CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

James Doyle Sell Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

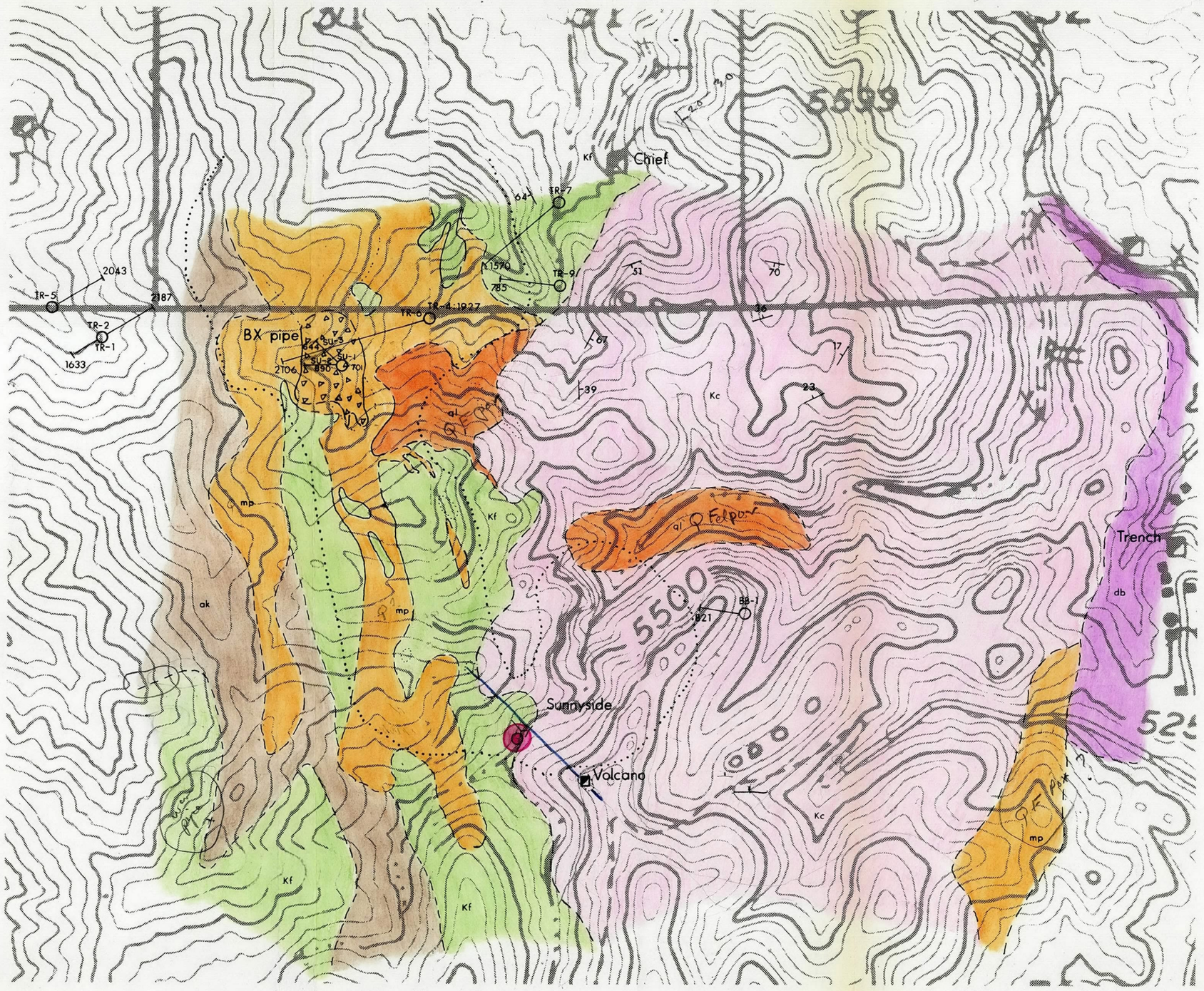
CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.



EXPLANATION

- mp — MONZONITE PORPHYRY
- ql — QUARTZ LATITE
- Kc — CHIEF FORMATION
- db — DIABASE
- ak — ALASKITE
- Kf — FLUX SEDIMENTS & VOLCANICS (may include some older rocks)

- Copper oxide occurrences
- Indigenous limonite after enargite
- Breccia
- Shear zone
- +10ppm Mo in rock
- TR-5 2043' — Drill hole showing depth
- Proposed drill hole

0 — 1000' — 2000'

N

GEOLOGIC MAP
BX-SUNNYSIDE AREA
PATAGONIA MOUNTAINS
SANTA CRUZ Co., ARIZONA

F.T.G. Aug. 1972

Santa Cruz Co
Ariz

J. H. C.
OCT 30 1974

WORLD'S FAIR MINE

ABSTRACT

The World's Fair Mine, located in the northern Patagonia Mountains of Santa Cruz County, Arizona was discovered by early Spanish explorers and was intermittently operated by Americans from 1879 through 1942. Production records are incomplete but the mine has probably produced well in excess of 200,00 ounces of silver along with some gold and substantial amounts of lead from narrow, high veins.

The veins that have been mined occur in a northwest trending diorite intrusive that is bounded by andesite flows on the east and a west dipping fragmental rhyolite or ignimbrite on the west. Hydrothermal alteration and limonite mineralization appears to extend beyond the limits of the narrow veins, and preliminary sampling has shown that, in places, these altered zones contain more that 1/2 ounce of silver. An initial grid geochemical sampling program, undertaken to determine the range and extent of silver values at the surface has discovered a large area of anomalous silver values in a previously unprospected portion of the claims on a steep, brush covered slope south of the old workings. Over an area of some 1700 feet long by approximately 400 feet wide silver values jump from a background of 0.05 ounce per ton to a range of 0.20 ounce to 2.05 ounces per ton. If one half of this anomalous area represents the leached surface outcrop of a body containing mineable amounts of silver it would contain 30,000 tons per vertical foot or 15 million tons if extended to a depth of 500 feet. Although the property available for option is limited to 9 claims of about 175 acres, sufficient room exists for development of a large tonnage. Little geologic data exists on the outcrop characteristics of bulk silver occurrences but the potential value of a large tonnage of several ounce silver ore justifies additional work on the World's Fair property.

More detailed geological mapping, geochemical sampling, the building of a short road, and three to five rotary or diamond drill holes are recommended for further testing of the larger anomalous silver area and the ground underlying the old World's Fair mine workings.

WORLD'S FAIR PROSPECT
SANTA CRUZ COUNTY, ARIZONA

The World's Fair mine and property consists of nine unpatented claims lying approximately 10 miles by road south of the town of Patagonia, Arizona in T22S, R16E, Section 21 of Santa Cruz County. Patagonia is a small town situated 20 miles northeast of the city of Nogales, Arizona which lies on the Arizona-Mexico border.

The World's Fair mine was discovered by early Spanish prospectors and was first located in 1897 by a Mr. McNamee. The mine is described in Bulletin 582 of the United States Geologic Survey, "Mineral Deposits in the Santa Rita and Patagonia Mountains, Arizona," by Frank C. Schrader (1915). The write-up on pages 248 through 251 from Schrader's report follows as the next page in this report.

Records of shipments from the property indicate the following ore was produced during the period 1937-1942:

Year	Tons	Gold oz/T	Silver oz/T	Lead %
1937	538	.025	22.1	16.6
1938	198	.065	151.7	7.3
1939	526	.139	107.1	7.6
1940	200	.21	65.4	7.8
1941	167	.04	98.2	9.3
1942	53	.01	12.4	22.2

In 1963 the mining claims lapsed and the property was acquired by staking by the Platoro Corporation. Platoro Corporation was one of the Thayer Lindsley companies and the field engineer directing the staking of the claims in 1963 was Lyall Lichty who at that time was part owner of Platoro. Lichty has continued to supervise the assessment work on the claims and has maintained his participation in the property to the present date.

Geology

Geology in the immediate area of the World's Fair mine has not been mapped in detail and some features of existing maps may be inaccurate. Rock types known in the area are volcanic flows, intrusive diabase, and a series of conglomerates and agglomerates.

The area is one of rugged topography cut by many canyons. Several former producing mines are found adjacent to the World's Fair property. Adjoining to the south is the January-Tranch property which was operated for 20 years by ASARCO. To the northwest about a mile is the Flux property operated by ASARCO and later by Nash and McFarland. These properties produced silver-lead-zinc ores with small amounts of copper and gold from fault zones in the Tertiary sedimentary rocks.

The World's Fair property is mostly underlain by diabase with an exposure to Chief conglomerate overlies diabase and dips at an angle of 70 degrees to the northeast. Various rhyolite dikes intrude the diabase. Fault zones, more or less mineralized, cut through the diabase. One large fault related to the ore mined, strikes north 70 degrees east and dips 70 degrees northwest.

Alteration and mineralization on the World's Fair property includes a number of vein breccia and alteration zones and possible areas of stock-work mineralization. These should be mapped in more detail.

Current exploration activity in the area surrounding the World's Fair area is intense. Kerr-McGee has discovered a porphyry copper deposit in several hundred million ton class immediately northeast of the World's Fair. ASARCO is conducting exploration for silver and copper immediately south of the World's Fair property. Other companies are exploring the ground to the southwest of the World's Fair property.

The mine is developed by a main level tunnel about 1180 feet long from which most of the ore was extracted. At a point about 680 feet

underground from the adit portal is an internal shaft 348 feet deep with levels at 99, 148, 188, 252 and 348 feet below the collar. above the main level is an upper level with stopes reaching through to surface. Farther up the slope is a short level, designated the uppermost level, from which good ore was extracted but which did not reach the downward extension of ore found at surface.

The stopes are found mainly on two vein systems designated as the hanging wall zone and the footwall zone. The main stope on the footwall zone occurs on the contact of diabase and conglomerate. A strong fault cutting the veins almost at right angles is observed in the shaft station on the main level.

Some 1,000 feet in a northeasterly direction from the main level adit is a second adit which produced some high grade ore, remnants of which remain.

