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L SURVEY OF GEORGIA

CALLIE, STATE GEOLOGIST

HAND-BOOK

MINERAL RESOURCES

OF

GEORGIA

UC-NRLF



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S. W. McCALLIE

STATE GEOLOGIST

ATLANTA, GA.

1918

EXCHANGE



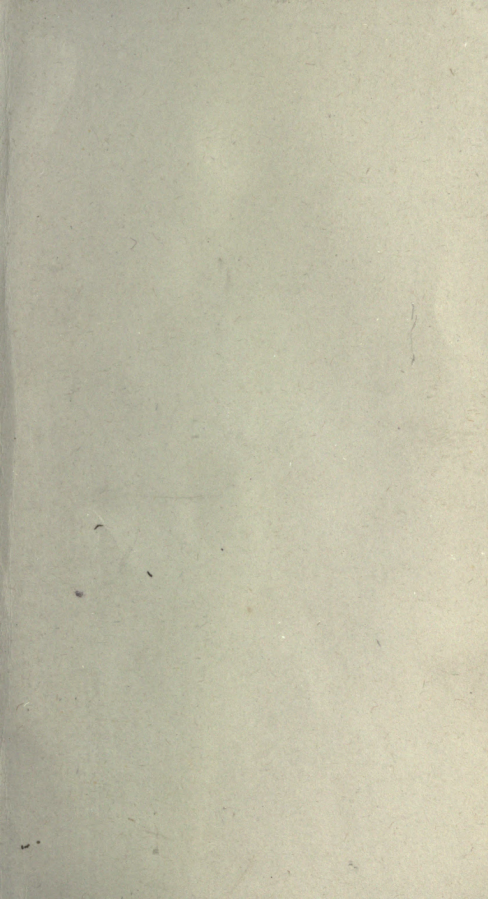
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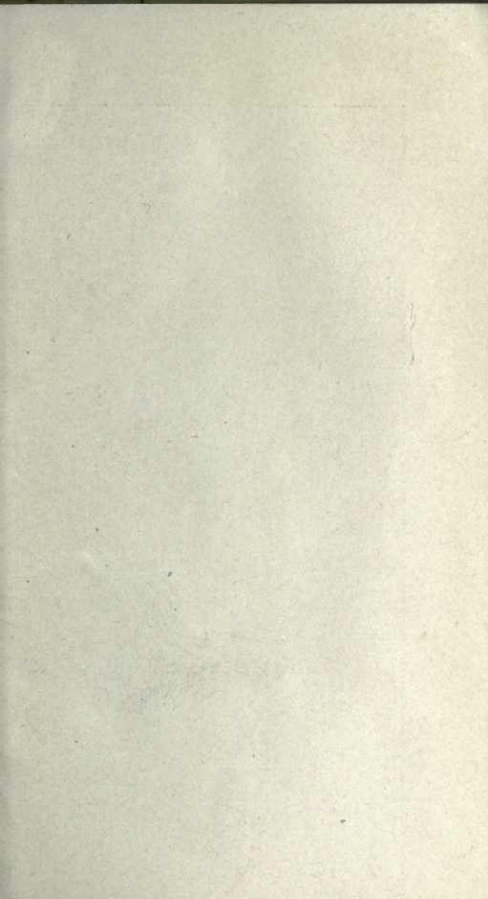
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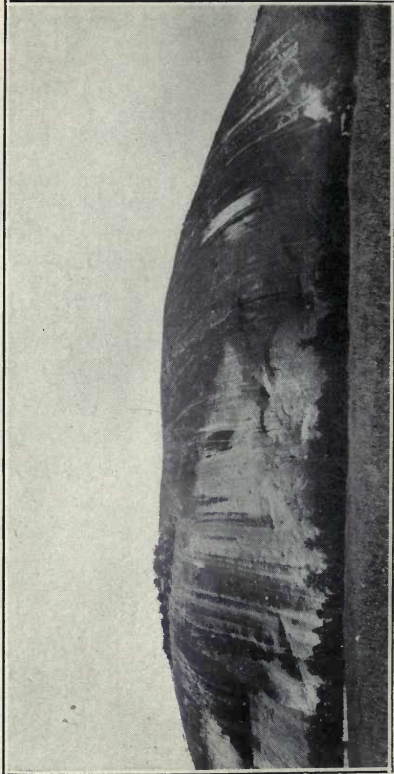
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The seal features a central open book with a five-pointed star above it, emitting rays of light. A ribbon scrolls across the book with the motto 'FIAT LVX'. The entire emblem is enclosed in a circular border with the Latin text 'SIGILLVM · VNIVERSITATIS · CALIFORNENSIS'. The seal is set within a decorative, arched frame.

