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GOLD OCCURRENCES NEAR JEFFERSON, SOUTH CAROLINA

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Abstract

Gold, possibly in economic amounts, is present in the Jefferson area, South Carolina. It occurs in Slate Belt rocks of Paleozoic age, in Coastal Plain sediments of Cretaceous age, and in alluvial deposits of Quatornary age. The area is near the inner edge of the Coastal Plain province and includes the Brewer Gold Mine, which was intermittently active until 1935 and had a total gold production valued at about $450,000. Slate Belt rocks underlie the entire area and crop out mainly in valley slopes and upper drainage ways; auriferous Coastal Plain sediments underlie a small upland; and Quaternary alluvium lies in and along streams draining the upland and adjacent areas. Gold in the bedrock at the Brewer Mine occurs chiefly in vein lodes in siliceous volcanic and metavolcanic rocks of Paleozoic age. Gold in Coastal Plain sediments is mainly in placer deposits in the lower gravel layers. Gold in Quaternary alluvial deposits is in placers in the present stream channels and in flood plain and abandoned channel deposits. A lode deposit may exist in the rocks beneath the Coastal Plain sediments.

Introduction

The purpose of this paper is to report on the possible gold potential in the Jefferson area, Chesterfield County, S.C. (fig. 1) which is near the Brewer gold mine. Gold is present in most of the rock types of the area and occurs not only in the volcanic rocks of

Figure 1 near here

Paleozoic age but also in the overlying Coastal Plain sediments of Cretaceous age and in the alluvial deposits of Quaternary age.

This preliminary report describes briefly the geology of an area of about 25 square miles which spans the boundary between the Coastal Plain and Piedmont provinces (fig. 2), and presents laboratory analyses and panning results of numerous samples of the various rocks and sediments.

Figure 2 near here

The work is part of a much broader field reconnaissance study of the distribution of gold in the Atlantic Coastal Plain physiographic province, done under the Heavy Metals program of the U. S. Geological Survey during 1966, 1967, and 1968.

Figure 1.--Index map of South Carolina, showing area of Chesterfield County (Stippled). Black area is the area of this report and of Figure 2.

Figure 2.--Map showing sample locations and generalized geology of the Jefferson area, South Carolina.

Gold in the amount of 1.20 ppm (parts per million) was detected in 1966 in a sample from the basal Coastal Plain gravel one-half mile south of Jefferson (outcrop sample 1, Table 2). Additional sampling of outcrops and panning of stream gravels during the fall of 1967 showed gold to be not only in the older rocks in several places beneath the Coastal Plain sediments, but in the Coastal Plain sediments and Quaternary alluvium. During March and May, 1968, in order to determine the geologic association and extent of the gold, auger holes were bored through the Coastal Plain sediments, additional outcrop samples were collected, and more stream sediments were panned.

All samples were analyzed by atomic absorption techniques, either in mobile laboratories near the site or in the Denver laboratory of the U.S. Geological Survey. Analysts were G. W. Doumay, T. G. Ging, T. A. Roemer, J. G. Friskin, and A. J. Toevs.

Physiography

The Jefferson area lies across the boundary between the Coastal Plain and Piedmont physiographic provinces. The Coastal Plain sediments generally underlie fairly level to gently rolling low uplands between altitudes of 350 and 650 feet. These uplands have a gentle slope toward the southeast, a general characteristic of the Coastal Plain surface.

The region is well dissected by small streams; most of the major parts of the streams have eroded through the Coastal Plain sediments into the bedrock formations underlying the Piedmont physiographic province, leaving areas of the Coastal Plain sediments as isolated upland remnants. Only the small upper reaches of the streams flow on Coastal Plain sediments. The land surface of the Piedmont is much more rolling and has steeper slopes than those of the Coastal Plain. Piedmont landforms vary from gently sloping areas underlain by saprolite to steep valley walls and bald knobs of bedrock rising conspicuously above the surrounding land surface.

Streams are bordered by floodplains of alluvium of different widths and thicknesses. Some floodplains are narrow and covered by a thin mantle of alluvium through which bedrock protrudes, whereas others, particularly along Fork Creek, are fairly wide and flat, and alluvium is sufficiently thick to cover the bedrock.

Geology

Paleozoic rocks

The oldest rocks in the area are part of what has long been known as the Carolina Slate Belt series (Overstreet and Bell, 1965A, p. 18-32). Rock types include argillite, rhyolite tuff, rhyolite porphyry, silicified tuff, sericite and muscovite schist, breccias, volcanic flow rocks, hornblende gneiss, amphibolite, graywacke, diabase, and granite. In the Jefferson area, these rocks are mapped as three units; argillite, granite, and intermixed rocks. The argillite and intermixed rocks are low-grade metamorphic rocks of Ordovician to Mississippian age, and the granite, which intrudes them, may be as young as Permian. The rocks are in various stages of weathering, ranging from fresh and hard through saprolites in which the parent formation can still be determined to nearly unidentifiable saprolite clay.

Argillite

Argillite underlies valley bottoms and fairly gentle slopes and benches in the southern part of the area shown in fig. 2. This rock is largely greenish-and brownish-gray, fine-grained, laminated, tuffaceous argillite. As shown by Overstreet and Bell (1965B), the unit includes other lithologies such as breccias and agglomerates, and is similar to the rocks mapped in North Carolina as the Tillery Formation (Conley and Bain, 1965, p. 126). In this report on the Jefferson area, the unit mapped as argillite is largely restricted to the laminated argillite; the other lithologies are included in the intermixed rock unit.

Much of the argillite is fissile and splits readily into thin wavy plates. Laminae typically range in thickness from 0.5 mm to 0.5 cm. Minute platelets of mica are abundant and have a strong preferred orientation. Because of the fine laminations the rock is often referred to as "varved." Foliation surfaces are wavy and minutely irregular, and lateral crinkling of laminae and minute offsets or faults are evident. Many outcrops are littered by papery plates of weathered rock. Fresh rock tends to be greenish-gray; weathered rock is shades of brown, dull reds, and dull yellows.

Intermixed rocks

Included with the intermixed rocks are those mapped between the argillite to the south and the granite to the north. Inliers of the unit are within the granite at two locations in the northwestern part of the area (fig. 2). The unit includes rhyolite tuff, rhyolite porphyry, silicified tuff and breccia, diabase, hornblende gneiss, amphibolite, muscovite schist, sericite schist, and saprolitic tuff.

Rhyolite tuff crops out in the road cut along Route 39 just east of stream sample number 41 location (Table 1). Tough, yellow-brown to pale orange-pink rhyolite porphyry crops out in and along Fork Creek just north of Route 43 at stream sample number 23 location (Table 1), and along Nugget Creek at stream sample number 51 location (Table 1), between Routes 39 and 40. The rock contains abundant pinkish feldspar crystals, bipyramidal quartz crystals, and some small pyrite cubes. Silicified tuff crops out in and along Fork Creek, about 50 yards upstream from stream sample number 20 location, and along Nugget Creek at stream sample number 52 location (Table 1). The rock is gray, tough, fine- to coarse-grained and contains considerable pyrite in the fine-grained varieties.

