THE VAUCLUSE GOLD MINE, ORANGE COUNTY, VA.[1]

CHARLES E. BASS.

ABSTRACT.

The Vaucluse gold property has been worked intermittently since gold was discovered in 1832. The latest operation was carried on by the V–M Corporation from March 1935 to November 1938, producing 26,452 tons of ore of $143,760 gross value, of which $91,569.36 was won in 1938.

The host rock is a quartz-sericite-chlorite schist. The workings lie wholly within a well-defined shear zone up to 40 feet in width, which has been traced along the surface for several miles. The shear zone strikes N. 40°–60° E. and is conformable with the schistosity of the enclosing rock.

The ore is in shoots that pitch NE. at angles ranging between 30° and 70° and conform to fluting in the shear zone. The ore occurs along the walls of the shear zone and the location of the shoots was controlled, partly at least, by pre-mineral fractures.

Quartz, sericite, and ankerite make up most of the gangue and chlorite is abundant in the enclosing rock. Abundant pyrite is the only important sulphide; some chalcopyrite and galena are generally present. Gold is the only mineral of economic value and is intimately associated with the pyrite.

The ore was milled on the property and flotation concentrates were shipped to a smelter. Direct mining, milling, and shipping cost per ton, from December 1935 to November 1938, was $4.56. Approximately 4,500 feet of core drilling was done below the 300-foot level, which indicated about the same conditions as those present above this level.

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INTRODUCTION.

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Production.—Early production figures from the property are not available but from surface indications (Fig. 1) and the history of early gold mining in Virginia it is probable that the mine yielded a large part of the State's production between 1833 and 1860. From December 1935 until closing, 26,452 tons of ore yielded 4,305.3 ounces of gold with a gross value of $143,760.56, or $5.43 per ton. Approximately 1,500 tons of this material,

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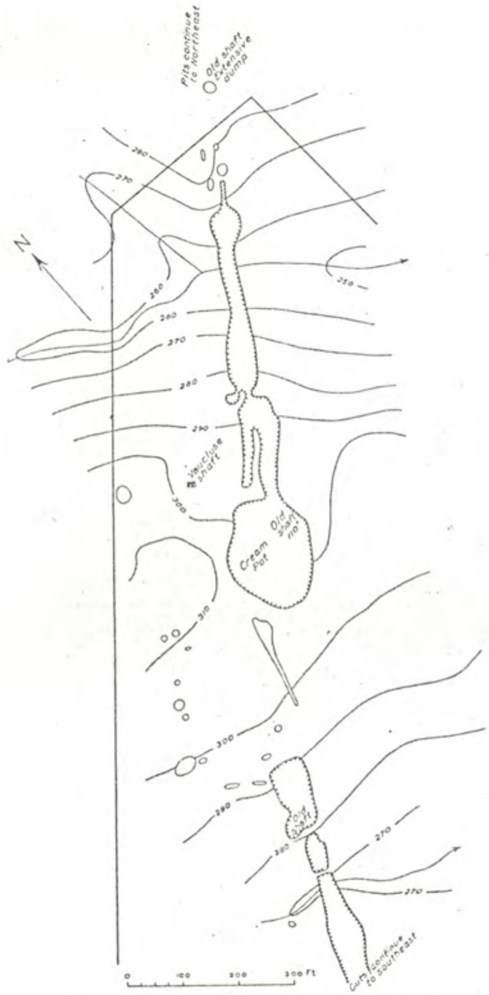

FIG. 1. Surface map showing portion of Vaucluse property, Orange County, Va.

ounces of gold with a gross value of $91,569.36, or $5.48 per ton. Of the 4,305.3 ounces recovered, 3,812.3 ounces, or 91 per cent, was contained in flotation concentrates (paid for at $32.81 per ounce) and 493 ounces were recovered as metallic gold, which was liberated during fine grinding.

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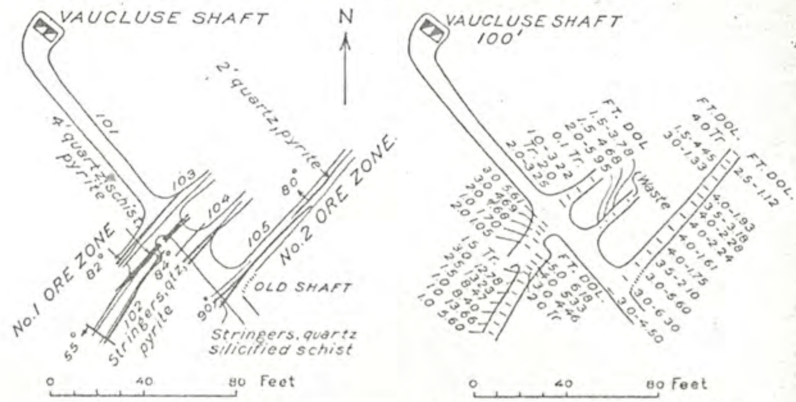

FIG. 2. Geologic and assay map of 100-foot level, Vaucluse mine.

All known commercial ore bodies above the 300-foot level have been exhausted.

GENERAL GEOLOGY.

The rocks of the Virginia Piedmont include many different varieties of schist and gneiss. They have been described by Jonas,[5] Roberts,[6] and Pegau.[7]

At the Vaucluse mine the rock is a quartz-sericite-chlorite schist, which is a part of the Wissahickon formation.[8] The mine workings lie within a shear zone (Fig. 4), which has been prospected

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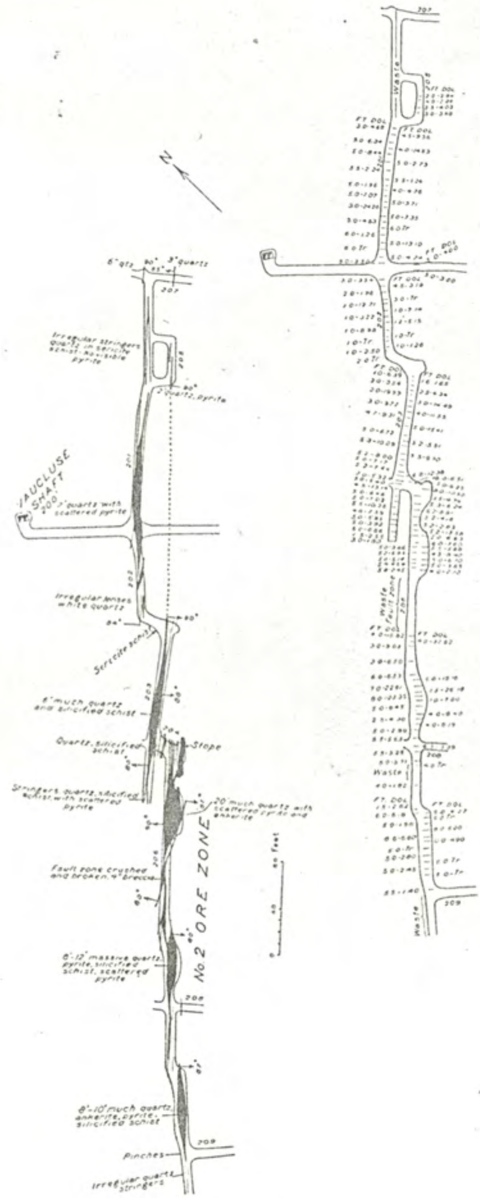

Fig. 3. Geologic and assay map of 200-foot level, Vaucluse mine.

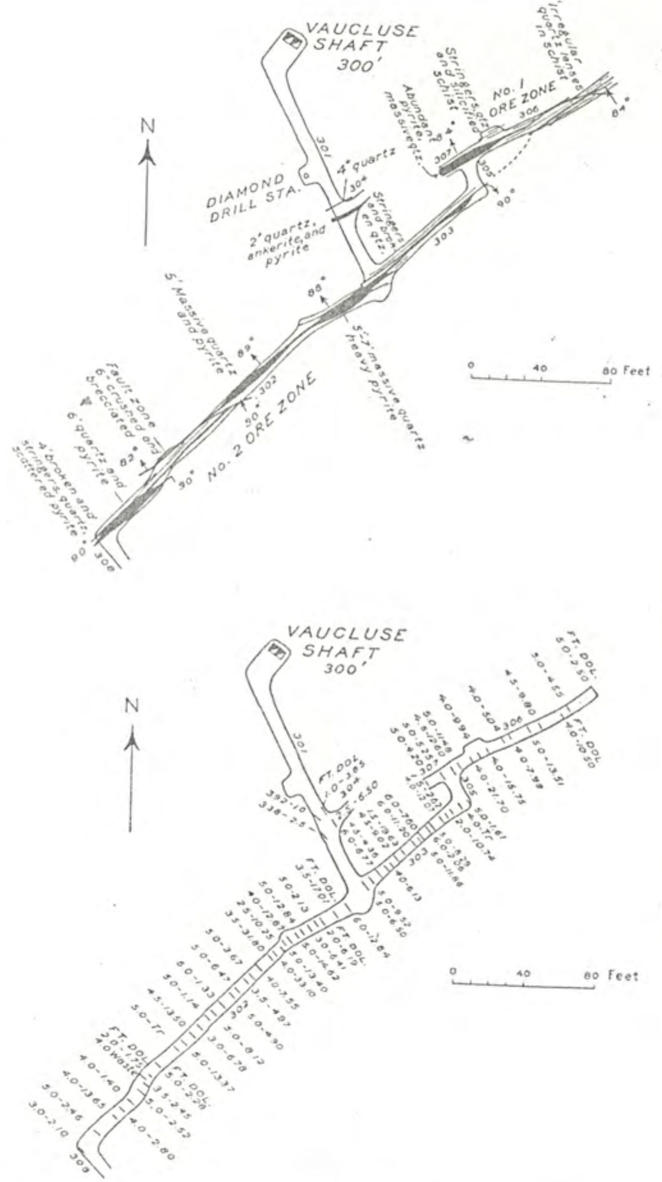

FIG. 4. Geologic and assay map of 300-foot level, Vaucluse mine.

by pits, shafts, and underground workings for 3 miles along the surface. Pits to the north and south of the main Vaucluse shaft (Fig. 1), are from 20 to 125 feet wide and are almost continuous for one-half mile. They indicate that the shear zone is continuous but that individual ore bodies are not. The strike and dip of the shear zone nearly conform with the schistosity of the enclosing rock, which strikes N. 40° to 60° E. and dips from 80° NW. through vertical to 80° SE.

The shear zone is limited on each side by several feet of thinly laminated rock and its width ranges up to 40 feet. Post-mineral movement is evident along the shear zone, and to a less extent across it. The walls show pronounced grooving and slickensides.

ORE DEPOSITS.

Mineralogy.

The mineral composition of the ore is simple. Quartz, sericite, ankerite, chlorite, and calcite are the principal gangue minerals. Pyrite with minor amounts of chalcopyrite and galena are the only sulphides. Gold, which generally occurs with the pyrite, is the only valuable mineral.

Quartz is the most abundant gangue mineral. It occurs mainly in lenticular masses as much as 200 feet long and up to 30 feet in width; it also forms stringers along foliation planes in the adjoining schist. It is mostly fine-grained, but some coarse-grained bunches are present here and there within the lenticular masses. The color is commonly white or light gray, but in places it is dark bluish gray or reddish brown.

Sericite is the principal mica in the wall rock schist that envelops the quartz-ore-shoots, and it is concentrated both along the walls of the quartz bodies and as thin lenses in their midst.

Chlorite is a common constituent of the country rock but is generally separated from the mineralized zones by layers of sericite. Where chlorite is found in the shear zone, it is generally accompanied by much ankerite with little or no quartz.

Ankerite and minor amounts of calcite are common in the mineralized areas and in places they constitute a considerable part of the ore masses. Ankerite is milky white and is found coating quartz and in layers between ore and schist. Calcite, where present, is associated with quartz and ankerite and fills fractures in the ore. In several places, bands of pinkish calcite 2 feet wide and from 10 to 12 feet long were found in the schist parallel to, but not adjacent to the ore bodies.

Many other non-metallic minerals, such as biotite, garnet, tourmaline, hornblende, actinolite, barite, kyanite, and feldspar, have been reported from the area. Of these minerals, only garnet has been identified in the mine.

Pyrite contains most of the gold and is the only abundant sulphide. Under the microscope, the pyrite shows gold in veinlets from 10 to 50 microns wide and as isolated inclusions as much as 25 microns in diameter. Pyrite is irregularly disseminated in the quartz and is found in large pockets and masses along the walls of the ore zone. Small crystals occur in the surrounding schist but all are barren of gold. Numerous small grains of chalcopyrite and galena have been found with the pyrite but flotation concentrates contain only traces of copper and lead.

Gold is the only valuable mineral recovered. In the sulphide zone, it is in microscopic particles intimately associated with pyrite. In the oxidized zone, it forms veinlets and coarse flakes in the quartz. Gold from both zones is of high purity. Mint returns on 493 ounces of bullion show an average fineness of 901 parts per thousand.

The Ore Bodies.

The quartz bodies lie along the walls of the shear zone. The west wall is called No. 1 ore zone and the east wall No. 2 ore zone. The ore bodies are in part irregular pod-shaped lenses of quartz, which taper to quartz stringers or leaders at each end, and in part, elongated cylindrical masses that terminate abruptly downward and are not connected with other bodies. The lenses conform roughly to the schistosity of the enclosing rock but some cut across it at low angles. Silicified schist uniformly surrounds the lenses and makes up part of the ore shoots. Many of the lenses are compound and some are essentially continuous for several hundred feet, as several may lie so closely together that a drift face passes from one lens into another without a break in mineral composition or value of ore. In planning development, this type of deposit must be studied carefully, as a drift may cut the top, middle, or bottom of a lens. If cut near the top (Fig. 5), little accessible ore would be found above the drift.

The widths of the lenses range from a few inches to 30 feet and the lengths from a few inches to more than 200 feet, but the average width is about 4 feet and average length about 50 feet. The ore shoots pitch to the northeast (Fig. 5) at angles that range between 30° and 70°.

Many small irregular lenses ranging from a few inches to 10 feet in length and from 1 inch to 2 feet in width are irregularly scattered in the shear zones but have no economic importance. These lenses exhibit the same characteristics as the larger bodies and occur under similar conditions.

To judge from the many remnants of partly digested wall rock that it contains, the ore was formed largely by replacement. The schist wall rock is silicified to different degrees near the walls of the ore lenses and in places partial silicification extends as much as 50 feet on either side of the shear zone. Locally such silicified schist is ore.

The causes of localization of the ore shoots are imperfectly understood, although deposition seems to have been dependent, at least in part, upon the ease with which the mineralizing solutions circulated. The shoots are commonly alined parallel to the conspicuous grooves in the walls of the shear zone, along which the ore-forming solutions evidently traveled. Many northwestward-striking tension fractures, which dip about 85° NE., exist near the larger ore bodies but, unless reopened after mineral deposition, do not extend into the ore bodies. Near the larger ore shoots these fractures are a few inches apart, but fractures of the same set are several feet apart near the smaller or isolated lenses. It is likely that these cross fractures played an important part in making the schist more susceptible to replacement by ore-forming solutions.