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STONE MOUNTAIN, DEKALB COUNTY, 16 MILES NORTHEAST OF ATLANTA, RISING 686 FEET ABOVE THE GENERAL LEVEL OF THE SURROUNDING COUNTRY.

GEOLOGICAL SURVEY OF GEORGIA
S. W. McCALLIE, STATE GEOLOGIST

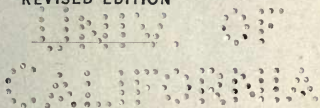
HAND-BOOK

MINERAL RESOURCES

OF

GEORGIA

REVISED EDITION



BY

S. W. McCALLIE
STATE GEOLOGIST

ATLANTA, GA.

1918

FOOTE & DAVIES CO., ATLANTA

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MINERAL RESOURCES

OF

GEORGIA

The mineral resources of Georgia are both varied and extensive. The State is producing at present 34 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.

Following the description of each individual mineral here given will be found references to publications issued by the State Geological Survey, in which the minerals are more fully discussed. Any of these publications can be obtained from the State Geologist upon payment of postage.

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 in Habersham and White counties, near Nacoochee, 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.

References on Asbestos:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23, 1910, 208 pp.*

Hopkins, Oliver B., Asbestos, Talc, and Soapstone Deposits of Georgia. *Bull. Ga. Geol. Survey No. 29, 1914, 319 pp.*

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

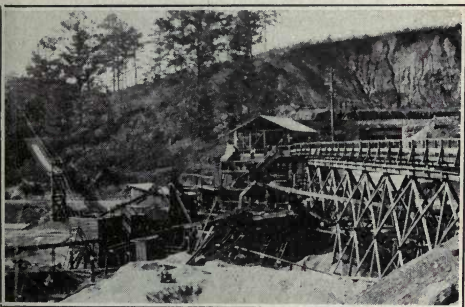
manufacture of paper, rubber, oilcloths, paper collars, and barium salts, as well as for refining sugar, glazing pottery, and for enameling iron.

Georgia last year produced about two-thirds of the barytes mined in the United States, all of which came from the Cartersville district.

References on Barytes:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23, 1910, 208 pp.*

Hull, J. P. D., Barytes Deposits of Georgia: *Bull. Ga. Geol. Survey No. 36, in preparation.*

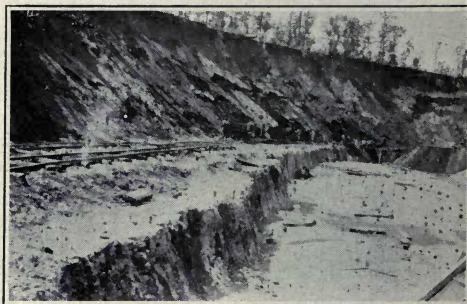


BARYTES MINING, BARTOW COUNTY.

BAUXITE

The first bauxite found in America was discovered near Hermitage, Floyd Coun-

ty, in 1887. Later, deposits were found in Polk, Bartow, Gordon, Chattooga and Walker counties, and between 1907 and 1915 deposits were found in the vicinity of McIntyre, Wilkinson County, near Andersonville, Sumter County, and also near Warm Springs, Meriwether 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



BAUXITE MINE, SUMTER COUNTY.

this country has been obtained from Arkansas, Georgia and Alabama.

Bauxite is a hydroxide of alumina. The ore occurs both in the form of large pockets and as beds, and is mined in the

same manner as clay. 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.

References on Bauxite:

Watson, Thos. L., Bauxite Deposits of Georgia: *Bull. Ga. Geol. Survey No. 11*, 1904, 169 pp.

Veatch, Otto, Clay Deposits of Georgia: *Bull. Ga. Geol. Survey No. 18*, 1909, *Appendix D*.

