery with two batteries in Savannah and one in Atlanta; one battalion of coast artillery, four companies in Savannah; one squadron, four troops of cavalry and one detached troop, besides sanitary troops, field hospital and other essential military adjuncts.

These troops are supported both by the state and Federal governments and besides being subject to call under certain conditions by the Government, they are always ready for the immediate performance of

any state duty that the governor may direct. The presence and immediate availability of this well-trained force of troops has been a strong factor in making Georgia a law-abiding state and has had the undoubted effect of reducing insurance and loan rates in the state.

With \$580,000,000 farm capitalization, Georgia's annual agricultural production is \$269,220,000, while Ohio, with nearly \$2,000,000,000 of farm capital, produces only \$388,485,000.

Business is good in Georgia. Georgia stands recognized and pre-eminent among Southern states as the geographical and financial center of wholesale and retail merchandizing, and as southern headquarters for practically all of the big Northern and Eastern insurance and manufacturers' agency concerns.

Money is easy to obtain for legitimate purposes in Georgia, and merchants, big and little, are, generally speaking, prosperous. The percentage of failures is low.

While industries and productiveness have doubled in Georgia during the past ten years, the active capital, available through banks, to handle increased business, has more than trebled in the same time.

In the argument before the Federal Commission which established the Federal Reserve Bank in Atlanta, the Atlanta Chamber of Commerce produced actual figures to show that more than half the merchants in the southeastern states buy goods in the Georgia market.

More than 90,000 merchants in the seven southeastern states are registered as regular customers of Atlanta alone. Atlanta wholesalers and manufacturers' agents alone sell to southeastern territory more than \$350,000,000 worth of goods per year—and Atlanta is only one city. Georgia's seaports are among the busiest on the Atlantic Coast.

The whole current of trade in southeastern territory flows into and out of Georgia. Railroad headquarters are centered in Georgia for all the territory between the Ohio, Potomac and Mississippi rivers.

The productiveness of Georgia, combined with the available capital and the advantageousness of shipping rates and conditions, make it an ideal location for the merchant, large or small.

Georgia has more national banks, with more capital and surplus than any other southeastern state, and has nearly twice as many state banks, with more than double the capital surplus of any of the seven states in the southeastern group.

Georgia is the center of the phenomenal business growth of the southeastern region—a development which has been more rapid than that of any other section of the United States, unless it be Texas and Oklahoma or a portion of the Pacific Coast.

Georgia has four seaports handling extensive domestic and foreign commerce—Savannah, Brunswick, Darien and St. Mary's.

Savannah is entered by four great railway trunk lines which pour the products of field and factory onto her wharves that line the Savannah River on either side for a distance of six miles. In 1889 Savannah had a total foreign commerce of \$18,239,435. Constant deepening of

the harbor, making provision for larger and deeper draught vessels, and the natural growth of the country tributary to this port—the largest on the South Atlantic, south of Baltimore—has steadily increased this until in 1904 it amounted to \$54,694,443, while in 1914, ten years later, it had more than doubled, being \$116,864,657. Chief exports from Savannah are more than 1,000,000 bales of cotton annually, naval stores and lumber. Savannah's foreign imports approximate \$6,000,000 annually. Direct freight steamship lines ply between Savannah and the ports of the United Kingdom, Continent of Europe, Latin-America and the Orient; while coastwise steamers connect regularly with New York, Boston, Baltimore, Philadelphia and Jacksonville.

Brunswick has one of the deepest and most accessible harbors on the South Atlantic Coast. From this port there was handled in 1913 a total tonnage, foreign and coastwise, of 984,446 tons, valued at \$54,892,433.55. In this were 353,090 tons of railroad cross-ties, valued at \$1,977,304.80. Brunswick's total foreign exports for 1913 were 230,002 tons, valued at \$19,348,161. Foreign imports for the same year were 16,268 tons, valued at \$157,175.75. Brunswick's chief exports are cross-ties, lumber, naval stores, cotton and linters; while principal imports are kaint and other fertilizer materials.

Similar exports in smaller quantity are handled principally by sailing vessels from the ports of Darien and St. Mary's, both of which have good harbor facilities.

Georgia has eleven thriving cities of more than 8,000 inhabitants, and hundreds of prosperous, growing, smaller towns.

Atlanta, the capital of the state, with over 200,000 inhabitants, is the largest city in the South in bank clearings and postal receipts, and next to New Orleans, the largest in population. The growth of Atlanta is steady, rapid, substantial. The 1914 census gave her population as 179,292. Conservative estimates in 1915 show that she has nearer 200,000. Atlanta is not only a railroad and manufacturing center, but is general Southern headquarters for a majority of the big insurance companies, and other big eastern and national corporations. Her twelve large skyscraper office buildings are always filled. A new courthouse costing \$1,500,000 has recently been finished, and a magnificent \$1,000,000 postoffice and federal building erected three years ago is already being outgrown. Atlanta has over 500 manufacturing plants with an annual output of over \$50,000,000.

Atlanta has six national banks, with a paid-in capital stock of \$4,700,000, and a surplus of \$3,900,000. In addition she has a dozen or more strong state and local banks, and is a Federal Reserve city. The Regional Reserve Bank for the Southeast is located in Atlanta. An active Chamber of Commerce, Convention Bureau, and other wide-awake organizations have given the phrase "Atlanta Spirit," a national circulation.

SAVANNAH

Georgia's next largest city is Savannah, with a population given in the 1914 census as 67,917, and since materially increased. The largest port on the Atlantic Coast south of Baltimore, Savannah is of world-

wide importance for its industries and shipping. Savannah is the largest sea island cotton market in the world. Manufacturing has become an extensive industry, offering many opportunities. There are \$18,000,000 invested, with annual products of \$37,000,000.

Savannah was the site of the original Georgia colony founded by General Oglethorpe. It is laid out in beautiful squares, with its residence sections magnificently shaded, and is one of the loveliest cities in the world from a scenic standpoint. The hundreds of miles of modern roads in and around Savannah are famous and have been used for some of the greatest national and international auto races in the history of the sport.

AUGUSTA

Augusta, with a population of 55,000, is one of the largest cotton manufacturing cities in the South, and is the second largest inland cotton market in the world. Its modern office buildings are rapidly increasing, and its residential suburbs are noted for beautiful homes, parks and drives. Augusta is situated in the heart of a rich cotton and corn producing section, and is a metropolis for the whole Savannah Valley. Augusta's postal receipts have doubled within the past ten years. Augusta is the location of the Southern Ordnance Department of the United States Government. Situated at the head of navigation on the Savannah River, boats are operated to Savannah and freight rates are low.

MACON

The City of Macon, with a growing population of about 45,000 is located almost in the geographical center of Georgia, and is consequently an important business point for a very large section of the state. In the midst of the cotton belt, and directly in the center of Georgia's magnificent fruit producing territory, Macon is an important manufacturing, packing and shipping point. Her manufacturing industries are growing steadily. Her banks are prosperous and her postal receipts are increasing yearly. Macon is an important educational center, and is the site of the Wesleyan Female College and Mercer University.

Other important cities in Georgia are Columbus, a big manufacturing center, with a population in 1914 of 21,805; Waycross, with 18,134; Athens, site of the State University, with 16,900; Rome, with 14,146; Brunswick, with 10,649; Valdosta, with 10,000; Albany, with 9,717; and Americus, with 8,227. Georgia has 128 cities with a population of 1,000 or more.

The 128 cities of Georgia of 1,000 inhabitants or more, each enjoys the service of some form of public utility. According to figures collected by the state railroad commission, 118 of these have electric lighting and power plants, of which seventy-eight are municipally owned, while forty belong to private corporations; three cities own their own gas companies, while there are ten other gas companies privately owned. There are in the state 245 telephone exchanges, operating more than 100,000 telephones. Of the exchanges 111 are owned or controlled by the Southern Bell Telephone and Telegraph Co., while 134 are inde-

pendent exchanges. In and tributary to Atlanta are nearly one-fourth of the entire number of telephones in use in the state.

TRANSPORTATION AND MARKETS

Georgia's transportation facilities are rivaled by those of few other states in the South, and surpassed by none.

A perfect network of railroads traverses every section, connecting every city, town and almost every village; bringing rural communities into close communication with each other and with the principal shipping centers and markets.

Georgia has 152 counties, of which 146 have railroads.

The total railroad mileage of the state is 7,290 miles, or more in proportion to area than any other state south of Virginia.

She has 1,500 stations which are shipping points, and 725 which have express offices.

Several boat lines touch at Georgia's four ports, Savannah, Brunswick, Darien and St. Mary's.

Of the 100,000 telephone stations in Georgia, over 25,000 are in rural districts, and are being used more generally each year as an aid to marketing crops.

Not only is railroad transportation rapid and comprehensive between points in Georgia, but ten important trunk lines connect every section of the state with all the big city markets of the North, South, East and West. The trunk lines which enter and traverse Georgia are the Atlantic Coast Line; Southern Railway; Seaboard Air Line; Atlanta, Birmingham & Atlantic; Louisville & Nashville; Nashville, Chattanooga & St. Louis; Atlanta & West Point; Georgia Southern & Florida, Central of Georgia, and Georgia Railroad.

Freight and express rates over all this great network of railroads in Georgia are fixed by a state railroad commission, and Georgia shippers today enjoy the lowest freight rates in the South.

The Railroad Commission of Georgia is vested with wider powers than its name indicates. In reality it is a public utilities commission. It has not only the power to establish just and reasonable rates, but to enforce adequate and efficient service as well. The help it renders to shippers of agricultural and industrial products is extensive. It establishes special commodity rates on vegetables and fruits, both canned and fresh, to encourage shipping, and prescribes special fast trains for perishable commodities.

The railroads and express companies are themselves co-operating along similar lines, and by the establishment of market departments are rendering voluntarily a splendid aid to the Georgia producer not merely in the transportation of his products but in the finding of the best markets therefor. Among the railroads which are now operating market departments for this purpose are the Southern Railway, the Central of Georgia, the A. B. & A., and the Atlantic Coast Line. The

Southern Express Company is operating a similar department, with benefit to producer and consumer alike.

The State Department of Agriculture, as already shown, State College of Agriculture, Georgia Chamber of Commerce and other agencies are rendering valuable assistance in the marketing of farm products.

The many islands along the Georgia seacoast are attractive both as summer and winter resorts, and upon them are several valuable estates and clubs whose members use them as winter resorts and game preserves.

Cumberland Island has long been famous as the home of the Carnegie estate, and also as an attractive summer resort and fishing ground. Jekyll Island is known as the home of the famous Millionaires' Club. Other islands used as resorts or as private fishing and game preserves are St. Simons, Sapelo, Wolf, St. Catherine's, Ossabaw and Tybee. There are many smaller islands on the coast, and practically all of them are productive and furnish advantageous home sites.

Georgia furnishes ideal sport for both hunter and fisherman in the proper season. Quail or partridges, as well as wild turkey, wood cock, doves, grouse and pheasants may be found in practically all parts of the state, while duck, deer, squirrels and o'possums are numerous in certain sections.

Mountain trout, black bass and bream, as well as the channel cat, inhabit many of the fresh water streams, while the salt water fishing is as fine as can be had on the southeastern coast.

