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san francisco, california

YU 2-1436

July 25, 1961

Baron Maximilian de Clara
Bahamas Magnetite Ltd.
Penthouse Suite, Squibb Building
745 Fifth Avenue
New York 21, N.Y.

Dear Sir:

Herewith two copies of my report on the Archibald copper prospect, which looked sufficiently favorable to warrant a somewhat detailed study, although a single day on the property is by no means sufficient to make my conclusions other than tentative.

Buttram's Cully mill is not described in the report because the copper prospect must stand or fall on its own merits. So far as I could see, the mill performs well (although I am not a metallurgist). But no matter how well it performs, it cannot make a mine if there is none.

I know that at least one major mining company would examine the prospect as it stands, on my recommendation; but I think that at least Step 1, described in the report, should be completed before deciding what to do. It is barely possible that Step 1 might alter the picture of low-grade copper ore that I have formed from my study, and that possibilities might be indicated for a high-grade deposit that might be put in production at reasonable cost; but if my picture is correct, and Step 1 shows chances for a large, low-grade deposit which could be exploited only by a major mining company, then the detail mapping and systematic sampling resulting from Step 1 would be of great aid in interesting such a company in the prospect.

Sincerely
Edward Wisser
Edward Wisser

RECONNAISSANCE REPORT ON ARCHIBALD COPPER PROSPECT,
TRINITY AND HUMBOLDT COUNTIES, CALIFORNIA

INTRODUCTION

The following report is based on an inspection of the property, July 14, 1961, in company with Messrs. M. R. Archibald and Myron Buttram; on mill tests of the ore conducted in my presence at Medford, July 15 and 16, and on laboratory study of specimens collected. A report by John MacGinness and John X. Murphy, October 1957, a letter from Murphy, April 21, 1958, and a Defense Minerals Exploration Administration proposal of September 3, 1958 were also consulted.

LOCATION. TOPOGRAPHY. COMMUNICATIONS.

The prospect lies mainly in northwestern Trinity County, but is covered by a line of claims extending north-northwest into Humboldt County, as shown on the accompanying map. The Trinity County claims lie in The Trinity National Forest, those in Humboldt County, in the Six Rivers National Forest. The area is roughly 41 miles airline N75°E from Eureka.

The property is reached from Arcata, on Highway 101 and the Northwestern Pacific Railroad, by following Highway 299 about 45 miles to Willow Creek, the nearest supply center, thence 12 miles further on Highway 299 to Hawkins Bar, where Trinity River is crossed and a graded road followed northeast to Denny P.O. on the New River. About a mile northeast of Denny this road is left and a road built by Archibald followed north up Quinby Creek. This road is passable by ordinary car as far as Cut No. 6, shown on the map. It is 24 miles from Hawkins Bar to Cut No. 6, making a total of about 81 miles from Arcata to Cut No. 6. From this point to Redding, on Highway 99 and the Southern Pacific Railroad, is about 113 miles.

The accompanying map and profile show the rugged topography in the area of the prospect.

GEOLOGY

The U.S. Geological Survey Geologic Map of Northwestern California, 1955, shows a great mass of granitic rock intruding Triassic and Paleozoic metamorphosed sediments and volcanics, and extending along

the eastern border of Humboldt County. An offshoot from the main mass trends S 20 E, in the area of the Archibald copper prospect; the ore zone lies along the eastern edge of this offshoot.

In the Archibald area the granitic rock appears to be diorite. Its eastern edge is remarkably straight and is marked by an ultrabasic dike, generally altered to serpentine, as shown on the accompanying map, the geology of which is mainly taken from maps accompanying the D.M.E.A. proposal mentioned, but which was checked in part in the field.

The dike has such a consistent N 20 W course that it is thought to have come up along a major fault.

MINERALIZATION

The writer observed the dike only in Wheelbarrow No. 1, Wheelbarrow No. 6 and Grizzly No. 1 claims; but the U.S. Geological Survey map accompanying the D.M.E.A. proposal, and examination of specimens collected in the intervening stretch which was not examined, convince me that the dike is persistent, not only through the stretch shown on the map, but for a mile or more north and south of that stretch.

Where erosion has not cut down into the sulfide zone, the dike everywhere shows a gossan of iron oxide typical of the oxidation of massive pyrite. The iron oxide however is not everywhere massive, but appears in many places merely as iron-soaked basic dike, giving the impression that the pyrite is not evenly distributed through the dike, but occurs as "plums" of roughly spherical shape, from a few feet in diameter, up to masses tens of feet wide on the surface. The exposures observed will next be described. Refer to accompanying map and profile.