Shearer, H. K., Bauxite and Fullers Earth Deposits of the Coastal Plain of Georgia: *Bull. Ga. Geol. Survey No. 31*, 1917, 340 pp.

CEMENTS

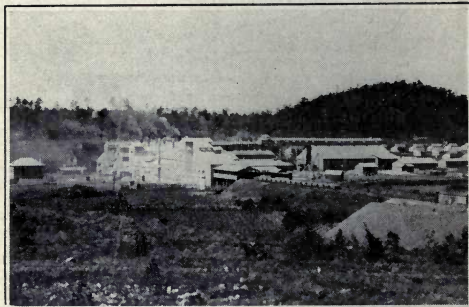
Both natural and Portland cements are made in Georgia. Natural cement plants are located at Cement, Bartow County and at Rossville, Walker County, while extensive Portland cement plants are operated at Rockmart, Polk County. The raw materials for the manufacture of Portland cement, consisting of limestones and shales, are abundant and pretty generally distributed throughout northwest Georgia. Both 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.

References on Cements:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

Maynard, T. Poole, Limestones and Cement Materials of North Georgia: *Bull. Ga. Geol. Survey No. 27*, 1912, 296 pp.

Brantly, J. E., Limestone and Marls of the Coastal Plain of Georgia: *Bull. Ga. Geol. Survey No. 21*, 1916, 300 pp.



PORTLAND CEMENT PLANT, POLK COUNTY.

CHLORITE

Chlorite is a magnesian aluminum silicate composed of greenish or grey mica-like scales. It has a soapy feel and for this reason it is often mistaken for talc or soapstone.

This material occurs in commercial quantities five miles west of Canton, Cherokee County. In the last two or

three years this chlorite deposit has been extensively mined and hauled to Canton, where it is ground and prepared for markets. It is said to be used for foundry facings, coating tarred roof paper, in the manufacture of electrical insulators, for lubricating purposes, etc.

Reference on Chlorite:

Hopkins, O. B., Asbestos, Talc and Soapstone Deposits of Georgia: *Bull. Ga. Geol. Survey No. 29*, 1914, 319 pp.

CHROMITE

Only two counties in Georgia, nameiy, Towns and Troup, as far as known at present, have chromite in apparently commercial quantity. The deposit in Towns County is located two miles due west of Hiawassee, on lot 92; while the deposit in Troup County is near Louise. From the latter locality a limited amount of ore has recently been shipped. The ore in both localities is associated with ferro-magnesian rock and is generally found in the form of boulders in residual clays.

Chromite is used in the manufacture of hard chrome steel and chrome brick, which stand intense heat. It is also used in calico printing and electric batteries as well as a source of various chromium compounds such as potassium bi-chromate.

Reference on Chromite:

Hopkins, O. B., Asbestos, Talc and Soapstone Deposits of Georgia: *Bull. Ga. Geol. Survey No. 29, 1914, 319 pp.*

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 duplicated 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 firebrick, 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.

References on Clays:

Ladd, Geo. E., The Clay Deposits of Georgia: *Bull. Ga. Geol. Survey No. 6-A, 1898, 204 pp.*

Veatch, Otto, Clay Deposits of Georgia: *Bull. Ga. Geol. Survey No. 18, 1909, 453 pp.*



KAOLIN PLANT, TWIGGS COUNTY.

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 mine and the mine of the Vulcan Coal Company, both located on Lookout Mountain, are the only mines now in operation in the State. 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 the State, at our present rate of consumption, for more than 200 years.

Reference on Coal:

McCallie, S. W., Coal Deposits of Georgia: *Bull. Ga. Geol. Survey No. 12, 1904, 121 pp.*



COKE OVENS, WALKER COUNTY.

COPPER

The most extensive copper deposits, so far located in the State, are to be found in Fannin, Cherokee and Harrison 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 de-

posits have been worked at only one place, namely, the Canton copper mine, one mile south of Canton. The Waldrop copper mine in Haralson County is located about three 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.

References on Copper:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23, 1910, 208 pp.*

Shearer, H. K., and Hull, J. P. D., A Preliminary Report on a Part of the Pyrite Deposits of Georgia. *Bull. Ga. Geol. Survey No. 33, in preparation.*

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 or translucent, used 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.