Some post-ore movement is indicated along the shear zone by the local brecciation of quartz and the polishing of pyrite. In a few places the ore bodies are offset several feet along transverse fractures.

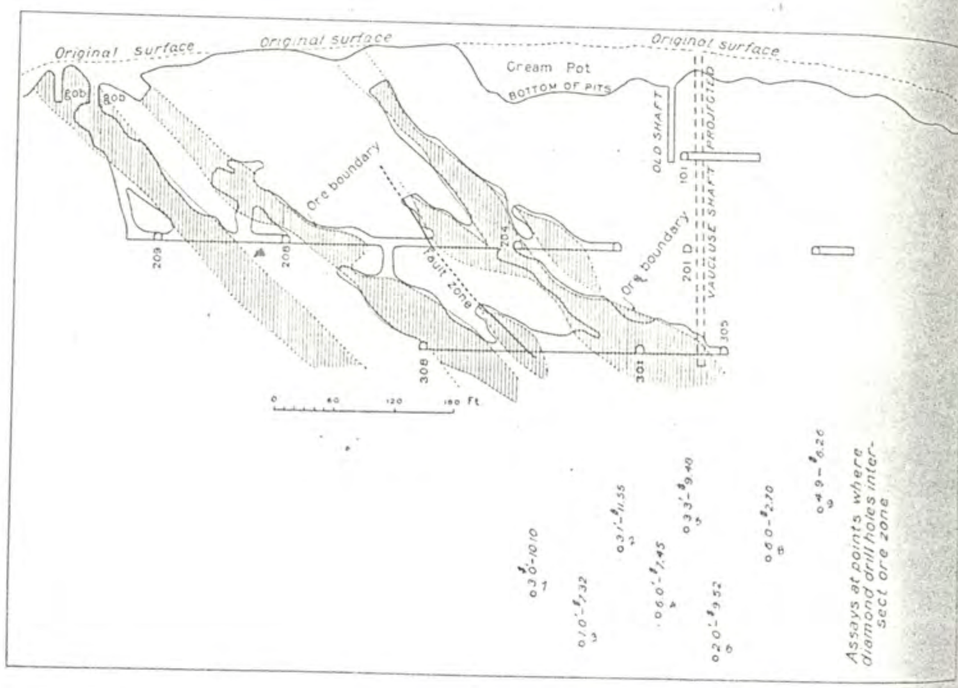

Fig. 5. Longitudinal section on No. 2 mineralized zone, Vaucluse mine, showing rake of ore shoots.

Oxidation and Enrichment.

During the early days of gold mining in Virginia, placers and mechanically enriched surface material yielded a large part of the gold. The depth to which enrichment penetrated was from 50 to 150 feet in this area.

At the Vaucluse mine, mechanical and probably chemical enrichment along cracks and faults is evident to a depth of 110 feet at which the oxidized material grades into fresh unaltered rock. Near the surface much coarse gold was found and streaks of rich ore were obtained along water courses and fractures. No enrichment was found, however, in the sulphide zone. Marcasite and some pyrite, deposited by downward circulating waters, were found in fractures on the 200- and 300-foot levels. Many samples were taken along water courses, fault zones, and tension cracks, but their gold contents were no higher than samples taken from the unbroken ore where enrichment was less likely.

Mining Methods and Costs.

As indicated by its mineralogy, the ore and adjacent wall rock are hard. In development headings, the rock stands well and only occasional sections required timbering. The walls are strong and stand well in stopes without support during mining operations.

Owing to the irregularity in size and grade of the ore bodies, no established mining method was used. Where a drift cut the bottom of a pitching ore shoot, regular 5-foot drift sets were placed as far back under the brow as required. As the stope advanced up the pitch, vertical raises were started to cut the ore higher up and obviate rehandling before loading into cars. All labor was paid on an hourly basis; 35 and 40 cents was the prevailing hourly wage.

Detailed mining costs are given in table 1.

Milling Methods and Costs.

The ore crushed to three-fourths inch is fed to a 6′ × 22″ ball mill in closed circuit with a 2-foot classifier. Overflow from the classifier goes direct to the second of five flotation cells in series. Underflow from the fifth cell goes to waste and overflow from the four cells is returned to the first, where a finished product is produced. The overflow from the classifier contained 28 per

TABLE 1.

DIRECT MINING COST PER TON, VAUCLUSE MINE.

December 1935—November 1938. 26,452 tons.

	Labor, compensation and supervision.	Comp. air power, drills and steel.	Other power.	Explosives.	Timber	Other supplies.	Total.
Development, crosscutting, and drifting...	$0.433	$0.153	$0.160	$0.115	$0.022	$0.024	$0.907
Haulage and hoisting.......	.156	—	.042	—	—	.034	.262
Pumping........	.133	—	.124	—	—	.013	.270
General expense underground, including stoping...........	.527	.318	—	.190	.061	.042	1.108
Surface expense..	.305	.037	—	—	—	.021	.363
Total.......	$1.554	$ .508	$ .326	$ .305	$ .083	$ .134	$2.910

cent solids, 65 per cent through 200 mesh. Following is a typical screen analysis:

	Per cent
+ 60 mesh....................	0.30
+100 mesh....................	12.20
+150 mesh....................	9.50
+200 mesh....................	13.00
−200 mesh....................	65.10

Reagents number 208 aerofloat and number 301 xanthate were added in the ball mill and classifier, respectively, and pine oil was added at classifier overflow in the following amounts in lbs. per ton of ore: No. 301, .10; No. 208, .07; Pine oil, .03.

The concentrate ran by gravity into a series of settling vats; the dried concentrates were shoveled out by hand and dried before shipping to the smelter.

Detailed milling costs are given in table 2.

Overhead, freight, and treatment charges were as follows:

	Per ton of ore milled
Freight on concentrate................................	$0.088
Smelter charges..	.108
Depreciation..	.147
Lease expense..	.002
Miscellaneous and bullion shipment charges..............	.105
Total..	$ .450

TABLE 3.

DIRECT MILLING COST PER TON, VAUCLUSE MINE.
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	Labor and compensation.	Power.	Reagents.	Other supplies and repairs.	Total.
Sorting..........	$0.010	—	—	$0.001	$0.011
Crushing..........	.075	$0.070	—	.028	.173
Grinding..........	.127	.160	—	.032	.319
Flotation.........	.127	.032	$0.075	.021	.255
Assaying..........	.074	.008	.010	.006	.098
Drying and sacking concentrates.....	.043	.002	—	.015	.060
General expense....	.148	.026	—	.110	.284
Total.........	$ .604	$ .298	$ .085	$ .213	$1.200

Total direct mining, milling, and marketing expense per ton was $4.56.

Diamond Drilling.

A small amount of core drilling was done below the 300-foot level. The intersections of the drill holes with the No. 2 ore zone, the widths of the zone penetrated, and the gold contents of the cores are shown in Fig. 5. Only a few cores extended below the 300-foot level. No material of commercial grade was cut in No. 1 ore zone. The drilling was done under contract at $1.90 per foot, and the total footage was 4,500 feet.

Owing to the irregularity of the gold contents, no attempt was made in these few holes to ascertain the exact gold content at the 500- and 600-foot depths, but rather to determine the width and character of both mineralized zones. The known ore zones were cut in each of the eight holes and showed approximately the same width and gold content as above the 300-foot level.

U. S. GEOLOGICAL SURVEY,
WASHINGTON, D. C.,
Oct. 19, 1939.

it is impractical to classify them on the basis of these factors. Three sub-groups are recognized:

Group IV–A: Shoots in common pegmatite. Fifty-five examples.

Group IV–B: Pegmatites in gneiss and schist. Thirteen examples.

Group IV–C: Not classified as Sub-groups A or B; some originally worked for mica alone; twenty-one examples.

(To be concluded in the following number.)

Number 7.

Number 8.

Volume XXXV January-February 1940 Number 1

Economic Geology

and the Bulletin of the Society of Economic Geologists

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PUBLISHED SEMI-QUARTERLY

Five Dollars a Year, Seventy-five Cents a Copy

THE ECONOMIC GEOLOGY PUBLISHING COMPANY

Prince and Lemon Streets, Lancaster, Pa.

Entered as second-class matter, March 30, 1906, at the Post Office at Lancaster, Pa., under the Act of Congress of March 3, 1879

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1832-1938

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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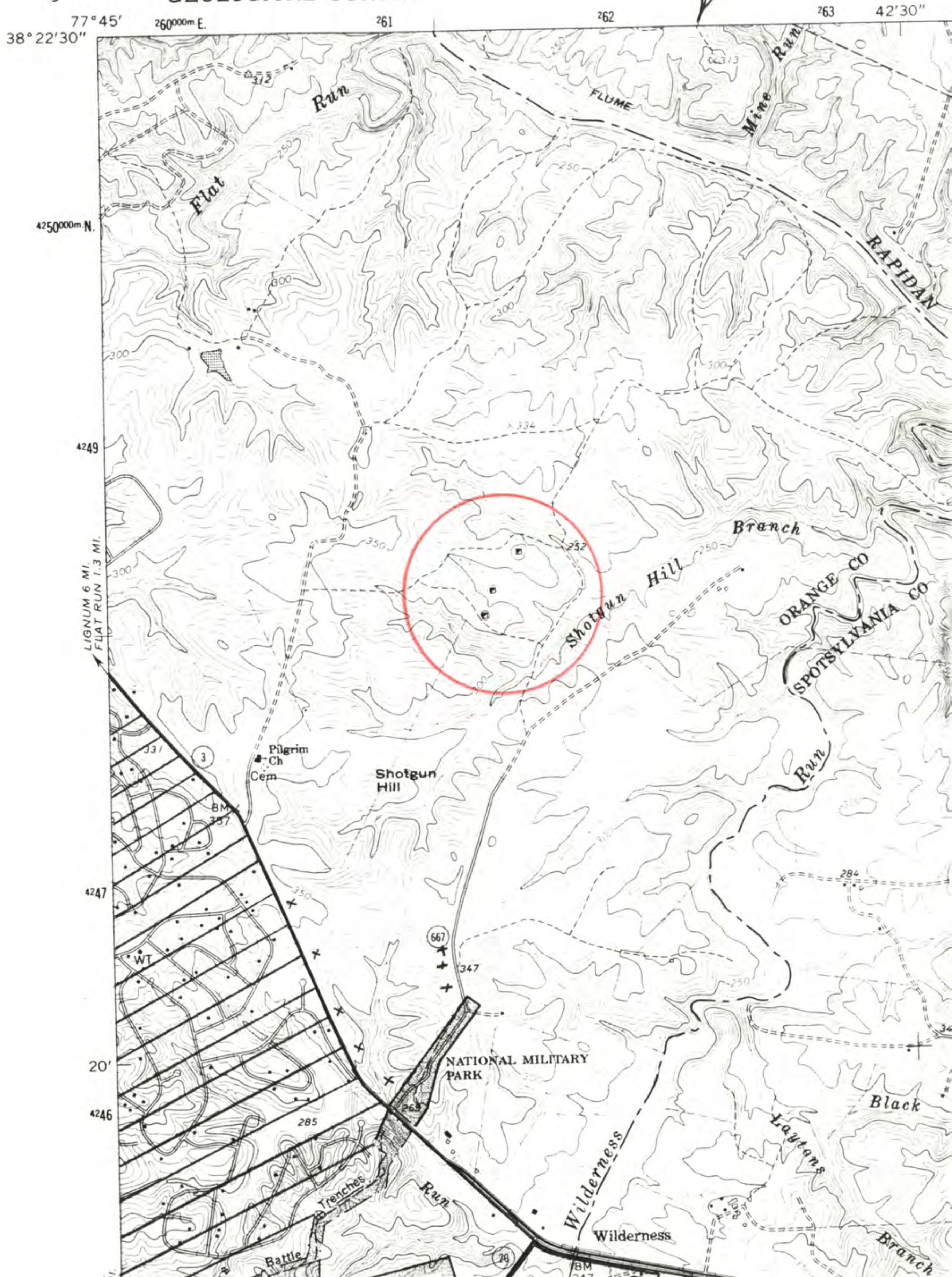
(GERMANNA BRIDGE)



Chancellorsville, VA quad.

