

REPORT ON THE BAY CITY GROUP  
SEARCHLIGHT MINING DISTRICT  
CLARK COUNTY, NEVADA.

I- LOCATION:

The Bay City Group consists of four unpatented lode claims of the standard size 800 X 1500 feet, as follows: Bay City, Bay City No. 1, Berkeley, Virginian.

Location notices and yearly notices of assessment work are on file in Las Vegas, County seat of Clark County, Nevada, and at Searchlight, the office of the District Recorder for the Searchlight Mining District.

The claims are situated immediately North of the main road between Searchlight, Nevada, and the Colorado River, about two miles East of the Town of Searchlight. The accompanying Flat #1 shows the location of the Bay City Group with reference to Searchlight and the important properties, having a record of production, in the district.

The Searchlight Mining District is in the extreme Southern point of Nevada in Clark County, twelve miles west of the Colorado River about fifty miles North of Needles.

Communication is established by stage line connection with Nipton, the nearest railroad point twenty-two miles distant on the Union Pacific Railroad fifty-six miles South of Las Vegas.

By reference to Flat #2 the location of the Searchlight District with reference to lines of communication and the main mining district of the Southwest can readily be seen.

The nearest mining district having a record of gold production as the El Dorado Canyon district twenty-two miles North of Searchlight and

and Crescent district seven miles Southwest of Nipton.

However, the Searchlight district is centrally located with reference to the principal gold producing districts of the United States, notably the Chloride, Kingman, Gold roads districts to the East in Arizona, the Tonopah, Goldfield, Belmont, Manhattan and Bullfrog districts to the Northwest in Nevada, and the Kearn River, Death Valley, Randsburg and Mohave Desert districts to the West in California. Geologically there is considerable similarity between all these districts, they being fissure and replacement deposits in rhyolite and andesite flows associated with acidic intrusives.

## II- TITLES AND PRESENT OWNERSHIP

As the mining claims in this group are all unpatented, titles consist of the regular filed location notices and affidavits of annual assessment work made out by locators, Mr. E. P. Jones of Pasadena, Calif., and Mr. A. C. Calkins of Searchlight, Nevada; subject to a lease and an option to buy made out by said E. P. Jones and A. C. Calkins, as lessors in favor of the writer, O. N. Rugen of Alhambra, California, as lessee.

## III.- HISTORY OF THE PROPERTY AND THE DISTRICT.

Discovery of gold was made in 1898 on the Searchlight Claim, now part of the Duplex Mine. The quartette, the principal mine of the dist., was opened the same year. In 1902 a twenty stamp mill was constructed on the Colorado River and this was shortly afterward connected with the mine by a fifteen mile narrow gauge railroad. In 1903 water was encountered in the lower levels which led to the construction of a new twenty stamp mill at the mine and the abandonment of the mill at the river.

According to Ransome (U.S.G.S.B.303) the production of the Searchlight up to 1905 was between \$1,750,000 and \$2,000,000.

The total production of the district is hard to estimate, as most of the mines have been operated on the leasing system. According to old residents it may possible as follows:

1. Duplex about \$1,700,000.
2. Quartette between \$3,000,000 and \$4,000,000.
3. Goodhope possibly \$50,000.
4. Cyrus Noble about \$200,000.
5. Santa Fe-nominal.
6. Searchlight M & M Co., about \$300,000.
7. Blossom Claim of the Southern Nevada M. & M. Co. about \$750,000.
8. Pompeii about \$50,000.

The above figures could not be verified but are given as the statements of miners who were in the district since its location.

The main activity in the district ceased in 1916 and there has only been intermittent leasing operations on some of the properties since that time. However, renewed interest is being witnessed in the district at the present time, as evidenced by the recent sale of the Duplex property to operators from Oatman, Arizona for \$150,000.

The Bay City group was originally located in the early days of the camp but was abandoned in 1925 after the death of the original locators when it was relocated by the present owners who have been in possession of it since that time. The work on the property to date has been purely of a prospecting nature although a few small shipments of ore have been made as millrun tests, according to the owners. These mill run tests proved very satisfactory both as to the value of ore and recovery although mill statements of these runs are now unavailable and could not be checked up.

#### IV-TOPOGRAPHY.

Searchlight lies in a range of hills running North and South, known as the Opal Mountains, and locally marking the edge of the diversified plateau which borders the valley of the Colorado on the West. The altitude of this plateau, as defined by the broad desert valleys, is from twenty-five hundred to thirty-five hundred feet above sea level or from two thousand to three thousand feet above the river. The town of Searchlight is situated about three thousand feet above the river and the hills here are not particularly rugged and rise about one thousand feet above the alluvial plain.