Reference on Corundum:

King, Francis P., Corundum Deposits of Georgia: *Bull. Ga. Geol. Survey No. 2, 1894, 133 pp.*

FELDSPAR

The feldspars are widely distributed throughout the Piedmont and Appalachian areas of Georgia, where they occur in dikes associated with mica and quartz.

The only place where feldspar has so far been mined in any quantity is near Hiram in Paulding County. A limited amount has also been mined in White and Rabun counties. The Georgia feldspars so far put on the market are potash feldspars and have been used for fertilizer purposes after being chemically treated to make the potash soluble.

Feldspar is used extensively as an ingredient in the raw mix of china porcelain, whitewash, glazes, and enamels. It is also used as an ingredient in some polishing scouring soaps; in the manufacture of certain kinds of glass, for pottery, grits, etc.

Furthermore, it has recently been used to a limited extent as a source of potash.

Reference on Feldspar:

Galpin, S. L., Feldspar and Mica Deposits of Georgia: *Bull. Ga. Geol. Survey* No. 30, 1915, 129 pp.

FLUORSPAR

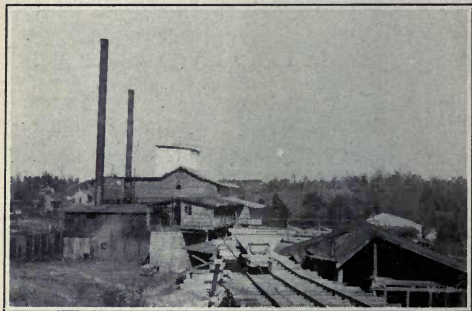
Fluorspar is used largely as a flux in smelting ore, in the manufacture of opalescent glass, and hydrofluoric acid. The mineral has a variety of colors, the most common being purple and green.

Fine specimens of this mineral, having a beautiful greenish color, have recently been found in the vicinity of Ranger, Gordon county. At Graysville, in Chattooga County, the mineral in the form

of cubic crystals with a violet color, occurs associated with limestone.

FULLERS EARTH

The best known deposits of fullers earth occur near Dry Branch, Twiggs County, and in the vicinity of Attapulgus, Decatur County, where they have been worked for some years. Extensive deposits also occur in Bibb, Columbia



FULLERS EARTH PLANT, TWIGGS COUNTY.

and other counties near the Fall Line. The deposits of Twiggs County are now being worked by the General Reduction Company. Georgia stands second in the production of fullers earth, being exceeded only by Florida.

Fullers earth is a clay-like material of various colors. It differs from common

clay in being more porous, carrying a high percentage of silica as compared with the alumina and in having little or no plasticity. Fullers 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.

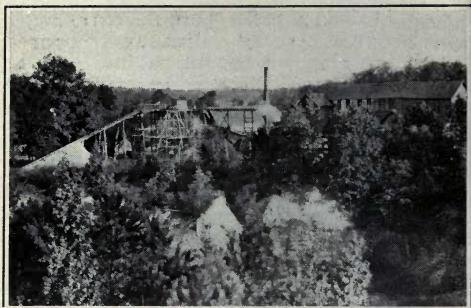
References on Fullers Earth.

Veatch, Otto, Clay Deposits of Georgia: *Bull. Ga. Geol. Survey No. 18, 1909, 433 pp.*

Shearer, H. K., Bauxite and Fullers Earth of the Coastal Plain of Georgia: *Bull. Ga. Geol. Survey No. 31, 1917, 340 pp.*

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 mint 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 north-east-southwest trend. The most impor-



GOLD MINING PLANT, HARALSON COUNTY.

tant 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.

References on Gold:

Yeates, W. S., McCallie, S. W., King, F. P., *Gold Deposits of Georgia: Bull. Ga. Geol. Survey No. 4-A, 1896, 542 pp.*

Jones, S. Percy, *Gold Deposits of Georgia: Bull. Ga. Geol. Survey No. 19, 1909, 283 pp.*

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 one of the largest barren 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 DeKalb 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 the country, being exceeded only by Vermont, Massachusetts, Maine, Colorado, Wisconsin and Maryland.

