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airtrack holes intersected copper oxide mineralization scattered over an area roughly 3000 feet square. Mapping and collection of 23 samples covered an area encompassing approximately two sections. Sampling focused on linear zones of elevated fracture hematite and on several prospects exposing fracture chrysocolla and variable amounts of silicification. Peripheral to these copper showings and some one to two miles distant are several reported gold and silver prospects.

Much of the area exposes well-developed planer silicification, chlorite/sericite alteration and mylonitic textures in granodiorite, and strongly suggests a detachment setting.

Sampling yielded seven assays exceeding 2500 ppm Cu with a high of 1.7% over three feet. Additional testing will require trenching or drilling.

Dripping Springs/Alice Mine Area, Pinal & Gila Counties: This area is dominated by extensive exposures of carbonates with lesser diabase and interbedded quartzites. Magnetite and local copper skarn mineralization were evaluated in several areas where andesite porphyry dikes intrude the carbonate sequence. Workings expose mostly discontinuous and poddy replacement-type mineralization. Structurally prepared quartzite and diabase appear to be the most prospective host lithologies for copper oxide mineralization in this area and will be the focus of any further work.

Prospect adjacent to Suizo & Copper Cadillac, Pinal County: Several prospect showings approximately one mile north of Copper Cadillac appear to be discovery posts and do not expose any mineralization.

Of most interest are several prospect showings of matrix chrysocolla in poorly graded, mixed lithology sedimentary units interpreted to be gravels deposited on the paleosurface between Tertiary volcanic flows. Four samples collected to date averaged 2.8% Cu including 20 feet of 2.7% Cu. Mineralization here appears to be exotic. Further work is anticipated in April.

Discussions with William Lacey, Tucson: Attempts to gain information on a reported drill intercept of oxide copper mineralization in the vicinity of Suizo were unsuccessful. However, Mr. Lacey has strongly recommended investigation of the Johnson Camp area along the east flank of the Laramide age Texas Canyon intrusive. Previous drilling efforts are reported to have partially outlined extensive copper mineralization hosted by carbonate and quartzite lithologies. Mr. Lacey will be sending additional data on this area.

Star Route Claims, Gila County: These claims, located approximately .5 miles southwest of the proposed Carlota pit were submitted to Cambior by Richard Amodo. Two to four foot wide quartz veins in Schultz granite host pyrite, chalcopyrite, molybdenite, araninite(?), and local azurite and malachite. Gold

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HOT TAMALE PEAK QUADRANGLE
ARIZONA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1962. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

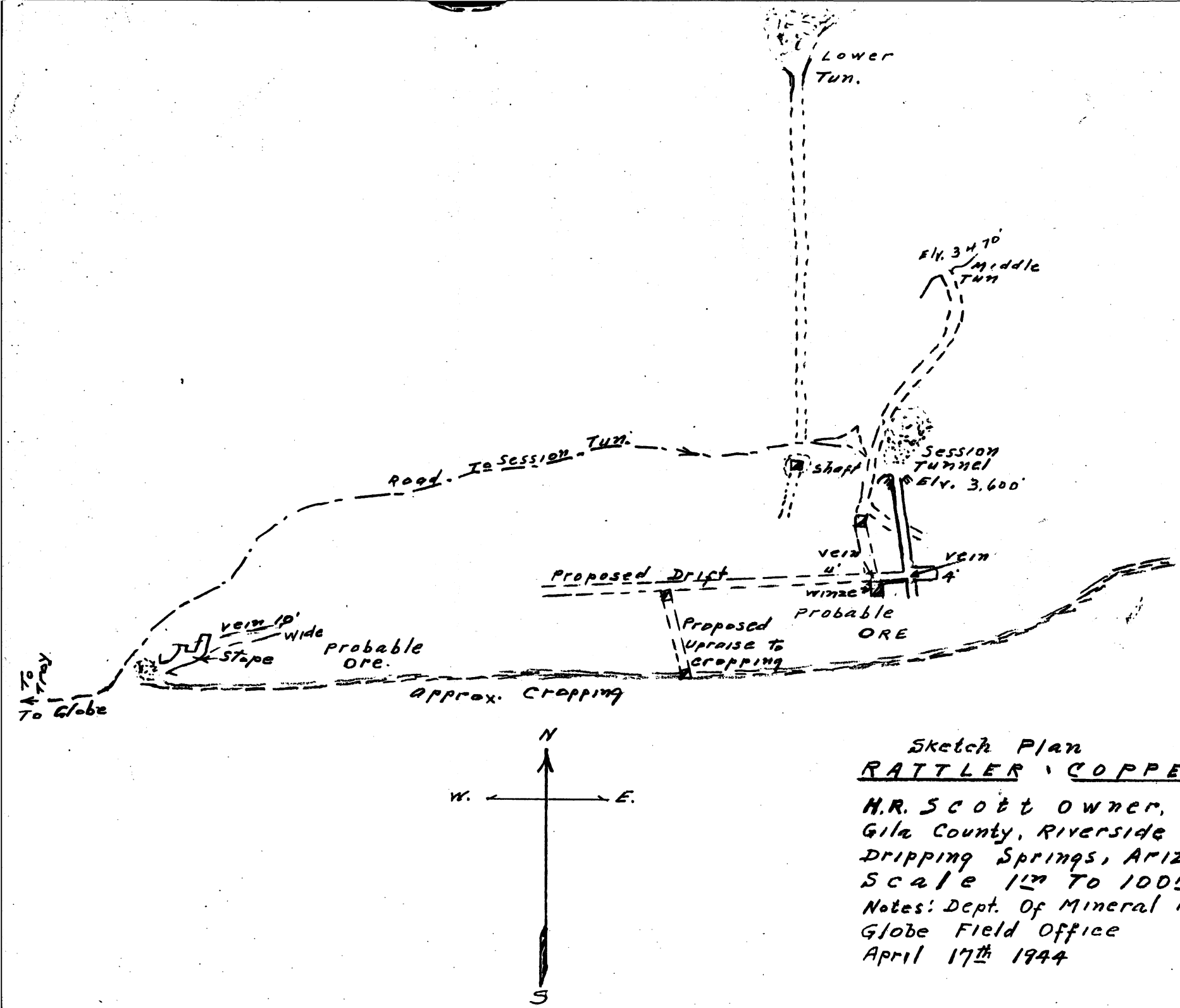
CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
State Route

ARIZONA
QUADRANGLE LOCATION

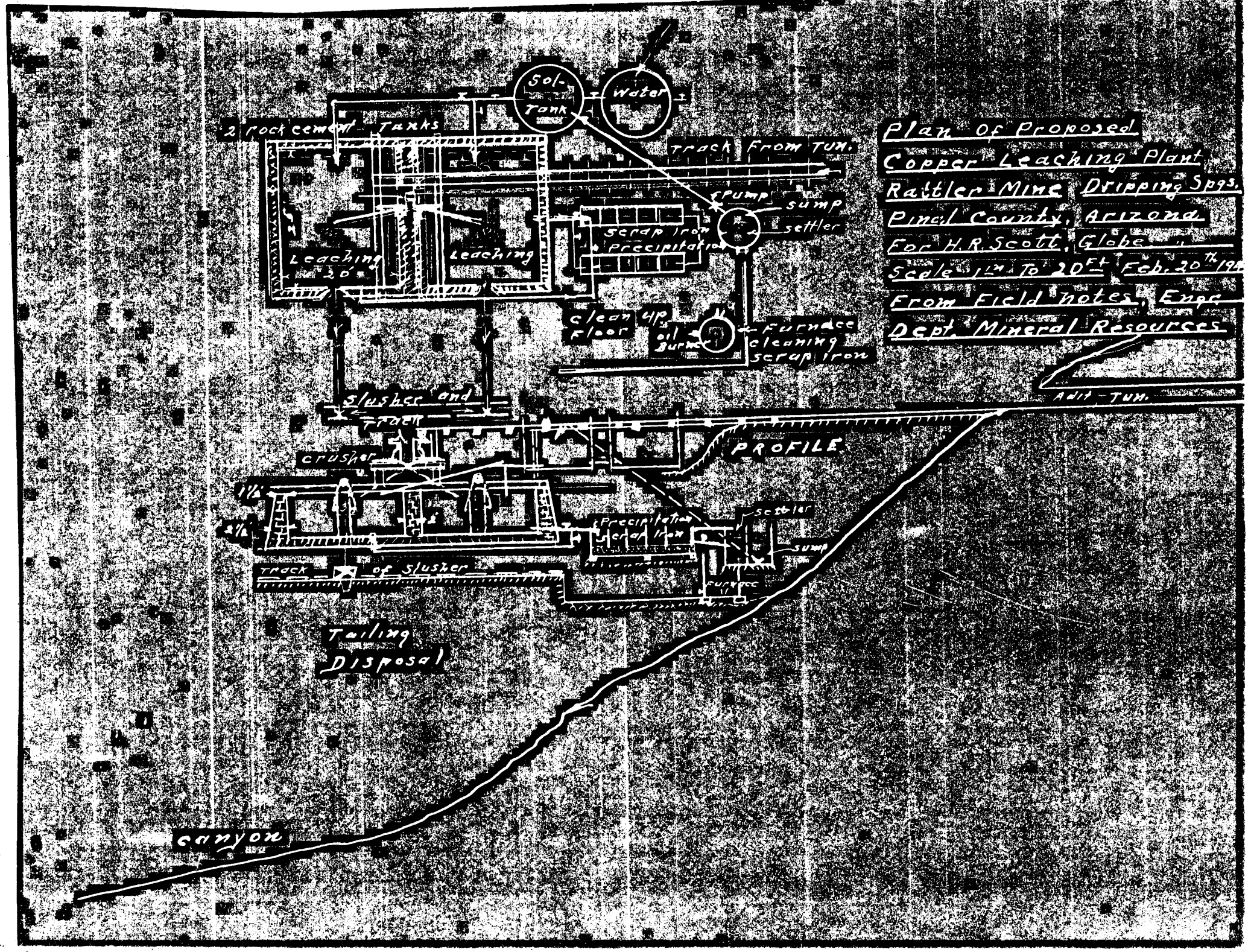
KEARNY, ARIZ.
N3300—W11052.5/7.5
1964
AMS 3850 III SW—SERIES V898

