

disseminated sulfides are present.

2. Photograph 7872 - pronounced lineation striking about N. 30° E. at 4,000 feet N. 27° E. of U. S. Mineral Monument No. 1. This zone can probably be correlated with the well developed vein system mapped to the south, and is postulated as being the extension of the Silver Girt Vein system.

3. Photograph 7872 - pronounced lineation striking about N. 15° E. at 5,000 feet N. 3° E. from U. S. Mineral Monument No. 1.

4. Photograph 7870 - lineation striking about N. 70° and 80° E. at 1,400 feet S. 55° E. from U. S. Mineral Monument No. 1. This area was inspected on the ground; the area is covered with talus, nothing was recognized.

5. Photograph 7870 - lineation striking about N. 10° W. part of a system thought to continue 3,000 feet to the south; at 1,800 feet S. 72° E. from U. S. Mineral Monument No. 1. Nothing was recognized on the ground.

6. Photograph 7870 - lineation striking about N. 30° W., part of a system thought to continue 3,000 feet to the southeast; at 3,800 feet East of U. S. Mineral Monument No. 1. This structure is postulated to be of major importance, and a part of the structure correlated with the Little Ajo Mountain Fault.

7. Photograph 7866 - pronounced lineation striking N. 30° E. at 4,700 feet S. 5° W. from U. S. Mineral Monument No. 1. It is to be noted that this structure is almost parallel to the Keystone Vein some 900 feet to the west; and is almost parallel to the vein some 600 feet to the east.

8. Photograph 7866 - pronounced lineation striking N. 5° E. at 4,600 feet S. 17° E. from U. S. Mineral Monument No. 1. This is possibly the southern extension of the Surprise Vein System. It is thought that part of this structure has been recognized in the field - the fault that cuts and offsets the basic

dike, and cuts off the rhyolite dike. About 400 feet south of the rhyolite dike cut-off, along the trend of this structure is found an area that has small seams of quartz, some of which contain chalcopyrite. This is the only area in the district seen with this sulfide mineral at the surface; no exploration has been done in this area.

The southern part of this structure apparently is influenced by lineation that strikes N. 70° E. This zone of intersection might be the key to the emplacement of the chalcopyrite, and should be investigated.

9. Photograph 7870 - lineation striking N. 55° E. at 5,300 feet S. 50° E. from U. S. Mineral Monument No. 1. It is to be noted that this zone of lineation will make an intersection with the lineation described in Item 6; the intersection will be near the center of Section 22, and should be investigated.

10. Photographs 7865 and 7866 - in the vicinity of the Burro Burro Claim and westward, general massive lineation striking N. 70° to 80° E. This is thought to be from the numerous basic dikes found in this area. This trend does not pass eastward beyond the Keystone Vein.

11. Photographs 7863 and 7864 - lineation striking about N. 10° W. at 3,600 feet N. 60° W. of U. S. Mineral Monument No. 1; lineation striking N. 5° E. at 2,900 feet S. 80° W. of U. S. Mineral Monument No. 1. These are thought to be the same structure. It is to be noted that the lineation on the 9" x 9" photographs strikes very nearly North, yet in trying to plat it on the 1" to 300' topographic sheet the strike is changed - could be distortion in the enlargement from which the 1" to 300' print was made.

12. Photograph 7864 - lineation striking N. 45° E. at 1,500 feet S. 70° W. of U. S. Mineral Monument No. 1; and lineation striking N. 15° W. at 1,400 feet S. 60° W. of U. S. Mineral Monument No. 1.

13. Photograph 7864 - lineation striking N. 75° E. at 3,500 feet S. 27° W. of U. S. Mineral Monument No. 1; and lineation striking N. 85° E. at 2,600 feet S. 15° W. of U. S. Mineral Monument No. 1.

14. Photograph 7864 - lineation striking N. 40° W. at 4,500 feet S. 80° W. of U. S. Mineral Monument No. 1; and lineation striking N. 30° W. at 4,050 feet S. 60° W. of U. S. Mineral Monument No. 1; and lineation striking N. 25° W. at 4,200 feet S. 42° W. of U. S. Mineral Monument No. 1. These are thought to be the same structure.

It is thought that the fourteen lineation trends just described should be investigated.

#### (Folds)

No folds were recognized in the field.

#### (Faults)

As mentioned before, it is thought there are old lines of weakness of an old geosyncline present in this area. Some of these lines of weakness or faults are mineralized and represent the veins in the area.

As will be discussed in the section on veins, these are divided into three groups; (1) veins that strike to the northwest and dip to the southwest, (2) veins that strike to the north, northeast, and east, and dip to the east and southeast, and (3) veins that strike to the east and northeast and dip to the north and northwest.

As has been discussed in the section on aerial photographs, probable major fault zones that strike from N. 50° to 60° W. are thought, by the writer, to be present near the Indian Village of Schuchuli. It is postulated that a split of this zone, trending N. 30° W., probably forms the eastern boundary of the district,

and passes through the center of Section 22. A somewhat similar trend is thought to be present in the extreme western part of the district where lincation trends N.  $25^{\circ}$  to  $40^{\circ}$  W. are found.

A set of faults trending N.  $50^{\circ}$  to  $75^{\circ}$  E. are found in the area; a good example is the fault found 260 feet southeast of the Surprise Incline.

A set of faults trending North to N.  $30^{\circ}$  W. are found in the area, good examples are those found cutting the Gunsight and the Silver Girt Veins near the Gunsight vertical shaft.

Special notice should be taken here of the mineralized fault zone near the south endline of the Surprise No. 3 Claim. The vein-fault strikes from N.  $15^{\circ}$  E. to North. A black basic dike follows this same trend. An easterly striking rhyolite dike is cut and offset by this fault zone; and shows a horizontal displacement of more than 200 feet. The basic dike is clearly shown as being younger than the rhyolite; and in one section the basic dike is shown as being younger than the vein material.

#### (JOINTS)

Joint systems are found in this area in both the granite aplite and the granite.

The granite aplite of the central area, most pronounced in the vicinity of U. S. Mineral Monument No. 1, is characterized by three joint systems; (1) a system that strikes N.  $45^{\circ}$  E. and dips  $65^{\circ}$  to  $75^{\circ}$  SE, (2) a system that strikes N.  $15^{\circ}$  W. and dips  $70^{\circ}$  to  $80^{\circ}$  NE, and (3) a system that strikes N.  $70^{\circ}$  to  $85^{\circ}$  E. and dips  $75^{\circ}$  to  $85^{\circ}$  NW. Most of the joints have a very thin coating of specularite.

The granite that outcrops on the ridge southeast of the Gunsight Mine has a deeply weathered joint system that strikes N.  $25^{\circ}$  to  $35^{\circ}$  E. and dips  $80^{\circ}$  to  $90^{\circ}$  SE.

The significance of the joint systems is not known.

### Geologic History of Area:

It is thought that a deep Permo-Triassic geosyncline was developed in southwestern Arizona. It is assumed that during Triassic time the sediments in the trough were folded into a mountain chain, later erosion leveled the mountain chain. The lines of weakness of the old geosyncline and Tertiary mountain building forces tended to make the present fault-block mountain ranges; and formed lines of weakness for the intrusion of igneous rock and of volcanic activity.

It is thought the granite in the northern and eastern part of the district intruded the quartz monzonite of the southern and southeastern section of the district at some depth; for the granite contains fluorite as an accessory mineral as well as specularite, probably indicating an elevated temperature and pressure. The granite also contains 100 PPM tungsten. The age of the granite is unknown, but it is thought to be probably Laramide.

It is thought the granite aplite intruded both the granite and the quartz monzonite; and that it probably represents a more acidic phase of the same magma that produced the granite, for while both contain tungsten, the granite aplite contains the greater amount (500 PPM). The age of the granite aplite is unknown, but it is thought to be probably Early Tertiary.

At a still later time rhyolite dikes and finally basic dikes invaded the area, some of these are thought to be associated with the same magma, for again some of them contain tungsten (50 to 375 PPM) while others (basic dikes) have none.

Important renewed fracturing separated different stages of vein formation; three separate vein systems were developed. The veins all contain some fluorine, barium, tungsten, zinc, and copper. The metallization is believed to be associated to the end phase of the intrusions from the same magma that produced the granite and the granite aplite.

## ORE DEPOSITS:

### Prior Mining and Exploration in District:

A good deal of mining exploration has been done in this area, most of which is thought to have been done prior to 1900. Prospect pits and shafts have been sunk on the various veins. The only systematic development has been the Gunsight Mine; this work being done on faulted segments of both the Gunsight and the Silver Girt veins.

At the Gunsight Mine, there is a vertical shaft considered to be the deepest in the district; it is thought to be about 600 feet deep, with levels at 200 feet and at 400 feet. The total amount of drifting and crosscutting is unknown.

The Surprise Incline, on the Surprise Claim, is thought to be about 150 feet deep. This incline was sunk on the Surprise Vein. The amount of drifting and crosscutting is unknown.

The C & C Incline, located in the southwest corner of the C & C Claim, is thought to be a deep one, for the dump located at the collar of the incline is quite large. This incline was sunk on the C & C Vein.

On the Burro Burro Claim a vertical shaft was sunk. This shaft is thought to be probably the second deepest in the district, for a big dump is located at the collar. This shaft was not sunk on a vein, but was sunk in country rock, part of which was basic dike rock. The sinking of a big deep shaft in this location is hard to explain for the small discontinuous veins found on the Burro Burro Claim; unless of course one considers that 500 feet to the east is one of the major veins of the district, and that it dips to the west and should intersect the Burro Burro Shaft at about 1900 feet vertical depth.

The mineral production from the district is unknown, but in all probability the Gunsight Mine accounted for practically all of it. The only statistics known

to the writer, are those mentioned in the "Report of the Director of the Mint Upon the Statistics of the Production of Precious Metals in the United States" for the years 1882 and 1884.

In the report for the year 1882, it is mentioned that the Gunsight Mine produced 4,000 tons of ore during the prospecting work, that averaged between \$ 30 to \$ 40 per ton. Thus it is thought that the production was from \$ 120,000 to \$ 160,000, for or prior to 1882.

In the report for the year of 1884, it is mentioned that the Gunsight Mine had ore with values of \$ 23 per ton, \$ 60 per ton, and \$ 75 per ton, however the tonnage mined was not given.

It is thought that with the scant information known that the total production from the Gunsight Mine was probably in excess of \$ 250,000 and that, it probably represents the production of the district; and, that the values were in silver and lead.

#### Distribution - Vein Systems:

On the basis of field work done to date, it is thought, that the vein systems of this district can be separated by their physical characteristics into three groups: (1) veins that strike to the northwest and dip to the southwest, (2) veins that strike to the north and northeast and dip to the east and southeast, and (3) veins that strike to the east and northeast and dip to the north and northwest.

#### (Veins That Strike to the Northwest and Dip to the Southwest):

1.) Strike N. 15° W., dip 78° SW., Cashier Claim. This is a prospect pit exposure. The vein shows black carbonate with some green fluorite. Two samples were taken:

Sample No. 596 - 24.0-inches, HW, Trace Au, 0.70-oz. Ag, 0.14% Pb, 0.03% Cu,

0.31% Zn, 0.001% Mo, 0.07% Ba, 1.43% CaF<sub>2</sub>, and 0.15% WO<sub>3</sub>.  
Sample No. 597 - 46.0-inches, plus, vein, 0.005-oz. Au, 1.25-oz. Ag, 0.28% Pb,  
0.27% Cu, 0.31% Zn, 0.002% Mo, 0.50% Ba, 10.45% CaF<sub>2</sub>, and  
0.11% WO<sub>3</sub>.

2.) Strike N. 30° W., dip 62° SW., Galena No. 4 Claim. This is a prospect  
pit exposure. No samples were taken.

(Veins That Strike to the North and Northeast and Dip to the East and Southeast)

1.) Strike North-South, dips 70° to 80° E., C & C Claim. Shafts were sunk  
on these two veins. Two samples were taken on the east vein at a depth of 35 feet  
down the shaft.

Sample No. 584 - 11.0-inches, soft broken vein, 0.020-oz. Au, 0.28-oz. Ag,  
0.10% Pb, 0.89% Cu, 0.31% Zn, 0.004% Mo, 0.08% Ba, 15.16% CaF<sub>2</sub>,  
and 0.19% WO<sub>3</sub>.

Sample No. 585 - 33.0-inches, FW, 0.025-oz. Au, 0.28-oz. Ag, Trace Pb, 0.41% Cu,  
0.27% Zn, 0.003% Mo, 0.15% Ba, 1.28% CaF<sub>2</sub>, and 0.13% WO<sub>3</sub>.

2.) Strike North-South, dip 80° E., South Cashier Extension Claim. The shaft  
was sunk on vein fault breccia. One sample was taken 10-feet below the surface.

Sample No. 576 - 60.0-inches, 0.010-oz. Au, Trace Ag, 0.31% Pb, 0.07% Cu, 0.27% Zn,  
0.003% Mo, 0.21% Ba, 7.46% CaF<sub>2</sub>, and 0.15% WO<sub>3</sub>.

3.) Strike North-South, dip 68° E., Kerlin Claim. A 24-foot incline has been  
sunk on this vein. Three samples were cut at 18-feet down the incline.

Sample No. 586 - 12.0-inches, HW, fault zone broken, Trace Au, Trace Ag, Trace Pb,  
0.04% Cu, 0.27% Zn, 0.18% Ba, 3.35% CaF<sub>2</sub>, and 1.13% WO<sub>3</sub>. Note,  
this is the highest sample in tungsten taken in the district.

Sample No. 587 - 26.0-inches, middle, Nil Au, Trace Ag, Trace Pb, 0.14% Cu,  
0.31% Zn, 0.007% Mo, 0.28% Ba, 0.61% CaF<sub>2</sub>, and 0.49% WO<sub>3</sub>. Note,



this is the third highest tungsten sample taken in the district. Sample No. 588 - 26.0-inches, FW, Nil Au, Trace Ag, Trace Pb, 0.32% Cu, 0.27% Zn, 0.006% Mo, 0.21% Fe, 1.42% CaF<sub>2</sub>, and 0.65% WO<sub>3</sub>. Note, this is the second highest sample in tungsten taken in the district.

