IC 4

GEORGIA

STATE DIVISION OF CONSERVATION

DEPARTMENT OF MINES, MINING AND GEOLOGY

A. S. FURCRON, Director

THE GEOLOGICAL SURVEY

Information Circular 4

THE GOLD DEPOSITS OF GEORGIA

By

Roy A. Wilson

ATLANTA

1934

Reprinted 1965

THE GOLD DEPOSITS OF GEORGIA

By
ROY A. WILSON

(Published by permission of the Director, United States Geological Survey)

Note: This article gives the general results of an investigation made by the United States Geological Survey under a grant of funds from the Public Works Administration. The detailed studies will later be published by the United States Geological Survey in a report on the gold deposits of the Southern Appalachians. This investigation was the first scientific study of Georgia's gold deposits since the publication of Bulletin 19 of the Georgia Geological Survey in 1909. With the amount of money available for this investigation, no prospecting could be done and detailed geologic work had to be limited to the Dahlonega area where a detailed topographic map was available and where more prospecting and mining was in progress than in any other area. All active mines and prospects in the other areas were visited, however. I feel that this article will dispel many erroneous beliefs in regard to the gold deposits and will point out the proper steps to take in prospecting and developing a gold mine.—Richard W. Smith, State Geologist.

I.

General Features

A study of the gold deposits of Georgia by the United States Geological Survey under allotment from the Public Works Administration and with the cooperation of the Georgia Department of Forestry and Geological Development forms the basis of a series of short articles of which this is the first.

The gold deposits of Georgia (fig. 1), like those in all other parts of the world, represent a natural resource which can be wrested from the earth only by much hard labor. That as a rule rewards from this labor will be at best modest and often nil is demonstrated by the history of any gold-mining camp. The idea that the gold deposits of Georgia are largely undeveloped and that many rich ore bodies lie buried in the gold belt awaiting intelligent prospecting and development has no basis in fact. Rich deposits of gold which handsomely reward the efforts of those fortunate enough to uncover them are very uncommon in any mining district. With rare exceptions, gold occurs in ore bodies of relatively low grade, which require considerable capital for their development and which yield a reasonable margin of profit only with cautious and intelligent application of modern principles of prospecting, mining, and milling. The recent increase in the price of gold, in so far as it has not been accompanied by a general rise in prices, makes possible the opening of mines that could not be operated under former conditions, but all the hazards of mining still prevail.

The gold in Georgia occurs in placer and saprolite deposits and in quartz loads in bed-rock from which these deposits were formed (fig. 2).

Placer deposits.—The gradual erosion of a gold-bearing vein or lode generally results in a mechanical concentration of the gold at favorable places in the streams that drain the area, because the gold is heavier and more resistant to physical and chemical destruction than the other minerals of the vein. The gold may be widely disseminated or locally concentrated in the alluvial deposits, its distribution depending on distance of transportation, topography, character of the stream bed, and other factors. Placer ground usually yields but a few cents to the cubic yard of alluvium: rich streaks are rarely found. It is a very general rule that the richer deposits occur next to bedrock, because the gold, being heavier than the other materials, has gradually worked its way downward to this position in the constantly shifting alluvium.

The history of most gold-mining districts shows that the placer deposits were first discovered and worked before much attention was given to "hard rock" or placer mining. This history holds true for Georgia. Placer ground is widespread over the gold belt, but nearly all the promising areas have been worked over once or several times. Occasionally rich ground has been found, but these deposits have more com-

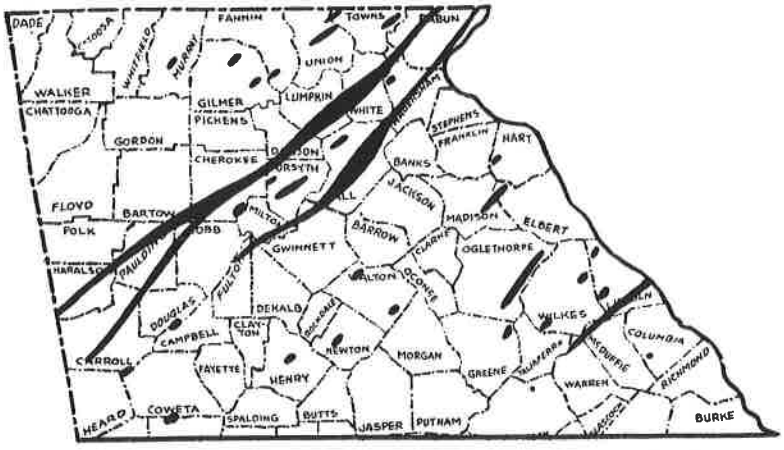

Figure 1.—Map of North Georgia showing the distribution of gold deposits (after S. P. Jones, Georgia Geol. Survey, Bull. 19, 1909)

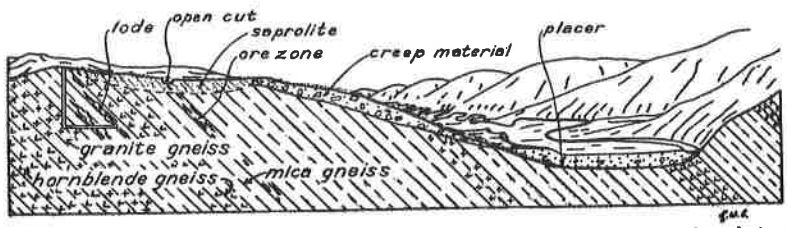

Figure 2.—Diagrammatic cross-section of a North Georgia stream valley showing the relations of lode, saprolite, and placer. (After G. W. Crickmay.)

monly furnished modest amounts of gold. During the nineteenth century the State was pretty thoroughly combed over by gold miners, and it is doubtful if any undiscovered placers of importance exist. Even by the time of the gold rush to California, in 1849, the placers of Georgia were mostly worked out. Small patches of unworked ground in some placer areas can still be found, and systematic prospecting might disclose new placer ground of small area.