Plat #3 is a topographic map prepared by the Los Angeles Metropolitan Water District and shows in detail the topographic conditions of this district.

#### V- GEOLOGY

According to Ransome, the essential facts are a North and South belt of quartz monzonite (locally known as granite), gneiss and schist which forms the main mass of the Opal Mountains, flanked here and there by areas of Tertiary volcanic rocks.

The schists and gneisses are the oldest rocks in the region and may be Pre Cambrian. They are much disturbed and are cut by the quartz monzonite as well as by dykes of splite, pegmatite and andesitic porphyries.

The granite is a fine grained gray rock showing to the naked eye abundant biotite, some hornblende and considerable quantities of plagioclase as well as orthoclase. The mineralogical composition indicates that it is a true quartz monzonite intermediate in composition between a true

granite and diorite. It is debatable whether or not the quartz monzonite like the gneiss and schist is part of the old crystalline floor through which the tertiary eruptives broke through or whether it is a tertiary intrusive mass itself.

Bordering the quartz monzonite and schist belt on the East and between these rocks and the river is a zone of volcanic rocks several miles in width. They form a mass several hundred feet in thickness consisting of flows of andesite, andesitic breccia, white and brown tuffaceous sandstone and minor flows of basalt. The whole series dips to the West with a maximum dip of about 55°. The general Westerly dip is maintained close to the quartz monzonite contact, which is probably a fault.

Along the line where this fault might be expected are usually irregular intrusive bodies of biotitic andesite porphyrys which on account of the conspicuous white phenocrysts of feldspar is locally known as the "birdseye porphyry."

The probability is that the quartz monzonite mass has been upthrust by faulting and that intrusions of "Birdseye porphyry" took place along the zone of dislocation.

On the West side of the Opal range the relations of the rocks appear to be similar to those just described although less clearly shown. They consist of low slopes of andesitic flows passing westward below a cover of alluvium and cut near the granite by numerous dykes of andesite or "birdseye" porphyry. This same porphyry has invaded the gneiss South of Searchlight on the Quartette property in a multitude of nearly parallel dykes.

Plat #4 indicates this general arrangement in an ideal cross section prepared by Ransome.

These general geological conditions described above are readily discernable and were checked by the writer on a preliminary investigation of the district. A more detailed geological study of individual properties or deposits giving exact relationships could not be made due to the time available, although this would be advisable before starting any exploration or development work.

#### VI- ORE DEPOSITS OF THE SEARCHLIGHT DISTRICT.

The principal producing mines of the district, as shown by Plat #1, are confined to a North and South belt about four miles long and three-quarters of a mile wide which lies just West of the town.

With the exception of the Southern Nevads, the ore deposits of the belt West of Searchlight are on fissure zones striking N65° W and dipping Southwest at various angles. All are within one-half mile of the general contact between the quartz monzonite and gneiss block on the one hand and the Tertiary surface flows on the other. In some mines such as the Quartette and possibly the Duplex the lode crosses the contact and extends into the older rocks, although in general the absence of commercial deposits in the older rocks is very noticeable.

The lodes contain very little solid quartz and do not outcrop prominently. To the West they either pinch out or pass beneath the alluvium which covers the lower slopes of the hills.

The lode material is much softer than the country rock and is very easy to mine, in fact has a tendency to cave and usually requires careful timbering wherever the lodes attain any considerable width. This fact accounts for the generally inconspicuous and narrow outcrops as erosion tends to halt at the point of maximum resistance, which in the case of soft ore bodies is at their narrowest widths. -6-

The lode material is generally a soft mass of crushed or shattered country rock colored by chrysacola and oxides of iron and carrying freegold as its valuable constituent. Quartz is common in fags, druses and veinlets and is fine grained, cellular or honey-combed. Specular hematite, magnetite, manganese oxides, cerussite, malachite, azurite, calcite and wulfenite are common gangue minerals in the oxidized zone above the permanent water level. Below the water level, in the Quartette and Duplex mines, considerable quantities of sulphides of iron, lead and copper appeared producing refractory base ores which would not yield to direct amalgamation.

#### VII- THEORY OF ORE DEPOSITION:

While a real scientific development of the geological history of the ore bodies in the district would take considerable more time and research than has been devoted to it, I believe that enough geological facts have been developed to be able to offer a logical explanation for their occurrence.

If we follow the modern theory of ore deposition from magmatic waters (or waters resulting from the condensation of vapors escaping from a cooling igneous or molten mass of rock), we find that the first requirement for their deposition is a place or opening through which these waters can circulate and in which their mineral content can be deposited. Where the country rock is rather porous as in sandstones or limestones, these cooling condensing vapors can find their way through the minute cavities in the rock itself and deposit their mineral contents either by filling the voids or replacement of the more soluble portions of the rock mass.