Game and fish are protected by adequate game laws, revised under an act of the Legislature in 1911, and a state department of game and fish, headed by Commissioner Chas. L. Davis, and strongly backed by public sentiment, is enforcing the law against pot hunters and "game hogs" and at the same time doing splendid constructive work in game preservation.

License to hunt in the county of residence costs \$1. Statewide license for a resident of Georgia costs \$3. Non-residents hunting in Georgia, except on their own land, are required to pay a license of \$15.

The open season for quail, partridges, wild turkeys, doves and plovers is November 20th to March 1st; wood cock and summer ducks, December 1st to January 1st; migratory duck, September 1st to April 20th; cat squirrels, August 1st to January 1st; grown male deer, October 1st to December 1st; o'possums, October 1st to March 1st. The killing of doe, fawn, fox squirrels, turkey hens, and all imported game birds, is a crime at all times. The law prohibits baiting fields. It prohibits the use of seines or nets for fish between February 1st and July 1st. The use of dynamite or explosives in streams is altogether forbidden.

CHAPTER III

GEORGIA'S FIELDS AND FORESTS, FLOCKS AND HERDS, ORCHARDS AND VINEYARDS

GEORGIA FOURTH AMONG THE AGRICULTURAL STATES—FIRST ON THE ROLL FOR PEACHES AND SWEET POTATOES—SECOND AS A PRODUCER OF COTTON, SUGAR-CANE AND PEANUTS—THIRD IN ITS WATERMELON CROP—POPULATION WELL DISTRIBUTED—CLIMATE AND RAINFALL—GEORGIA'S COTTON CROP—GROWTH OF THE SEED INDUSTRY—CORN AND CORN CLUBS—OATS, WHEAT, RYE AND RICE—GEORGIA CANE SYRUP—FORTUNES IN TOMATOES—THE FAMOUS GEORGIA PEACH—PECAN GROVES AS MONEY-MAKERS—LIVE STOCK IN GEORGIA—STAMPING OUT DISEASES—FERTILIZER AND OIL INSPECTION—PURE FOOD AND PURE DRUG LAW—THE MARKET BUREAU—WORK OF THE STATE ENTOMOLOGIST—AGRICULTURAL EDUCATION—UNITED STATES FARM DEMONSTRATION WORK—THE EXPERIMENT STATION—HEALTH SAFEGUARDED—GEORGIA'S TIMBER LANDS.

[This chapter has been carefully prepared from an authoritative work entitled: "The Empire State of the South," published by Hon. James D. Price, Commissioner of Agriculture, for the year 1915; and also in part from the Third Annual Report of Hon. Harris M. Stanley, Commissioner of Commerce and Labor.]

Fourth in rank among the agricultural states, as shown in census figures of 1910, Georgia occupies first place in the production of peaches and sweet potatoes; she ranks second among all the states in cotton, sugar-cane and peanuts; she holds third place in the yield of watermelons and canteloupes, for which markets are never lacking; she is ninth in corn production and tenth in raising swine—figures which today are undergoing rapid revision in the direction of still further attainment.

Illinois, Iowa and Texas, only, lead her in total value of annual farm products; her 291,027 farms produce every year more than \$250,000,000 in staple products. Her 1914 cotton crop alone, including seed, is worth \$147,000,000; one year of Georgia corn, richer in protein content than the famed western grain, will sell for \$52,000,000; she makes \$8,000,000 worth of wheat, oats and rye, and \$2,000,000 worth of hay; her peaches, pears and apples, unexcelled by those of any state, bring \$5,000,000 more; sweet potatoes bring another \$5,000,000, and white potatoes, the entire output consumed at home, means \$1,000,000 more; meats bring \$6,000,000; poultry and eggs, \$7,000,000; and milk, butter and cream, \$10,000,000; cane and sorghum crops yield close to \$2,000,000, while peanuts, chufas, tobacco, sheep, pecans, watermelons, canteloupes, vegetables and a few minor crops bring in another \$5,000,000 every year.

1806

In 1914 Georgia produced more than 9,000,000 bushels of oats without half trying, and then bought more than 4,000,000 bushels from outside states. And yet oats may be made and harvested in time to put another profitable crop upon the same piece of land, the same year. What an opportunity here for the energetic and resourceful planter!

The same story may be told of corn and wheat and hay; there is money awaiting every man with the ability and energy to make Georgia ground do what it can do. There is a market for every Georgia product; her fruit, vegetables and melons have attained national and even international fame.

With an equable climate, with temperatures which make agriculture possible almost the year round, with a rainfall favoring abundant production, ranging from forty-five to sixty inches a year, the record of production is far ahead of that of the colder northern and western states. In many parts of Georgia two crops a year are easily made; while on some of the better South Georgia lands, three crops annually are not uncommon.

In addition to this brief preliminary mention of agricultural possibilities, Georgia now has more than 5,000 manufacturing establishments, turning out hundreds of different kinds of products with an annual value of nearly \$250,000,000. She has millions in mineral resources, developed and undeveloped. There are coal and iron in her mountains to serve generations; and, in fact, it has been truly said that if a wall were built around Georgia, and the state closed to outside communication, she would still be self-supporting, with almost ten times her present population.

The largest state east of the Mississippi River, Georgia has 59,475 square miles, and less than one-third of her 34,000,000 acres of tillable land are now under actual cultivation. It is 320 miles from her northern to her southern line, and 254 miles across the state from west to east.

Georgia's population at the close of 1914, as estimated by the United States Census Bureau, was 2,776,513, an increase of 167,392 over the census figures of 1910, and a growth of 560,182 since the census of 1900. Georgia's rural population, including that living in cities and towns of less than 8,000 inhabitants, is 2,338,283; while living in cities of more than 8,000 are 438,230. Georgia's white population is increasing more rapidly than that of the negroes, the proportion being about 22 per cent for whites to 14 per cent for colored.

Georgia has 152 counties, each constituting a separate and distinct political unit. Four of these were created in 1914. County populations vary from 8,000 to nearly 250,000 for Fulton, in which is located Atlanta, the capital city of the state.

In 1913 there were 5,318,000 acres, or nearly one-half of Georgia's cultivated lands, planted to cotton. An extensive reduction of acreage is in prospect for 1915, due to the more extensive planting of food crops. The foregoing is exclusive of linters (the fine lint from cotton seed) of which the state produces annually from 50,000 to 110,000 bales.

The price varies according to total production. In 1910 cotton sold at an average of 14.69 cents per pound; in 1911 the average was 9.69 cents; 1912, 12.05 cents; 1913, 13.07 cents; while the crop of 1914, due to European war conditions, brought 7 to 10 cents. There are approximately 5,000 cotton gins in the state.

Georgia's production of upland cotton, in 500-pound bales, for the last five years, has been as follows: 1910, 1,812,178 bales; 1911, 2,768,627; 1912, 1,776,546; 1913, 2,316,601; 1914 (estimated), 2,713,470.

A quarter of a century ago cotton seed were thrown away or used as fertilizer; today the cotton seed industry is one of the largest in the South. Georgia alone has 170 cotton seed oil mills, with an annual production of nearly \$20,000,000. In 1912 Georgia oil mills crushed 630,836 tons of cotton seed, and the cost of the seed was \$18,900,000. The oil is used in the vast variety of products, including lard compounds and a substitute for olive oil. The meal and hulls are used as a food for cattle and stock, and as a fertilizer.

Sea island cotton, the rich, long staple variety, is grown in a total of only thirty-four counties in the world. In only sixteen of these is it a commercial success, and one-half of this area is in Georgia—the coast counties. It is used in making fine laces, thin fabrics and imitation silks, and brings around 25 cents a pound. In 1910 it sold at 27.36 cents a pound, and in 1913 it brought 19.61 cents. In 1912 Georgia made 43,736 bales of sea island cotton against a total crop of 73,777 bales; and in 1911, the record year, Georgia made 72,904 bales against a total crop of 119,293 bales.

But a few years ago half a bale of cotton to the acre was considered a pretty good yield; today the farmer who does not produce a bale to the acre, is doing commonplace or poor farming. In many sections two bales to the acre are easily made, while the yield has in instances been pushed to three bales and more.

Georgia is the fourth state in the manufacture of cotton. She has grown from 68 cotton mills with 817,345 spindles in 1900, to 165 mills with 2,160,571 spindles in 1914, and an annual consumption of 632,332 bales. In cotton manufacture Massachusetts, North and South Carolina only, are ahead of her.

Corn production in Georgia has increased from 46,536,619 bushels on 3,906,703 acres in 1909, to approximately 65,000,000 bushels in 1914 on about 4,100,000 acres. And still production falls short of home consumption requirements. It is to be noted that the yield of corn has increased in greater proportion than the acreage, and much of the credit for this result must be given to the Boys' Corn Club movement, fostered by United States and state agencies. In a single year as many as eighty-five of these boys, under eighteen years of age, have grown 100 bushels or more to the acre, with a top record of 217 bushels.

The boys' corn clubs are under the direction and supervision of J. Phil Campbell, a representative of the United States Department of Agriculture, who is stationed at the State College of Agriculture, Athens. Mr. Campbell and his assistants have been remarkably successful in this work with the result that in the last seven or eight years, some \$25,000,

000 to \$30,000,000 of value has been added to the Georgia corn crop, attributable almost directly to the stimulus which their work has given it. For the last four years there has been held annually in the state capitol, under the auspices of the Atlanta Chamber of Commerce, the Georgia Corn Show, in which the boys exhibit their product with a record of their yield, and there is the keenest competition for the valuable prizes that are offered.

On account of much planting on poor corn land, the average yield for the state appears small; but the best farmers now make regularly from forty to eighty bushels to the acre.

Among grains, oat production comes next in importance to corn; and, again, there is still room for large increase before home consumption is taken care of. Georgia made 6,199,243 bushels of oats on 411,664 acres in 1909, while in 1914 the crop had grown to more than 9,000,000 bushels on 450,000 acres. Again there is shown an increased yield per acre due to improved farming methods which are fostered by so many active agencies.

Thousands of acres of winter wheat and other grains were planted in the fall of 1914, pursuant to the plan of getting away from the one-crop idea of cotton, so that Georgia's 1915 production of wheat, oats and rye will be far in excess of any previous record. In 1909 Georgia grew 752,858 bushels of wheat on 93,065 acres; with 140,000 acres the 1914 crop was 1,694,000 bushels, more than double the yield on a third increase in the acreage. Georgia makes a high grade wheat, equal to that grown in the West.

Rye is one of the minor Georgia grain crops, though a marvelously increased yield has been shown in the last few years. Georgia made 121,000 bushels of rye in 1914 as against 59,937 bushels in 1909.

Georgia is the sixth state in rice production. The state's annual production of rice is around 100,000 bushels, but much larger crops have been made. For many years rice growing was confined to the belt of counties along the seacoast, but in recent years rice has been grown successfully in the northern and hilly sections of the state. In Jackson County, Northeast Georgia, there have been grown as much as fifty bushels to the acre on the hillsides, while in the creek bottoms seventy bushels per acre have been made. Several other North Georgia counties are now growing rice profitably. A high grade of the cereal is produced. There is opportunity for extensive increase in rice production in Georgia before home consumption is supplied.

