



## **CONTACT INFORMATION**

Mining Records Curator  
Arizona Geological Survey  
1520 West Adams St.  
Phoenix, AZ 85007  
602-771-1601  
<http://www.azgs.az.gov>  
[inquiries@azgs.az.gov](mailto:inquiries@azgs.az.gov)

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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: POLAND

ALTERNATE NAMES:

POLAND-WALKER TUNNEL  
OCCIDENTAL VEIN  
PATENTED CLAIMS MS 1616  
PATENTED CLAIMS MS 1052-1055  
PATENTED CLAIMS MS 3959  
HAMILTON & BELLE

YAVAPAI COUNTY MILS NUMBER: 1087A

LOCATION: TOWNSHIP 12.5N RANGE 1 W SECTION 28 QUARTER E2  
LATITUDE: N 34DEG 26MIN 15SEC LONGITUDE: W 112DEG 21MIN 59SEC  
TOPO MAP NAME: POLAND JUNCTION - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

GOLD  
SILVER  
COPPER  
LEAD  
ZINC

BIBLIOGRAPHY:

USGS POLAND JUNCTION QUAD  
BLM MINING DISTRICT SHEET 223  
ADMMR POLAND MINE FILE  
WILSON, E.D. ETAL. LODE GOLD MINE AZBM BULL  
137 1967 P 39  
LINDGREN, W. ORE DEPTS JEROME & BRADSHAW MTN  
QUADS USGS BULL 782 1926 P 136  
ADMMR POLAND PROPERTY COLVO FILE

POLAND MINE

YAVAPAI COUNTY

~~NE 100, 9, T. 12 N, R. 12 W~~

12.5N, 1W, 28E2

ABM Bull. 137 p. 39  
ABM Bull. 140 p. 101

USGS Bull. 782 p. 136

E&MJ Vol 74 p. 622

Production to 1912 \$750,000  
silver, major metal  
J.W. Still's figures  
(corres. file)

? Ariz. Mng. Journal, August, 1918, p. 17

KAP WR 7-6-78 - Discussed prospecting and exploration plans with Cliff Freeman of the Poland Mine, Big Bug District, Yavapai County. He wants to prospect and explore the property and has requested some guidance. He is also reportedly still trying to resolve his problems with Fred Finnell on the Little Pan Mine. The State Securities Division of the State Corporation Commission is reviewing the Little Pan operation. 10-20-78 bh

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KAP WR 7-7-78 - Frank Hamblin, P. O. Box 1106, Snowflake, and Gary Ellsworth, a Utah resident, who is living at the claim, are prospecting a vein near the Poland Mine in the Big Bur District, Yavapai County. They have been sampling the vein where it has been exposed in road cuts and has requested an engineer to visit the property. 10-20-78 bh

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NJN WR 4/9/82: John Makarchuk with Westwind Construction Inc., P.O. Box 740, Tempe, AZ 85281 - Phone 244-9946 has been in this office several times seeking abandoned mines to use for growing mushrooms. His requirements are that the mine be cool, wet, and obviously dark. Of the mines suggested to him, he reported 2 to 3 months ago that a preliminary examination showed the Poland-Walker Tunnel, Yavapai County to be ideal and that he was going to contact the owners. A visit to the property (the open Poland end) showed no activity or change from a couple years ago.

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DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
FIELD ENGINEERS REPORT

Mine Poland  
District Big Bug  
Subject: Present Status

Date March 23, 1957

Engineer Mark Gemmill

Since the previous report of Jan. 4, 1954 the Ducor Mining & Milling Co. continued development in the winze as mentioned. The winze was also unwatered to the bottom, another 100 ft. Drifting was done on both these levels and although it was reported that no ore of consequence was found, nevertheless a small mill was built on the property. This was not a success, probably the principal reason being lack of ore. The company failed owing considerable money.

The property was idle for some months but eventually was taken over by the U. S. Consolidated Mining Co. This company opened the Poland tunnel practically its entire length to prospect other veins cut by it. It was reported that nothing of interest was found and the project completely abandoned last year.

The property is idle at present.

July 14, 1955

Mr. Ross Reed  
141 N. Marina  
Prescott, Arizona

Dear Mr. Reed:

In response to your letter of July 12, we are requesting our mailing bureau to send you two copies of our Bulletin No. 163.

The Poland mine is credited with a production during 1900-1912 of approximately 1,000,000 pounds of lead, \$300,000 of gold, and \$400,000 of silver, valued in all at \$750,000. The following statements are copied from U. S. Geological Survey Bulletin 782, Ore Deposits of the Jerome and Bradshaw Mountains Quadrangles, by Waldemar Lindgren, page 136.

"A switchback carries the railroad track up to the south portal of the 11,000-foot tunnel. Here the amphibolite borders against the somewhat schistose Bradshaw granite, through which the tunnel is driven. Just west of the portal a 75-foot dike of phylite porphyry crops out, striking N. 30° E. The tunnel intersected several veins, which have been somewhat extensively worked."

The Poland vein was cut 600 feet from the south portal, and the Poland, Hamilton, and Belle claims are located on it. The Poland property is owned by the Murphy estate. Quartzose ore from this vein still lies on the dump. It shows drusy quartz crusts with pyrite and some sphalerite and galena. The vein strikes northeast and dips steeply northwest. A 20-stamp mill on the property was started in 1900 and worked intermittently until about 1912. In 1905 the output was about 75 tons of ore a day. In 1907 it is recorded as producing \$130,465 in gold and 16,609 ounces of silver. There has been a great production, probably mostly in silver; the value of the output is estimated at \$750,000. A shaft was sunk, it is said, to a depth of 325 feet below the tunnel level."

"The Accidental vein, carrying gold, silver, and lead, is said to have been cut 500 feet from the north or Walker portal; from accounts this was similar to the Poland vein and was followed to a depth of 200 feet below the tunnel level. It had some production."

Trusting this material to be what you desire,

Sincerely yours,

C O P Y

DEPARTMENT OF MINERAL RESOURCES

FIELD ENGINEERS REPORT

MINE - YAVAPAI AREA  
TO: R.I.C. MANNING, Director  
SUBJECT: Present Activities

DATE: Feb. 24, 1954

ENGINEER: Mark Gemmill

POLAND MINE

Development work at this property continues with 8 men presently employed. A small shipment of ore to the Iron King Mill was made recently for test purposes. The mine is being operated by the Ducor Mining and Milling Company, H. H. Records Genl. Mgr. Box 13, Prescott Ariz. Louis Dandrea, Mayer, Ariz., is mine foreman.

DEPARTMENT OF MINERAL RESOURCES

News Items

Date Jan. 4, 1954

Mine Poland

Location About 8 miles west of Humboldt

Owner James Reed

Address James N. Reed

141 N. Marina, Prescott, Ariz.

Operating Co. Ducor Mining & Milling Corp. / Lessee

Address Monterey Park, Calif.

Pres.

Genl. Mgr. H. H. Records, Monterey Park, Cal

Mine Supt. Louis Dandrea, Mayer, Ariz.

Mill Supt.

Principal Metals Gold, Silver, Copper, Lead Zinc

Men Employed 7

Production Rate Exploration work only

Mill, Type & Capacity none

Power, Amt. & Type 365cfm Diesel Compressor

Signed Mark Gemmill

(Over)

C O P Y

February 13th, 1945

Mr. Brent N. Rickard  
American Smelting & Refining Company  
Valley National Bank Building  
Tucson, Arizona

Dear Rickard:

Following our little talk concerning the Poland Tunnel and the expression of your desire for some additional information concerning the history of the same, I looked up a few notes that I had here in the office and have written up the enclosure which you may find of interest. Perhaps you would want to pass the extra copy along to Mr. Gerard who has now acquired the Postmaster Mine, and with whom you had talked over the matter before I saw you. I remember that he approached me some time ago in reference to some details concerning the old workings in the Postmaster, but they were carried on long before my time, and I could not help him to any extent.

The Walker-Poland District owed its activity to quite remarkable surface showings and the early production of some very high grade ore from near the surface workings in various mines. However, most of these properties were taken over by irresponsible promoters or concerns which were principally interested in stock market operations and as far as I have been able to learn there were very few constructive attempts to solve the metallurgical problems on which the profitable operations of the mines were absolutely dependent. The entire district had a bad black-eye before I first came out in 1914 and was generally shunned by all of the larger mining companies.

At one time, - when Julius Kruttschmidt was acting as Consulting Engineer for the Sheldon Mining Company, - I was given to understand that the American Smelting and Refining Company very seriously considered taking an option on that mine along with several others in the Walker-Poland District and carrying on extensive exploration and development. No doubt you have a fairly complete file covering the possibilities and since I understand that it is again the policy of your company to seek to expand your mining activities, I suggest that this district should be given careful re-consideration.

I do not believe that you would be likely to develop any one very large body of ore, but I think that from several small or medium sized workings in comparatively close proximity a very substantial aggregate tonnage might be derived and profitably treated by modern methods in one centrally located plant.

I have a great deal of data concerning various individual mines or prospects in this district and vicinity, and some of it might be useful to any one else who decided to give the situation serious consideration.

Hope we shall meet againsoon. Best regards,

Sincerely,

GMC/b  
Enclosures 2

GMC

DEPARTMENT OF MINERAL RESOURCES  
State of Arizona  
Field Engineers Report

MINE Poland

Date Jan. 4, 1954

DISTRICT Walker

Engineer Mark Gemmill

SUBJECT: Present Operation

OWNERSHIP AND LOCATION

The property consists of about 200 acres of patented ground located about 2 miles directly east of Walker and about 8 miles west of Humboldt by road. It is owned by James Reed of Prescott and now leased with option to buy, to Ducor Mining and Milling Corp. Monterey Park, Calif.

HISTORY

Available records indicate that work on the mine started about 1885. Development consisted of tunnel work from which considerable was mined, much of which was shipped to smelters. Later on a mill was built which was not very successful in treating the refractory ores, of the property, which carried in addition to gold and silver, copper lead and zinc. It is reported that gold values predominated near the surface and that some very high grade ore was produced. About 1900 the mine was acquired by the Frank Murphy interests. A railroad was built from Poland Junction near Humboldt and extensive development work at the mine followed. A Xcut tunnel was driven from Poland through the mountain to the Mud Hole mine on the Walker side. This tunnel cut several other veins as well as the Poland vein at depths ranging up to 700 ft. The veins were explored from the tunnel level but apparently not much profitable ore was found anywhere. All ore in the Poland vein above this tunnel level appears to have been mined. There is no production record of the property available. The property was closed down about 1907 and with the exception of some small leasing operations, nothing further has been done until now.

PRESENT OPERATIONS

The present operators since acquiring the property recently have cleared the Poland Tunnel in to the Poland vein, a distance of about 800 ft. In a drift a short distance south of the intersection they found a winze reported to be 300 ft. deep. They have unwatered the winze to 100 ft. where they have started drifting both directions on the vein. The drifting has just started and thus far no ore of any consequence has been encountered.

The property is well equipped for the present work and the operators appear to be prepared to spend considerable money on exploration. H. H. Records is Genl. Mgr. and Louis Dandrea is Mine Foreman.