The future of placer mining in Georgia will be a matter of reworking old deposits by modern methods, using drag-line excavators, dredges, or any system that can handle large amounts of alluvium more cheaply than was possible by more primitive methods. Working with a drag-line excavator, three or four men under favorable conditions can handle a sufficient amount of alluvium each day to make operations profitable, even where the tenor of the deposit is as low as 10 or 12 cents to the cubic yard. At various localities along the gold belt old methods of placer mining are still being used, but miners who are making more than a modest daily wage by such methods are exceptional.

"Panning" is likely to yield traces or "colors" of gold in almost any part of the belt. This does not prove that the area contains valuable deposits. The presence of colors in the pan indicates simply that traces of gold exist in the alluvium, saprolite, or vein, as the case may be. Thorough sampling and prospecting is necessary to establish the true value of the deposit.

Georgia has much fine gold or "flour" gold, which is widespread through the alluvium and weathered rocks of the gold belt. This fine gold shows up readily in careful panning, but its recovery is difficult and constitutes one of the major problems of gold mining in the State today.

Saprolite deposits.—The term "saprolite" was originally defined by geologists as "weathered rock in place." Among miners in Georgia the term is generally restricted to the weathered portion of the lodes. It is important to note that the distinction between the saprolite and lode deposits rests on the physical condition of the rock and is not a primary geologic feature. In other words, that portion of the lode which has been exposed to the physical and chemical processes of weathering (hydration, etc.) forms the saprolite zone. This zone passes downward into the unaltered, "hard rock" portion of the lode and has gradually become enriched by the mechanical concentration of gold during the slow breaking down of the lode in the process of weathering. As in the placer deposits, the richer portions of saprolites lie next to the unaltered bedrock. However, the fine gold may be more thoroughly disseminated through the deposit.

Saprolite deposits are characteristic of the Piedmont region of the southern Appalachians because the geologic history of this region has been favorable to very slow removal of the weathered rock, much of it remaining in place to form thick accumulations. The working of these deposits led to a special type of mining, in which a hydraulic giant shooting a stream of water under high pressure was used to wash away the softer weathered rock. This type of mining was carried on extensively after the Civil War and up to about 30 years ago. With the working out of the higher-grade deposits along the gold belt, probably only a few areas remain in which hydraulic mining could be carried on profitably today.

The great problem in saprolite mining has been the satisfactory recovery of the fine gold disseminated in the clay. Losses from inability to separate this flour gold from the clay have been high, sometimes 40 per cent or more. So far, attempts to find an efficient and practical process of separation have met with little success. If this problem could be solved, certain saprolite deposits that are now considered of little value might be worked at a profit.

Lode mining.—Lode mining gradually attracted more attention as the higher-grade placer and saprolite deposits along the gold belt of Georgia became exhausted. The total amount of underground development in the state is very small compared with that in other mining regions. Much of it has been "gophering"—the digging by hand in the oxidized and partly weathered zone of the lodes for rich quartz stringers and pockets. Although a few mines have operated on a fairly extensive scale and penetrated to depths of several hundred feet below the oxidized zone into the sulphide ore bodies, the lode miners have generally abandoned their efforts at depths of 100 feet or less. Increased difficulties of mining and depletion of richer ore are the two common factors behind such abandonment.

The limited mining of the quartz lodes explains the widespread belief that the future of gold mining in Georgia lies in the exploration of the deeper parts of the deposits with the hope of finding profitable ore bodies. In areas having favorable geologic conditions this is a definite possibility, but there is no present basis in fact for the statement that the gold belt of Georgia contains a second "Mother Lode."

In this connection it is important to note that the lodes of the gold belt are characterized by small, very irregularly distributed veins in which the small ore shoots are separated by much barren material (fig. 3).

The difficulties of mining such a deposit are apparent.

At the time of these studies none of the deeper mines in the state was accessible. Most of them had been abandoned for a long period. Reliable statistics of production either have not been kept or are not available. Underground maps are generalized and show little in the way of reliable geology. Word-of-mouth information must be carefully sifted for data that are accurate. The owners or past operators of these mines are prone to err on the side of undue optimism or have forgotten essential details. A mine that can be operated at a profit, and especially one that still contains extensive bodies of rich ore, is not likely to be abandoned. Litigation, accidental flooding, etc., are exceptional causes. The assumption is reasonable that most of these deeper mines were abandoned because they failed to yield a profit. Even if they were profitable at first, the ore probably became too lean to be workable at depths.