5460 IV NE
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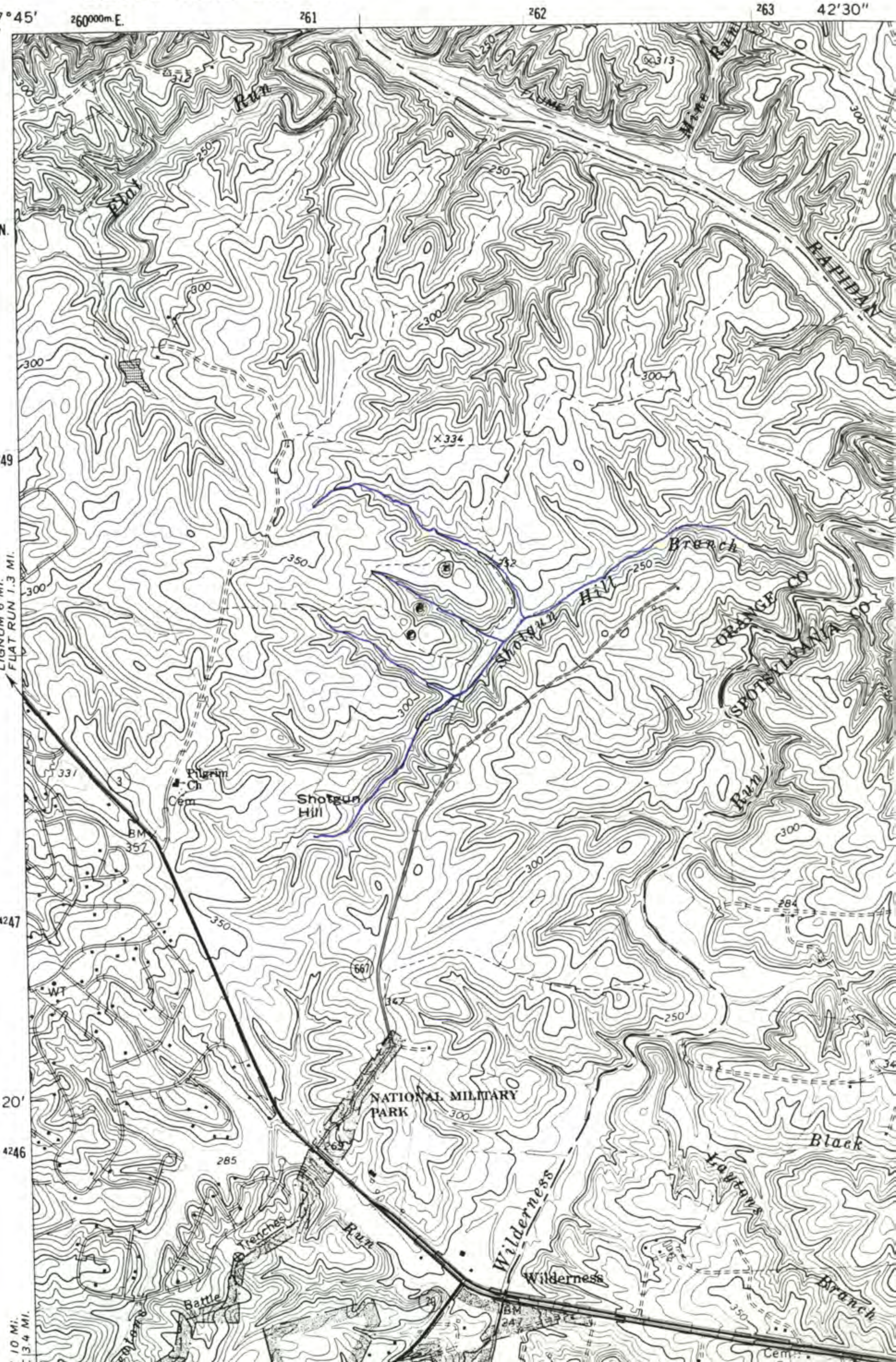

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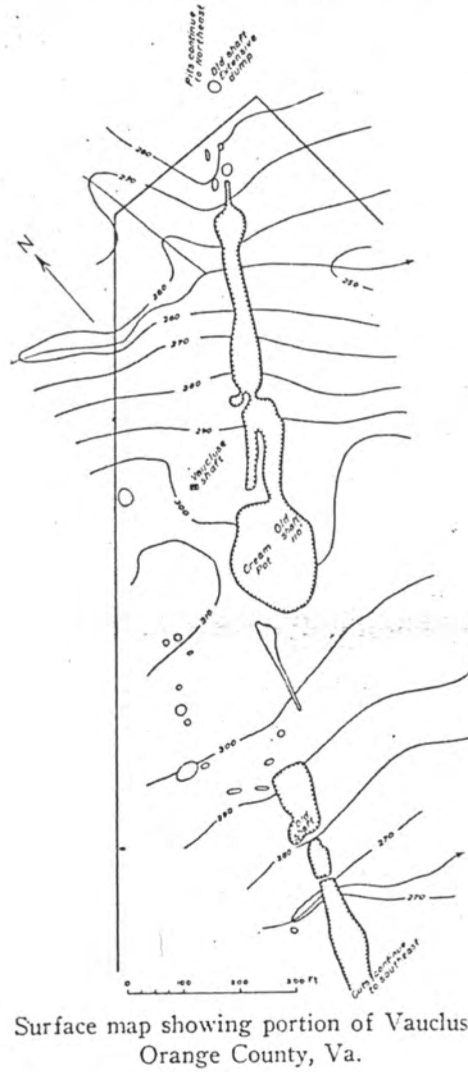

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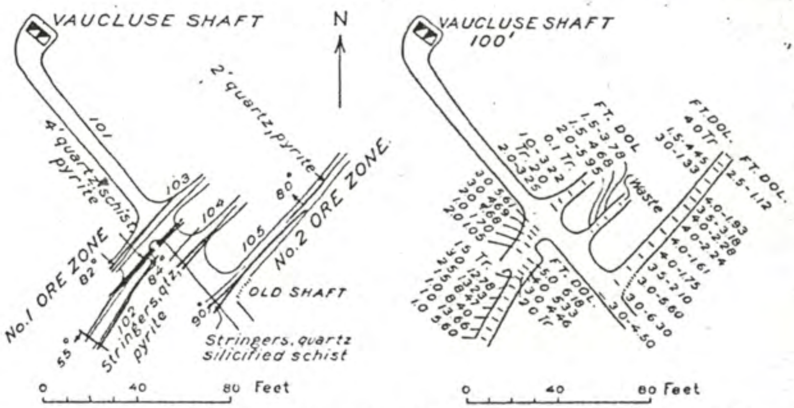

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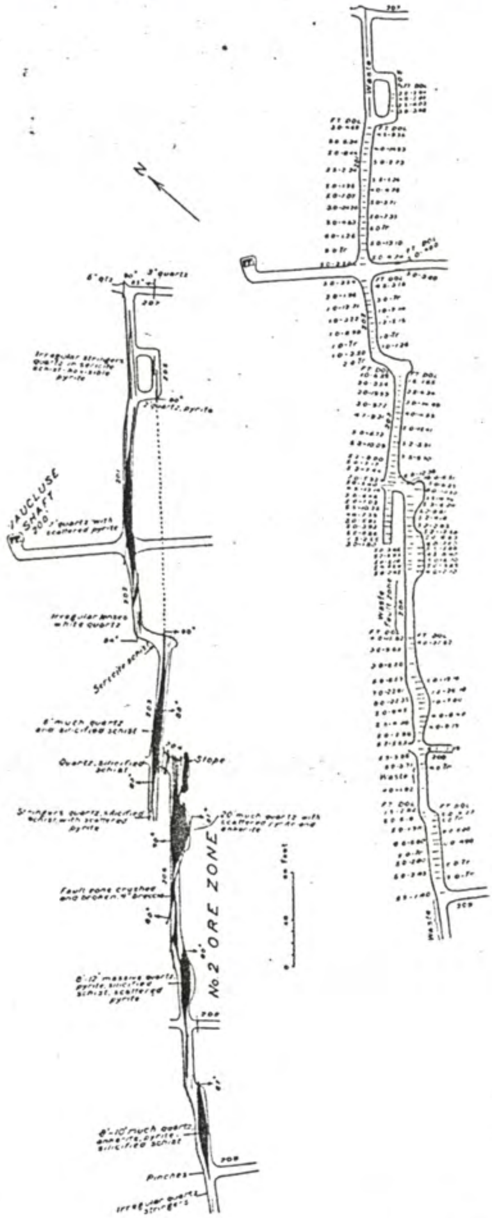
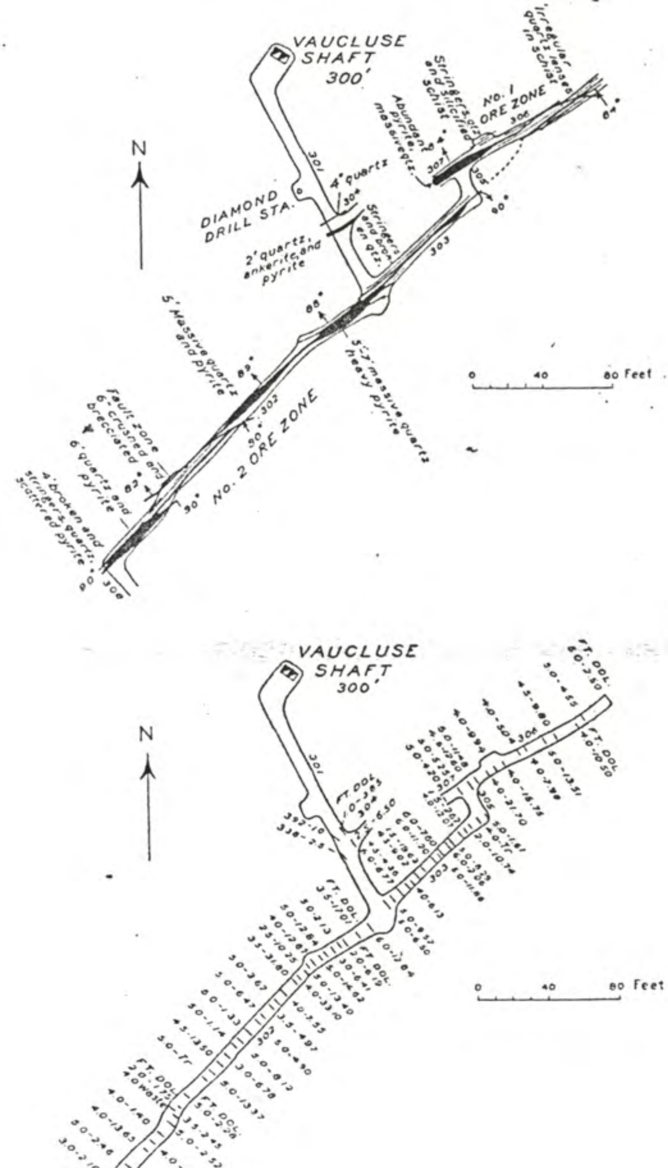


FIG. 3. Geologic and assay map of 200-foot level, Vaucluse mine.



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Ankerite and minor amounts of calcite are common in the mineralized areas and in places they constitute a considerable part of the ore masses. Ankerite is milky white and is found coating quartz and in layers between ore and schist. Calcite, where present, is associated with quartz and ankerite and fills fractures in the ore. In several places, bands of pinkish calcite 2 feet wide and from 10 to 12 feet long were found in the schist parallel to, but not adjacent to the ore bodies.

Many other non-metallic minerals, such as biotite, garnet, tourmaline, hornblende, actinolite, barite, kyanite, and feldspar, have been reported from the area. Of these minerals, only garnet has been identified in the mine.

Pyrite contains most of the gold and is the only abundant sulphide. Under the microscope, the pyrite shows gold in veinlets from 10 to 50 microns wide and as isolated inclusions as much as 25 microns in diameter. Pyrite is irregularly disseminated in the quartz and is found in large pockets and masses along the walls of the ore zone. Small crystals occur in the surrounding schist but all are barren of gold. Numerous small grains of chalcopyrite and galena have been found with the pyrite but flotation concentrates contain only traces of copper and lead.

Gold is the only valuable mineral recovered. In the sulphide zone, it is in microscopic particles intimately associated with pyrite. In the oxidized zone, it forms veinlets and coarse flakes in the quartz. Gold from both zones is of high purity. Mint returns on 493 ounces of bullion show an average fineness of 901 parts per thousand.

The Ore Bodies.

The quartz bodies lie along the walls of the shear zone. The west wall is called No. 1 ore zone and the east wall No. 2 ore zone. The ore bodies are in part irregular pod-shaped lenses of quartz, which taper to quartz stringers or leaders at each end, and in part, elongated cylindrical masses that terminate abruptly downward and are not connected with other bodies. The lenses conform roughly to the schistosity of the enclosing rock but some cut across it at low angles. Silicified schist uniformly surrounds the lenses and makes up part of the ore shoots. Many of the lenses are compound and some are essentially continuous for several hundred feet, as several may lie so closely together that a drift face passes from one lens into another without a break in mineral composition or value of ore. In planning development, this type of deposit must be studied carefully, as a drift may cut the top, middle, or bottom of a lens. If cut near the top (Fig. 5), little accessible ore would be found above the drift.

The widths of the lenses range from a few inches to 30 feet and the lengths from a few inches to more than 200 feet, but the average width is about 4 feet and average length about 50 feet. The ore shoots pitch to the northeast (Fig. 5) at angles that range between 30° and 70°.

Many small irregular lenses ranging from a few inches to 10 feet in length and from 1 inch to 2 feet in width are irregularly scattered in the shear zones but have no economic importance. These lenses exhibit the same characteristics as the larger bodies and occur under similar conditions.

To judge from the many remnants of partly digested wall rock that it contains, the ore was formed largely by replacement. The schist wall rock is silicified to different degrees near the walls of the ore lenses and in places partial silicification extends as much as 50 feet on either side of the shear zone. Locally such silicified schist is ore.

The causes of localization of the ore shoots are imperfectly understood, although deposition seems to have been dependent, at least in part, upon the ease with which the mineralizing solutions circulated. The shoots are commonly alined parallel to the conspicuous grooves in the walls of the shear zone, along which the ore-forming solutions evidently traveled. Many northwestward-striking tension fractures, which dip about 85° NE., exist near the larger ore bodies but, unless reopened after mineral deposition, do not extend into the ore bodies. Near the larger ore shoots these fractures are a few inches apart, but fractures of the same set are several feet apart near the smaller or isolated lenses. It is likely that these cross fractures played an important part in making the schist more susceptible to replacement by ore-forming solutions.

Some post-ore movement is indicated along the shear zone by the local brecciation of quartz and the polishing of pyrite. In a few places the ore bodies are offset several feet along transverse fractures.

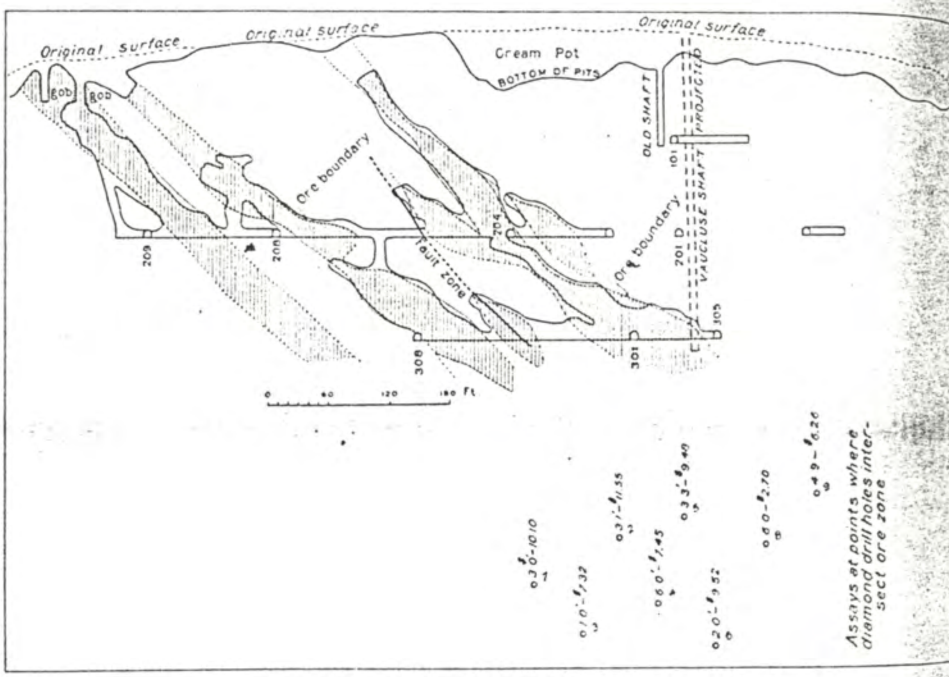


FIG. 5. Longitudinal section on No. 2 mineralized zone, Vaucluse mine, showing rake of ore shoots.

Oxidation and Enrichment.

During the early days of gold mining in Virginia, placers and mechanically enriched surface material yielded a large part of the gold. The depth to which enrichment penetrated was from 50 to 150 feet in this area.

At the Vaucluse mine, mechanical and probably chemical enrichment along cracks and faults is evident to a depth of 110 feet at which the oxidized material grades into fresh unaltered rock. Near the surface much coarse gold was found and streaks of rich ore were obtained along water courses and fractures. No enrichment was found, however, in the sulphide zone. Marcasite and some pyrite, deposited by downward circulating waters, were found in fractures on the 200- and 300-foot levels. Many samples were taken along water courses, fault zones, and tension cracks, but their gold contents were no higher than samples taken from the unbroken ore where enrichment was less likely.

Mining Methods and Costs.