## RE POLAND TUNNEL & TRIBUTARY RESOURCES

Some time in the early 1890's a mining promoter named George M. Middleton became active in Yavapai County and built a gravity concentration mill near the present town of Humboldt where ores from mines in that district, including those which originated around Prescott and Mayer and along Lynx Creek and Big Bug Creek, were treated on a custom basis. In or about 1895 the Val Verde Smelter equipped with a copper blast furnace was erected close to the Middleton Mill to treat concentrates as well as direct smelting ores originating in that vicinity. A man named Cecil G. Fennell was instrumental in organizing and financing the company which built this smelter and which was in some way connected with the Middleton Mill and also with the Arizona Exploration Company which had acquired and was operating the Blue Bell and De Soto copper mines south of Mayer.

Meantime Frank M. Murphy of Prescott and his associates were actively developing and operating a number of mines around Crown King and also in the Poland and Walker Districts and they built the Prescott and Eastern Railway from Prescott out through Humboldt and Mayer to Crown King with a branch line from Poland Junction ( $4\frac{1}{2}$  miles beyond Humboldt) following 9 miles up Big Bug Creek to its source at Poland where the Poland Mine, owned by the Frank Murphy interests was located.

From about 1895 to 1902 there was much mining activity at and near the old camp of Walker which was located along the head waters of Lynx Creek and separated from Poland only by a steep ridge of granite and either the Middleton or the Murphy interests built a custom mill at Walker and connected this by a narrow gauge railway with several of the producing mines of that district, including the Major and the Crescent (now the Sheldon) and the Mudhole and Occidental. The grade of this old track and foundations of the mill may still be seen and I was once showed an old map of the entire railway and photos of the ore trains which were pulled by mules.

When it was known that the railway would be built to Poland it obviously became advantageous to arrange for a connection with Walker and this was accomplished about the year 1900 by driving a tunnel thru the granite ridge for a distance of 8400' (frequently mis-stated as being 11,000') thru which cars of concentrates and ore were pulled by mules from Walker to Poland and stored in bins from which they were loaded into the standard railway cars. The cost of this tunnel was stated to have been in excess of \$500,000.00.

I cannot find a record of just which outfit drove this tunnel, but it appears that both the Middleton Company and the Development Company of America, which was a holding company for several of the Murphy interests had a hand in it, although by 1907 the control appears to have been held by the Mudhole Mining Company who may have participated in its construction.

The tunnel (of which I have a map) cut the Poland Mine workings 800' from the south (Poland) portal and further along cut the Mudhole Mine workings and the Occidental Vein about 500' from the north (Walker) portal.

In 1904 the first Consolidated Arizona Smelting Company acquired the mines of the Arizona Exploration Company, also the Middleton Mill and Val Verde Smelter, both of which were dismantled as soon as a new smelter was completed at Humboldt. The Consolidated Arizona Smelting Company was promoted by John F. Elliot and was partly financed by the Santa Fe Railway, which had purchased from Frank Murphy and his associates the Prescott and Eastern Railway including the main line from Prescott to Phoenix (via Congress and Wickenburg) and the branches from Prescott to Crown King and to Poland.

Apparently the Poland tunnel was constantly used for shipments from the mines at Walker until the latter part of 1907 when the Mudhole and practically all of the other mines in the camp were shut down. The tunnel was then idle until 1915. It was then reopened at the time that I first went thru it, and ores from the Sheldon and other mines were hauled thru the tunnel by mules

until 1921 when the Humboldt Smelter suspended operations for over a year.

During 1922 the Sheldon Company purchased the ownership of the tunnel and reconditioned it with heavier rails and new equipment including a gasoline locomotive and from that time forward operations were continuous until the smelter and all of the mines in the district were closed down in 1930.

I have not personally visited this tunnel since 1930, but since the solid granite stands well and, as I recall, required very little timbering, I imagine that it could be put in good shape at small expense beyond the cost of replacing the track.

The mines at Walker and those located along Poland Gulch generally contain a more or less complex ore. The Sheldon, which was by far the largest producer, was essentially a copper-lead mine with substantial values in silver and gold, especially in the upper levels where there is still much country that has never been explored. The Postmaster operating from 1898 to 1906 produced some rich gold ore, also silver, copper, lead and zinc. The Mudhole and the Occidental were primarily gold mines, while the ore from the Poland Mine, which produced from 1900 to 1912 carried mostly lead with some gold, silver, copper and zinc. These five metals in varying proportions are found in nearly all of the mines but in cases where the zinc predominated they were but little developed since economic conditions have never made zinc production profitable in that district.

At the time the railway was built from Poland Junction to Poland I was told that for every mile of track there was a mill in operation and many smaller mines were developing or shipping crude ore.

The very incomplete records compiled by the Arizona Bureau of Mines credit the mines along the upper portion of the Big Bug, including those at McCabe and Chaparal (where values were nearly all in gold) with a production

valued at \$7,700,000 while the output of only 3 mines is recorded at Walker with aggregate value of \$1,675,000. Both of these figures, especially the latter, appear to be much too low.

I am sure that anyone looking over those districts today, even though almost all of the underground workings are inaccessible, could not fail to be impressed with the great number of old openings and the quantity and variety of ore that may be noted in the outcrops and on the dumps.

Time and again while I was operating the Humboldt Smelter and Mill, we found ourselves unable to cooperate with the mine operators because we were only equipped to recover copper, gold and silver and at that time there was no local market for their lead and zinc.

I presume that this last handicap has now been removed thru the operation of the mill at the Iron King Mine, but on the other hand, transportation conditions have deteriorated since 1930 and few of the mines are owned by parties who have sufficient financial resources to permit their reopening except with the aid of Government loans, which last nearly always involved constant inefficiency and contributed to ultimate failure.

/s/ G. M. Colvocoresses

2/13/45

## POLAND MINE

"Extract from report of Bradshaw Mines Inc. made in 1936, presumably by Morris Elsing."

\* \* \* \* \*

The Poland Mine is owned in fee by Bradshaw Mines, Inc. and is located in the Big Bug, Walker Mining Districts between Poland and Walker about 21 miles by road from Prescott and about 7 miles by airline from the Davis-Dunkirk. The property consists of twenty-one patented claims covering the length of the old Poland-Walker tunnel and about 4,800' of the Poland vein. Reports and records of former owners show development work of 16,150' but only 37.8% accessible.

The Poland-Walker tunnel was driven about 8,000' through a granite ridge and was used by the Sheldon Mine to haul its concentrates from Walker to Poland. The Poland vein, which was cut 800' from the south portal, strikes northeast with a steep dip to the northwest. This is a strong vein, opened from the Poland-Walker tunnel, but in the north drift, re-opened in 1933 to 1,400', the vein is readily accessible for inspection and sampling. The ore is a drusy quartz mineralized with galena, sphalerite, pyrite, and chalcopyrite.

The old Poland tunnel, some 210' above the main drift, opened the vein for some 2,400' now caved at both ends and inaccessible at present. From this drift the Belle stope was carried to surface in a good grade of shipping ore. The same ore shoot was mined to some extent from the main drift below but is now inaccessible from this point.

The development on the Poland vein has been quite extensive, and re-opening of now inaccessible portions will provide more data on which to base future operations.

The Occidental vein, cut about 500' from the north portal of the Poland-Walker tunnel and followed to a depth of 200 feet below the tunnel level is now inaccessible but was reported to be similar in extent and value

to the Poland vein. According to reports the Occidental vein has been very little developed and is an additional possibility for future exploration.

In addition to the Poland and Occidental veins, there were several other ledges cut by the Poland-Walker tunnel. Among these is the C.O.D. vein, which has never been developed but appears to promise ore of commercial grade. Although the tunnel was driven for haulage purposes, it has proved of considerable value in exploration of the ridge as a whole. Many of the smaller veins cut by the tunnel have no surface out-croppings but may be evidence of deeper ore deposits which are worthy of further examination.

C  
O  
P  
Y

DEPARTMENT OF MINERAL RESOURCES

News Items \_\_\_\_\_ Date 8/8 /40(?)

Mine POLAND DUMPS

Location \_\_\_\_\_

Owner LEASE TO

Address K.D. TERRELL  
MAYER.

Operating Co. \_\_\_\_\_

Address 5 MEN

Pres. SCREENING &

Genl. Mgr. TABLING DUMPS.

Mine Supt. \_\_\_\_\_

Mill Supt. \_\_\_\_\_

Principal Metals \_\_\_\_\_

Men Employed \_\_\_\_\_

Production Rate \_\_\_\_\_

Mill, Type & Capacity \_\_\_\_\_

Power, Amt. & Type \_\_\_\_\_

Signed JK.

(Over)

GEORGE A. PACKARD  
MINING ENGINEER  
50 CONGRESS STREET, BOSTON, MASS., U. S. A.  
CABLE ADDRESS, GEOPACK, BOSTON

REPORT ON THE PROPERTY OF THE

SHELDON MINING COMPANY

WALKER MINING DISTRICT, YAVAPAI COUNTY

ARIZONA

Boston, Mass.

February 1931.

By

George A. Packard

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REPORT ON THE PROPERTY OF THE  
SHELDON MINING COMPANY  
WALKER MINING DISTRICT, YAVAPAI COUNTY  
ARIZONA

INTRODUCTORY

The report is accompanied by eight maps and five charts showing the location of openings, geology, assays and practically all of the data upon which the conclusions reached are based. Lists of the cuts, shafts, tunnels, etc. with brief descriptions and the results of assays of samples, when any were taken, are also appended, p. 37, in numerical order. I regret the unsystematic manner in which the numbers occur on the claims, a result of the fear that snow might stop the work if time were taken to complete the preliminary survey before beginning the examination.

The surface map is based on a compass survey, tied in at occasional claim corners. It was made by Jesse L. Maury of Butte, Montana, assisted by Mr. Lecklider of the mine staff, who also made the assays. Mr. Maury also assisted me in the sampling and study of geological conditions.

For the purpose of studying relative underground conditions the highest two and lowest two levels are mapped in

detail. Because the timbering conceals much of the vein only the unusual geological features which can be seen are shown.

#### THE PROBLEM

The problem is to determine if geological and operating conditions justify further exploration either at depth or laterally in the Sheldon Mine, or at any other point on the property.

#### PROPERTY

The Sheldon Mining Company owns nearly forty claims, most of which are patented. The area is over 500 acres. It covers 7000 feet on the Sheldon vein system, as well as 3000 feet or more on the Capital, Eureka and Mudhole vein systems.

The mine is equipped with a double drum electric hoist, good for 2000 feet, with a capacity of 300 tons a day. There are both skips and cage. There are two good compressors of 750 feet capacity each, or enough for 15 or more drills, and also a 200 foot compressor and 25 H P hoist which could be used for exploration. There is a concentrating mill with a capacity of 180 tons for 24 hours and a filtering and drying plant which is located at Walker, nearly a mile below.

There are good office buildings, warehouse, assay office, boarding house, a comfortable manager's residence and separate bunk-houses for the employees.

The Company also owns the Poland Tunnel which includes a narrow gauge road through the mountain, by which

concentrates are shipped directly to the Prescott and Eastern Railroad.

LOCATION

The property is 15 miles southeast of Prescott by road, 5 miles being State highway, the balance over low hills on a very good grade, but offering some difficulties in muddy weather. However, the Poland connection with the railroad permits shipments of supplies and concentrates in and out.

The mine is about 15 miles from the Humboldt Smelter, which is not now operating.

NATURAL CONDITIONS

The property is in the Bradshaw Mountains at an elevation of 6200 to 7100 feet. The country is rough but not precipitous. The vertical projection of the Sheldon vein system gives a fair idea of the topography. A depth of 200 feet is the greatest which can be gained by a tunnel of reasonable length. The water from the mine supplies the mill and results are used for domestic purposes. The climate is excellent. This is not in the desert region with oxidation extending to great depths but sulphide ores are found close to the surface and the country is covered with pine, spruce and other timber.