Coarse-grained, dark-gray to greenish-gray and light-gray amphibolitic saprolite crop out in Nugget Creek at outcrop sample locations 3, 4, and 10 (Table 2), both east and west of Route 40. In the upper tributary to Fork Creek, northeast of White Plains Church at stream sample number 2 location, is an outcrop of a similar rock, gneissic amphibolite, both unweathered and saprolitized.

Mica schist crops out in the road cut near the top of the hill along Route 40, south of outcrop sample number 12 location (Table 2). The rock is schistose, saprolitized, and is cut by quartz veins; angular fragments of quartz litter the surface. Mica schist also crops out in cuts along the west side of Route 151, just east of stream sample number 8 location (Table 1). The rock is partly sheared and saprolitic, cut by quart veins and pods, and contains much muscovite and sericite as books up to one inch across.

Amorphous siltstones and claystones, which may be weathered tuffs, crop out in cuts along Route 39 west of Nugget Creek.

The intermixed rocks underlie valley bottoms and slopes intermediate in steepness between the fairly gentle slopes on the argillite and the steep ones on the granite.

Granite

Light-gray, coarse-grained, massive, biotite granite, containing sparse, small lenses of fine-grained granite, crops out in the northern half of the area. Most outcrops of hard rock are along streams and low, fairly steep slopes; the rock underlying upper land surfaces is largely saprolite. In appearance granite saprolite is much the same as the hard rock, but it can be easily excavated by hand shovel. Pink to light-gray potassic feldspar crystals and plates of biotite are clearly identifiable even though the rock is decomposed in place. The saprolitized rock generally is pale red to grayish-pink as compared with the light gray of the relatively unweathered granite.

Although not common, hard granite does crop out on the upper land surfaces. In the west central part of the area shown on fig. 2, just west of outcrop sample number 13 location (Table 2), granite forms prominent, massive, rounded knobs rising as much as 30 feet above the hilltops and upper slopes. The ground surface, surrounding these outcrops is covered by light-gray sand; this surface resembles a surface on the Coastal Plain material. When examined closely, however, the sand grains can be seen to be angular fragments of quartz and feldspar derived from the disintegrating bedrock.

As determined from auger holes and road cuts, the granite is locally saprolitized to depths of at least 40 feet. Except at and near the surface, in the zone of eluviation, the saprolite is clayey and maintains steep slopes in cut exposures. With the exception of some inliers of older rocks, the granite underlies most of the northern half of the area shown in fig. 2. It apparently postdates the argillite and intermixed rocks, and may be of Permian age.

Cretaceous Tuscaloosa Formation

Coastal Plain sediments of Late Cretaceous age in this area are referred to as the Tuscaloosa Formation (Wilmarth, 1938, p. 2200) and are considered by Cooke (1936, p. 19) to be equivalent to the Raritan of the Middle Atlantic Coastal Plain, although some of the lower deposits may be of Early Cretaceous age.

Swift and Heron (1969) reviewed the stratigraphy of the Carolina Cretaceous and redefined the upper part of the Tuscaloosa as the Middendorf Formation and the lower part as the Cape Fear Formation.

The Cretaceous Coastal Plain sediments in the Jefferson-Pageland area are unconsolidated, light-gray, yellow-brown, and reddish-brown clay, silt, sand, and gravel; sand predominates, especially in the upper part of the formation. Clay ranges from yellow to reddish-brown and is chiefly kaolinite. Sand is composed mostly of quartz, but is locally arkosic, particularly where it is adjacent to or overlaps granite. Gravel is generally more abundant at the base and in the lower part of the unit; some layers of gravel above the lower beds are exposed in road cuts such as the one at outcrop sample number 2 location (Table 2 and fig. 2). The gravel is chiefly pebble size, but some cobbles are present. The base of the formation is irregular and unconformably overlies all the older rock types in the area. Some deposits of sand and gravel are filled channels cut into the older rocks. The upper sandy deposits cover most of the upland along Route 151 from Jefferson northward for about four miles; the sand is generally leached to light gray at the surface.

Compact arkosic sand is well exposed in a cut on Route 40 at outcrop sample number 13 location (Table 2 and fig. 2). Cross stratification is well defined in this outcrop as it is in other exposures. The formation is generally well bedded and gravel is chiefly in distinct layers and lenses from several inches to several feet thick.

Most of the formation in this area probably is continental in origin and was deposited in stream channels and on flood plains. The fossils found elsewhere in the formation are plant remains of terrestrial origin. The irregular channeled base, horizontal and cross stratification, lenticular shapes of gravel beds, abundance of sand, and apparent fluviatile origin favor correlation of these sediments with the Middendorf (upper Tuscaloosa) of Swift and Heron (1969, p. 208 and 213-215), for which they suggest a fluvial origin, more than with the Cape Fear Formation (lower Tuscaloosa), for which they seem to favor an origin other than fluvial (p. 212).

It is difficult, however, to specifically identify the Coastal Plain sediments in the Jefferson area with one of the divisions of Swift and Heron (1969), based only on the criteria of that report. Therefore, the Coastal Plain sediments in this area are still referred to as the Tuscaloosa Formation.

Quaternary deposits

The streams are bordered by Quaternary deposits which are largely sand and gravel. Because these deposits are mostly thin and somewhat discontinuous along many of the streams, they are only shown on the map (Fig. 2) along part of Fork Creek where they form a floodplain as much as 1/4 mile wide and are thick enough to cover bedrock completely.

Gold resources-present distribution

Gold is present in most of the rock types of the area. It seems to be more abundant in the silicified tuffs and breccias, Coastal Plain sediments, and Quaternary deposits than in the other rocks. This distribution is corroborated by past mining in these rocks and sediments and by the results of this study. Gold is concentrated in the Brewer Mine area and farther north in the Jefferson-Pageland upland area.

During the present study, gold was detected in the highest values (to 12 ppm) in unweathered silicified tuff (Table 2) and in silicified tuff saprolite (Table 3), in amounts to 2.20 ppm in Coastal Plain sediments (Tables 2 and 3), and in amounts to 0.70 ppm in stream sediment samples (Table 2).

The rock type in which gold seems next abundant in quantity to the tuff and Coastal Plain sediments is the amphibolitic rocks. Gold was detected in these rocks in amounts of 0.02 to 0.04 ppm (Table 2). Gold was detected in argillite in an amount of 0.02 ppm in one outcrop sample (Table 2). Gold was not detected in two outcrop samples of granite from within the map area, but samples of granite saprolite from auger holes contained gold in amounts of 0.02 ppm (Table 3).