As indicated by its mineralogy, the ore and adjacent wall rock are hard. In development headings, the rock stands well and only occasional sections required timbering. The walls are strong and stand well in stopes without support during mining operations.

Owing to the irregularity in size and grade of the ore bodies, no established mining method was used. Where a drift cut the bottom of a pitching ore shoot, regular 5-foot drift sets were placed as far back under the brow as required. As the stope advanced up the pitch, vertical raises were started to cut the ore higher up and obviate rehandling before loading into cars. All labor was paid on an hourly basis; 35 and 40 cents was the prevailing hourly wage.

Detailed mining costs are given in table 1.

Milling Methods and Costs.

The ore crushed to three-fourths inch is fed to a 6′ × 22″ ball mill in closed circuit with a 2-foot classifier. Overflow from the classifier goes direct to the second of five flotation cells in series. Underflow from the fifth cell goes to waste and overflow from the four cells is returned to the first, where a finished product is produced. The overflow from the classifier contained 28 per

TABLE 1.

DIRECT MINING COST PER TON, VAUCLUSE MINE.

December 1935—November 1938. 26,452 tons.

	Labor, compensation and supervision.	Comp. air power, drills and steel.	Other power.	Explosives.	Timber	Other supplies.	Total.
Development, crosscutting, and drifting...	$0.433	$0.153	$0.160	$0.115	$0.022	$0.024	$0.907
Haulage and hoisting.......	.156	—	.042	—	—	.034	.262
Pumping........	.133	—	.124	—	—	.013	.270
General expense underground, including stoping...........	.527	.318	—	.190	.061	.042	1.108
Surface expense..	.305	.037	—	—	—	.021	.363
Total.......	$1.554	$ .508	$ .326	$ .305	$ .083	$ .134	$2.910

cent solids, 65 per cent through 200 mesh. Following is a typical screen analysis:

	Per cent
+ 60 mesh....................	0.30
+100 mesh....................	12.20
+150 mesh....................	9.50
+200 mesh....................	13.00
−200 mesh....................	65.10

Reagents number 208 aerofloat and number 301 xanthate were added in the ball mill and classifier, respectively, and pine oil was added at classifier overflow in the following amounts in lbs. per ton of ore: No. 301, .10; No. 208, .07; Pine oil, .03.

The concentrate ran by gravity into a series of settling vats; the dried concentrates were shoveled out by hand and dried before shipping to the smelter.

Detailed milling costs are given in table 2.

Overhead, freight, and treatment charges were as follows:

	Per ton of ore milled
Freight on concentrate..............................	$0.088
Smelter charges..............................	.108
Depreciation..............................	.147
Lease expense..............................	.002
Miscellaneous and bullion shipment charges............	.105
Total..............................	$ .450

TABLE 3.

DIRECT MILLING COST PER TON, VAUCLUSE MINE.
December 1935—November 1938. 26,452 tons.

	Labor and compensation.	Power.	Reagents.	Other supplies and repairs.	Total.
Sorting	$0.010	—	—	$0.001	$0.011
Crushing	.075	$0.070	—	.028	.173
Grinding	.127	.160	—	.032	.319
Flotation	.127	.032	$0.075	.021	.255
Assaying	.074	.008	.010	.006	.098
Drying and sacking concentrates	.043	.002	—	.015	.060
General expense	.148	.026	—	.110	.284
Total	$ .604	$ .298	$ .085	$ .213	$1.200

Total direct mining, milling, and marketing expense per ton was $4.56.

Diamond Drilling.

A small amount of core drilling was done below the 300-foot level. The intersections of the drill holes with the No. 2 ore zone, the widths of the zone penetrated, and the gold contents of the cores are shown in Fig. 5. Only a few cores extended below the 300-foot level. No material of commercial grade was cut in No. 1 ore zone. The drilling was done under contract at $1.90 per foot, and the total footage was 4,500 feet.

Owing to the irregularity of the gold contents, no attempt was made in these few holes to ascertain the exact gold content at the 500- and 600-foot depths, but rather to determine the width and character of both mineralized zones. The known ore zones were cut in each of the eight holes and showed approximately the same width and gold content as above the 300-foot level.

U. S. GEOLOGICAL SURVEY,
WASHINGTON, D. C.,
Oct. 19, 1939.

Min. Res. Rept 7 Base + Precious Metal $5.00
and Related Ore Dep. of VA.,
Luttrell, 1966

missing!

April 16, 1953

Mr. Simon H. Ulman
903 Caroline Street
Fredericksburg, Va.

Dear Mr. Ulman:

We are returning herewith the drill hole assay logs which you sent to us several weeks ago. If there is an engineering or geological report on the Vaucluse-Melville Mine available, it would be helpful in interpreting the results of the drilling. In the absence of this information, the drilling seems to indicate considerable very low grade mineralization in the range of a dollar or two per ton but very few intersections that would stand the cost of an underground mining operation.

We have made a copy of the drill hole assays and will hold it for reference in case we have further correspondence about this property.

Yours very truly,

R. D. LEISK
General Manager

RDL/mm

Enclosure

Registered - Return Receipt Requested

ULMAN'S

LIFETIME JEWELRY Box 420

903 CAROLINE STREET FREDERICKSBURG, VA.

April 14, 1953

Sunshine Mine Corp.
Kellogg, Idaho

Attn: Gen. Supt.

Gentlemen:

Kindly advise if you received assay report on Vaucluse-Melville Mine diamond core drills which I mailed to you several weeks ago.

Yours very truly,

ULMAN'S LIFETIME JEWELRY

Simon H. Ulman

Simon H. Ulman

P.S.

Also were sent registered - air mail -

Sunshine Mining Company

P.O. BOX 1080 PHONE 39

Kellogg, Idaho

R. D. LEISK,
GENERAL MANAGER

March 12, 1953

Mr. Simon H. Ulman
903 Caroline Street
Fredericksburg, Va.

Dear Mr. Ulman:

This will acknowledge your letter of March 9th with reference to a gold deposit near Fredericksburg. On account of the fixed price of gold, it has been the policy of our directors in recent years to avoid consideration of the more marginal types of gold deposits on account of the steady upward trend of labor, material and other costs.

Of course it is a matter of economics controlled largely by the grade of ore and size of deposit, but generally speaking the history of gold mining efforts in the Appalachians is not encouraging. However, we suggest that you send us any specific information that you may have on the deposit referred to in your letter.

Yours very truly,

R. D. Leisk
R. D. LEISK
General Manager

RDL/mm

Dear Sir

Trust this will be the information desired - Please be sure to return this to me - by Reg. mail when finished with same as it does not belong to me - Thanks so much. Yours very truly

Simon H. Ulman Box 420 or 903 Caroline St. Fredericksburg Va

3.24.53

ULMAN'S
LIFETIME JEWELRY
903 CAROLINE STREET FREDERICKSBURG, VA.

Mr R. D. Leisk.
- Kellogg - Idaho -
Gen. Manager. Sunshine Mining -

Dear Sir -

3-9-53

As a stockholder of Sunshine I am very much interested in our Company -

We have quite a large deposite of gold - near Fredericksburg - but same has been mined by a few small Companies - It has been my belief if a larger Company - such as yours would be interested - it would be very profitable -

I have no land or no personal reasons to write this only - for the advancement of "Sunshine" - Would be more than pleased to hear from you in regards to same -

Yours very truly
Simon H. Ulman

Letters "V"

File

Sunshine Mining Company

P. O. BOX 1080 PHONE 39

Kellogg, Idaho

R. D. LEISK,
General Manager

April 16, 1953

Mr. Simon H. Ulman
903 Caroline Street
Fredericksburg, Va.

Dear Mr. Ulman:

We are returning herewith the drill hole assay logs which you sent to us several weeks ago. If there is an engineering or geological report on the Vaucluse-Melville Mine available, it would be helpful in interpreting the results of the drilling. In the absence of this information, the drilling seems to indicate considerable very low grade mineralization in the range of a dollar or two per ton but very few intersections that would stand the cost of an underground mining operation.

We have made a copy of the drill hole assays and will hold it for reference in case we have further correspondence about this property.

Yours very truly,

R. D. Leisk

R. D. LEISK
General Manager

RDL/mm

Enclosure

Registered - Return Receipt Requested

Dear Sir -
Am sorry but have no other information in regards to the above mine -
Yours very truly
Simon H. Ulman

4-25-53

Ulman – file

April 30, 1938

V-M Corporation

Assay values of Diamond Drill Cores

Hole #	Box #	Distance of Core		Assay Values oz/ton	Dollars
1	1	7.6'	– 12.6'	.032	$ 1 12
1	1	12 5	17 0	008	28
1	1	17 0	22 0	028	98
1	1	22 0	26 5	034	1 19
1	1	26 5	32 0	.34	11 90
1	2	32 0	36 3	04	1 40
1	2	36 3	41 3	–	–
1	2	41 3	47 0	356	12 46
1	2	47 0	52 0	–	–
1	2	52 0	57 0	08	2 80
1	3	57 0	62 0	04	1 40
1	3	62 0	67 0	036	1 28
1	3	67 0	72 0	032	1 12
1	3	72 0	77 0	108	3 78
1	3	77 0	82 0	trace	
1	4	82 0	87 0	06	2 10
1	4	87 0	92 0	04	1 40
1	4	92 0	97 5	128	4 48
1	4	97 5	101 5	168	5 88
1	4	101 5	106 5	056	1 96

Assay Values of Diamond Drill Cores (cont.)

Hole #	Box #	Distance of Core		Assay Values oz/ton	Dollars
1	5	106.5'	111.0'	trace	
1	5	111.0	116.0	044	$1.64
1	5	116.0	121.0	032	1.12
1	5	121.0	127.0	064	2.24
1	5	127.0	134.0	040	1.40
1	6	134.0	139.0	02	0.70
1	6	139.0	144.0	032	1.12
1	6	144.0	149.0	trace	
1	6	149.0	154.0	trace	
1	6	154.0	159.0	056	1.88
1	7	159.0	162.0	819	28.66
1	7	162.0	169.0	124	sludge 4.34
1	7	169.0	176.0	04	1.40
1	7	176.0	181.0	036	1.26
1	7	181.0	185.5	04	1.40
2	1	18.0	19.0	492	17.12
2	1	27.0	29.0	148	5.18
2	2	33.5	37.0	108	3.78
2	2	45.5	48.7	162	5.76
2	2	50.5	59.0	07	2.45
2	2	70.0	72.0	04	1.40
2	2	72.0	75.0	044	1.64

Assay Values of Diamond Drill Cores (cont.)

Hole #	Box #	Distance of Core		Assay Values oz/ton	Assay Values Dollars
2	3	91.7'	92.7'	.050	$1.75
2	5	145.0	147.0	034	1.19
2	6	161.5	164.6	330	11 55
3	2	51.0	59 5	062	2 17
3	4	87 5	90.5	178	6 23
3	4	94 0	95 5	209	7 32
3	5	130 0	133 0	010	0 35
3	5	155 5	156 5	209	7 32
4	1	18 0	21 0	096	3 36
4	1	25 5	26 0	211	7 38
4	2	38 0	38 5	122	4 27
4	2	48 5	56 9	121	4 23
4	3	60 0	61 5	407	14 24
4	3	69 5	71 0	092	3 22
4	(?)	127 0	127 5	782	27 37

Assay Values of Diamond Drill Cores (cont.)

Hole #	Box #	Distance of Core		Assay Values oz/ton	Assay Values Dollars
4	7	166.5′	168.0′	.488	$17.08
4	8	194.0	196.9	.413	14.45
5	2	37.5	40.5	.04	1.40
5	2	55.5	56.5	.075	2.62
5	3	60.5	62.5	.098	3.43
5	3	71.2	71.8	.06	2.10
5	3	84.0	85.0	.608	21.28
5	4	111.2	112.4	.026	0.91
5	5	118.0	119.0	.082	2.86
5	5	138.0	141.3	.271	9.48
6	1	27.3	28.0	.281	9.83
6	2	30.0	33.0	.054	1.89
6	2	46.8	48.0	.173	6.05
6	3	59.0	64.5	.066	2.31
6	3	76.0	78.0	.433	15.15
6	4	92.5	94.0	.271	9.48
6	7	160.0	162.0	.272	9.52

Assay Values of Diamond Drill Cores (cont.)

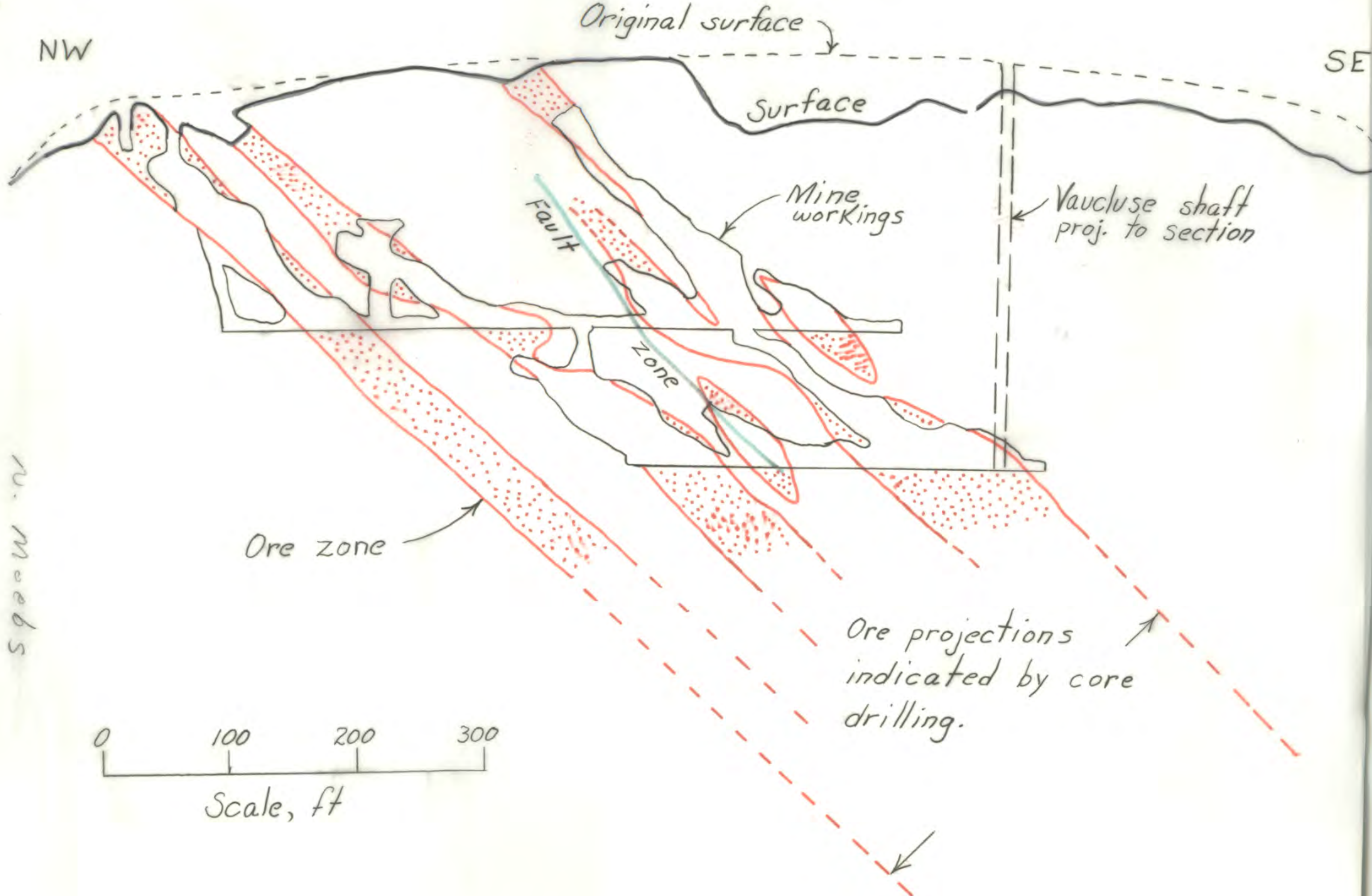
		Hole #	Box #	Distance of Core		Assay Values oz/ton	Assay Values Dollars
		7	2	31.7'	34.7'	.255	$ 8.92
		7	2	55.0	61.5	.142	4.97
		7	5	113.0	114.0	1.01	35.35

Assay Values of Diamond Drill Cores (cont'd.)

