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*Independence Mine
& General notes on*

THE WEAVER MINING DISTRICT OF YAVAPAI COUNTY, - ARIZONA

George A. Kirkbride, Consulting Mining Engineer.

The Weaver Mining District embraces a portion of one of the oldest known and probably richest gold belts in Arizona, or the Southwest. Rich Hill in the center of this district, was the scene of the first discovery of placer gold in the early sixties and has produced several million dollars.

The mineral belt on its normal strike sources thru the southern slope of the Bradshaw Range from the town of Congress to the west, to and beyond the Monte Christo silver mine on the southwest, but it is with that sector extending from the Congress Mine to the Octave Mine, a distance of about 12 miles, that we will deal at present. This, considering the fact the gold values predominate.

The history of the Weaver District is typical of Arizona in the early days of gold production, when transportation facilities consisted of freight teams, pack outfits, and travel by foot. Free gold was necessary, due to lack of smelter or other marketing facilities.

Rich Hill is a spur of the Weaver Range of mountains which formed a part of the southern encampment of the Colorado plateau. Quartz veins traverse the "hill" in an east-west direction, with mines located upon both flanks.

Rich Hill was the scene of the earliest and most important placer discoveries made in this country and one of the richest ever made anywhere. The presence of placer gold on the southern slope of the Bradshaw was probably known as early as 1860, but it was not until two years later that there was discovered the first of the great deposits of coarse gold, whose subsequent exploitation caused the steady development of the Weaver District and the growth of the towns in that section of Arizona.

In 1862 Pauline Weaver, Jack Swilling, and a man named Peeples, after whom Peeples Valley was named, discovered what is known as Weaver Diggins, near Stanton, which was found only by accident. One of the parties, having left an animal which had strayed, went in search of it and discovered coarse gold. The ground was immediately staked and worked, and yielded, it is said, within a small area something over \$1,000,000.00. Subsequent production is not recorded, but the placers of Weaver Gulch and Rich Hill supported a population of Americans and Mexicans numbering from 1000 to 2000 over a period of several years after their discovery. The production in total has been estimated at from \$10,000,000.00 to \$12,000,000.00. Later work, extending from about 1890 to 1910, resulted in opening of the quartz veins of the district and production from the Congress, Alvarado, Rincon, and Octave, as well as other smaller properties, with a total production of several millions.

The country rock along the main strike for the full distance is granite; the veins occurring as quartz filled fissures with one or more periods of mineralization. The veins dip almost without variation into the Bradshaw Mountains from 20° to 30°, and in most cases occur in greenstone or

porphyritic dikes intruding the granite. Vein widths vary from one to several feet and values of reported production vary from a mill grade of about \$13.00 to several hundred dollars per ton. The most notable production of the district has been from the Congress Mine.

This property was opened in 1889 and over the period from March 3, 1889 to August 3, 1891, shipped 1129 tons of ore that gave a net return of \$155,652.99, and 2500.8 tons of concentrates that gave a net return of \$335,308.57. From June 3, 1891 to August 31, 1892, 4,693 tons were shipped, giving a net smelter and bullion return of \$592,000.00. Work was then discontinued due to the death of Diamond Joe Reynolds, then the owner, and to await the construction of the Phoenix-Prescott A.T. & S.F. Railroad.

In 1894 new interests acquired control. The metallurgical problem of handling what was at that time a very difficult complex ore, was partially solved and the new interests, over the period from March 1894 to December 1910, built up a net return of \$7,054,422.75 in gold shipped. Other estimated production not of record brings the total to \$9,000,316.00, with an average value for the entire mine of \$13.65 per ton.

The Congress was mined to a depth of 3950 feet. The longest ore stope mined continuously was 1800 feet. Consistent values were reported in the lowest workings.

The Octave Mine, along the same general series, has a depth of 2300 feet and a production record of approximately \$3,000,000.00. The Mining World of February, 1907, stated: "During the past six years the Octave property has been well handled by skillful mining men and is today one of the best developed and equipped of any mine in the district. Work has been done on sixteen levels, with ore showing in every face. The veins are well defined and easily traced. On the sixteenth level of shaft No. 3 east, is a continuous ore shoot over 700 feet long without a break, with the face still in ore."

In going over the prospectus of the Octave Mining Company, issued about that time, it seems to be one of the few properties of the time that fully lived up to the statements given in the prospectus.

The most attractive feature of the entire district along the normal strike is the fact that there has, in so far as I am able to determine, never been a property "bottomed". The separation of gold from the sulphide ores seems to have been the main reason for abandonment of most of the lesser properties of the district.

The Octave Company is at this time remodeling the reduction plant, changing from flotation to cyanide, and will continue operations.

The Rich Hill Mine, directly to the west, is being prepared for a considerable development program.

Tailings and dump ore are being re-worked on the Congress and tentative plans are under way to rehabilitate the old workings.

Several other operations are being planned or are under way, indicat-

ing that a gradual revival of interest in gold mining is taking place in this old productive district.