When Platoro Corporation acquired the property, the main level was cleaned out and made accessible and the upper level and the uppermost levels were partially cleaned out. The main level was surveyed and a start was made for the preparation of diamond drill locations to search for ore extensions. No attempt was made to pump out the water from the internal shaft, but the flow is not great and this could be done without difficulty.

The Platoro Corporation, because of other exploration demands, did not undertake the recommended diamond drilling of geologic mapping they had planned.

Present data on the World's Fair mine claims indicates an interesting precious metal-base metal prospect with significant bulk silver potential. Geochemical values shown in the initial surface sampling indicate silver, lead and copper associated with fracturing the diabase, and show silver values from .05 to 2.75 ounces per ton, lead values to

3.85%, and copper values to 1,000 parts per million. The exploration target indicated can be tested cheaply by further geological mapping, geochemical sampling, the construction of a short road, and rotary exploratory holes. This will be done to see if a commercial precious metal-base metal deposit underlies the geochemical anomaly and/or the old World's Fair workings. The property is available on favorable option terms.

The World's Fair mine is near the center of the western part of the district, 2 miles west of Harshaw, on Alum Gulch, at an elevation of about 4,680 feet. (See Pls. I and II, in pocket.)

It was located in 1879 by a Mr. McNamee, who shipped a considerable quantity of ore from it and is said to have abandoned it in 1881. In 1883 William Moran relocated the property and in 1884 sold it to Frank Powers, the present owner, for $100. Mr. Powers is reported to have soon shipped a few carloads of ore of 25 tons each, which brought from $8,000 to $25,000 a car, and by 1903 it was said that $600,000 worth of ore had been blocked out in the mine ready to ship. Since its acquisition by Mr. Powers it has been worked at intervals only[1] but has always produced considerable rich ore, which was mined or milled and shipped as desired. In 1907, for instance, the production was $74,210 worth of ore, in lead, copper, gold, and silver.[2] During the year 1910 the production was $42,730.82.[3] In 1912 a shipment of a few carloads, mostly very rich ore, is reported to have been made to the Selby smelter. Early in August, 1914, the mine was said to be shipping two carloads of rich ore a week to Douglas.

The property comprises a group of eight claims and is reported to have produced more than $1,000,000, of which over $500,000 was in high-grade ore. Several hundred thousand dollars' worth of medium-grade ore, it is said, now lies on the dumps. It is reported that the owner has received several offers for the mine, ranging as high as $500,000 to $600,000,[1] but that the price asked has been $1,000,000, of which 10 per cent was to be paid down before anyone would be allowed to enter the mine to make an examination. In 1913 the mine was reported to have been sold or bonded to the Copper Queen Co. for $800,000. Early in 1914 the tax commission of the State of Arizona was reported to have valued the mine at $155,000 and to have collected $7,000 in taxes based on this valuation. More recently it has been reported that Charles E. Knox, president of the Montana-Tonopah Mining Co., of Tonopah, Nev., and A. Y. Smith, formerly manager of the Prince Consolidated, of Pioche, Nev., have taken over the mine, and are shipping about 50 tons of ore daily.

The mine is said to be developed to a depth of 600 feet and is the deepest mine in the district. It contains about 15,000 feet of drifts, tunnels, stopes, shafts, and winzes. The owner was absent at the time of visit and the mine was closed. The main entrance to the mine is a crosscut tunnel at an elevation of 4,680 feet, from which, it is reported, a winze has been sunk to a depth of 600 feet with drifting 1,000 feet each way from the winze on the vein at levels spaced 100 feet apart.

The principal equipments are a 10-stamp mill supplied with concentrators, etc., which made an apparently unsuccessful run of three months in 1897 and has been idle ever since. There is also a steam hoist within the tunnel and power drills.

The topography is rough, as shown in Plate XVII, A, and the canyon on the north below the property is impassable, so that the mine is reached by 1½ miles of wagon road of easy grade descending the canyon on the south from the county highway at a point a mile west of Harshaw.

[1] U. S. Geol. Survey Mineral Resources, 1905, p. 155, 1906; idem, 1906, p. 170, 1907.
[2] Idem, 1907, pt. 1, p. 178, 1908.
[3] Mines and Mining, Aug. 1, 1911.

[1] Curtis, J. N., Report of the Governor of Arizona, 1902, p. 47.

The country rock, as shown in figure 31, is a small area of diorite which forms the northward continuation of the Harshaw belt, but which at the mine is almost surrounded, overlain, and intruded by rhyolite and is more or less pyritic and mineralized. The rhyolite, which is also considerably mineralized and altered, seems to be similar to that at Red Mountain, with which it is apparently connected. Just across the canyon east of the mine the surface is underlain by a purple altered andesitic volcanic rock composed almost wholly of oligoclase-andesine and a little biotite or altered hornblende.

The deposits, to judge from the location of the workings, are about all on or associated with the contact of the rhyolite intruded into the diorite. The workings trend north-northwest and the deposits seem to dip about 80° WSW. into the mountain, but in the mine the dip is said to be about 45°. From the main entrance, which is located about 40 feet above the floor of the canyon, the openings and croppings extend for one-eighth of a mile or more southward and through a vertical range of about 400 feet, which together with the 600 feet of depth the vein is said to have in the mine gives for the deposits a known vertical range of about 1,000 feet. The croppings are irregular, however, and in places difficult to identify and follow.

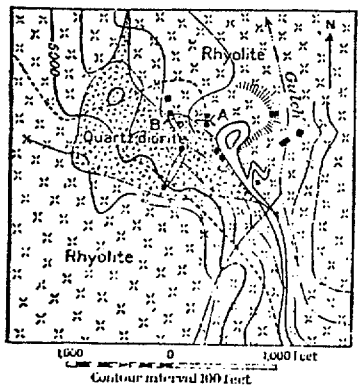
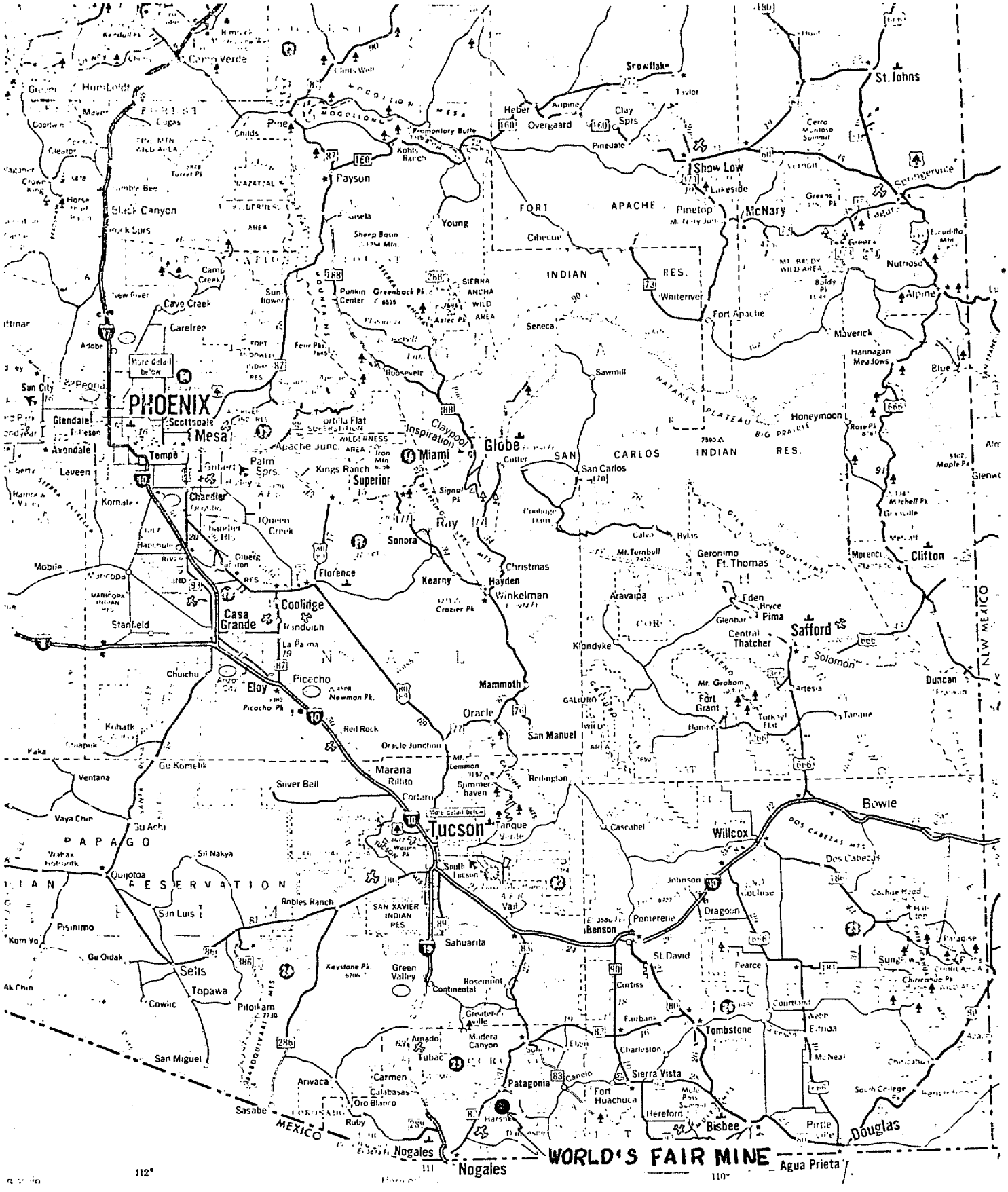