It is obvious from the samples taken in the Kerlin Incline that no assay limit for tungsten was reached in the sampling program. This is an altered and broken area, and extends about 400 feet to the west. More work is thought needed in this area.

4.) Strike North-South, dip 55° E., Galena No. 2 Claim. A shaft was sunk on this structure; much iron oxide is present. A grab sample was taken off the dump. Sample No. 509 - grab sample, 0.010-oz. Au, Trace Ag, Trace Pb, 0.20% Cu, 0.09% Zn, and 0.060% Mo.

5.) Strike N. 5° E., dip 25° SE., Gunsight Claim. Three such veins were mapped with this strike, the only dip taken was on the most easterly. The two westerly veins apparently cut and offset the vein striking N. 40° E. No samples were taken.

6.) Strike N. 10° E., dips 55° to 70° SE., Silver Girt Vein. Galena was seen on the Lower Adit Level in this vein. The galena occurred in irregular, discontinuous streaks. According to the sketch maps of "Rasor, 1942" included in the report of Vance N. Bacon, the Silver Girt Vein was the main vein drifted north of the Main Shaft on the 200 level of the Gunsight Mine.

Two samples were cut in the face of the west drift on this vein on the Lower Adit Level, see samples No. 524 and 525.

The Silver Girt vein was sampled in a surface cut about 850 feet northeast of the adit exposure; here the vein appears to be mostly quartz, see samples No. 528 and 529.

Sample No. 524 - 6.0-inches, HW of fault, Trace Au, 6.90-oz. Ag, 0.70% Pb, 0.03% Cu, 0.26% Ba, 0.35% Zn, 0.002% Mo, 8.63% CaF<sub>2</sub>, and 0.011% W.

Sample No. 525 - 60.0-inches, vein of quartz, barite, galena(-), None Au, 1.40-oz. Ag, 0.78% Pb, 0.04% Cu, 6.60% Ba, 0.99% Zn, 0.004% Mo, 6.63% CaF<sub>2</sub>, and 0.010% W.

Sample No. 528 - 60.0-inches, FW, altered granitic rock with quartz stringers, None Au, 0.10-oz. Ag, 0.54% Pb, 0.02% Cu, 0.80% Ba, 0.35% Zn, 0.001% Mo, 2.50% CaF<sub>2</sub>, and 0.015% W.

Sample No. 529 - 60.0-inches, vein with quartz and barite, None Au, 0.80-oz. Ag, 0.67% Pb, 0.02% Cu, 4.34% Ba, 0.30% Zn, 0.008% Mo, 6.13% CaF<sub>2</sub>, and 0.013% W.

7.) Strike N. 10° E., dips 60° to 70° SE., Surprise and Surprise No. 5 Claims. On the Surprise Claim is a well timbered two compartment incline at 73° SE. In the vicinity of the incline an iron stained gossan more than 100 feet wide and about 200 feet long outcrops. In the iron stained gossan the minerals specularite, barite, and fluorite can be seen. In a surface cut at S. 20° W. at 35 feet from the collar of the incline two samples were cut, see samples No. 536 and 537.

This vein continues to the northeast, and on the Surprise No. 5 Claim surface cuts and shafts expose the vein. In a surface cut of the Surprise No. 5 Claim, some 1,300 feet northeast of the Surprise Incline, five samples were cut, see samples No. 539, 540, 541, 542, and 543.

Sample No. 536 - 60.0-inches, FW, much iron oxide, some quartz, 0.010-oz. Au, 0.59-oz. Ag, Trace Pb, 0.04% Cu, 0.08% Ba, 0.30% Zn, 0.009% Mo, CaF<sub>2</sub> not run, 0.008% W.

Sample No. 537 - 24.0-inches, quartz with some iron oxide, Trace Au, 1.60-oz. Ag, 2.73% Pb, 0.02% Cu, 0.06% Ba, 0.30% Zn, 0.008% Mo, CaF<sub>2</sub> not run,

and 0.009% W.

Sample No. 539 - 24.0-inches, FW, gray zone some quartz, Trace Au, 2.80-oz. Ag, 0.72% Pb, 0.05% Cu, 0.94% Ba, 0.69% Zn, 0.028% Mo, 6.56% CaF<sub>2</sub>, and 0.014% W.

Sample No. 540 - 2.0-inches, purple quartz, 0.005-oz. Au, 0.20-oz. Ag, 0.26% Pb, 0.09% Cu, 0.16% Ba, 0.30% Zn, 0.002% Mo, 6.92% CaF<sub>2</sub>, and 0.008% W.

Sample No. 541 - 60.0-inches, iron oxide impregnated rock with quartz stringers, 0.005-oz. Au, 0.10-oz. Ag, 0.15% Pb, 0.09% Cu, 0.20% Ba, 0.30% Zn, 0.002% Mo, 4.21% CaF<sub>2</sub>, and 0.003% W.

Sample No. 542 - 32.0-inches, recemented quartz zone with some iron oxide, Trace Au, 0.50-oz. Ag, 1.69% Pb, 0.08% Cu, 0.12% Ba, 0.30% Zn, 0.027% Mo, 1.85% CaF<sub>2</sub>, and 0.006% W.

Sample No. 543 - 24.0-inches, recemented fault breccia, Trace Au, 5.60-oz. Ag, Trace Pb, 0.04% Cu, 0.14% Ba, 0.40% Zn, 0.015% Mo, 2.14% CaF<sub>2</sub>, and 0.008% W.

8.) Strike N. 15° E. to North-South, dips 70° to 80° SE., Surprise No. 3 Claim, and south of Surprise No. 3 Claim. Shafts and surface cuts prospect this vein. This vein system is thought to be present in one of the larger fault zones in the district for two reasons; (1) a basic dike follows this same fault zone, and (2) an east striking rhyolite dike is cut and offset more than 200 feet by this fault zone. A small amount of red cinnabar is thought to be present in the southern area where three samples were taken.

Sample No. F-1505 - 60.0-inches, FW, highly altered granitic rock, Trace Au, Trace Ag, 0.18% Pb, 0.06% Cu, 0.31% Zn, 0.003% Mo, 0.18% Ba, 3.10% CaF<sub>2</sub>, 0.15% WO<sub>3</sub>, and 0.035% Hg.

Sample No. F-1506 - 36.0-inches, Vein, 0.005-oz. Au, 1.45-oz. Ag, 0.96% Pb, 0.31% Cu, 0.72% Zn, 0.188% Mo, 5.81% Ba, 36.06% CaF<sub>2</sub>,

0.11%  $WO_3$ , and 0.010% Hg. Note, this is the highest sample in fluorite taken in the district; also highest in Mo.

Sample No. F-1507 - 24.0-inches, HW, highly altered granitic rock, Trace Au,

0.20-oz. Ag, 0.30% Pb, 0.02% Cu, 0.40% Zn, 0.083% Mo,

0.31% Ba, 1.18%  $CaF_2$ , 0.05%  $WO_3$ , and 0.010% Hg. Note, this

is the second highest sample in Mo taken in the the district.

9.) Strike N.  $30^\circ$  E., dips  $45^\circ$  to  $50^\circ$  SE., Galena Claim. This vein is exposed by surface cuts and a shaft. Vein material containing big pieces of galena were found in the shaft dump. A grab sample of the galena was sent for assay to determine the silver content.

Sample No. 502 - grab sample of galena, Trace Au, 9.5-oz. Ag, 66.10% Pb,

0.90% Cu, Trace Zn, and Nil Mo.

10.) Strike N.  $30^\circ$  E., dips  $30^\circ$  to  $85^\circ$  SE., Crescent Claim. Surface cuts expose the vein. The vein outcrop is heavily iron stained. Sample No. 510 was taken 250 feet northeast up the hill from the open cut at the end of the road.

Samples No. 511, 512, 513, 514, and 515 were taken in the open cut at the vein at the end of the road. Sample No. 516 was a broken piece of oxidized vein material dug out of the road, about 50 feet northwest of the open cut at the end of the road, where it had been carried by the bulldozer; green copper minerals are in this specimen - a piece of which was given to Mr. Hale C. Tognoni.

Sample No. 510 - 72.0-inches, east part of 33 foot wide altered zone, iron stained,

Trace Au, Trace Ag, 0.20% Pb, 0.02% Cu, 0.15% Zn, None Mo.

Sample No. 511 - 20.0-inches, HW, fault breccia, 0.030-oz. Au, 0.67-oz. Ag,

0.93% Pb, 0.12% Cu, 1.38% Zn, and 0.002% Mo.

Sample No. 512 - 44.0-inches, broken vein material, 0.030-oz. Au, 0.57-oz. Ag,

1.54% Pb, 0.54% Cu, 1.78% Zn, and 0.007% Mo. Note, this is the

highest sample in Zinc taken in the district.

Sample No. 513 - 30.0-inches, iron stained wall rock, 0.010-oz. Au, 0.29-oz. Hg, 0.25% Pb, 0.11% Cu, 0.30% Zn, and 0.002% Mo.

Sample No. 514 - 60.0-inches, iron stained wall rock with quartz stringers, 0.100-oz. Au, 0.40-oz. Ag, 0.45% Pb, 0.04% Cu, 0.30% Zn, and less than 0.001% Mo. Note, this is the highest sample in gold taken in the district.

Sample No. 515 - 60.0-inches, iron stained wall rock with quartz stringers, 0.060-oz. Au, 0.34-oz. Ag, 0.41% Pb, 0.22% Cu, 0.25% Zn, and 0.007% Mo. Note, this is the second highest sample in gold taken in the district.

Sample No. 516 - grab sample, specimen of green copper minerals, 0.040-oz. Au, 0.36-oz. Ag, 0.37% Pb, 21.95% Cu, 0.30% Zn, and 0.004% Mo. A portion of this grab sample was sent for spectrographic analysis, also indicated were Mn, Ba, Ni, Be, Sr, V, Cr, Co, Zr, and B.

11.) Strike N. 30° E., dips 65° to 70° SE., Eastern Claim. An adit was driven on this vein. No samples were taken.

12.) Strike N. 35° E., dips 50° to 60° SE., Sunrise Claim. This vein was sampled in a surface cut about 150 feet south of its most northerly outcrop. These three samples are the most northerly taken in the district on a vein.

Sample No. 530 - 60.0-inches, FW, highly altered granitic rock, None Au, 0.70-oz. Ag, 0.44% Pb, 0.01% Cu, 3.80% Ba, 0.40% Zn, 0.002% Mo, 3.99% CaF<sub>2</sub>, and 0.015% W.

Sample No. 531 - 44.0-inches, FW vein, barite and black carbonate, Trace Au, 1.20-oz. Ag, 1.94% Pb, 0.01% Cu, 21.78% Ba, 0.49% Zn, 0.003% Mo, 11.41% CaF<sub>2</sub>, and 0.009% W.

Sample No. 552 - 10.0-inches, HW vein, quartz and barite, Trace Au, 1.40-oz. Ag, 0.56% Pb, 0.04% Cu, 13.56% Ba, 1.83% Zn, 0.003% Mo, 5.06% CaF<sub>2</sub>, and 0.010% W.

13.) Strike N. 40° E., dips 75° SE., Gunsight ~~Vein~~. This vein is thought to be the main Gunsight Vein. Note that east of the north trending fault zone the Gunsight Vein has apparently changed from a north or northwest dipping vein to one that dips to the southeast. No samples were taken in this area.

14.) Strike N. 60° E., dip 48° SE., claim east of Surprise No. 7 Claim. A prospect pit has been sunk on this vein. One sample was taken, it is the most easterly sample taken in the district.

Sample No. 573 - 60.0-inches, broken iron stained zone with some green fluorite, Trace Au, 0.05-oz. Ag, 0.25% Pb, 0.04% Cu, 0.27% Zn, 0.002% Mo, 0.38% Ba, 5.13% CaF<sub>2</sub>, and 0.45% WO<sub>3</sub>. Note, this is the fourth highest tungsten sample taken in the district.

In summary of this group of 14 veins it can be seen that 12 of them are found in sub-group of from North-South to N. 35° E. in strike; and here are found the highest samples taken in the district in gold, molybdenum, tungsten, zinc, barium, and fluorite.

(Veins That Strike to the East and Northeast and Dip to the North and Northwest)

1.) All of the following vein segments are thought to be part of the same vein system; the sequence is from West to East:

a.) Strike N. 50° E., dip 70° NW., west of Extension of Morning Star Claim. One sample was taken; it is the most westerly of any taken in the district.

Sample No. 517 - 60.0-inches, vein of quartz, barite, fluorite, and galena,  
Trace Au, 5.60-oz. Ag, 1.71% Pb, 0.38% Cu, 18.30% Ba, 0.49% Zn,  
0.003% Mo, and 16.78% CaF<sub>2</sub>. Tungsten was not run.

b.) Strike N. 50° E., dip 70° NW., Extension of Morning Star Claim. No samples were taken.

c.) Strike N. 30° E., dips 62° to 85° NW., Morning Star Claim. No samples were taken.

d.) Strike East, dip 70° N., Morning Star Claim. No samples were taken.

e.) Strike N. 70° E., dip 70° NW., Morning Star Claim. This location is about 2,500 feet east of Sample No. 517, and is about 1,000 feet west of the open stope of the Gunsight Mine. One sample was taken.

Sample No. 535 - 33.0-inches, vein, very hard iron stained quartz,  
Trace Au, 2.80-oz. Ag, 0.82% Pb, 0.03% Cu, 0.94% Ba,  
less than 0.001% Mo, 13.73% CaF<sub>2</sub>, and 0.013% W.

f.) Strike N. 70° E., dip 77° NW., Gunsight Claim. No samples were taken.

g.) Strike N. 75° E., dip 75° NW., Gunsight Claim. This location is about 200 feet west of the open stope of the Gunsight Mine, and is the faulted segment west of the Gunsight Mine workings. One sample was taken.