The following discussion gives the total number of samples taken and the number containing gold: Of 11 samples of granite and granite saprolite, 2 contained gold; 9 of 35 samples of intermixed rocks and saprolite from intermixed rocks contained gold; of 16 samples of argillite, 1 contained gold; 13 of 100 samples of Coastal Plain sand and gravel contained gold; and 92 of 110 samples of stream sediments contained gold.

In addition to the samples mentioned above, 72 samples were collected from one road cut in an attempt to determine the precise stratigraphic position and lateral distribution of the gold. Each s mple was continuous for a horizontal distance of 10 feet, The cut is 200 feet long and 4 to 8 feet deep; it is along the west side of Route 151, one half mile south of Jefferson, and is field sample number 1 location (Table 2). Fifteen samples were collected and analyzed from the upper one foot thickness of argillite exposed in the base of the cut; gold was not detected in any of these samples. Of nineteen samples collected and analyzed from the basal one foot of the gravelly Coastal Plain sediments; gold, in the amount of .06 ppm, was detected in 2. This is the same horizon from which outcrop sample number 1, containing 1.20 ppm gold, was collected. Gold was not detected in any of nineteen samples from the Coastal Plain sediments 2 feet above the base, nor in any of 19 more from the top foot of the cut. The gold was in the basal gravelly sand of the Coastal Plain sediments and must have been transported into this area, because none was detected in the underlying argillite bedrock.

Two hundred forty-three additional samples were collected in 1967 by A. F. Kinkel, U.S.G.S., near the Brewer Mine. This sampling and the analyses are discussed in the following Brewer Mine section.

Previous mining and potential - Brewer Mine area

The Brewer Mine area includes the Tanyard Placer, the Hartman, Topaz, and Brewer Pits, and the other workings in the immediate vicinity (Pardee and Park, 1948, pls. 30, 31 and fig. 2, this report).

About $450,000 in gold was recovered at the Brewer Mine during the period from 1828 to the mid-1890's and during brief periods up to 1935 (Pardee and Park, 1948, p. 106). The Brewer deposit consists of gold-bearing silicified tuff, saprolite, and Coastal Plain sediments; the last were largely derived from the weathered tuff. The first discoveries were placer deposits in the small, isolated outlier of Coastal Plain sediments which blanketed the bedrock surface west and south of the lode pit. The Coastal Plain sediments in this outlier ranged in thickness from a thin veneer to possibly 10 feet. In the early years of the operation as many as 200 people were working the deposit, mining both the placer and top few feet of the underlying saprolite. Mining subsequently progressed down into weathered tuff and into the lode deposits.

The ore was washed in rockers; later Chilean arrastres were used. Apparently there was little activity during the period from the late 1850's until after 1880 when much of the placer was reworked by hydraulic methods, using water pumped from Little Fork Creek. A five-stamp mill, built in 1886 near the creek, was expanded to 40 stamps by 1889 and, in 1892, a chlorination plant was added. Shortly after this the operation closed, partly as a result of legal issues over tailing damage; since then, operaton has been minimal and brief.

Production from the placer contributed the bulk of the gold recovered from the total mining operation. Placer production has been estimated at $300,000 and the lode production at $150,000 (Pardee and Park, 1948, p. 106). About two-thirds of the placer area was known as the Tanyard Placer. Placer areas other than the Tanyard included patches of Coastal Plain sediment around the outcrop of the lode and strips from these patches down natural drainage ways. The total placer area mined was about 185,000 square yards (38 acres). In addition to the placer mines, the Brewer deposit included two large pits in the lode, the Brewer and Hartman, and many small surface openings in bed-rock along a belt trending northwestward on the ridge between Little Fork Creek and Lynches River (Pardee and Park, 1948, pls. 30, 31, 32).

Lode rock

The Brewer lode is chiefly in gray, hard, cherty, siliceous (quartz-sericite) schistose rock, much of it breccia and all probably derived from bedded volcanic rocks. The lode is about 200 to 300 feet wide and extends northeast about 1,000 feet. The deepest workings, the Brewer Pit, are 140 feet deep. The upper 40 to 60 feet of rock is weathered to varying degrees and some is loose, fine, white quartz sand. Weathering extends to a depth of at least 140 feet along a shattered zone in the southwest part of the Brewer Pit.

Pyrite is abundant in the unweathered rock, mostly as disseminated grains, and constitutes from several percent to nearly half of large masses of rock in the lower part of the Brewer Pit.

Other minerals of the lode include bismuth, cassiterite, topaz, gold, and several copper minerals. Parts of the lode rock are composed almost entirely of topaz (Fries, 1942). The gold-bearing rocks of the lode consisted of irregular lens-like bodies 10-30 feet wide, closely grouped in the pit area, and oriented northwestward. The better grade of ore assayed $5 to $7 per ton and averaged $3.

Samples 6 and 7 (Table 2), taken by the author from the unweathered pyrite-rich zones in the bottom of the Brewer Pit, gave gold values of 12.0 and 0.04 ppm; the richest value was from the north side of the pit. A. R. Kinkel, Jr., U.S.G.S. (open file report, 1970), sampled the hard rock in the Brewer, Topaz, and Hartman Pits (fig. 2) and obtained the following analytical results (values in ppm):

Pit	Field No.	Lab. No.	Au
Brewer	K 289	ABP 310	4.50
Topaz	K 356	ABX 023	3.90
Topaz	K 1458	ABX 972	0.56
Hartman	K 358	ABX 025	0.64
Hartman	K 359	ABX 026	1.90
Hartman	K 361	ABX 028	0.22

Kinkel (open file report, 1970) collected 243 samples along Route 110 between Route 265 and Route 39 (fig. 2) to see if the mineralized zone might extend southwest from the Brewer Mine toward the Haile Mine (fig. 1). These samples were almost continuous along all road cuts. Twenty of the samples contained gold in amounts of 0.02 ppm to 0.20 ppm. The apparent lack of rich mineralization in an arc of nearly 180° to the west of the mine led Kinkel to speculate that (p. 2): "The Brewer Mine may be at a volcanic center. The presence of fairly coarse pyroclastic and coarse tuff, shatter brecciation of diatreme type, very strong silicification in a limited area, and the presence of an unusually large amount of fluorine in topaz, suggest that the mine might be in an explosion vent."

Coastal Plain sediments

Most of the area of Coastal Plain sediments at the Brewer Mine was worked and reworked during early mining operations. Not only the fluvial and possibly marine (Pardee and Park, 1948, p. 111) placers in the Coastal Plain sands and gravels were worked but also the residual placers in the easily excavated underlying saprolite. The 3-or 4-acre area of unworked Coastal Plain sediments, from a few feet to 10 feet thick (including the underlying weathered sandy saprolite), may be worth investigating further. If the value of 2.20 ppm obtained from sample 8 (Table 2) is representative of several feet of the sand, the deposit may be economically significant, at least in conjunction with mining of the lode.