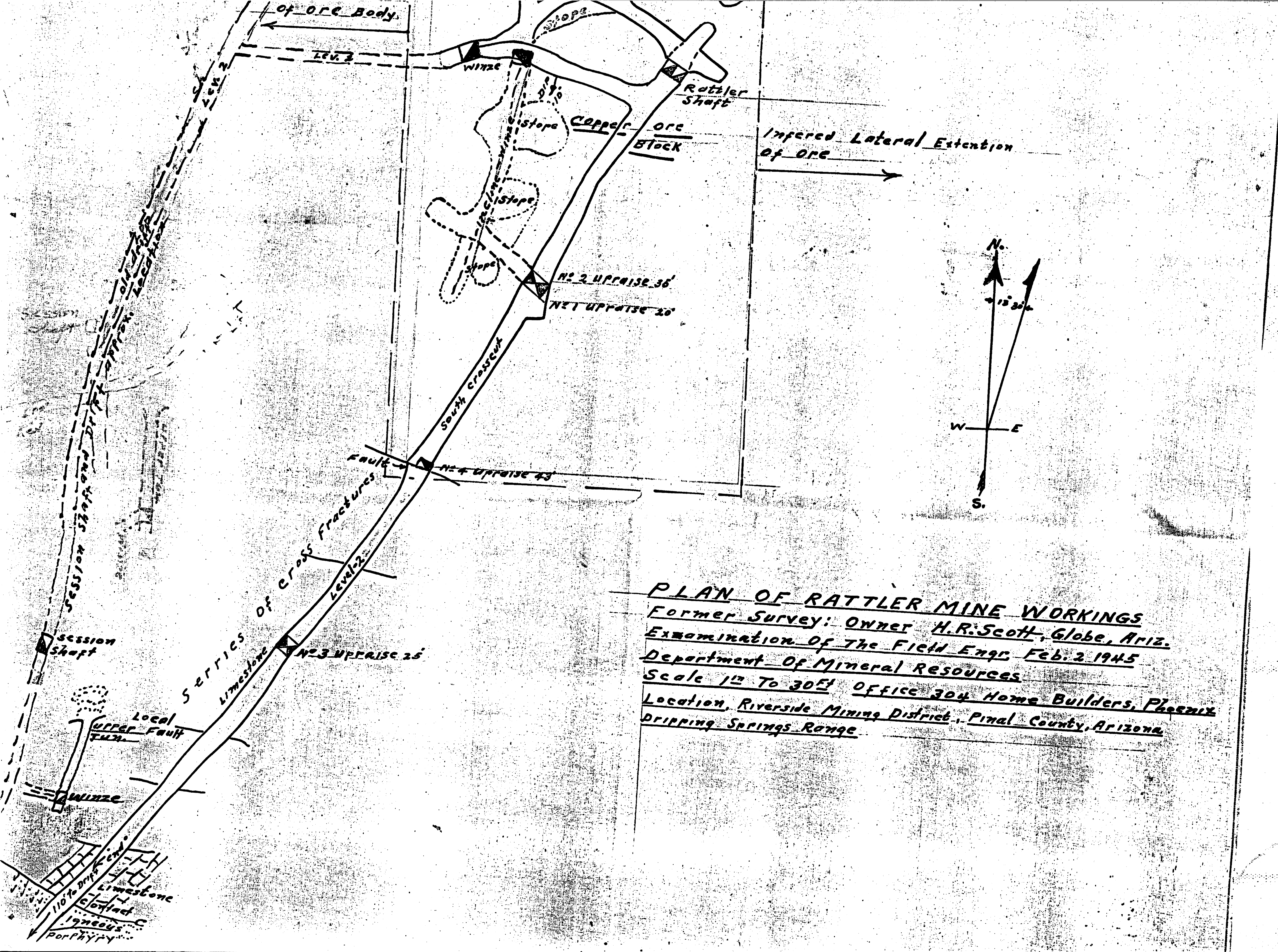


Sketch Plan

RATTLER COPPER MINE

H.R. Scott Owner, Globe, Ariz.
Gila County, Riverside Mng. Dist.
Dripping Springs, Arizona.
Scale 1in To 100Ft
Notes: Dept. Of Mineral Resources
Globe Field Office
April 17th 1944


Sol-
Tank
Water
2 rock cement Tanks
Track From Tun.
Plan Of Proposed
Copper Leaching Plant
Rattler Mine Dripping Spgs.
Pinal County, Arizona
For H.R. Scott, Globe
Scale 1 In. To 20 Ft. Feb. 20th 19
From Field Notes, Emp.
Dept. Mineral Resources
Pump
sump
settler
Scrap Iron
precipitation
Leaching
20'
Leaching
clean up
floor
oil burner
Furnace
cleaning
scrap iron
Adit Tun.
slusher and
Trap
PROFILE
crusher
Precipitation
of lead Iron
settler
sump
track
of slusher
furnace
Tailing
Disposal
canyon



PLAN OF RATTLER MINE WORKINGS

Former Survey: Owner H.R. Scott, Globe, Ariz.

Examination Of The Field Engr. Feb. 2 1945

Department Of Mineral Resources

Scale 1in To 30Ft Office 304 Home Builders, Phoenix

Location, Riverside Mining District, Pinal County, Arizona

Dripping Springs Range

CAMBIOR USA, INC. NO. 39102

ROCK: ☒ Date: 2/6/93

SOIL: ☐ State: Az

SED.: ☐ County: Gila

Project: 304 Dripping Springs NW of Rattler Mine

DRILL HOLE NO. _____ FROM _____ TO _____

Loc.: T 3 N; R 14 E; SE ¼; S 23

Quad: Hot Tamale Peak (S) (W) Scale 7.5

RX: Dump/Tailings (Outcrop) Float (Fresh) Weathered

5"

Outcrop Location: Small prospect

N. side of ridge NO.

Sample Description: Rock Type:

Rock Mod: Mineral:

Oxides: Alteration:

Structure: Spl. Width:

Similar to 39101 dk brown jasp

carb replac, irreg lim bands, calcite veining

minor Cu oxide (malachite) in chalky silty

lmst unit ≈ 6" thick at edge of

4-5' jasp rib

(picture)

CAMBIOR USA, INC. NO. 39101

ROCK: ☒ Date: 2/6/97

SOIL: ☐ State: Az

SED.: ☐ County: Gila Co

Project: 304 Dripping Spring pm N of Rattler Mine

DRILL HOLE NO. _____ FROM _____ TO _____

Loc.: T 3 N; R 14 (E); SE ¼; S 23

Quad: (S) Hot Tamale Peak Scale 7.5

RX: Grab (Dump/Tailings) Outcrop/Float (Fresh/Weathered)

Outcrop Location: shallow shaft immed below RR (with rail sticking up) NO. _____

Sample Description: _____ Rock Type: _____

Rock Mod: _____ Mineral: _____

Oxides: _____ Alteration: _____

Structure: _____ Spl. Width: _____

Carbonate replacement; pervasive lim-hem-FeOx mod, some voids & Bx text, red-brown jasp text common, local bleb & vug crystcalls with calcite & felty epidote green mineral?