Sample No. 501 - 60.0-inches, chip sample, rock very hard, quartz, barite, galena, and fluorite; Trace Au, 3.90-oz. Ag, 1.20% Pb, 0.01% Cu, Trace Zn, Nil Mo.

h.) Strike N. 80° E., dip 80° NW., Gunsight Claim. The vein in this vicinity has probably accounted for most of the production from this district. This is the open stope of the Gunsight Mine. The Gunsight Vein was sampled on the Lower

Adit level in two places; (1) the back at 7-feet west of the winze, see samples No. 520 and 521, and (2) the face of the east drift approximately 150-feet north-east of the winze, see samples No. 522 and 523.

Sample No. 520 - 26.0-inches, FW part of vein, Trace Au, 23.30-oz. Ag, 5.22% Pb, 0.03% Cu, 10.70% Ba, 1.55% Zn, 0.012% Mo, 11.77% CaF<sub>2</sub>, and 0.010% W. Note, this is the highest assay sample taken in the district in both silver and lead.

Sample No. 521 - 36.0-inches, FW part of vein, Trace Au, 13.20-oz. Ag, 1.53% Pb, 0.04% Cu, 12.42% Ba, 1.53% Zn, 0.010% Mo, 5.63% CaF<sub>2</sub>, and 0.013% W. Note, this is the second highest assay sample taken in the district in silver.

Sample No. 522 - 45.0-inches, FW part of vein, 0.005-oz. Au, 1.20-oz. Ag, 2.17% Pb, 0.06% Cu, 0.82% Ba, 1.58% Zn, less than 0.001% Mo, 11.20% CaF<sub>2</sub>, and 0.009% W.

Sample No. 523 - 42.0-inches, HW part of vein, None Au, Trace Ag, 2.49% Pb, 0.04% Cu, 0.58% Ba, 0.30% Zn, less than 0.001% Mo, 15.55% CaF<sub>2</sub>, and 0.010% W.

It is to be noted that the vein system that has been traced from west to east is the only one in the northern part of the district that dips to the north and northwest; and that, east of the north trending faults shown on the map some major shift must have taken place, for the vein systems dip to the south-east.

2.) Strike N. 30° E., dips 75° to 80° NW., south of Keystone Claim, Keystone Claim, and most southwestern part of Southern Belle Claim. This vein is thought to be the largest in the southern part of the district; it has been traced for over 1,800 feet in strike length, and at one place is 30.0-feet in width, see



sample No. F-1516. A gossan zone over 100 feet in width is found near the north endline of the Keystone Claim; see samples F-1517, F-1518, and F-1508.

Sample No. F-1516 - 10.0-foot chip sample of east side of 30-foot vein, near south endline of Keystone Claim, quartz, black carbonate, fluorite, some  $\text{CuO}_x$ ; 0.003-oz. Au, 0.35-oz. Ag, 0.41% Pb, 0.40% Cu, 0.36% Zn, 0.016% Mo, 1.78% Ba, 29.64%  $\text{CaF}_2$ , 0.05%  $\text{WO}_3$ , and 0.39% Mn. Note, this is the second highest fluorite sample taken in the district.

Sample No. F-1517 - 60.0-inches chip sample, east side of 100-foot gossan, 0.002-oz. Au, 0.10-oz. Ag, Trace Pb, 0.21% Cu, 0.36% Zn, 0.072% Mo, 0.25% Ba, 0.71%  $\text{CaF}_2$ , 0.03%  $\text{WO}_3$ , and 0.06% Mn. Note, this is the third highest Molybdenum sample taken in the district.

Sample No. F-1518 - 60.0-inches chip sample, 35 feet west of Sample No. F-1517, altered granitic rock, Trace Au, Trace Ag, 0.08% Pb, 0.07% Cu, 0.40% Zn, 0.004% Mo, 0.34% Ba, 0.17%  $\text{CaF}_2$ , 0.05%  $\text{WO}_3$ , and 0.06% Mn.

Sample No. F-1504 - grab sample of dump, massive green boulders from what looks like an old prospect pit on south edge of wash, on west edge of gossan; 0.005-oz. Au, 0.05-oz. Ag, 0.41% Pb, 0.44% Cu, 0.90% Zn, 0.012% Mo, 0.85% Ba, 22.47%  $\text{CaF}_2$ , 0.15%  $\text{WO}_3$ , and 0.03% Hg. Note, this is the fourth highest sample in fluorite taken in the district, and this is the second location where mercury has been found.

3.) Strike N.  $75^\circ$  to  $85^\circ$  E., dips  $60^\circ$  to  $75^\circ$  NW., Burro Burro Claim. Two veins are in this group. They appear to be small, discontinuous, and in the footwall of small basic dikes. In a prospect pit at 70 feet N.  $30^\circ$  W. of the

51 1/2 vertical Burro Burro Shaft two samples were cut, see samples No. F-1509 and F-1510. In a prospect pit S. 75° E. at 200 feet from the big vertical Burro Burro Shaft three samples were cut, see samples No. F-1512, F-1513, and F-1514.

Sample No. F-1509 - 24.0-inches, altered granitic rock,  $\text{CuO}_x$  on seams,  
Nil Au, Trace Ag, 0.16% Pb, 0.25% Cu, 0.31% Zn, Nil Mo,  
0.14% Ba, 2.35%  $\text{CaF}_2$ , and 0.05%  $\text{WO}_3$ .

Sample No. F-1510 - 24.0-inches, HW, black basic dike,  $\text{CuO}_x$  on seams,  
Nil Au, 0.05-oz. Ag, Nil Pb, 0.92% Cu, 0.36% Zn, 0.001% Mo,  
1.25%  $\text{CaF}_2$ , and 0.03%  $\text{WO}_3$ .

Sample No. F-1512 - 31.0-inches, FW, altered granitic rock, some  $\text{CuO}_x$ ,  
Trace Au, 0.05-oz. Ag, Trace Pb, 0.29% Cu, 0.31% Zn, Nil Mo,  
0.22% Ba, 0.39%  $\text{CaF}_2$ , and 0.07%  $\text{WO}_3$ .

Sample No. F-1513 - 16.0-inches, iron stained granitic rock with quartz stringers,  
Trace Au, 0.20-oz. Ag, Trace Pb, 0.18% Cu, 0.27% Zn, Nil Mo,  
0.18% Ba, 0.36%  $\text{CaF}_2$ , and 0.07%  $\text{WO}_3$ .

Sample No. F-1514 - 12.0-inches, HW, black basic dike, some  $\text{CuO}_x$ ,  
Trace Au, 0.10-oz. Ag, Trace Pb, 0.61% Cu, 0.27% Zn, 0.004% Mo,  
0.18% Ba, 0.71%  $\text{CaF}_2$ , and 0.04%  $\text{WO}_3$ .

It is interesting to note that copper is associated with the basic dikes in this area.

4.) Strike N. 25° E., dip 77° NW., Galena No. 2 Claim. This is a prospect pit. This is an altered, bleached white, area, with maroon colored iron oxide staining. Two samples were cut.

Sample No. 507 - 60.0-inches,  $\text{CuO}_x$  disseminated in a highly bleached rock,  
Trace Au, Trace Ag, Trace Pb, 0.95% Cu, 0.30% Zn, 0.006% Mo.

Note, this is the second highest copper assay from a cut sample taken in the district.

Sample No. 508 - 6.0-inches, quartz stringer with  $\text{CuO}_x$ ,

0.020-oz. Au, Trace Ag, Trace Pb, 2.45% Cu, 0.49% Zn, 0.008% Mo.

Note, this is the highest copper assay from a cut sample taken in the district.

In summary of this group of veins it can be seen that here are found the highest assays of samples taken in the district in silver, lead, and copper. Fluorite is present, while not having the highest assay value, is found in wider veins that rank second and third in fluorite assay value. In this group are found, what is considered by the writer to be, the two major vein systems in the district.

#### Mineralogy:

The veins are traceable on the surface as dark gray-brown croppings, with quartz, dark brown carbonate (siderite?), fluorite, and barite. The outcrops generally are dense and hard, apparently little effected by weathering.

A small amount of galena was seen in the outcrops in the northern and northwestern sections of the district.

A small amount of chalcopyrite was seen in the rocks in the southeastern part of the district.

Specularite is a common mineral in this area.

Scheelite was seen as disseminated small blue white specks under an ultra-violet light; it is thought than another tungsten mineral is present for some of the samples assayed higher in tungsten than was thought possible for the amount of scheelite present.

Some of the calcite fluoresces a deep red in color, probably indicating manganese as an activator.

Chrysocolla, malachite, and azurite in small amounts are found on some of the dumps

Cinnabar was seen as small reddish stains on altered granitic rock in the most southerly area mapped.

No zinc mineral was recognized.

No silver mineral was recognized. Silver is thought to be somewhat independent of the lead mineral galena in this district; its distribution is erratic as a check of the assays will show, good examples are Sample No. 502 and 524.

Sample No. 502 - 9.5-oz. Ag, 66.10% Pb

Sample No. 524 - 6.8-oz. Ag, 0.70% Pb.

While six assays show a trace of silver to varying amounts up to 2.49% lead could be considered normal; eight assays show a trace or nil in lead and up

to 3.60-oz. silver, and these assays are considered to be abnormal. This leads one to suspect that there should be some silver minerals present, and that genetically some of the silver is independent of the lead.

Gold, silver, and lead mineralization is thought to be independent of the tungsten mineralization. Good examples of this are Samples No. 586, 587, and 588.

Sample No. 586 - Trace Au, Trace Ag, Trace Pb, and 1.13%  $WO_3$

Sample No. 587 - Nil Au, Trace Ag, Trace Pb, and 0.49%  $WO_3$

Sample No. 588 - Nil Au, Trace Ag, Trace Pb, and 0.65%  $WO_3$ .

For the district the following generalizations are thought to be recognized:

(1) There is a greater amount of quartz in the vein outcrops in the most northern area mapped.

(2) There is a greater amount of barite in the vein outcrops in the most northern and western areas mapped.

(3). More specularite is found in the north central and the north area.

(4). Most of the epidote is found in the southeast central area.

(5). Fluorite is probably the most common vein mineral after quartz and

the dark brown carbonate (siderite?).

In this area the fluorite crystals seen were of the octahedral form. The color was a dull white to gray with very little of the green or purple varieties. Assays indicate too, that fluorite is present in large amounts in this district. The highest value was found in a sample taken 1,000 feet southwest of the Surprise No. 3 Claim, in the southern part of the district, see sample No. F-1506.

Sample No. F-1506 - 36.0-inches, vein; 0.005-oz. Au, 1.45-oz. Ag, 0.93% Pb, 0.31% Cu, 0.72% Zn, 0.188% Mo, 5.81% Ba, 0.11%  $WO_3$ , 0.010% Hg, and 56.06%  $CaF_2$ .

The second highest value in fluorite was found in a sample taken in the southern part of the district, near the south endline of the Keystone Claim. This chip sample was the east ten feet of a 30-foot outcrop of the Keystone Vein, see sample No. F-1516.

Sample No. F-1516 - east 10-feet of a 30-foot vein; 0.003-oz. Au, 0.35-oz. Ag, 0.41% Pb, 0.40% Cu, 0.36% Zn, 0.016% Mo, 1.78% Ba, 0.05%  $WO_3$ , 0.39% Mn, and 29.64%  $CaF_2$ .

The third highest value in fluorite was found in the Upper Adit above the Gunsight Mine, on the west end of the open stope. This vein is in the footwall of the Gunsight Vein. Two samples were cut, see samples No. 526 and 527.

Sample No. 526 - 33.0-inches, vein; None Au, 0.20-oz. Ag, 0.45% Pb, 0.04% Cu, 3.10% Ba, 0.30% Zn, 0.022% Mo, 0.016% W, and 25.18%  $CaF_2$ .

Sample No. 527 - 60.0-inches, hanging wall of vein (note how the fluorite has penetrated into the wall rock); None Au, Trace Ag, 0.25% Pb, 0.05% Cu, 0.94% Ba, 0.35% Zn, 0.001% Mo, 0.016% W., and 14.26%  $CaF_2$ .

The Cunsight Vein carries fluorite, in the Cunsight Mine. The vein was sampled underground at seven feet west of the collar of the winse on the adit level, see sample No. 520.

Sample No. 520 - 26.0-inches, vein, Trace Au, 23.50% Ag, 5.22% Pb, 0.06% Cu, 10.70% Ba, 1.53% Zn, 0.012% Mo, 0.010% W, and 11.77%  $\text{CaF}_2$ .

It is interesting to note that the granite carries fluorite. A specimen of unaltered granite was taken from near the northeast endline of the Surprise No. 5 Claim, in the eastern part of the district, see sample No. 538.

Sample No. 538 - granite rock specimen, Trace Au, Trace Ag, 0.20% Pb, None Cu, 0.09% Ba, 0.46% Zn, 0.001% Mo, 0.006% W, and 1.43%  $\text{CaF}_2$ .

It was suggested in a letter to Mr. Hals C. Tognoni dated May 6, 1963, that ten of the highest grade  $\text{CaF}_2$  samples from different parts of the district be checked by spectrographic analysis. The pulps of these samples are still at Hawley and Hawley, Assayers and Chemists, Inc., and they could send a portion of each pulp for the analysis.

The elements that should be specifically requested to be checked in the spectrographic analysis are the following: (1) Cerium, (2) Yttrium, (3) Lanthanum, (4) Europium, (5) Samarium, (6) Erbium, (7) Dysprosium, (8) Neodymium, (9) Terbium, and (10) Germanium.

The following samples are the ones that should be checked: Samples No. 520, 526, 527, 535, 538, 573, 597, F-1504, F-1506, and F-1516.

#### (Wall Rock Alteration)

Wall rock alteration of the veins is not pronounced, in change of color, in most cases.

Bleaching of the granitic rock to a white color is found; this form of hydrothermal alteration is thought to be sericitization. A good example of this type of alteration is found in the vicinity of samples No. 507 and 508, on the Galena No. 2 Claim; these samples are the highest cut copper samples taken in the district.

Carbonatization could be one of the types of hydrothermal alteration, for much carbonate was found in the district; however, it was not apparent to the writer as a form of wall rock alteration.

Silicification of the wall rocks was not apparent to the writer.

Greisenization of the wall rocks was not apparent to the writer.

The penetration of fluorine into the wall rocks is one of unique significance for this district. All samples taken, that have been assayed for fluorine, show fluorite is present in the wall rocks adjacent to the veins. In some cases the fluorite content is considered to be extremely high, see samples No. 526 and 527.