Beneath the Coastal Plain sediments at the Brewer Mine is weathered siliceous bedrock ranging from a veneer to several feet. Unless examined closely, this material looks nearly identical to the overlying Coastal Plain sand. The weathered siliceous rock is a white-to yellow-brown and reddish-brown fine-grained quartz sand that seems to have blanketed nearly all the bedrock over the entire Tanyard Placer. Near the middle of the placer area is an abundance of vein quartz; much of it is in windrows, apparently placed aside during mining operations. The large volume of material dug up, both Coastal Plain sediments and underlying sandy saprolite, represents a prodigious effort because most of the work was done by hand. Hydraulic methods were used later, largely to rework previously excavated material.

An interesting aspect of the placer mining is the local abundance of rounded "pebbles" of ironstone other than iron-oxide coated quartz pebbles near the bedrock pits. The presence of these ironstone "pebbles" on the surface where no Coastal Plain sediments now exist seemed to indicate a former wider distribution of such deposits which were subsequently eroded, leaving the ironstone "pebbles" as lag deposits. On the basis of this reasoning, gold found in the saprolite sand beneath the "pebbles" was considered to be in stream or wave action placer deposits. Close examination of the "pebbles", however, leads the author to the conclusion that these "pebbles" are merely oxidized, rounded residual fragments of pyritic siliceous bedrock and do not by themselves necessarily indicate that Coastal Plain sediments formerly blanketed these particular areas.

Other gold recovery operations in the mineralized area were scattered and small. It seems probable that panning and sluicing or rocker recovery methods may have been employed along most of the streams, at least those near the Brewer Mine. However, large areas found in this study to be gold-bearing apparently were untouched by early miners, and the only stream along which remains of workings are still readily visible is Nugget Creek, and only west of Route 40. On the south flood plain of this creek, between Routes 39 and 40, are small diggings a few feet across, ditches 2 or 3 feet wide and 10 to 30 feet long, and small piles of tailings from material scraped and dug from pockets and weathered joint fillings in bedrock. A local farmer, Mr. Ingrahm, said that tenant farmers mined gold along the creek between Routes 39 and 40 over an 8-to-10-year period, apparently during the 1930's. He said (oral commun., March 19, 1968) they used a shaker (half barrel with cleats) and mercury.

Although the author walked along several other streams in the area and panned along much of their lengths, no tangible evidence of mining activity like that along Nugget Creek was seen. This is surprising because gold is readily recoverable in small amounts along the streams, particularly along Fork Creek which has a broad flood plain containing a considerable volume of alluvium. Also the largest particles of gold (coarse to very coarse) recovered by the author were from Nugget Creek east of Route 40 where the flood plain shows no evidence of former mining activities. There are old ditches in a regular pattern, but they appear to be part of a drainage system used when the land was formerly tilled.

Jefferson-Pageland upland area

The Jefferson-Pageland upland area includes the remnant upland of Coastal Plain which constitutes the fairly flat-topped north-south drainage divide between Fork Creek on the east and Little Fork Creek on the west. It also includes the flat area of Coastal Plain in the vicinity of White Plains Church, and the flanking stream valleys, slopes, and hills of argillite, intermixed rocks, and granite (fig. 2).

Argillite

Only one sample (number 5, Table 2) of 16 taken in the argillite in the map area (fig. 2) contained gold. Gold was detected, however, in many places in the stream sediments lying on the argillite. Most of this gold was finer grained than that recovered from stream sediments on the intermixed rocks. This distribution may indicate finer gold in the host rocks, or the fact that, because of the smaller particle size, the gold was capable of being transported farther and was derived from other rock types upstream from the argillite.

To date, gold values from the argillite are not encouraging, and further investigation of this rock unit does not appear to be as promising as that of the intermixed rocks.

Intermixed rocks

Gold was detected in 7 samples of a total of 33 obtained from the intermixed rocks; 4 of these (3, 4, 10, and 12 Table 2) were outcrop samples and 3 (holes 2 and 5, Table 3) were saprolitic material from auger hole cuttings. Outcrop samples 3, 4, and 10 were obtained from exposures along Nugget Creek. The rock in each exposure is coarse-grained saprolitic amphibolite. Outcrop sample 12 was obtained from a road-cut exposure of weathered rhyolite tuff.

The auger cuttings samples, which contained as much as 0.04 ppm gold, were from hole 2 from depths of 35-39 and 39-43 feet, and from hole 5 ~~to~~ from 40-41 feet (Table 3). Each sample was a saprolite clay overlain by 35 to 40 feet of Coastal Plain sediments. The gold could have been contamination from the Coastal Plain sediments as the cuttings were withdrawn from the holes. However, because gold was detected in the same type of bedrock in outcrop (sample 12, Table 2) probably the gold was in place in the saprolite.

Nugget Creek, whose drainage is confined to the intermixed rocks, yielded more coarse gold than any other stream, and it was worked previously by prospectors over a period of 8-10 years during the 1930's. The nearby location of the Brewer Mine, in the same belt of rocks, is an added factor to the economic potential of these rocks. Peter Popenoe and C. Tippens, U.S. Geological Survey, ran ground electromagnetic surveys across part of this belt of rocks along the road east of Route 151 (along which the series of auger holes 1-6 are located) and along the next road to the east (fig. 2). These surveys detected two strong anomalies; the first, 100 feet wide, between auger holes 3 and 4, and the second, 150 feet wide along the next road to the east on a line extended between auger holes 3 and 4 northeast to stream sample number 21 location (fig. 2). These two anomalies may be a single continuous anomaly and may indicate a massive sulphide deposit in bedrock at a depth of possibly 35-40 feet beneath the Coastal Plain sediments (Peter Popenoe, oral commun., February 4, 1970).

A straight line extended southwest from the two electromagnetic anomalies passes through the known mineralized zone at the Brewer Mine. The Nugget Creek northeast-trending zone lies north of this line and warrants further investigation. Possibly the area north of the Brewer Mine and southwest of the Nugget Creek zone should also be investigated,, possibly at depth. The possibility of a mineralized zone in the rocks buried beneath the Coastal Plain sediments northeast from the Brewer Mine calls to mind the Iola and Uwarra Mines near Candor, North Carolina (Pardee and Park, 1948, p. 82-83), where the lode was not discovered until 1901. This late discovery was due primarily to the fact that the lode was mostly beneath a cover of Coastal Plain sediments. This lode produced a million dollars worth of gold in the first 15 years of operation.

Granite

As mentioned previously, gold was not present in any samples obtained from granite outcrops within the map area (fig. 2). Although gold was in auger cuttings from two samples of granite saprolite, contamination was possible from the overlying Coastal Plain sediments through which the samples passed on retrieval. Gold was recovered at many locations from stream sediments lying on granite bedrock. There, too, the gold could have been derived from the overlying Coastal Plain sediments in which it is present as fossil placers. However, only 11 samples were taken of the granite, both fresh and saprolitic. A more thorough sampling seems warranted. Gold was found in minute amounts in three samples of granite collected from a long deep road cut along Route 601 on the west side of Lynches River, 6 3/4 miles west of the map area (Z.S. Altschuler, U.S.G.S., written commun., April 4, 1968). Gold values determined were 1.8, 1.9, and 2.4 parts per billion.