Hole #	Box #	Distance of Core		Assay oz/ton	Values Dollars
8	1+2	51.0'	57.8'	.147	$ 5.15
8	3	57.6	60.0	.013	0.46
8	3	63.6	64.8	.041	1.44
8	3	65.6	69.0	.280	9.80
8	3	69.0	72.0	.351	12.29
8	4	84.0	96.5	.373	13.06
8	4	104.7	109.0	.017	0.60
8	5	114.5	116.0	.017	0.60
8	5	119.5	120.8	.140	4.90
8	7	164.0	168.0	.06	2.10
8	9	209.0	211.0	.09	3.15
9	2	47.5	49.5	.079	2.77
9	2	51.5	54.0	.077	2.70
9	3	54.0	56.0	All Core lost, Mineralized Material	
9	3	56.0	60.0	.045	1.57
9	3	66.5	72.0	.120	4.20
9	3	72.6	73.6	.254	8.89
9	3	78.0	80.5	.024	0.74
9	5	105.5	111.3	.100	3.50
9	5	111.6	113.5	.11	3.85

Assay Values of Diamond Drill Cores (cont.)

Hole #	Box #	Distance of Core		Assay Values oz/ton	Dollars
9	5	114.8'	119.0'	.179	$ 6.26
9	5	123.5	125.2	.59	20.65
9	5	125.2	128.0	.02	.70
9	7	164.5	167.0	.014	.49
9	8	189.0	193.0	.016	.56
10	1	18.5	20.0	.04	1.40
10	1	20.9	23.6	.014	0.49
10	1	23.6	25.1	.014	0.49
10	3	80.0	83.0	.015	0.52
11	1	13.8	17.3	.026	0.81
11	1	25.3	31.0	.017	0.59



Schematic Profile of Vaucluse Gold Mine

Moebs

Volume XXXV January-February 1940 Number 1

Economic Geology

and the

Bulletin of the Society of Economic Geologists

CONTENTS

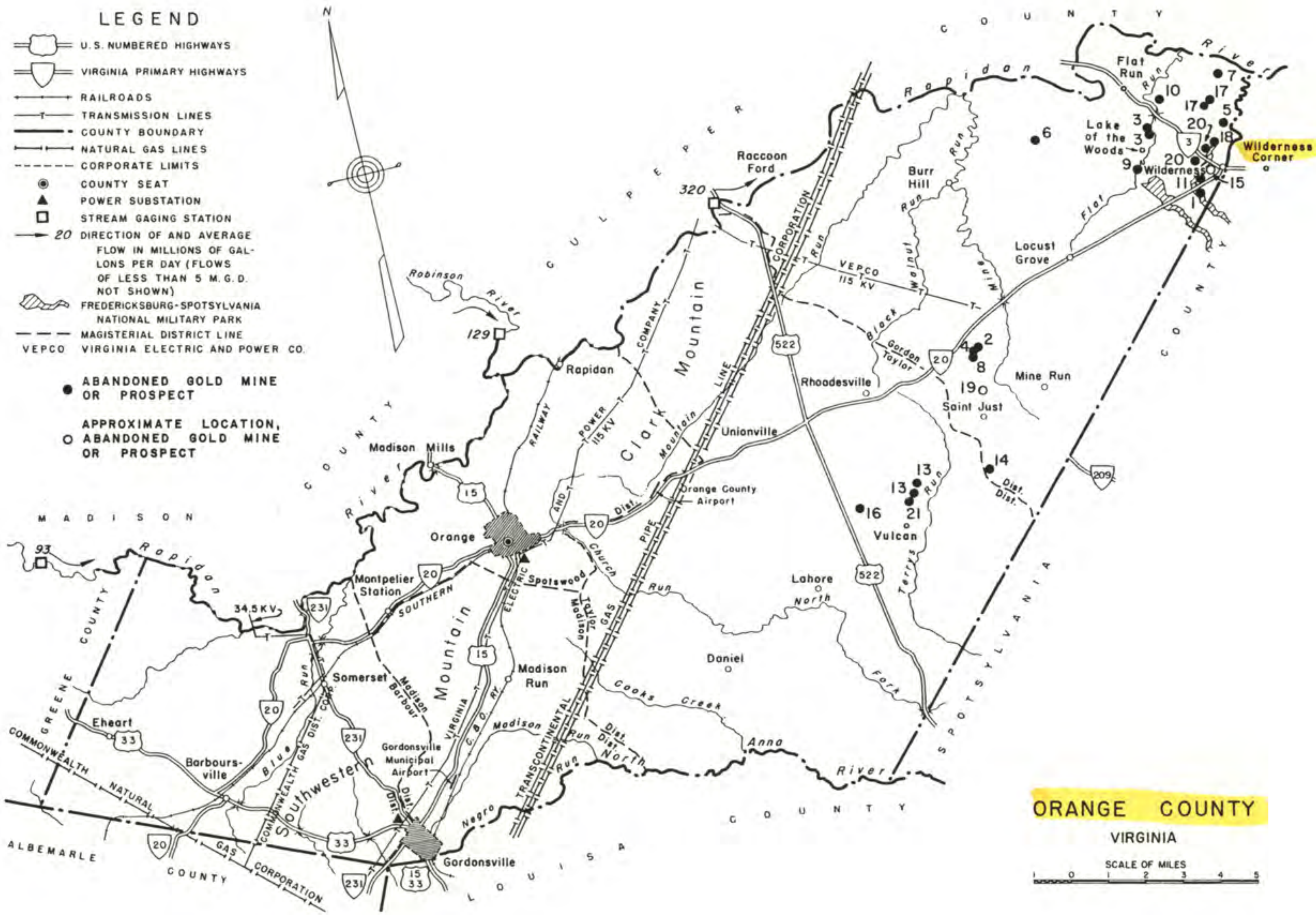
PUBLISHED SEMI-QUARTERLY

Five Dollars a Year, Seventy-five Cents a Copy

THE ECONOMIC GEOLOGY PUBLISHING COMPANY

Prince and Lemon Streets, Lancaster, Pa.

Entered as second-class matter, March 30, 1906, at the Post Office at Lancaster, Pa., under the Act of Congress of March 3, 1879


LEGEND
U. S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
NATURAL GAS LINES
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M. G. D. NOT SHOWN)
FREDERICKSBURG-SPOTSYLVANIA NATIONAL MILITARY PARK
MAGISTERIAL DISTRICT LINE
VEPCO VIRGINIA ELECTRIC AND POWER CO.
ABANDONED GOLD MINE OR PROSPECT
APPROXIMATE LOCATION, ABANDONED GOLD MINE OR PROSPECT
N
CULPEPER COUNTY
MADISON COUNTY
GREENE COUNTY
ALBEMARLE COUNTY
LOUISA COUNTY
SPOTSYLVANIA COUNTY
Rapidan River
Robinson River
Flat Run
Lake of the Woods
Wilderness
Wilderness Corner
Raccoon Ford
Burr Hill
Locust Grove
Mine Run
Saint Just
Rhoadesville
Unionville
Orange County Airport
Vulcan
Lahore
Daniel
Madison Mills
Orange
Rapidan
Montpelier Station
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Madison Run
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Barboursville
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Gordonsville
Clark Mountain
Southwestern Mountain
North Anna River
TRANSCONTINENTAL GAS PIPE LINE CORPORATION
COMMONWEALTH NATURAL GAS CORPORATION
VEPCO 115 KV
34.5 KV
ORANGE COUNTY
VIRGINIA
SCALE OF MILES
1 0 1 2 3 4 5

ORANGE COUNTY

AMBLER **(1)**
Quadrangle: Chancellorsville
Location: N 4,244,510 E 260,150 (Zone 18)
About 1.9 miles (3.1 km) southwest of Wilderness, 0.1 mile (0.2 km) off the south-southeast side of State Highway 20 approximately 0.95 mile (1.53 km) by road southwest of its intersection with State Highway 3.
Observations: Caved pit and trench; small dumps.
References: Luttrell, 1966, p. 8.

DICKEY **(2)**
Quadrangle: Mine Run
Location: N 4,240,540 E 249,650 (Zone 18)
About 2.05 miles (3.30 km) northwest of Mine Run, 0.05 mile (0.08 km) off the northeast side of State Road 692 approximately 0.55 mile (0.88 km) by road southeast of its intersection with State Highway 20.
Observations: Beaver pond; covered dumps.
References: Sweet, 1975, p. 2.
Watson, 1907, p. 557.

GORDON'S, H. **(3, two mines)**
Location: N 4,247,870 E 258,640 (Zone 18)
N 4,247,540 E 258,480 (Zone 18)
In Lake of the Woods subdivision, just east of the intersection of Liberty Blvd. with Wakefield Drive and just southwest of Harpers Ferry Drive about 0.1 mile (0.2 km) by road southeast of its intersection with Lakeview Parkway.
Observations: Caved pit and four trench cuts; quartz dumps.
References: Darter, 1957, p. 295.
Map, 1867.
Spotsylvania County Deed Book, AF, p. 44.

GRASTY **(4)**
Quadrangle: Mine Run
Location: N 4,240,470 E 249,470 (Zone 18)
About 2.05 miles (3.30 km) northwest of Mine Run, 0.075 mile (0.121 km) off the southwest side of State Road 692 approximately 0.55 mile (0.88 km) by road southeast of its intersection with State Highway 20.
Observations: Numerous caved shafts and pits; old roasting-stack; dumps (Figure 13).
References: Lonsdale, 1927, p. 80.
Sweet, 1975, p. 2.
Watson, 1907, p. 555-557.

GREENWOOD (Laird) **(5)**
Quadrangle: Chancellorsville
Location: N 4,247,180 E 261,930 (Zone 18)
About 1.65 miles (2.66 km) northwest of Wilderness along a tributary of Wilderness Run, about 0.85 mile (1.37 km) down a woods road off the east side of State Road 667 approximately 0.5 mile (0.8 km) by road northeast of its intersection with State Highway 3.
Observations: Four large pits; two hillside cuts; remains of plant equipment; scattered quartz.
References: Pardee and Park, 1948, p. 60.


Figure 13. Mining area in 1957 of the Lucky Hundred Mineral and Mining Corporation at the old Grasty tract mine, Orange County

JONES **(6)**
Quadrangle: Mine Run
Location: N 4,248,500 E 254,140 (Zone 18)
About 2.65 miles (4.26 km) southwest of Flat Run, at the end of State Road 685 extended, 0.65 mile (1.05 km) east of its intersection with State Road 603.
Observations: Two caved depressions possibly represent an old pit and shaft.
References: Lonsdale, 1927, p. 80-81.

MELVILLE (Rapidan) **(7)**
Quadrangle: Chancellorsville
Location: N 4,249,140 E 261,930 (Zone 18)
About 2.8 miles (4.5 km) northwest of Wilderness, 300 feet (91.44 m) off the west side of State Road 667, extended; approximately 2.25 miles (3.62 km) by road north of its intersection with State Highway 3.
Observations: Caved shaft; numerous caved pits; concrete foundations; brick roasting-stack (Figure 14).
References: Lonsdale, 1927, p. 82.
Pardee and Park, 1948, p. 57-59.
Park, 1936, p. 21-26.
Sweet, 1971, p. 29-30.
Sweet, 1975, p. 3.

Figure 14. Surface plant during 1934 at the Melville mine, Orange County. (Photograph by C. H. Vivian, 1934, p. 4326)

OLD TINDER (8)
Quadrangle: Mine Run
Location: N 4.240.350 E 249,370 (Zone 18)
About 2.05 miles (3.30 km) northwest of Mine Run, 0.15 mile (0.24 km) off the southwest side of State Road 692 approximately 0.55 mile (0.88 km) by road southeast of its intersection with State Highway 20.
Observations: Three caved shafts; caved pit; covered dumps.
References: Sweet, 1975, p. 3.

ORANGE GROVE (9)
Quadrangle: Mine Run
Location: N 4.246.420 E 258,070 (Zone 18)
About 3.1 miles (5.0 km) northeast of Locust Grove, near the present location of a boat ramp on the lake at Lake of the Woods.
Observations: —
References: L. T. Jones, 1974, personal communication.
Lonsdale, 1927, p. 83.
Map, 1830-1840's.

PARTRIDGE (10)
Quadrangle: Chancellorsville
Location: N 4,248,830 E 259,860 (Zone 18)
About 3.2 miles (5.2 km) northwest of Wilderness, on both sides of the Rapidan-Stratford Park road approximately 0.5 mile (0.8 km) by road north-northeast of its intersection with State Highway 3.
Observations: Caved shaft; and three caved pits; dumps.
References: Dunlop, 1924, p. 13.
Lonsdale, 1927, p. 83.
Sweet, 1975, p. 3.

PROSPECT A (11)
Quadrangle: Chancellorsville
Location: N 4,244,790 E 260,390 (Zone 18)
About 1.7 miles (2.7 km) west of Wilderness, on the north side of State Highway 20 approximately 0.75 mile (1.21 km) by road southwest of its intersection with State Highway 3.
Observations: Five caved pits; covered dumps.
References: Sweet, 1975, p. 2.

RANDOLPH (12, not plotted)
Quadrangle: —
Location: insufficient
Observations: —
References: Lonsdale, 1927, p. 83.
Pardee and Park, 1948, p. 54.

SAUNDERS (13, two mines)
Quadrangle: Lahore
Location: N 4,235,290 E 245,470 (Zone 18)
N 4,234,960 E 245,200 (Zone 18)
About 1.4 miles (2.2 km) northeast of Vulcan, 0.15 mile (0.24 km) off the southwest side of State Road 619 approximately 0.8 mile (1.3 km) by road southeast of its intersection with State Road 624.
Observations: Caved shaft (?); five caved pits and trenches; dumps.
References: Pardee and Park, 1948, p. 54.