Sample No. 526 - 33.0-inches , vein, assays 25.18%  $\text{CaF}_2$

Sample No. 527 - 60.0-inches , HW wall rock, assays 14.26%  $\text{CaF}_2$ .

The question raised by the enrichment of the wall rock in fluorite deals with the porosity of the rock, and upon the back pressure of the escaping gases or fluids. Since the wall rocks are igneous granitic types of rocks, it is thought by the writer, that the back pressure must have been substantial and it probably indicates a deeper zone of formation than one would ordinarily expect.

(Paragenesis)

The paragenesis of the minerals in this area is not known, for as of this

time no polished sections or thin sections of the vein material have been made or studied.

#### Ore Controls:

The veins of the district occupy fault zones, that have had renewed fracturing during different stages of vein formation. Some vein material has brecciated and recemented and then broken again. Some of the vein-fault zones are long; the Gunsight Vein has been traced on the surface westward for over 4,000 feet.

At the points of intersection with divergent structures (faults, veins, or basic dikes) the mineralizing solutions appear to have permeated into the broken country rocks. Good examples of these zones are the gossans in the vicinity of the Surprise incline; and, the area at the north end of the Keystone Vein and its intersection with the basic dike.

Influence of rock type should be considered, for very little in the way of veins or vein material is found in the central area of granite aplite. The spacial relation to igneous bodies shows an abundance of mineralization near the edge of or away from the granite aplite core.

Chemical ore controls are thought to be important for this is a district very high in fluorine, as seen in the mineral fluorite. Fluorite, it is to be remembered, forms under a wide range of pressure and temperature conditions. The granite of the north and eastern part of the district has been found to contain 1.43% fluorite, and was probably produced at elevated temperatures and under pressure.

Studies of the crystal habit of fluorite suggest that the light-colored octahedral crystals are typical of relatively high temperature of formation, where the more deeply colored cubic crystals are formed under low-temperature conditions (see page 33, The System of Mineralogy, Seventh Edition, Volume 2,



Plach, Berman, and Frondel, 1951).

The granitic rock of the north and eastern part of the district has been found to contain 0.08% Ba. Barium is thought to be removed from the wall rock by fluorine bearing gases and becomes concentrated therein, giving rise to fluorite-barite veins (see page 478, Geochemistry by Kalervo Rankama and Th. G. Sahama, The University of Chicago Press, 1949). This supposition might account for the higher barite content of the veins in the northern part of the district.

Tungsten is also found in the district, with the greater amount, 500 PPM, being found in the granite aplite. The samples from the Kerlin Incline seem to indicate the scarcity at the time of the deposition of the tungsten of gold, silver, and lead; and that even the mineral fluorite was in short supply.

Copper is found in the district, with the greater amount being found in the southern and southeastern parts of the district. Chalcopyrite has been found on the surface in the southeastern section. It could be that the silver-lead metallization of the northern part of the district is a manifestation of zoning from the copper area of the southeast to the silver-lead of the north.

CONCLUSIONS:

- 1.) Study of the aerial photographs indicates lineation, and possible lineation intersections that should be checked in the field.
- 2.) Igneous rocks were mapped in this district that contain significant amounts of fluorine, tungsten, and zirconium.
- 3.) Strong persistent veins outcrop in this area; one has been mapped on the surface for over 4,000 feet.
- 4.) The veins follow fault zones.
- 5.) The vein systems of this district can be separated into three groups:
  - (1) Veins that strike to the northwest and dip to the southwest.
  - (2) Veins that strike to the north and northeast, and dip to the east and southeast.
  - (3) Veins that strike to the east and northeast, and dip to the north and northwest.
- 6.) The veins that strike to the east and northeast, and dip to the north and northwest have produced the major amount of ore from the district; the values have been in silver and lead, with total production thought to be in excess of \$ 250,000 and produced prior to 1900.
- 7.) Large mineralized areas are found at the intersections of veins and other structures.
- 8.) Minerals seen in this area are: quartz, calcite, siderite (?), specularite, fluorite, barite, scheelite, galena, chalcopyrite, chrysocolla, malachite, azurite, and cinnabar.
- 9.) No silver mineral was recognized. The distribution of silver is erratic.

It is thought that genetically some of the silver is independent of the lead mineral galena.

10.) Gold, silver, and lead mineralization is thought to be independent of the tungsten mineralization.

11.) Fluorite is probably the most common vein mineral after quartz and the dark brown carbonate (siderite?).

12.) In this area the fluorite crystals seen were of the octahedral form. Studies of the crystal habit of fluorite suggest that the light-colored octahedral crystals are typical of relatively high temperature of formation.

13.) The penetration of fluorine into the wall rocks is one of unique significance for this district. All samples taken, that have been assayed for fluorine, show fluorite is present in the wall rocks adjacent to the veins. Since the wall rocks are igneous granitic types of rocks, it is thought by the writer, that the back pressure must have been substantial and that it probably represents a deeper zone of formation than one would ordinarily expect.

14.) Fluorite is thought to be present in economic amounts in this district.

15.) Tungsten is one of the most persistent elements in this district. The only tungsten mineral seen was scheelite, however it is thought another tungsten mineral is present. One structure shows a calculated average of 64.0-inches of width assaying 0.675%  $WO_3$ ; however the assay limits of this structure are not known in width or in length. Tungsten is thought to be present in economic amounts in this district.

16.) One vein system that strikes to the east and northeast and dips to the north and northwest is the Gunsight-Morning Star- Extension of Morning Vein System. This vein system has been traced for over 4,000 feet on the surface.

where it has been developed on the Gunsight Claim it has probably produced over \$ 250,000, in silver and lead. It is thought that other economic ore bodies of silver and lead will be found along this structure.

17.) The copper mineral chalcopyrite has been found on the surface in the southeastern section of the district. It could be that the silver-lead metallization of the northern part of the district is a manifestation of zoning from the copper area of the southeast to the silver-lead of the north. As stated before this is elephant country in regard to mineral wealth. One elephant has been found, the big copper deposit of the New Cornelia Mine, at Ajo. If there be any credence to the zoning hypothesis, then the southeastern section of this district should be prospected for copper.

## RECOMMENDATIONS:

The following recommendations are made for this district:

1. The lineation and lineation intersections should be checked in the field; if nothing can be seen by walking over the ground, the areas should be trenched by bulldozing; if it proves to be necessary they should be channel sampled, with the eventual thought of drilling.
2. The Keystone Vein, where it is 30 feet wide, should be trenched and channel sampled across the entire width. A bulk sample of the vein should be taken for preliminary mill testing. The Keystone Vein should be drilled.
3. The gossan areas of the Surprise Incline Area and the North Keystone Area, should be trenched by bulldozing and channel sampled, with the thought of drilling.
4. The Surprise Incline should have ladders installed so that it can be mapped and sampled, with the thought of driving a crosscut from the bottom of the incline through and under the gossan exposed on the surface.
5. (a) The Gunsight Mine should be mapped and sampled, and specimens should be taken for mineralogical and petrographic examination so that the paragenesis can be worked out for this section of the district.  
(b) The Gunsight Vein System (4,000 feet long) should be explored to the west. A good way to start, on the east end, would be to drift southwest on the Silver Girt Vein, on the Lower Adit Level, to its intersection with the Gunsight Vein and then follow the Gunsight Vein to the southwest.  
(c) The western section of the Gunsight Vein System should be drilled.  
(d) The Upper Adit Level of the Gunsight Mine should be sampled to the portal. The 33-inch vein near the face assayed 25.18%  $\text{CaF}_2$ , and the next 5-feet of the hangingwall assayed 14.26%  $\text{CaF}_2$ , yet the remaining distance to the

Gunsight Vein that was stoped at the portal has not been sampled.

6. Specimens should be taken for mineralogical and petrographic examination from near the bottom of the Kerlin Incline; the three samples taken at 13 feet down the incline assayed from 0.49% to ~~1.53%~~ <sup>1.53%</sup>  $WO_3$ , for a calculated average of 64.0-inches of width assaying 0.675%  $WO_3$  (these are the highest tungsten samples taken in the district), so that the paragenesis can be worked out for this section of the district.

(a) It is to be noted that no assay limit was reached in the sampling of this structure in either the foot or hanging walls, thus they should be tested by drilling.

7. The bleached zone that strikes N. 25° E. and dips 77° NW., on the Galena No. 2 Claim, that assayed 0.95% Cu for 60.0-inches and 2.45% Cu for 6.0-inches, should be cut by bulldozing and then channel sampled with the thought of drilling.

8. The area in the southeastern part of the district where the copper mineral chalcopyrite was found as very small stringers should be trenched by bulldozing and then channel sampled with the thought of drilling. Geophysical prospecting for sulfides at depth in this area should be given careful consideration.

9. The apparent lineation intersection near the center of Section 22, T. 14 S., R. 4 W., Gila and Salt River Base and Meridian is thought to be possibly a big gossan area. This area should be studied, bulldozed, sampled, and considered for geophysical prospecting.

*Harry E. Nelson*  
Harry E. Nelson  
Registered Geological Engineer  
License No. 891, Nevada  
Las Vegas, Nevada  
May 25, 1933

Rockhouse group

BEAR CREEK MINING COMPANY  
SOUTHWEST DISTRICT

PRICE PROPERTY EVALUATION  
PIMA COUNTY, ARIZONA

by

Noel Horlocker

January, 1970

## SUMMARY

The Price property consists of five unpatented claims located on the Papago Indian Reservation about 20 miles southeast of Ajo, Arizona. The property was submitted to Bear Creek by Mr. W.L. Price. The claims contain copper oxides, chalcocite and goethite mineralization on narrow, wide spaced shears. There is no evidence of disseminated sulfides or pervasive alteration. No pediment exists adjacent to mineralized bedrock. If a source exists vertically below the exposed mineralization it must be very deep. No further work in this area is recommended.

## LOCATION

The Rockhouse claim group is located on the Papago Indian Reservation in T14S, R4W, Sections 32 and 33, about 20 road miles southeast of Ajo, Arizona.

## Submitted By

The property was submitted by Mr. W.L. Price, 301 East 2nd Avenue, Ajo, Arizona.

## Data Submitted

The submittal was accompanied by a good, amateur resume of the geology and mineralization of the area prepared by Mr. Price.

## Land Status and Ownership

The Rockhouse claim group consists of five unpatented lode claims owned by Mr. Edward Ketchum, 1341 North Street, Ajo, Arizona. The claims are located on the Papago Indian Reservation with the Papago Tribe owning the surrounding mineral rights.

## History

Several shafts and prospect pits expose copper oxide mineralization along shears. Production was negligible with no production in recent years.

The area was evaluated with negative results during the Pediment Reconnaissance Program in 1966. This evaluation included two east-west I.P. lines across the general area of the Rockhouse claims. The I.P. data were recently reviewed by D. Haupt who concurs with the past interpretations that the lines are not anomalous.

## GEOLOGY

Bedrock consists of coarse-grained, equigranular biotite granite overlain on the west by recent alluvium. Several, narrow, east-west trending dikes of andesite intrude the granite. The Rockhouse claims contain numerous, weak to strong east-west trending shear zones.



### MINERALIZATION AND ALTERATION

The shear zones on the property contain copper oxides, chalcocite, and minor goethite mineralization. The estimated grade is 0.1% to 2.0% copper. The shears are narrow and widespaced. The exposed mineralization apparently represents multicycle oxidation and enrichment of lower grade chalcopyrite-pyrite protore. Bull quartz and lesser calcite are generally associated with the mineralization. There is no evidence of disseminated sulfide mineralization or pervasive alteration.

### CONCLUSIONS

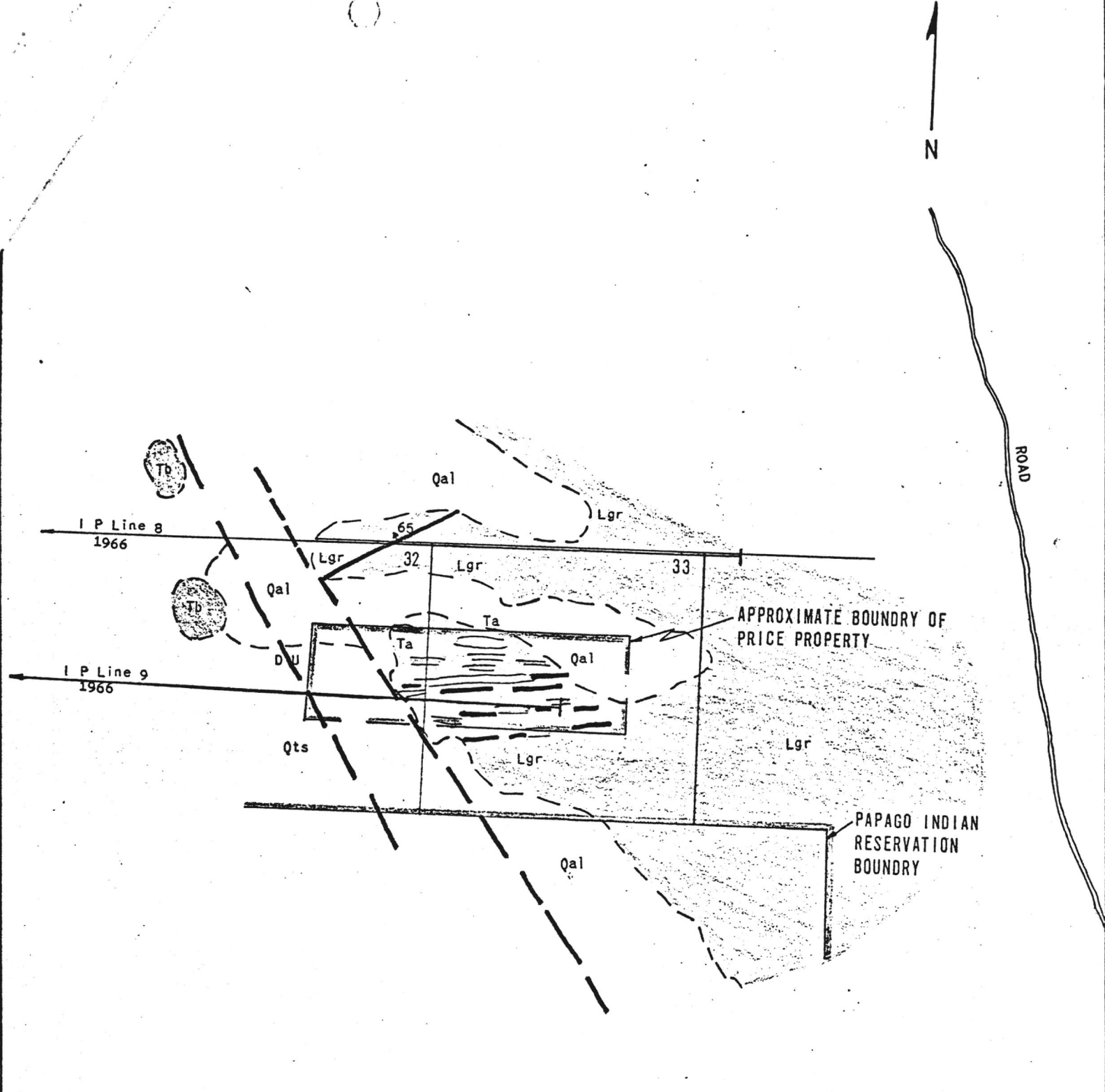
The known mineralization does not constitute a target for Bear Creek. No significant pediment exists adjacent to mineralized bedrock. If the source of mineralization is vertically beneath the exposed mineralization it must be very deep.