Georgia's altitude above sea level ranges from zero at the coast to 4,000 feet or more on the highest mountains of the Blue Ridge. The average annual temperature for the southern section of the state is 67 degrees Fahrenheit, and for the northern section 60 degrees. The lowest mean annual temperature is 57 degrees at Clayton, in Rabun County, the extreme northeastern mountain section, while the highest is at Waycross, 67 degrees. The lowest normal monthly temperature recorded in the state is 40 degrees, in extreme winter.

Such a thing as zero weather is almost unknown, even in the higher

altitudes, and extreme or excessive heat and cold, such as occur in the North and West, are unknown. The average annual rainfall varies from 45 inches in one or two central and southern sections, to 60 inches in the extreme northeast, the average for the state being approximately 50 inches. Climate and rainfall are most conducive to agriculture and general health, more so, the United States Weather Bureau points out, than, perhaps, in any other state of the South. There are seven recognized climate belts in which grow well everything from the hardest plants to subtropical fruits.

Georgia is not a state of swamps and lowlands. Only 540 of her 59,475 square miles of territory are under water, and provision is being rapidly made for the drainage of this small area. More than half the state is in the coastal plain region with an altitude averaging 500 feet. Altitudes in the Piedmont Plateau, extending across the central section toward the northeast and into the Carolinas, vary from 350 to 1,200 feet above sea level, while in the northern section altitudes range from 750 to more than 4,000 feet.

In a direct line Georgia has 100 miles of coast on the Atlantic Ocean, while following the shore line the distance is approximately 170 miles, exclusive of islands; and upon this coast are located the three first-class harbors of Savannah, Brunswick and St. Mary's, with an annual shipping that runs into many millions.

Cotton has always been Georgia's foremost money crop. It will, no doubt, continue to be so for many years to come; and yet there is now a tendency, strengthened by the crisis due to the European war, to get away from the one-crop idea and put food crops to the forefront.

Since cotton first began to be planted in Georgia in 1734, less than two years after the settlement of the colony, Georgia has been second only to the extensive State of Texas in cotton production. Invention of the cotton gin in 1793 by Eli Whitney, gave the industry great impetus. Since then the Georgia cotton crop has gradually grown until today lint and seed bring the state from \$125,000,000 to \$200,000,000 annually.

Cotton is planted from March 15th to May 1st, and does best in a soil of sandy loam, although it is cultivated in nearly every county in the state, the yield being forced through the use of fertilizers. Picking begins in August and extends almost to Christmas, with October and November as the heaviest months.

Grown as a hog and cattle food, as well as a food for man in the natural state, in peanut butter, oils and extracts and an ingredient of candies, Georgia peanuts represent an annual yield of \$2,500,000 on approximately 175,000 acres. Census figures of 1909 show a yield of 2,569,787 bushels on 160,317 acres; the production has trebled within twenty years.

Although Georgia made last year 338,000 tons of hay, she still had to import more than 100,000 tons to meet home requirements. And yet hay can be and is made in Georgia at a profit considerably greater than that from cotton. With comparatively little difference in the acreage,

which has remained around 250,000, Georgia made 338,000 tons of hay in 1914, as against 261,333 tons in 1909. The average value of the product was little under \$12 per ton, on the farm.

The principal hay crops cultivated in Georgia are clover, cultivated grasses, cow-peas, alfalfa, velvet beans, soy beans, and the like, and the yield on well-regulated farms varies all the way from two tons to 6½ tons per acre. Cow-peas are extensively planted, both for their valuable stock food content and for the purpose of replenishing nitrogen in the soil.

Successful cultivation of alfalfa in recent years promises abundant increase in the state's total forage yield. The State College of Agriculture, at Athens, has already demonstrated the possibility of making, with five cuttings, more than 6½ tons annually on a stiff clay soil, where the seed are inoculated with nitrogen bacteria. Instances of six cuttings with a ton per acre per cutting, are not infrequent in the southern section of the state, with a value yield of around \$100 per acre.

Georgia offers great opportunities to the expert tobacco grower. The largest shade tobacco plantation in the world is located at Amsterdam, Decatur County, the section in which is grown the only Sumatra tobacco made in the United States.

Only about 2,000 acres are in tobacco cultivation in Georgia, while there are at least 100,000 acres available for successful tobacco growth. And yet Georgia made in 1914 approximately 1,900,000 pounds as compared with 1,485,994 pounds on about the same acreage in 1909. Cured, the leaf brings anywhere from 25 to 35 cents a pound, and the state yield per acre in 1913 was 1,000 pounds, as compared with 830 pounds in 1912.

In 1913 the United States Department of Agriculture called attention to the fact that the tobacco yield in Georgia had increased, while in other tobacco-growing sections it had fallen off. The value of the 1913 crop was \$558,000 as compared with \$449,000 in 1912. The net return ranges on the average from \$125 to \$150 per acre.

Ranking second only to Louisiana in sugar cane production, Georgia makes about \$2,500,000 of sugar cane products annually. The cane is grown principally in the southern and central portions of the state, being planted in March and harvested at the first frost. With a cost of \$50 to \$75 an acre for cultivation, the profits are large, the gross yield running up to \$300 to \$400 an acre.

Genuine Georgia cane syrup has an international reputation. For purity and wholesomeness as a food, it is unrivaled. It is made chiefly from the red cane which is run through stone presses to extract the juice, and this is boiled night and day during the season which may run anywhere from a week to a month or more, depending on the size of the crop. On 37,046 acres, according to the 1909 census report, Georgia made 317,460 tons of sugar and 5,553,520 gallons of syrup, not including sorghum, which is also grown extensively and from which 740,450 gallons of syrup were made the same year.

Millions of dollars come into the state every year through the garden truck industry. Millions more can be made from it right here at home as well as by shipments to other states. Notwithstanding the possibilities in truck growing in Georgia, in which many Georgians have made money and some have grown wealthy, Georgians themselves are now spending approximately \$11,000,000 a year away from home for this class of food.

Despite the fact that the state raises some 780,000 bushels of Irish potatoes annually which bring around \$1 a bushel, nearly 2,000,000 bushels a year are purchased away from home. An acre of Georgia ground will produce anywhere from 100 to 200 bushels.

Georgia produces more sweet potatoes than any other state in the Union. The annual crop has run as high as 7,500,000 bushels, with a yield of anywhere from 100 to 250 bushels an acre and a ready market for the product at 75 cents to \$1 a bushel. The profit may be readily figured.

Georgia is waiting for somebody to raise about 400,000 bushels more of onions than are now grown in the state, and the producer can easily average \$1 a bushel for them. It is not unusual to make 200 bushels and more to the acre.

Early corn or green corn is an article of steady diet in Georgia through the summer. It will bring \$100 a year and more an acre and will leave the ground available for turnips in the fall which will pay the producer as much more.

As high as \$500 an acre has been made from Georgia-grown tomatoes, and careful growers in many sections of the state are regularly collecting from \$200 to \$300 an acre for their product. Canning tomatoes is inexpensive and this industry has proven remarkably successful in many sections of Georgia.

Cucumbers will make the Georgia grower from \$100 to \$250 gross per acre, and yet Georgia is buying something like \$40,000 worth of this product every year.

Beans will yield 100 crates per acre, selling at something like \$2.00 a crate. An acre of cabbage will produce from \$200 to \$250 and yet the quantity shipped into Georgia annually is something enormous.

Spinach, kale, beets, carrots, cauliflower, squash, lettuce, egg plant, collards and some twenty other varieties of garden vegetables are in good demand over the state the season round, and the only place where they will not grow in Georgia is where the seed are not put into the ground.

The opportunities are here and they are open to the world. The trouble has been that too many Georgia farmers spend from eight to nine months in the year preparing ground, planting, cultivating and gathering cotton for which they get \$25 to \$50 per acre, whereas the same time, energy and investment in garden truck, would return them from four to eight times the profit.

Asparagus growing in many parts of Georgia, particularly around Marshallville, just south of Macon, is rapidly becoming an important industry. It was begun there by L. A. Rumph, twenty years ago, and now there are some twenty growers there cultivating over 1,000 acres

annually. Marshallville now ships annually 15,000 cases of one dozen cans each, and this will soon grow to 25,000 cases, or fifty carloads. The product easily competes with the California and Charleston asparagus, and the industry, now a profitable one, promises even to rival the peach in the volume of business done.

Peaches, an internationally famous fruit, as grown in Georgia, bring into the state annually from \$3,500,000 to \$4,000,000. This is conservative; the returns have been even larger.

Peach culture has succeeded in practically every section of the state. The greatest volume of the crop is grown in the middle southwestern counties along the line of the Central of Georgia Railway from Macon to Americus, and Macon to Columbus. There is extensive culture on the Central between Macon and Athens, and next in importance is the territory adjacent to the Southern Railway between Atlanta and the South Carolina line. Other good peach sections are on the Southern Railway from Williamson to Fort Valley; on the Georgia Railroad between Atlanta and Augusta; on the Nashville, Chattanooga and St. Louis, between Atlanta and Dalton, and on the Central between Rome and Chattanooga, Tennessee.

Fifty years ago there were only a few small orchards near Augusta. Improved methods of culture, improved transportation facilities, and successful packing methods, have revolutionized the industry. The first refrigerated car of peaches went to New York in 1887, twenty-eight years ago. In 1898, a good peach year, total shipments from Georgia to all points were approximately 3,000 refrigerated cars.

The Georgia peach, with good weather conditions, yields splendid results. In 1912, a record year, 7,157 refrigerated cars were shipped from the state to 100 or more different distributing points. The 1913 crop suffered from weather conditions and was only 1,219 cars, but prices were correspondingly higher and the returns were good. In 1914 the total shipments were 4,020 cars, with an average price nearly double that of 1912. Georgia peach growers figure if they can make one good crop in three years, the industry proves profitable. They have done this.

It is estimated that there are approximately 12,000,000 peach trees in Georgia. The principal varieties shipped to outside markets are the Carman, Hiley Bell, Georgia Bell, Early Rose, Uneda, Greensboro, Johnson and the Elberta. The Georgia Elberta is the most famous peach in the world. There are individual orchards in Georgia with as many as 250,000 trees in bearing.

The Georgia Fruit Exchange, with headquarters in Atlanta, is an organization of the growers of the state, whose purpose is to get the best results in marketing the crop. The exchange places the fruit in the best available markets as it is ready, and in this way has saved thousands of dollars to the growers besides having collected hundreds of claims from the railroads for loss or damage which individuals had always found great difficulty in handling. The exchange has recently made

plans for handling watermelons, canteloupes and other fruits, as well as peaches.

The peach, apple and other fruit industries have attracted thousands of dollars of capital to Georgia from the North and East. Massachusetts peach growers own large and successful orchards around Marshallville and Fort Valley; New York peach and apple growers have settled in Habersham and other North Georgia counties. The yield in profits has been abundant and satisfactory where orchards were handled on a business basis. Apples are successfully grown almost over the entire northern half of the state; but the northeastern mountain counties are best adapted to their culture. Apples do better on elevations or hillsides and abundant rainfall is necessary. There is no section in the world that has yet been found better adapted to apple culture than the northeastern mountain counties of Georgia.