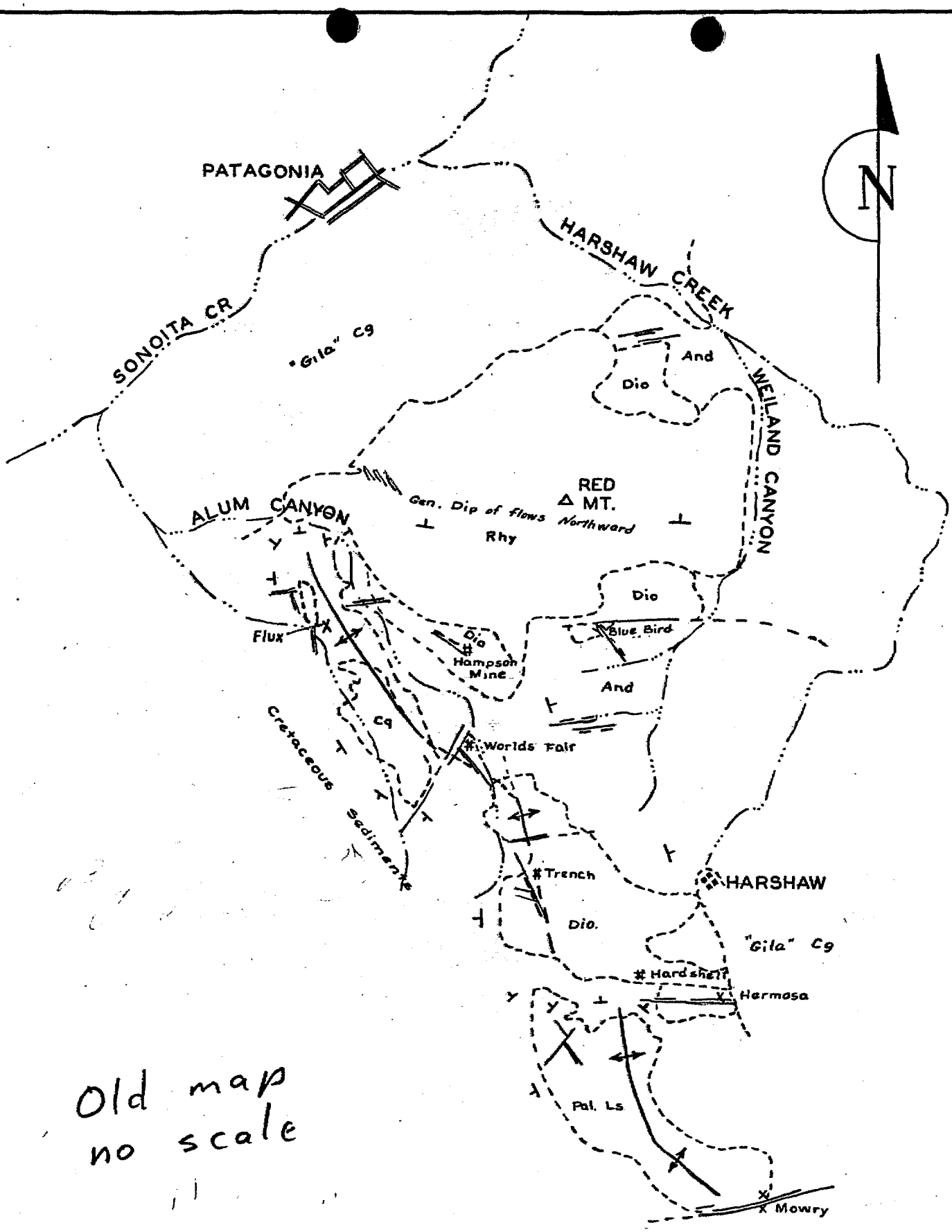
FIGURE 31.—Geologic map of the vicinity of the World's Fair mine.

The croppings range from 10 to 14 feet in width, and the average width of the vein in the mine is said to be about 6 feet, nearly all of which is good workable ore. The metalliferous minerals are said to occur mostly in the rhyolite or hanging-wall side of the contact. A considerable portion of the openings to the south of the mine are on the north-south rhyolite dike cutting the diorite. The croppings of the dike are 15 to 25 feet wide and consist of a reddish-yellow siliceous rhyolite. The valuable metals in the ore are silver, gold, lead, and copper, silver predominating. The gangue of the vein is commonly said to be quartz, but in most of the ore seen on the dump barite seems to equal the quartz in amount, and in some run of mine specimens it is the chief or only gangue mineral, quartz being inconspicuous or absent. The barite gives to much of the ore a sparry aspect and is particularly prominent as seams, blades, and plates filling fractures and cavities, denoting that much of it is of late or postvein age.

In the upper workings the ores, it is said, were mostly rich lead-silver sulphides, but below water level, in the unoxidized zone, where they maintain or exceed their surface tenor, they carry besides galena considerable copper, mostly in the form of tetrahedrite or gray copper, with some chalcocite and antimonial silver, in places rich in gold. In fact, a considerable part of the ore seems to be antimonial silver. There is also a sprinkling of finely disseminated chalcopyrite and pyrite. The ores from the deeper part of the mine are reported to average about 20 per cent in copper and 500 ounces in silver and $15 in gold to the ton. Judging from about 500 tons or more seen on the dump the ore is mostly hand-sorted and well graded, seemingly by screens, into sizes ranging from that of a walnut up to that of a 10-inch bowlder. It is then shipped direct to the smelter at Selby, Cal.

LOCATION MAP OF WORLD'S FAIR MINE





Old map
no scale

JHC

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

W. L. K.
JUN 21 1974

June 18, 1974

File

J. H. C.
AUG 5 1974

Memorandum to: W. L. Kurtz

From: F. T. Graybeal

Comparison of the Finley-Adams Canyon (Patagonia Mtns.) and Pinos Altos (Silver City, N.Mex.) prospects

It seems generally accepted that Exxon's Pinos Altos prospect is a possibly significant discovery. The Pinos Altos district has produced some gold from a swarm of northeast-striking quartz-sericite-pyrite veins which cut through the center of a northeast-elongate quartz monzonite porphyry intrusion. The veins appear partly coincident with a strongly porphyritic portion of the stock. The mineralized zone now being explored occurs as a replacement of Paleozoic sedimentary rock along the northeast contact of the quartz monzonite porphyry. The zone is rumored to be 6000 ft. long, 1500 ft. wide, and 450 ft. thick with an approximate grade of 1% Cu and 2% Zn. The mineralization is nowhere exposed, being covered by premineral but unmineralized andesitic volcanic rocks. The edge of the mineralized zone was reportedly (second hand information) cut in a drill hole by USSR&M several years ago, but they failed to drill deep enough to reach the lower portions of the Paleozoic section. The extensive limestone replacement and porphyry copper deposits of the Hanover-Santa Rita area lie about 10 miles to the east.

The similarities between the Pinos Altos district and the Finley-Adams Canyon area are striking. The southern portion of the Patagonia Mtns. has yielded some 100 million lbs. of Cu, Pb, and Zn from limestone replacement deposits in the Washington-Duquesne district. The Finley-Adams area, which is located about 2 miles north of Washington Camp, lies along strike of a quartz-sericite-pyrite vein system which cuts across the south side of a strongly porphyritic zone in a quartz monzonite-granodiorite pluton. This vein system contains local concentrations of chalcopyrite and molybdenite, and a mineralized breccia pipe containing 5 million tons of 0.8% Cu in a zone of strong potassic alteration lies adjacent to the vein system.

Finley-Adams Canyon, which centers on the area of greatest interest, is covered with a weakly pyritized section of pre-mineral siliceous volcanic rocks, presumably of Triassic age. Rare dikes of strongly pyritized granodiorite porphyry are present in outcrop and drill core. Of greater importance is the 64 ft. section of skarn cut by USSR&M in hole B-1 which contains small

amounts of chalcopyrite and sphalerite. The limestone was underlain by a bleached porphyritic rock, possibly related to the granodiorite, which was weakly tourmalinized. The hole was bottomed after cutting about 200 ft. of the bleached porphyry. To date a serious attempt to test the lower portions of the Paleozoic section in this area has yet to be made.

I believe it is likely that a considerable thickness of Paleozoic carbonate rocks exists beneath the siliceous volcanic rocks in the Finley-Adams Canyon area. These carbonates are probably in contact with a porphyritic phase of the granodiorite pluton and are presumably cut by the quartz-sericite-pyrite-chalcopyrite-molybdenite vein system. The chances for discovery of an extensive zone of altered and mineralized limestone are considered reasonably good. I expect that perhaps 5 drill holes to be drilled to possibly 2500 ft. should be sufficient to test the ground, if an option can be negotiated with U.V. Industries.

The discontinuous, rather small size of the deposits in the Washington-Duquesne district is often assumed to be typical of this part of the range. I should emphasize, however, that the granodiorite in contact with the limestones in this area is equigranular and unmineralized. In fact, many of the skarn-sulfide zones are true hypothermal deposits which occur many hundreds of feet from the intrusion. The erratic and discontinuous occurrence of sulfides in limestone replacement deposits is well-documented; however, this fact alone is not sufficient to reject these deposits from further exploration, as evidenced by ore-bearing skarns at Silver Bell, Lakeshore, Johnson Camp, Mission-Pima-Twin Buttes, possibly Santa Rita, and perhaps Pinos Altos. It is true that most of these deposits have associated porphyry copper deposits either as part of the same zone of mineralization or at least in the same district. However, the Patagonia Mtns. are fast becoming a legitimate porphyry copper district and the quartz monzonite porphyry involved in the Sunnyside mineralization is part of the same pluton involved in the Finley-Adams Canyon area.

In summary, the evidence favoring exploration of the Finley-Adams Canyon area is in part circumstantial, particularly in view of the rather negative geochemical response. However, as far as I am able to determine, a similar situation was also present in the Pinos Altos district. I think that future exploration in Arizona will have to consider limestone replacement deposits more critically and, in light of the strong similarity to the Pinos Altos area, I recommend that we again inquire with U.V. Industries as to the possibility of joint venturing the Finley-Adams Canyon area.