SELDON (14)
Quadrangle: Lahore
Location: N 4,235,330 E 248,270 (Zone 18)
About 2.85 miles (4.59 km) northeast of Vulcan, 0.1 mile (0.2 km) off the east side of State Road 692 approximately 0.65 mile (1.05 km) by road south of its intersection with State Road 619.
Observations: Caved pit; scattered dump material.
References: Pardee and Park, 1948, p. 54.

SOMERVILLE (15)
Quadrangle: Chancellorsville
Location: Just west of Wilderness.
Observations: —
References: Map, 1830-1840's.

STUART (16)
Quadrangle: Lahore
Location: N 4,234,870 E 242,930 (Zone 18)
About 1.15 miles (1.85 km) northwest of Vulcan, just east of Riga Run, about 0.65 mile (1.05 km) east of U. S. Highway 522, approximately 1.0 mile (1.6 km) by road south of its intersection with State Road 650.
Observations: Caved shaft; caved pit; several small cuts and trenches; dumps.
References: Cline, Watson and Wright, 1921 (map).

VAUCLUSE (Grimes, Grymes) (17, two mines plotted)
Quadrangle: Chancellorsville
Location: N 4,248,390 E 261,560 (Zone 18)
N 4,248,220 E 261,430 (Zone 18)
N 4,248,110 E 261,390 (Zone 18)
About 2.4 miles (3.8 km) northwest of Wilderness Corner, about 0.15 mile (0.24 km) along a woods road off the west side of State Road 667 extended, approximately 1.7 miles (2.7 km) by State Road 667 north-northeast of its intersection with State Highway 3.
Observations: Two large open pits; numerous small caved pits; concrete foundations; covered dumps.
References: Bass, 1940, p. 79-91.
Lonsdale, 1927, p. 81-82.
Pardee and Park, 1948, p. 59-60.
Park, 1936, p. 26-28.
Sweet, 1971, p. 26.

WILDERNESS (18)
Quadrangle: Chancellorsville
Location: N 4,246,430 E 261,240 (Zone 18)
About 0.75 mile (1.21 km) north-northwest of Wilderness, on the east side of State Road 667, approximately 0.4 mile (0.6 km) by road northeast of its intersection with State Highway 3.
Observations: Two open shafts (Figure 15); several caved pits; concrete foundations (Figure 16); dumps.
References: Lonsdale, 1927, p. 82-83.
Sweet, 1971, p. 30.
Sweet, 1975, p. 3.

Figure 15. Water-filled, open shaft at the old Wilderness mine, Orange County

Figure 16. Concrete foundations at the old Wilderness mine, Orange County

WOODMAN (19)
Quadrangle: Mine Run
Location: Lower Orange County.
Observations. —
References: *Culpeper Exponent* newspaper, April 6, 1900.

WOODVILLE (Coulter's, Coalter's) (20, two mines)
Quadrangle: Chancellorsville
Location: N 4,246,140 E 260,980 (Zone 18)
N 4,245,820 E 260,630 (Zone 18)
About 0.6 mile (1.0 km) northwest of Wilderness, on both the northeast and southwest sides of State Highway 3.
Observations: Caved shaft; about twelve caved pits and trench cuts; covered dumps.
References. Darter, 1957, p. 295.
L. T. Jones, 1975, personal communication.
Map, 1830-1840's.
Map, 1867.
R. A. Hodge, 1975, personal communication.
Taylor and Hayes, 1950, 15 p.

YOUNG (21)
Quadrangle: Lahore
Location: N 4,234,670 E 245,020 (Zone 18)
About 0.95 mile (1.53 km) northeast of Vulcan, 0.45 (0.72 km) off the southeast side of State Road 624 approximately 0.75 mile (1.21 km) by road south of its intersection with State Road 619.
Observations: Caved pit; dumps.
References: Luttrell, 1966, p. 145.
Pardee and Park, 1948, p. 54.

VIRGINIA DIVISION OF MINERAL RESOURCES PUBLICATION 19

GOLD IN VIRGINIA

Palmer C. Sweet

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF MINERAL RESOURCES

Robert C. Milici, Commissioner of Mineral Resources and State Geologist

CHARLOTTESVILLE, VIRGINIA
1980

The quartz in the Moss vein is platy, vitreous, and iron-stained. It contains abundant sericite, some pyrite, marcasite, galena, and sphalerite, and a little free gold. Pyromorphite and vanadinite were found in quartz from the near-surface workings, and tetradymite has been reported.

This property is said by the operators and by previous observers to have yielded some exceptionally high assay values, but no sampling was done during the 1935 survey. Late in 1935, after the writers' visit, additional capital was obtained and exploration work was resumed under the supervision of W. T. Millar. As the property has not been revisited since, the results of this work are not fully known, but according to Mr. Millar a small mill was constructed and some ore mined. The mine was shut down in 1936.

OTHER PROPERTIES

The old Collins placer is in the valley of Collins Branch, about 4 miles south of Tabscott, Goochland County. The property is controlled by the Powhatan Mining Co. and is in charge of Lewis L. Stow. It was visited in October 1934, and again in June 1935. A considerable area of bottomland along the branch had been cleared of timber and brush. A portable machine for recovering placer gold and a steam dragline were operating. The gravels are said to carry about 0.011 ounce of gold to the cubic yard. Plate 19, *A*, is a view of the dragline and gold-saving machine, which is designed to use a minimum of water. Judging from the results of several pannings of the heads and tails, the machine was making a clean separation.

The Tellurium mine, 2½ miles southwest of Tabscott, on the county line between Goochland and Fluvanna counties, was reopened late in 1935 by W. S. MacDonald. At the time the property was visited the work had just been started and nothing could be seen except the old mine dumps and a few caved pits and shafts. Taber visited the property in 1910, and at that time some of the workings were accessible.[34] The property is said to have been worked almost continuously, and profitably, from its discovery in 1832 until 1857, when the mill was burned. Since the War between the States, many attempts have been made to reopen the mine, but none has been successful. Three veins have been worked—the "Little," the "Middle," and the "Big Sandstone." The "Big Sandstone" vein is described by Taber as a ledge of quartzite about 3 feet in average width, cut by small gold-bearing stringers.

The Waller workings, near Tabscott, had recently been cleaned out in 1935, and a new shaft had been sunk to a depth of about 300 feet. A crosscut was driven from the bottom of the shaft to intersect the vein, and a total of about 300 feet of work was done on this level. When visited the workings were flooded, but the vein is said to have been thin and barren where it was cut. Work was discontinued because of lack of capital to pursue the development. The Waller property has been described by Taber.[35]

The gold deposits of the James River Basin have been described in detail by Taber.[36] The district was idle when visited, and no information to supplement Taber's individual mine descriptions was obtained.

HALIFAX COUNTY

VIRGILINA

The Virgilina district[37] has been almost inactive since 1918. It was primarily a copper district, but all the ores contained more or less gold, and a few prospects were explored mainly for gold. All the larger mines and prospects in the district and most of the smaller ones are described in Laney's report. No additional information was obtained during a brief visit to the district in 1934.

ORANGE COUNTY

MELVILLE

The Melville mine is about 18 miles west of Fredericksburg and about 3 miles northwest of the Wilderness Store, on the Fredericksburg-Culpeper highway. The Melville tract of 844 acres is leased by the V–M Corporation. C. E. Bass was in charge of the property at the time of visit. Underground work was discontinued in November 1935, but the mine was kept unwatered for some time thereafter.

The Melville workings are on a well-defined shear zone, which has been prospected from the Rapidan River on the north to a point more than 1,000 feet south of the area shown on plate 20. The Culpeper property, north of the Rapidan River, may be on the northern continuation of this zone.

The property is developed by two shafts 125 and 240 feet deep. A level at a depth of 110 feet connects the two shafts, and a 200-foot level has been driven from the deeper shaft. The total length of the drifts accessible in 1935 was about 1,800 feet. Old workings on and above the 110-foot level had been driven from the 125-foot shaft, but they were mostly caved and inaccessible.

A small modern flotation mill, equipped to handle a maximum of about 75 tons of ore a day, is reported to have recovered slightly more than 90 percent of the gold. The mill and the rest of the surface plant have

[34] Taber, Stephen, op. cit., pp. 18–19, 152–172.

[35] Taber, Stephen, idem, pp. 148–151.

[36] Taber, Stephen, Geology of the gold belt in the James River Basin, Va.: Virginia Geol. Survey Bull. 7, 1913.

[37] Laney, F. B., The geology and ore deposits of the Virgilina district of Virginia and North Carolina: North Carolina Geol. Survey Bull. 26, 1917; Virginia Geol. Survey Bull. 14, 1917.

been described by Anderson [38] and McGill.[39] McGill gives a partial analysis of the concentrates, which is reproduced below:

Silica ....percent..	28.70
Alumina ....do....	7.57
Iron ....do....	25.65
Calcium oxide ....do....	.21
Sulphur ....do....	25.59
Arsenic ....do....	.07
Antimony	Trace
Zinc ....percent..	.37
Copper ....do....	.32
Lead	Trace
Silver ....ounces per ton..	.07
Gold ....do....	3 to 5

Concentrates were shipped to the American Metal Co.'s smelter at Carteret, N. J., from June 7 to December 31, 1934. These shipments contained a total of about 529 ounces of gold, valued at $18,489.

The water level before the mine was reopened is said to have been about 30 feet below the collar of the 125-foot shaft. In 1935 the mine made about 90 gallons of water a minute, which was utilized in the mill and in drilling. According to the mill operator,[40] the mine water was consistently alkaline.

Very little information was gathered by mapping the numerous old shafts and pits on the surface. The distribution of the old workings shows the location of the main shear zone, and a very general idea of the extent of the underground developments may be obtained from the size of the dumps. As the early miners in the region located and worked all the known ore shoots that cropped out, the size and extent of the old surface workings may be considered fair indicators of what is to be expected in the sulfide zone. The few exposures of saprolitic schist in the pits and the character of the fragments of quartz and country rock on some of the dumps suggest that the nature of the shear zone and mineralization is in general the same throughout the property.

The rocks above the 110-foot level are almost completely decomposed, although it is generally possible to distinguish between the sericitized schist in the shear zone and the chloritized schist of the country rock. Downward from the 110-foot level the degree of decomposition of the rock in the shear zone gradually decreases. On the 220-foot level, except along fractures, the country rock is hard and appears fresh. In the stopes and raises about 50 feet above the 220-foot level, the rocks are slightly softer than below and show iron-oxide stains and solution cavities, but they are much fresher there than on the 110-foot level.

The mineralized zone is about 60 feet wide in the mine. It strikes about N. 30° E. and is nearly vertical. As the shear zone is approached sericite becomes increasingly abundant; it generally occurs in layers that fade laterally into the chloritized schist. Thin silicified streaks are usually present in the sericitic layers, and the positions of the hanging wall and footwall in a given place must often be decided somewhat arbitrarily. Grooving that strikes within 5° of the strike of the schistosity, usually diverging from it northwestward, and that pitches 25° to 35° NE. is conspicuous at many places in the mineralized zone. Much well-crystallized pyrite, which is not gold-bearing, is disseminated through the chlorite schist.

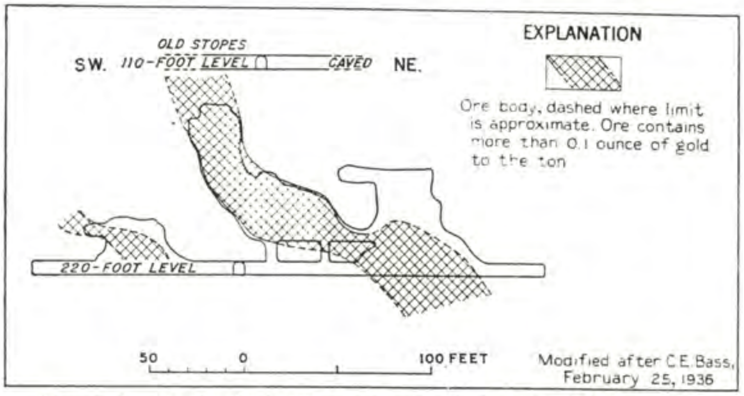


FIGURE 9.—Longitudinal section of part of the lode. Melville mine, Orange County, Va.

Most of the ore is confined to two streaks, both of which have been explored underground (see pl. 20), one near the footwall and one near the hanging wall of the shear zone. Between the two streaks is partly silicified and sericitized chloritic schist.

The best ore developed is in the eastern, or hanging-wall streak. Two shoots, each about 10 to 15 feet thick and 25 to 40 feet in strike length, were mined on the 220-foot level where the ore streak widened. They were formed where the lode was crossed by zones of northwestward striking faults. The shoots are nearly vertical, strike in general parallel to the schistosity of the country rock, and pitch about 35° NE., parallel to the grooving (see fig. 9). Ore of as high grade as that in

[38] Anderson, C. S., Mining lode gold in Piedmont Virginia: Eng. and Min. Jour., vol. 135, p. 404, Sept. 1934.

[39] McGill, W. M., Gold-mining operations in northern Virginia: Min. Cong. Jour., pp. 15–16, October 1934.

[40] Anderson, C. S., Personal communication, November 1934.

the shoots is said to occur in many other parts of the lode, but such ore cannot be mined profitably where it is narrow; but the enlargement at the intersection of the two fracture systems gives the lode sufficient width to make it minable. Figure 62 is a longitudinal section through part of the lode, showing the ore bodies.

In each of the stopes there are small faults of less than 6 feet displacement (fig. 7). They appear to be arranged in steplike groups that pitch about 35° NE., parallel to grooving in the shear zone. Individual faults die out within short distances and cannot be projected from level to level. They strike about N. 60° to 90° W. and are nearly vertical. Many fractures are sealed with quartz and ore, others brecciate the ore, and still others are entirely postore and cut across the mineralized zone with no widening of the ore streak. In the fractures seen the north wall has moved to the east relative to the south wall. Very little postmineral movement has taken place along the mineralized shear zone striking N. 30° E., although a few grains of grooved and polished pyrite were seen.

The gangue of the ore consists mainly of quartz and sericite but includes some ankerite. Coarse-grained pyrite is common and contains nearly all the gold. Small spots of chalcopyrite are present, and sphalerite is reported by the operators. A little pyrrhotite was seen in a polished section. Thin sections of the quartz from the northeast stope on the 220-foot level show a typical mortar texture, broken fragments of quartz lying in a fine-grained recrystallized aggregate. An 8-foot channel sample taken on the 220-foot level across the south face of the southwest stope was assayed in the Geological Survey laboratory by E. T. Erickson; the assay gave 0.16 ounce of gold to the ton and no silver. Most of the ore was probably formed by replacement of the schist, although some of the quartz lenses and veinlets may not be of replacement origin.

As the faults and fractures afford ready access for downward-moving solutions, they would seem favorable for supergene enrichment of gold. The assays that were given under the heading "Oxidation and enrichment" (p. 47), however, indicate that little such enrichment has taken place in the deeper ores.