(picture)

CAMBIOR USA, INC. NO. 39103

ROCK: ☒ Date: 2/6/92

SOIL: ☐ State: AZ

SED.: ☐ County: Gila

Project: 304 Dripping Springs Area N. of Rattler Mine

DRILL HOLE NO. _____ FROM _____ TO _____

Loc.: T 3 N; R 14 (E); SE ¼; S 23

Quad: Hot TAMALE Peak (W) Scale 7.5

RX: Grab (Dump/Tailings) Outcrop/Float (Fresh/Weathered)

Outcrop Location: prospect grab

inner w. of fence gate, w saddle NO. _____

Sample Description: _____ Rock Type: _____

Rock Mod: _____ Mineral: _____

Oxides: _____ Alteration: _____

Structure: _____ Spl. Width: _____

(Similar to 39102)

good Bx text, perv lim-hem & asp

No visable Cu oxids

CAMBIOR USA, INC. NO. 39102

ROCK: ☑ Date: 2/6/93

SOIL: ☐ State: Az

SED.: ☐ County: Gila

Project: 304 Dripping Springs area Kirk Rattler Mine

DRILL HOLE NO. _____ FROM _____ TO _____

Loc.: T 3 N; R 14 E; SE ¼; S 23

Quad: Hot Tamale Peak Scale 7.5

RX: Dump/Tailings (Outcrop) Float (Fresh/Weathered)

5'

Outcrop Location: small prospect

N. side of ridge NO. _____

Sample Description: _____ Rock Type: _____

Rock Mod: _____ Mineral: _____

Oxides: _____ Alteration: _____

Structure: _____ Spl. Width: _____

Similar to 39103 dk brown jasp

carb replac. irreg lim bands, calcite veining

minor Cu oxide (malachite) in chalky silty

most amt ≈ 6" thick at edge of

4-5' jasp rib

(picture)

CAMBIOR USA, INC. NO. 39103

ROCK: ☒ SOIL: ☐ SED.: ☐

Date: 2/6/92

State: Az

County: Gila

Project: 304 Dripping Springs Mtns N. of Rattler Mine

DRILL HOLE NO. _____ FROM _____ TO _____

Loc.: T 3 N; R 14 E; SE ¼; S 23

Quad: Hot Tamale Peak Scale 7.5

RX: Grab | Dump/Tailings | Outcrop/Float | Fresh/Weathered

Outcrop Location: prospect grab

1mm N. of fence gate, in saddle NO. _____

Sample Description: _____ Rock Type: _____

Rock Mod: _____ Mineral: _____

Oxides: _____ Alteration: _____

Structure: _____ Spl. Width: _____

(Similar to 39102)

sm Bx text, pervas lim-hem asp

No visable Cu oxids

CAMBIOR USA, INC. NO. 39101

ROCK: ☒ SOIL: ☐ SED.: ☐

Date: 2/6/92

State: Az

County: Gila Co

Project: 304 Dripping Springs Mtn N. of Rattler Mine

DRILL HOLE NO. _____ FROM _____ TO _____

Loc.: T 3 N; R 14 E; SE ¼; S 23

Quad: Hot Tamale Peak Scale 7.5

RX: Grab | Dump/Tailings | Outcrop/Float | Fresh/Weathered

Outcrop Location: shallow shaft 1mm below rd (with rail sticking up) NO. _____

Sample Description: _____ Rock Type: _____

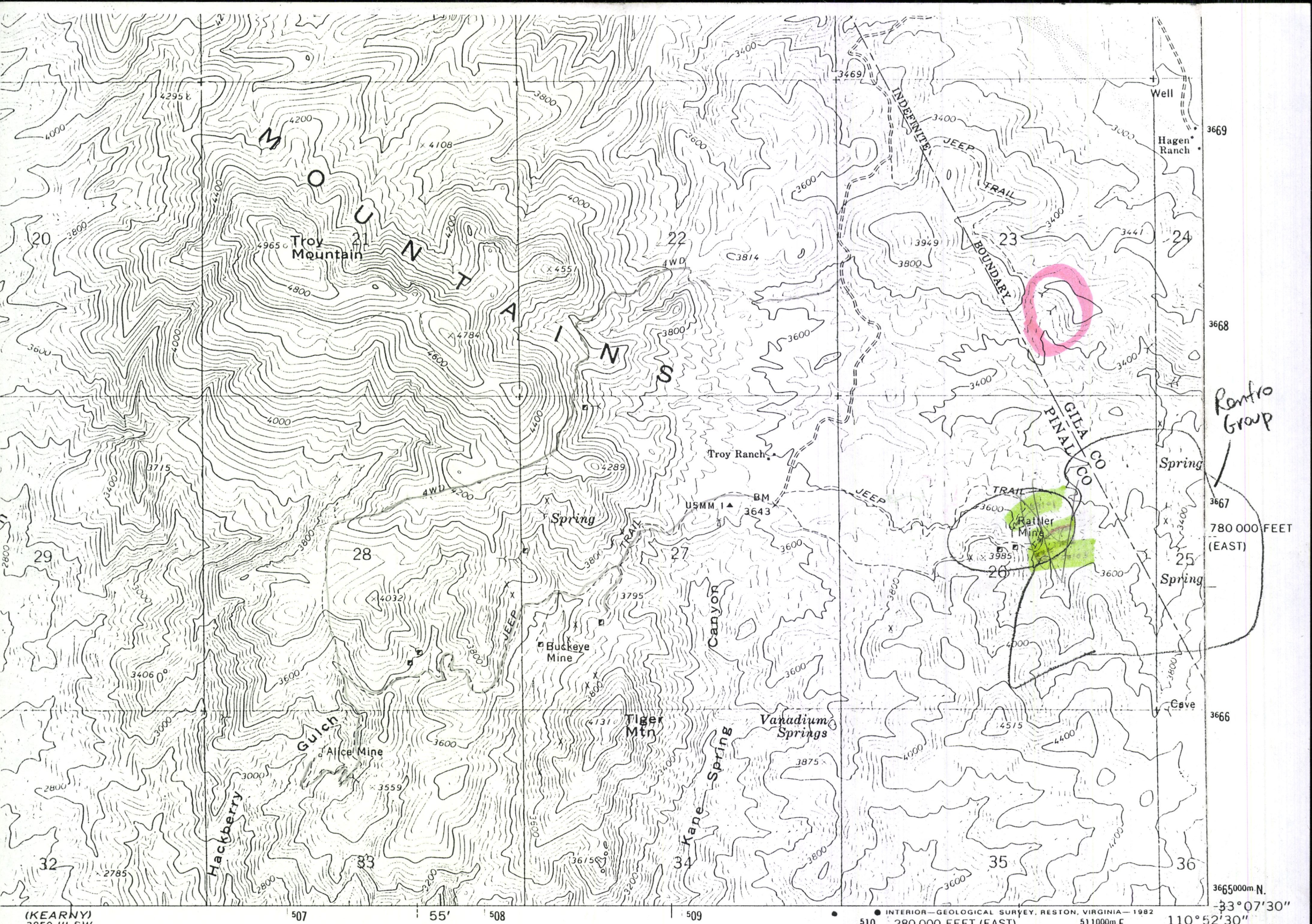
Rock Mod: _____ Mineral: _____

Oxides: _____ Alteration: _____

Structure: _____ Spl. Width: _____

Carbonate replacement; pervasive lim-hem-Fe ox wad, some vuggy & Bx text, red-brown jasp text common, local blob & vug crystalline with calcite & felty apple green mineral?