Georgia apples have taken prizes at fairs and fruit exhibitions throughout the United States, in competition with those from Oregon, Washington, New York, Missouri, and other famed apple sections. At the National Apple Growers' Show at Spokane, Washington, several years ago, in competition with 1,500 entries, Georgia apples took second prize for the best exhibit from the Southern states and second prize for the best new variety open to the world. Georgia apples won four first and two second premiums at the annual fruit exhibit of the New York State College of Agriculture in 1913, where 130 varieties of apples were entered.

There are now approximately 2,000,000 apple trees in the state with an annual production of about 3,800,000 bushels. The varieties which have been found to produce the best results in successful commercial orchards are the Red June, Yellow Transparent, Early Ripe, Red Astrachan, Duchess of Oldenburg, Rome Beauty, Winesap, Grimes' Golden, Kinnard, Wealthy, and Black Twig.

While peaches and apples are the principal tree fruit crops, pears, plums, prunes, cherries, and quinces are successfully grown on smaller scale. Some of the 1909 yields were pears, 150,000 bushels; plums, 61,000 bushels; cherries, 5,000 bushels, and quinces, 2,000 bushels.

Strawberries are a growing money crop in Georgia. As much as \$2,000 per acre has been received for highly cultivated berries. The expense of cultivation is, naturally, greater than for most other crops; yet with the right conditions the net yield is far in advance of most other products. In 1910 there were approximately 1,000 acres devoted to strawberries and raspberries with a yield around 1,300,000 quarts.

Watermelons and canteloupes are grown successfully all over Georgia, although the best commercial results are attained in the southern and southwestern sections of the state where the largest and finest melons are grown for the northern and eastern markets.

Watermelons and canteloupes yield, under careful cultivation and favorable weather conditions, a carload to the acre, with returns of \$100 to \$500 per acre, depending upon quality and market conditions. Georgia ships annually more than 10,000 carloads of watermelons,

averaging 1,000 to the car, to northern and eastern markets. The most produced varieties are the Georgia Rattlesnake, Florida Favorite, or McGuire, Kolb Gem and Tom Watson. Georgia also ships annually several thousand cars of canteloupes to various parts of the country, and the favorites are the Rocky Ford and Pink Meat.

Within the last ten years many Georgians have brought small pecan groves to that state of development and production, that they now derive splendid incomes from them—incomes sufficient for family support and maintenance.

Fifteen or twenty years ago the pecan was not considered a money-maker; today there is approximately \$10,000,000 to \$15,000,000 invested in hundreds of groves with an annual yield of 400,000 pounds of nuts that sell all the way from 10 cents a pound for seedlings, to \$1.00 for the larger paper shell varieties, and even more for the highest grade of seed nuts. The majority of the groves have not yet come into bearing.

Five to ten acres in pecans, properly cared for, will comfortably support a large family. Many Georgia groves are now netting more than \$100 per acre, and some of them several times that amount. J. B. Wight, of Cairo, has one tree, a Frotscher, in his yard that brings him \$100 a year; this is an exception, but there are other trees doing as well, and it can be repeated.

"Young man, set a pecan grove and when you are old it will support you," is a slogan once received with misgiving and doubt, but now demonstrated in hundreds of cases. The only requirements are good, strong trees, the best land, which may be had at \$25 to \$30 an acre, and proper care and attention, and the result is certain, for the pecan grower has the whole world for a market.

While the trees take five to ten years to come into bearing, there is the advantage of being able to plant the land in other crops while waiting.

The greatest degree of success with the pecan has been reached in the Flint River section of Southwestern Georgia. While the bare land may be had at anywhere from \$20 to \$30 an acre, young groves bring anywhere from \$100 to \$500 an acre, and the best bearing groves have been sold as high as \$1,000 to \$1,500 an acre. Many commercial companies, which sell small groves on the installment plan, care for them until the trees come into bearing. The pecan is subject to comparatively few diseases and is easily cultivated and cared for.

Like other states, Georgia has her lean and fat years, but Georgia has never known a complete failure of any staple crop. Weather and other conditions may, at times, affect yield, but no crop has ever suffered complete elimination.

The live-stock industry in Georgia is growing rapidly, and farmers in every section are gradually awakening to the possibilities of cattle and hog raising both for home and foreign markets.

While Georgia still imports from 5,000,000 to 6,000,000 pounds of meat per month, the amount of imported meat is steadily decreasing.

and the time is already in sight when Georgia will be making every pound of meat she uses within her own borders.

The soil and climate are ideal for the production of feeds, while there are thousands and thousands of acres of open range suitable for cattle raising, both in North Georgia and South Georgia. In the southern part of the state cattle can graze on open range practically twelve months out of the year, while even in the northern section of the state it is necessary to feed cattle only about two months in the year.

Approximate figures, carefully prepared by State Veterinarian Peter F. Bahnsen, of the Department of Agriculture, show that the live-stock industry in Georgia for 1914 was worth about \$91,146,600, and that it has increased in value more than \$13,000,000 during the past five years.

This increase represents quality even more than number of head, and recent importations of high class registered cattle, including Short-horns, Herefords, Aberdeen Angus, Holsteins and Red Polled, have already raised the total value to more than \$100,000,000.

Eradication of the cattle tick in many counties has materially encouraged cattle raising. A few years ago it was the one outstanding disadvantage to cattle raising. Today this situation is under control, and cattle owners generally have learned the economic importance of tick eradication.

The dairy industry deserves more attention than it has received. Local demands for milk and milk food products are in excess of the supply. Only proper methods and organization are needed to give this industry unprecedented impetus.

According to the 1910 census the number of cows on farms reporting dairy products that year was 323,468. There were 74,908,776 gallons of milk, and 27,246,247 pounds of butter produced in 1910, and the total value of dairy products, excluding home use of milk and cream, was \$6,621,585.

The past eight months has shown an unprecedented development in interest in pork production on a more extensive scale.

Finishing cattle for the market offers great opportunities in Georgia. In South Georgia the velvet bean crop offers the material for a large and inexpensive gain either in cattle or hogs, and in all parts of the state silage of corn, or corn and sorghum, can be produced at a cost not exceeding \$2 per ton. This and cotton seed meal both offer a suitable ration for finishing cattle for market.

The Department of Agriculture is rendering service of inestimable value in safeguarding the health of live stock and diligently suppressing contagious and infectious diseases. In addition, practical advice is furnished in every branch of the live-stock industry. Five veterinarians are constantly engaged in traveling about the state, meeting the people, presenting and demonstrating proper methods of live-stock work. Great work has been done in controlling cattle tick and tick fever. The work is systematic and involves quarantine of counties where necessary. In this work the state department has had the co-operation of the county authorities and of the Federal Bureau of Animal Industry.

Meat and dairy cattle in Georgia are particularly free from tubercular germs. Rules have been established to prevent the shipment of tubercular cattle into Georgia, and in 1914 the percentage of reactors was reduced to about 4 per cent. Slaughter-house inspection shows that less than one-half of 1 per cent of native Georgia cattle are infected.

The spread of hog cholera in Georgia has been extensive during the past few years, but this is true also of every other state in the Union engaged in pork production. Hog cholera serum is furnished by the Department of Agriculture at actual cost, and the department also tenders the services of a veterinarian to give practical demonstrations in its use.

To return to Georgia's natural advantages for live-stock raising, Bermuda grass is to Georgia what blue grass is to Kentucky. Bermuda and burr clover will grow in practically every part of the state, and this combination gives not less than ten months grazing. Georgia is only now beginning to realize the value of these grasses.

Big packing plants established in Georgia within the past few years are doing much to encourage live-stock raising. Five modern killing plants are now in operation in Georgia, two in Atlanta, one at Augusta, one in Savannah, and one in Moultrie. Of these five two are packing plants, viz., the White Provision Company, of Atlanta, and the Moultrie Packing Company. During the five years that the White Provision Company has been established it has increased Atlanta cattle receipts five times over. Last year this company killed 10,000 cattle and 25,000 hogs. It has double this capacity. The Moultrie Packing Company has wrought a similar transformation; in a community where formerly cotton was the only crop and the only agricultural topic, the brood sow and her litter are today an absorbing subject.

An additional packing plant is assured, and not less than five municipal abattoirs are planned. It is predicted that within the next few years Georgia will not only be feeding herself, but will have a liberal supply of meats left to furnish other markets.

Brooks County, Turner County and a number of others are taking the lead in live stock and meat, and their products have already become famous.

Many counties have sheep, and though little is heard of the industry, Georgia ranks today as the eighth wool-producing state in the Union.

Poultry is rapidly increasing in Georgia, both in numbers and in value. The 1910 census gave the increase in number of fowls on Georgia farms during the preceding ten years as 402,132, or more than 8 per cent, and percentage of increased value as over 43 per cent. Since 1910 the increase has been proportionately even greater, and general interest is increasing in fine poultry breeding. Poultry is reported on more than 85 per cent of the farms in Georgia.

The number of farms reporting bees decreased between 1900 and 1910 from 33,246 to 23,167, or slightly over 28 per cent. The total value of bee colonies in Georgia decreased during the same period from \$242,769 to \$187,242, or slightly more than 22 per cent.

The day of the large land owner in Georgia is rapidly giving way to that of the small farm. Improved methods of farming and increased yield have been most largely responsible for this, and more money is being made on less land than formerly. Between 1880 and 1910 the number of farms in Georgia more than doubled, increasing from 138,626, to 291,027, although the increase in improved lands in the same period was less than 50 per cent, or from 8,304,720 acres to 12,298,017, and not all of this was under actual cultivation.

This increase in small farms has gone on from year to year through subdivision of the larger plantations, until it is estimated there are now 325,000 individual farms in the state ranging from 2 or 3 acres up to 1,000 acres and more. Greatest increase is shown in farms of 20 to 49 acres, the number of which grew between 1900 and 1910 from 73,408 to 117,432. In the same period farms of 50 to 99 acres increased from 52,251 to 68,510, while all farms of larger size showed marked decrease in number.

In 1910 farms of less than 100 acres, constituted about 75 per cent of the total number, while today the percentage is even greater. The average size improved farm in Georgia is considerably under 100 acres and perhaps close to seventy-five. The average value per farm in 1910 was \$1,995. The same year the total value of farm lands, buildings, implements, machinery and live stock was \$580,546,381, while the present approximate investment in agriculture is about \$650,000,000. Annual agricultural production in Georgia is now about \$350,000,000.

Good agricultural lands may be had in Georgia all the way from \$10 to \$100 per acre, according to quality, improvements and location.

Organized and highly specialized agencies for the assistance of the farmer and the encouragement of intensive farming and increased yield, are operated by and in connection with the Georgia State Department of Agriculture. These various agencies are under the direction of Commissioner of Agriculture J. D. Price, and there is no product grown in the state in connection with which helpful assistance cannot be given the producer.

In addition to these there are also a number of independent agencies, such as the State College of Agriculture, at Athens, the eleven district agricultural schools, working along similar lines; while the United States Department of Agriculture puts both money and men into the state in the cause of better farming.

The very oldest and the original duty of the State Department of Agriculture, was the inspection of fertilizers for the protection of the consumer, from which fees now not only pay the entire cost of inspection, but furnish annually enough funds to support the eleven district agricultural schools. Firms or corporations selling fertilizers are required annually to register each brand sold. Samples of each brand are collected by the inspectors, carefully analyzed by the state chemist, Dr. R. E. Stallings, and regularly reported upon. All fertilizers are required to come up to certain standards, or otherwise under the law they are non-salable in the state.