Cut No. 6 An upper and a lower bulldozer cut, following the contours of the hillside, transect the dike at an angle of 45°. A fracture zone which may be the west wall of the dike strikes N10-20 W and dips 80 west. West of this is a white, dense, silicified rock. The dike east of the structure is altered serpentine, iron-stained throughout but with heavy iron oxide concentrated along the structure. Copper stain is sparse, but "plums" from 2 feet across upward contain oxidized pyrite with streaks and flakes of chalcopyrite. Examination of the crushed ore in the mill at Medford shows that it contains about 35% sulfides, with minor chalcopyrite, the great bulk being pyrite. The crushed ore is very slightly magnetic, indicating very sparse magnetite.

Cut No. 4, at North Adit. This was the best showing seen by the writer. The stream bank from the portal of the North adit eastward shows a body of massive pyrite about 25 feet wide, with small flakes

of chalcopyrite, replacing the basic dike, and cutting it in veinlets; some of the chalcopyrite occurs in masses several inches across. The N 10°W fracture zone is exposed, dipping here 68°W. The ore is moderately magnetic.

A miner is said to have shipped a ton of ore taken from the North adit in 1917 assaying 21.49% copper and 1.54 ounces of silver per ton, to Mammoth Copper Co. at Kennett, California. A photostat of the settlement sheet is at hand.

Cut No. 2. Here the mineralized zone is 180 feet wide. The tabular structure along or within the dike is again evident, showing calcite lenses along sheeting. The exposure in the cut varies from heavy pyritic gossan to bodies of massive and coarsely crystalline pyrite replacing the country rock, some of which may be, not basic dike but diorite. Chalcopyrite looks sparse, but several small masses of sphalerite were seen. Material crushed in the mill shows almost no sulfides and is extremely magnetic, mostly magnetite, but this material is probably not representative of the ore zone as a whole.

Cut No. 1. Structure of the sulfide body here is unlike that to the south, where it is tabular, more or less like a wide vein. At Cut No. 1 the sulfides take the shape of a large horseshoe, with the curved part upward and the straight parts dipping down to the east and west. The "horseshoe" is 6-8 feet thick, and consists of oxidizing massive pyrite, mostly white in color, with flakes of chalcopyrite. There is considerable magnetite.

An X-Ray test made at the University of California of typical Cut No. 1 sulfides showed 1% to 3% copper, probable content 2%, and 0.2% nickel.