The Melville mine was worked in 1934 and 1935 in conjunction with the nearby Vaucluse. The property was abandoned in 1938.

VAUCLUSE

The Vaucluse tract of 200 acres is owned by the V–M Corporation of Fredericksburg, Va. In 1935 the property was developed in conjunction with the work at the Melville mine, under the direction of Charles E. Bass, but it was closed and sold at auction in December 1938. Mr. Bass has described the later work.[41] The workings are on the southern continuation of the Melville shear zone (see pl. 20).

The Vaucluse tract was first worked in 1832, and decomposed surface material was mined for several years before the lode was discovered. In 1844 the property was acquired by an English company, which worked the lodes through two open-cuts, each about 60 feet deep, 75 feet wide, and 120 feet long.[42] By 1854 this company had sunk half a dozen shafts and had carried out extensive underground development. It also installed one of the most complete surface plants then existing in America, and is said to have extracted 556.3 ounces of gold, having a fineness of 0.943½, during 80 days of running in 1853. In December 1853 the mill was crushing 50 tons a day, and the average tenor of the ore was estimated to be 0.4 ounce a ton. The mine discontinued operations during the War between the States, and little has been done there since. In 1933–34 the old machinery was moved by Henry Ford to his museum at Dearborn, Mich.

The surface workings at the Vaucluse mine are the most extensive that were seen at any gold mine in Piedmont Virginia. The large pits shown on the map (pl. 20) continue about 1,000 feet southwest from the edge of the mapped area. There is a shaft with the shaft house still standing in 1935, near the south end of the workings. Most of the cuts were then full of water, and those that had been pumped dry were so full of silt and debris that little information was obtained from them. Plate 19, *B*, is a photograph of one of the Vaucluse cuts near the south end of the area shown on plate 20. The fluting on the walls is especially noticeable, and the ore shoots pitch parallel to this fluting.

The main working shaft, called the Vaucluse shaft, is nearly 100 feet west of the mineralized zone. In 1935 the shaft was cleaned out and deepened to about 220 feet and two new levels were driven, one at a depth of 110 feet and the other at 201 feet. There is also an old level at a depth of 50 feet.

The 110-foot level (pl. 20) contains about 275 feet of workings. The country rock is similar to that in the Melville mine but is somewhat more massive. Quartz, biotite, and chlorite are the most common constituents. A little sericite is usually present, and at some places in the mineralized zone it is the most abundant mineral. Layers of schistose quartzite alternate with layers of rock rich in chlorite and sericite. These layers strike N. 25° to 40° E.; near the shaft they seem to dip steeply eastward, but about 25 feet to the east they dip westward, and throughout the remainder of the level their dip is about 80° to 85° W.

[41] Bass, C. E., The Vaucluse gold mine, Orange County, Va.: Econ. Geology, vol. 35, pp. 79–91, 1940.

[42] Private report of O. Matthews and a committee to the Board of Directors of the Vaucluse mine, 1847, on file in the U. S. Geological Survey library. Gold mining in Virginia: Am. Jour. Sci., 2d ser., vol. 7, pp. 295–299, 1849. Whitney, J. D., Metallic wealth of the United States described and compared with other countries, p. 126, London, Lippincott Grambo & Co., 1854.

The rocks in the Vaucluse mine, possibly because of their more massive character, appear fresher than those at a similar depth in the Melville mine. Thin seams of marcasite are common, and cavities and iron-oxide stains occur along solution channels.

The mineralized zone is not tight as at the Melville mine, but consists of numerous small composite lenses of quartz, carbonate, and pyrite, separated by thin curving sheets of sericite. The management reported that where the 110-foot level cuts the west border of the main shear zone a width of 22 feet averaged 0.16 ounce of gold to the ton. The ore zone exposed is comparatively open, and descending waters circulate freely. Some of the pyrite is smoothed and polished, indicating that appreciable postore movement has occurred along the lode.

The old working level, which is intersected at a depth of 50 feet by the Vaucluse shaft, was visited the day after it was pumped out. The rock was thoroughly decomposed, and little could be observed in the mud-stained walls other than the dip and strike of the schistosity and the location of ore-bearing bands as indicated by the old timbered and caved drifts (pl. 20).

Exploration on and above the 110-foot level was abandoned in 1935, because of the difficulty of penetrating the loosened ground adjacent to old workings.

The lower level (pl. 20), driven at a depth of 201 feet, is about 90 feet below any of the known old workings. On January 1, 1936, it was being actively developed and about 780 feet of drifting had been done. As on the upper level, the country rock is chlorite and biotite schist containing layers of schistose quartzite. Sericite is generally present in small quantity, and in the mineralized zone the rock has been changed almost completely to sericite schist. At this depth the country rock is hard and apparently unaffected by weathering. Small pyrite crystals are widely distributed but contain little or no gold. Marcasite is common along seams and planes of schistosity.

Where the mineralized zone is cut by the crosscut from the shaft, most of the quartz is concentrated in two streaks separated by 15 to 20 feet of sericite schist. Both streaks persist to the northeast as far as they have been followed, but to the southwest the western streak dies out and another quartz layer comes in east of it. The mineralized zone may thus include a series of irregularly distributed lenticular quartz masses, but sufficient work has not yet been done to prove that such is the case. The quartz is white and somewhat milky; it is liberally speckled with pyrite, both as irregular masses and as crystals, which are usually larger than the crystals in the wall rock. Here, as at the Melville mine, white ankerite is abundant, especially between the quartz bodies and the sericite schist.

Throughout this level, as in the upper workings, the quartz and pyrite are shattered and rolled. Some of the quartz is in smooth round nodules, and some of the pyrite grains are smoothed and polished. Mr. Bass reports having found a little very fine grained blackish pyrite, similar to some obtained along fractures at the Melville mine. The pyrite usually contains considerable gold and here, as at the Melville, it appears to be supergene. Grooving is well developed and pitches about 30° NE. The long axes of the ore shoots appear to be parallel to the direction of the grooving, but more information is needed before this can be determined with certainty.

LAIRD

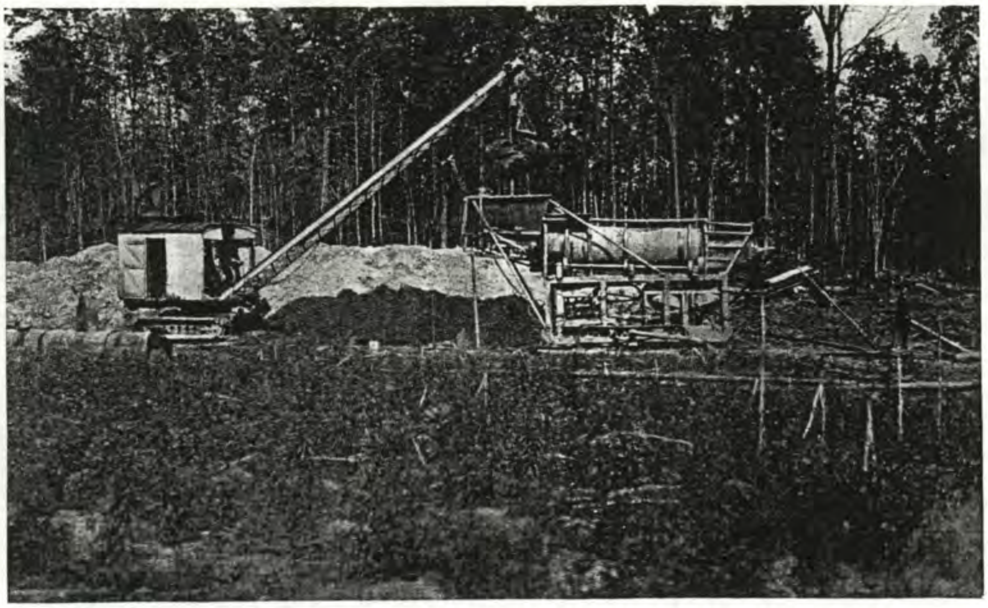
The Laird property, southeast of the Vaucluse mine and about half a mile north of the Wilderness Store, was developed during 1934 and 1935 by the Melba Mining Co. A shaft was sunk in the country rock to a depth of 317 feet. Two crosscuts, driven at a depth of 300 feet across the schistosity for about 200 feet eastward and westward from the shaft, exposed a few small mineralized veinlets and lenses of quartz. Fig. 4, shows the typical character of the quartz bodies. The shaft entered hard rock at a depth of about 110 feet; above this level the shaft was lined with concrete. The country rock is a quartz-biotite schist similar to that at the Vaucluse mine. The results of the development work were discouraging; several small quartz lenses containing specks of galena and chalcopyrite with a little gold were found, but no well-defined mineralized zone. The property was abandoned early in September 1935.

PRINCE WILLIAM COUNTY

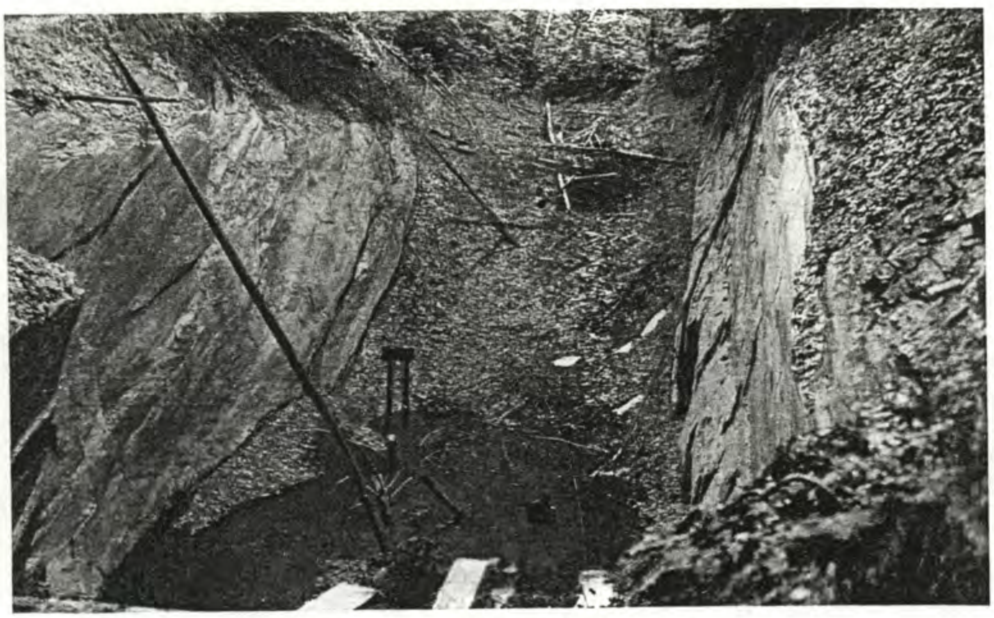
CRAWFORD

Shortly before 1935, Mr. William P. Crawford had found gold on Neabsco Creek and on a tributary known as Jack Patterson's Run, about 4 miles north of Dumfries and about 1¼ miles west of the main Richmond-Washington highway. So far as known, gold had not previously been reported from this locality.

The material being worked in June 1935 was stream gravel, containing gold in slightly rounded to angular particles that probably had not been transported far. Quartz stringers and lenses could be seen along the banks of the stream above the workings. The quartz is reported to contain some gold in places, and is probably the source of the gold in the gravel. A rock that appeared to be diorite formed the bed of the stream where the gravels were being washed, but the country rock that contains the quartz stringers is a series of schists and slates. The stream bed was covered with a layer of soil and gravel 3 to 4 feet thick. The average value of the gravel was not known, but such work as had been done was reported to indicate about 75 cents (0.021 ounce) a cubic yard for part of the material. The gravel is loose and clean and is so easily handled that a washer is not necessary. A small amalgam plate,



A. DRAGLINE AND GOLD-SAVING MACHINE, COLLINS PLACER, GOOCHLAND COUNTY, VA.



B. VAUCLUSE MINE, ORANGE COUNTY, VA.

Open cut near south end of area shown on plate 20. Looking southwest. Note prominent fluting in walls.

defined, and (2) indefinite bodies in which the quartz fades gradually into the country rock. The character of the quartz in the mineralized zones varies considerably: At the Haile mine, in South Carolina, the quartz is dense, fine grained, and light gray; at the Vaucluse mine, in Virginia, it is milky white and somewhat glassy; at the Battle Branch mine, in Georgia, it is coarse, granular, and of a watery light-gray color; and at the Howie mine, in North Carolina, it is dense, fine-grained, and dark bluish-gray. In quartz of all these kinds irregular remnants and shadows of country rock are common and many structures inherited from the country rock can be seen; such features are shown by ore from the Howie mine (pl. 9, *A*).

Stringers of white, vitreous, barren quartz, similar to that described above under "Barren quartz veins" are widely distributed in the mineralized zones.

WELL-DEFINED IRREGULAR BODIES

The well-defined irregular bodies consist of many unconnected lenses, stringers, and irregular masses of quartz erratically distributed along shear zones. Lenses in steplike arrangement but apparently with no regular direction of offset are common. Many of the larger quartz masses pass on all sides, within a few feet, into a few small silicified bands and stringers. In some deposits the abruptness of this change is striking. Bastin [88] cites an example at the Gold Log mine, in Alabama. There at the bottom of a 320-foot incline, was an exposure 5 feet wide of material that was about two-thirds quartz, but only 6 feet away along the strike nearly all the quartz had pinched out and the face consisted almost entirely of sericite schist. Many other similar examples might be given. Figure 4 shows three notebook sketches of the lode at the Laird prospect in Virginia,[89] and similar excellent illustrations of discontinuous lenses at the Young American mine, also in Virginia, are given by Taber.[90]

Where the wall rocks are schistose as is usually the case, the quartz tends to follow the strike of the schist in general, but here and there it crosscuts the foliation planes (see pl. 10). Near the quartz the schist is generally sericitized, and in some places it is also silicified. The sericite schist grades laterally into chloritic schist, and that in turn grades into typical country rock. As in the other lode deposits, schist partings and irregular remnants and shadows of schist are common in the quartz, and fragments of partly altered country rock are found in the sericitized and silicified schist. As stated on p. 47, the constituents of the rocks adjoining some of the lodes, particularly in north Georgia and Alabama, become coarser near the lodes, so that sharp boundaries between country rock and lode material cannot be drawn. In some of the deposits, particularly in northern Georgia—for example at the Lockhart mine—the ores are rudely banded (see pl. 9, *B*).

"Stringer leads" (or "lodes") is a term introduced by Becker [91] to apply to a system of "many associated small fissures, each bearing lenticular quartz masses." In the stringer leads the elongate lenses are in general parallel to the trend of the enclosing schist, although individual stringers can usually be found that break across the foliation. In many deposits, such as those at the White County and Cherokee mines, in Georgia, the alternating stringers of quartz and sericite schist are so closely spaced as to give the exposures a ribbonlike appearance (pl. 9, *C*). Generally the wall rock is sericitized and grades, away from the lode, into chloritic schist, and the sericite schist within the lodes is usually silicified. In some places the stringer leads coalesce and form large workable bodies; the Findley Ridge deposits of northern Georgia belong in this category. In many places, however, the stringers remain separate or become discontinuous and the quartz bodies are erratic in shape and distribution. Deposits such as that in the Shuford mine, in Catawba County, N. C., in which irregular veinlets of gold-bearing quartz are described as cutting the schist in all directions, may be classifiable as stringer leads.