HISTORY

Piles of rock along the road below the mine tell the story of early placer operations. Following that period

stamp milling of the oxidized surface ores was carried on during the latter part of the last century. As the ores became base at a depth of 100 to 250 feet, it ceased to be possible to save the gold by amalgamation; shipping concentrates did not pay, the grade also became low and milling ceased. When the Humboldt Smelter was built it offered opportunity to ship some of the richer base ores. After this, the present Sheldon mill was constructed and operations started in 1924 and continued up to March 1927, when work was stopped to permit enlarging and deepening the Sheldon Shaft. The mill was again operated the latter part of 1929 and up to October 1930.

Lindgren in United States Geological Survey Bulletin 782, gives the Sheldon production up to 1922 at about \$200,000.00, and credits the Mudhole with a production of \$400,000.00. The latter was formerly called the Penn Gold, later the Penn Arizona, and shipping returns show the ore carried gold, silver and lead. There was also considerable production from the Eureka and Capital vein systems, though neither would approach either of the figures given above. The mill treated 62,473 tons prior to 1929, and since then enough to bring the total well up to 100,000 tons. There was also some crude ore shipped directly to the smelter.

#### GENERAL GEOLOGY

The geology of this vicinity has been studied by Professors Jagger and Palache and later by Dr. Lindgren.

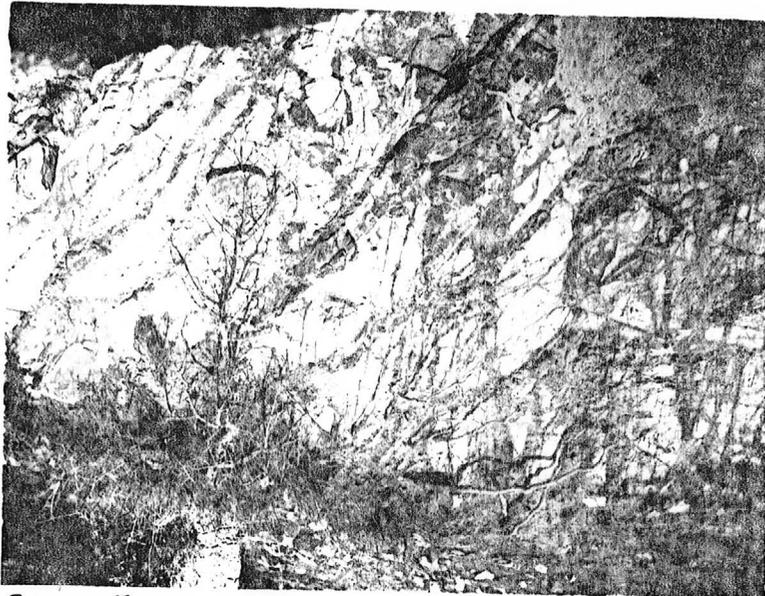
Their reports are published in Folio 126 and Bulletin 782 of the U. S. Geological Survey.

The formations with which we are concerned are listed below, the oldest at the bottom:

<u>Material</u>	<u>Period</u>	<u>Era</u>
Soil and gravel Rhyolite	Quaternary Tertiary	Cenozoic or Recent
Granodiorite or quartz-diorite	Tertiary or Cretaceous	Mesozoic or Intermediate
Sediments now all eroded away	Carboniferous to Cambrian	Paleozoic
Bradshaw granite Yavapai schists	Algonkian or Pre-Cambrian	Archean

While some other rocks were found in the vicinity they have no influence on the mineralization and are not discussed.

The oldest rocks on the property are the Yavapai Schists which, as shown on the large claim map, are found at the east end, on the Snow Flower, Golden Fleece, White House, Midnight Snap, The Penn, and to some extent on the Eureka and Monroe. They vary in character from thin schists to compact slates. Near the Mudhole Tunnel and elsewhere on that group some of them had such an appearance that the term gneissoid granite was adopted as a field name, and has been used on the map, though these undoubtedly are not the metamorphosed



CROSS FRACTURES IN FOOTWALL OF SHELDON  
VEIN, CNo. 1A, NORTH FACE.



SCHISTS AT PORTAL OF MUDHOLE TUNNEL

Bradshaw Granite of the region but interbedded igneous rocks in the original sediments making up the Yavapai Schists. The schists here have a general northeast direction and dip to the southeast, varying from  $40^{\circ}$  to nearly vertical. Near the contact with igneous rocks they are often hard, compact, and more or less silicified, and mineralized. An interesting example, on a small scale, was a block of schist about 10 by 20 inches in the granodiorite near the southwest corner of the Eureka, which showed a narrow seam of segregated quartz around it, and the entire block had absorbed enough copper so that on exposure it had oxidized with the formation of a thin film of copper carbonate over the entire schist surface. Near S 27 on the Midnight Snap the rock is dark, fine-grained, and crystalline with fine pyrite and traces of chalcopyrite scattered through. A photograph herewith shows the nearly vertical schists at the portal of the Mudhole Tunnel.

The schists on the Mudhole group are hard, compact, fine-grained, and jointed nearly vertically at right angles to the strike. On the Mudhole and in the Eureka Tunnel are bodies of amphibolite schists.

The Bradshaw Granite is later than the schists and intruded into them. It is classified as probably Algonkian. It was not observed anywhere on the property though it cannot be far to the south and west of the Monroe, Lovelock and Dyson claims.

Some 20 miles to the northeast there are Paleozoic sandstones and limestones, but around Walker these are all eroded away. Their only interest lies in the evidence that this area was probably covered by them at the time the veins were formed.

The granodiorite, called "quartz-diorite" by Jagger and Palache, is the prevailing rock on the greater portion of the Sheldon property. As shown on the map practically all of the Sheldon and Capital vein systems are in this formation. As seen underground it is a rather coarse grained, light gray, granitic rock with considerable hornblende and biotite. On the surface it weathers into darker gray spheroidal boulders in the regions where there is little mineralization, as along the west end of the Eureka, New State and New Strike claims. Near the vein systems it alters to a light brown, with dark brown to dull red coloration from the oxidation of the pyrite.

As a petrographic examination of the rocks was to be made elsewhere it was decided to be unnecessary for the purpose of this report. The impression had in the field was that all of the granodiorite contains a little very fine pyrite, that near the vein this increased, but is more plentiful in some areas than others, and especially along fractures. Near the Sheldon No. 1 Shaft (S 2) and on the American Flag and Ninety Eight claims, pyrite and the iron oxides from it, are abundant. In the 600 crosscut near the vein this is notable, but on the 1250 there is a marked decrease.

It would appear that the granodiorite must also contain a very small amount of copper, otherwise it is difficult to account for its presence along the contacts with included blocks of schist.

This granodiorite is intruded into the schists in a somewhat kiteshaped "stock" having the broad end toward the northeast, with a length of about three miles; the greatest width is one mile. At the northeast, on the Eureka, Midnight Snap and White House, tongues of this penetrate the schist and many irregular contacts are found both in the horizontal and vertical planes. Besides the metamorphism of the schists already mentioned there are sometimes changes in the composition of the granodiorite, from the absorption of the schist.

The granodiorite is obviously younger than the schists, and the Bradshaw Granite, as it intrudes both in the vicinity of Walker. Jagger and Palanche refer to it as the youngest intrusive in the region but on their map assign it as probably late Algonkian. Lindgren gives the following analysis of a specimen of the granodiorite from the Sheldon.

Silica	65.74
Alumina	16.76
Ferric Oxide	3.99
Magnesia	1.70
Lime	3.78
Sodium Oxide	3.37
Potassium Oxide	3.55
Loss on ignition	.99
	<u>99.88</u>

He states that -

"The pre-Cambrian of Arizona contains few if any rocks of this composition, but the rock agrees closely with the intrusives of Jurassic or later age which are so abundant in the western coast region of North America. The probability is strong that these masses were intruded in Cretaceous or early Tertiary time."

At the west end of the Independence claim to the north of Sheldon vein croppings is a small area of basic igneous rock, not seen in place. This is intruded in the granodiorite. There is no indication of any influence on the ore occurrence and no work was done on it. As basic dikes are more generally formed earlier than acid ones it is probably between the granodiorite and rhyolite, perhaps Cretaceous.

Rhyolite occurs as a wide dike on the Golden Fleece No. 3, in the Eureka Tunnel, and at one point on the Ninety Eight claim. The Mudhole mine was reported as working (1905) two veins having a rhyolite dike between them. This is probably at the shafts now inaccessible.

As the rhyolite intrudes not only the schists but the granodiorite it must be considered as late Cretaceous or Tertiary and is provisionally assigned to the latter by both Jagger and Lindgren. After his examination of the Bradshaw Mountains region Lindgren reported these acid dike rocks as "most intimately connected with the mineralization". No rhyolite was seen anywhere near the Sheldon vein except on the Ninety Eight but it is possibly associated with the miner-

alization here as a subterranean source of the mineral bearing solutions; and also its intrusion in the vicinity may have contributed to the compression.

#### AGE OF VEINS

The period in which the veins were formed is important because veins of the Tertiary Period have not been found to persist to a depth of more than 3000 feet while those in the Pre-Cambrian often continue to great depths. Those veins which are directly associated with the rhyolite, such as the Mudhole system, must be considered as Tertiary. So far as seen they differ in character from the veins in granodiorite, containing much less quartz, more zinc and lead, and with less fracturing.

The veins in granodiorite, those of the Sheldon and Capital systems, show much more movement, and some possible re-opening, or more probably a longer continuous period of mineralization. While it is possible they belong to a different period, we are confronted with Lindgren's opinion that the granodiorite is probably late Cretaceous or Tertiary, and there is no higher authority. How much of these veins has been eroded cannot be known. The placers prove that a portion is gone and it is very possible that a large part of the original 3000 feet has been removed. It is certain that minerals formed at high temperatures are lacking and the ore was not deposited at extreme depths.

### VEIN STRUCTURE

The ore occurs in veins in the granodiorite and the schist, on the contact of these, and on the contact of the schist and rhyolite. The veins are all steeper than  $40^{\circ}$ , and only those in the schists are flatter than  $60^{\circ}$ . For convenience they may be considered as divided into the Sheldon, Capital, Bureka, Mudhole and Monroe vein systems. They have a general northeast to southwest strike and the majority dip to the southeast, a few to the northwest. Some Capital and Sheldon veins appear to converge toward the northeast but there are also diverging branches.

The Sheldon vein system is unquestionably the major fracturing of the district. While there is no continuous outcrop it is exposed at frequent intervals for the entire length of the property, over 7000 feet (including the Independence). It is by no means a simple fissure with long straight walls but a complex fracture, with diverging and converging splits and seams, which require frequent crosscutting or long-hole drilling to make sure that a paying portion has not been left unopened. This is indicated by the croppings as shown on the large property map, and is also shown on the map of the upper two and lower two levels of the Sheldon mine. The divergence of the 450 Level southwest, the splits in the 650 northeast face and the 1100 southwest face are striking examples easily seen. There are many others less obvious. It is shown in better detail on the plans of the Shelton and Victory Tunnels.

In spite of these splits there are on the upper levels long straight stretches of 200 to 400 feet with smooth walls and continuous ore. On the lower levels these decrease in length or are lacking as may be seen on the map of the upper and lower levels. While this may in part result from the mining method the indications are that with depth the fracture is becoming more irregular and will gradually die out.