Properties located along the normal strike of the various fissures present no great problem, geologically. Vein movement seems to have been slight, in many cases a few inches on the vertical. Mineralization occurs in the more fractured zones in the quartz, gold values being accompanied by disseminated pyrite and galena with very little massive sulphide enrichment. The richest ores apparently occur with the hematite or limonite secondaries, altho high values in gold are obtained both with the galena and pyrite. Vein faulting has invariably been occasioned by cross dikes cutting them off entirely and a good cropping or surface showing is almost certain to extend to great depth with better values on the lower levels. The ore shoots lie almost as flat on the rake as do the veins with the formation. In the properties examined, no great widths were noted. The Leviathan seems to have the greatest width of any of the properties, but values somewhat lower. The average width of the quartz fissures seems to be about three feet. The highest values are noted below the 800 ' level on the incline.

Practically any of the ore of the district is amenable to treatment by either the flotation or cyanide process. Amalgamation is possible, but with poor recovery as very little of the gold is free. Prior to the introduction of the cyanide process, separation was effected by amalgamation and concentration, - the concentration being by Frue Vanners. The Congress Mine was at one time considered as worthless due to the complex nature of the ore. Ore that was impossible even as late as 1910 may not be mined and treated at a profit.

Water offers something of a problem, as there are no running streams; altho it is possible in most cases to develop sufficient for a normal mill operation, either with pits in Antelope or Weaver Gulch or by drilling.

Economic conditions are favorable; plenty of good labor, favorable climatic conditions, good railroad facilities, and close proximity to a base of supplies. The district has been practically abandoned for the past twenty years. Equipment was removed for scrap during the war and mining interest was centered on the huge copper deposits of Arizona.

With the present relative value of gold as compared to labor and supplies, it is logical to assume that capital properly expended may find an outlet in the Weaver District with more than ordinary possibility of developing long lived, profitable mining operations.

LOCATION AND EXTENT:

The Endependence Group consists of seven (unpatented) Mining claims, located eight miles east of Congress Junction, Arizona; - Congress Junction being the nearest shopping point and located on the Prescott-Phoenix branch of the A.T. & S. F.

The claims lie along or contiguous to the main Endependence strike, about three-quarters of a mile west of the Octave Mine, and are in the same series of Pre-Cambrian granites that are responsible for the large production of the Weaver District in both lode and placer gold.

The Little Daisy, Mow Hawk, Last Chance, Toreno, Endependence, Roseburg, and Oregon have an area of approximately 140 acres.

LOCAL CONDITIONS:

The elevation is 3500 feet, which assures a good all year climate for working conditions.

There is available a surplus of experienced miners at the regular rate of \$4.50 to \$5.00 a day. As these men live in the vicinity of the Mine, there is no necessity of providing a camp at the property.

A good automobile road leads directly from Congress Junction to the No. 2 shaft.

Mine supplies may be purchased at either Phoenix or Prescott and shipped by truck or railroad to Congress Junction.

Water for mining purposes is obtained from the No. 2 incline, and for domestic purposes there is an abundance of well and spring water.

EQUIPMENT:

The No. 2 incline of the Endependence claim is at present equipped with a 10 x 12 Compressor, receivers, blacksmith shop, mine cars, rock drills, etc., sufficient for the conservation of the present development program. Electric Power at a reasonable rate is furnished by the Central Arizona Power Company. (Equipment not on ground 11-1-33).

DEVELOPMENT:

The present considerable development consists of the main No. 2. incline shaft on the Endependence claim, various shallow shafts, cuts, etc., along the strike of the vein.

The No. 2 incline has reached a depth of 150 feet on the dip of the vein. Other workings of no importance to the present development program are located along the Last Chance vein and consist of shallow shaft cuts, etc.

GEOLOGY AND DEPOSITION:

The country rock of the Weaver District, extending from the Congress Mine to the Octave Mine, a strike extending southeast and northwest along the westerly slope of the Bradshaw Mountains, is granite.

There are three types of dike which carry quartz veins and mineralization along the main strike.

No. 1. The granite fissure in which the dike filler is greenstone trap rock. The quartz vein in this dike is accompanied by a clay salvage and the ore occurs in the dike in all possible positions from one wall to the other.

No. 2. This series is the normal granite fissure with dike filler of fine grained quartz porphyry. The strike is east and west, with nearly vertical dip.

No. 3. This series is entirely in granite, with no accompanying clay salvage, greenstone, or porphyry. The dip varies from 25° to 50° north and a characteristic of these all granite veins is the presence of a small amount of galena and higher silver contents.

The Independence Vein is of The latter type with a dip of approximately 30° north.

The deposition of mineral values has, without question, occurred in one or two periods later than the quartz formation and filling of the dike. The ore shoots normally lie flat or almost as flat in the vein as is the dip of the vein in the granite formation. The greater values and high grade gold ores of the district are invariably accompanied by either pyritic or lead sulphides and occur in the most highly fractured portions of the vein.