Coastal Plain sediments

Gold is present in the Coastal Plain sediments which form the upland from the south edge of Jefferson north to Pageland. Gold was detected in 11 samples of a total of 98 from this area. A sample of the basal Coastal Plain gravelly sand south of Jefferson contained 1.20 ppm gold (sample 1, Table 2, and fig. 2). Several other samples of the basal Coastal Plain sediments near here yielded minor amounts of gold.

Gold also was detected in small amounts in an outcrop of basal Coastal Plain gravel along Route 151 north of Route 109 (sample 2, Table 2, and fig. 2). Small amounts of gold were recovered from cuttings of Coastal Plain sand and gravel from auger holes 1, 8, 9, 12, and 13 (Table 3 and fig. 2).

The author first detected gold in panned concentrates from Fork Creek south of Jefferson. In an attempt to determine the source of the gold, stream bottom and bank sediments were panned, working upstream. In the first attempts, sediments from many locations only a short distance apart were panned. Later, because this obviously was too time consuming, sediments were panned at wider intervals. This partly explains the close spacing of sample locations along Fork Creek south of Jefferson and along Gold Dust Branch north of Route 109, and the wider-spaced intervals elsewhere. The close intervals along Nugget Creek, however, are partly because larger gold particles were recovered and because it was believed that they did not travel too far; close-spaced stations were selected in an attempt to locate the source.

After the source of some of the gold was traced into the base of the Coastal Plain sediments in the upper reaches of Gold Dust Branch (fig. 2), holes were bored in these sediments in an attempt to discover how widespread was the occurrence of gold in them. When gold was detected in stream sediments in the upper part of Fork Creek northeast of White Plains Church, auger holes were put down into the Coastal Plain sediments which ring the drainage basin. As can be seen on Figure 2 and Table 3, 8 of these 15 auger holes contained gold.

Possibly gold is present in amounts up to one part per million in the lower part of the unconsolidated Coastal Plain sediments over an area of several square miles in the Jefferson-Pageland upland. The Coastal Plain cover over this area ranges in thickness from a thin veneer to about 40 feet. Of course, in order to recover gold, the land would have to be literally turned over, the gold extracted, and an attempt made to restore the land to its farm function. In the process, silting of the streams undoubtedly would be a problem.

Quaternary deposits

Quaternary deposits contain gold in the Jefferson-Pageland upland area but these deposits constitute a much smaller total volume than the Coastal Plain sediments. Most of the streams are bordered by narrow flood plains underlain by thin alluvial deposits. The flood plain along Fork Creek, however, particularly south of Route 43, is fairly broad (fig. 2) and is underlain by alluvial deposits as much as 10 feet thick; this constitutes a considerable volume of alluvium. Traces of gold are nearly everywhere in bed load sediments of the present stream channel (Table 1) and were also detected in bank samples. Therefore, a fairly large volume of auriferous alluvial sediments probably is present on relatively unused land, and some may be of economic importance.

Source of gold--Coastal Plain sediments

The Brewer Mine is the nearest source for the gold in the Coastal Plain sediments of the area. Two smaller gold mines, the Leach and Kirkley, are located 2.0 miles N.54°W. and 2.3 miles S.10°E. of Jefferson, respectively (Pardee and Park, 1948, p. 105). The gold in the base of the Coastal Plain sediments at the Brewer Mine likely was not transported far; probably it was derived from the underlying weathered lode rock and possibly from a short distance to the north. The gold may have been concentrated by action of flowing water in a stream and/or by winnowing action of waves along a shoreline.

Gold in the Coastal Plain sediments of the Jefferson-Pageland upland area probably was also derived from the underlying saprolite and bedrock or from a short distance up slope to the north. Part of this interpretation is based on the fact that the economic concentration of gold in the Tanyard Placer at the Brewer Mine was located on and near the lode. At the Haile Mine, about 10 miles to the southwest near Kershaw (fig. 1), the Coastal Plain sediments directly over the lode contain appreciable amounts of gold as yet unmined. The author sampled the basal 5 feet of the 10-15 foot thick cover of Coastal Plain sediments in the southeast part of the Haile Mine. Thirty-three of 42 samples, from a horizontal distance of 300 feet, contained gold to 2.20 ppm and averaged .50 ppm (50 cents per ton). All 42 samples averaged .40 ppm gold.

Some of the fine gold particles may have come from some distance, but the coarser particles probably were not transported very far. A stream having a fairly steep gradient and appreciable volume of flow probably would have been required to transport the coarse particles of gold any considerable distance; a stream having large transport capability did not exist here because the Coastal Plain sediments are primarily sand with gravel layers only at and near the base of the section and most of the gravel is within the pebble size range.

Gold in the Coastal Plain sediments may have been concentrated a number of times by different processes. In several places in the general region where gold is present in low values in the bedrock, it is or has been present in higher values in the saprolite than in the underlying bedrock. These enriched saprolites can be considered residual placers, formed largely by lag concentration as the enclosing bedrock was saprolitized and the fines washed away by rainfall. If such a zone of enrichment existed in the saprolite prior to the fluvial and marine processes associated with erosion of the weathered surface and deposition as Coastal Plain sediments, then a second concentration as a fluvial or marine placer could exist. Subsequent flash floods or wave action reworking this material deposited as bars, fans, or deltas, possibly could constitute a third concentration process.

Considering that concentration could have taken place through one or more stages, placers of economic significance may have formed in the Coastal Plain sediments, particularly at the base and in this area where the bedrock contains gold. As mentioned earlier, rich lodes may be present in the rocks underlying the Coastal Plain sediments. Considering these aspects, the economic potential of the area should be investigated further.

Source of gold--Quaternary deposits

Gold in the Quaternary deposits is the result of one to several stages of reworking and concentrating. It may have been derived directly from bedorck and deposited in the stream gravels and flood plain deposits; thus having undergone only one stage of concentration before the final stage of deposition as a Holocene placer.

If conditions were favorable, repeated reworking may have concentrated the gold as more enclosing sand, silt, and clay were washed away; higher values may be present in the Quaternary deposits than in the Coastal Plain sediments because the younger deposits have undergone at least one more reworking. The wide flood plains along Fork Creek and Little Fork Creek, from southwest to east of Jefferson, may contain placers of significant values.

Conclusions

Gold is present in the Coastal Plain sediments (Tuscaloosa Formation) and Quaternary alluvium in the Jefferson area, South Carolina, in amounts up to at least 1.20 parts per million ($1.20 per ton). Gold-bearing Coastal Plain sediments cover an area of about 25 square miles and are several feet to 40 feet thick. The gold in these sediments seems to be mostly in the basal few feet and in sparse gravel layers above.