Reference on Granites:

Watson, Thos. L., Granites and Gneisses of Georgia: *Bull. Ga. Geol. Survey No. 9-A*, 1902, 367 pp.

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 has been mined on a more or less extensive scale. Fine samples of crystalline graphite have been found in Bartow, Pickens, Elbert, Hall, Madison, Douglas, Troup and Cobb counties. All of the graphite material so far mined in Georgia has been used as a filler for commercial fertilizers.

Reference on Graphite:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

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.

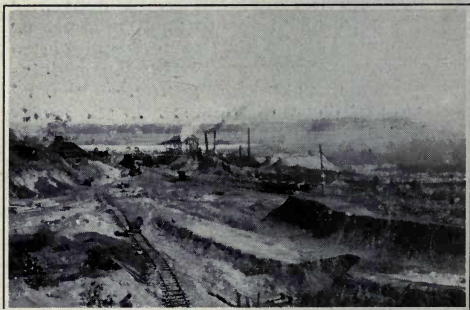
The red, or fossil, iron ores of Georgia are confined to Dade, Walker, Chattooga and Catoosa counties. These ores occur in the Red Mountain iron ore bearing

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.

References on Iron Ores:

McCallie, S. W., Iron Ores of Polk, Bartow and Floyd counties. Georgia: *Bull. Ga. Geol. Survey No. 10-A*, 1900, 190 pp.

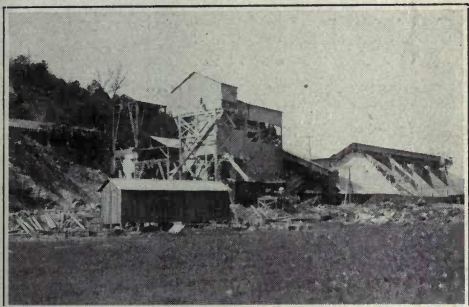
————— Fossil Iron Ores of Georgia: *Bull. Ga. Geol. Survey No. 17*, 1908, 199 pp.



IRON ORE MINING, POLK COUNTY.

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 Bangor and the Chickamauga lime-



LIMESTONE CRUSHING PLANT, BARTOW COUNTY.

stones. In addition to these occurrences, extensive beds suitable for lime and for agricultural purposes occur in the Cretaceous and Tertiary formations of south Georgia.

References on Limestones:

McCallie, S. W., Roads and Road-Building Materials of Georgia: *Bull. Ga. Geol. Survey No. 8*, 1901, 264 pp.

Maynard T. Poole, Limestone and Cement Materials of North Georgia: *Bull. Ga. Geol. Survey No. 27*, 1912, 296 pp.

Brantly, J. E., Limestones and Marls of the Coastal Plain of Georgia: *Bull. Ga. Geol. Survey No. 21*, 1916, 300 pp.

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 Beaver limestone 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.

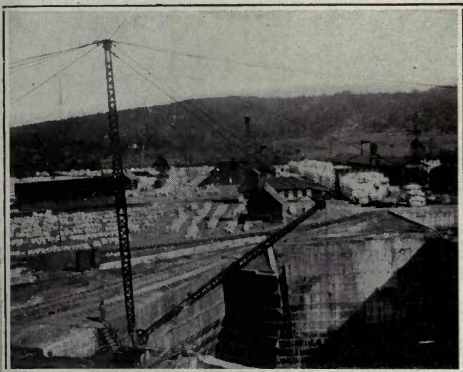
References on Manganese:

Watson, Thos. L., Manganese Deposits of Georgia: *Bull. Ga. Geol. Survey No. 14*, 1908, 195 pp.

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

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, Chero-



GEORGIA MARBLE QUARRIES, PICKENS COUNTY.

kee, 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 60 miles. The main marble indus-

try 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 construction 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; the Corcoran Art Gallery, Washington; and the Field Museum of Natural History, Chicago, Ill., 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 sat-

isfaction as the Georgia marble. The growth of the use of the stone has also been equally as phenomenal in monumental work.

Reference on Marble:

McCallie, S. W., Marbles of Georgia: *Bull. Ga. Geol. Survey No. 1 Revised*, 1907, 126 pp.

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.

References on Marls:

McCallie, S. W., Phosphates and Marls of Georgia: *Bull. Ga. Geol. Survey No. 5-A*, 1896, 98 pp.