fractured



SCALE 1:24 000

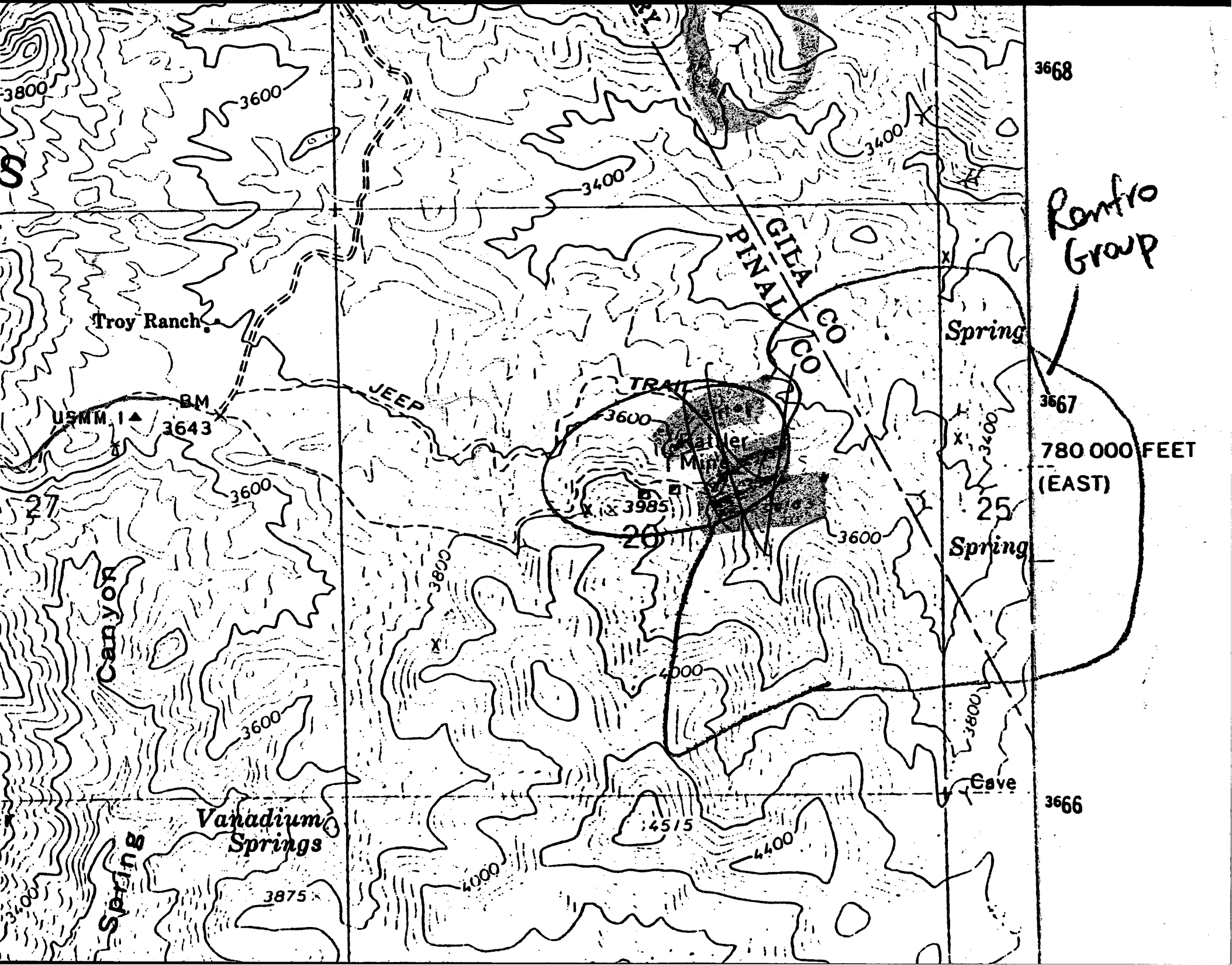
0 — 1 MILE

3000 4000 5000 6000 7000 FEET

2/6/93 Rx dep 39101-39103

ROAD CLASSIFICATION

Heavy-duty Light-duty


Rentro Group
Troy Ranch
USMM 1
3643
BM
JEEP TRAIL
PINAL CO
GILA CO
Spring
Cave
Canyon
Vanadium Springs
Spring
3985
4515
3875
3600
3400
4000
4400
3800
3668
3667
3666
780 000 FEET
(EAST)
25
26
27

cc: MMG RM NB RL

CERTIFICATE OF ANALYSIS
iPL 9300035

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Msg: ICP(AqR)30
Msg:

29 Samples 29= Rock 0= Soil 0= Core 0=RC Ct 0= Pulp 0=Other [iPL=39:0222:12:30:101]
Raw Storage: 03Mon/Dis -- -- -- -- -- Mon=Month Dis=Discard
Pulp Storage: 12Mon/Dis -- -- -- -- -- Rtn=Return Arc=Archive

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NV 89502-2345					
USA					
ATT: Nick Barr	Ph:702/856-5189				
	Fx:702/856-4549				

Analytical Summary

##	Code	Method	Title	Low Limit	High Limit	Units	Description		Element	##
01	721P	ICP	Ag	0.1	100	ppm	Ag ICP		Silver	01
02	711P	ICP	Cu	1	20000	ppm	Cu ICP		Copper	02
03	714P	ICP	Pb	2	20000	ppm	Pb ICP		Lead	03
04	730P	ICP	Zn	1	20000	ppm	Zn ICP		Zinc	04
05	733P	ICP	As	5	10000	ppm	As ICP	5 ppm	Arsenic	05
06	732P	ICP	Sb	5	1000	ppm	Sb ICP		Antimony	06
07	732P	ICP	Hg	3	10000	ppm	Hg ICP		Mercury	07
08	717P	ICP	Mo	1	1000	ppm	Mo ICP		Molybdenum	08
09	747P	ICP	Tl	10	1000	ppm	Tl ICP	10 ppm	Thallium	09
10	705P	ICP	Bi	2	10000	ppm	Bi ICP		Bismuth	10
11	707P	ICP	Cd	0.1	10000	ppm	Cd ICP		Cadmium	11
12	710P	ICP	Co	1	10000	ppm	Co ICP		Cobalt	12
13	718P	ICP	Ni	1	10000	ppm	Ni ICP		Nickel	13
14	704P	ICP	Ba	2	10000	ppm	Ba ICP		Barium	14
15	727P	ICP	W	5	1000	ppm	W ICP		Tungsten	15
16	709P	ICP	Cr	1	10000	ppm	Cr ICP		Chromium	16
17	729P	ICP	V	2	10000	ppm	V ICP		Vanadium	17
18	716P	ICP	Mn	1	10000	ppm	Mn ICP		Manganese	18
19	713P	ICP	La	2	10000	ppm	La ICP		Lanthanum	19
20	723P	ICP	Sr	1	10000	ppm	Sr ICP		Strontium	20
21	731P	ICP	Zr	1	10000	ppm	Zr ICP		Zirconium	21
22	736P	ICP	Sc	1	10000	ppm	Sc ICP		Scandium	22
23	726P	ICP	Ti	0.01	1.00	%	Ti ICP		Titanium	23
24	701P	ICP	Al	0.01	5.00	%	Al ICP		Aluminum	24
25	708P	ICP	Ca	0.01	10.00	%	Ca ICP		Calcium	25
26	712P	ICP	Fe	0.01	5.00	%	Fe ICP		Iron	26
27	715P	ICP	Mg	0.01	10.00	%	Mg ICP		Magnesium	27
28	720P	ICP	K	0.01	10.00	%	K ICP		Potassium	28
29	722P	ICP	Na	0.01	5.00	%	Na ICP		Sodium	29
30	719P	ICP	P	0.01	5.00	%	P ICP		Phosphorus	30

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DL=DownLoad 3D=3-1/2 Disk 5D=5-1/4 Disk BT=BBS Type BL=BBS(1=Yes 0=No)

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Approved

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Report: 9300035 R Cambior Exploration USA, Inc. Project: 304 317 Page 1 of 1 Section 1 of 2