For consideration of the vein formation the Sheldon and Capital systems, and very likely the Eureka, should be looked upon as a unit. The indications are that these are compression fractures and that the pressure came in a northwest-southeast direction causing the northeast-southwest fracturing, and perhaps the rising of the wedge shaped block between the Sheldon foot-wall and the Capital and Eureka systems.

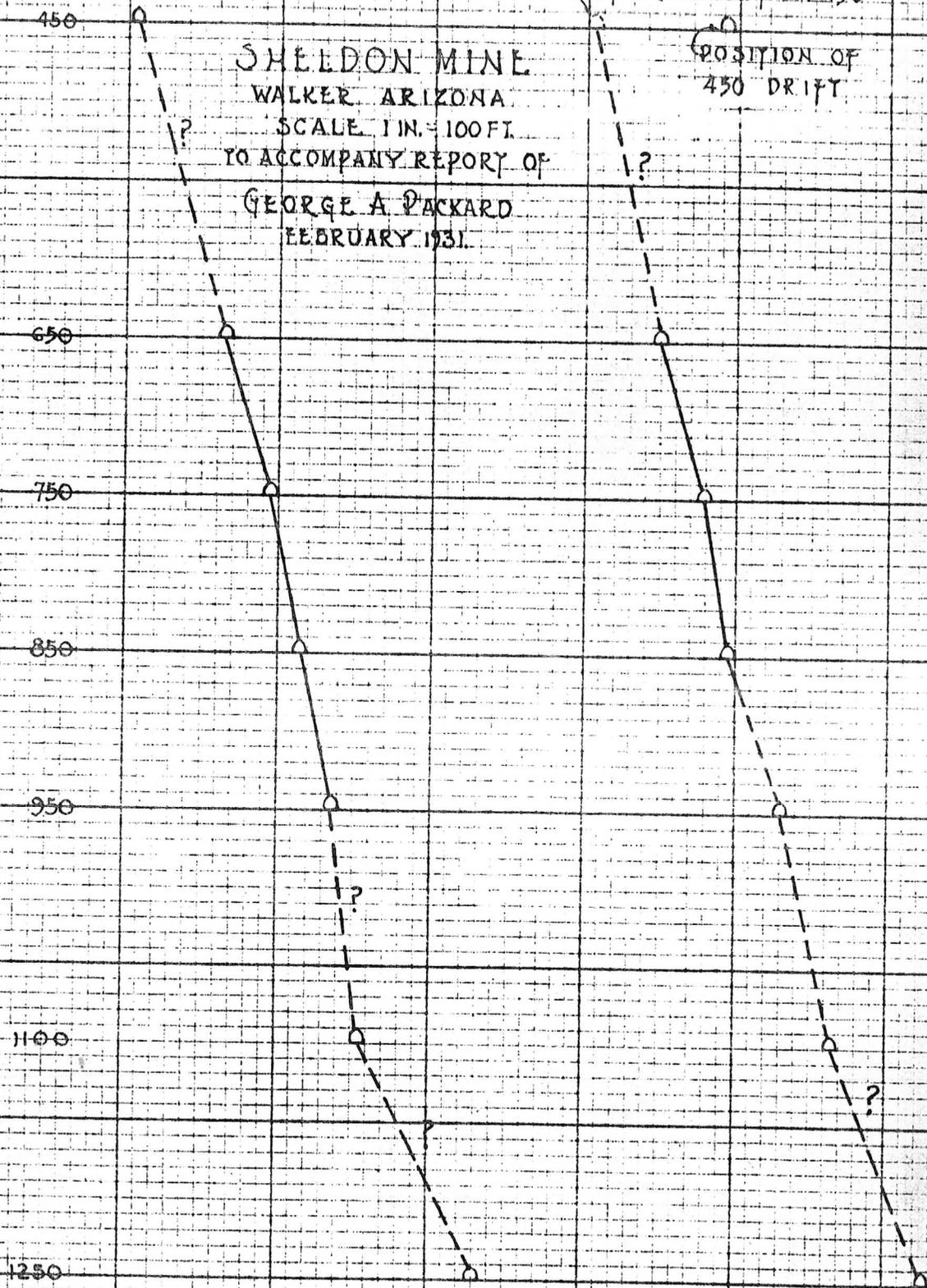
The structure in the cross-section is indicated in part by the photograph of the cross-fractures in the north face of Cut No. 1 A. Here the Sheldon Vein (not shown) is just to the right of the picture, dipping vertically, parallel to the fracture at the right side of the photograph. It can be easily seen that pressure from either northwest or southeast might cause these fractures with a northwest dip.

Another feature interpreted as denoting compression is the occurrence of slightly rounded, angular irregularities in the walls, as shown on the maps of the levels. There is no evidence that these are cross fissures existing prior to the formation of the vein as one would naturally infer. They have no relation to the ore occurrence.

SHELDON MINE  
WALKER ARIZONA  
SCALE 1 IN. = 100 FT.  
TO ACCOMPANY REPORT OF  
GEORGE A. PACKARD  
FEBRUARY 1931.

PROBABLE LOCATION  
OF ORE SHOOTS ON 450

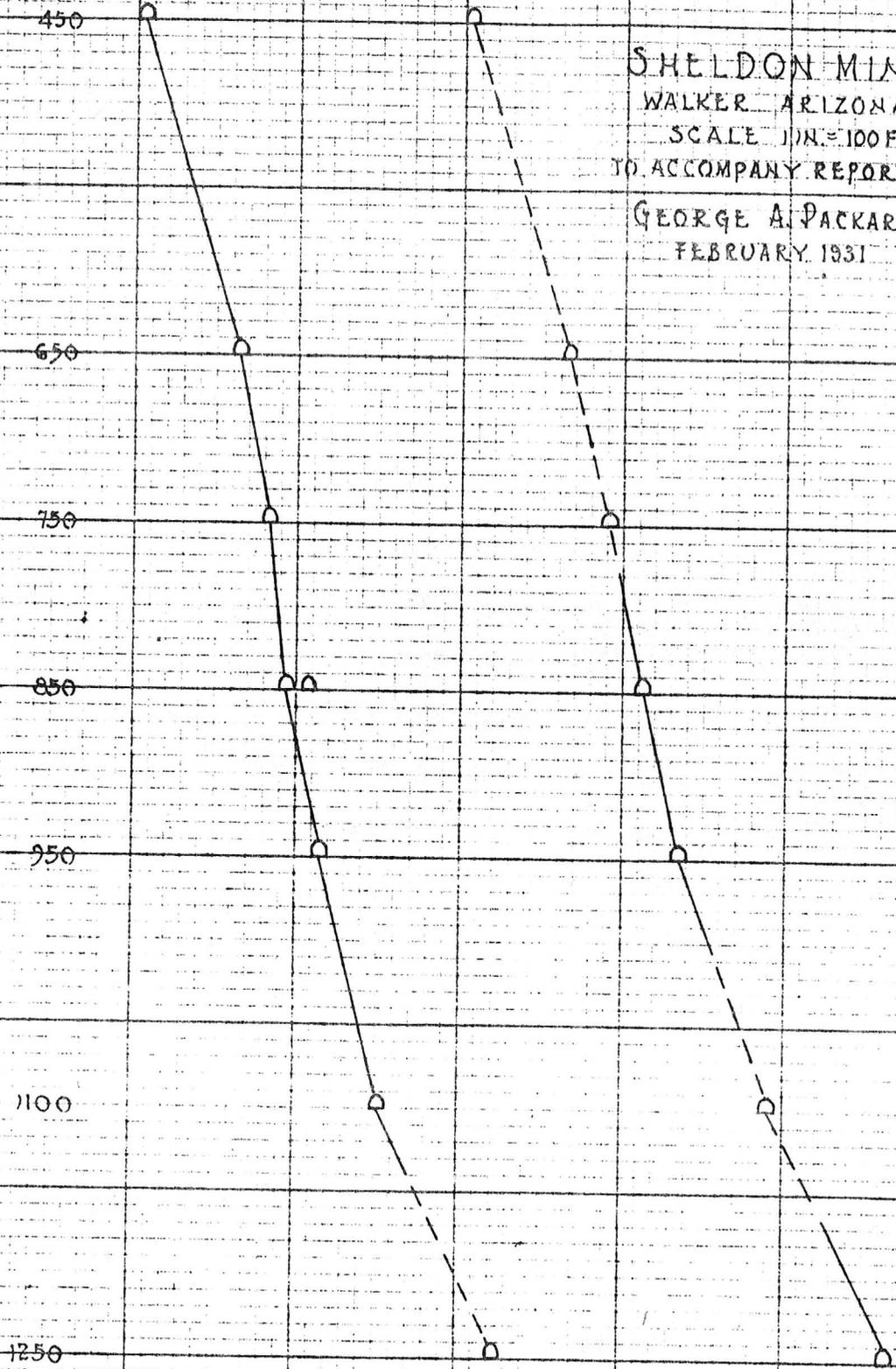
POSITION OF  
450 DRIFT



CROSS SECTION A-A  
NO. 4 SW. ORE SHOOT  
460 FT. SOUTH OF  
SHAFT LOOKING N.E.

CROSS SECTION B-B  
360 FT. SW. OF SHAFT  
LOOKING N.E.

SHELDON MINE  
WALKER, ARIZONA  
SCALE 1 IN. = 100 FT.  
TO ACCOMPANY REPORT OF  
GEORGE A. PACKARD  
FEBRUARY, 1931



CROSS SECTION DD  
NO. 1 ORE SHOOT  
150 FT. S.W. OF SHAFT  
LOOKING N.E.

CROSS SECTION CC  
50 FT. S.W. OF SHAFT  
NO. 5 ORE SHOOT  
LOOKING N.E.

Near the surface in the vicinity of the Main Shaft the dip is very steep, 80 to 90°, but with depth it flattens and the accompanying cross-sections through the mine workings show that this increases below the 1100 Level.

Along the Sheldon vein there is often from one-sixteenth to one inch or more of gouge, sometimes on the foot wall, sometimes on the hanging wall, sometimes on a plane within the vein, or in two places in the vein showing that movement under pressure continued during the formation of the vein. There is however very little evidence of grinding or brecciation of the ore. Some gouge is also found along the Capital vein as in T 10, and the parallel veins as in S 15 T. The veins in the Eureka Tunnel are generally frozen to the wall, or have little gouge. It is very possible all these may have originally been cooling cracks, and most of the veins in the Eureka Tunnel nothing more. The existence of veins of a type similar to the Sheldon and Capital in the schists of the vicinity however indicate that cooling cracks had little influence on their formation.

In the Sheldon Mine, beyond a split, the vein sometimes pinches to a few inches, though always so far as observed, with one wall well marked. The appearance of the exposures to the northeast on the Champion and Fortune suggests that there may be a very narrow connecting vein at intervals between wider sections like the face of the 650 level and the curved stope at C 18. And there is some suggestion of a "horsetail

formation" such as is occasionally found in other districts.

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The Sheldon veins apparently have an average width of something more than four feet, based on the figures on the mine maps and what can be seen on the levels; but the impression given by the stopes is that the width is somewhat greater. In places the vein is as much as 20 feet wide, not only in the stopes underground, but on the surface to the southwest. This is not entirely quartz, but with included bands of altered, mineralized country rock. No such wide exposures were noted to the northeast of the Main Shaft.