Brantly, J. E., Limestones and Marls of the Coastal Plain of Georgia: *Bull. Ga. Geol. Survey No. 21*, 1916, 300 pp.

MICA

Mica is widely distributed throughout the Piedmont Plateau. It has been worked to a limited extent in Upson, 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. Upson County is now an active producer as well as Meriwether County. Mica has been mined in Rabun County at the Kell Mica Mine, 10 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.

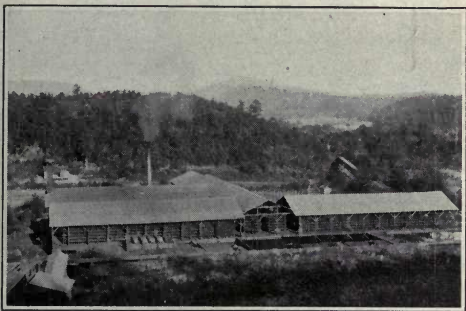
References on Mica:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

Galpin, S. L., Feldspar and Mica Deposits of Georgia: *Bull. Ga. Geol. Survey No. 30*, 1915, 190 pp.

OCHER

The ocher mines of Georgia produce more than one-half the yellow ocher output of the United States. 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, situated on the left bank of the Etowah River, two and one-fourth miles east of Cartersville. Ocher mining in the Car-



OCHER PLANT, BARTOW COUNTY.

tersville 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 1,000 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.

Reference on Ocher:

Watson, Thos. L., Ocher Deposits of Georgia: *Bull. Ga. Geol. Survey No. 13, 1906, 81 pp.*

PRECIOUS STONES

A large variety of minerals 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.

Reference on Precious Stones:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23, 1910, 208 pp.*

POTASH-BEARING SLATES

Slates containing 7 to 10 per cent. potash occur north of Cartersville, Bartow County, in a belt 15 miles long and 1 to 4 miles wide. The best exposures are near White, on the L. & N. Railway, where a thickness of several hundred feet of such material may be worked by open-cut methods. It is believed that these slates are exceptionally fine raw material for the extraction of potash for fertilizer and other purposes.

Some of the slate has also the essential physical and chemical properties of a first-class roofing slate.

Reference on Slate:

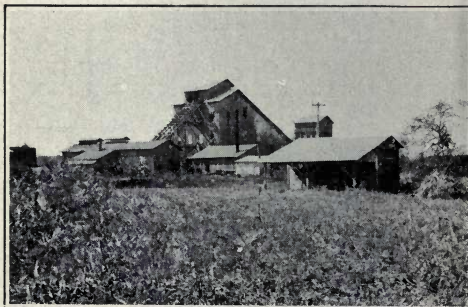
Shearer, H. K., *Slate Deposits of Georgia: Bull. Ga. Geol. Survey No. 35, in preparation.*

PYRITE

Pyrite is an iron sulphide chiefly employed in the manufacture of sulphuric acid. This mineral occurs in commercial quantities in a number of counties. The most important deposits are in Lumpkin, Cherokee, Paulding, Cobb, Douglas, Haralson, Carroll, Towns, and Rabun counties.

Mines operating in 1917 were the Chestatee mine, six miles northeast of Dahlonega, Lumpkin County; the Standard mine near Creighton, Cherokee County; the Little Bob and Shirley mines

near Hiram, Paulding County; the Marietta mine near Marietta, Cobb County; the Sulphur Mining & Railroad Company mine in Douglas County, and the Waldrop mine near Draketown, Haralson County. Other promising deposits, which have been worked in the past or rather exten-



PYRITE PLANT, CHEROKEE COUNTY.

sively explored are Reeds Mountain, near Bremen, Haralson County; the Southern Star mine, four miles west of Woodstock, Cherokee County; the Swift mine near Draketown, Haralson County; the Swift or Blake mine at Creighton, Cherokee County; the Canton Copper mine, Cherokee County; and the Mammoth mine near Hiram, Paulding County. The copper ore from Mine No. 20, Fannin County, is also a source of sulphuric acid.

References on Pyrite:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

Shearer, H. K., and Hull, J. P. D., A Preliminary Report on a Part of the Pyrite Deposits of Georgia: *Bull. Ga. Geol. Survey No. 33*, in preparation.