Sample Name	Type	Ag ppm	Cu ppm	Pb ppm	Zn ppm	As ppm	Sb ppm	Hg ppm	Mo ppm	Tl ppm	Bi ppm	Cd ppm	Co ppm	Ni ppm	Ba ppm	W ppm	Cr ppm
39300	Rock	<0.1	979	<2	30	<5	<5	<3	3	<10	<2	<0.1	8	21	78	<5	87
39301	Rock	<0.1	133	<2	40	<5	<5	<3	2	<10	<2	<0.1	9	16	56	<5	120
39302	Rock	0.7	313	210	70	<5	<5	<3	38	<10	3	<0.1	9	17	38	<5	121
39303	Rock	<0.1	92	2	43	<5	<5	<3	2	<10	<2	<0.1	10	18	39	<5	105
39304	Rock	0.1	1530	5	47	<5	<5	<3	1	<10	<2	<0.1	9	19	28	<5	84
39305	Rock	<0.1	109	20	48	<5	<5	<3	4	<10	<2	<0.1	10	18	35	<5	132
39063	Rock	<0.1	57	25	3	<5	<5	<3	6	<10	<2	<0.1	3	5	889	<5	93
39064	Rock	<0.1	98	10	7	<5	<5	<3	6	<10	<2	0.1	2	5	253	<5	98
39065	Rock	<0.1	47	3	1	<5	<5	<3	7	<10	<2	0.2	2	4	345	<5	104
39066	Rock	<0.1	41	10	8	<5	<5	<3	5	<10	7	0.1	5	8	814	<5	97
39067	Rock	<0.1	11	8	2	<5	<5	<3	4	<10	5	<0.1	2	3	652	<5	81
39068	Rock	<0.1	81	<2	150	<5	<5	<3	5	<10	<2	0.9	24	80	80	<5	71
39069	Rock	<0.1	38	11	2	5	<5	<3	7	<10	<2	0.1	2	6	908	<5	89
39070	Rock	<0.1	678	<2	5	<5	<5	<3	2	<10	2	0.2	2	4	71	<5	29
39071	Rock	0.1	641	3	25	<5	<5	<3	10	<10	<2	0.3	7	13	62	<5	64
39072	Rock	0.1	1132	13	41	5	<5	<3	5	<10	6	0.3	4	8	66	<5	23
39073	Rock	<0.1	641	<2	14	<5	<5	<3	3	<10	<2	<0.1	2	8	65	<5	24
39074	Rock	0.2	1087	86	7	5	<5	<3	12	<10	3	0.6	3	8	64	<5	81
39075	Rock	<0.1	4522	<2	41	<5	<5	<3	3	<10	<2	0.1	10	6	496	<5	17
39076	Rock	<0.1	743	9	34	<5	<5	<3	5	<10	<2	0.2	3	8	51	<5	70
39101	Rock	0.2m	4.4%	3.2%	4939	319	<5	5	0.6%	<10	476	12.6	12	<1	41	<5	78
39102	Rock	0.7	1315	98	36	21	<5	<3	28	<10	<2	0.2	9	14	33	<5	32
39103	Rock	<0.1	575	4	21	90	<5	<3	34	<10	<2	<0.1	24	17	85	<5	68
00925	Rock	2.0	401	996	344	209	<5	<3	103	<10	29	0.5	11	14	54	<5	48
00926	Rock	59.0	3.6%	3.2%	4968	224	<5	9	0.8%	<10	443	21.6	30	<1	53	<5	105
00927	Rock	0.2	701	242	76	11	<5	<3	56	<10	<2	0.1	19	15	36	<5	15
00928	Rock	0.1	135	21	9	8	<5	<3	14	<10	3	0.1	3	5	102	<5	47
00929	Rock	1.0	375	329	142	41	<5	<3	72	<10	3	0.2	6	8	198	<5	80
00930	Rock	9.3	13742	5	1572	<5	<5	<3	19	<10	<2	3.3	93	9	28	53	10
Minimum Detection		0.1	1	2	1	5	5	3	1	10	2	0.1	1	1	2	5	1
Maximum Detection		100.0	20000	20000	20000	10000	1000	10000	1000	1000	10000	10000.0	10000	10000	10000	1000	10000
Method		ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP

---=No Test ReC=ReCheck ins=Insufficient Sample m=Est/1000 %=Est % Max=No Est

Dupplins Springs Area

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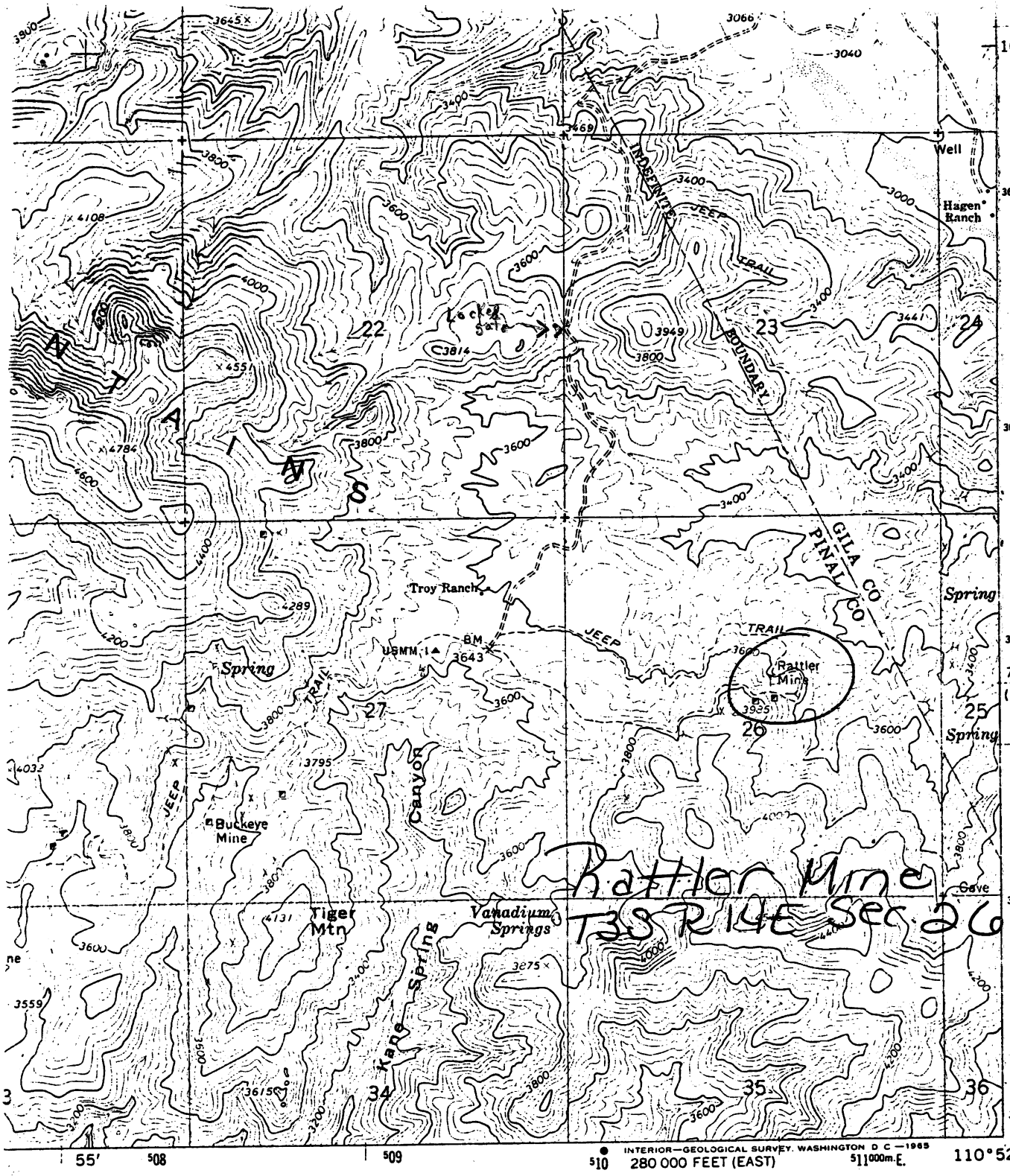
Report: 9300035 R Cambior Exploration USA, Inc. Project: 304 317 Page 1 of 1 Section 2 of 2