F. T. Graybeal

F. T. Graybeal

FTG:lb

MR. RHL WES
READ AND RETURN
PREPARE ANSWERS ____ HANDLE ____
FILE ____ INITIALS ____

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 17, 1969

J. H. C.
W.E.S. DEC 18 1969
DEC 18 1969

TO: J. H. Courtright

FROM: A. Dalla Vista

PATAGONIA MOUNTAINS
GEOCHEMICAL SAMPLING

Reconnaissance geochemical sampling of the Patagonia Mountains and adjoining areas was conducted during October and November. The purpose was to determine the possibility of low grade disseminated silver and gold targets.

A total of 104 samples from outcrops were collected.

Three different areas were covered and are grouped as follows:

GROUP A

(Saddle Mountain Area, Sample Symbol - SM)

Four days were spent on this area. Most of the samples were collected from outcropping tertiary andesitic and rhyolitic porphyry. Moderate silicification and weak argillation are the only noticeable type of alteration. Mn-OX and Fe-OX minerals are pervasive throughout the area, but did not indicate any association with silver mineralization.

Silver values up to .25 ozs/ton are very inconsistent and confined to a few highly altered zones.

GROUP B

(West Patagonia Mountains, Sample Symbol - WPM)

Results from the nine samples taken herein did not show any appreciable silver or gold values. One sample, representing highly altered coarse grained granite, ran .23 ozs/ton Ag.

One day was spent on this area.

GROUP C

(Trench - Flux Area, Sample Symbol TF)

Samples taken along the Humbolt Mine Canyon indicated a fairly consistent length of low silver values (1500' averaged .13 ozs/ton).

Four days were spent to collect 46 samples.

No appreciable gold values were obtained.

Attached are topographic maps showing sample locations and a list indicating rock type and alteration.

A. Dalla Vista

ADV:lab

GROUP A

Sample No.	Geologic Description	Alteration	Ag ppm
SM-1	Tertiary Andesite	Weak FeOx & chlorite	4.3
SM-2	Tertiary Andesite	Weak Mn-OX	4.3
SM-3	Tertiary Andesite	Weak FeOX	2.8
SM-4	Tertiary Andesite	Weak. Silicified FeOX	2.3
SM-5	Tertiary Andesite Porphyry	Weak. Silicified chloritizised FeOx	2.3
SM-6	Tertiary Andesite Porphyry	Weak. silicified chloritizised FeOX	1.8
SM-7	Tertiary Andesite Porphyry	Weak. silicified chloritizised FeOX	1.0
SM-8	Tertiary Andesite Porphyry	Stronger silicification	2.5
SM-9	Tertiary Andesite Porphyry	Weak silicification Weak Mn-OX coating	2.0
SM-10	Tertiary Andesite Porphyry	Weak silicification Mn-OX coating	2.0
SM-11	Tertiary Andesite Porphyry	Weak silicification Mn-OX coating	1.0
SM-12	Tertiary Andesite Porphyry	Weak silicification Mn-OX coating	1.0
SM-13	Tertiary Andesite Porphyry	Absence of Mn-OX	1.0
SM-14	Tertiary Andesite Porphyry	Absence of Mn-OX	1.0
SM-15	Tertiary Rhyolite Porphyry	Very weak silicification & Mn-OX	3.3
SM-16	Tertiary Rhyolite Porphyry	Strong silicification Finely disseminated FeS_2	1.0
SM-17	Tertiary Rhyolite Porphyry	Very weak silicification & Mn-OX	1.8
SM-18	Tertiary Andesite Porphyry	Weak silicification Strong FeOX	1.8
SM-19	Tertiary Rhyolite Porphyry	Weak silicification strong FeOX	3.0
SM-20	Tertiary Rhyolite Porphyry	Moderate to strong silicification, Moderate to strong FeOX	1.0
SM-21	Tertiary Rhyolite Porphyry	Moderate to Strong silicification, Moderate to strong FeOX	0.8
SM-22	Tertiary Rhyolite Porphyry	Moderate to strong silicification, Moderate to strong FeOX	0.8
SM-23	Tertiary Rhyolite Porphyry	Moderate to strong silicification, Moderate to strong FeOX	1.3
SM-24	Tertiary Rhyolite Porphyry	Weak silicification, traces of Mn-OX	1.3
SM-25	Tertiary Rhyolite Porphyry	Weak silicification traces of Mn-OX	1.5
SM-26	Tertiary Rhyolite Porphyry	Strong silicification Traces of Mn-OX	0.8
SM-27	Tertiary Andesite	Weak silicification, strong FeOX, traces Mn-Ox	1.3
SM-28	Tertiary Andesite	Strong silicification Traces of Mn-OX	0.8
SM-29	Tertiary Rhyolite	Weak silicification Moderate FeOX	0.8

GROUP A (Cont'd)

Sample No.	Geologic Description	Alteration	Ag Ozs/ton
SM-30	Tertiary Rhyolite Porphyry	Weak silicification near contact with recent volcanics	.01
SM-31	Tertiary Rhyolite Breccia	Weak silicification traces of Mn-OX	.02
SM-32	Tertiary Rhyolite Breccia	Weak silicification traces of Mn-OX	.05
SM-33	Tertiary Rhyolite Breccia	Weak silicification traces of Mn-OX	.01
SM-34	Rhyolite Porphyry	Moderate silicification traces of FeOX	.25
SM-35	Rhyolite Porphyry Breccia?	Moderate silicification traces of FeOX	.10
SM-36	Rhyolite Porphyry	Moderate silicification traces of FeOX	.03
SM-37	Rhyolite Porphyry	Strong silicification traces of FeOX	Tr
SM-38	Rhyolite Porphyry	Strong silicification traces of FeOX	.06
SM-39	Rhyolite Porphyry Breccia?	Moderate silicification Moderate FeOX	.14
SM-40	Rhyolite Porphyry	Moderate silicification Moderate FeOX	.07
SM-41	Dark colored volcanics	Clay. chloritizised	.11
SM-42	Rhyolite Porphyry Breccia?	Moderate silicification traces of FeOX	.10
SM-43	Rhyolite Porphyry Breccia?	Moderate silicification Moderate FeOX	.30
SM-44	Tertiary Rhyolite	Weak silicification and chlorization	.06
SM-45	Tertiary Rhyolite	Moderate silicification Weak argillation	.15
SM-46	Tertiary Rhyolite	Moderate silicification Weak argillation	.07

GROUP B

WEST PATAGONIA MOUNTAINS

Sample No.	Geologic Description	Alteration	Ag Ozs/ton
WPM-1	Volcanic Agglomerate	Strong silicification Moderate FeOX	.01
WPM-2	Coarse grained granitic rock	Epidotization, chloritization & Biotitization Weak FeOX,traces Mn-OX	.23
WPM-3	Coarse grained granitic rock	Epidotization, chloritization & Biotitization, Weak FeOX,traces Mn-OX	.10
WPM-4	Arkosic Quartzite	Strong silicification & FeOX	.08
WPM-5	Coarse grained granitic rock	Strong silicification & FeOX	.06
WPM-6	Tertiary Diabase	Weak FeOX	.06
WPM-7	Arkosic Quartzite	Weak FeOX	.10
WPM-8	Arkosic Quartzite	Weak FeOX	.11
WPM-9	Tertiary Diabase	Weak FeOX	.10