It may be that some of these old mines, if reopened and properly explored, could be operated at a profit under present economic conditions if modern methods of mining and milling were utilized. The geologic data indicate that exploration will probably show low-grade ore bodies, with

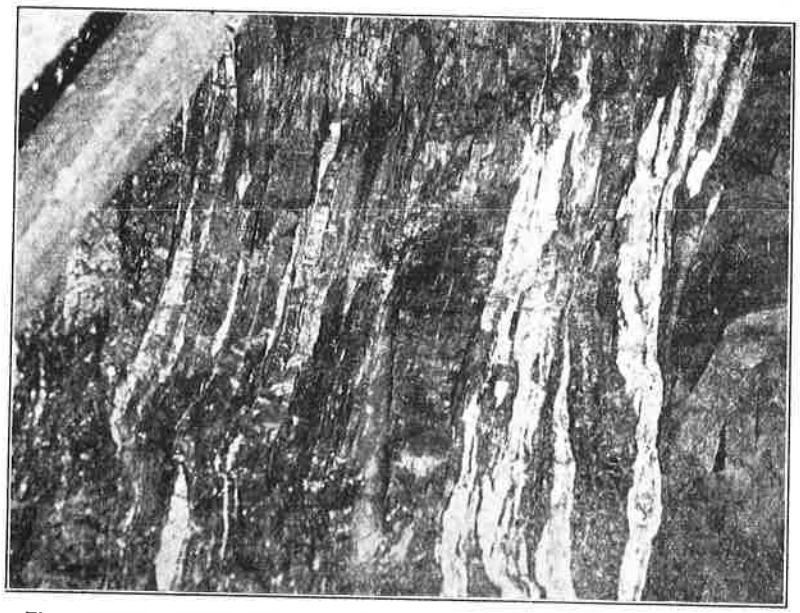

Figure 3.—View of lode exposed in Black shaft of Cherokee mine in Cherokee county. Shows typical arrangement of small quartz veins intermixed with altered country rock. Photograph by R. A. Newton.

here and there a richer pocket. The profit must ordinarily come from mining these low-grade ore bodies. With very rare exceptions, the discovery of rich pockets of gold represents something unexpected and unplanned for; they are the occasional "lucky finds" and should be so considered in the proper valuation of the property.

Too much emphasis should not be placed upon the past history of a mine. The richer ore may have been mined out. The character of the remaining ore is the all-important question. No mine is truly on a paying basis until sufficient exploratory work has proved the presence of ore bodies of sufficient size and value to guarantee a return of the capital investment, plus costs of operation, plus a reasonable margin of profit. Until that is established the mine is merely a prospect, subject to all the hazards attendant on the lack of knowledge as to what lies below. The advice of competent mining engineers and geologists will reduce these hazards somewhat but by no means eliminate them.

In addition to geologic data, sampling and assaying of the explored ore bodies is important. Gold veins, especially, show wide variations in value, even within a distance of a few feet, and the mean or average of the assayed samples will generally be much lower than the highest results obtained. Emphasizing the highest assays obtained in sampling gives an optimistic picture of the property's value which is not warranted. Selective or haphazard sampling of the ore body is equally worthless. Proper sampling requires the utmost caution and skill and is very often an expensive procedure, costing hundreds or even several thousand dollars, if the deposit sampled is of fairly large size. It is obvious that until sufficient exploration has been carried on to open up a considerable portion of the vein or lode, the most accurate sampling gives only a partial picture of the true value of the ore body. A detailed mine map showing the exact locality of each sample in the shafts, crosscuts, drifts, etc., and an assay sheet to accompany this map are absolutely essential.

The question of the depth to which profitable ore bodies extend in the gold belt of Georgia is still an open one. The answer to this question lies largely in what future underground development will disclose. Present knowledge does not indicate extensive and rich ore bodies in the deeper portions of the lodes. The known facts show that in areas where conditions of mineralization have been favorable, ore bodies that may be profitably mined lie below the water table in the sulphide zone but that only very locally do they contain small rich pockets of gold.

Mining cannot be carried on at a profit everywhere in the Georgia gold belt. There are large areas which show very little or no mineralization. In other areas the gold, though widely distributed, is present in so small an amount that mining operations of any type cannot be profitable, regardless of the present price of gold or other favorable economic factors.

It is frequently stated that certain mines are not operating because of the difficulty of treating the sulphide ores. There is no difficulty in treating sulphide ores if the value is there. Modern metallurgical practices are readily available to any operator who is interested. The "free gold," or that which is not intimately associated with the sulphides (iron pyrite, etc.), has been largely mined in the past because the simpler metallurgy and cheaper mining of the oxidized free-milling ore allow on the average a profit from a lower grade of material than can be worked in the sulphide zone.

II.
Geologic Features

It is probable that every part of Georgia which has shown surface indications of gold has been prospected during the last 100 years. Pits, trenches, old tunnels and shafts, open cuts, and abandoned placers are found in all the areas showing mineralization. It is doubtful if any large area exists that can be regarded as virgin territory for prospecting. Parts of the gold belt where there is no such evidence of past prospecting were for some reason passed over as unfavorable. Exceptions to this would be lands owned by individuals or families who have not permitted prospecting on their property by outsiders.

Certain parts of the gold belt have been favored by extensive and locally intense mineralization. It is in these areas that most of the mining has been done and that present activities and future possibilities of production largely lie. The recent surveys have therefore been largely confined to such areas.

Except for minor variations, the geologic features of Lumpkin county as related to the mineralization are characteristic of the gold belt as a whole, and the following discussion is based upon detailed studies in that county.

The productive areas of this county contain narrow, elongated lodes, trending northeast. The structure of the enclosing formations has controlled to a notable degree the development and mineralization of the gold-bearing lodes. It is believed that an understanding of these structural features will materially aid in prospecting and developing the ore bodies, and for this reason they have been studied in some detail.