In the case of dense impervious rocks, such as the lava flows found around Searchlight, this would be impossible and we would have to look for structural openings formed by dynamic movements of the rock masses. The upthrust through these lava beds of the large granites and gneiss blocks in the formation of the Opal range, has undoubtedly caused dislocations not only along the contact, which Ransome feels is a fault contact, but also in the body of the lava beds extending for a half a mile or more back from the contact. These dislocations in most cases probably consist of a number of parallel faults forming fault or shear zones rather than simple faults. It has been the experience of the district that the pay shoots often jump from one fault over to another parallel one in the same zone and the practice is, on losing a pay shoot, to cut into the footwall and hanging wall in the expectation of picking up a parallel shoot.

The second requirement under the magnetic theory is a cooling deep seated or intrusive igneous mass from which these mineral bearing waters can be derived. The prevailing occurrence of the "birdseye porphyry" close to all the important ore bodies leads me to believe this to be the source from which the mineral bearing waters originated. The intrusion of the Birdseye porphyry probably took place after the upthrust of the Opal Mountain block or may possibly have been the cause of it. The porphyry in rising to the surface undoubtedly found the main fault contact the easiest avenue of escape although part of the porphyry mass found its way through the larger minor faults in the lava flows, as evidenced by the number of smaller porphyry dikes found in the lavas at some distance from the contact.

The escaping vapors from these porphyry dikes condensing and passing through the minor faults and shear zones in the lavas, deposited



their mineral contents in the openings there afforded and in places where the conditions were right attacked the wall replacing to some extent the original material with the minerals they carried in solution.

As evidenced by the larger properties such as the Quartette and the Duplex which have been opened to sufficient depth, these primary ore deposits have been subjected to the process of oxidation and secondary enrichment. As a consequence we have near the surface a leached zone carrying a small amount of residual gold below which there is a zone of enriched oxidized ore. Below the permanent water level, there is the zone of rich sulphide ores which pass gradually into the primary ore. This primary ore evidently has been found to be too low grade to be profitably mined.

#### VIII- CONDITIONS AFFECTING BAY CITY GROUP OF CLAIMS.

##### A - Development Work.

The operations on the Bay City Group of claims as indicated by Plat #5 have been confined to shallow surface workings in an attempt to uncover and expose favorable leads. They may be listed as follows:

a- One Bay City Claim (1) the main shaft eighty-five feet in depth following along a quartz stringer varying in width from six inches to twenty inches: (2) the Tripod shaft sunk by a previous owner about sixty feet on the same lead. This is now partly caved and the ladders are gone so that it is impossible to investigate without going down on a rope. It appears from the surface as if some stoping operations had been carried on and I understand some ore had been shipped to one of the custom mills. (3) Another small shaft about thirty-five feet deep close to the Tripod Shaft and following along same lead: (4) a small shaft about ten feet deep across the

gully from the main shaft on a parallel lead to the first one: (5) a small shaft about twenty-five feet to the Southeast of the main shaft on a shattered zone in birdseye porphyry. This showed some small quartz leads and also possibly some replacement in the porphyry.

A number of surface trenches have also been dug to expose the outcrops and follow up these leads.

b- On the Virginian Claim there is a shaft (6) about fifty feet in depth sunk by a previous owner on a quartz lead running at a slight angle to the main Bay City lead. A test mill run was made from the ore in this shaft returning, according to Mr. Jones, \$47.00 a ton. A short tunner (7) was cross cut to reach the bottom of this shaft but the work had been abandoned Before completion due to the death of the previous owner.

c- On the Berkeley Claim there is an old shaft (8) on a quartz lead varying from six inches to twenty inches in width rather low grade. A distinctive feature of this quartz is the decided copper stain. There is a cross cut tunnel (9) seventy-five feet long run to cut the bottom of this shaft but never completed. In the face of this tunner there is a small quartz seam carrying some wulfinite. There are a number of surface trenches on a parallel quartz lead which is thirty inches wide on a strong clay seam but this has not been explored in depth due to low values encountered.

#### B- GEOLOGICAL CONDITIONS ON THE PROPERTY.

The country rock covering this group of claims is a fine grained andesite. There appear to be slight variations in this andesite over different parts of the group but whether this is an indication of different beds, varying surface alteration or contact effects was hard to determine in the limited time available. Several

exposures of the "Birdseye" porphyry were noted on the property and while the contacts were not carefully traced out, I believe they indicate the existence of several parallel dikes of the intrusive. The prospecting work has uncovered a number of small stringers of quartz, all of which are gold bearing to some extent. This quartz is fine grained, and in some places honeycombed. These quartz leads are not solid quartz but rather have the appearance of altered shattered country rock loosely cemented together by fine grained quartz.