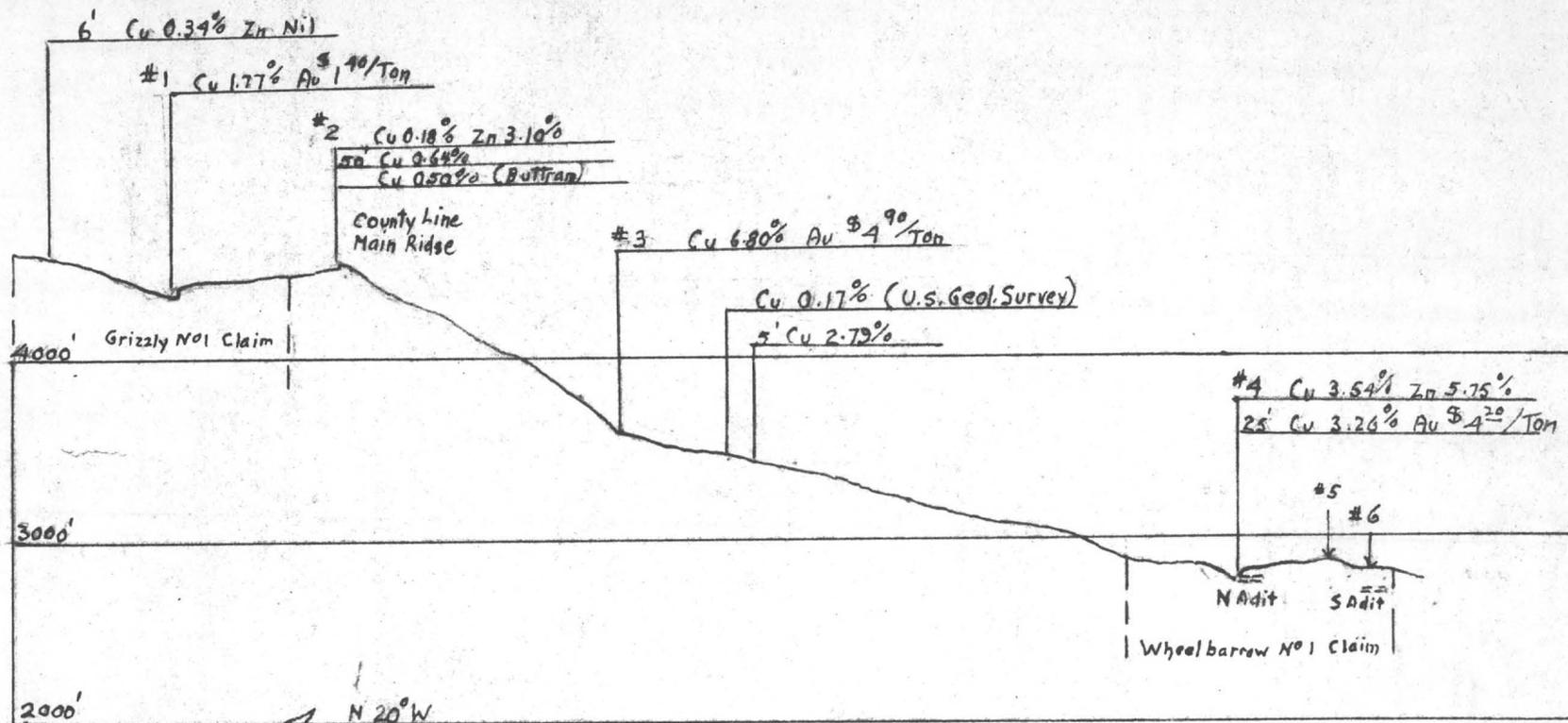
CHARACTER OF THE DEPOSIT

Most of the sulfide bodies have been shattered, with the cracks healed by later sulfides. This, together with the persistent tabular fracturing described, parallel with the dike, suggests that after the dike was intruded it was fractured by renewed fault movements; the fractures gave access to iron-and copper-bearing solutions which replaced portions of the dike to form the sulfide masses seen today.

Magnetite and nickel are typical minor constituents of ultrabasic rock; one or both may have been original constituents of the dike, or one or both may have been deposited from the mineralizing solutions.

DEVELOPMENT: SAMPLING: GRADE OF THE DEPOSIT

Development is limited to the North and South adits on Wheelbarrow No.1 claim, a shallow shaft or deep pit at Cut No. 1, and bulldozer cuts.



ARCHIBALD COPPER PROSPECT
 LONGITUDINAL PROFILE OF ORE ZONE
 Scale: 1" = 1000'

The North adit and the shallow shaft are in sulfides, but the South adit, caved at the portal but said to be 65 feet long, never cut the ore zone, but would cut it, by turning to the east, in another 65 feet.

Apparently very little systematic, proper sampling has been done. The samples taken by MacGinnes and Murphy shown on the map accompanying their report look plausible, to judge by my inspection of the ore, except that in Wheelbarrow No. 5 claim, their samples, taken not far north and south of the U.S. Geological Survey sample, give far higher copper content than did the Survey sample (see map). The latter sample was undoubtedly properly taken. But the MacGinnes-Murphy samples taken at Cut No. 4 accord with my observation of the sulfide mass there.

I have put on the map two Buttram samples which also accord with my field estimate of copper content. Other samples on record, however, taken by Buttram, Archibald, MacGinnes and Murphy (apparently after their report of October, 1957 was written) and supposedly by David Warne, D.M.E.A. mining engineer, appear much too high in copper to represent the ore zone as a whole; they were probably taken from picked high-grade. Chemically pure chalcopyrite (CuFeS_2) contains 34.5 % copper. This was the only copper mineral I saw, and never in masses over a few inches across; yet Warne is said to have obtained 39 % copper from a sample taken in Cut No. 6, and MacGinnes, 49 %. (Letter of Murphy to Archibald, April 21, 1958). It is highly improbable that any sizable body of sulfides contains such amounts of copper.