INDEFINITE BODIES

The indefinitely bounded bodies consist of silicified and otherwise intensely altered rock that grades into less altered rock, the limits of the ore being commonly determined by assay. Although they appear to have been formed along sheared zones, these deposits are generally in massive brittle rock, or in schistose rock made brittle by premineral silicification. The largest known deposits of this type, at the Haile and Brewer mines in South Carolina, are both in tuffs that are but slightly foliated.

Deposits of this class are exceedingly fine grained, and their chief constituents are quartz and sericite. The texture of the lode rock might be described as flinty. The pyrite and other sulfides may be perhaps a little coarser grained than the quartz, though few individual grains are larger than a pinhead. Crystals of enargite as much as an inch or so in length were noted at the Brewer mine, and a few crystal-lined vugs were seen at the Haile mine. Textures and structures of the original rock are abundantly preserved in the lodes and, as in other types of deposits, remnants of partly replaced country rock are found.

[88] Bastin, E. S., The Gold Log mine, Talladega County, Ala.: U. S. Geol. Survey Bull. 640, p. 161, 1916.

[89] Sketches by mine engineer A. L. Fentress, unpublished data.

[90] Taber, Stephen, op. cit. Figures 6, 7, 8, 9, and 11 are especially noteworthy.

[91] Becker, G. F., A reconnaissance of the gold fields of the Southern Appalachians: U. S. Geol. Survey 16th Ann. Rept., pt. 3, pp. 282–283, 1895.

in areas in which no granitic rocks have been found; these deposits, so far as field evidence shows, are merely associated with zones of regional shearing. Many granitic areas, moreover, do not contain lodes. The ores and the granitic intrusives may however have come from the same sources.

Gradation of the lodes into pegmatite dikes was observed by Taber[83] in the James River Basin, and Laney[84] states that in the Gold Hill district of North Carolina, "the barren portions of a few veins strongly resemble pegmatites, consisting for the most part of quartz and pink feldspar." Jones[85] says "at certain localities auriferous veins are closely associated with, and in some cases appear to grade into, pegmatite dikes." At the Franklin mine and Brown prospect, in Alabama, some of the quartz stringers grade into veinlets that resemble pegmatite dikes, for, in addition to quartz, they contain coarse biotite and muscovite, and white clay that may have been formed by the weathering of feldspars. The lodes that grade into or resemble pegmatite dikes are not numerous, however, and represent the exception rather than the rule.. They were probably formed at somewhat higher temperatures and pressures than most of the deposits.

At the White County mine, in Georgia, a pegmatitic facies of the granite locally seems to grade into larger, finer-grained masses, which in some places are cut by mineralized quartz stringers; but elsewhere in this vicinity, as previously noted by Nitze and Wilkins,[86] the pegmatitic dikes cut the mineralized bands (fig. 40). This locality is the only one seen by the writers of this report in which mineralized quartz bodies are definitely cut by granitic intrusives.

VEINS

Veins are most numerous in granite or granitic gneiss (pl. 6, *B*), where they outnumber the mineralized zones. The veins in these rocks include those that trend northwest and some of those that trend northeast. They range from mere stringers to bodies 2,000 feet or more in length and as much as 20 feet in greatest thickness, but long, continuous, well-defined veins are generally rare except in certain areas of granite, such as those in Mecklenburg County, N. C. In texture the veins are generally so coarse that their minerals can be identified without microscopic aid, and garnet, pyrite, and carbonate grains an inch or more across are not uncommon.

Many of the veins show evidence of postmineral movement, although in some the movement was negligible. At the Franklin mine, in Virginia, much of the vein material is loose and porous; locally there are nodules of quartz that appear to have been rolled and partly recrystallized, some pyrite crystals are smoothed and polished, and some of the quartz has a "mortar structure," moderate-sized fragments of quartz being embedded in a groundmass of fine-grained recrystallized quartz.

Thin curved lenses, sheets, partings, and irregular inclusions of sericite schist are common in many of the veins. They are generally oriented nearly parallel to the planes of schistosity in the wall rock, and in many places they fade into the quartz (figs. 2, 3, and pl. 8, *A*).

Crustified vein material from the Moore mine, Union County, N. C., was illustrated by Nitze and Hanna,[87] but during the recent investigation textures or structures that indicate open-fissure filling were rarely seen.

Many lodes are classified as veins even though they split and in places form disconnected lenses. Such lodes are exemplified at Hog Mountain, Ala. There the quartz is bounded in places by seams coated with chlorite or sericite, but near premineral shear-zone crossings it fades irregularly into the wall rock.

BARREN QUARTZ VEINS

Veins of coarse-grained barren white quartz, locally called bull quartz, are common throughout the gold-bearing region. They range from stringers to bodies 20 feet or more in thickness and hundreds of feet long. Many are exposed in road cuts, and some have been quarried extensively for road metal or concrete aggregate (pl. 8, *B*). Their disintegration during the general weathering and erosion of the region has produced a large part of the rubble of "flint rock" fragments that clutters many fields.

In some of the mines, veins of bull quartz cut across the lode quartz, but at many places where the two varieties are exposed close together their relations are not shown. As a rule the bull-quartz veins consist almost entirely of coarse-grained white quartz. Some are locally stained with iron oxide, a few enclose stray crystals of pyrite, and one, exposed in the tanyard pit at the Brewer mine, in South Carolina, contains coarse plates of ilmenite intergrown with the quartz.

MINERALIZED ZONES

The mineralized zones consist of quartz, sericite, chlorite, and small amounts of other minerals, arranged in and along zones of shearing. Two intergrading classes of mineralized zones are recognized, namely (1) stringer leads and other lodes in which the boundaries between quartz and country rock, though irregular, are sharply

[83] Taber, Stephen, Geology of the gold belt of the James River Basin, Virginia: Virginia Geol. Survey Bull. 7, pp. 217–219, 1913.

[84] Laney, F. B., The Gold Hill mining district of North Carolina: North Carolina Geol. Survey Bull. 21, p. 98, 1910.

[85] Jones, S. P., Second report on the gold deposits of Georgia: Georgia Geol. Survey Bull. 19, pp. 50–51, 1909.

[86] Nitze, H. B. C., and Wilkens, H. A. J., Gold mining in North Carolina and adjacent south Appalachian regions: North Carolina Geol. Survey Bull. 10, p. 22, 1897.

[87] Nitze, H. B. C., and Hanna, G. B., Gold deposits of North Carolina: North Carolina Geol. Survey Bull. 3, fig. 1, p. 50, 1896.

UNITED STATES DEPARTMENT OF THE INTERIOR
J. A. Krug, Secretary

GEOLOGICAL SURVEY
W. E. Wrather, Director

Professional Paper 213

GOLD DEPOSITS OF THE SOUTHERN PIEDMONT

BY

J. T. PARDEE AND C. F. PARK, JR.

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1948

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C

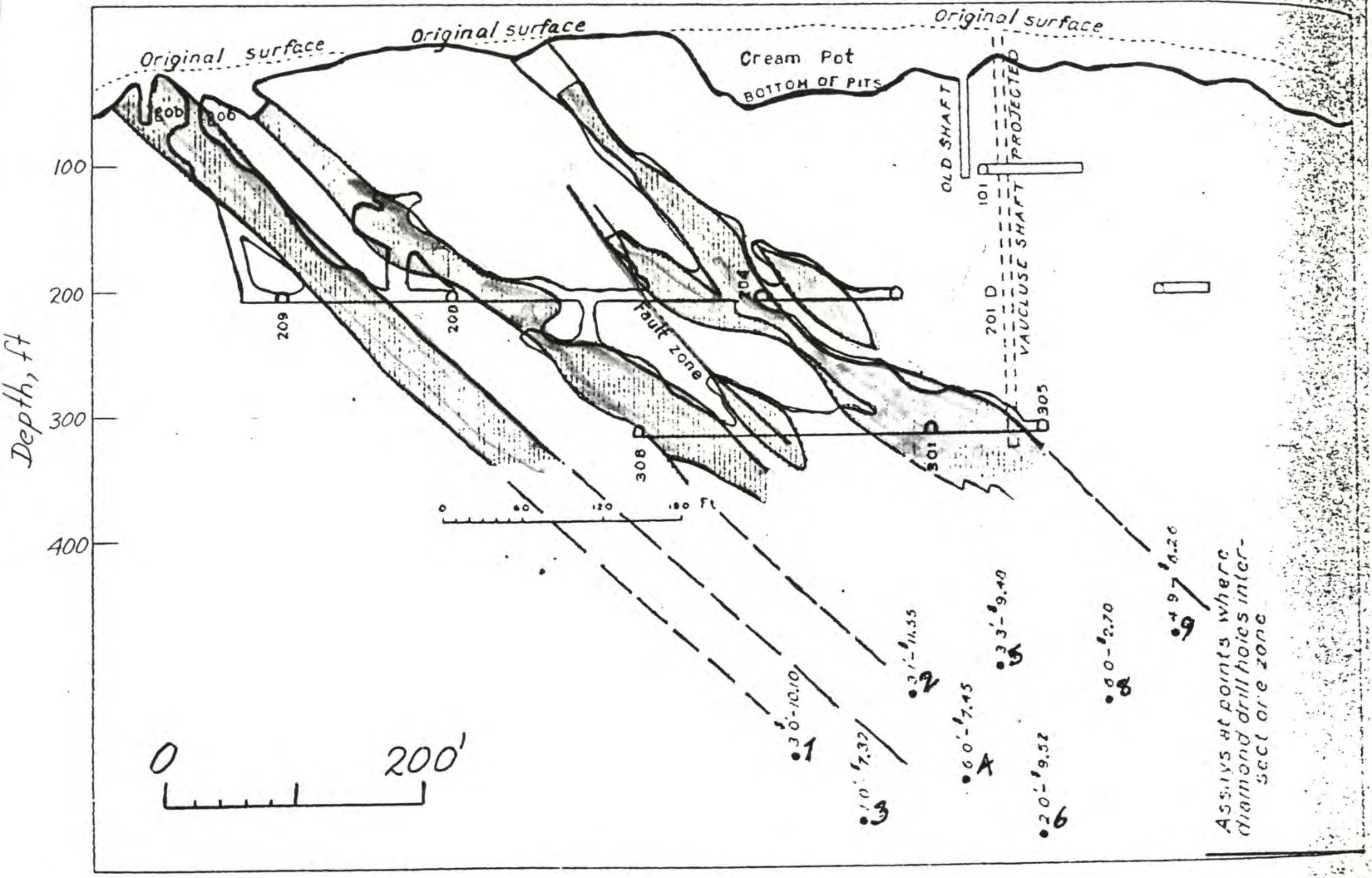
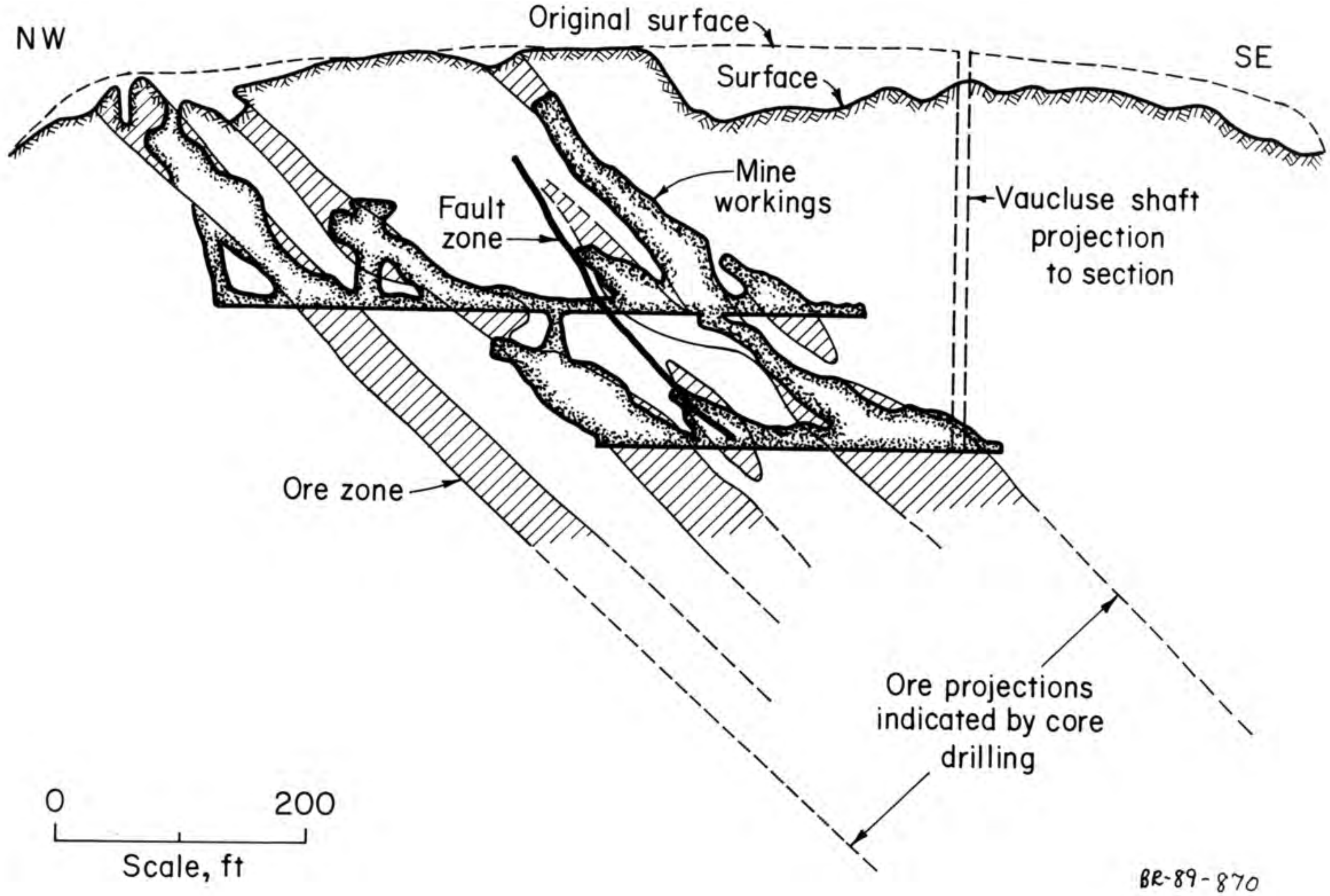


FIG. 5. Longitudinal section on No. 2 mineralized zone, Vaucluse mine, showing rake of ore shoots.


Original surface
NW
SE
Surface
Mine workings
Fault zone
Vaucluse shaft projection to section
Ore zone
Ore projections indicated by core drilling
0
200
Scale, ft
BR-89-870