Contrary to common belief, the individual lodes do not extend for long distances. They average a few thousand feet or so in length and show local variations in width from several feet to 100 feet. Greater widths are exceptional. Some of the lodes lie end to end, with barren areas between, and this arrangement probably explains the local belief that the lodes extend for many miles without a break. At any point in the gold belt several lodes may be developed parallel to one another. They lie either roughly parallel to the belt or—as on Findley Ridge, for example—at an agle to the belt (fig. 4). The position of the lodes is as a rule closely related to the cleavage, grain, or schistosity of the enclosing rock. Exceptions occur, but commonly the lodes trend northeast and dip or slope southeast with the cleavage of the formations.

These lodes are termed "veins" by the prospectors and miners, but the true veins consist of the many small irregular-shaped

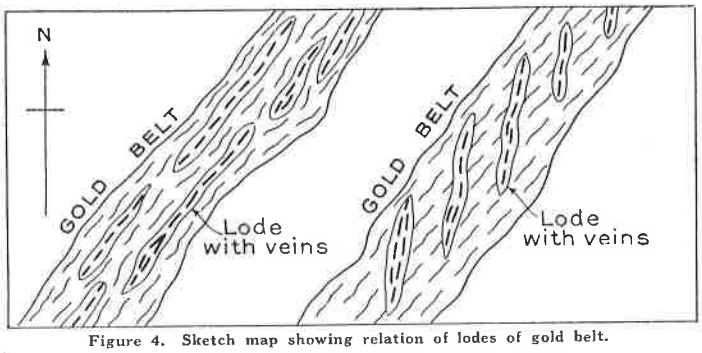

Figure 4. Sketch map showing relation of lodes of gold belt.

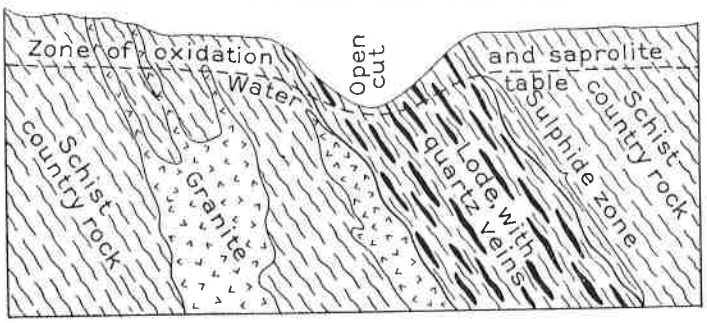

Figure 5. Idealized cross section showing character of lode and its relation to country rock.

masses and lenses of quartz that lie within the lodes. The typical veins range from an inch to several feet in thickness and from a few feet to several hundred feet in length. They swell and pinch abruptly. Commonly, the veins are in the form of small stringers of quartz which lie parallel to the cleavage or schistosity of the enclosing rock (fig. 5). The veins are largely the result of a replacement of the country rock which forms part of the lode. The country rock is composed of schist or granite and is in general intricately mixed with the vein material. The mineralization has generally been confined to the veins, but it may have penetrated the altered country rock that forms part of the lode.

The gold is irregularly distributed through the vein material, barren masses of quartz and the enclosing rock occurring along with those that carry gold. Commonly, the higher tenor tends to be concentrated in localized ore bodies, which vary in shape according to the local structural features of the rock. The deep-lying granitic intrusions, now well exposed over the region, probably formed the source of the mineralizing solutions, which found a more ready passage where such features as rolls in the schistosity, shear planes, joint planes or fissures, or more open cleavage were present.

Technical details relative to the mineralization will be considered more fully in a forthcoming report by the United States Geological Survey. The point emphasized here is that in the area of mineralization the structural features are significant. As an illustration of this point, it is common knowledge among the miners doing underground work in the gold belt that in many places the ore forms shoots or chimneys in the lodes. These ore shoots are in the form of ellipsoidal masses that average a few feet in cross section and rarely exceed 100 feet in length. They generally plunge or "rake" at fairly steep angles within the lode and to the northeast. The data in hand show that "rolls" (waves) in the schistose cleavage of the country rock have determined the formation of such ore bodies.

The reader can obtain a mental picture of this structural arrangement of an ore shoot by comparing the lode with its many small, irregular veins to a house roof sloping southeast. If the roof had large corrugations running at an angle down the slope and to the northeast, these corrugations would represent the rolls in the schistosity. The ore shoots lie with their long axes roughly parallel to these rolls or corrugations and at points along the length of the lode where structural conditions have been more favorable for the localization of gold deposition. Quartz stringers may be equally well developed between these ore shoots but show much less mineralization. Other forms of ore bodies occur, but this type seems especially characteristic of the Georgia gold belt.

The present surveys indicate that the above-outlined features of geology and mineralization are in general typical of the entire Georgia gold belt. In different portions of the belt there are peculiar local features, some of which will be briefly mentioned later in descriptions of the active properties.

III.
Present Mining Activity

Note: Dr. Wilson's articles were written in August, 1934. In order that the description of mining and prospecting activities might be brought up to date as of December 15, 1934, the State Geologist has revisited most of the properties and has added numerous notes and insertions, all of which are indicated by italics and are not to be ascribed to Dr. Wilson.—Richard W. Smith, State Geologist.

Here and there over the gold belt, especially in localities that have produced gold in the past, the placer and saprolite deposits are worked from time to time by a small group. Most of these miners are local farmers or landowners who operate with pick and shovel and sluice box, discontinuing their gold mining when the water gets too low, when farm work demands their attention, or when more lucrative labor can be obtained. Few of these miners average more than a modest daily wage. An occasional richer find may create much local excitement.