In similar manner the department inspects all illuminating oils and

gasoline sold in the state, and these are required by law to meet certain tests before they can be sold. Each grade must be sold as such, and misrepresentation is a misdemeanor. Thus the consumer buys and pays for just what he gets.

The chemical laboratories, in charge of the state chemist, with eight assistant chemists, and one bacteriologist, all well trained and qualified, are well equipped for service. Fertilizers, foods, feeding-stuffs, and drugs that are taken throughout the state and sent in by the inspectors, are all analyzed to see if they meet the requirements of the different laws, and then reported upon to the Commissioner of Agriculture. Bacteriological analyses are made of milks and other food products to see if they are suitable for food. In this laboratory is prepared the bacteria for leguminous crops which the department furnishes the farmer at cost.

Another important branch of the department looks after the enforcement of the pure food and drug law. Here there are two different divisions, the pure food department under Inspector P. A. Methvin and the pure drug department under Dr. T. A. Cheatham. These two agencies have practically eliminated the sale in Georgia of all impure food products and drugs as well as injurious and adulterated feedstuffs for cattle and live stock. Every food and feed product, every drug, must be sold for just what it is, shown clearly on the package, and misstatements and false branding are rigorously and severely dealt with. Dairies, abattoirs and slaughter houses are regularly inspected and required to be maintained in thoroughly sanitary condition. Through the pure food division, the department has been able to render great assistance to the dairymen of Georgia, as well as to the farmers, whether as a consumer or a seller of food products and feedstuffs.

The veterinary branch of the department, under Dr. Peter F. Bahnsen, although but a few years old, is now profitably using thousands of dollars in helping the farmer to control all animal diseases and build up the live-stock industry, as already told of under the head of live stock.

Another recent interesting activity of the Department of Agriculture is the production of nitrogen-forming bacteria for the better growing of leguminous crops. This bacteria is sold to the farmers at the rate of 25 cents per acre. Splendid results have already been obtained from its use by growers of these crops.

One of the most important of all recent developments along progressive agricultural lines, has been the establishment by Commissioner of Agriculture J. D. Price of a market bureau in connection with the State Department of Agriculture. He has appointed J. A. Montgomery, of Savannah, as the department's market agent. The object of this bureau is to bring producer and consumer into closer touch and to provide an outlet for the farm products of the state to the best possible advantage. This department will co-operate with both producers and consumers in order to accomplish real and permanent results, and without expense to either party. This advanced step was taken because of the manifest tendency to get away from the single crop idea and to engage more extensively in the production of food crops: and the

services of the department's market agent are at all times at the disposal of the producer and the consumer free of cost.

The Georgia Board of Entomology is virtually a branch of the State Department of Agriculture. Under the direction of State Entomologist E. Lee Worsham, this division has done work that has saved perhaps some millions of dollars to agriculture and horticulture throughout the state. Insect pests and plant diseases of every type occurring in this territory are dealt with, and remedies and methods of control indicated. Without the use of proper sprays, Georgia's fruit industry would amount to little, as it would be impossible to produce perfect fruit. Growers are both told and shown just what to do and how to do it, in order to make the quality of fruit that brings the highest market price. One of the most important works of the entomological department has been in the amelioration of serious cotton diseases and pests, and the preparation of Georgia farmers to meet boll weevil conditions, when that insect reaches the state. So thorough has been the work of preparing for the coming of the boll weevil, that Dr. W. D. Hunter, plant insect specialist of the U. S. Bureau of Entomology, says that Georgia is better equipped today to withstand the onslaught of the weevil, than has been any other of the cotton-growing states. The department is also producing highly specialized varieties of cotton with improvement of lint and greater yield per acre, one especially, known as "Dixieff," being an upland long staple cotton which brings from 3 to 5 cents a pound more than ordinary cotton. Services of attaches of the department are at the command of producers whenever needed.

A wonderful work for Georgia is being done by the State College of Agriculture, with Dr. Andrew M. Soule as president. Located in Athens as a part of the State University, which began as Franklin College and has been Georgia's seat of learning for 130 years, the State College of Agriculture is comparatively a new institution, but in the brief space of its existence it has brought remarkable development to agriculture in the state and instances are not infrequent where it has turned the proverbial single blade of grass into two or more.

At this institution every phase of agriculture of interest to the state is dealt with. Upon its 1,100 acres, part of which is in the city limits of Athens, actual experimentation in all the various lines of agriculture, horticulture and animal husbandry are in progress, not only for the benefit of the students, but with a view to showing the farmers of the state how to increase the yield. It has always been such an easy matter comparatively, to make crops in Georgia, that until recent years little or no attention was given to intensive farming. The State College of Agriculture is showing the farmers how to make an acre produce two or three times more than the farmer formerly got out of it, with small increase in cost of cultivation. It has its expert professors and instructors in every branch of agricultural effort, and its bulletins and advice and information are free to the farmers of the state for the asking.

Connected, and intimately associated with the State College of Agriculture is the farmers' co-operative demonstration work, instituted and maintained by the United States Department of Agriculture for the benefit of the farmers of the state, under the direction of J. Phil Campbell, as state agent. This intimate association of the two agencies was brought about by the recently enacted Smith-Lever bill, passed by Congress and co-ordinating the extension work of U. S. Department of Agriculture with the State College of Agriculture. These two are carrying on the extension work in almost all lines of farming.

There are now stationed at the college three live stock experts who spent their time in organizing live stock associations, giving advice to the farmers on making pastures, growing crops and breeding live stock. They also aid the farmer in buying pure bred stock. There are two dairymen doing a similar work for the dairy farmers of the state, as well as giving instruction in the building of silos, the making of silage, making of butter and the improvement of the dairy herd. There is a hog cholera expert who spends his entire time in instructing and educating the farmer in the eradication of this disease. There are corn club agents, canning club agents, farm demonstration agents, a poultry club agent, and a pig club agent, all maintained jointly by the college and the U. S. Department of Agriculture, in co-operation with county school officials and business organizations of the state. Many of the railroads are assisting in the maintenance of county agents. Besides the foregoing there are an horticulturist and seed-breeding specialists.

There are 75 county agents for men's and boys' work, and 35 county agents for women's and girls' work located in as many counties of the state. These agents conduct specific demonstrations in various crops and soil building with about 7,500 Georgia farmers. They organize annually 10,000 corn club boys, 3,000 canning club girls, 1,000 pig club boys and 1,000 poultry club members. Each of the experts from the extension department of the college spends the greater part of his time with the county agents, giving them information along their special lines and helping them to develop these particular industries.

The Boys' Corn Clubs of Georgia have already been mentioned under the subject of corn. These clubs are destined to make Georgia one of the greatest corn growing states of the Union. Likewise extraordinary encouragement has been given to the canning industry through the work of the Girls' Canning Clubs, a co-ordinate industrial movement. The girls' annual exhibit of canned vegetables and fruits is made at the state capitol along with that of the corn club boys. The canning clubs are organized in about 35 counties and in many instances individual members have made as much as \$100 by canning and selling the tomatoes from a quarter of an acre.

Conducted solely in the interests of better agriculture, the Georgia Experiment Station, comprising 220 acres at Experiment, Georgia, near Griffin, is supported entirely by the Federal Government, which makes it an annual appropriation of \$30,000 for agricultural research work.

The station is supervised by a regular board of fifteen members, and is managed by Director R. J. H. DeLoach, who has a staff of seven

experts and a corps of day laborers. Among its possessions and equipment are a herd of sixteen Duroc Jersey hogs with which to study cotton seed toxicity; twelve Red Poll beef steers with which it is conducting animal nutrition work; eight pure bred Jersey cattle with which it is conducting dairy investigations; about \$5,000 worth of fine scientific apparatus; two concrete barns; an office and two laboratory buildings; two small greenhouses; a gin house; dwelling houses and other accessories.

The work of the station is to solve problems that arise in agricultural practice. Station officers find these problems, work them out and give the results to the public. Suggestive of what its work means to the state, it may be pointed out that 60 per cent of the cane syrup sold in the open market by farmers, will not keep for ninety days. The station is now working on this problem, which, when solved, will mean a saving of half a million dollars a year to the state.

Soil experts say that approximately 40 per cent of the fertilizers now put in the ground is wholly lost; that only about 60 per cent is taken up by the growing plant. This means a loss of about \$10,000,000 a year on fertilizers in Georgia alone. The biggest work of the experiment station, now in progress, is to solve the problem of making available for plant food and growth, practically all of the fertilizers used.

Other problems now being worked out by the station are the proper feeding of cattle in order to get the maximum result; the remedy for plum wilt, so as to make commercial plum growing possible; the problem of successful apple culture; how to remove the toxic properties of cotton seed meal in order to make it a valuable food, both for man and beast, and yet others along many important lines of agriculture, horticulture and animal husbandry.

Diversification and rotation of crops, resulting in conservation of the soil and increased yield, are now considered the most important agricultural problem in Georgia. All of the various agencies organized for the assistance of the farmer, are engaged in stressing the importance of diversification and crop rotation, and are ready at all times to show the farmer just what to do and what crops to plant to get the best results. When this system is brought into general use on the farms of Georgia, as it already has on many of them, it will result in practically doubling the annual crop values of the state.

Georgia maintains a well-organized State Board of Health, which devotes its attention to sanitary and health conditions in every section of the state. This board has rapidly cleaned the counties of the state from the insidious hook worm disease, and among its special activities are the treatment of cases of rabies or hydrophobia in connection with which it has had splendid results, and supplying to the people of the state serums for the treatment of diphtheria and other diseases. County boards of health are being rapidly established under its supervision, and through its work the annual death rate in Georgia has been materially reduced.

To complete this chapter, we quote the following brief discussion of Georgia timber lands from the third annual report of Hon. Harris M. Stanley, commissioner of commerce and labor. Says he:

"In forest timbers Georgia is also rich. Among those of northwest Georgia are six varieties of oak (red, white mountain or chestnut, black, water and post oak); two varieties of pine (short leaf and long leaf, the latter differing from the long leaf pine of southern Georgia); poplar, ash, beach, elm, chestnut, hickory, maple (including the sugar maple), walnut, iron wood, sugar berry, sycamore, sweet gum, black gum, dogwood, persimmon, sassafras, wild cherry, red bud, wahoo, and cedar. Many of these are manufactured into furniture, hardwood finish for dwellings, farming utensils, wagons, etc. Great quantities of oak and pine are annually shipped.

"In the red lands of northeast and middle Georgia are Spanish, white and post oaks, hickory, chestnut, dogwood, persimmon, sassafras, short leaf pine, poplar, walnut, cherry and buckeye.

"Throughout the gray lands and pine hill belt of middle and south Georgia are both short and long leaf pines, black jack, sweet gum, dogwood, poplar, cypress, walnut, hickory, cedar, water oak, red oak, live oak and other varieties of hard wood.

"Throughout the coast regions are grand live oaks, red and water oaks, red cedar, hickory, chinquapin, sassafras, blue and palmetto cabbage.

"Immense live and water oaks, with festoons of gray moss, impart an air of solemn grandeur to the forest and frequently in long avenues remind one of the stately columns of some vast cathedral.