The formation is without question deep seated and the mines that have attained a depth of 800 feet or greater have, without variation, produced higher grade ores with correspondingly greater widths.

It is a matter of record that there has never been a decrease in values or vein widths with deep development in this district.

ENDEPENDENCE ORE BODY:

The gold values in the main No. 2 incline of the Independence occur in a white blocky quartz, accompanied by a disseminated galena and pyrite. The vein casing is granite with values in places extending into both hanging and foot wall.

The shaft has a north dip of 25° to 29° and the vein width the entire depth of 150 feet is from 24 and 36 inches.

Gold values are erratic, the lowest assay being \$4.00 per ton, and the highest shown on assay reports \$1,405.00 per ton. The latter being selected from fine galena.

The best sample was a recently shipped car of ore taken from above the 80 foot level. The car gave a smelter value of \$14.75 per ton, and it is safe to say that this value could have been increased to \$20.00 per ton by proper selective mining and sorting.

Average assays by three engineers of good reputation on channel samples taken down the shaft at regular intervals, gave a composite value of \$20.00 per ton in gold.

The Last Chance Vein is reported to have given good values and is worthy of some exploration.

ECONOMIC PHASE:

Considering the location of the property, type and character of the veins and the fact that values are consistent to a depth of 150 feet, it may be reasonably assured that the widths and values will continue to a depth consistent with what has been proven by other mines of the district.

Both wall rock and veins are hard and require considerable steel and powder for breaking.

The fact of the vein being on an incline makes for a little higher cost than the ordinary mining of a vertical vein of this width.

Based on other mines of the district, it is logical to assume a safe margin by estimating of mine cost, if the development is properly planned, of \$3.50 per ton.

On a 50 ton per day basis for milling by either flotation or amalgamation and concentration, a mill cost of not to exceed \$1.50 per ton may be assumed. Using as a figure for calculation the last car of ore shipped, or \$14.75 per ton, 10% metallurgical loss, we have a gross value of \$13.28 per ton.

COSTS:

Mining	\$3.50
Milling	1.50
Amortization & overhead	.25
	<hr/>
	\$5.25

\$13.28 - \$5.25 = \$8.03 per ton profit

50 tons per day x \$8.03 = \$401.50 daily profit.

As the gold would be shipped direct to the Mint, no charge has been made for marketing.

On a shipping basis, the cost per ton of ore mined would increase as would the average value of the ore.

Due to the high silicious content, the smelting rate would not exceed \$1.50 per ton for \$20.00 ore.

COSTS: (Con't.)

Based on a shipping grade of \$20.00 per ton:

Mine Cost	\$4.50	per	ton	of	ore	
Trucking to R.R.	2.25	"	"	"	"	(Will be under \$1.)
R.R. Freight	2.00	"	"	"	"	
Smelter Treatment	1.50	"	"	"	"	
Sorting	.25	"	"	"	"	
	<u>10.50</u>					

\$20.00 value - \$10.50 Cost - \$9.50 per ton profit.

50 tons per day - 20% sorting shrinkage, or 40 tons per day x \$9.50 - \$380.00 per day profit.

Sorted ore waste to be later utilized as mill feed. The Octave Mine has a reported average value over approximately 30 years operation of \$13.00 per ton. This ore has been mined and milled with a profit.

The Congress Mine also gave an average value of about \$13.00 per ton on over 650,000 tons produced. The Congress vein width averaged about three feet.

PROPOSED DEVELOPMENT:

The present No. 2, Endependence incline, should be continued downward to a depth of not less than 600 feet. Levels should be driven at 150 foot intervals along the strike of the vein.

Both faces at the 80 foot level show good widths and value where the vein is opened a length of about 150 feet. Drifting should be carried to a length of at least 500 feet on each level and the levels connected with raises at 100 foot intervals.

Using the present exposed ore as a criterion, this work would block out approximately 90,000 tons of ore having a net value on the mill basis of \$722,700.00. This work should be consummated and a mill constructed within 18 months.

Considering the depth of the adjacent Octave property, which is 2300 feet, and the depth of the Congress, which is 3900 feet, the development outlined above for the Rich Hill would block out only a comparatively small portion of the potential ore that should be available in the property. The estimate of 500 feet in length is conservative as there are several shoots having a length of 700 feet in the Octave Mine with widths varying from three to ten feet.

The cost of developing the ore estimated above should not exceed the following:

REPORTS

ON

RICH HILL CONSOLIDATED MINING & DEVELOPMENT COMPANY MINE

INCLUDES

Brief report by Theo. H. M. Crampton, E. M.

Record of sampling taken by Theo. H. M. Crampton.

Record of sampling taken by B.W. Vallat, E.M.

Copy report upon mine, with history of district by
C.F. Karns, E.M.

Records of samples taken by C. F. Karns.

Copy of Report by L. H. Dobson, E. M.