There are several counties where mining operations are of sufficient magnitude to merit more detailed descriptions. Some of these properties have afforded valuable data on the problem of Georgia gold deposits.

Lumpkin County

Battle Branch Mine—The mine at present creating the greatest interest in this area is the Battle Branch mine, a short distance west of Auraria, close to the Etowah River (fig. 6). Exploratory work in the sulphide zone has opened up some pockets or shots of high-grade ore. The mine is under the management of Mr. R. A. Newton. The history of this property is typical of many of the mines along the gold belt. "Gophering" for richer streaks in the oxidized portion of the lode and hydraulic mining of the saprolite have been carried on from time to time in the past, mainly before 1900. The present operations include reopening an inclined shaft into the sulphide zone and extending a shallow drift from this shaft. A small amount of stoping has been done along the richer parts of the ore body. In addition to this work, another shallow tunnel has been extended. *Enough free gold was recovered by panning the ore from the rich shoots to pay for the cost of deepening the shaft to 200 feet, at which level another drift has been started, and for the erection of a small mill. The mill consists of a jaw-crusher, a 10-stamp Straum circular stamp-mill, amalgam plates to recover the free gold, and a Wilfey table to recover the sulphides, which are now being stored for later shipment to a smelter. All the ore from the mine, low-grade and rich shoots alike, will be treated in the mill.* This property typically illustrates the characteristics of lode deposits described in a previous article. The high-grade ore represents the "lucky find" that now and then occurs in gold mining. One

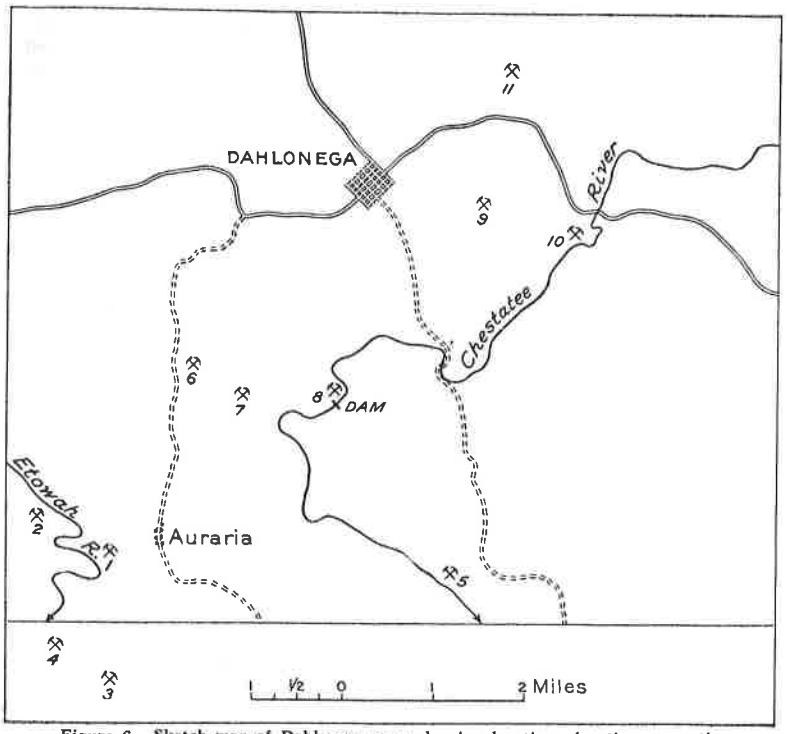

Figure 6. Sketch map of Dahlonega area showing location of active properties. 1. Topabri mine, 2. Battle Branch mine, 3. Baggs Branch placer, 4. Saprolite mine, 5. Long Branch placer, 6. Barlow cut, 7. Bunker Hill placer, 8. Briar Patch placer, 9. Lockhart mine, 10. Boly Field mine, 11. McDonald mine.

of the interesting things about the mineralization in this lode is the close association of the gold with galena (lead sulphide).

Lockhart Mine—The Lockhart mine, a short distance east of Dahlonega on Yahoola Creek, is another property on which systematic exploration of the deeper part of the lode has been in progress. Mr. W. M. Grant was in charge of operations. This mine has had a long history. Past operations have included hydraulic mining of the saprolite and extensive gophering for richer pockets in the oxidized zone of the lode. The recent operations included the sinking of a vertical shaft to a depth of 148 feet and drifting along the lode from this shaft to explore and block out whatever ore might be encountered. Development work here is confronted by a problem which should be considered in all plans for mining the deeper parts of the lodes in this district. The mineralization is characterized by an abundance of garnet impregnating the veins and altered country rock. This feature, together with the general toughness of the country rock, appreciably slows up drilling and breaking of the vein material. *As the development work progressed it became apparent that a fault parallel to the general strike had at places considerably limited the size of the ore body, both horizontally and vertically. The work was stopped and the property abandoned by Mr. Grant in November. The lack of success at this particular property is an example of the hazards of mining, but by no means should it deter similar exploratory work by private capital on other properties where geologic conditions appear to be favorable.*