### RECOMMENDATIONS

No further work is recommended in this area.

*Noel Horlocker*

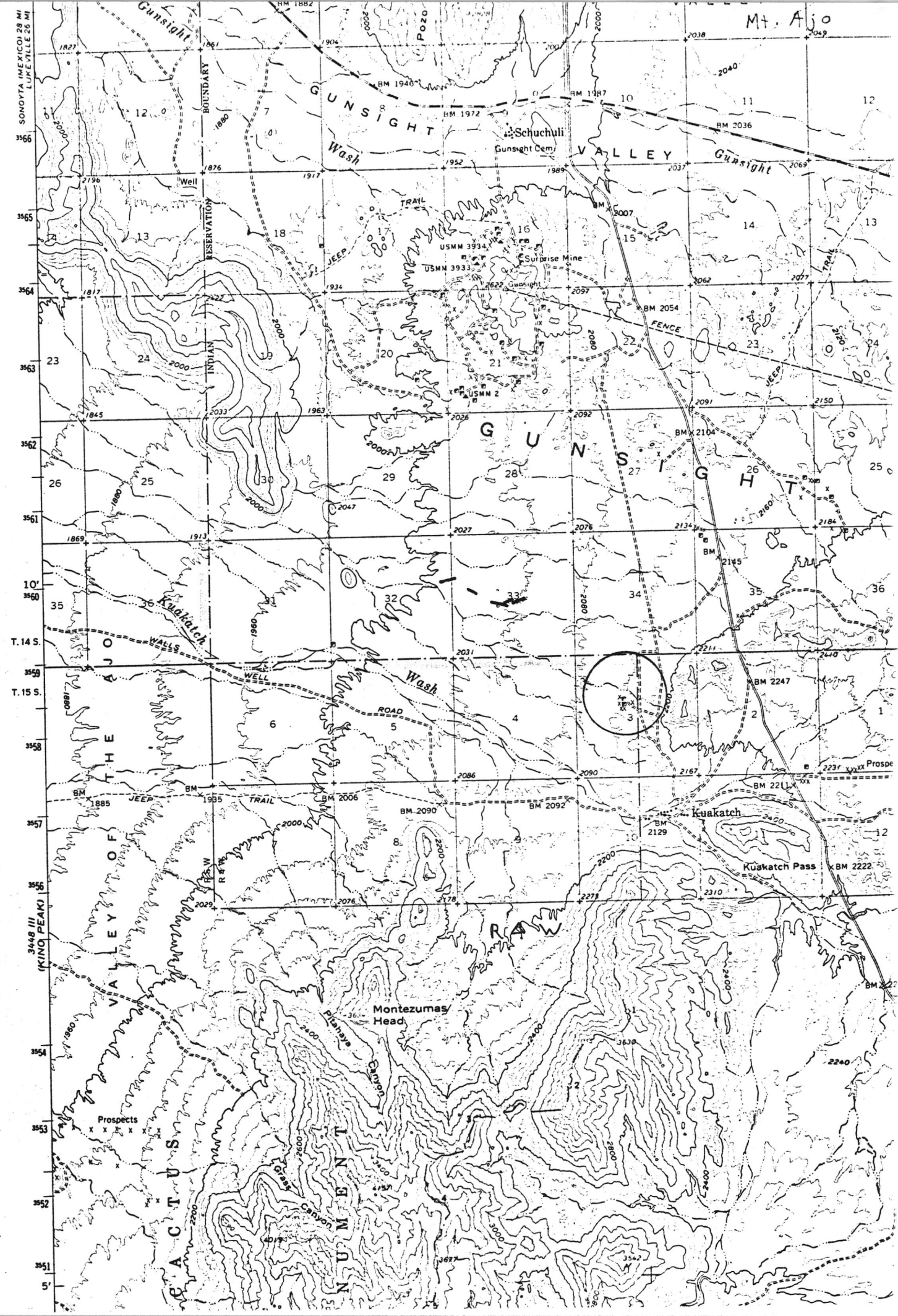
Noel Horlocker



**EXPLANATION**

- Qal Alluvium
- Qts Hertergenous pediment type alluvium
- Tb Basalt flows
- Ta Andesite dikes
- Lgr Equigranular granite to quartz monzonite
- Faults, dashed where infered

**GEOLOGIC MAP OF**  
**PRICE PROPERTY EXAMINATION**  
 PIMA COUNTY, ARIZONA  
 SCALE: 2" = 1 MILE  
 DATA BASE: A. M. S. PHOTO 380  
 DATA BY: N. HORLOCKER



RESPECTFULLY OFFERED FOR YOUR EXAMINATION AND POSSIBLE  
GEOPHYSICAL WORK

Property

This is a group of copper claims located on the Papago Indian Reservation well within the Tucson copper circle, toward the western end of Pima County. The prospect is on typical Sonoran Desert terrain: cactus, mesquite, paloverde, greasewood, etc.

Intention of  
Owners

These claims have been firmly and carefully held for many years. The owners now wish to sell these claims at a fair market price in event exploration discloses an ore body of commercial possibilities. Absolute cooperation of the owners is assured.

Exploration

The owners hereby invite any interested company to send in a capable geologist to examine the claims and to follow up with geophysical work if indicated by his examination. And if such geophysical work were encouraging, eventually drill. The property has never had geophysical work such as magnetometer, geochemical soil sampling, or drilling. At this writing, it is not a "second-hand" prospect.

Some Geological  
Observations of an  
Amateur Nature

It is not my intent to make bold, rash, or grandiose statements about these claims; only honest observations are offered here. The property lies somewhat in the center of a large mass of gray granites, which in turn forms a basin in enclosing ranges of desert volcanic hills. The claims are situated on two long low ridges of what appears to be quartz monzonite carrying high quartz content and biotite. This fairly large acreage is coursed by copper veins running parallel east to west. These veins are narrow most of them about 3" to 4"; however two or three of the veins will run from 2' to 3'. Here the copper is thinned whereas the narrow finger wide seams carry bornite and chalcocite. Malachite, chrysocolla, and what I believe to be azurite is in all the veins. What has been designated as the No. 1 lode is reportedly andesite. This travels along the country rock (quartz monzonite?) as wandering brown, lava-like veins travelling parallel to the copper veins. This turns dark

forrest green on being opened up. There is always red hematite, smeared hematite, specular iron, etc. Wherever the iron thickens, seams of copper are enclosed. Two deep shafts, about 25' to 30' are sunk into the main andesite (?) vein. Hand samples are rich in copper and the stain is about 3' wide here. Red pits have been dug along this vein always exposing some copper seams. These pits go toward the east for a few hundred yards. To the west this main vein goes under desert sediments and appears to be lost. The two deep shafts here and many medium pits and shallow pits would afford your examiner much information about the area. About 125 yards to the south, a second important vein runs parallel to this main vein. Here there is a different appearance. The vein is 2' wide at the surface and widens to 3' down into a 20' shaft. The vein appears to be a fine grained monzonite in which there appears to be some dissemination of copper grains. The oxide copper grains travel across this vein and is variously interrupted by veinlets of specular iron and hematite. Now, intervening between this large vein and the No. 1 lode vein described above are about three visible small rich veins of copper which have ridden up with orange-brown-red iron. Once again where the iron thickens or rises there is copper.

On the second ridge to the north, veins continue to travel east and west, paralleling each other and in parallel also with the andesite (?) brown iron-rich veins. One deep shaft here exposes a vein complex that spans two or three feet. On this ridge the pits afford near the surface chalcocite and bornite. Malachite is rich and compact here. The chalcocite sometimes is thumb-wide though thicker pieces have been reported. The bornite found was in small masses. I do not know how to prove that chalcopyrite may have been here unless it is by the blue azurite-like carbonate. The chalcocite is rich and pure looking.

In all the shafts, the monzonite seems to darken at depth. All cleavage planes and joints have a tendency toward the orange-tan coating of limonite (?) weak in some places, stronger in others. I believe there could be pyrite in some of these planes as shown by the presence of some of this limonite. Could pyrite be associated with the biotite in the monzonite? This coating resembles the iron where the copper appears in the veins. Hopefully, the iron stain on these rocks would thicken at depth and include low grade coppers.

I cannot find what might be called a gossan, that is, the existence of massive limonite following pyrite. I do not find a

Amateur Geological  
Observations (continued)

leached or rotted zone. I do not believe there is limestone in the area unless it was engulfed and submerged. As to contact minerals I believe there is a little silky muscovite but scant. It does not seem to thicken. I do not believe there is garnets or schistosity. Epidote exists sparingly and runs as narrow strips down the centers of the brown andesite veins. Specularite and possibly some magnetite is present.

Possibly the main things lacking is an indentifiable gossan and a leached zone, and limestone or sediments against which a quartz monzonite magma could rise. Maybe the coatings on the country rock could thicken on depth and furnish some sort of submerged gossan. If this were the rich red-tan-orange iron as in the veins possibly low grade copper would accompany such iron. Once again in this area the copper seems to accompany the reddish iron.

The flat desert soils lie between the ridges and could hide contacts or other veins. However this is assuming.

At any rate there is a copper attitude on these ridges. Although there are no general wide spread splashes of malachite and azurite, the veins carry rich malachite along with the live coppers. All the veins have a faithful relationship and resemblance to each other; all seem to run parallel; all appear to have the same source; all carry the reddish iron.

The ridges commit a large acreage to a copper attitude.

Shafts on the prospect include four shafts twenty foot deep or more. There are many pits and shallow exposure of veins. Dumps afford a look at rock that came from deeper down, showing alteration on depth. Good roads lead to the general area. A pickup truck can negotiate any of the terrain with ease.

I feel there is sufficient copper "sign" here to justify examination by a capable geologist who hopefully would recommend further geophysical work. If these claims are not the heart of copper mineralization they might be the key to a large deposit. They would afford an excellent base for geophysical work in the whole area.

Amateur Geological  
Observations (continued)

To repeat, our aim is to interest you in and perhaps to sell you  
these claims at the earliest opportunity.

Walter L. Price

Walter L. Price,  
301 East 2nd Avenue,  
Ajo, Arizona 387-7415

July 22, 1969



**Kennecott Exploration, Inc.**  
**Exploration Services Department**

**Geologic  
Research  
Division**

March 12, 1976

MEMO TO: G. D. Van Voorhis

FROM: Richard L. Nielsen

SUBJECT: Gunsight (Meyer) Mining District, Papago Indian Reservation,  
Pima County, Arizona by J. W. Allan

Exploration interest in the subject area was generated through analyses of data derived from the southwest structural study. A major west-northwest fracture zone is apparent, and known mineralization prompted a field study. This report records results of that field work and includes descriptions of mines and prospects in the region.

Laramide and mid-Tertiary intrusive activity and mineralization appear localized by an intersection of a west-northwest zone with a north-trending fracture. Analyses of exploration potential and recommendations for exploration under postmineral cover are in a companion report by Jim Allan. This report is in part background support for those recommendations.

*Dick*

Richard L. Nielsen

RLN:gp  
Attachment

cc: H. L. Bauer  
M. T. Pana w/o attach.  
J. C. Wilson



Kennecott Exploration, Inc.  
Exploration Services

GEOLOGIC RESEARCH DIVISION



GUNSIGHT (MEYER) MINING DISTRICT  
PAPAGO INDIAN RESERVATION  
PIMA COUNTY, ARIZONA

by

James W. Allan

Salt Lake City, Utah  
March 12, 1976

## CONTENTS

	Page
SUMMARY AND CONCLUSIONS . . . . .	1
Summary of Geology and Mineralization . . . . .	1
Conclusions and Recommendations . . . . .	2
INTRODUCTION . . . . .	2
Location and Land Status . . . . .	2
District Metal Production . . . . .	5
Purpose and Scope of Examination . . . . .	5
GEOLOGY . . . . .	5
Areal Geology . . . . .	5
Rocks . . . . .	7
Precambrian(?) granite-gneissic basement . . . . .	7
Laramide(?) dike swarms . . . . .	7
Mid-Tertiary(?) composite stock . . . . .	8
Late Tertiary-Quaternary volcanic rocks . . . . .	8
Recent bolson and alluvial gravels . . . . .	9
STRUCTURE . . . . .	9
Introduction . . . . .	9
Laramide and Older Faults and Dikes . . . . .	9
Mid to Late Tertiary Faults and Intrusions . . . . .	11
Basin and Range Faults . . . . .	11
MINERALIZATION . . . . .	11
Introduction . . . . .	11
Laramide Veins . . . . .	11
Mid to Late Tertiary Epithermal Veins . . . . .	12
REFERENCES . . . . .	13
APPENDIX - MINE AND PROSPECT DESCRIPTIONS . . . . .	15

### ILLUSTRATIONS

Figure 1. Location map . . . . .	3
Figure 2. Patented mining claims . . . . .	4
Figure 3. Generalized geologic map with overlays showing index to geologic map and reports and index to geophysics . . . . .	6

Figure 4. Generalized geologic map with overlay showing structural interpretation . . . . . 10

Plate 1. Reconnaissance geologic map with overlay showing mineralization . . . . . in pocket

GUNSIGHT (MEYER) MINING DISTRICT  
PAPAGO INDIAN RESERVATION  
PIMA COUNTY, ARIZONA

by

James W. Allan

March 12, 1976



SUMMARY AND CONCLUSIONS

Summary of Geology and Mineralization

The exposed portion of the area under consideration is an irregularly shaped 3 by 6-mile window of granitic and gneissic rocks surrounded by late Tertiary-Quaternary volcanic rocks and gravels. Crystalline rocks, dominantly quartz monzonite to granodiorite in composition of probable older Precambrian in age, are intruded by a small mid-Tertiary(?) composite stock of leucocratic quartz monzonite and aplite. South of the stock the granitic/gneissic rocks are intruded by a swarm of Laramide(?) porphyry dikes which range in composition from quartz monzonite to hornblende diorite.