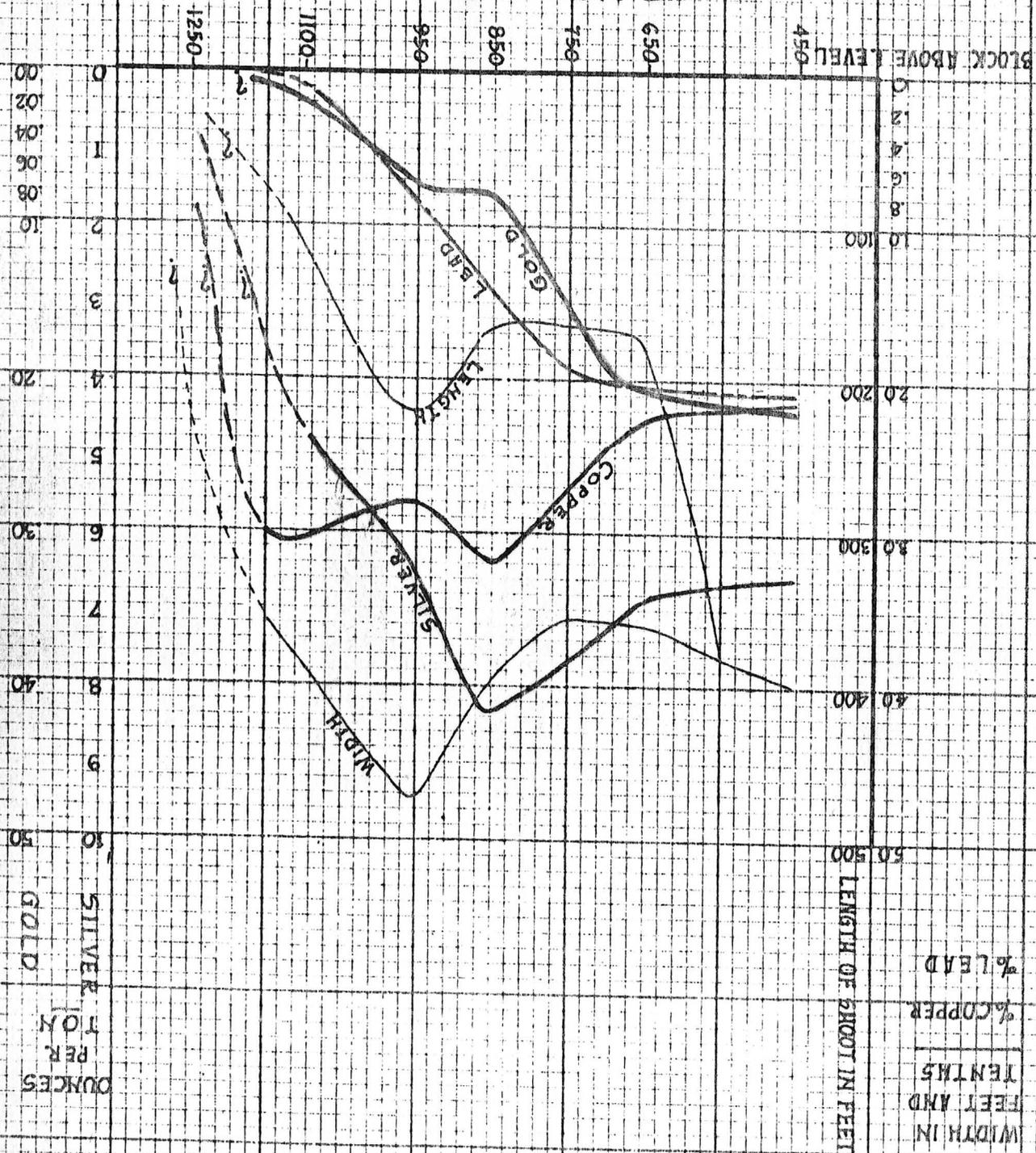
On the accompanying charts of the five ore shoots opened is a curve showing the average width of each as reported on the mine maps. It will be noted that the maximum width is reached between the 750 and 950 levels.

The veins of the so-called Eureka System on the Midnight Snap and northeast end of the Eureka are generally of a different character. They are quite commonly on the contact of the schist blocks with the intruded granodiorite, sometimes merely a mineralized tongue of granodiorite. To the southwest as we get away from the schist many disappear. They are usually narrow. There is little gouge.

The principal Mudhole (Snow Flower) vein was seen only in a cut, the old shafts being inaccessible. Wm. Casey reports the new shaft to be in the foot wall. From what could

WIDTH AND ASSAYS AT DIFFERENT LEVELS AS SHOWN  
 BY MINE MAPS - JAN. 1930.

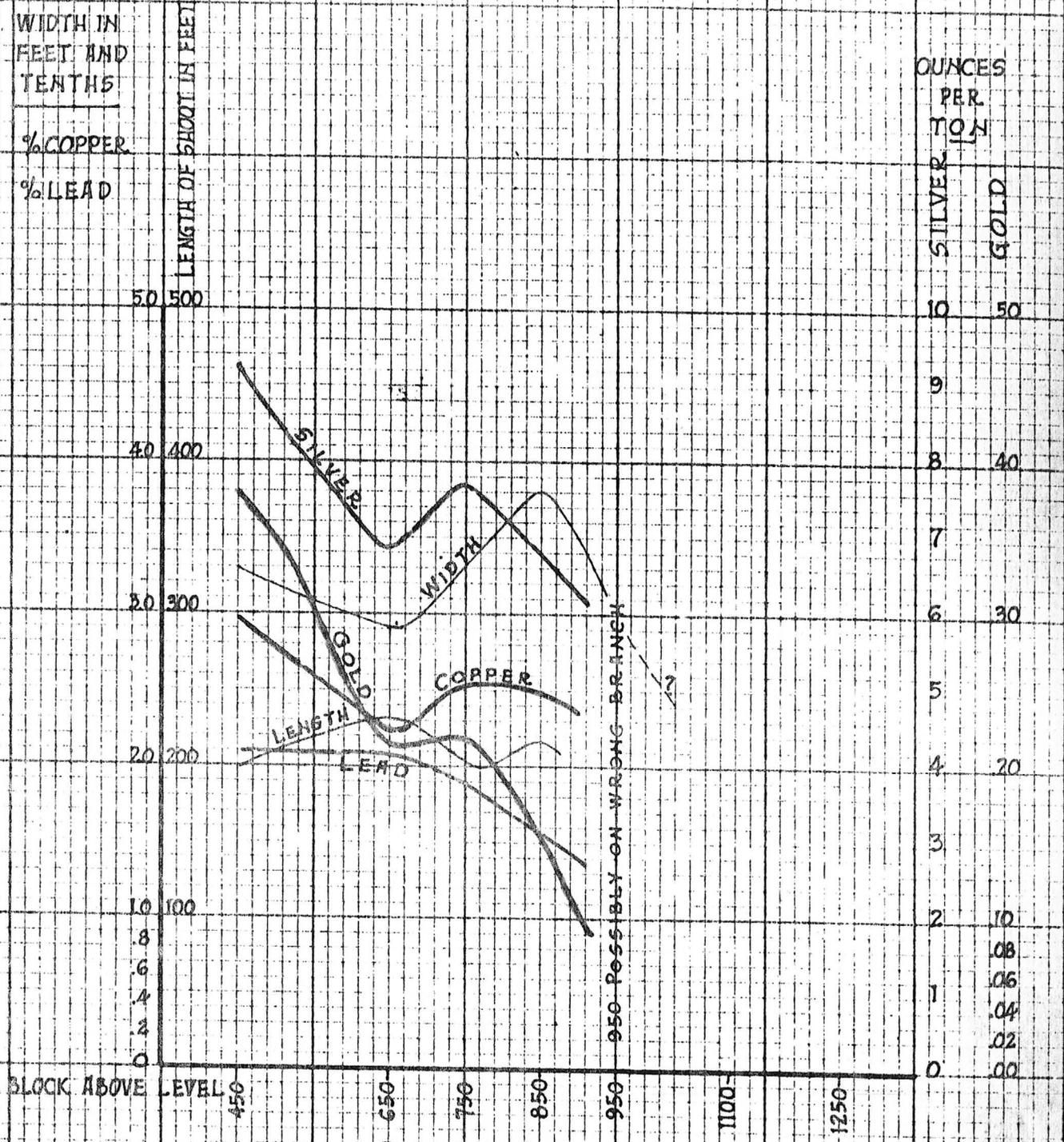
NO. 1 ORE SHOOT -  
 WILKER - ARIZONA  
 SHELDON MINE