These sediments appear to be largely fluviatile in origin but may include some beach deposits. Gold may have undergone several concentration processes, and placers of economic potential may be present in the Coastal Plain sediments and also in the wider flood plain alluvial deposits bordering the present streams.

Factors detracting from the potential values of the deposits include the present land use as residential and productive farm land, probable silting of creeks during gold recovery processes, and necessity to restore the land to its pre-gold-recovery condition.

This study shows that gold in economic amounts may be present in underlying bedrock lodes that have not yet been discovered because of the thick cover of Coastal Plain sediments. The intermixed group of rocks seems to be the most promising of the bedrock formations for further investigation. Gold is present in these rocks in several places up to at least 12 ppm, both where they are exposed and where they lie beneath the Coastal Plain sediments.

In summary, the possibility of lode gold in the area north of Jefferson is suggested by: (1) the coarse gold in Nugget Creek, (2) the electro-magnetic anomalies, and (3) the gold-bearing saprolite recovered from auger hole number 2 (Table 3).

If gold in economic amounts is present in bedrock beneath the Coastal Plain sediments, then possibly underground mining methods could be employed in which minimal surface damage and disfiguration would be affected.

References cited

Cooke, C. W., 1936, Geology of the Coastal Plain of South Carolina: U.S. Geol. Survey Bull. 867, 196 p.

Conley, J. F., and Bain, G. L., 1965, Geology of the Carolina slate belt west of the Deep River-Wadesboro Triassic basin, North Carolina: Southeastern Geology, v. 6, no. 3, p. 117-138.

Fries, Carl, Jr., 1942, Topaz deposits near the Brewer Mine, Chesterfield County, South Carolina: U.S. Geol. Survey Bull. 936-C, p. 59-78.

Overstreet, W. C., and Bell, Henry, 3d, 1965A, The crystalline rocks of South Carolina: U.S. Geol. Survey Bull. 1183, 126 p.

Overstreet, W. C., and Bell, Henry, 3d, 1965B, Geologic map of the crystalline rocks of South Carolina: U.S. Geol. Survey Misc. Geol. Inv. Map I-143, scale 1:250,000.

Pardee, J. T., and Park, C. F., Jr., 1948, Gold deposits of the southern Piedmont: U.S. Geol. Survey Prof. Paper 213.

Swift, D. J. P., and Heron, S. D., Jr., 1969, Stratigraphy of the Carolina Cretaceous: Southeastern Geology, v. 10, no. 4, p. 201-245.

Wilmarth, M. G., 1938, Lexicon of geologic names of the United States: U.S. Geol. Survey Bull. 896, Part 2, M-Z, p. 1245-2396.

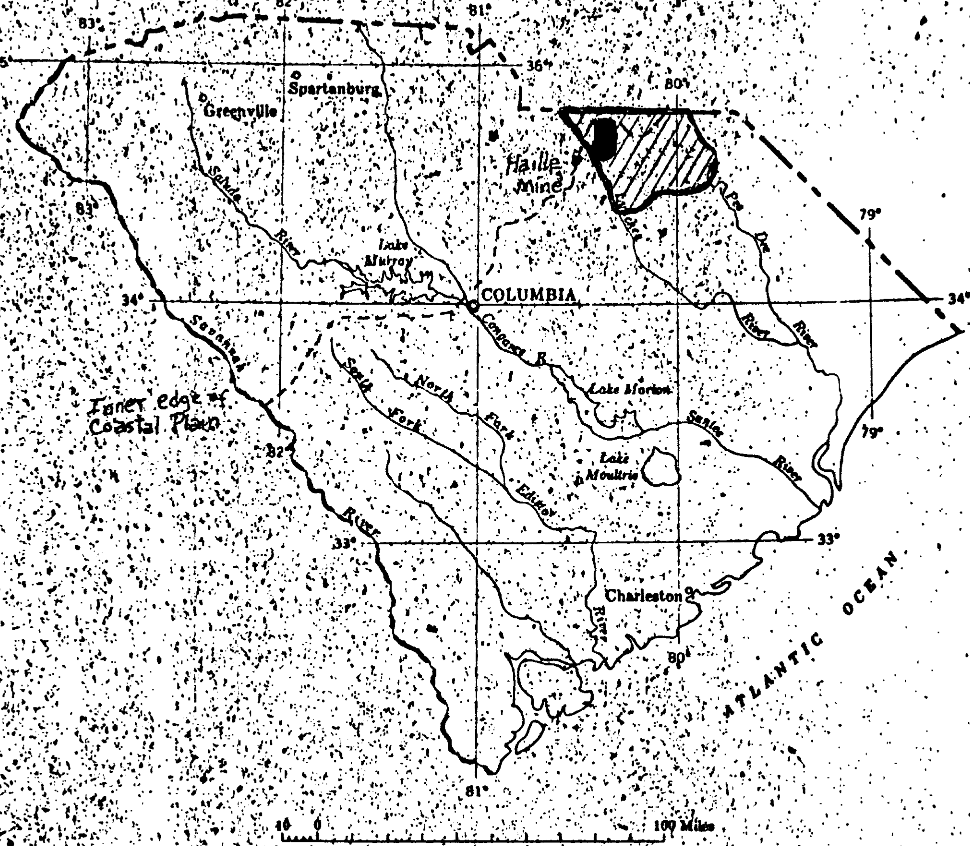

Figure 1. INDEX MAP OF SOUTH CAROLINA. Lined area is Chesterfield County, solid area is the area of the report and of the large scale map, figure 2.

Table 1. Data on panned stream sediment samples. Only the fraction passing the .185 inch opening sieve was panned. A 15 inch gold pan was used; sample size was about 3/4 of a pan.

Sample no. on map	Field no.	Location (Figure 2)	Description of sample site	No. of gold particles in each pan; silt to VC* sand size
1	259D	upper part Fork Creek NE of White Plains Church	sand and gravel riffle at the head of a shallow pool	2
2	259	"	sand and gravel scraped from joints in hornblende gneiss bedrock	1
3	259C	"	sand and gravel riffle near the head of a shallow pool	2
4	259B	"	"	2
5	259A	"	sand and gravel riffle	2
6	235B	"	"	1
7	235C	"	"	0
8	235A	"	"	0
9	239B	E side Rte 151 first creek N of Gold Dust Branch	"	4
10	239A	W side Rte 151 upper part Gold Dust Branch	sand bar in bottom of pool	4
11	232I	Gold Dust Branch of Fork Creek, E of Rte 151	small gravel riffle, stream is about 4 feet wide	18
12	232H	"	"	3
13	232G	"	"	4
14	232F1	"	gravel riffle at head of pool, 10 foot high granite outcrop 20 feet from SW bank	52
"	232F2	"	sand and gravel near the foot of the same pool as 232F1	18

*VC, C, and M in this column means very coarse, coarse, and medium respectively

Table 1. Data on panned stream sediment samples. Only the fraction passing the .185 inch opening sieve was panned. A 15 inch gold pan was used; sample size was about 3/4 of a pan.