Sample Name	V ppm	Mn ppm	La ppm	Sr ppm	Zr ppm	Sc ppm	Ti %	Al %	Ca %	Fe %	Mg %	K %	Na %	P %
39300	27	305	13	27	<1	2	0.01	1.19	3.33	1.77	0.59	0.29	0.05	0.04
39301	36	299	12	26	<1	3	0.08	1.01	1.81	1.74	0.70	0.25	0.07	0.03
39302	52	299	12	29	<1	3	0.07	1.06	1.30	1.84	0.76	0.18	0.08	0.03
39303	35	264	12	26	1	3	0.12	1.15	0.62	1.90	0.72	0.19	0.07	0.04
39304	34	259	12	23	1	3	0.09	1.12	0.40	1.97	0.77	0.17	0.08	0.34
39305	41	308	13	32	1	3	0.12	1.10	1.12	1.98	0.87	0.15	0.07	0.04
39063	33	45	2	109	2	<1	<0.01	0.60	0.19	3.55	0.08	0.03	0.02	0.09
39064	30	48	2	57	2	<1	<0.01	0.58	1.44	3.31	0.17	0.02	0.02	0.06
39065	42	37	<2	36	2	<1	<0.01	0.52	0.22	5.2%	0.01	0.03	0.02	0.10
39066	25	220	3	101	3	<1	<0.01	0.75	0.47	2.63	0.05	0.02	0.02	0.08
39067	16	70	7	128	3	<1	<0.01	0.74	0.15	1.25	0.03	0.03	0.02	0.05
39068	90	615	6	183	7	6	0.01	5.2%	4.07	3.79	2.40	1.04	0.04	0.05
39069	29	23	2	192	2	<1	<0.01	0.72	0.08	2.25	0.03	0.05	0.03	0.03
39070	14	9	22	5	4	1	0.01	0.96	0.02	4.78	0.05	0.36	0.02	0.01
39071	24	28	16	5	3	1	<0.01	0.55	0.03	6.8%	0.05	0.24	0.02	0.10
39072	27	31	20	13	4	1	<0.01	1.21	0.04	8.1%	0.06	0.29	0.02	0.07
39073	22	13	25	10	4	1	0.01	1.01	0.02	3.05	0.19	0.54	0.02	0.07
39074	13	17	10	20	4	1	<0.01	0.72	0.03	8.8%	0.05	0.28	0.02	0.18
39075	70	183	8	68	1	6	0.14	2.84	0.69	5.3%	1.41	1.17	0.15	0.22
39076	14	39	13	3	3	1	<0.01	1.08	0.02	4.82	0.40	0.25	0.02	0.09
39101	3748	4381	2	18	1	<1	<0.01	0.45	1.30	11%	0.18	0.10	0.02	0.10
39102	110	199	<2	13	4	1	0.02	0.25	1.62	19%	0.42	0.04	0.02	0.05
39103	177	331	<2	12	4	<1	0.01	0.12	0.12	19%	0.09	0.02	0.02	0.09
D0925	285	230	<2	14	5	<1	0.01	0.32	0.12	23%	0.18	0.06	0.02	0.03
D0926	3218	7712	3	18	1	<1	<0.01	0.50	0.59	8.7%	0.30	0.05	0.02	0.08
D0927	60	558	<2	19	5	<1	<0.01	0.12	3.54	22%	2.47	0.01	0.01	0.02
D0928	36	64	13	19	1	3	<0.01	0.53	0.17	4.33	0.16	0.35	0.02	0.03
D0929	35	120	18	42	1	1	<0.01	0.55	0.10	6.8%	0.10	0.27	0.06	0.08
D0930	25	6536	<2	6	2	2	0.01	0.32	1.02	16%	12%	0.12	0.02	0.04
Minimum Detection	2	1	2	1	1	1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Maximum Detection	10000	10000	10000	10000	10000	10000	1.00	5.00	10.00	5.00	10.00	10.00	5.00	5.00
Method	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP

---=No Test ReC=ReCheck ins=Insufficient Sample m=Est/1000 %=Est % Max=No Est



1 MILE

Sonora 7.5'

ROAD CLASSIFICATION

Heavy-duty	———	Light-duty
Medium-duty	– – –	Unimproved dirt
	◯	State Route

QUADRANGLE LOCATION

SONORA, ARIZ.

NW/4 RAY 15' QUADRANGLE

N3307.5—W11052.5/7.5

1964

AMS 3850 III NW—SERIES V898

2

P

Dear Mr. [illegible] Here is data re Wall St. Journal ad on copper property you called about.

Sincerely,

Jim Gaylor

UNIVERSAL COPPER COMPANY

5613 E. MABEL

TUCSON, ARIZONA

PHONES: 792-0877

298-5516

JAMES E. GAYLOR, PRESIDENT

Geology Department

Gentlemen: RE: Sale of Copper Property

Enclosed are a geology map (compiled by Dr. Willard C. Lacy of the University of Arizona at Tucson), assays, and a report on 85 claims which include my 14 claims that I am offering for sale or royalty.

The Troy Copper Co. (an eastern stock company), between 1900 and approx. 1912 had grouped 85 copper claims forming a 4-mile long oval extending NE and SW. My 14 claims are on the extreme SW end; referred to in the report as the "West Group". Inspiration Copper Co. recently spent a number of months doing geophysical work and drilling on their property north of and contiguous to my 14 claims and around the old townsite of Troy. No drilling has been done on my claims. My claims consist of the old Alice Mine workings and the 2,200-foot long Pratt Tunnel which shows on Dr. Lacy's map.

At the turn of the century this was perhaps the largest copper mining operation in Arizona. According to the old reports the richest copper ore was taken from the Alice Mine. In those early days the miners only worked the carbonate ores because they were unable to process sulphide ores. Therefore, all of the sulphide ores remain untouched. Ore that was under 7% copper was too low to mine profitably in those days. The old reports indicate that 50,000 tons of high grade carbonate ore was mined from the Alice Mine in 1902 running from 8% to 16% copper for an average of 12%. Since the Alice Mine workings (4 levels) and the Pratt Tunnel are caved-in, this property is offered simply as a raw prospect. The surface area is extremely broken and difficult to geologize. I believe that a modest amount of drilling will prove enough copper ore to justify expansion. Because the property is unproven at the moment as to whether it will or will not support a sizeable mining operation--underground or open pit--I believe it would be better for both parties to agree to an equitable royalty. The property is free and unencumbered and I will give a reasonable exploration and drilling option to any substantial company who will contract to perform the various phases of development within reasonable time limitations.

Dr. Lacy stated to me that there might be between 1,000,000 and 2,000,000 tons of "high-grade copper ore" in and near the Alice Mine. If this averaged 5% copper at current prices it would approximate $100,000,000 worth of copper. I doubt whether any other mine in Arizona--large or small--started with a better looking base. Yet, invariably, nearly all of the big mines in Arizona have continued to expand their reserves from year to year.

In addition to such potential high-grade copper ore, the Pratt Tunnel cuts through over 200 feet of low grade copper ore. Also, for your easier evaluation, here are some quotes from the enclosed report and from the "Copper Handbooks" at the U. of A. Library pertaining to my property:

"A map compiled by the writer (Mead circa 1904) several years ago when the ore body was exposed, is a geological section of the ore exposure of the shaft of the third and fourth levels (Alice workings). The ore exposed at that time was high grade and assayed from 6 to 12% copper. The Alice Shaft went down on the Alice Vein. It was 3 feet wide at the top and had widened out to 11 feet at the bottom of the shaft at 350-foot depth."

Vol. III of Copper Handbook, 1903 states, "Vein is 3' to 11' in width and gaining in width at bottom of Alice Shaft. Smelter returns for 1902 gave an average of 10% copper. 200 feet of drifting east from the Pratt Tunnel should hit the Alice Vein about 150 feet lower than the bottom of the Alice Shaft."

John C. Devine said in the old report, "The work done on the east side of the Alice Shaft on the lowest level cut a porphyry fault running somewhat across the general trend of formations and it is this fault that produced some very high grade ore and appeared to be making downward with increasing strength. It would require driving the Pratt Tunnel five or six hundred feet east in order to cut this ore, and considering the pitch of the ore body, a stoping backing of about 400 feet would result from this development." This fault was probably the south end of the Climax Fault mentioned in next paragraph.

Devine further reports with reference to the Climax Fault: "The prominent features of this fault are its strength and regularity, traceable on its surface as it is for a distance of more than 2,000 feet. Copper values are to be seen along the fault at several points where surface work has been done." I walked the length of this fault with a geologist and picked up a lump of chrysocolla copper ore from the surface that assayed 36% copper.

The 1905 Copper Handbook (Vol. V) states, "The Buckeye winze is said to show a 25-foot vein of malachite, giving smelter returns of 6 to 10% copper." My claims run right up to the edge of the Buckeye dump. The Pratt Tunnel could be extended to reach this copper ore.

These old reports and maps have proven fairly accurate as far as I have been able to tell. Any minor discrepancies appear to be personal differences by the 4 men reporting rather than any intention to deceive. John Devine (now deceased) had an outstanding reputation among mining men in his time according to my investigations. If you consider the enormous fluctuations in copper prices in those years (a drop of 31% in 1902, for example) you can understand why copper mining operations might have stopped in this relatively remote area and in later years new mines were opened in easy-to-get-to places. Today, however, the economics of mining this property are excellent. It is only 2-1/2 miles at a raise of approx. 1,000 feet from the railroad, excellent highway, and the Gila River to the adit of the Pratt Tunnel. This road could easily be built today, whereas, in the old days such road building was not even considered. This property lends itself well to block-caving, or it could be open pitted if enough copper ore were blocked out to justify it. This is the best copper ore in the world to process as it is very high in silica. The silica in places runs as high as 95%. There is a trace of gold and silver in the ore. In some places the gold should be a worthwhile by-product. Another extremely valuable factor is the fact that this copper property is within spitting distance of 7 copper smelters and only a half hour by rail to the new copper refinery that Newmont is planning to build at San Manuel (Magma Copper). This property is in the very heart of Arizona's "Copper Porkchop".

The way the faults and beds are making nearly straight down into the earth they could very well go down for a mile as the ore did at the Magma mine at Superior, nearby. After nearly 50 years, Magma at Superior is still taking out extremely high-grade copper ore from a depth of 5,000 feet. When they started down on a vein they didn't look as good as the Alice Mine looks today. Yet they have sold over a billion dollars' worth of copper.