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.

References on Road Materials:

McCallie, S. W., Roads and Road-Building Materials of Georgia: *Bull. Ga. Geol. Survey No. 8*, 1901, 264 pp.

McCallie, S. W., Public Roads of Georgia, Second Report: *Bull. Ga. Geol. Survey No. 24*, 1910, 36 pp.

McCallie, S. W., Public Roads of Georgia: *Bull. Ga. Geol. Survey No. 28*, 1912, 12 pp.

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, one and one-half 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.

References on Sand and Gravel:

McCallie, S. W., Roads and Road-Building Materials of Georgia: *Bull. Ga. Geol. Survey* No. 8, 1901, 264 pp.

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey* No. 23, 1910, 208 pp.

SERICITE

Sericite of exceptional purity occurs in Pickens County only a short distance west of Jasper, where it is found in beds from a few inches to six feet or more in thickness, interlaminated with quartz schist.

The mineral is a variety of mica made up of small elongated silver-colored shreds. It resembles talc very closely, in

physical properties, and is often used for the same purposes.

The Pickens County sericite has recently attracted considerable attention as a raw material for the extraction of potash. Two different companies are now mining this material with a view of extracting the potash for fertilizer purposes. The results of the tests so far worked out by the companies here referred to, have not yet been made public. However, they appear to be very sanguine of a financial success.

References on Sericite:

Hopkins, O. B., Asbestos, Talc and Soapstone Deposits of Georgia: *Bull. Ga. Geol. Survey* No. 29, 1914, 319 pp.

Galpin, S. L., Feldspar and Mica Deposits of Georgia: *Bull. Ga. Geol. Survey* No. 30, 1915, 192 pp.

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.

Reference on Serpentine:

McCallie, S. W., Marbles of Georgia: *Bull. Ga. Geol. Survey No. 1, Revised, 1907, 126 pp.*

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 belt is found in northern Bartow, Gordon and Murray counties. This slate has a greenish color and possesses all of the physical and chemical qualities of a first-class roofing slate.

References on Slate:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23, 1910, 208 pp.*

Shearer, H. K., Slate Deposits of Georgia: *Bull. Ga. Geol. Survey No. 35 in preparation.*

TALC AND SOAPSTONE

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. Four 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 Co-hutta 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, fire-proof paints and toilet powders.

References on Talc and Soapstone:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

Hopkins, Oliver B., Asbestos, Talc and Soapstone Deposits of Georgia: *Bull. Ga. Geol. Survey No. 29*, 1914, 319 pp.

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.

Reference on Tripoli:

McCallie, S. W., Mineral Resources of Georgia: *Bull. Ga. Geol. Survey No. 23*, 1910, 208 pp.

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.

References on Mineral Waters:

McCallie, S. W., Underground Waters of Georgia: *Bull. Ga. Geol. Survey No. 15*, 1908, 376 pp.

McCallie, S. W., Mineral Waters of Georgia: *Bull. Ga. Geol. Survey No. 20*, 1913, 190 pp.

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.

References on Artesian Wells:

- McCallie, S. W., Artesian Wells of Georgia: *Bull. Ga. Geol. Survey No. 7, 1898, 214 pp.*
———, Underground Waters of Georgia: *Bull. Ga. Geol. Survey No. 15, 1908, 376 pp.*

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 \$20.00 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

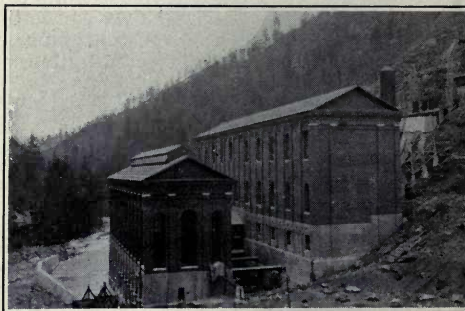
season, fully 1,000,000 horse-power, at a low estimate, could be utilized.

References on Water Powers:

Anderson, C. C., and Hall, B. M., Water Powers of Georgia: *Bull. Ga. Geol. Survey No. 3-A*, 1896, 150 pp.