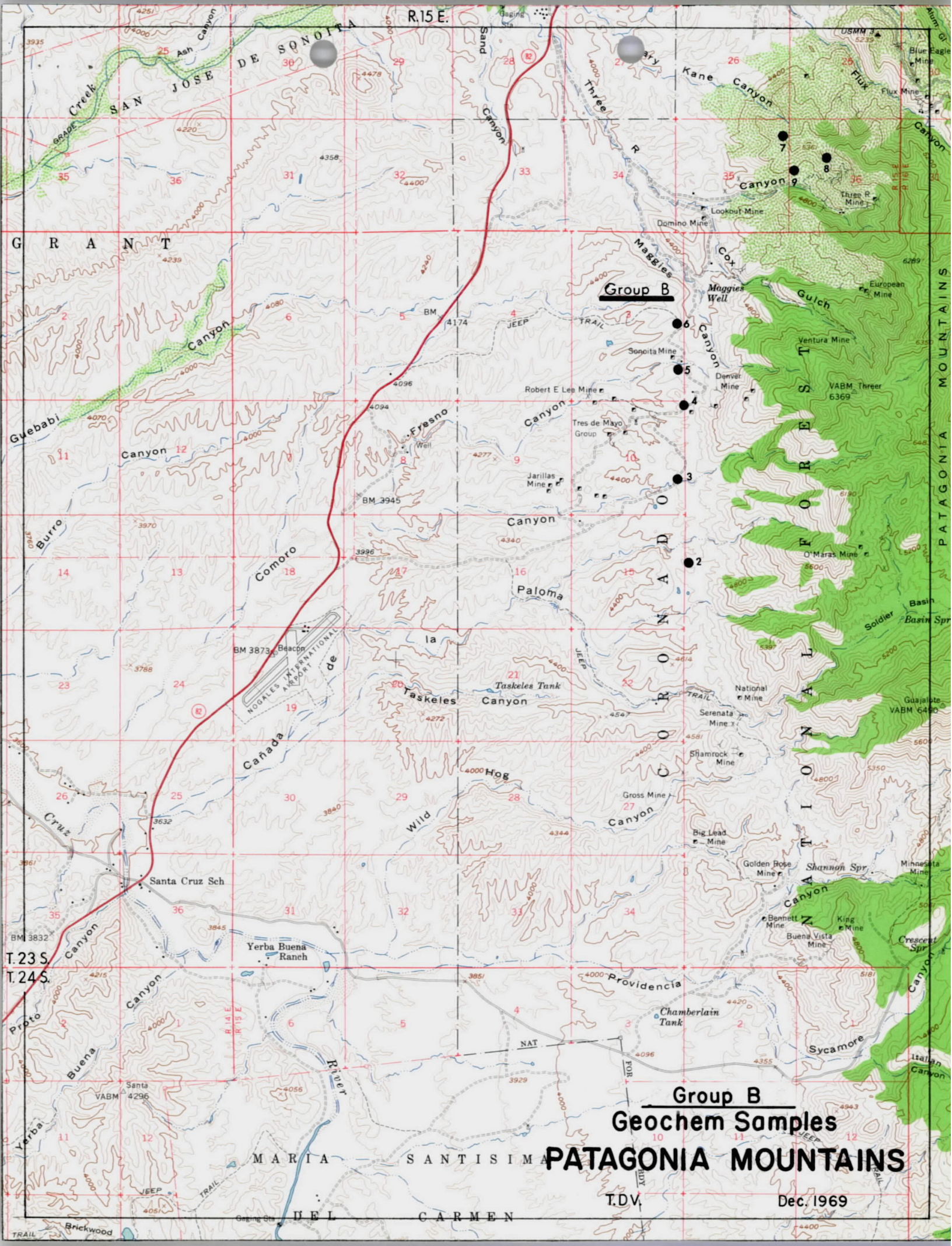
GROUP C

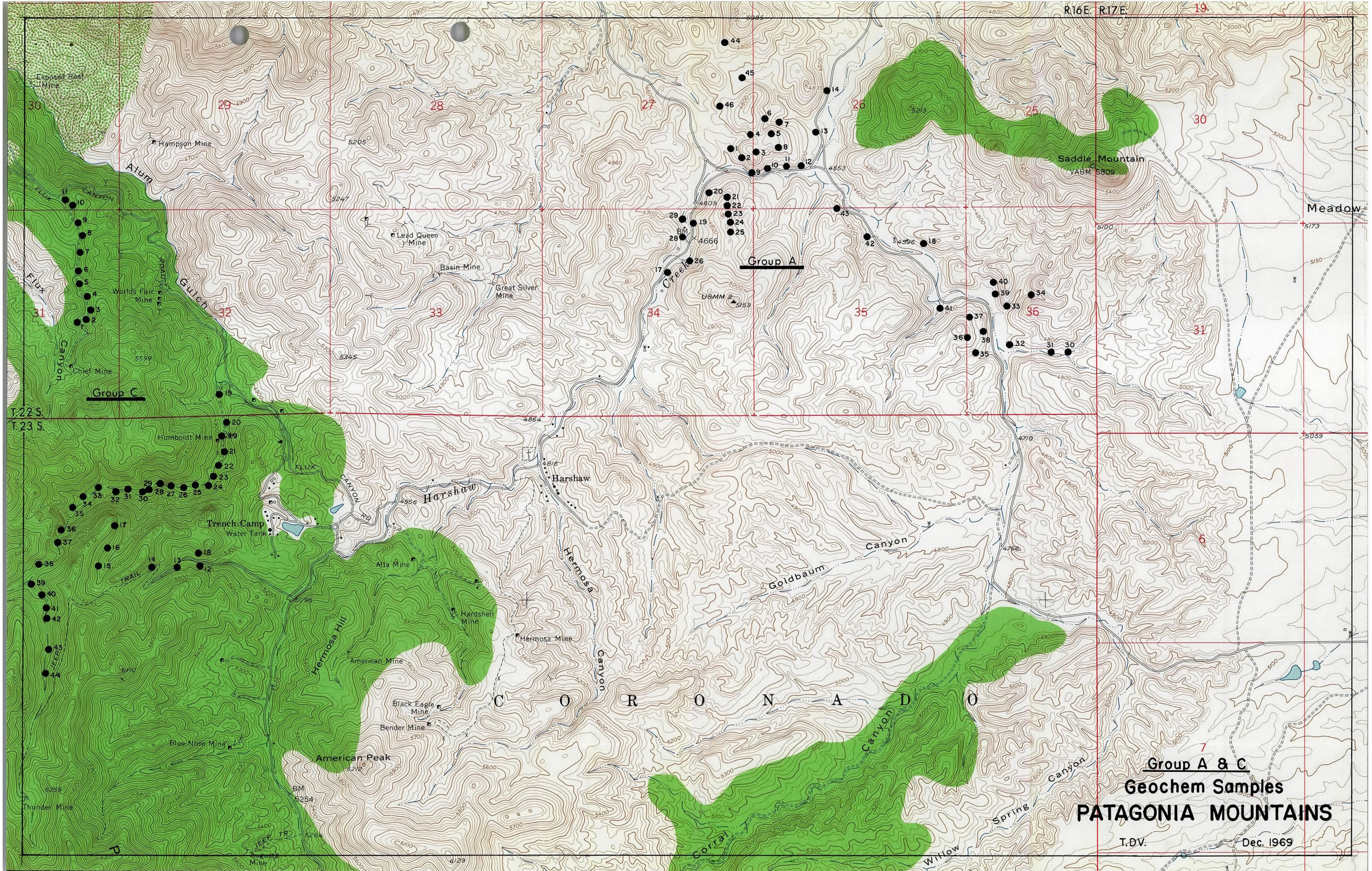
TRENCH - FLUX AREA

Sample No.	Geologic Description	Alteration	Ag ppm
TF-1	Cretaceous Andesitic Agglomerate	Weak silicification Epidotization & FeOX	2.8
TF-2	Cretaceous Andesitic Agglomerate	Siliceous inclusions Traces FeOX	4.8
TF-3	Cretaceous Andesitic Agglomerate	Siliceous inclusions Traces FeOX,Traces MnOX	2.8
TF-4	Cretaceous Andesitic Agglomerate	Siliceous inclusions Traces FeOX	2.0
TF-5	Cretaceous Andesitic Agglomerate	Siliceous inclusions Traces FeOX	2.0
TF-6	Cretaceous Andesitic Agglomerate	Siliceous inclusions Traces FeOX	2.0
TF-7	Cretaceous Andesitic Agglomerate	Siliceous Inclusions Traces FeOX	3.3
TF-8	Cretaceous Andesitic Agglomerate	Siliceous inclusions Traces FeOX	2.0
TF-9	Cretaceous Andesitic Agglomerate	Strong limonite & Hematite	2.0
TF-10	Cretaceous Andesitic Agglomerate	Strong Limonite & Hematite,Stronger Silicification	1.5
TF-11	Cretaceous Andesitic Agglomerate	Strong Limonite & Hematite	5.5
			Ag Ozs/Ton
TF-12	Cretaceous Andesitic Agglomerate	Partly fault gouge Moderate silicification	.10
TF-13	Pyroclastics (Tuffs)	Partly fault gouge Moderate silicification	.18
TF-14	Cretaceous Andesitic Agglomerate	Partly fault gouge Moderate silicification	.10
TF-15	Andesitic Agglomerate	Partly fault gouge Moderate silicification	.04
TF-16	Andesitic Agglomerate	Partly fault gouge Moderate silicification	.20
TF-17	Andesitic Agglomerate	Partly fault gouge Moderate silicification	.03
TF-18	Andesitic Agglomerate	Stronger silicification Strong FeOX in cementic material	.15
TF-19	Andesitic Agglomerate	Stronger silicification Strong FeOX in cementic material	.13
TF-20	Andesitic Agglomerate	Limonite Boxworks after Pyrite	.10
TF-21	Andesitic Agglomerate	Limonite Boxworks after Pyrite	.10
TF-22	Andesitic Agglomerate	Limonite Boxworks after Pyrite	.16
TF-23	Andesitic Agglomerate	Limonite Boxworks after Pyrite	.14

GROUP C (Cont'd)

Sample No.	Geologic Description	Alteration	AgOzs/Ton
TF-24	Silicified Fine Grained Volcanics	Very strong silicification, Traces Pyrite	.10
TF-25	Agglomerate	Weak to Moderate silicification, weak limonite	.13
TF-26	Silicified Fine Grained Volcanics	Very strong silicification, Traces Pyrite	Tr
TF-27	Agglomerate	Weak to Moderate Silicification, Weak Limonite	.10
TF-28	Agglomerate	Weak to Moderate Silicification, Weak Limonite	.07
TF-29	Agglomerate	Strongc silicification Weak pyrite	.14
TF-30	Agglomerate from shallow pit	Weak Pyrite	.06
TF-31	Silicified Fine Grained Volcanics	Very strong silicification, Traces Pyrite	.17
TF-32	Silicified Fine Grained Volcanics	Very strong silicification, Traces Pyrite	.16
TF-33	Silicified Fine Grained Volcanics	Very strong silicification, Traces Pyrite	.19
TF-34	Altered Porphyritic Intrusive	Chlorite, Hydromica Traces Pyrite	.24
TF-35	Silicified Volcanics	Strong silicification	.14
TF-36	Silicified Volcanics	Strong Silicification	.07
TF-37	Silicified Volcanics	Strong Silicification	.17
TF-38	Altered Porphyritic Intrusive	Chlorite, Hydromica Traces Pyrite	.15
TF-39	Agglomerate	Weak Silicification Weak FeOX	.10
TF-40	Silicified Fine Grained Volcanics	Strong silicification Traces Pyrite & Limonite	.21
TF-41	Altered Porphyrytic Intrusive	Chlorite, Hydromica Traces Pyrite	.14
TF-42	Altered Porphyritic Intrusive	Chlorite, Hydromica Traces Pyrite	.06
TF-43	Silicified Agglomerate	Moderate Silicification Weak Pyrite & Limonite	.24
TF-44	Silicified Agglomerate	Moderate Silicification Weak Pyrite & Limonite	.10
TF-45	Porphyritic Intrusive	Weak Silicification Argillitic, Epidotized Hydromica, Pyrite Limonite	.04
TF-46	Agglomerate	Moderate Silicification Traces Pyrite	.08
TF-47	Agglomerate	Moderate Silicification Traces Pyrite	.05
TF-48	Agglomerate	Moderate Silicification, Traces Pyrite, Strong Limonite-Hematite	.21
TF-49	Silicified Fine Grained Volcanics	Moderate Silicification Traces Pyrite	.14