On pulverizing and passing the quartz a small amount of magnetite or specularite and manganese oxides were shown. Probably all the other more soluble constituents have been leached out.

Some minor displacements in these quartz leads were noted indicating that there may have been some post mineral faulting.

#### C. Assay Results.

The locators have had numerous assays made of the quartz exposed by these various workings with results running from \$5.00 to \$40.00 a ton. According to their statement they have never had an assay made on the quartz that failed to show some gold.

However, inasmuch as I do not know how these samples were taken, I prefer to ignore these assays as having very little meaning other than that the quartz, wherever found, is gold bearing to some extent. I have roughly checked these results by panning samples of the quartz taken from the various workings and have obtained colors in every panning, enough to approximate the same values and indicate the same conclusions. As I do not consider that the workings have developed ore bodies of a stopping size that can be practically worked, I feel that a systematic sampling and assaying of the various exposures is unnecessary. In

fact it would be inadvisable as it might lead to erroneous conclusions.

#### D. Mining Facilities.

The surface equipment on the property is better than one would expect to find on a small prospect and consists of a 15 H.P. Fairbanks-Morse Oil driven hoist with five hundred feet of hoisting cable; belt connected with an 8 X 12, 2 cylinder, Ingersoll Band Air Compressor, receiver and piping; one jackhammer drill; complete blacksmith outfit; hoisting bucket; one mine car and satisfactory headframe and hoist house.

This is all in good working condition and would only require the purchase of necessary supplies such as additional drill steel and explosives to start development operations. The original cost of this equipment was over \$4000.00 and it is practically new.

#### E. Operating Conditions and Costs.

There is an adequate local supply of labor available at a fair rate of wages. The prevailing wage scale in the camp is as follows: Miners, \$5.50, Hoistmen, \$6.00, Timbermen, \$5.00, Superintendent, \$250.00 a month. Until operations develop on a large scale camp facilities would not have to be provided on the property due to the proximity to the town of Searchlight. At the present time water is not available on the property although on an adjoining claim immediately North of this group a shallow shaft has encountered water. The probability is that with depth water can be developed on the property. Supplies of all sorts will be rather expensive due to the long truck haul from the railroad. At the present time a stage line to Nipton handles all the supplies for

the camp but it might pay a company on large scale operations to operate its own trucks.

Operating costs are almost impossible to estimate at this time due to the main unknown factors concerning the size, shape and condition of ore bodies and the amount of development work that may be required. All that one can say is that wherever ore bodies have been encountered in the district they have been of sufficient value to return a good profit on the venture.

#### IX- CONCLUSIONS:

My conclusions regarding the possibility of the Bay City Group developing into a producing mine may be summarized as follows:

Geologically the same conditions exist on the Eastern slope of the Opal Mountains as on the Western. The same series of Tertiary lava beds are on one side as on the other. The dynamic forces causing the upheaval of the quartz monzonite block which formed the Opal Mountains produced the same fissuring in the Tertiary beds on the one side as on the other. The intrusion of the "Birdseye porphyry" found equal access in the fissures on both sides of the mountain. It, therefore, seems logical to me to assume that this same set of conditions would produce the same result in the formation of ore deposits in one place as another.

While we know that the same general geological conditions exist at the Bay City Group of claims as at the producing properties West of the mountains, it need not necessarily follow that this group is the location of one of the ore shoots. However, the presence of free gold in the amounts showing in the leached portions of the fissures exposed on the property, would lead one to believe that there is a strong possibility of this being the case. The porous, fine grained



condition of the quartz, the altered condition of the crushed country rock in the fissures as well as the residual gold all point to this possibility. While it is true the width of these fissures as exposed at the surface is small, this is to be expected in a district where the ore bodies are softer than the adjoining country rock and should not be interpreted as a discouraging condition. In fact it should lead one to believe that the deposit at greater depth will open up to a more satisfactory width. What this width and the value of the ore found there will be, can only be determined by actual development work. How much development work will be necessary to prove this, is naturally impossible to estimate in view of the known erratic and spotty nature of gold deposits of this sort. However, if sufficient capital is available to carry on an extensive development campaign, I believe the conditions existing on the property, as outlined above, justify such development work and I feel that I can conscientiously recommend the property under the conditions of the lease and bond mentioned above.

OTTO N. RUGEN, E.M.