"Georgia with a total area, land and water, of 59,000 square miles, is the largest state east of the Mississippi River. Its four and a half degrees of latitude with elevations, in some of the most northern localities reaching 5,000 feet above the sea level, and diminishing, as one goes southward, to 100 feet along the Atlantic coast, give to Georgia a great variety of climate and products.

"In the northeast, where Sitting Bull, the middle summit of Nantahala reaches 5,046 feet above the sea level, while Mona, the eastern summit of the same ridge, rises to 5,039 feet, closely approximated by Enota, Rabun, Bald, Blood, Tray, Cohutta, and Dome, each above 4,000 feet, with Grassy, Tallulah and Yonah, each more than 3,000 feet high, we find a climate like that of upper New England, with products corresponding. A small area this is, but a somewhat larger one along the slopes of these highest mountains shows climate and products like New York and the mountain region of Virginia. The upper of these two areas has a mean annual temperature of less than 40 degrees, while the next one has a mean annual temperature of between 40 and 45 degrees.

"Then comes a climate zone of between 45 and 50 degrees, corresponding with portions of New York, Pennsylvania and Ohio.

"A narrow strip running from Georgia through North Carolina and Virginia up to New Jersey, has a temperature of between 50 and 55 degrees.

"The area of the zone between 55 and 60 degrees, which is between two and three times as large as the four preceding zones combined, passes from Georgia northward through both the Carolinas and Virginia.

"The sixth zone, between 60 and 65 degrees of mean annual temperature, embracing the greater part of middle Georgia, lies between the same isothermal lines as upper Alabama, Mississippi, Louisiana and Texas, West Tennessee, and Arkansas and extends into Virginia.

"The seventh zone, between 65 and 70 degrees of mean annual temperature, corresponds with that of lower Texas, Louisiana, Mississippi and upper Florida.

"The eighth zone, between 70 and 75 degrees, lies right along the Florida line.

"Thus, in traversing Georgia from the highest elevation of the north, to the lowlands of the extreme south, we have passed through eight of the nine climate belts of the United States, and have found the products of each of those belts.

"We have looked upon the mountains in their azure hue, with interlying valleys carpeted in green; we have seen crops of wheat, oats, rye, corn, all varieties of grass for hay, including alfalfa, bermuda, clover, red top, etc., also fields of the cowpea that restores to fertility whatever starving and exhausted soil has received them into its bosom.

"In all but a few of the most northern counties we have met with growing crops of cotton, up to this time Georgia's greatest money crop.

"Throughout middle and southern Georgia, sugar cane grows luxuriantly and the syrup made from it finds a ready market every where.

"At no time is a trip through Georgia more charming, than when one can view the orchards along the southern slopes of mountain and hill, or, stretching out over the lands of middle and south Georgia, with thousands of trees laden with peaches, apples, plums, cherries, pears and other equally luscious fruits in their proper seasons.

"In every part of the State grows what has made Georgia famous from one end of the country to the other—the luscious watermelon. Canteloupes also grow most luxuriantly and in south Georgia can be found great fields of this melon, grown for the markets of the world.

"The products of Georgia fields, gardens and orchards have a value of about \$260,000,000. All other farm products added to the above would run these figures up far beyond \$300,000,000.

"If strangers, visiting the State Capitol, will take the elevator and go up to the third floor, they will see a fine display of Georgia's minerals, building stones and forest trees and some of her agricultural and horticultural products, which are under the supervision of her State Geologist."

CHAPTER IV

GEORGIA'S MINERAL RESOURCES

ASBESTOS—BARYTES—BAUXITE—CEMENTS—CLAYS—COAL—COPPER—
CORUNDUM—FULLER'S EARTH—GOLD—GRANITES—GRAPHITE—IRON
ORES—LIMESTONES—MANGANESE—MARBLES—MARLS—MICA—OCHRE
—PRECIOUS STONES—PYRITE—ROAD MATERIALS—SAND AND GRAVEL—
SERPENTINE—SLATE—TALC AND SANDSTONE—TRIPOLI—MINERAL
WATERS—ARTESIAN WELLS—WATER POWERS.

[This chapter in its entirety was prepared by Prof. S. W. McCallie, State Geologist. Both in the variety and in the extent of her mineral resources, Georgia is one of the wealthiest states of the Union. Our chief mineral products are marbles, granites, clays, iron ores, and coal.]

The mineral resources of Georgia are both extensive and varied. The state is producing at present twenty-three different kinds of minerals in commercial quantities. This great diversity of mineral resources is accounted for in a large measure by the great diversity in the geological formations.

ASBESTOS

Asbestos is a fibrous mineral often resembling petrified wood. The asbestos deposits of Georgia are confined chiefly to the Piedmont Plateau, where they are found associated with dark colored, igneous rocks. There are two varieties of asbestos, the chrysotile and the amphibole. The latter variety is extensively mined near Nacoochee, White County, this state. The White County mines here referred to, have been the chief producers of asbestos in this country for several years. The finer varieties of asbestos are spun and woven into fire-proof cloth. It is a non-conductor of heat and electricity, and therefore is used for electrical insulation, steam pipe, boiler coverings, etc. It is also used in the manufacture of fire-proof paint, various building materials, such as lumber, shingles and plaster.

BARYTES

This mineral, often called heavy spar, from its high specific gravity, is a common gangue mineral of lead, zinc, copper, etc. It likewise occurs as distinct veins and as irregular ore bodies in limestones, sandstones, and in residual clays. The Georgia barytes deposits, which have so far been worked in a commercial way, are located near Emerson, Bartow County, and at Eton, Murray County. The mineral is largely used as

a substitute for white lead. It is used also in the manufacture of paper, rubber, oilcloths, paper collars, and barium salts, as well as for refining sugar, glazing pottery, and for enameling iron.

BAUXITE

The first bauxite found in America was discovered near Hermitage, Floyd County, in 1887. Later, deposits were found in Polk, Bartow, Gordon, Chattooga and Walker counties, and in 1907 valuable deposits were found in the vicinity of McIntyre, Wilkinson County. The bauxites of Northwest Georgia are associated with Cambrian rocks, while those of Central Georgia occur associated with the white Cretaceous kaolins. Since 1888 a high percentage of the bauxite mined in this country has been obtained from Georgia.

Bauxite is a hydroxide of alumina resembling clay. The ore occurs both in the form of large pockets and as beds, and is mined in the same manner as iron ores. The Georgia bauxites are used largely in the manufacture of alum and the metal aluminum. Bauxite is also employed in making firebrick and alundum, an artificial abrasive.

CEMENTS

Both natural and Portland cements are made in Georgia. Natural cement plants are located at Cement, Bartow County, and at Rossville, Walker County, while extensive Portland cement plants are operated at Rockmart and Davitts, Polk County. The raw materials for the manufacture of these cements, consisting of limestones and shales, are abundant and pretty generally distributed throughout Northwest Georgia. Portland and natural cements are largely used for structural purposes, and as these uses are so rapidly increasing it might be said that we are now entering the cement age of structural material.

CLAYS

The clays of Georgia, which may be classed as one of our inexhaustible mineral resources, present a great variety. In the southern part of the state occur the Cretaceous and Tertiary sedimentary clays. The great thickness of these beds and the purity of the clays themselves are probably nowhere else to be found in this country. These clays, which are now being extensively mined, are used largely for the manufacture of high-grade china, for paper filler, and for fire-brick, terra cotta, etc. Scarcely less important are the alluvial and residual clays of the Piedmont Plateau and Northwest Georgia, which have extensive use in the manufacture of common building brick. The value of the clay products of Georgia now exceeds that of any other mineral product of the state.

COAL

The coal measures of Georgia are confined to Sand, Lookout and Pigeon mountains, in Dade, Walker and Chattooga counties. They form a part of the northern extension of the Coosa and the Warrior coal fields of

Alabama. The Durham Coal and Coke Company's mines and the mines of the Lookout Coal and Coke Company, located on Lookout Mountain, are the only mines now in operation in Walker County, while the Georgia Steel Company operates a mine in Dade County. The coal from these mines is semi-bituminous, has a high heating value, and is largely used for steam and coking purposes. The total coal area of the state is approximately 170 square miles, which area is estimated to have had originally 933,000,000 short tons of coal. About 12,000,000 tons of coal have been mined up to the present, leaving still in the ground a total of 921,000,000 tons, enough to last, at our present rate of mining, for more than 1,500 years.

COPPER

The most extensive copper deposits, so far located in the state, are to be found in Fannin, Cherokee and Haralson counties. Those in Fannin County are located in the extreme northern part of the county only a short distance from the famous Ducktown copper mining district of Tennessee. The Cherokee copper deposits have been worked at only one place, namely, the Canton copper mine, one and one-fourth miles south of Canton. The Waldrop copper mine in Haralson County is located about four miles northwest of Draketown, near the Haralson-Polk County line. In addition to the deposits here named, copper is also known to occur in Lincoln, Lumpkin and Fulton counties. The copper deposits of Fannin, Cherokee and Haralson counties are associated with Cambrian rocks, while those in Lumpkin, Fulton and Lincoln counties occur in older rocks, probably Archaean.

CORUNDUM

Corundum is an aluminum oxide. It is next to the diamond in hardness. There are three varieties of this mineral: sapphire, corundum and emery. The purer kinds of fine colors, transparent and translucent and useful for gems, are known as sapphires and rubies; the dull colors, not transparent, are called corundum; while the black or grayish black variety, intimately mixed with oxide of iron, either magnetite or hematite, is known as emery. All varieties of corundum have been found in Georgia, with the exception of emery. The principal variety is the non-transparent variety. A few gems of the variety sapphire have been found near Hiawassee, Towns County. These were small, prismatic crystals of ruby color, but somewhat cloudy. A few gems of sapphire are said to have been found at the Laurel Creek mine in Rabun County. Corundum is known to occur in many counties in North Georgia. The chief corundum output has come from the Laurel Creek mine, located in the extreme northeastern part of Rabun County.

From 1880 until 1892, Georgia was one of the chief corundum producing states in the Union. In recent years, the mines have been idle, due, chiefly, to the low price of corundum. In addition to gem material, corundum has an extensive use as an abrasive.

FULLER'S EARTH

The best known deposits of fuller's earth occur in the vicinity of Attapulgus, Decatur County, where they have been worked for some years. Extensive deposits also occur in Bibb, Twiggs, Columbia and other counties near the Fall Line. The deposits of Twiggs County are now being worked by the General Reduction Company. Georgia stands third in the production of fuller's earth, being exceeded only by Arkansas and Florida.

Fuller's earth is a clay-like material of various colors. It differs from common clay usually in being porous, carrying a high percentage of combined water as compared with the alumina and in having but little or no plasticity. Fuller's earth, so called on account of it being first used in fulling cloth, is now largely employed in decolorizing and clarifying oils and fats. Besides the use here given, it has also a limited application in the preparation of certain medicines and in the manufacture of soap, as well as an absorbent.