Group B
Geochem Samples
PATAGONIA MOUNTAINS
T.D.V.
Dec. 1969
R.15 E.
T.23 S.
T.24 S.
SAN JOSE DE SONOITA
GRANT
MARIA SANTISIMA DEL CARMEN
CORONADO NATIONAL FOREST
PATAGONIA MOUNTAINS
Maggies Well
Lookout Mine
Domino Mine
Sonoita Mine
Robert E Lee Mine
Tres de Mayo Group
Jarillas Mine
Denver Mine
Ventura Mine
European Mine
O'Maras Mine
National Mine
Serenata Mine
Shamrock Mine
Gross Mine
Big Lead Mine
Golden Rose Mine
Bennett Mine
King Mine
Buena Vista Mine
Minnesota Mine
Flux Mine
Blue Eagle Mine
Three R Mine
Taskeles Tank
Chamberlain Tank
Shannon Spr
Crescent Spr
Basin Spr
Santa Cruz Sch
Yerba Buena Ranch
NOGALES INTERNATIONAL AIRPORT
Beacon
Fresno Well
Guajalote VABM 6490
VABM Threer 6369
VABM 4296
BM 3873
BM 3832
BM 3945
BM 4174
Gaging Sta
Brickwood
Sycamore
Providencia
Comoro
Paloma
Taskeles Canyon
Hog
Wild
Cañada de la Cruz
Proto
Yerba Buena
Guebabi
Burro
Soldier
Kane
Flux
Cox
Maggies
Three R
Sand
Ash
Creek
Canyon
Gulch
JEEP TRAIL
NAT FOR RDY


R16E. R17E.
T.22 S.
T.23 S.
Group A
Group C
Group A & C
Geochem Samples
PATAGONIA MOUNTAINS
T.D.V.
Dec. 1969
Saddle Mountain
VABM 5809
Meadow
Exposed Reef Mine
Hampson Mine
Alum
Flux
Canyon
Lead Queen Mine
Basin Mine
Great Silver Mine
Worlds Fair Mine
Chief Mine
Humboldt Mine
Trench Camp
Water Tank
Harshaw
Harshaw Creek
Alta Mine
Hardshell Mine
Hermosa Mine
Hermosa Canyon
Hermosa Hill
American Mine
Black Eagle Mine
Bender Mine
Blue Nose Mine
American Peak
Thunder Mine
Augusta Mine
Goldbaum Canyon
C O R O N A D O
Corral Canyon
Willow Spring Canyon
USMM 2
BM 4666
BM 5254

MR. WES
READ AND RETURN
PREPARE ANSWERS HANDLE
FILE INITIALS

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 4, 1969

W.E.S.
JUN 5 1969

J. H. C
JUN 4 - 1969

TO: Mr. J.H. Courtright

FROM: Mr. J.D. Sell

Patagonia Mountains
Kerr-McGee Operations
Santa Cruz County, Arizona

On June 3, 1969, I accompanied Mr. Russ Corn on a quick tour of their major holdings in the Patagonia Mtns.

South of Trench west of American peak

They are presently recleaning a road into the Thunder Mountain prospect (the canyon and area northwest from Thunder Mountain) and will deepen a drill hole. In Thunder Mountain canyon a Laramide porphyry some 1500 ft by 2500 feet is exposed. Clay alteration, abundant silica veinlets and addition and some sericite is within the porphyry along with abundant iron oxides and minor limonite after chalcocite. The intruded tuff and tuff breccia series is also well sheared and contains abundant iron oxides, some copper limonites, and alunite veins and masses. Ore grade material is apparently similar to Red Mountains----The chalcocite blanket has been heavily leached and destroyed by post-chalcocite formation uplift.

At Red Mountain they are presently drilling (Joy 22) a deep hole with the possible underlying limestones as the target. The hole is in upper Aztex Gulch at about the 5600 elevation. Drilling is presently at 3400 feet in one of the volcanic units. Veinlets of pyrite with chalcopyrite with half inch quartz halos cut the highly silicic volcanics.

James D. Sell

J.D. Sell

JDS:ir

Aa 19.16.0
JHC File

October 20, 1967

Dr. Donald Bryant
Geology Department
University of Arizona
Tucson, Arizona

Dear Don:

We are sending you a sack of sedimentary rock specimens collected by Mr. B. Watson and myself in the Patagonia Mtns. west of the old Mowry Mine.

The location is along the road branching south at a distance of .8 miles west of the Mowry Mine. At about .6 of a mile along the south branching road which leads to Guajalote Flat, we noted what appeared to be coral stems in a dark flinty sedimentary rock containing disseminated pyrite. This is in the vicinity of the section described by Stoyanow as the Moly Gibson formation of lower cretaceous age. As I recall, the corals are not diagnostic but you might find other associated fossils which might be diagnostic.

Recently the USGS published a sketch map of the northerly continuation of the sediments and labeled them "Bisbee Group."

Yours very truly,

JHC:lmi

J. H. Courtright

Aa-19.16.0

J. H. C

DEC 3 0 1957

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 26, 1957

Mr. L. H. Hart
Chief Geologist
New York Office

SOUTHWESTERN PATAGONIA MOUNTAINS
Santa Cruz County, Arizona

Dear Sir:

Enclosed is copy of a memorandum with two maps, dated December 2, by Mr. Blucher, representing his recent reconnaissance study of a porphyry copper area at the south end of the Patagonia Mountains.

Mr. Courtright and I have since looked over the area with Mr. Blucher. His map correctly displays the general relationships among porphyry intrusives, alteration zones, breccia pipes and evidence of disseminated copper.

Although none of the deposits on the US side of the border appear to have commercial possibilities, the limonites after chalcocite and chalcopyrite are widespread. The zone as a whole strengthens to the south and continues beyond where it was last traversed south of the border. We have the impression that what we have seen could be the tag end of a substantial mineralized zone lying farther to the south.

It is notable that, due to the intensity of alteration, outcrops are not copper-stained. As a consequence, the area has been prospected only by an occasional pit or short adit. It can be presumed that a similar prospecting environment exists on the Mexican side, and that the area there may not have been prospected much either. It may not be known particularly as a mining district, for that matter.

In any event, the possible continuation of this zone southerly is something which we believe merits a reconnaissance study. Therefore, I am sending Mr. Clendenin a copy of this letter and Mr. Blucher's data. In case Mr. Clendenin wishes to carry this matter further, it would be my suggestion that Mr. Blucher could cross the border at Nogales as a tourist, meet one of Mr. Clendenin's men, and jointly they could explore the area from the south. We have no specific information on accessibility from that direction, although I presume it would be difficult. Also, there may be regulations prohibiting prospecting along the border. But I will leave it to Mr. Clendenin to comment on these details if he considers the project feasible.

Yours very truly,

Original Signed By
K. Richard

KENYON RICHARD

KR/ds
Enclosures
cc: TLClendenin - w/encl
JHCourtright - w/encl
ABlucher - w/encl

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 2, 1957

MEMORANDUM FOR MR. K. E. RICHARD

SOUTHWESTERN PATAGONIA MOUNTAINS
Santa Cruz County, Arizona

In accordance with your request, I have prepared a reconnaissance map of that portion of the Patagonia Mountains extending from the Nogales-Washington Camp road southward to the Mexican border. This area includes approximately 20 square miles within a rough northwest trending parallelogram. It is bounded on the north by the southern limits of the Red Mountain-Four Metals Area reported on by Courtright, and by the Duquesne-Washington Camp District. Minimum elevation is 4800 feet, maximum is 7200 feet, a relief of 3400 feet. Nearly all of the area is moderately to heavily wooded.

Mapping was done on a scale of 1:24000 or approximately 2 1/2 inches equals 1 mile. For the purpose of this reconnaissance rocks were mapped as three units: Pre-mineral rocks, Mineralizing Intrusives, and Post-mineral rocks, in this case alluvium. Alteration was divided as two degrees: Weak -- sericitization along quartz veinlets with pyrite and occasional chalcopyrite, where the between-veinlet rock is fresh or shows variable chloritization of the mafic minerals with disseminated pyrite and occasional chalcopyrite; Strong -- intense sericitization, intense silicification, or recrystallization associated with breccia pipes. The dividing line between the two degrees is fairly abrupt, but the lower limit of "weak" is gradational.

At least 90% of the rock exposed is a granitic intrusive.

On the northeastern flank the intruded sediments strike N 25 E and dip 35 degrees E. With the exception of the Duquesne district they consist of sandstone, sandy arkose, quartzite, and a silicified siltstone(?) which resembles what has been called "ribbon rock" in other parts of southern Arizona.

On the southwest the monzonite has intruded alaskite and, on the southern end, metamorphic rocks and alaskite. Along this contact are numerous irregular intrusions of basic porphyritic rock which in some places shows diabasic texture.

In the southeastern part of the area are several small outcrops of a later intrusive. Along San Antonio Canyon just north of the Mexican border, and in the north 1 1/2 miles west of Duquesne are much larger outcrops of this intrusive. It is a porphyry of the type commonly associated with disseminated copper orebodies of this region. It shows little mineralization and alteration but is immediately adjacent to mineralized breccia pipes in at least three places in this area. The outcrops of San Antonio Canyon may be the fringe of a large mass as fragments from an old churn drill hole 1 1/2 miles east of the last observed outcrop showed the same porphyry.

Within the area mapped are two extremely spotty and irregular zones of alteration. The lesser starts at a small breccia pipe just south of the Nogales-

Washington Camp Road and marked as "Red Top" on the Lenon map of Santa Cruz County, and runs a little over one mile southeast as a zone of weak alteration. The reddish areas south of there are due to weathering of unmineralized basic rocks with the exception of small zones along the Alaskite contacts. The major and more promising zone starts at a breccia pipe 1 1/2 miles west of Duquesne and extends southeast to and over the US-Mexican Boundary, becoming stronger as it crosses the border.

Within this zone are ten or more mineralized breccia pipes of mappable dimensions. Numerous small areas within the zone have weak veinlet and disseminated copper mineralization mapped as weak alteration in this reconnaissance. The east-dipping sediments flanking the fresh appearing monzonite show intense sericitization and common "live limonite" on bedding planes and occasionally on fractures near the contact with the monzonite. None of the mineralized outcrops on the US side of the border were outstandingly promising; however, the ground just north of the border and southwest of San Antonio Creek, and the brecciated area west of Duquesne are of possible interest. Other small breccia pipes might exist within the central part of the monzonite as that portion of the area was less frequently traversed than the more interesting fringes, but it is unlikely that any large areas of mineralization have been overlooked.