Several firms attempted to reach the Alice bodies during World Wars I and II but gave up when they ran out of money and the copper price took a sharp drop. The Government engineers thought enough of this property to give an R.F.C. loan during World War II, but the first ore body was never reached.

This mine can be put into operation quickly and profitably. Some of the ore blocking could be done by drifting on high grade ore. There would be no need to block all the ore before starting to mine. Millions of dollars' worth of ore could go right out the Pratt Tunnel while the over-all blocking program was being carried out. Another tunnel could be driven later to the bottom of the ore simply by starting further down the mountainside, which will be closer to the Gila River, the railroad, and the highway. Ore can be removed from the side of the mountain by a stripping operation. Large tonnage may be blocked out by relatively inexpensive tunnel drilling and drifting.

Because President Johnson virtually depleted nearly all of our copper stockpile, any military emergency could put this country into an extremely critical short position on copper, despite expected production increases in the immediate future. As our population explodes, the demand for copper increases.

Copper ore bodies are almost impossible to find in Arizona any more. Numerous companies have had top-notch geologists and engineers working for years and spending hundreds of thousands of dollars on drilling (mostly in the most unlikely places) only to finally pack up their tents and silently steal away. They would have been miles ahead if they hadn't been so independent and had put their time and effort on a property that had such a proven copper history as the Alice Mine and surrounding claims and the Climax Fault.

Furthermore Russia is working overtime to place Communist regimes in copper-producing countries in Africa and South America, as well as building the world's largest submarine fleet to cut off American imports. In future years the United States won't be able to produce one-half as much copper as she consumes, because our mines will be petering out rapidly because of the huge tonnages of ore being milled daily. Here in Arizona some of our open pit copper mines are hauling out over 50,000 tons of ore per <u>day</u>, to get from 10 to 15 pounds of copper per ton of ore. As Unions force mining, milling, and smelting costs up, much of the "reserve" ore here that is marginal now will become unworkable and will remain waste rock forever. So when certain mining companies claim they have reserves for a certain number of years, they are not reckoning with over-population, inflation, and the "Unthinkable War".

This property is perhaps the only one in Arizona where a relatively small investment might result in a billion-dollar bonanza, and where you could start producing quickly enough to cash in on the current shortage of copper and record high price.

ng a copper mine or pit out of this property, please have
you as soon as possible. I will show him the property
I can. I can also show him additional maps, data, etc.
n open until all parties have made preliminary examina-
tive proposals. I am seeking a fair and quitable propo-
No promoters will be included.

Very sincerely yours,

Jim Gaylor

James E. Gaylor
President of Universal Copper Co.

30 So. Main St.
P. O. Box 1889

JACOBS ASSAY OFFICE

REGISTERED ASSAYERS

Phone 2-0813

DUPLICATE

Tucson, Arizona, April 4th, 1958

Certificate No. 33452

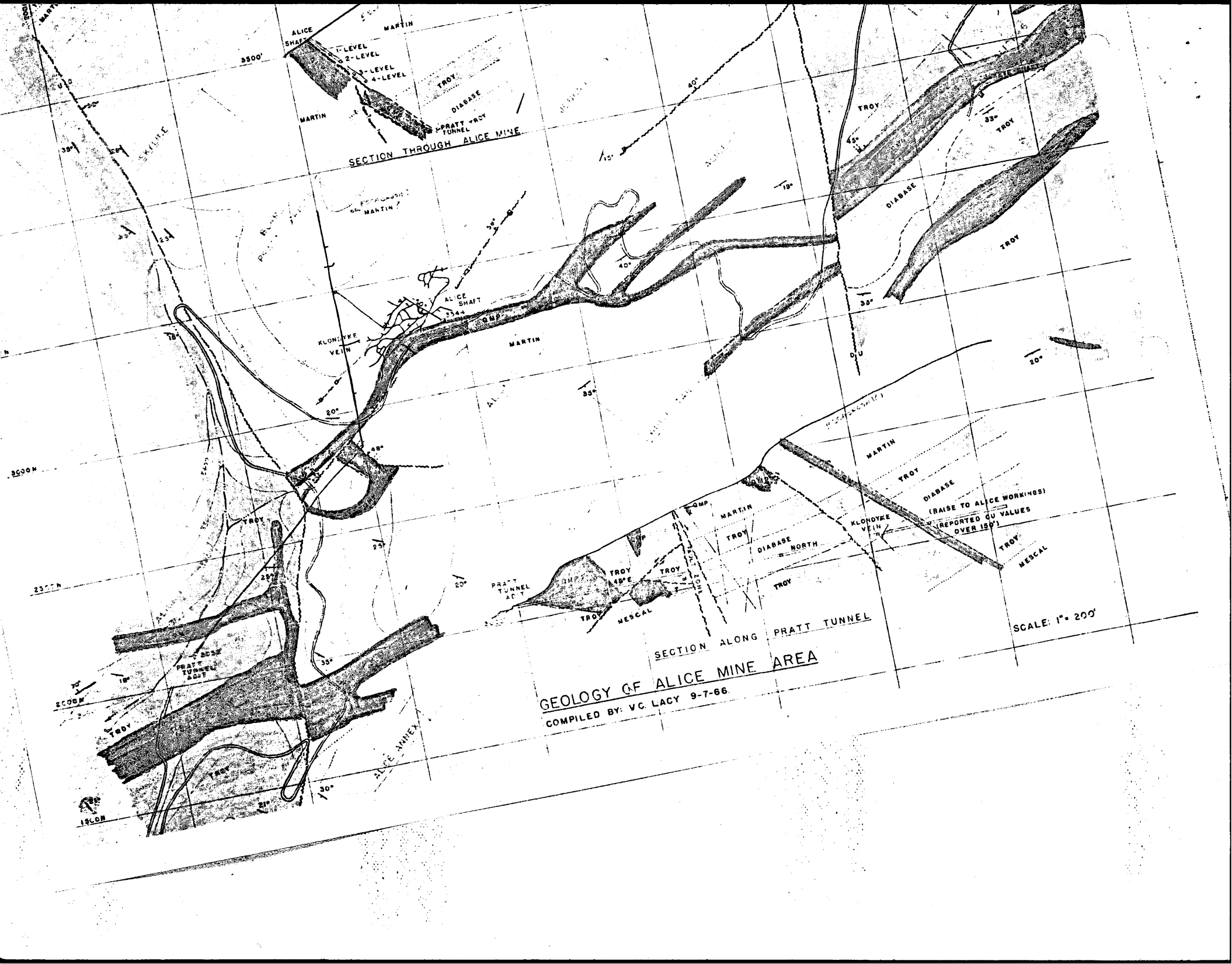
Sample Submitted by Mr. Universal Ryan Co