Sample no. on map	Field no.	Location (Figure 2)	Description of sample site	No. of gold particles in each pan; silt to VC sand size
14	232F3	Gold Dust Branch of Fork Creek, E of Rte 151	gravel bar at the foot of the same pool as 232F2	42
"	232F4	"	gravel riffle below the same pool as 232F3	7
15	232E	"	sand and gravel bar in a pool beneath an overhanging granite ledge	0
16	232D1	"	gravel paved foot of a pool below a 2 foot high water fall over ledges of granite	10
"	232D2	"	gravel riffle below 232D1	3
17	232C	"	gravel bar in creek in a cut through a granite ridge	0
18	232B1	"	gravel bottom in a pool below a a low falls over a granite ledge	2
"	232B2	"	gravel bottom in a pool 50 feet downstream from 232B1	1
19	232A	Fork Creek just downstream from Rte 109	coarse sand bar in a pool by several large granite boulders	2
20	234A	Fork Creek downstream from Rte 109	sand bar in a pool about 50 yards downstream from an old earth and rock dam	0
21	234B1	"	coarse gravel bar in the middle of the creek	6
"	234B2	"	"	13
"	234B3	"	"	5
22	234D1	Fork Creek upstream from Rte 45	gravel riffle	2
"	234D2	"	"	5

Table 1. Data on panned stream sediment samples. Only the fraction passing the .185 inch opening sieve was panned. A 15 inch gold pan was used; sample size was about 3/4 of a pan.

Sample no. on map	Field no.	Location (Figure 2)	Description of sample site	No. of gold particles in each pan; silt to VC sand size
23	234C1	Fork Creek just upstream from Rte 43	bottom gravel in a pool below low falls over ledges of rhyolite porphyry	3
"	234C2	"	"	4
"	234C3	"	"	3
24	260C	east branch of Fork Creek between Rtes 43 and 265	sand and gravel bar in a pool	1
25	260B1	"	sand and gravel bar composed mainly of quartz gravel	3
"	260B2	"	"	4
"	260B3	"	"	3
26	260A1	"	sand and grave riffle	12
"	260A2	"	"	10 (some M-C)
27	217-1	Fork Creek just upstream from Rte 265	gravel riffle	21
"	217-2	"	"	24
"	217-3	"	"	28
"	217-4	"	"	17
"	217-5	"	"	17
"	217-6	"	"	13
28	216H1	Fork Creek between Rtes 265 and 151	"	12
"	216H2	"	"	10

Table 1. Data on panned stream sediment samples. Only the fraction passing the .185 inch opening sieve was panned. A 15 inch gold pan was used; sample size was about 3/4 of a pan.

Sample no. on map	Field no.	Location (Figure 2)	Description of sample site	No. of gold particles in each pan; silt to VC sand size
29	216G	Fork Creek between Rtes 265 and 151	gravel bar	3
30	216F	"	fine gravel on bottom of pool	0
31	216E1	"	gravel riffle	2
"	216E2	"	"	2
32	216D1	"	"	2
"	216D2	"	"	24
33	216C1	"	"	5
"	216C2	"	"	5
34	216B1	"	"	2
"	216B2	"	"	2
35	216A1	"	"	10
"	216A2	"	"	15
"	216A3	"	"	22
36	216	Fork Creek just east of Rte 151	"	10
37	215-1	"	"	10
"	215-2	"	"	2
"	215-3	"	"	8
"	215-4	"	"	20
"	215-5	"	"	12
38	214-1	"	"	4
"	214-2	"	"	10
"	214-3	"	"	6

Table 1. Data on panned stream sediment samples. Only the fraction passing the .185 inch opening sieve was panned. A 15 inch gold pan was used; sample size was about 3/4 of a pan.

Sample no. on map	Field no.	Location (Figure 2)	Description of sample site	No. of gold particles in each pan; silt to VC sand size
38	214-4	Fork Creek just east of Rte 151	gravel riffle	1
"	214-5	"	"	20
"	214-6	"	"	18
39	244C	Little Fork Creek N of Rte 39	"	0
40	244A	"	"	1
41	244B	"	"	2
42	245A	branch of Little Fork Creek just east of Rte 40	"	3
43	251D	upper part of Nugget Creek east of Rte 40	gravel bar in a narrow channel	0
44	251C	"	gravel bar below a 4 foot thick qtz vein in mudstone saprolite	0
45	251B	"	fine bottom gravel	0
46	251A	"	bottom gravel on quartz-veined ~~mudstone~~ saprolitic tuff	0
47	248	Nugget Creek east of Rte 40	gravel riffle on mudstone saprolite cut by a quartz vein	2
48	254-1	"	sand and gravel in joints of saprolitic amphibolite	6 (1 coarse)
"	254-2	"	"	0
"	251-3	"	"	1
49	253-1	"	pothole in saprolitic amphibolite	25
"	253-2	"	"	30 (1 VC grain)
"	253-3	"	"	1
50	246-1	"	pockets in bedrock joints just above 6 in. high falls over saprolitic amphibolite	3
"	246-2	"	"	5 (1 VC grain)

Table 1. Data on panned stream sediment samples. Only the fraction passing the .185 inch opening sieve was panned. A 15 inch gold pan was used; sample size was about 3/4 of a pan.

Sample no. on map	Field no.	Location (Figure 2)	Description of sample site	No. of gold particles in each pan; silt to VC sand size
50	246-3	same as 246-2	same as 246-2	1
"	246-4	"	"	1
"	246-5	"	"	2 (C-VC grains)
"	246-6	"	"	1
"	246-7	"	"	2
"	246-8	"	sand and gravel from joints in saprolitic amphibolite just below 6 inch high falls	16 (4 C, 1 VC grain)
"	246-9	"	"	12 (6 med, 2 C-VC grains)
"	246-10	"	"	2 (1 C & 1 VC grain)
"	246-11	"	"	0
"	246-12	"	"	0
"	246-13	"	"	8 (1 C grain)
51	243A	Nugget Creek between Rtes 39 & 40	bottom gravel just below ledges of rhyolite porphyry	4
52	242B1	"	gravel from bottom of pool at a bend below an outcrop of vitreous tuff	2
"	242B2	"	"	5
53	242A1	"	pockets of gravel in weathered grooves in foliated bedrock just below old mortared dam remnant	7
"	242A2	"	"	3
54	252A	Little → Fork Creek just N of Rte 265 (below Brewer Mine)	gravel riffle	2

Table 2. Data on outcrop samples shown on the map (Figure 2).