One day was spent on the Mexican side of the boundary to ascertain whether or not the mineralization continued and several breccia pipes were located -- all showing better mineralization than those on the US side -- however, as this crossing was illegal, only a rudimentary check was made.

Of the breccia pipes three types were noted: Fragments in a matrix of uneven granular rock with very indistinct fragment boundaries and scant sulphide mineralization; the same with abundant quartz filling and fair sulphide mineralization (a sample off one dump which penetrated some weakly altered monzonite and some breccia ran 1.19% Cu); intensely sericitized rock with large vugs of pyrite and occasional weak chalcopyrite. Nearly all showed very weak and spotty molybdenite.

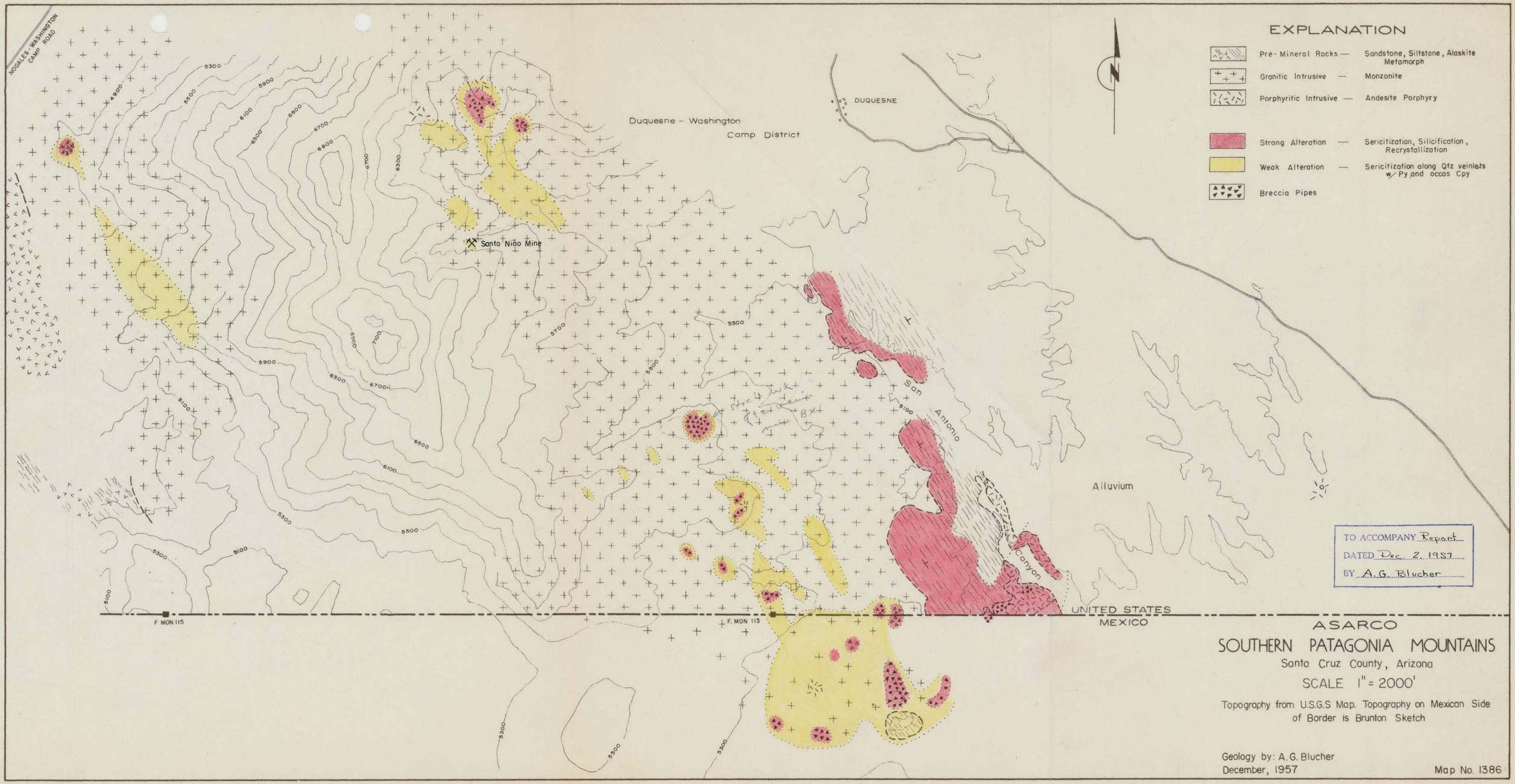
The Santo Nino Mine which lies in the northwest of the major altered zone was a small vein-like deposit in which chalcopyrite, pyrite, and molybdenite were disseminated through fresh monzonite and sometimes completely replacing all the rock except some of the feldspars.

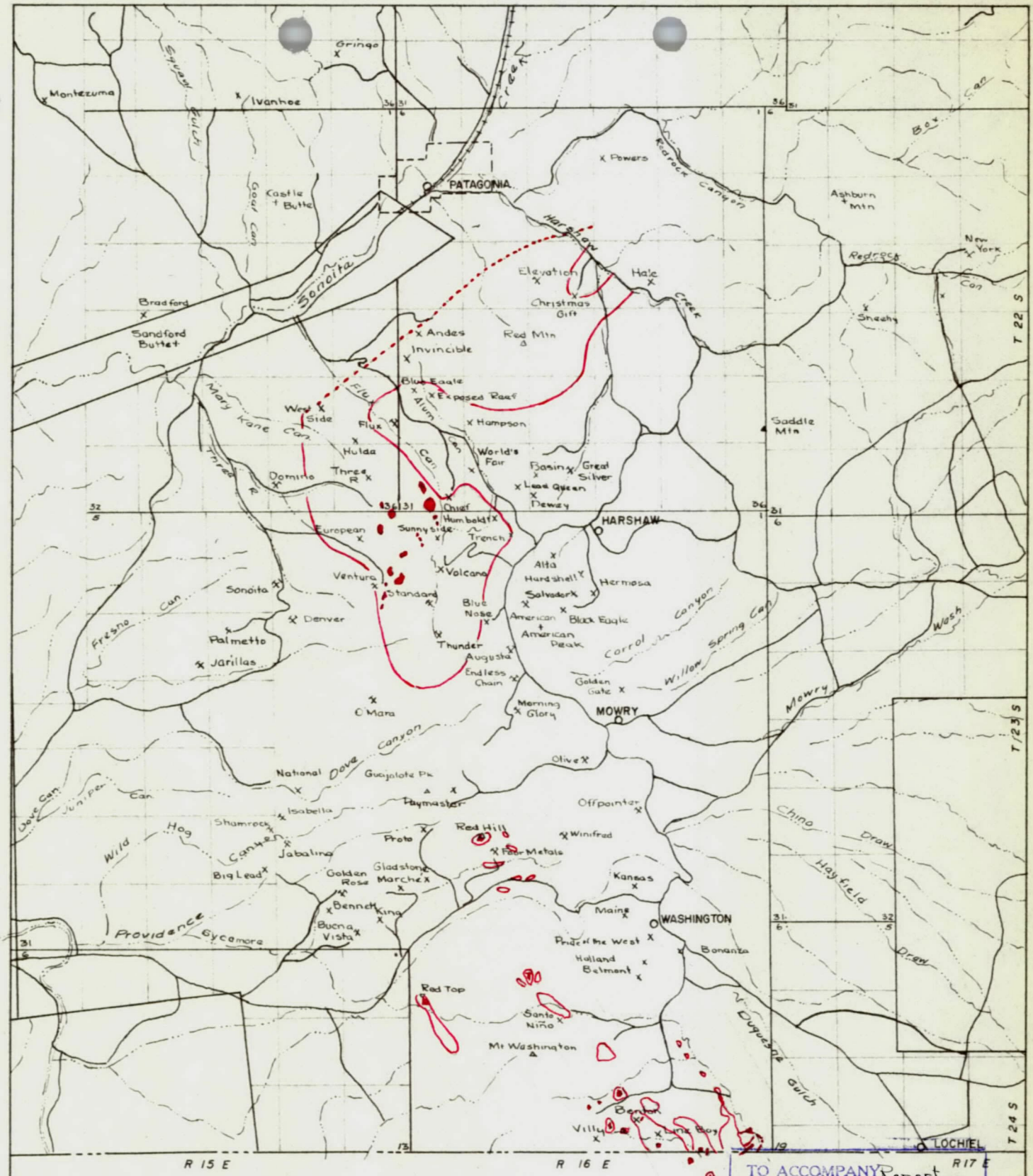
Although alteration is almost completely limited to the breccia pipes and their immediate surroundings, and to the intruded sediments within a few hundred feet of the contact, copper mineralization is quite common in the area. Previous exploration and the presence of sulphides in most of the shallow prospects probably preclude the possibility of secondary enrichment. I consider the possibilities of economic primary copper mineralization to be fair -- at least on the Mexican side.

I recommend an examination by yourself or Courtright of the areas on the US side of the line which are mentioned above as possible, and a thorough examination of the Mexican side of the boundary.