Major fractures in the district are interpreted as a strong west-northwest zone of pre-Laramide transcurrent faults intersected by a north-south zone of Tertiary faulting and intrusion. The mid-Tertiary Gunsight stock is emplaced at the intersection of these major fault zones.

Mineralization in the district is of two distinct types and ages. Classic epithermal quartz-barite-fluorite veins occur within and peripheral to the mid-Tertiary stock to which they very probably are genetically related. The lead- and silver-bearing portions of these veins account for the bulk of the Gunsight district's modest production. South of the stock, quartz-chalcopyrite veins of markedly different nature are closely associated spatially with the Laramide(?) porphyry dikes. These veins have been seriously prospected in places, but their production appears to have been insignificant.

## Conclusions and Recommendations

The mined and prospected veins of the Gunsight district appear to have no potential as significant future producers of base or precious metals. No mineralization or alteration of the type and pervasiveness normally associated with porphyry copper deposits was noted within the mapped area, and nothing seen in the exposed bedrock suggests the cover immediately surrounding the window may obscure a nearby porphyry copper deposit.

It is interpreted that major west-northwest faulting and Laramide porphyry dike swarms and copper-bearing veins in the district are elements of a structural framework very similar to that at Ajo. In a previous report (Allan, 1976), an induced polarization survey was recommended for the volcanic gravel-covered area along the projection of the west-northwest fault zone immediately west of the Papago Indian Reservation's western boundary.

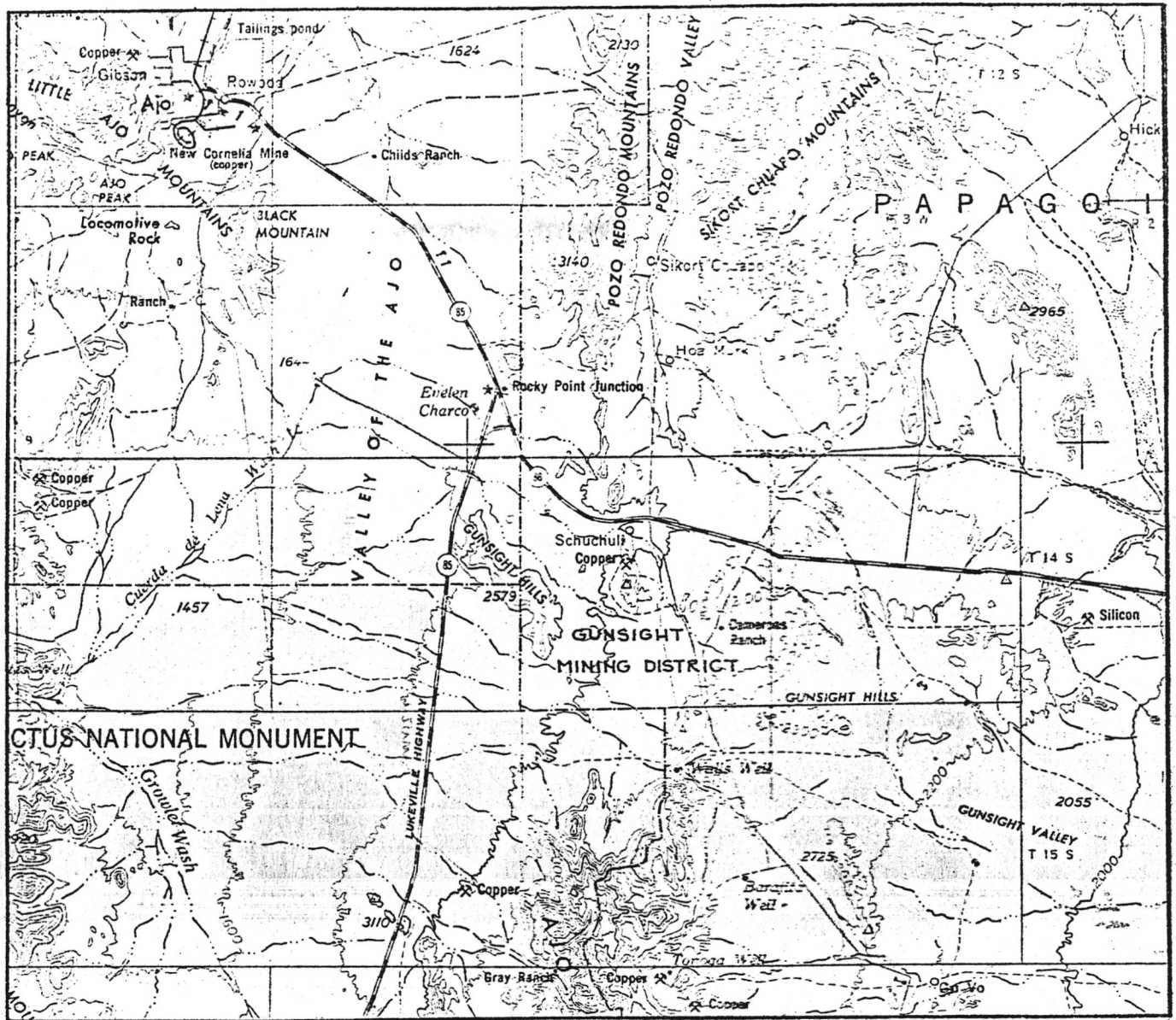
The Gunsight mining district as described in this report should be considered of no further interest at this time.

## INTRODUCTION

### Location and Land Status

The Gunsight or Meyer mining district comprises an ill-defined area of about 100 square miles in western Pima County, Arizona (Fig. 1). The southwestern portion (Copper Mountain area) of the district lies within the Organ Pipe Cactus National Monument; the northern and eastern part (Gunsight area) of the district with which this report is concerned is on the Papago Indian Reservation immediately east of the Reservation's western boundary.

In the part of the district on the Papago Indian Reservation, a total of 14 patented claims (Fig. 2 and Plate 1) surrounded by 78 valid (pre-1955) unpatented claims are currently held by the Gunsight Mining Corporation (Tognoni, 1964). Any other land in the district unclaimed prior to 1955 is totally owned by the Papago Indian Tribe. Several valid unpatented claims may exist in the Rockhouse group (Horlocker, 1970) 2 miles south of the patented claim group; however, this was not verified.



SCALE 1:125,000

AJO AMS sheet

LOCATION MAP  
 GUNSIGHT MINING DISTRICT  
 PIMA COUNTY, ARIZONA

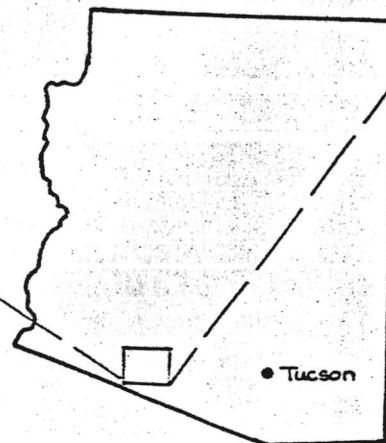
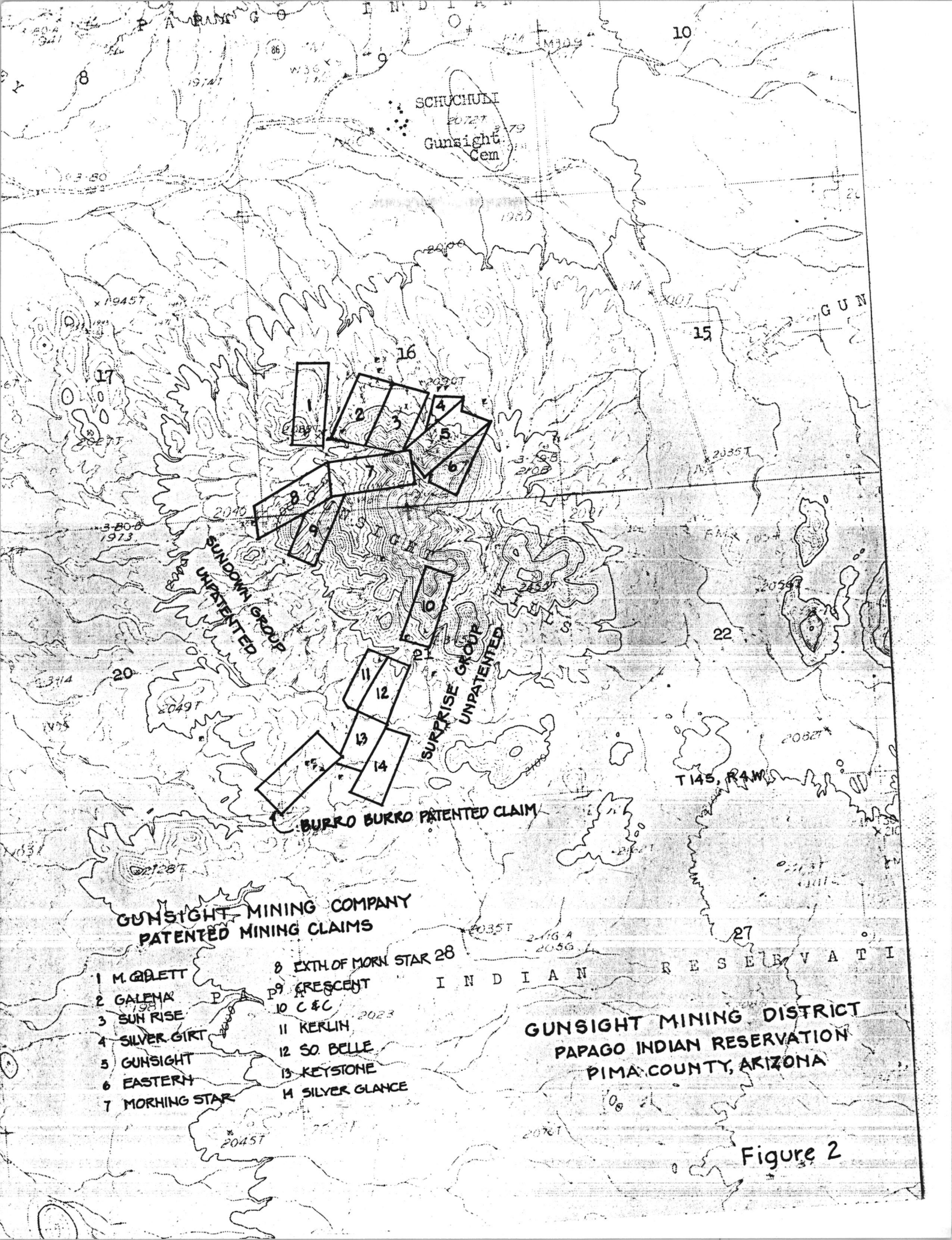


FIGURE 1



SCHUCHUNI  
Gunsight  
Cem

SUNDOWN GROUP  
UNPATENTED

SURPRISE GROUP  
UNPATENTED

BURRO BURRO PATENTED CLAIM

**GUNSIGHT MINING COMPANY  
PATENTED MINING CLAIMS**

- |                |                        |
|----------------|------------------------|
| 1 M. GIBETT    | 8 EXTH OF MORN STAR 28 |
| 2 GALENA       | 9 CRESCENT             |
| 3 SUN RISE     | 10 C & C               |
| 4 SILVER GIRL  | 11 KERLIN              |
| 5 GUNSIGHT     | 12 SO. BELLE           |
| 6 EASTERN      | 13 KEYSTONE            |
| 7 MORNING STAR | 14 SILVER GLANCE       |

INDIAN RESERVATION  
**GUNSIGHT MINING DISTRICT  
PAPAGO INDIAN RESERVATION  
PIMA COUNTY, ARIZONA**

Figure 2

## District Metal Production

The Gunsight mine was a minor producer of silver between 1878 and 1896 with an estimated total production of \$100,000 (Elsing, 1936). A more recent estimate of the district's total production is \$176,000 which includes 100,600 oz silver, 400 oz gold, 780 tons lead, and very minor copper, zinc, and tungsten (Keith, 1974).

Some of the copper production probably is from the Burro Burro mine area where some near-surface stoping along veins is evident. Ruins of very old stone residences and a mill or sorting house mark the site of Burro Burro which is shown on a map of Pima County bearing the date 1878.

## Purpose and Scope of Examination

This examination of the Gunsight district was prompted by the observation of an east-northeast-trending Laramide(?) dike swarm at Burro Burro during the structural evaluation of the Ajo AMS quadrangle. About 4 days were spent examining mines and prospects and briefly recording the traversed bedrock geology in the course of the mineral examinations with the purpose of evaluating the district's porphyry copper potential as initially suggested by the dike swarm. All previous Bear Creek-Kennecott data and other available information on the district were closely reviewed; all geologic and geophysical data are indexed on Figure 3 overlays and listed under "References."