GOLD

Gold has been mined in Georgia for more than three-quarters of a century. Previous to the discovery of gold in California, the mines of Georgia furnished the greater part of the gold produced in the United States. As early as 1838, the output of the mines of the state had become so important that the United States Government found it necessary to establish a mine at Dahlonega. The gold deposits of Georgia belong to the Appalachian gold fields, an auriferous belt extending from Nova Scotia to Alabama. In Georgia, the gold occurs in a number of narrow, parallel belts, having a northeast-southwest trend. The most important of these are the Dahlonega and Hall County belts. Another belt including some very important mines traverses Lincoln, Columbia, McDuffie and Warren counties, in the eastern part of the state. The individual auriferous belts are usually made up of a great number of veins or ore bodies running parallel to each other. The veins vary in thickness from a fraction of an inch to several feet or rods, and often continue without interruption for long distances.

GRANITES

The granites of Georgia, together with the gneisses, constitute the most extensive and one of the most important building and monumental stones in the state. They occur in inexhaustible quantities and are widely distributed throughout the Piedmont Plateau. One of the most interesting and the largest isolated bearen granite masses in the country is that of Stone Mountain, located only a few miles northeast of Atlanta. This mountain has long been the seat of a very important granite industry. The stone obtained from these quarries is a light colored muscovite granite possessing remarkable strength, and is quite free from all chemical and physical defects. The stone has extensive use as a building material and is also largely employed in street improvement. There is probably no granite in the South more widely known and more generally

used than that furnished by the Stone Mountain quarries. Another granite, or rather a granite-gneiss, of almost as much economic importance as the Stone Mountain granite, is the lithonia granite. This stone covers a considerable area in the eastern part of De Kalb and the contiguous parts of Rockdale and Gwinnett counties. The lithonia quarries are very extensive and furnish large quantities of stone for street improvements as well as for concrete and general building purposes.

In addition to the granites here named, there are other granites of superior quality used for monumental stone. Some of the granites of this character are those obtained from the Elberton, the Oglesby, the Lexington and the Meriwether quarries. These monumental granites have but few equals, if any superiors, in the United States as a monumental stone. At present, Georgia stands seventh in the rank of the production of granite in this country, being exceeded only by Vermont, Massachusetts, Maine, Colorado, Wisconsin and Maryland.

GRAPHITE

Both amorphous and crystalline varieties of this mineral occur in Georgia. The amorphous variety is quite abundant in the neighborhood of Emerson, Bartow County, where it is now mined on a more or less extensive scale. Promising prospects of crystalline graphite occur in Pickens, Elbert, Hall, Madison, Douglas, Troup and Cobb counties. All of the graphite material at present mined in Georgia is used as a filler for commercial fertilizers.

IRON ORES

Iron ores occur in Georgia in large quantities. The most common ores are the brown ores, or limonites, and the fossil ores, or hematites. Magnetite also occurs. The brown iron ores are most abundant in Polk, Bartow and Floyd counties, but workable deposits are also to be found in nearly every county in the northwestern part of the state. These ores are confined chiefly to two geological horizons, viz., the Weisner quartzite and Knox dolomite. The ores associated with the Weisner quartzite sometimes occur in ill-defined veins, but more generally they are found in the form of pockets or irregular deposits in the residual clays. The brown iron ores of the Knox dolomite series occur chiefly in the form of pockets or irregular deposits in the residual clays. The deposits are quite variable in size. Some of the individual deposits in the vicinity of Cedartown have been worked on an extensive scale for more than ten years without exhausting the supply.

The red, or fossil, iron ores of Georgia are confined to Dade, Walker, Chattooga and Catoosa counties. These ores occur in the Red Mountain iron ore bearing series, which is so well developed near Birmingham. The ores occur in continuous beds varying from a few inches to several feet in thickness. Some idea may be had as to the abundance of the red fossil iron ores of Georgia when it is stated that the aggregate length of the outcroppings of the beds, which average more than two feet in thickness, is approximately 175 miles, and that in many places the ore can be economically mined to the depth of several hundred feet.

LIMESTONES

Cambrian, Silurian and Carboniferous limestone, suitable for lime, fluxing and building materials, exist in great abundance in Northwest Georgia. The most extensive of these calcareous formations is the Knox dolomite, a magnesian limestone of great thickness. This formation furnishes much of the lime used in the state, as well as a large amount of stone for concrete and for general building purposes. Other calcareous formations of scarcely less commercial importance are the Banger and the Chickamauga limestones. In addition to these occurrences, extensive beds suitable for lime and for agricultural purposes occur in the Cretaceous and Tertiary formations of South Georgia.

MANGANESE

The manganese ores, like the brown iron ores, are confined chiefly to Bartow, Floyd and Polk counties. The largest and most productive deposits are found in the vicinity of Cartersville, where the ores occur as irregular deposits in the residual clays derived from the Knox dolomite and the Weisner quartzite. The manganese deposits of Georgia have been worked almost continuously for many years. During their early workings the ores were shipped to England, but in the last few years they have found a ready market in this country, where they have been used in the manufacture of steel and for bleaching powder. In 1898, Georgia produced nearly 7,000 tons of manganese ore, which was approximately one-half of the manganese produced in the United States for that year.

MARBLES

Previous to 1884, the marbles of Georgia were practically unknown as building and ornamental stones, but at present the output of the quarries exceeds that of any state in the Union with the exception of Vermont. The most valuable marbles of Georgia are those of Pickens, Cherokee, Gilmer and Fannin counties. These marbles occur in a narrow belt which runs parallel to the Louisville and Nashville Railroad, from near Ball Ground, Cherokee County, to the Georgia-North Carolina state line, a distance of more than sixty miles. The main marble industry of the state is located in the vicinity of Tate, Pickens County, where the deposit attains its greatest thickness. The Pickens County marble usually has a coarse texture, but admits of a very fine polish and is admirably suited both for building and monumental purposes. In color, the stone varies from white to almost black. A flesh-colored variety is also found. The physical and chemical properties, as shown by the numerous tests made by the State Geological Survey, demonstrate that its durability equals or exceeds that of any other marble now being put upon the market.

At present a number of different marble quarries, having an aggregate annual output of several hundred thousand cubic feet of stone, are being operated in Pickens County. The product of the quarries is shipped to nearly every state in the Union, where it is used in the con-

struction and decoration of some of the most costly buildings. The state capitols of Minnesota and Rhode Island; the United States Government Building, Boston; St. Luke's Hospital, New York; and the Corecoran Art Gallery, Washington, with numerous other handsome buildings throughout the United States, are constructed wholly or in part of the Georgia marble. There is probably no building stone in this country, in recent years, which has gained such a widespread use and given such universal satisfaction as the Georgia marble. The growth of the use of the stone has also been equally as phenomenal in monumental work.

MARLS

Marls of good quality are found in the Cretaceous and Tertiary formations of South Georgia. There is probably no county in the southern part of the state which does not possess marl deposits of more or less agricultural value. In addition to the common calcareous or shell marl, green sand marls also occur. Analyses of these green sands show that they carry a considerable amount of phosphoric acid and potash, two of the most important plant foods. The use of the Georgia marls as a natural fertilizer has so far been quite limited, but in all cases where they have been given a fair test the result has been entirely satisfactory.

MICA

Mica is widely distributed throughout the Piedmont Plateau. It has been worked to a limited extent in Cherokee, Lumpkin, Union, Hall and Rabun counties. Some of the most promising prospects in Cherokee County are in the vicinity of Holly Springs and Toonigh, and in the Hickory Flats district about ten miles southeast of Canton. The Lumpkin and Union County deposits, as so far developed, occur near the Lumpkin-Union County line. Mica has been mined in Rabun County at the Kell Mica Mine, ten miles east of Clayton, and in Hall County, near Gainesville. In addition to these localities, good mica prospects are found in a large number of other counties in the Piedmont Plateau.

Mica has a great variety of uses, but at present the greater part of the production is consumed in the electrical industry. Ground mica is largely used in wall paper and roofing as well as a lubricant.

OCHER

The ocher mines of Georgia produce more ocher than all the states in the Union. These mines are located near Cartersville, Bartow County. The deposits are confined to a narrow belt about eight miles in length and less than two miles in width. The most extensive workings are those of the Georgia-Peruvian Ocher Company, to be seen on the left bank of the Etowah River, 2¼ miles east of Cartersville. Ocher mining in the Cartersville district had its beginning in 1877. In 1890 the Georgia-Peruvian Ocher Company began operations on an extensive scale, and, later, three other large ocher plants were put in operation. The total maximum output of these four plants is estimated at about 800 tons per annum.

The principal use made of the yellow ocher mined in Bartow County, up to the present time, is in the manufacture of linoleums and oilcloths. The important markets are England and Scotland. It is also used to a limited extent in the manufacture of paints.

PRECIOUS STONES

A large variety of mineral suitable for gems and other ornamental objects and cabinet specimens has been found in the state. No systematic mining for gems, however, has been carried on, and the finds have been accidental, or incidental to gold, corundum and other mining. Nearly all of these minerals are found in the Piedmont Plateau and the mountainous section of the northeastern part of the state. The most important gem stones heretofore noted as occurring in the state are as follows: Diamond, ruby, amethyst, rose quartz, rutilated quartz, smoky quartz, agate, jasper, opal, beryl, garnet, rutile, moonstone.

PYRITE

Pyrite is an iron sulphide chiefly employed in the manufacture of sulphuric acid. This mineral is met with in commercial quantities in a number of counties. The most important deposits occur in Carroll, Haralson, Paulding, Cobb, Cherokee and Lumpkin counties. The Carroll County deposits have been worked rather extensively near Villa Rica and at Reid's Mountain. Both of these mines are now operated. The Haralson County prospect is situated near the Haralson-Paulding county line, four miles north of Draketown. Another prospect in this county is the Waldrop mine, originally worked as a copper mine. The Cobb County deposits are near Acworth. Considerable pyrite was mined some years ago in Paulding County, two miles west of Hiram. What appears to be the most extensive and important deposit in Cherokee County is known as the Blake Pyrites Mine, near Creighton. In the immediate vicinity of the Blake mine is the Franklin Pyrites and Power Company's prospect. The main deposit in Lumpkin County occurs six miles northeast of Dahlonega.

ROAD MATERIALS

The road-building materials of Georgia are quite abundant and pretty evenly distributed throughout the state. Nearly all the varieties of stone used in highway construction occur in large quantities in many sections. It is questionable whether any state in the Union possesses a greater variety of road-building materials than the State of Georgia.

SAND AND GRAVEL

Sand and gravel are both widely distributed throughout the state. They are especially abundant in the northern part of the Coastal Plain. Enormous deposits of sand are to be seen near Howard, on the Central of Georgia Railway, in Taylor County; at Junction City, in Talbot County; on Bull Creek, three miles east of Columbus; on the west side

of the Flint River, at Bainbridge; on the Flint River, just opposite Albany; on the east bank of Little Ogeechee River, 1½ miles northeast of Lumber City; and on the east bank of the Oconee River at Dublin. In addition to these various localities there are numerous other localities throughout the Coastal Plain where more or less extensive deposits of sand and gravel are to be found. In the Piedmont Plateau and the Appalachian Valley region, the sands and gravels are mostly found along the streams.

SERPENTINE

Serpentine is a hydrous silicate of magnesia, carrying, usually, more or less impurities. The only deposit of serpentine, so far worked in Georgia, occurs at the Verde Antique Marble Quarry in Cherokee County, about two miles southwest of Holly Springs. The stone is used almost exclusively for interior finish and decorations. It is especially adapted for stairways, corridors, mantels and pedestals for statuary.