ARTHUR BLUCHER

AB/ds


EXPLANATION
Pre-Mineral Rocks — Sandstone, Siltstone, Alaskite Metamorph
Granitic Intrusive — Monzonite
Porphyritic Intrusive — Andesite Porphyry
Strong Alteration — Sericitization, Silicification, Recrystallization
Weak Alteration — Sericitization along Qtz veinlets w/ Py and occas Cpy
Breccia Pipes
NOGALES-WASHINGTON CAMP ROAD
Duquesne - Washington
Camp District
DUQUESNE
Santo Niño Mine
San Antonio Canyon
Alluvium
UNITED STATES
MEXICO
F. MON 115
F. MON 113
TO ACCOMPANY Report
DATED Dec. 2, 1957
BY A.G. Blucher
ASARCO
SOUTHERN PATAGONIA MOUNTAINS
Santa Cruz County, Arizona
SCALE 1" = 2000'
Topography from U.S.G.S Map. Topography on Mexican Side of Border is Brunton Sketch
Geology by: A.G. Blucher
December, 1957
Map No. 1386



TO ACCOMPANY Report
DATED Dec. 2. 1957
BY A. G. Blucher

Zone of Alteration

Breccia Pipes

HARSHAW DISTRICT

Santa Cruz County, Arizona

Copied in part from Lenon's Map of Santa Cruz County

SCALE 1" = 2 mi (approx)

A. G. Blucher
December, 1957

Map No. 1388

MEXICAN MINING DEPARTMENT

El Paso, Texas
Jan. 2, 1957

Mr. Kenyon Richard,
Tucson Office.

Dear Sir:

SOUTHWESTERN PATAGONIA MOUNTAINS
Santa Cruz County, Arizona

I refer to your letter of Dec. 26 to Mr. Hart, to which was attached a memorandum by Mr. Blucher on the above-named locality. This describes an area showing various evidence of porphyry copper mineralization, including alteration zones, breccia-pipes, and showings of limonite after chalcocite and chalcopyrite. The evidence did not seem to indicate anything of commercial interest on the U. S. side of the border, but the mineralization appeared to strengthen toward the south, as the border was reached and crossed, so that there might be something of greater interest on the Mexican side. You therefore suggested that it might be worth while to continue the study into Mexico, and cover the extension of the mineralized area there.

This is a very interesting suggestion, and we would like to carry it out. We cannot do so immediately, as Mr. Snow, the geologist we would want to send, is very busy at this time with some other special jobs, as well as with some of our usual end-of-the-year work. It might be a couple of months before he will be free to go. If this timing will be satisfactory to you, then, we can arrange for the trip along the lines you suggested, having Mr. Snow meet Mr. Blucher in Nogales, so that they can make the study together. Mr. Snow would bring a pick-up truck, and Mr. Blucher could enter Mexico as a tourist. I do not think there would be any legal difficulties to trouble us. I will therefore get in touch with you later, say sometime in February, and we can fix an exact time for the trip.

Yours very truly,

Original Signed
T. P. CLENDENIN

TPC/fbd

cc:
LHHart
JHCourtright
ABlucher
WJHock
AFMorle
WHSnow

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 12, 1950

MEMORANDUM FOR L. KENNETH WILSON

PATAGONIA AREA
Santa Cruz Co., Arizona
Disseminated Copper Prospects

I have recently completed a preliminary review of the Patagonia area for the purpose of appraising the significance of its spectacular coloration and associated alteration. Four days were spent in the field during the week ending May 28, 1950, attention being confined to parts of the region lying south of Sonoita Creek. My conclusions regarding the area in general and comments on individual properties follow:

. . . . . .

Outcrops characteristic of disseminated copper mineralization occur in a number of places along the west slope of the Patagonia mountains, in a northwest trending belt of Cretaceous granitic rock containing several large masses of intrusive alaskite. This belt appears to continue northwesterly to the Twin Buttes district, and is reported to extend southeasterly through the Cananea district. These outcrops show maroon to black limonite (after chalcocite) as veins, veinlets and grains in a quartz sericite matrix. The reddish color tones, viewed at a distance, are dull and pale, in contrast to the brilliant hues of Red Mountain, near the Trench mine.

The character of the alteration and mineralization is typical of that in the leached outcrops over porphyry copper deposits; however, the extent is limited to small, widely dispersed patches with relatively barren rock intervening. In other words, the quality is present, but the necessary quantity is lacking. The most prominent showings of this type of mineralization were found one to two miles west of the Four Metals Mine, in the vicinity of the Golden Rose prospect. Here, areas up to three or four hundred feet in diameter , displaying pale brown or red tones, are weakly impregnated with residual limonite. Stronger mineralization is confined to narrow zones along veins. These range from a few inches to 10 feet in width.

At the Three R mine, on the west slope of the Patagonia Mountains and two miles west of the Trench Mine, several highgrade chalcocite veins have been mined in the past. The chalcocite occurs as narrow, discontinuous lenses in altered alaskite. The leached outcrops show massive limonite after chalcocite in widths up to 12 inches. Occasionally small patches of disseminated limonite were

noted near the veins; otherwise the alaskite is unmineralized. The veins are not sufficiently close spaced to offer any chance of large tonnages of commercial ore.

The alluvial slopes along the west flank of the Patagonia Mountains contain notable amounts of gravel made up of altered rocks containing abundant limonite, some of which is "live" in appearance. This material appears to represent an accumulation of relatively resistant quartz-sericite rock, derived from veins in the friable "sandy" granitic rocks on the slopes above, rather than underlying rocks, since fresh, unmineralized bedrock directly beneath the gravels is exposed at numerous points.

Red Mountain, situated in the volcanic flow rocks on the east flank of the aforementioned granitic mass, stands out by reason of its brilliant red and orange colors. Numerous exposures along the south and east flanks were examined. In general, the color tones are produced by iron oxide stain, or "fog" in the outcrops, rather than by residual limonites. The volcanics appear to be more susceptible than the plutonics to such staining. For the most part the iron oxide pigment was probably produced by hydrothermal alteration of ferromagnesian minerals, which may also form pyrite simply by the addition of sulphur.

Significant amounts of introduced pyrite are present in the Andes property on the north slope of Red Mountain. Here a sizeable area, a thousand feet or more in diameter, shows in a number of exposures pyrite mineralization as a stockwork of veinlets cutting rocks altered to clay and sericite. Silicification appears to have been rather weak. No limonite after chalcocite was noted, although the lower Andes dump shows traces of chalcocite. The mineralization here is similar to that of porphyry copper deposits, however it is essentially pyritic as proven by the Company's drift sampling of the sulphide zone in 1947. These averaged .06% Cu and 5.2% Fe.

Such cupriferous pyrite disseminations often occur on the flanks of commercial porphyry copper deposits, but premineral rocks surrounding the Andes area are well exposed, except for the narrow strip of conglomerate in Sonoita Valley, and their outcrops are lacking in the essential features. The rock fragments in the ferruginous conglomerate were examined at many points; no "live" limonite was observed. Some boulders displayed color tones very similar to those characteristic of outcrops containing "live" limonite, however, these proved to be colored by specularite derivatives (distinguished by wine-red tones).

FOUR METALS MINE

This prospect, also known as Red Mountain or Kino, is situated high up on the west slope of the Patagonia Mountains, 16 miles by road from Nogales. The crest of the Red Mountain here represents the

more resistant portion of a mineralized breccia pipe, on the order of 1000 feet in diameter. Conspicuous brecciation appears to be confined to the southern half of the pipe; stronger silicification, alteration and copper sulphide mineralization occur in this area of more intensely shattered rock. The outcrops of the southern portion show sparse to moderate amounts of limonite derived from chalcocite, as irregular vugs and as small grains in a light gray, sericitic groundmass. The total sulphide content, prior to leaching, appears to have been low, probably representing less than 5% of the rock by volume.

The northern portion of the pipe, though concealed by mantle rock and brush for the most part, appears to be essentially pyritic. Finely disseminated pyrite occurs in the sericitized rocks exposed in the gully just below the dump of the adit on the northside of the Four Metals Red Mountain. A sample of this dump assayed:

No.	Au	Ag	Cu
4420	Tr	.4	.09

The dumps on the south side of the deposit are all quite limonitic. It seems likely that they were mined from both sulphide and leached materials. Representative samples assayed as follows:

	No.	Au	Ag	Cu
Middle Adit	4417	Tr	.5	.08
" "	4418	Tr	.6	.42
Lower Adit, West Dump	4415	Tr	.6	.24
" " "	4416	Tr	.5	.86

Composite of the four samples above:

Pb	Zn	MoS2
.05	.04	.14

The files here contain considerable information and numerous opinions concerning this property, but no reliable assay data from exploration drifts which crosscut the deposit from three to six hundred feet below the hilltop. The I.S.& R. Co. reportedly drilled several holes to a depth of 800 feet below the lower adit in 1929 and subsequently abandoned the property. In 1947 James Pollock took a sample from the lower adit dump (.52% Cu, 0.8 oz. Ag) and recommended that information on the potential grade and tonnage of this mineralized breccia pipe should be obtained. Subsequently you referred the matter to Mr. Playter and later, in April 1948, arranged an examination by C. A. Rasor who reported on the property

and concluded that it should be dropped from further consideration. You mentioned that you, and Paul Kerr also, visited the property. However, no information is at hand on results of past exploration and development.

I am inclined to agree with Pollock, even though it is almost certain that the exploration work done in the past indicated a substantial portion of the pipe to be "submarginal" in grade. However, if Tovotes' ideas (1917 report on file) of horizontal dimensions - 300 by 600 feet (at 1.25% copper) - have any foundation, the potential tonnage is rather large, roughly 15 million tons for a vertical distance of 1000 feet. It is possible that Tovotes' estimated average grade of 1.25% Cu was based on samples containing considerable supergene chalcocite; if such is the case, copper values below in the primary zone are certain to be much lower. The dump samples show enough silver and molybdenum to be equivalent to three or four tenths of one percent copper; this accompanying, say .5% primary copper, could be of interest in large tonnages.

At your request I have written the president of the company, Milton Leon of Tulsa, Oklahoma, soliciting information on the results of the past exploration and a statement of terms if the property is available. The company is listed in the Nogales, Arizona telephone directory as "Coronado Mines Inc., 136 Grand, Phone 555."

JHC

JHC/fh J. H. COURTRIGHT

Attachment - Location Map Patagonia Mountains.

TO ACCOMPANY Letter
DATED June 12, 1950
BY J. H. Courtright

LOCATION MAP

PATAGONIA MOUNTAINS

SANTA CRUZ COUNTY, ARIZONA

SCALE 1 INCH = 2 MILES

AFTER U.S.G.S. TOPOGRAPHIC MAP - DATED 1914