Sample no. on map	Field no.	Location (Figure 2)	Description of sample	Amount of gold
1	105	road cut west side Rte 151 south of Jefferson	basal, gravelly, clayey Coastal Plain sand	1.20 ppm
2	239	road cut east side Rte 151 north of Rte 109	coarse pebble layer in the Coastal Plain sand	3 flakes in 1000 g. samp.
3	247	Nugget Creek east of Rte 40	coarse-grained amphibolitic saprolite in creek bed	0.02 ppm
4	255	"	"	0.02 ppm
5	260	east branch Fork C Creek 2 miles NE of Jefferson	yellow-brown to pink-purple laminated argillite saprolite	0.02 ppm
6	261	Brewer Mine, bottom Brewer pit, north side	pyritic silicified tuff	12.0 ppm
7	318	Brewer Mine, bottom of Brewer pit, south side	" "	0.04 ppm
8	316	Brewer Mine, north-east part of the Tanyard pit	coarse Coastal Plain sand 3 feet from the base	2.20 ppm
9	317	"	from the basal foot of the coarse Coastal Plain sand	0.06 ppm
10	305	Nugget Creek West of Rte 40	coarse-grained saprolitic amphibolite in creek bed	0.04 ppm
11	216	Fork Creek east of Rte 151 south of Jefferson	stream bottom sand and gravel	0.70 ppm
12	297	road cut east side Rte 40 south of Nugget Creek	weathered tuff	1 flake in 100 g. sample
13	300	road cut west side Rte 40, 2 1/2 miles NW of Jefferson	cross-stratified, arkosic, pebbly, coarse Coastal Plain sand	"

Table 3. Data ~~from~~ on cuttings from auger holes shown on the map (Figure 2).

Hole no. on map	Field no.	Location (Figure 2)	Depth, in feet, from surface	Description of sample	Amount of gold
1	262	spur road along east side Rte 151 N of Jeffer.	25	yellowish-gray, pebbly clayey Coastal Plain sand	0.04 ppm
"	263	"	30	"	-
2	264	"	30	yellow-brown, coarse, clayey Coastal Plain sand	-
"	265	"	35-39	yellow-brown, clayey ~~mudstone~~ saprolite	0.02 ppm
"	266	"	39-43	yellow-brown to grayish-blue, clayey saprolite	0.04 ppm
"	267	"	43-48	blue-gray saprolite	-
"	268	"	48-51	"	-
3	269	"	20-25	fine-pebbly, coarse Coastal Plain sand	-
"	270	"	28-30	"	-
"	271	"	30-35	yellow-brown saprolite	-
"	272	"	35-41	yellow-brown to purplish saprolite	-
4	273	"	10	Coastal Plain coarse sand and fine gravel	-
5	274	"	20	coarse Coastal Plain sand	-
"	275	"	30-35	pebbly, coarse Coastal Plain sand	-
"	276	"	38	"	-
"	277	"	40-41	greenish-gray saprolite clay	1 flake in 100 g. sample

Table 3. Data ~~from~~ on cuttings from auger holes shown on the map (Figure 2).

Hole no. on map	Field no.	Location (Figure 2)	Depth, in feet, from surface	Description of sample	Amount of gold
6	278	spur road along east side Rte 151 N. of Jeffer.	15-20	yellow-brown Coastal Plain sand	-
"	279	"	35-38	clayey, pebbly, coarse Coastal Plain sand on yellow-brown saprolite	-
"	280	"	38-41	green-gray saprolite	-
7	281	west side Rte 151 south of Rte 109	20	coarse Coastal Plain sand	-
"	282	"	30	"	-
"	283	"	35	"	-
"	284	"	40-43	dusky-red granite saprolite	-
"	285	"	45-50	"	-
8	286	east side Rte 151 north of Rte 109	15-18	clayey, coarse, light-gray Coastal Plain sand	-
"	287	"	25	clayey, coarse, fine pebbly Coastal Plain sand	1 flake in 100 g. sample
"	288	"	30	"	-
9	289	"	1-4	gravel layer in Coastal Plain sand	3 flakes in 1000 g. panned sample
"	290	"	20	clayey, coarse, angular, quartz sand with much feldspar. Derived from granite saprolite	-
"	291	"	30	"	2 flakes in 100 g. sample
"	292	"	35-40	"	"

Table 3. Data ~~from~~ on cuttings from auger holes shown on the map (Figure 2).

Hole no. on map	Field no.	Location (Figure 2)	Depth, in feet, from surface	Description of sample	Amount of gold
10	293	west side Rte 151 south of 2nd creek north of Rte 109	0-3	pebbly Coastal Plain sand	-
"	294	"	3-6	light-gray to pink granite saprolite	-
11	304	south side of road east of White Plains Church	0-5	coarse Coastal Plain sand	-
"	305	"	5-11	light-gray to dusky-red saprolite clay	-
12	306	just north of White Plains Church	5-10	coarse Coastal Plain sand	0.02 ppm
"	307	"	10-16	coarse Coastal Plain sand on granite saprolite	-
13	308	west side of road north of White Plains Church	6-8	pebbly, coarse, Coastal Plain sand	0.02 ppm
"	309	"	8-12	pebbly, coarse Coastal Plain sand on granite saprolite	0.02 ppm
14	310	"	8-12	yellow-brown, clayey, coarse Coastal Plain sand	-
"	311	"	12-18	pebbly, coarse Coastal Plain sand	-
"	312	"	18-22	white, fine- to medium sand from weathered granite	-
15	313	north side of road 1.2 miles NE of White Plains Church	1	ironstone	-
"	314	"	8-10	intermixed Coastal Plain sand and granite saprolite	-
"	315	"	14-15	sandy granite saprolite	0.02 ppm

70-374

Figure 2. Map showing sample locations and generalized geology of the Jefferson-Pageland area, South Carolina.
Geology by J. Minard, 1967-68, partly adapted from Pardee and Park, 1948, pl. 32 and Overstreet and Bell, 1965, Map I-413.

EXPLANATION

Qal

Alluvium

Sand, gravel, silt, and clay deposits. Shown only along Fork Creek where they are wide and thick enough to map

QUATERNARY

Kt

Tuscaloosa Formation

Sand and gravel, yellowish-brown to light-gray; contains layers of silt and clay. Gravel is mainly at or near the base. Locally contains pebbly arkosic sand near the base and adjacent to the granite. Both horizontally and cross stratified. Irregular base.

CRETACEOUS

POg

Granite

Coarse grained to porphyritic biotite granite; gray to pinkish-gray.

ORDOVICIAN TO PERMIAN

MOir

Intermixed rocks

Rhyolite tuff, rhyolite porphyry, silicified tuff and breccia, hornblende plagioclase schist, muscovite schist, and sericite schist.

MOa

Argillite

Greenish-and brownish-gray to grayish-brown, laminated fissile, tuffaceous argillite.

ORDOVICIAN TO MISSISSIPPIAN

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Contact

Dashed where approximately located, dotted where concealed.

⊗

Location where streambed sand and gravel were panned. Underlined indicates that gold was recovered from the concentrate. Refer to Table 1.

•

Location of outcrop sampled; where underlined and numbered gold was detected. Refer to Table 2.

⊙

Location of auger hole. Underlined indicates gold was recovered in the cuttings. Refer to Table 3.

Location of ground electro-magnetic anomaly