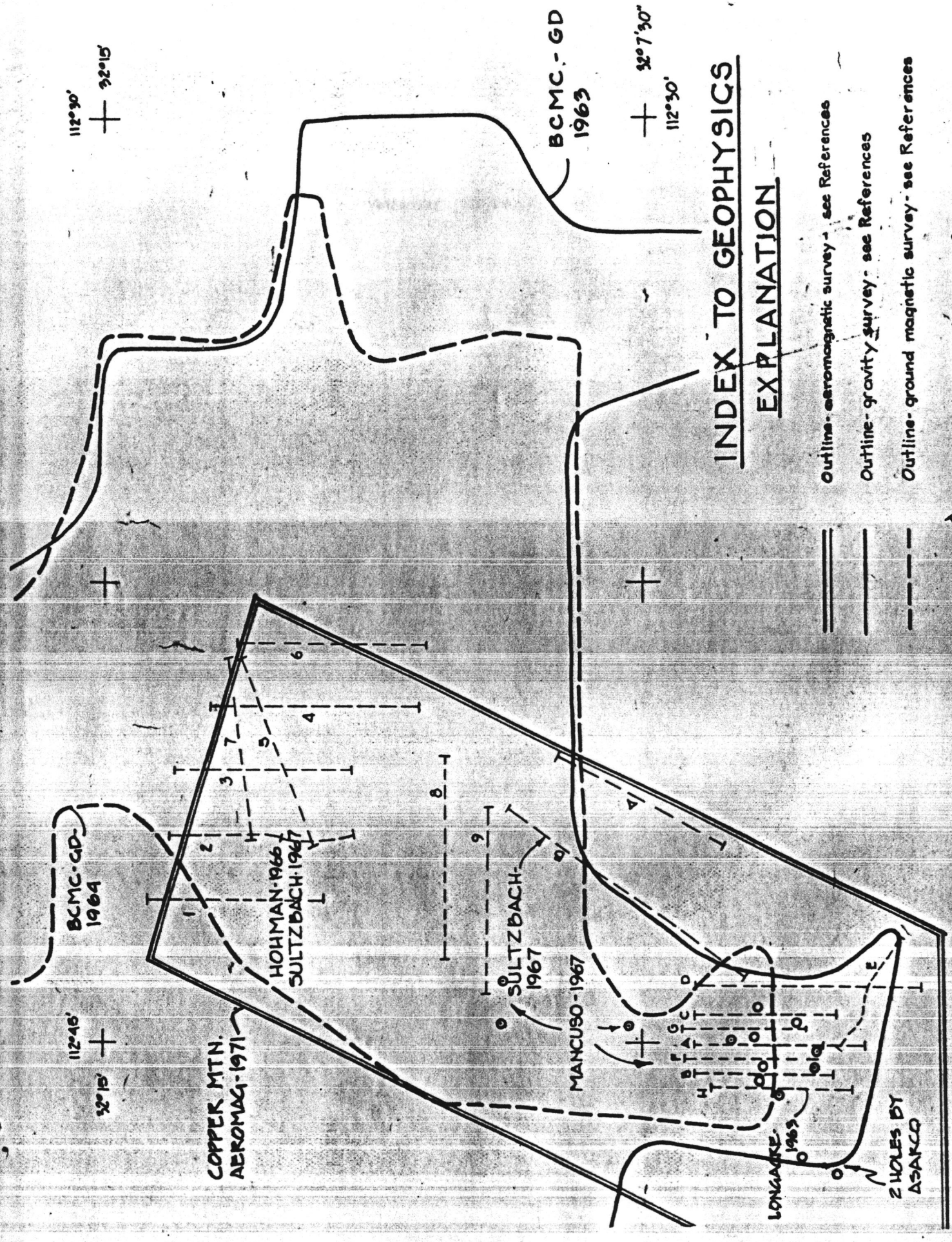
## GEOLOGY

### Areal Geology

Rocks old enough to host Laramide and mid-Tertiary mineralization in the Gunsight mining district are exposed in a group of irregular, different-sized windows surrounded by late Tertiary volcanic rocks and gravels for more than 10 miles in all directions (Fig. 3). The windows occupy a broad, low pass across a north-trending mountain range composed mainly of late Tertiary to Quaternary volcanic rocks.

Exposed bedrock in the windows is mainly gneissic to locally schistose granite cut by numerous aplite and pegmatite dikes and lenses. On the Arizona State Geologic Map these rocks are shown as Laramide, an age assignment which seems questionable; 40 miles to the northeast in the Vekol-Table Mountain area, similar rocks are depositionally overlain by late Precambrian Apache Group strata.

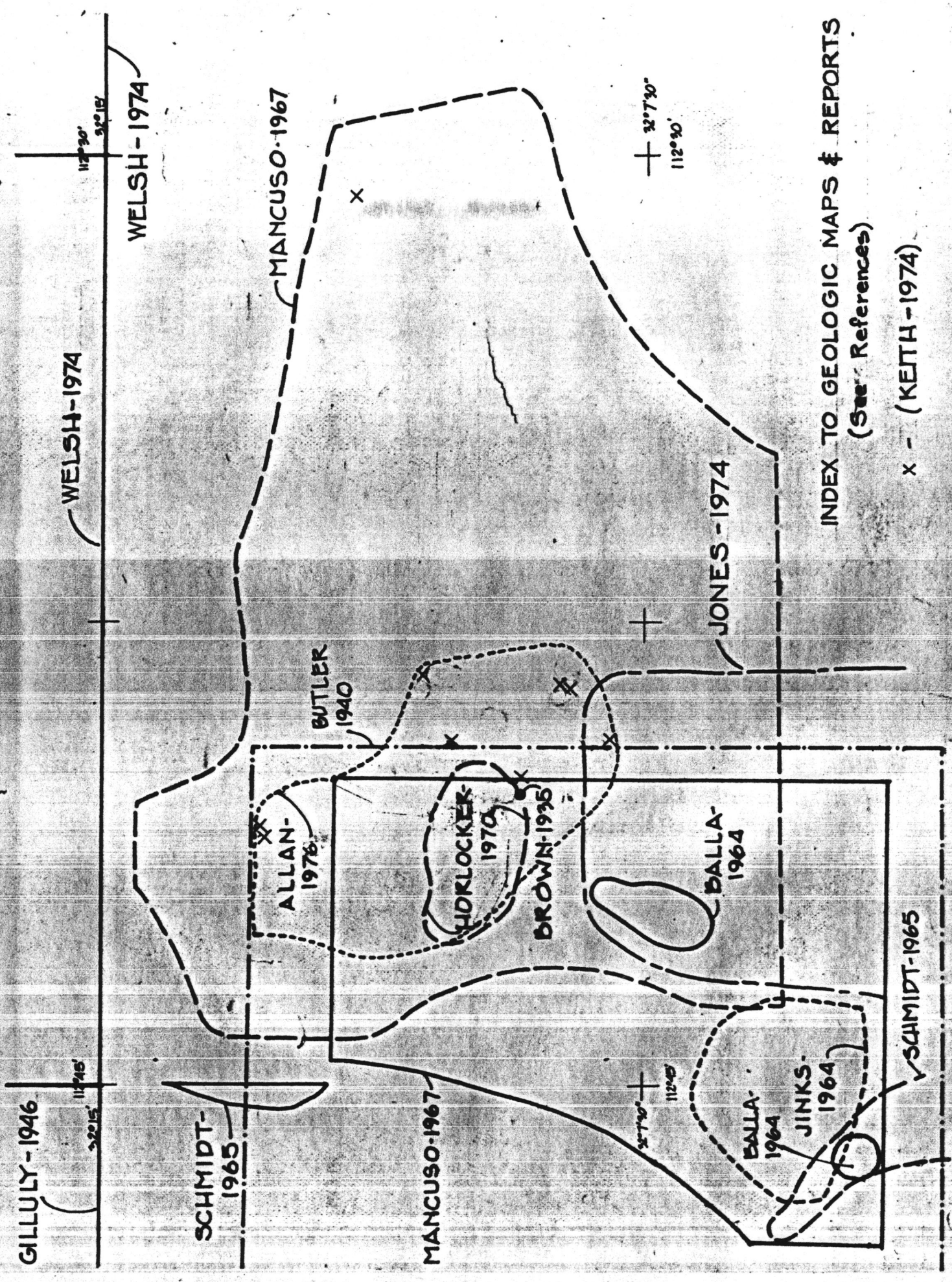




**INDEX TO GEOPHYSICS**  
**EXPLANATION**

- Outline - aeromagnetic survey - see References
- Outline - gravity survey - see References
- Outline - ground magnetic survey - see References
- IP lines (pre-VIP) - see References

**FIGURE 3**



INDEX TO GEOLOGIC MAPS & REPORTS  
(See References)

FIGURE 3



## Rocks

Precambrian(?) granite-gneissic basement. -- Older crystalline rocks within the area of the Gunsight mines and southeastward (Plate 1) consist mainly of medium- to coarse-grained equigranular granodiorites and/or quartz diorites (hand lens). In the northwestern two-thirds of the mapped area these crystalline rocks generally are medium grained and decidedly gneissic; in the southeastern area the rocks are consistently coarser grained with only very weak gneissic texture. The southeastern exposures are laced by hundreds of narrow east-west- to west-northwest-trending aplite dikes, most of which are too small to show at the map scale. These latter, less gneissic rocks commonly exhibit different degrees of pervasive cataclastic deformation of feldspar and quartz phenocrysts.

Two K-Ar age dates of the gneissic-granitic rocks done in conjunction with a University of Arizona masters thesis (Jones, 1974; P. E. Damon, personal communication) are shown on Plate 1. One located at latitude  $32^{\circ}10'$  longitude  $112^{\circ}40'$  yielded 46 m. y.; the other at latitude  $32^{\circ}08'$  longitude  $112^{\circ}38'$  yielded 39 m. y. These ages are highly questionable. On the basis of similarities to stratigraphically dated rocks to the northeast, the granitic-gneissic rocks and aplite dikes of the Gunsight district probably should be considered older Precambrian age. Texturally isotropic unaltered Laramide intrusions of similar composition would be difficult to detect in the granitic rocks and some may well be present.

Laramide(?) dike swarms. -- The gneissic crystalline rocks are cut by numerous, generally east-west-trending dikes of variable composition. The dikes are essentially undeformed and clearly truncate the linear gneissic structure in the enclosing rocks at many places.

In the north, the Burro Burro dike swarm trends east-northeast over an exposed strike length of 6,000 feet and width of 4,000 feet (Plate 1). The dikes are to a degree shown schematically on the map; many more exist than can be drawn at the map scale. Texturally the dikes are porphyries and range from quartz monzonite to hornblende diorite in composition (hand lens).

To the south near Rockhouse prospect, the dikes are markedly less abundant and trend west-northwest. The dikes are decidedly more mafic and finer grained in composition than those to the north. They generally are dark greenish to almost black in color and seemingly are comprised mainly of a fine-grained amphibole-like mineral.

The assignment of a Laramide age to the dike swarms is tenuous. They do not appear volcanic in nature and are very similar, particularly in the Burro Burro swarm, to the hornblende andesite and feldspathic andesite porphyry dikes mapped as Cretaceous-Tertiary in the Ajo district (Gilluly, 1946) 15 miles to the northwest.

Mid-Tertiary(?) composite stock. -- In the northern end of the mapped area the gneissic rocks are intruded by an aplite-quartz monzonite composite stock which in plan is at least 1 mile wide and 2.5 miles long. The stock is comprised mainly of two distinct intrusions. One, seemingly forming the largest proportion of the stock, is alaskite aplite (hand lens) which is conspicuously miarolitic and almost devoid of ferromagnesian minerals. The other is similar to the aplite but is distinctly coarser grained and appears near quartz monzonite in composition. This rock also is strongly miarolitic and leucocratic. The relative ages of these two facies were not determined; however, their contact is sharp and distinct where observed and careful mapping probably would determine which is older. A few narrow, north-trending quartz porphyry and basalt-andesite dikes cut the stock; none of these was mapped.

The stock is characterized by disseminated intergranular clots and films of specularite in most outcrops observed. Specularite is a common although not abundant constituent of the epithermal veins in the stock and may be more a result of mineralization than an accessory mineral to the intrusions themselves. In this region of Arizona, specularite is conspicuous in most of the mineralized occurrences, including the porphyry copper deposit at Ajo.

What may be a third facies of the stock or a completely separate intrusion was noted at the southeast end of the main aplite-quartz monzonite body (Plate 1). This rock, which was only briefly examined, is a medium-grained equigranular biotite quartz monzonite (hand lens) where observed. The rock is somewhat similar to some of the Burro Burro dikes and may be related to them.

As with the Laramide(?) dikes, assignment of an age to the stock is speculative. It simply "appears" mid-Tertiary; the abundant miarolitic cavities and generally high intergranular porosity are typical of intrusions of this age elsewhere in the region. In addition, the stock is closely associated spatially and probably genetically with classic epithermal veins which are almost certainly of mid- to late Tertiary age.

Late Tertiary-Quaternary volcanic rocks. -- Flanking the mapped area on all sides but only generalized on Plate 1 are late Tertiary to possibly Quaternary volcanic rocks. These rocks generally appear to be a series of andesitic to latitic flows, agglomerates, and tuffs capped locally by basaltic flows. Refer to Jones' thesis (Jones, 1974) for description of these rocks in the region south of the mapped area of Plate 1. Age dates of some of these rocks as listed in the thesis are as follows:

base of Organ Pipe volcanics:  $16.0 \pm 0.3$  m.y. and  $17.1 \pm 0.7$  m.y.

top of Organ Pipe volcanics:  $14.7 \pm 0.5$  m.y. and  $15.4 \pm 0.3$  m.y.

overlying basalt:  $15.0 \pm 0.4$  m.y.

Recent bolson and alluvial gravels. -- Bolson gravels and alluvium over a range of thickness cover most of the area of Plate 1 and Figure 3. The granitic and gneissic rock mapped on Plate 1 is covered by a thin layer of pediment gravels and alluvium.