SLATE

Slate is found in Georgia in Bartow and Polk counties. The largest area of slate, in Polk County, extends from about three miles south of Cartersville to about five miles south of Rockmart. Another belt of slate of the same age occurs south of Cedartown. The Polk County slate is of a dark blue to black color. It has a fine texture and smooth cleavage and but few defects. Another very promising slate is found in the northern part of Bartow County, near Fairmount. This slate, which has only recently been put on the market, has a greenish color and possesses all of the physical and chemical qualities of a first-class roofing slate.

TALC AND SANDSTONE

Talc is a white, gray or greenish soft mineral with a greasy feel. It is a silicate of magnesia. Soapstone is usually considered an impure form of talc.

Talc has been found at a large number of localities in the northern part of the state, but commercial deposits have been developed at only a few places. Soapstone is more widely distributed. Two companies are at present producing talc in Georgia. The mills of these companies are located at Chatsworth, Murray County, and the mines are on Fort and Cohutta mountains, about three miles distant. A considerable amount of prospecting and mining has been done on the Dickey property, one-half mile south of Mineral Bluff, Fannin County. Talc has also been mined to a limited extent near Ball Ground and Holly Springs, Cherokee County. Favorable prospects are known to occur in other counties in North Georgia. Talc is principally used for pencils, gas tips, paper filler, lubricants, fireproof paints and toilet powders.

TRIPOLI

A light, porous, siliceous stone, locally known as tripoli, occurs in Murray, Whitfield, Chattooga and other counties in Northwest Georgia.

One of the best known deposits in Murray County is on the Tilton property, near Spring Place. There are several localities in Whitfield County where it is known to occur. It has been rather extensively worked near Dalton and Lyerly. Tripoli mined in Georgia is said to be used largely in the manufacture of scouring soaps and polishing powders.

MINERAL WATERS

Mineral springs of greater or less importance are widely distributed throughout the state. They are abundant in the Piedmont Plateau and Appalachian Valley, where one or more having a local reputation are met with in nearly every county. These springs are especially abundant in the mountainous regions of the Piedmont area, where many of them have become sites of prominent summer resorts.

ARTESIAN WELLS

The artesian wells of Georgia are practically all confined to the Coastal Plain, which is the only part of the state where the geological conditions are favorable for artesian water supply in large quantities. A considerable number of deep, non-flowing wells are also found in the Crystalline and Paleozoic areas, but as a general rule these wells furnish only a limited amount of water and they can not always be relied upon for a continuous supply, as they are often affected by long drouths.

MINERAL PRODUCTION OF GEORGIA IN 1913

Asbestos	\$ 11,000
Barytes	22,000 (†)
Bauxite	68,578
Cement	430,000 (†)
Clay	324,671
Clay products	2,806,541
Coal	361,319
Coke	186,304
Fuller's earth	75,000
Gold	15,108
Granite	906,470
Graphitic shale	5,000 (†)
Iron ore	237,876
Lime	13,483
Limestone	83,899
Manganese	75,000 (†)
Marble	1,101,997
Mineral paints	123,616
Mineral waters	69,442
Pyrite	55,094
Sand and gravel	166,798
Sand-lime brick	11,000 (†)
Silver	45
Talc and soapstone	26,000 (†)
Total	\$7,176,241

WATER POWERS

It is estimated that the streams of Georgia at low water will furnish an aggregate of 500,000 horse-power, only a small part of which is now developed. The money value of this power, reckoning a horse-power at \$20 per annum, is \$10,000,000, which is nearly twice the state's annual income from taxes and all other sources. By the use of storage dams, or by the use of auxiliary steam power for short periods during the dry season, fully 1,000,000 horse-power, at a low estimate, could be utilized.

DEVELOPED WATER POWER

The following tabulated data collected by the State Geological Survey gives the developed and ultimate development in horse-power of all of the main water-power plants at present in the state.

DEVELOPED WATER POWERS OF GEORGIA

Stations	Present Development (Horse-power)	Ultimate Development (Horse-power)
Georgia Railway & Power Co.:		
Tallulah Falls, Tallulah River.....	85,000	102,000
Mathis Storage Dam, Tallulah River.....	10,000
Bull Sluice, Chattahoochee River.....	17,500	17,500
Dunlap Shoals, Chattahoochee River.....	3,400	3,400
	105,900	132,900
Augusta Canal:		
Savannah River, total power.....	11,458	11,458
Georgia-Carolina Power Co.:		
Stevens Creek Development, Savannah River	16,525	32,150
Athens Railway & Electric Co.:		
Station No. 1, Mitchell's Bridge	1,025	1,025
Station No. 2, Tallassee Shoals	1,300	1,300
Station No. 3, Barnett Shoals	5,600	5,600
	7,925	7,925
Gainesville Railway & Power Co.:		
Chestatee River, near Dahlonega.....	1,500	1,500
Central Georgia Power Co.:		
Ocmulgee River, near Jackson.....	22,000	33,500
Columbus Power Co.:		
No. 1, North Highlands	8,770	8,770
No. 2, North Highlands	1,990	1,990
No. 3, City Mills	1,076	1,076
No. 4, Goat Rock	16,800	40,000
	28,636	51,836
Eagle & Phoenix Mills:		
Chattahoochee River at Columbus.....	5,900	5,900
Albany Power & Mfg. Co.:		
Muckafoonee Creek, near Albany.....	2,500	2,500
Grand total	202,344	279,669

The estimated horse-power above given, it should be noted, is in water-wheel capacity, the present development being in water-wheel capacity as now installed and the ultimate development being the full water-wheel capacity of the plant when equipped according to the original designs. By comparing the total present water-wheel capacity with the total ultimate water-wheel capacity it will be observed that the latter is more than $1\frac{1}{2}$ times that of the former. In other words, Georgia's water-power plants are at present producing less than three-fourths the power for which they were constructed; or, to state it differently, these water-power plants, as now developed, can be increased by the installation of additional units in the present plants more than $1\frac{1}{2}$ times. This additional installation, which in many cases will be comparatively inexpensive, will, no doubt, be made from time to time as the demand for power increases, so that within the next decade, or possibly in a much shorter interval, all of the plants will be fully installed and be producing all the power for which they were originally designed.

The smaller developed water powers of the state have not been included in the above estimates on account of the great difficulty of securing reliable data. Had these powers been included the above total present developed water powers would be increased by possibly as much as 10,000 horse-power.

This would give the present water-wheel capacity of all the plants now operated 212,344 horse-power. Comparing these figures with unpublished data recently compiled by Mr. B. M. Hall, formerly a member of the hydrographic division of the United States Geological Survey, who estimates the total wheel installation water powers of the state at 1,223,600 horse-power, we find that our present developed powers are only about 14 per cent of our total water power.

BULLETINS OF THE GEOLOGICAL SURVEY OF GEORGIA.

1. Marbles of Georgia, by S. W. McCallie, 1894, 87 pp., 16 pl., and 2 maps. Out of print.
- 1¹. Marbles of Georgia, Second Edition, Revised and Enlarged, by S. W. McCallie, 1907, 126 pp., 52 pl., and 2 maps. Postage, 13 cents.
2. Corundum Deposits of Georgia, by Francis P. King, 1894, 133 pp., 6 pl., 1 map. Postage, 9 cents.
3. A Part of the Water-Powers of Georgia, by C. C. Anderson and B. M. Hall, 1896, 150 pp., 10 pl., and 2 maps. Postage, 9 cents.
4. A Part of the Gold Deposits of Georgia, by W. S. Yeates, S. W. McCallie and Francis P. King, 1896, 542 pp., 21 pl., and 1 map. Out of print.
5. A Part of the phosphates and Marls of Georgia, by S. W. McCallie, 1896, 98 pp., 3 pl. Postage, 7 cents.
6. A Part of the Clays of Georgia, by Geo. E. Ladd, 1898, 204 pp., 17 pl. Postage, 11 cents.
7. Artesian-Well System of Georgia, by S. W. McCallie, 1898, 214 pp., 7 pl., and 2 maps. Postage, 13 cents.
8. Roads and Road-Building Materials of Georgia, by S. W. McCallie, 1901, 264 pp., 27 pl., and 1 map. Postage, 14 cents.
9. A Part of the Granites and Gneisses of Georgia, by Thomas L. Watson, 1902, 367 pp., 32 pl., and 4 maps. Postage, 21 cents.
10. Iron Ores of Polk, Bartow and Floyd Counties, Georgia, by S. W. McCallie, 1900, 190 pp., 8 pl., 1 map. Postage, 11 cents.
11. Bauxite Deposits of Georgia, by Thos. L. Watson, 1904, 169 pp., 12 pl., and 1 map. Postage, 10 cents.
12. Coal Deposits of Georgia, by S. W. McCallie, 1904, 121 pp., 14 pl., and 1 map. Postage, 9 cents.
13. Other Deposits of Georgia, by Thos. L. Watson, 1906, 81 pp., 11 pl., and 3 maps. Postage, 6 cents.
14. Manganese Deposits of Georgia, by Thomas L. Watson, 1908, 195 pp., 8 pl., and 2 maps. Postage, 12 cents.
15. Underground Waters of Georgia, by S. W. McCallie, 1908, 376 pp., 29 pl., and 3 maps. Postage, 20 cents.

16. Water-Powers of Georgia, by B. M. and M. R. Hall, 1908, 424 pp., 14 pl., and 1 map. Postage, 21 cents.
17. Fossil Iron Ore Deposits of Georgia, by S. W. McCallie, 1908, 199 pp., 24 pl., and 3 maps. Postage, 14 cents.
18. Clay Deposits of Georgia, by Otto Veatch, 1909, 463 pp., 32 pl., and 3 maps. Postage, 25 cents.
19. Gold Deposits of Georgia, by S. P. Jones, 1909, 283 pp., 8 pl., and 2 maps. Postage, 16 cents.
20. Mineral Waters of Georgia, by S. W. McCallie. In preparation.
21. Marls and Limestones of Georgia, by Otto Veatch. In preparation.
22. Brown Iron Ores of Georgia, by S. W. McCallie. In preparation.
23. Mineral Resources of Georgia, by S. W. McCallie, 1910, 208 pp., 20 pl., and 2 maps. Postage, 14 cents.
24. Public Roads of Georgia, Second Report, by S. W. McCallie, 1910, 36 pages. Postage, 3 cents.
25. Drainage Reclamation in Georgia, by S. W. McCallie, J. V. Phillips, F. G. Eason, J. R. Haaswell, and L. L. Hildinger, 1911, 123 pp., 7 pl., and 5 maps. Postage, 8 cents.
26. Geology of the Coastal Plain of Georgia, by Otto Veatch and L. W. Stephenson, 1911, 463 pp., 30 pl., and 2 maps. Postage, 26 cents.
27. Cement and Lime Resources of North Georgia; Bull. Ga. Geol. Survey No. 27. In preparation.
28. Public Roads of Georgia, by S. W. McCallie, 1912, 12 pp. Postage, 2 cents.
29. Asbestos, Talc and Soapstone Deposits of Georgia, by Oliver B. Hopkins, 1914, 319 pp., 21 pl., and 1 map. Postage, 17 cents.
30. Feldspar and Mica Deposits of Georgia, by S. L. Galpin, 1915, 192 pp., 9 pl., and 1 map. Postage, 16 cents.