WIDTH IN  
 FEET AND  
 TENTHS  
 % COPPER  
 % LEAD

LENGTH OF SHOOT IN FEET

DUNCES  
 PER  
 TON  
 SILVER  
 GOLD

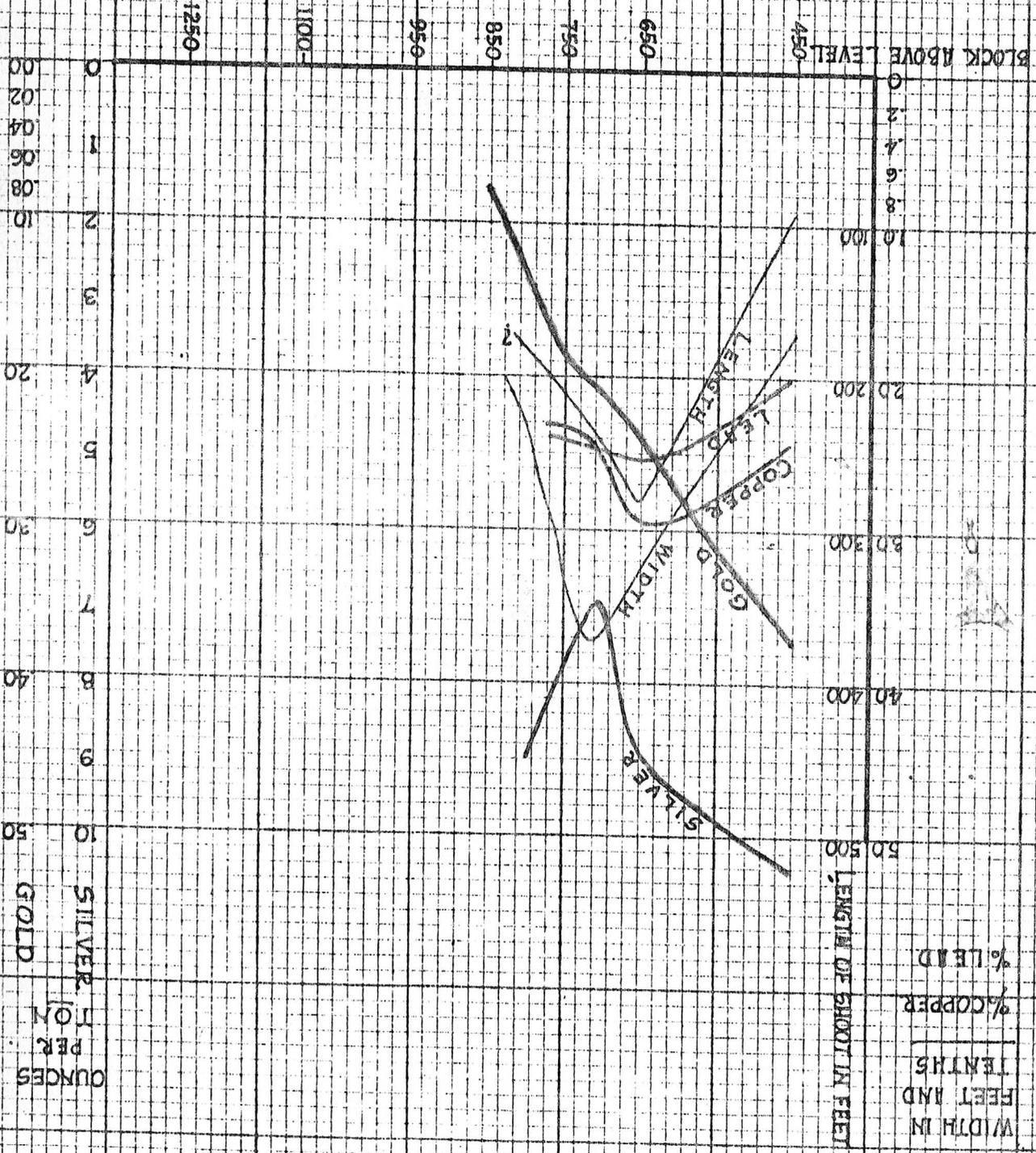


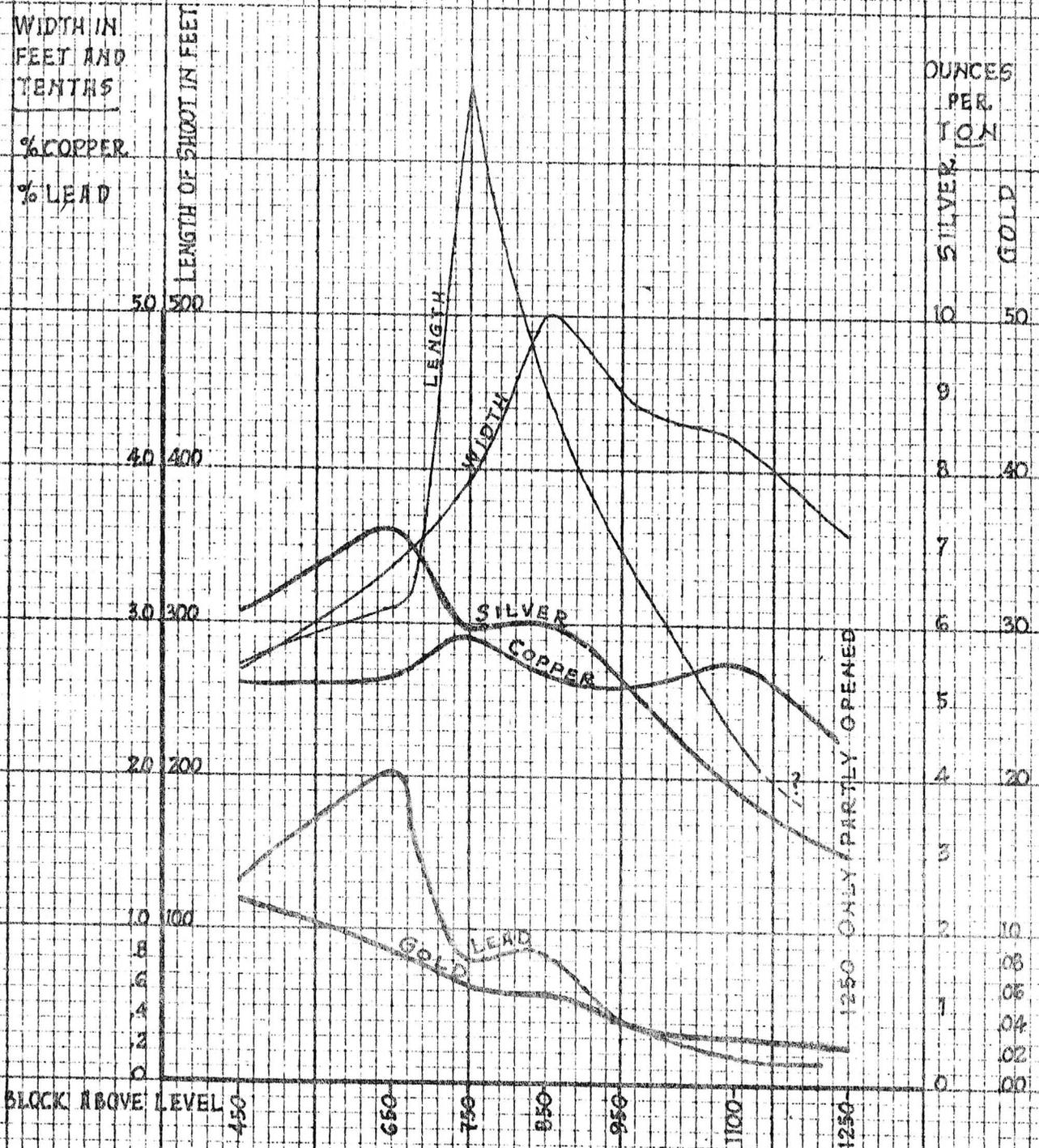
SHELDON MINE  
 WALKER - ARIZONA  
 No. 2 ORE SHOOT -

WIDTH AND ASSAYS AT DIFFERENT LEVELS AS SHOWN  
 BY MINE MAPS - JAN. 1930.

WIDTH AND ASSAYS AT DIFFERENT LEVELS AS SHOWN BY MINE MAPS - JAN. 1930.

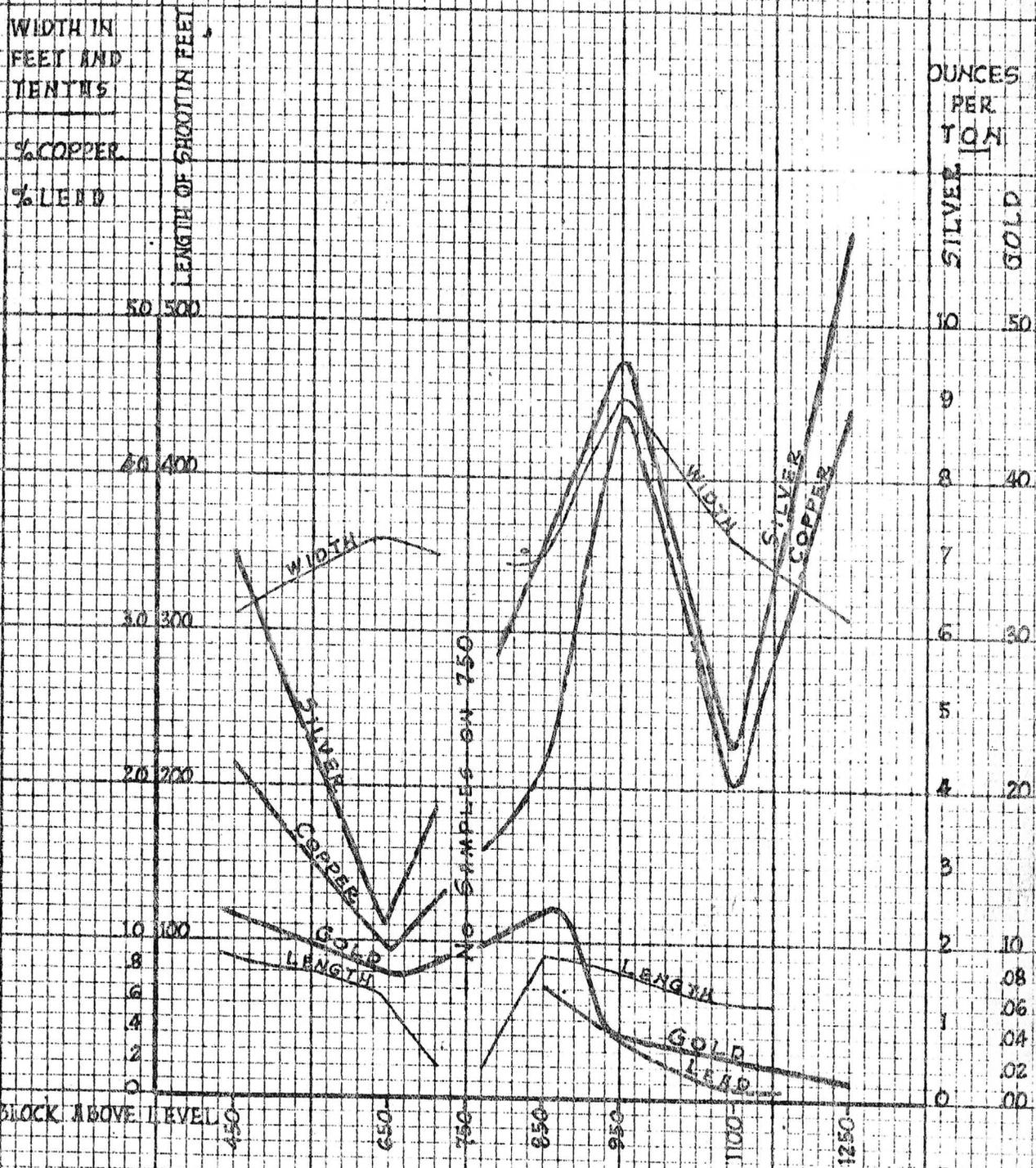
SHELDON MINE  
 WILKER - ARIZONA  
 NO. 3 ORE SHOOT





**S HELDON MINE**  
 WALKER - ARIZONA  
 No. 40 RE SHOOT.

WIDTH AND ASSAYS AT DIFFERENT LEVELS AS SHOWN  
 BY MINE MAPS - JAN. 1930.



**SHELDON MINE**  
 WALKER - ARIZONA  
 No. 5 ORE SHOOT-

WIDTH AND ASSAYS AT DIFFERENT LEVELS AS SHOWN  
 BY MINE MAPS - JAN. 1930.

be seen it looked like a sheared zone in schist and slate. The tunnel vein is unquestionably in sheared schist. The intrusion of the rhyolite dike may well have been responsible for the formation of these veins.

The Monroe vein is in schist at the tunnel portal, but on the hill above it is in granodiorite. There was little opportunity to study it in place as the workings are all inaccessible.

#### ORE OCCURRENCE IN THE SHELDON VEIN SYSTEM

##### MINERALS

The minerals in the Sheldon vein system include white quartz, iron pyrites, chalcopyrite, galena, small amounts of chalcocite, tetrahedrite and sphalerite with rare bornite. There is very little calcite. The gold is apparently associated with the pyrite. There may be a little argentite but the silver is largely in tetrahedrite. Near the surface the resulting minerals derived by oxidation are found. There is some slight oxidation down to the 450, though sulphides are also found practically at the surface. As a whole oxidation may be considered limited in extent. Nevertheless the graphs indicate that copper and silver has generally leached to some extent above the 450 and been re-deposited below. There is much altered granodiorite. The quartz is white, often coarsely crystalline, sometimes with vugs, and near the surface very generally with cavities where the pyrite has been leached out. A similar appearance

is found in the altered granodiorite, which is frequently silicified within and near the vein and carrying pyrite. The pyrite is generally coarsely crystalline, sometimes in cubes and rather white. The pyrite is scattered through the quartz but there are frequent seams of heavy sulphides, possibly 25 to 50% of pyrite up to six inches wide in the vein. Near the vein it is common in the walls, especially along fractures, even up to 50 feet away, though decreasing with distance. The occurrence in the walls does not appear to be related to the ore shoots in such a way that it can be used as a guide to exploration. In places there is some gossan, but practically none to be seen above the known ore shoots. It is marked on the Ninety Eight, and carried 0.5% copper, but with no associated gold and silver.