## STRUCTURE

Introduction

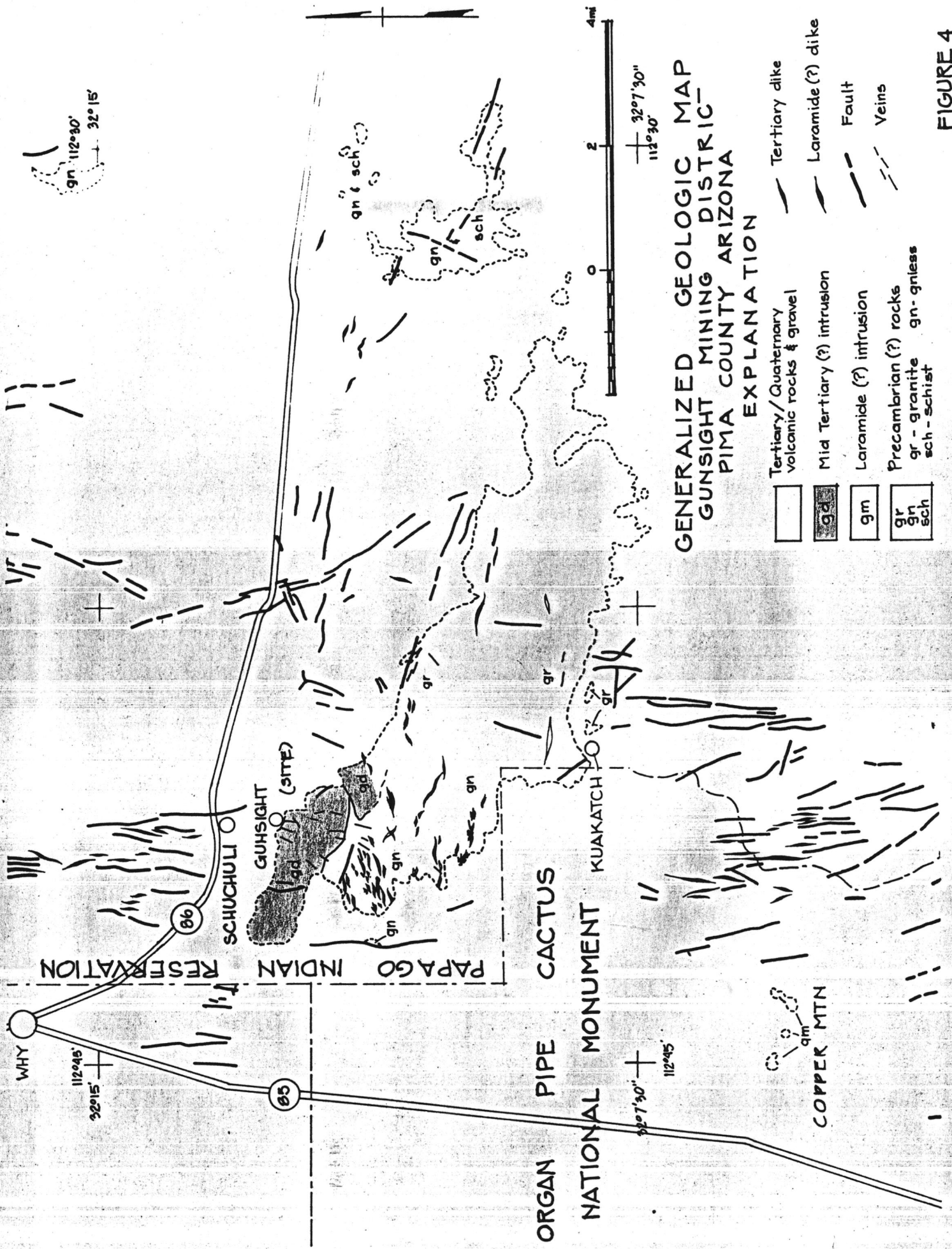
The Gunsight district, exposed rocks older than the late Tertiary volcanic rocks are all of intrusive igneous origin and thereby lack any reference to the structural information such as folding, tilting, and faulting which can be inferred. The following brief discussion of structure is limited to fault and dike patterns and their probable significance. The interpreted age of these structures obviously is only as correct as the presumed age of the affected rocks.

### Younger and Older Faults and Dikes

The faults cutting older rocks of the district consistently trend west-northwest and east-west (Plate 1). In the central and southern portions of the district, dike swarms of presumed Laramide (quartz monzonite porphyries) and Precambrian (aplite) age are emplaced along the fault and fractures of this trend. The southern contact and fracture pattern of the Gunsight stock conform to the west-northwest

west-northwest-trending zone of faulting and dike intrusion extends about 2 miles east of the Gunsight district (Fig. 4) where it is obscured by younger volcanic gravels. To the west the zone is covered by younger volcanic gravels immediately west of the district.

The northeast-trending Burro Burro dike swarm represents elements of a structural pattern which deviate from the above-noted trends. The west-northwest to east-west elements of the older faulting are assumed to be transcurrent or wrench fault patterns, the Burro Burro trend is assumed to be with tensional strain derived from left-lateral shearing stress along the west-northwest plane of rupture (Fig. 4). The west-northwest faults are assumed to be second-order master (McKinstry, 1953) or first-order (Moody, 1956) faults. The east-west faults are assumed to be Riedel or second-order shearing.



**GENERALIZED GEOLOGIC MAP  
GUNSIGHT MINING DISTRICT-  
PIMA COUNTY ARIZONA**

**EXPLANATION**

- Tertiary/Quaternary volcanic rocks & gravel
- Mid Tertiary (?) intrusion
- Laramide (?) intrusion
- gr  
gn  
sch Precambrian (?) rocks  
gr - granite  
sch - schist
- Tertiary dike
- Laramide (?) dike
- Fault
- Veins

**FIGURE 4**

PROSPECT DATA

Prospect Prospect F Former Name \_\_\_\_\_

Metal(s) of Interest Cu, Au, W? Exam. by JWA Date 4-25-75

Location Papago Ind Res  
County Pima State Ariz

Common Cor Secs 1, 2, 11, & 12; T 15 S, R 4 W Map Ref. Tonaca NW quad sheet Mt Cjo 15' quad

Property & Owner \_\_\_\_\_

References, remarks, etc. Briefly described in part on the Black Bear and Bullion Bar mine groups in Ariz Bur Mines Bull 139.

Development SW cor sec 1: one incline shaft ± 30', numerous pits for 400' east.  
SE cor sec 2: one incline shaft ± 70', one vert shaft ± 15' and several shallow pits. NE cor sec 11: one shaft, caved, possibly ± 30'

Remarks \_\_\_\_\_

Geology, Type Deposit: quartz-pyrite-chalcopyrite veins  
Areal geology, rocks: \_\_\_\_\_

veins cut medium to coarse grained, holocrystalline quartz diorite or granodiorite. In some vein walls rock is schistose parallel to vein. Numerous splite dikes cut the quartz diorite in the area.

Structure: SW cor sec 1: incl shaft on 1' to 2' quartz vein N50W, 75S, pits to east on several N75W, 50 to 60S veins. NE cor sec 11: fault (10') zone faced with massive, impersistent quartz veins, best copper show in area, N70E, 60N. SE cor sec 2: quartz vein 1 to 2' wide N78W, 65S.

Minerals: quartz, pyrite, chalcopyrite (inferred) scheelite (reported), little chrysocolla and malachite

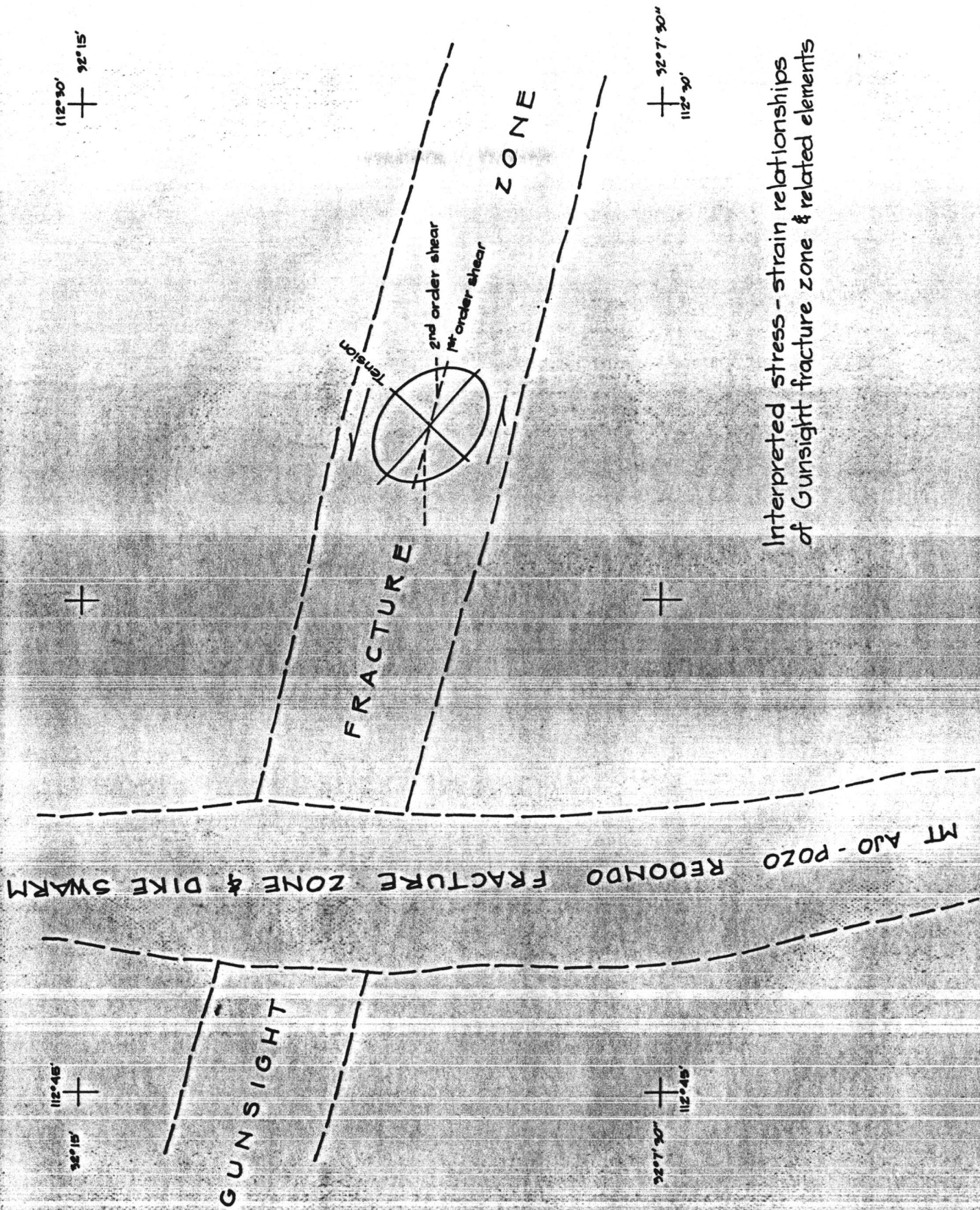
Alteration: \_\_\_\_\_

Oxidation: \_\_\_\_\_

Conclusions and Recommendations: \_\_\_\_\_

of no further interest.





Interpreted stress - strain relationships  
of Gunsight fracture zone & related elements

Figure 4  
overlay



PROSPECT DATA

Prospect Little Chief silica pit Former Name \_\_\_\_\_

Metal(s) of Interest silica flux Exam. by JWA Date 4-18-73

Location 49 mi SE of Ajo County Papago and Pima State Ariz  
SE 1/4 Sec. 19 ; T 14S , R 2W Map Ref. Mt Ajo 15'

Property & Owner unsurveyed

References, remarks, etc. mentioned in Ariz Bur Mines Bull 189

Development Large open cut of relatively recent vintage, about 800 ft long, up to 100 ft wide, and as deep as 50 ft - long axis of the cut strikes N65E

Remarks Produced silica flux for Ajo smelter

Geology, Type Deposit: quartz lenses & veins  
Areal geology, rocks: lenticular veins and lenses of massive, crystalline quartz occur in latite-baldspar gneisses and minor schist. Numerous dikes & irregular bodies of albite pegmatite occur in the area.

Structure: Foliation in the rocks trends N65E and dips 70 N. Quartz and pegmatite bodies occur concordant with the foliation and generally, but locally discordant dikes and veins occur.

Minerals: quartz

Alteration: \_\_\_\_\_

Oxidation: \_\_\_\_\_

Conclusions and Recommendations: of no further interest

## Mid to Late Tertiary Faults and Intrusions

Faults and dikes of demonstrated mid to late Tertiary age without exception trend north-south in the Gunsight mining district (Fig. 4). These structural elements form the central portion of a 4-mile-wide, north-trending zone of Tertiary faulting and intrusion more than 30 miles in length. The Gunsight stock is emplaced squarely in the intersection of this north-south zone with the above-described older zone of west-northwest faulting.

The epithermal veins of the Gunsight district fill faults and fractures of the same general trend with a slight tendency toward a north-northeast strike at the north and south ends of the vein system. Most of the other epithermal districts of southern and central Arizona exhibit north-trending vein and dike systems.

## Basin and Range Faults

No well-defined Basin and Range faults were mapped in the Gunsight district although the western edge of the district probably roughly coincides with a north-trending zone of faulting of Basin and Range type.

## MINERALIZATION

### Introduction

Mineralization of at least two and possibly three distinct types and ages have been mined and prospected in the Gunsight mining district. Quartz veins carrying small amounts of copper and a few with small but mineable amounts of tungsten and gold are the oldest. The tungsten-gold-bearing veins are considerably removed from the copper veins and also may be different in age. The youngest and most important mineralization in the district is silver- and lead-bearing epithermal veins.

### Laramide Veins

Relatively narrow, impersistent quartz-pyrite-chalcopyrite veins cutting gneissic granodiorite have been fairly extensively prospected in the Burro Burro and Rockhouse areas. In both areas, the mineralization is closely associated with Laramide(?) dikes which are themselves locally veined to a minor extent with quartz, pyrite, and chalcopyrite. Wall rock alteration in the Burro Burro area consists of strong argillization and chloritization of the gneissic vein walls for distances of 3 or 4 feet. The porphyry dikes are generally weakly epidotized, even where completely barren of mineralization. Alteration in the Rockhouse area is difficult to identify; the vein walls seemingly are flooded for 2 or 3 feet by a dark, fine mixture of silica(?) and chlorite(?).