Hall, B. M. and M. R., Water Powers of Georgia: *Bull. Ga. Geol. Survey No. 16*, 1908, 424 pp.

Hall, B. M. and M. R., Third Report on the Water Powers of Georgia. *In preparation.*



TALLULAH FALLS POWER PLANT (102,000 H. P.), HABERSHAM COUNTY.

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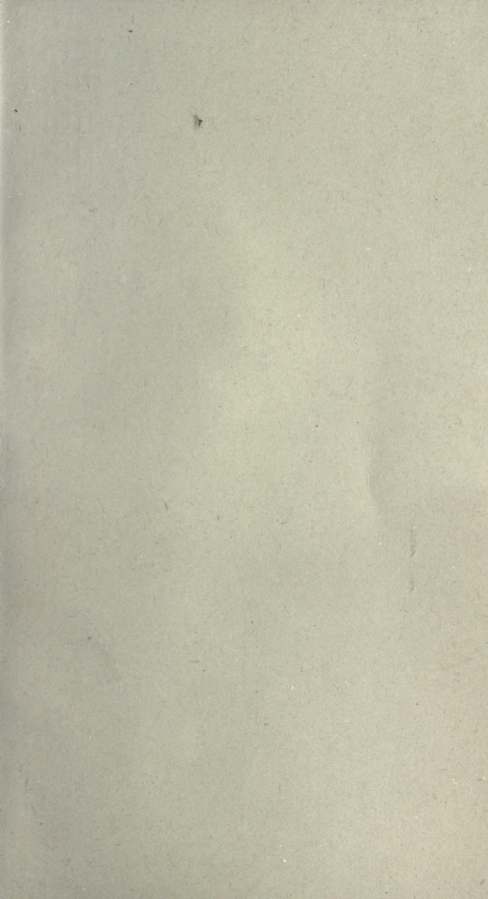
1. Marbles of Georgia, by S. W. McCallie, 1894, 87 pp., 16 pl., and 2 maps. *Out of print.*
1. Marbles of Georgia, Second Edition, Revised and Enlarged, by S. W. McCallie, 1907, 126 pp., 52 pl., and 2 maps. *Postage, 13 cents.*
2. Corundum Deposits of Georgia, by Francis P. King, 1894, 133 pp., 6 pl., 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 Phosphate and Marls of Georgia, by S. W. McCallie, 1896, 98 pp., 3 pl. *Out of print.*
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. Ocher 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 2 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, 453 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, 1913, 190 pp., 24 pl., and 1 map. *Postage, 11 cents.*
21. Limestones and Marls of the Coastal Plain of Georgia, by J. E. Brantly, 1916, 360 pp., 11 pl., and 1 map. *Postage, 18 cents.*
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, 5 cents.*
25. Drainage Investigations in Georgia, by S. W. McCallie, and U. S. Department of Agriculture, 1911, 123 pp., 7 pl., and 5 maps. *Postage, 12 cents.*
26. Geology of the Coastal Plain of Georgia, by Otto Veatch and L. M. Stephenson, 1911, 463 pp., 30 pl., and 2 maps. *Postage, 21 cents.*
27. Limestones and Cement Materials of North Georgia, by T. Poole Maynard, 1912, 296 pp., 22 pl., and 1 map. *Postage, 18 cents.*
28. Public Roads of Georgia, by S. W. McCallie, 1912, 12 pp. *Postage, 5 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.*

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31. Bauxite and Fullers Earth of the Coastal Plain of Georgia, by H. K. Shearer, 1917, 340 pp., 16 pl., and 1 map. *Postage, 21 cents.*
32. Agricultural Drainage in Georgia, by H. H. Barrows, J. V. Phillips, and J. E. Brantly, 1917, 122 pp., 9 pl., and 6 maps. *Postage, 12 cents.*
33. A Preliminary Report on a Part of the Pyrite Deposits of Georgia, by H. K. Shearer, and J. P. D. Hull, 1918. *In preparation.*
34. Third Report on the Water Powers of Georgia, by B. M. and M. R. Hall, 1918. *In preparation.*
35. Slate Deposits of Georgia, by H. K. Shearer, 1918. *In preparation.*
36. Barytes Deposits of Georgia, by J. P. D. Hull. *In preparation.*



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