Barlow Mine—*Carey, Inc., under the direction of Mr. Reg. A. Brett, have cleaned out, widened, and deepened to 50 feet an old shaft in the bottom of the Barlow Cut, southeast of Dahlonega, the largest of the old saprolite workings in the district. This struck a sulphide lode about 5½ feet wide, thought to lie to the west of the main Barlow lode. They have drifted for 160 feet south of the shaft and are now stoping upward along the lode. A mill has just been erected, consisting of a jaw-crusher, Ellis ball Chili mill, Ainley centrifugal bowl concentrator, amalgamation plates, two Erhenwald flotation cells, and Wilfey table. The free gold will be recovered in the Ainley bowl and on the plates, and the sulphide concentrates will be shipped to a smelter.*

Lumpkin County has produced a large amount of gold from its saprolite deposits. In the period between 1880 and 1895, when saprolite mining was at its height, nearly $1,250,000 in gold was produced in this county, largely from saprolite deposits. Deep open cuts scar the hillsides in many parts of the district, showing that the promising saprolite areas were pretty thoroughly mined out. The future of saprolite mining lies in working lower-grade deposits, which were not considered profitable in the past. The successful recovery of the fine gold from the clays, a problem which is still in the experimental stage, would probably revive this type of mining to some extent.

Topabri Mine—The single major hydraulic operation in the county at the present time is the Topabri Mine, west of Auraria, on McKlusky Creek, close to the Etowah River. This property is under the management of Mr. Bartlett F. Johnston and has been in operation for about three years. The material is sluiced down the creek through several hundred feet of flume equipped with riffles, to a small stamp mill near the river, where the coarser fragments pass through the stamps to a small amalgamation table. The fine material passes into settling tanks and then over Gibson impact amalgamators. Systematic experimental work has been carried on here for some time on the problem of recovering fine gold. *At present the mine is shut down for the duration of the winter months.*

McDonald Mine—The McDonald mine, several miles northeast of Dahlonega, under the management of Mr. Carl McDonald, has been operating for several months. The exposed lode shows deeply weathered granite containing small stringers and kidneys of auriferous quartz with pyrite (iron sulphide). This saprolite material is mined by washing and with pick and shovel and is then treated in a small stamp mill.

Placer mining in Lumpkin County is at present confined to the reworking of stream gravel at several localities by small groups using pick and shovel and sluice box and to two operations on a somewhat larger scale.

Baggs Branch Mine—The Dixie Gold Mining Co., with Mr. William Loffler in charge, is reworking the stream gravel of Baggs Branch about 2 miles south of Auraria. The equipment consists of sluice boxes, a hydraulic lift, and a small hydraulic giant. *Work on this placer was temporarily stopped in October. At present plans are being made to hydraulic mine a small saprolite deposit. The gold in the fine material will be recovered in a sluice box and the coarser material will be treated in a small stamp mill.*

Long Branch Mine—Southeast of Dahlonega, at the junction of Long Branch with the Chestatee River, a small chain elevator has been installed [*by the Ranald Gold Mining Co., Mr. W. R. Shillington in charge*] to excavate the sandy alluvium. This operation is based on the belief that the early placer miners who worked in this area were not equipped to work the water-saturated deposits adjacent to the river. The company hopes to find some rich streaks in the gravel next to bedrock. *This work has been hindered by the old problem of lack of equipment that would handle the water. The company has also done some prospecting on the placer deposits up Long Branch, on the weathered portions of two narrow lodes just west of the branch, and on a saprolite deposit south of the Chestatee River.*

Work is beginning on the following properties as this article is written (August, 1934): Mr. Robert H. Reid plans to rework the Bunker Hill property, southeast of the Barlow cut, with a drag-line outfit [*not yet begun*]. The Briar Patch placers, on the Chestatee River south of Dahlonega, are to be reworked by the same company that is operating the Topabri mine. A modern dam is being constructed on the river for this purpose [*now held up until a question of riparian rights is settled*]. Work has been started on the old Boly Field property, east of Dahlonega and adjacent to the Chestatee River [*by the Bowsend Mining Co., Inc.*], under the direction of Mr. Charles A. Roberts [*and Mr. Herbert G. Campion*]. *The Chestatee River for about 1000 feet has been diverted into an old channel, and in the spring they expect to start placer operations in the former channel. In the course of this work they uncovered and cleaned out an old inclined shaft that went 60 feet into the bedrock with a short drift at the bottom. This followed a narrow vein and is thought to be the old Boly Field shaft said to have been sunk in 1848 along a rich pocket. A wide saprolite zone on both sides of the river is now being prospected.*

The Reliance Development Corp., in charge of P. G. Jacobson, E. Samuelson, and F. Lindberg, is prospecting the Whim Hill saprolite deposit about seven-eighths of a mile north of Auraria. A number of rich shoots on this property were "gophered" to water level some 30 to 40 years ago.

The Findley mine on the north end of Findley Ridge near Dahlonega has recently been sold to Mr. Cornelius O'Kane of New York. Prospecting has been started and it is reported that equipment will soon be installed for hydraulic mining of the remaining saprolite deposits.

White County

All the present mining in White county is confined to reworking stream placers. The topography of this general region has favored the development of placers, and a considerable portion of the gold obtained in this county in the past has come from these deposits.

Bean Creek Mine—Mr. T. J. Stevenson is operating a drag-line excavator on Bean Creek a short distance from Nacoochee and several miles north of Cleveland. The alluvial debris is scooped out by a one-ton bucket and passed through a screen separator, from which the finer material goes into a sluice box (fig. 7). Several hundred cubic yards of material is handled each day. This placer ground was extensively worked in the early days for its richer streaks.