The Copper Bluff mine of Celtor Company lies in the Hoopa Indian Reservation, 15 miles airline northwest of the Archibald prospect. Ore going into the mill was inspected, and found to be entirely similar to that on the Archibald prospect. I was told that the Copper Bluff mill heads contain 2.5% to 3% copper. It is my impression, from field and laboratory work, that the Archibald massive sulfides contain, on the average, 2% to 3% copper, although locally the copper content may be higher. As stated above, X-Ray test of typical massive sulfides from Cut No. 1 gave about 2% copper.

It has been shown that massive sulfides do not exist everywhere within the dike, but occur as masses ranging in size from a few feet across to relatively large bodies. Whether this prospect contains a mine will depend on the amount and distribution of massive sulfides in the ore zone. If the sulfides are scattered in small bodies there is no potential mine, because, if the copper content of these bodies is 2% to 3%, the grade of material sent to a mill would be far below this, with the sulfides scattered in small bodies through barren rock. To make any money in this isolated location mill heads should carry at least 2 % copper. (Trucking rates for concentrates shipped to Redding are about \$8 per ton; railroad freight from Redding to Tacoma smelter is \$9.10 per ton, making a total of \$17.10).

Ore carrying 2% copper will liquidate, (i.e. yield at the smelter) at not over \$10 per ton. Out of this must come mining, milling and overhead. To obtain a production cost which will yield a profit on ore liquidating at \$10 per ton, mass production is necessary, say at the rate of 1000 tons per day. Hence if the Archibald prospect is to make a mine, a large tonnage of 2% copper ore must exist.

The possibility for large tonnage seems to be there. The northernmost showings shown on the map are shown by sampling to run low in copper; but inspection of the ore zone there suggests that it may carry higher copper than the sampling shows. The profile facing this page shows a length of ore zone sampled of 7,500 feet; but the total length with potential ore greatly exceeds 12,000 feet. Assuming that length, with an average width of 25 feet, gives 300,000 square feet of area, ore or less mineralized. The deposit is of a type which may go deep; assuming it persists for 1000 feet below the surface, there would be 300,000,000 cubic feet of material. With a density of 10 cubic feet per ton, there would be 30,000,000 tons of material. If one-tenth of this were ore, concentrated in minable bodies, there would be 3,000,000 tons of ore, giving a ten-year life to the mine, with a production of 1000 tons of ore per day. If the grade of mill heads were 2% copper, this life should be sufficient to return the large capital investment needed, plus an overall profit. (The long-term outlook for copper prices is favorable).

The Defence Minerals Exploration Administration thought enough of the showings on Wheelbarrow No. 1 claim to offer Archibald a proposal involving further trenching, rehabilitation of the South Adit, extending the adit to cut the ore zone, and drifting along the ore zone under Cut No. 6; total cost of the underground work, \$9860.

It is concluded that the Archibald prospect has possibilities for a large, relatively low-grade mine. Capital expenditures for putting such a mine into production would be very heavy, and feasible only for a major mining company. A gamble involving a relatively small sum of money might put the prospect in shape to attract such a major company. The following recommendations are based on this notion.

RECOMMENDATIONS

1. Detailed geologic mapping and sampling of present exposures by a competent geologist; I can supply such a man. Estimated cost, \$2000 to \$2500. If the result is disappointing, the project should be dropped. On the other hand, there is an outside chance that bodies of copper ore containing well over 2% copper might be indicated.

2. If Step 1 results favorably, more trenching should be done, especially on Wheelbarrow No. 1 claims. If this turns out well, the South Adit should be advanced to cut the ore zone, and the zone drifted on, following the D.M.E.A. proposal.

The work of Step 1 might suggest an alternative to extending the South adit. The North adit, on the best showing I saw, might be extended southward instead. In either case, total cost of Step 2 might be about \$25,000 to \$30,000.

If the South adit work or the alternative North adit work fails to find ore, this would not necessarily damn the prospect, especially if trenches to the north showed promise; but exploration further than that described should be done, not by private individuals, but by a large mining company. Completion of Stage 2 should reveal, either that the property has only very doubtful potential, or that it merits consideration by a major mining company.

San Francisco, California
July 25, 1961.

Edward Wisser

RECONNAISSANCE GEOLOGIC MAP
ARCHIBALD COPPER PROSPECT
TRINITY AND HUMBOLDT COS., CALIF.

Scale: 1"=1000'
Contour Interval 200 Feet

- LEGEND
- Paleozoic Metasediments:
 - Diorite:
 - Ultrabasic Dike:
 - Cut: #1
 - Adit:
 - Bulldozer Road:

Samples by MacGinness and Murphy unless otherwise noted.