The vein here at T 7 is more than ten feet wide as it is also on the Ninety Seven at C 27. Here the practically unaltered pyrite is seen, but even a selected sample of considerable size with 25.5% iron failed to show gold and silver and only 0.2% copper; 500 feet further southwest on the Ninety Seven at S 9 the results were similar, but with 1.33% copper in specimens.

There is also some gossan on the American Flag but the results of assays here were likewise disappointing.

The chalcopyrite generally occurs as fine spots mixed through the pyrite. The bornite is rare except as a film on chalcopyrite.

Chalcocite is seen more or less frequently, both as the sooty secondary variety and as the primary steel gray mineral. The latter occurs more generally below the 650.

Tetrahedrite is found on the surface and all levels. It increases in amount on the 1250 in shoot No. 5 and is doubtless the cause of the increased copper and silver reported there.

Galena is common above the 750, and bunches more than a foot thick have been mined. Below that it rapidly decreases. Sphalerite is less common and rare below the 750.

#### DISTRIBUTION OF METALS

The accompanying graphs, based on the mine maps, show the distribution of the metals in the five ore shoots so far developed. The location of the shoots is shown on the vertical projection, and the assay averages on the "Key Map to Ore Blocks".

With the exception of Shoot No. 5 referred to above all the metals except copper decrease in quantity below the 950. The gold decreases fairly regularly from the highest level recorded (850) and obviously becomes unimportant on the bottom level. If this situation is typical of the gold veins in the Bradshaw Mountains it explains why so many mines have been closed.

But the relative gold values in the different shoots above the 450 level furnish a problem difficult to solve. Beginning with the most northeasterly shoot, No. 3, and going southwest the averages are .37, .38, .22, .12, .12 ounces gold

per ton. Dr. Lindgren thinks these gold and silver veins "were deposited from solutions ascending from a rhyolitic magma". There is certainly a considerable amount of rhyolite to the east, while but little was seen to the west. This seems a possible solution. There is little or no manganese anywhere in the vein, too little to serve for leaching the gold. The veins are not sufficiently open to allow mechanical enrichment down to the 450. The suggestion that steeper hillsides to the south caused rapid detrition while flatter country to the north permitted the gold to circulate downward seems unreasonable.

There is little opportunity to sample above these ore shoots and there is no record of gold values, but as the surface ores were milled they doubtless assayed as well in gold as on the 450. Sample S 4 assayed about the same as Ore Shoot No. 2 below it, but the nearby tunnel TS 4 did not. Similarly samples from T 1 over Ore Shoot No. 4 were mostly poorer, with one as good as the shoot averaged on the 450 level.

The gold values in the samples to the south of the Main Shaft are certainly not encouraging. To the north of the shaft a number of samples from C 15 A to C 18 showed attractive results. These are about 500 feet apart, apparently on different portions of the Sheldon vein system, toward the southwest end of the Fortune claim. Obviously the amount of gold bears little relation to the quantity of silver and copper and cannot be used for a guide in the search for these metals.

The lead curves are not unlike those for gold, but apparently with less variation in quantity going from northeast to southwest. From around 2% above the 650 it drops to almost nothing on the 1100 level. So far as the Sheldon vein system goes the lead is of very minor interest.

The graphs of silver and copper occurrence in the Sheldon ore shoots are fairly parallel. Both tend to show a peak between the 650 and 950 levels, doubtless due to leaching from above and secondary enrichment. The silver values above the 450 range from 10.4 in Shoot No. 3 at the north to 6.5 in Shoot No. 4 at the south. With the exception of Shoot No. 5 the tendency seems to be to drop as depth is gained, so far as shoots have been opened. The short No. 5 shoot, as already explained, has higher silver and copper because of the tetrahedrite. Silver doubtless leached to some extent along the croppings, but in T 1, S 4 and CS 4 over the present ore shoots silver values ranging from 3.5 to 14 ounces were obtained. Southwest of the Main Shaft, beyond the present underground workings, in C 3, C 6 and C 7 values of 12, 5 and 2 ounces were obtained. These are all within the limits of the Shelton claim. The last is about 800 feet southwest of the present face of the 450 level.

To the northeast of the Main Shaft and beyond the face of the present underground workings we have in Cuts 16 and 17 assays of 3, 2 and 8 ounces. These are on the Fortune claim about 800 to 900 feet northeast of the present face of the

450 level and where the interesting gold values previously referred to were found. Beyond to the northeast there are no attractive silver values on the Sheldon vein system.

The copper values, as stated above, show the effect of secondary enrichment, but do not decrease below the 950 as rapidly as the silver. In general the copper content runs from 2 to 3%, decreasing somewhat on the 1250, excepting in Sheet No. 5.

#### SHELDON ORE SHOOTS

A photostat of the mine "Key Map to Ore Blocks" for January 1, 1930 accompanies the report; and as taken from this the five shoots are shown on the "Vertical Projection". There are also graphs showing the length of the shoots at the different levels on the charts. A very good percentage of the ground opened is rated as ore. The best is on the 750, which with a length of 1620 feet, has 1200 feet, or 74%, an exceptional ratio shown as ore. On the 950 it is 42%, on the 1100 33%; and on the 1250 less than 10% is shown as ore unless the downward projection of Shoot No. 4 is included. So far as opened it does not seem possible that the price of metals will ever reach a point where sinking and opening such ore as this will be justified.

While there is little doubt that more ore will be developed on the lower levels, the map shows an unquestionable shortening of the shoots with depth.

In some cases the limits of the ore shoots appear to be connected with a change in strike or dip. For example the No. 5 ore shoot appears to be delimited on both ends by a change in strike, and the No. 1 ore shoot at its southwest limit in the same way, but this is by no means universal. Nor are the shoots associated with the joining of slips as they can be seen continuing on a single slip beyond these junctions, or where there are no junctions. It is believed however that the variations governing ore deposition were structural rather than chemical, as no variations in rock composition were noted at the shoot limits.

#### PROBABILITIES AT DEPTH ON THE SHELDON VEIN

In a general way the distribution of metal values conforms fairly well to the zonal arrangement with which we are familiar. The galena and sphalerite are deposited higher up in the vein, at lower temperatures than the copper, and the light colored pyrite comes in the deeper and hotter portions. Silver commonly decreases with depth.

The tetrahedrite might be expected to pass downward into chalcopyrite; the chalcocite might well continue. In spite of the rather poor showing to date on the 1250 I doubt if the bottom of the copper zone has been approached. But this alone, with the little silver, gold and lead to be expected, does not justify exploration at greater depth. And this conclusion is borne out by the facts already stated with reference to decreasing mineralization in the walls, width of

vein and length of ore shoots, change in character of the vein, and its possible tertiary origin.

POSSIBILITIES ALONG THE STRIKE OF THE  
SHELDON VEIN SYSTEM

It is apparent from the assay maps and graphs that while there is no definite ratio between copper and silver values there is a marked tendency for them to rise and fall together; also while an abnormally high gold assay sometimes means an abnormal silver assay the gold assays cannot be taken as an indication of the amount of silver or copper to be expected. As copper leaches more readily than silver we may conclude that where the croppings and surface pits show fair silver values at least normal copper values may be anticipated below the leached zone.

To the south of the Main Shaft, the attractive vein showings on the Ninety Seven, Ninety Eight and American Flag fail to show promising values. It is only the Cuts (C3 and C6) on the Shelton just south of the present underground faces that are of interest.

To the north of the Main Shaft the branch extending northerly toward the Last Chance gave attractive silver results. This apparently would leave the vein not far from the present face of the 450 and 550 levels and should be looked for. The gold is low.

Further east on the Fortune, along the normal strike, is the shoot of attractive gold values, with one good silver

value, in Cuts C 16, C 17 etc. The vein here is narrow, but the shoot has not been traced to its limits. There are possibilities southwest toward C 15 A, and from 200 to 650 feet northeast there are almost continuous cuts and old stopes.

#### THE CAPITAL VEIN SYSTEM

The Capital vein system, as already stated, is a complement of the Sheldon. It was doubtless formed at the same time, as a relief to the strains resulting from compression. It is made up of three or more practically parallel veins in the hanging wall of the Sheldon vein system, and from 150 to 400 feet southeast, converging in some cases, toward the northeast. These veins outcrop on the New Strike, Capital and First North Extension of the Capital, possibly extending onto the Fortune. They are in granodiorite and vary in dip from  $65^{\circ}$  southeast to  $55^{\circ}$  northwest, sometimes changing on the same vein from southeast to northwest within 100 feet. The walls show more or less movement. The veins are generally narrow, with rarely over a foot of quartz. The minerals are the same as in the Sheldon. No shoots of even 100 feet in length appear to have been developed, and except as they may have been cut from the old Fortune shafts there is no work 100 feet deep other than the Sheldon shaft crosscuts. *The principal work is the Capital Tunnel (see Descriptions F 10) on the most northwesterly vein of the system. There was undoubtedly a shoot of good ore here as it was stoped about 50 feet long, both above and below the tunnel, and three inches of quartz in the southwest*

face assays two ounces gold, 11.5 ounces silver and some copper. This tunnel exposes the vein for 110 feet. The ore decreases to the northeast but there is a chance that it may be picked up beyond a cross-slip which appears there. The northeast face shows no value. This vein dips  $80^{\circ}$  northwest at the southwest end and  $80^{\circ}$  southeast at the northeast end of this tunnel. If either dip continues it must have been cut by the 650 cross cut southeast from the Main Shaft and is probably the vein on which there is a drift, but little value.

There appear to be two veins on the northwest side of the ridge, opened by this tunnel and cuts above, but nothing more of value is to be seen.

S 16, on the Extension, above the road, 1600 feet northeast of the Capital Tunnel, showed seven inches assaying 1.57 ounces gold and 2.13 ounces silver. This was the face of a short stope with  $70^{\circ}$  southeast dip. It is one of the Capital system but probably southeast of the T 10 vein which very likely has joined the Sheldon at that distance northeast of the Capital Tunnel, being possibly the vein in C 15 A.

Other exposures of interest on the Capital vein system are C 45 and C 158 (see "Description of Openings") down toward the tailing pile on parallel veins to the southeast and carrying some value. The latter especially, with a width of seventeen inches and good silver would be worthy of attention were it not that other cuts nearby are not attractive.

EUREKA VEIN SYSTEM

In the Eureka vein system are included for convenience the veins on the New State, Eureka and Midnight Snap claims. So far as those on the New State, and the Eureka except the very southeast corner, are concerned, these are like the Capital. As may be seen on the large map and the "Description of Openings" there are apparently at least four, more or less parallel, veins dipping steeply northwest or southeast and all in granodiorite.

It is hard to see the excuse for sinking the Curran Shafts (S 34 and S 32) as there is little in the cuts nearby. Nothing was seen on the New State and the west end of the Eureka which is of interest. There is little gouge, small mineralization, and poor values.

The Eureka Tunnel (T 12) cuts all but one of the veins which outcrop on the east end of the Eureka claim. A detail map is shown in the inset on the large map. The tunnel starts in rhyolite, passes through schists, then granodiorite, then another block of schist, and the last 200 feet is in granodiorite. The total length is about 480 feet. The first two veins apex in the Eberhart claim, but may cross the corner of the Eureka. One has been stoped but is small.