Hudson Mine—On Dukes Creek, about 3 miles south of the Bean Creek area and a short distance west of the Cleveland-Helen highway, Mr. W. C. Hudson is mining old placer ground with a hydraulic giant. Low water has necessitated a temporary shut-

down. *Operations were resumed in September and soon after a rich streak was found that contained a number of fair-sized nuggets.*

Dunbar Mine—Mr. A. A. Atwater [*and Mr. C. L. Dunbar*] has moved in a steam shovel for placer operations on an area about 4 miles north of Cleveland. *Recoveries from this placer proved to be disappointing and in November the operations were transferred to Dukes Creek on the Cleveland-Helen highway, adjacent to the Hudson mine. Mr. Atwater has recently died and the work is now in charge of Mr. Dunbar and Mr. L. E. Cobb.*

Cox Bottoms Mine—Mr. H. L. Schwalbe has recently moved a drag-line excavator to the Cox Bottoms on the Little Tesnatee Creek, about 4 miles north of Cleveland. This placer deposit is said to have been partially worked years ago.

Poland and Beach Mine—Mr. C. O. Poland and Mr. W. B. Beach are prospecting a sulphide lode, the "Sprague vein", on Land Lot 47, 4th District, about five miles northwest of Cleveland, and saprolite deposits on the lots adjoining to the southwest. A shaft was sunk on the lode to a depth of 50 feet and a small stamp-mill erected, but the work has been temporarily halted by a sudden inflow of water, probably from the old workings on the adjoining Blake property.

The future of placer mining in this county, as well as in other parts of the gold belt, will depend on economical operation by drag-line excavator, steam shovel, dredge, or hydraulic giant; or by any method enabling gravel averaging as little as 10 or 12 cents to the cubic yard to be worked at a profit. Detailed testing of the placer ground before operations are started is strongly recommended. From the information furnished by properly distributed test pits and bore holes many valuable data can be obtained as to the distribution of the gold and the best method of working the deposit. The tendency for the gold to concentrate in the basal portions of the alluvium next to the bedrock is again emphasized. The more complete recovery of the fine gold is a problem facing all placer operations.

Cherokee County

In Cherokee County there are several properties which have had a history of profitable operations.

Creighton-Franklin Mine — The Creighton-Franklin mine, 7 miles southeast of Ball Ground, on the Etowah River, was at one time the most extensive gold mine in the State. Owing to accidental flooding, this mine has been abandoned for a number of years. Its most interesting feature is the depth of the workings, some of the shafts extending over 500 feet vertically below the surface. The available data that can be relied upon indicate that the ore bodies encountered in the underground workings were ellipsoidal chimneys or shoots of moderate size associated with conspicuous rolls in the schistosity of the country rock, as described in a previous article. *This property has recently been prospected under the direction of Mr. Joseph B. Sitton. It is reported that diamond drilling will soon be undertaken in an effort to determine the depth of the mineralization.*

301 Mine—Work has been resumed at the 301 mine, about a mile west of Holly Springs, under the direction of Mr. W. H. Fluker, of Thompson, Georgia. An inclined shaft to a vertical depth of 80 feet and short drifts in both directions along the strike of the lode had been completed at the time the property was visited. The ore is treated in a small mill. *The shaft is being extended to a depth of 200 feet and is now at 150 feet. The lode is widening slightly and its dip appears to be a little flatter. Some changes are being made in the mill equipment and a small cyanide plant is being added.*

Other abandoned mines in this county which were operated on a large scale include the Cherokee, about 4 miles west of Holly Springs, adjacent to the Little River, and the Sixes mine, about 2 miles north of the Cherokee. The productive possibilities of these properties can be determined only by additional exploratory work. It will be necessary to reopen the underground workings and sample and assay all the exposed ore bodies systematically before any satisfactory decision can be made as to the future value of these mines.

Forsyth County

A small area of placer ground about 2 miles east of Cumming, leased from Dr. Mashburn, of that town, has been operated for some time. The material is washed down by a hydraulic giant. *This work stopped in October due to disagreement among the leasees.*

This property illustrates a feature common to most of the placers in the gold belt. The richer gravel lies in lenticular channels next to the decomposed bedrock.

Paulding County

Present mining activity in Paulding County is largely confined to the Burnt Hickory Ridge district, about halfway between Cartersville and Dallas. In addition to the usual small-scale sluice-box mining, the Old Twillery mine is being worked by shallow trenching in the saprolite of the lode that passes through the property. The ore is treated in a small ball mill. *The placer and saprolite deposits of the old Yorkville mine, about two and a half miles east of Yorkville, are now being prospected under the direction of Mr. J. Sproul Colbert.*

McDuffie County

McDuffie County has had several important mines in past years, but at present the only activity, aside from haphazard "gophering" by local farmers and landowners, is confined to the property of Mr. W. H. Fluker, about 12 miles northwest of Thomson, adjacent to the Little River. A quartz vein has been opened by a shallow shaft. The ore is treated in a small stamp mill.

On the Fluker property and distributed over adjacent areas are several mines which have been producers in the past. These include the Columbia, Park, Hamilton, and Seminole or McGruder mines. All these properties have been abandoned for several years, some of them for many years, and any determination of their future possibilities would require careful examination of the old workings, which are now inaccessible.

The geologic features and character of mineralization in McDuffie County are in general similar to those in other parts of the gold belt, but this area shows a more pronounced development of the veins.

The reader who is interested in further details should write to the State Geologist in Atlanta. Bulletins 4-A and 19 of the Georgia Geological Survey (now out of print but available at many public libraries) give descriptions of all the properties of any past importance in the gold belt. Valuable information relative to methods of placer mining, lode mining, milling of gold ores, etc., can be obtained by writing to the Director of the United States Bureau of Mines at Washington, D. C.

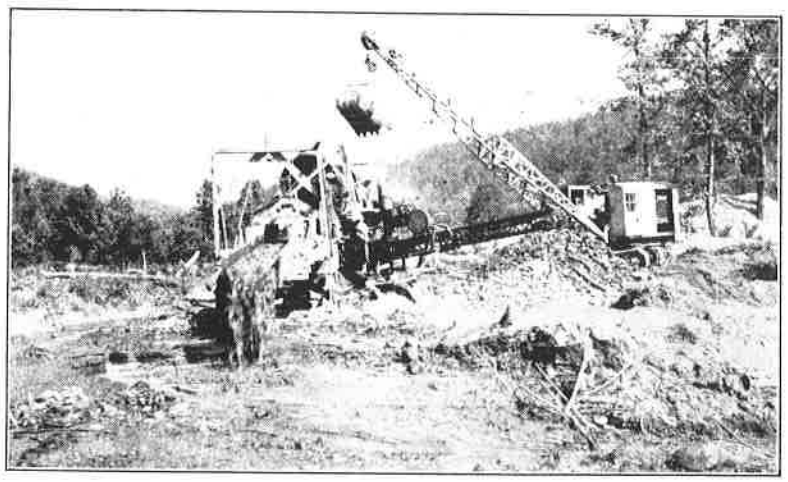

Figure 7.—View showing drag-line excavator working placer ground on Bean Creek in White County. Material from shovel passes through revolving screen, from which coarse gravel passes out on conveyor belt to pile and finer sand and clay go into sluice box.

RECORDED PRODUCTION OF GOLD AND SILVER IN GEORGIA, 1830-1933

(From Mineral Resources of the United States[1])

Year	GOLD		SILVER		Total Value
	Troy Ounces	Value	Troy Ounces	Value[3]	
1830-1879[2]		$14,180,500			$14,180,500
1880		120,000			120,000
1881		125,000			125,000
1882		250,000			250,000
1883		199,000		$1,000	200,000
1884		137,000			137,000
1885		136,000			136,000
1886		152,500		1,000	153,500
1887		110,000		500	110,500
1888		104,000		500	104,500
1889		107,605	359	464	108,069
1890		100,000	400	517	100,517
1891	3,870	80,000	400	517	80,517
1892	4,583	94,734	400	517	95,251
1893	4,702	97,200	500	646	97,846
1894	4,772	98,652	343	443	99,095
1895	6,192	128,000	400	520	128,520
1896	7,305	151,000	600	776	151,776
1897	6,192	128,000	400	520	128,520
1898	6,221	128,600	500	646	129,246
1899	5,466	113,000	400	517	113,517
1900	5,644	116,700	400	248	116,948
1901	6,023	124,500	400	240	124,740
1902	4,730	97,800	400	212	98,012
1903	3,000	62,000	400	216	62,216
1904	4,688	96,900	1,500	870	97,770
1905	4,688	96,910	1,040	628	97,538
1906	1,146	23,700	300	203	23,903
1907	3,135	64,800	700	500	65,300
1908	2,719	56,200	200	100	56,300
1909	2,099	43,400	200	100	43,500
1910	1,161	24,000	300	200	24,200
1911	1,548	32,000	600	300	32,300
1912	526	10,900	200	100	11,000
1913	730	15,108	75	45	15,153
1914	787	16,270	67	37	16,307
1915	1,732	35,821	138	70	35,891
1916	1,090	22,539	74	49	22,588
1917	333	6,889	46	37	6,926
1918	218	4,500	45	44	4,544
1919	37	767	8	8	775
1920	35	732	194	211	943
1921	49	1,022	4	4	1,026
1922	155	3,224	364	364	3,588
1923	25	529	2	1	530
1924	24	500			500
1925	460	9,500	47	33	9,533
1926	140	2,900	11	7	2,907
1927	15	300	4	2	302
1928	34	700	5	3	703

(Continued on last page)

RECORDED PRODUCTION OF GOLD AND SILVER IN GEORGIA, 1830-1933 (Cont'd)

(From Mineral Resources of the United States[1])

Year	GOLD		SILVER		Total Value
	Troy Ounces	Value	Troy Ounces	Value[3]	
1929	58	1,200	13	7	1,207
1930	203	4,200	23	9	4,209
1931	88	1,827	12	3	1,830
1932	256	5,300	30	8	5,308
1933	559	11,543[4]	65	23	11,566
TOTALS		$17,735,972		$13,965	$17,749,937

[1]Mineral Resources of the United States was published by the Geological Survey from 1880 until 1926 and by the Bureau of Mines after 1927.

[2]Estimated. See Becker, G. F., Reconnaissance of the goldfields of the Southern Appalachians: U. S. Geol. Survey, Ann. Rep. 16, pt. 3, p. 258, 1895. Also Dunlap, J. P., Gold, silver, copper, lead and zinc in the Eastern States in 1914; U. S. Geol. Survey, Mineral Resources of the U. S., 1914, pt. 1, p. 142, 1916.

[3]Coinage value of silver at $1.29 per troy ounce used through 1899. From 1900 the yearly current commercial value used.

[4]Figured at the mint value for fine gold, that is, $20.671835 per fine ounce. Using the average premium received from August to December would add approximately $2,730 to the value of the gold.