Beyond these are a number of narrow quartz seams in granodiorite; of no value. The main Eureka vein 460 feet from the portal has been stoped with a width of two to five feet. It is largely inaccessible, but evidently had a good sheet of ore. Mr. Kouttschnitt in his 1924 report states a sample

"at the bottom of the winze" assayed 0.68 ounces gold, 3.2 ounces silver, 0.6% copper, 2.4% lead, and the vein had a width of two feet. This is undoubtedly the most promising showing on the Eureka system, but is too far to reach from other workings and too small to explore with a separate plant. The strike of the Eureka vein is N 70° E, which if continued would result in its cutting the Capital and Sheldon veins to the southwest, but it cannot be traced on the surface. S 24 is said to have gone down on it vertically 90 feet, then 110 feet dipping NW 65°. The stops at the end of the tunnel are nearly vertical.

At the east end of the Eureka and on the Midnight Snap the ore occurrence is on the granodiorite tongues in schist, or in small narrow sheared altered schist seams. There has been a great deal of prospecting and some pockets of good value must have been found to induce it. Occasional picked specimens gave good values, but very little was found in place which is attractive. These workings are described in the appended list.

At T 13 dump a number of comparative samples showed that the gold here occurs in the coarsely crystalline quartz with pyrite and a little carbonate. Many of the seams are short contacts of the granodiorite with included schist blocks and lack continuity.

WHITE HOUSE, MUDHOLE, MONROE  
AND THE PENN

The White House has a number of large cuts in schist in a direction N 37° E with the vein dipping 80° southeast. The first sample of the best quartz, three inches wide, gave \$8.80 in gold (C185) but after cleaning out additional samples failed to show values of interest. This claim lies southeast of the Midnight Snap. The quartz conforms with the schist in dip and strike.

The Mudhole Group, formerly Penn-Arizona, lies to the southeast of all veins so far considered. These claims are the Golden Fleece No. 3, N. E. Fraction Golden Fleece No. 2, and Snow Flower. The Gold Belt is the northeast extension of the latter. This group was disappointing because while it lies in the favorable Pre-Cambrian formation we were unable to get any definite information of the principal workings. Jagger and Palache state the Mudhole had two parallel six to eight feet veins in granite-gneiss with a rhyolite dike between them, sometimes brecciated and cemented with silica. Mr. Casey says the new shaft (S 10) was down 700 feet on the incline and a crosscut had cut the vein showing good gold, silver and copper values. He states the 600 level was poor but values were good above that .

The sole exposure of what is probably the principal "Mudhole" vein is in C 30 B, about 200 feet southwest of the New Mudhole Shaft, but it is here much steeper than the shaft,

having a dip of  $80^{\circ}$  to the southeast. There is considerable gouge next the white slate footwall, and above this is five feet of altered silicified slates, with thin gouge separating them from brecciated rounded quartz. It is an interesting exposure indicating a fracture where there has been ample opportunity for mineralization, but showing only \$2. value.

The vein in the Mudhole Tunnel (T 9, see map) conforms in dip and strike to the schist in which it occurs - around N  $55^{\circ}$  E, dip  $55^{\circ}$  to  $65^{\circ}$  southeast. Northeast of the crosscut the hanging wall is rhyolite. See details in "Description of Openings". There is nothing to be seen now on this group which justifies any expenditure by the Company.

The Monroe is a well defined vein with good walls in granodiorite, except for a block of schist at the portal of the tunnel (T 14). The strike appears to be N  $50^{\circ}$  E and the dip from  $55^{\circ}$  to  $60^{\circ}$  southeast. A great deal of work has been done here but the tunnel is caved. It is said to be 300 feet long. There is an incline shaft, S 37, connecting with it, and reported to continue below it. There is also a shaft (S 36) near the mouth of the tunnel. The dump shows considerable quartz and much pyrite with a little lead and zinc, besides copper. The geological conditions are attractive but nothing was found having sufficient value to justify any work here.

The Penn is all in schist, so far as could be seen. It strikes N  $50^{\circ}$  E to N  $60^{\circ}$  E and dips steeply,  $75^{\circ}$  or more,

to the southeast. There is no shearing at the tunnel, (T 19), merely a very thin slip, and nothing to be seen at C 178. No work here is justified.

### VALUES AND COSTS

This examination is concerned with the values and costs only so far as it affects the advisability of exploration. Costs for development, mining, milling and transportation to Poland for April and the first four months of 1930 are given as follows:

#### SUMMARY OF COSTS FOR THE MONTH OF APRIL AND YEAR 1930 TO MAY FIRST

	<u>Amount</u>	<u>APRIL</u>	<u>YEAR TO DATE</u>	
		<u>Cost per ton</u>	<u>Amount</u>	<u>Cost per ton</u>
Mining	15706.06	3.64	57679.34	3.73
Development	623.72	.15	9711.26	.63
Mine Pumping	651.78	.15	2674.78	.17
Transportation	1114.32	.26	4383.94	.28
Milling	4661.03	1.08	16168.77	1.17
Surface	158.82	.04	2479.64	.16
Office	483.05	.11	2023.74	.13
Taxes	129.71	.03	518.75	.03
Other Expense Items	<u>1545.48</u>	<u>.36</u>	<u>6232.64</u>	<u>.40</u>
	25673.97	5.82	103872.86	6.71

This is for 15476 tons or about 130 tons per day. It does not include a normal charge for development which is said to be from \$1.25 to \$1.50 per ton. This would add 62 to 87 cents, making a total of \$7.30 to \$7.55 per ton. If operations are confined to the ground above the 950 level, as suggested later, and the production increased to 250 to 300 tons per day this figure should be reduced to \$6.50 per ton, probably less, in last column.

If we take, for example, the ore reported in Shoot No. 3 above the 450 level and assume that it is shipped to a smelter with the usual charges and deductions we have the following result. This block assays .37 ounces gold, 10.4 ounces silver, 2.45% copper, 2.08% lead. It is probably safe to assume that production will not be resumed until prices have reached 12 cents for copper, 30 cents for silver and 5 cents for lead. A saving of 90% of the gold, silver and copper, and 55% of the lead is assumed. I understand this is a little low for the gold, possibly one or two percent too high for silver and copper, and about as much lead as is recovered in saleable form. The concentration ratio is about four tons to one for the copper and 20 tons to one for the lead. Much of the gold goes with the lead, but assuming that results will be equalized the net smelter returns on this ore would be about \$12. per ton. This allows a profit of \$5.50 per ton with the metal prices mentioned. With present prices of 27 cents for silver 9½ cents for copper, and 4½ cents for lead the net smelter return would be \$10.50, yielding \$4. per ton profit on this ore with a gross value today of \$16.51 per ton. In other words, assuming costs as stated and smelting charges as shown on past settlement sheets \$12. is necessary. This would vary somewhat with the composition of the ore, the losses and deductions on gold being very small and losses and deductions on lead being very large. Shoot No. 4, above the 650 level,

carries .094 ounces gold, 7.24 ounces silver, 2.63% copper and 2.06% lead. Based on the same figures this ore would have a gross value of \$12.42 per ton, and the net smelter returns would be very close to \$6.50. After allowing for dilution in mining there would be a loss, were it not that ore can doubtless be mined and hoisted from these upper levels at less cost.

Tons exposed per foot of development work appears to be over ten, above the 950 level, over 14 taking the 750 and 800 levels only. With additional shoots developed laterally the cost per ton for development will show considerable decrease. And if the ore can be mined rapidly cost of keeping the ground open is less, while dilution decreases. I understand the ore as mined now shows around 85% of the estimated value, which is about the average for mines of this type, where the walls are none too good.

#### CONCLUSIONS AND RECOMMENDATIONS

1. The Sheldon vein system is a strong but somewhat irregular fracture system well mineralized for a remarkably large portion of the length of the present underground exposure on the upper levels.
2. As a result of secondary enrichment the better ore is generally between the 650 and 950 levels.
3. The gold and lead decrease fairly regularly from the 450 level, possibly from the surface, downward, and are of little importance below the 950 level. They also

decrease on the same level from the northeast to the southwest.

4. The silver, and the copper content shows some increase toward the 950, but <sup>No Increase</sup> decreases below that, the silver more rapidly than the copper.

5. Below the 950 level the ore developed, and "probable", will not repay the cost of development and upkeep. It would be well to consider some long-hole drilling on the 1100 and 1250 for possible ore on unopened splits, and a little additional driving to make sure the downward extension of the shoots has not been missed, with a view to determining whether it may not be wise to abandon these levels.

6. Certain long-hole drilling or cross-cutting on the 650 and 950 which Mr. French has in mind should be done, and will probably show some additional ore. It would be advantageous if maps of each level showing the splits and slips were kept on tracing cloth to be superimposed for comparison and indicating probable ore shoot location.

7. There is no fixed ratio of gold or lead to silver and copper, but high silver so frequently occurs with high copper that it may reasonably be considered as a guide for exploration near the surface where the copper leaches more easily.

8. The attractive region for exploration to the southwest on the Sheldon vein system is near Cuts 3 to 6, 1200 to 1500 feet from the main Sheldon Shaft. This is

perhaps 300 to 800 feet beyond the southwest face of the 450 level. There is a reasonable probability that a shoot with values similar to Shoot No. 4 may be found here.

9. To the northeast of the Main Shaft toward the northeast corner of the Champion the line of pits C 171 to C 172 shows silver and copper justifying trenching, and promises a possible good copper shoot branching from near the present northeast faces of the upper levels. It should be sought underground.

10. The section between Cuts 15A and C 18 justifies considerable trenching, if not drifting under it. This is 1600 to 2000 feet northeast of the Main Shaft and 800 to 1200 feet northeast of the end of present levels.

11. Trenching at 50 foot intervals to trace and sample the vein is the logical preliminary for investigation of these three Sheldon sections but in view of the snow, and the fact that the 450 drifts underground can be advanced at a comparatively small additional expense, and give much more information, the latter is not unreasonable exploration. It is possible the 650 or 750 might show better copper and silver values than the 450, but the gold will be better on the 450 and ventilation problems less.

There is certainly a good foundation for three possible shoots, of which two might have low gold, but average copper and silver values, the third good gold, possibly a \$10. average, with low silver and copper values.

12. The Ninety Seven and Ninety Eight claims do not justify exploration. Diamond drilling would be the most advantageous method if undertaken.

13. The American Flag does not justify exploration at present but renders the work toward C 3 to C 6 more attractive.

14. While the Mudhole veins are credited with the largest production outside of the Sheldon there is nothing attractive to be seen on this group, and information as to conditions in the bottom of the old shaft is too vague to justify any expenditure.

15. The Eureka vein appears to be the strongest and most attractive, which can be seen, aside from the Sheldon, but leasers have removed practically all the exposed ore of value. It would be well to seek the source of the \$82. ore in the pile at S 23.

16. The Capital at such points as <sup>P 87</sup> T 10, S 16, C 45 and C 153, as well as some points on the Eureka should be attractive to leasers when the Husboldt smelter is running, or if the ore could be bought at the Sheldon mill. It may prove desirable to crosscut the Capital veins from the Fortune if the 450 is extended northeast.

17. The large amount of work on the Monroe gives the impression that this claim must have had some good ore, and it may be wise to re-open the tunnel enough to inspect

and sample while it can be done at small expense. Nothing was seen on the balance of the property which justifies any further consideration.

Respectfully submitted,

*Geo. A. Packard*

Boston, Mass.

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