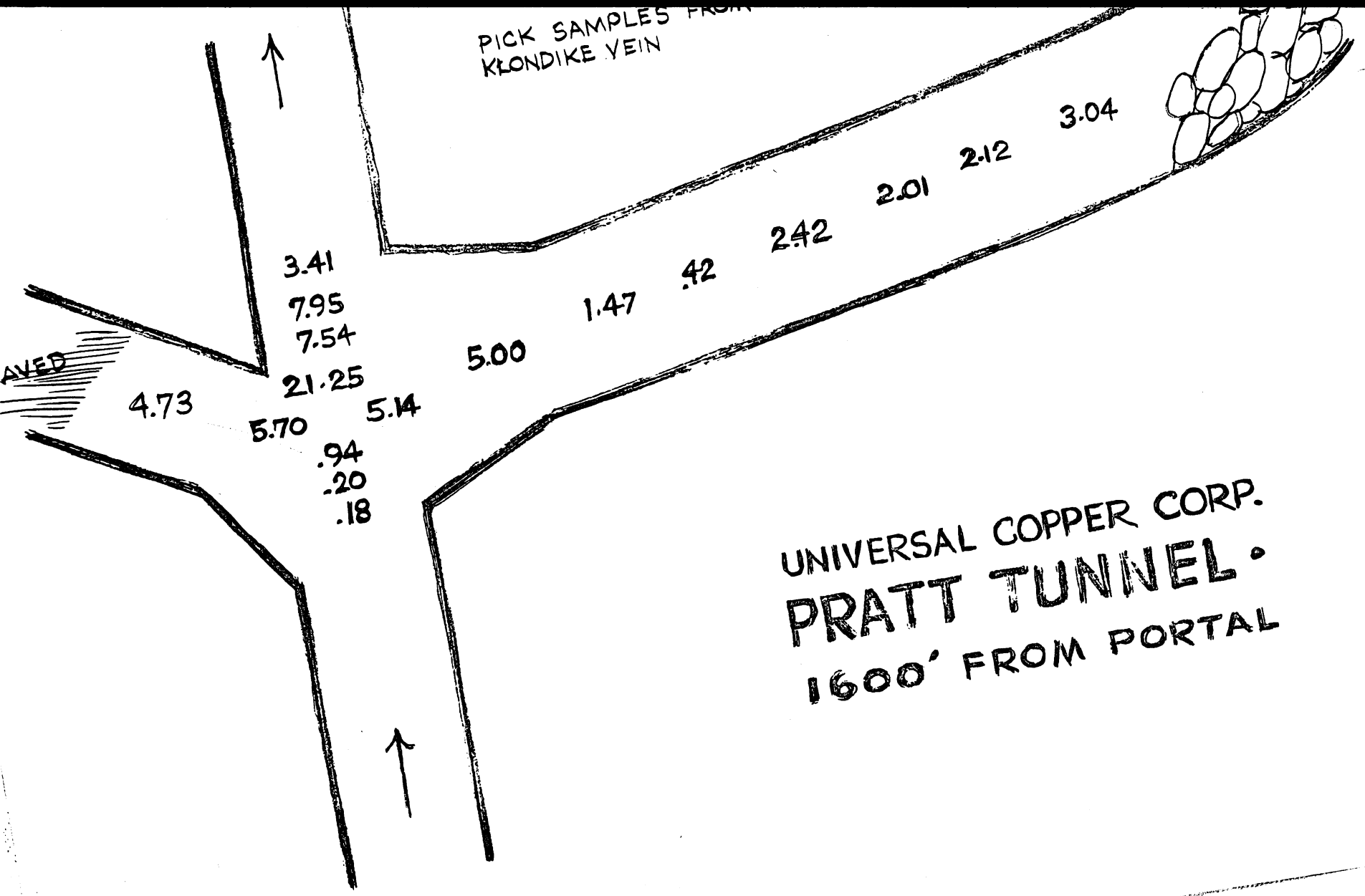
SERIAL	SAMPLE MARKED	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per cent Wet Assay
			$				
156231	0				304		
32	1				212		
33	2				201		
34	3				2.42		
35	4				0.42		
36	5				1.47		
37	6				3.00		
38	7				3.14		
39	8				3.70		
40	9				4.13		
41	10				0.18		
42	2				0.20		
43	3				0.14		
44	4				21.25		
45	5				7.04		
46	6				7.45		
47	7				3.41		

Very respectfully, Jacobs

* Gold Figured $35.00 per oz. Troy

Charges $ 25.50


SECTION THROUGH ALICE MINE
ALICE SHAFT
1-LEVEL
2-LEVEL
3-LEVEL
4-LEVEL
MARTIN
TROY
DIABASE
PRATT TROY TUNNEL
SECTION ALONG PRATT TUNNEL
PRATT TUNNEL ADIT
ALICE SHAFT
KLONDYKE VEIN
MESCAL
(RAISE TO ALICE WORKINGS)
(REPORTED Cu VALUES OVER 150')
SCALE: 1" = 200'
GEOLOGY OF ALICE MINE AREA
COMPILED BY: V.C. LACY 9-7-66.


PICK SAMPLES FROM
KLONDIKE VEIN
3.04
2.12
2.01
2.42
.42
1.47
5.00
3.41
7.95
7.54
21.25
5.14
4.73
5.70
.94
.20
.18
AVED
UNIVERSAL COPPER CORP.
PRATT TUNNEL.
1600' FROM PORTAL

TROY-ARIZONA COPPER COMPANY

ENGINEERS

The following well known engineers have been employed to examine the property:

LEO VON ROSENBERG

Mr. Von Rosenberg was on the property at various times from 1912 to 1916, studying its geology, securing and adding desirable claims and sinking test shafts.

ROY G. MEAD

Mr. Mead was employed from 1912 to 1916 by the Department of the Interior as Mineral Examiner of the General Land Office. This work took him all over California and Arizona and enabled him to study the geology and various classes of mining and development work in these states. He has passed upon the holdings of many of the important companies operating in Arizona and has done much work in the mineral belt in which Troy is located.

G. G. WALD

At the time Mr. Wald made his examination of the property he was in the employ, as engineer, of the Ray Consolidated Copper Company located about five and one half miles from Troy, and consequently thoroughly understood this territory.

JOHN C. DEVINE

Mr. Devine was employed by the Ray Consolidated Copper Company for a period of ten years. About 1916, at which time he was Assistant Superintendent at the Ray Mines, he voluntarily resigned and has given his personal attention to our property. He has done a large amount of shaft and tunnel work at the mine and consequently is the best informed man about the underground conditions there.

EXTRACTS FROM ENGINEERS' REPORTS

GEOLOGY

LEO VON ROSENBERG:

"The geology of the area in which the property of the Troy-Arizona Copper Company is situated, is more or less complex. Briefly stated, the rocks of the locality are granite, granodiorite, diabase, porphyry, limestone, quartzite, schist and conglomerates. The diabase, granite, granodiorite and the porphyry, occur as intrusions. The porphyry occurs mainly in the form of a very strong and persistent dikes, cutting through the granite, diabase, etc. Very probably the diabase was the first intrusion into the sedimentary rocks (sandstone, limestone, etc.,) when they were still in the horizontal position. The intrusion of the diabase was followed by the intrusion of the granite rocks, which caused the displacement of the diabase and further tilting of the sedimentary rocks. Then occurred the intrusion of the porphyry, followed by the ore deposition. It might be stated that the intrusions of the porphyry are closely related to the ore deposition although the diabase may also have been a mineralizing agency. At various times the whole area was subject to much faulting and shattering.

The porphyry dykes are from a few to fifty feet in thickness, and in some cases are much thicker. They have a general northeasterly and southwesterly strike; in the eastern portion of the property, they assume a more easterly and westerly course. The dip of most of the dykes is rather steep. The ore occurs along the fault fissures in the granite and diabase (usually along or near the porphyry dykes) and also in the fractures of the sedimentary rocks, and along the bedding planes of the same. The mineralogical character of the ore is virtually the same as that of the ores produced in the various mines at Globe, Cananea, Clifton, etc.

The ores consist of carbonates of copper and of the various copper and iron oxides and sulphides. The predominating gangue is quartz. Generally stated, the ore bodies carrying oxides occur mainly on the contact of the different sedimentary rocks, also on the contact of the sedimentary rocks and porphyry and diabase.

The sulphide ores will be found mainly in veins occurring in granite rocks, and in the porphyry and diabase. However, secondary copper ores may also be found in the veins associated with the intrusive rocks, especially in the upper portions of these veins."

GEOLOGY: East Group of Claims

ROY G. MEAD:

"Briefly stated, the geological formation underlying the group in question, consists of a basal granite exposed over the northern and eastern part, which is overlain in the south by sedimentary series consisting of quartzite and limestone which is traversed in an easterly direction by diabase and porphyry dikes. There has been considerable faulting and displacement of the sedimentary beds, which renders the geological structure more or less complex. However, the pronounced faulting offers a very favorable condition for ore deposition.

Two mineralizing dikes traverse the area in an easterly direction; one a diabase dike averaging one hundred feet in width, lying between the granite and limestone; the other a porphyry dyke averaging two hundred feet in width, lying between the quartzite on the south and the limestone on the north, along which is exposed the Rattler vein. The porphyry dyke caused a faulting of the sedimentary beds, resulting in a drop or displacement of several hundred feet on the north side, and the present position of the limestone which is apparently below and underlying the quartzite.

The porphyry dyke, in my opinion, the source of the mineralization in the limestone designated as the Queen vein, as well as the source of the mineralization in the Rattler vein. Owing to the fact that the limestone is a soluble rock, it offered a favorable condition for the deposition of copper and iron from the mineralized solutions coming from the porphyry dyke, and there resulted there from the Queen vein. As the mineralization extended upward from the dyke, it follows that it became weaker the farther it got from the porphyry dyke, consequently, the richer ore bodies are to be expected near the dyke, which fact is being proven by the work now being carried on in the Rattler workings; the deeper work now showing an ore with a higher copper content and less magnetite than the ores found nearer the surface. While large bodies of secondary sulphide ore are to be expected in the limestone beds, the future of the property as a steady producer of copper, depends upon the development of the primary sulphide ores which will no doubt be found below the limestone in the Rattler vein and in the porphyry dyke. In view of the extensive body of secondary ores in the limestone, the source of which is from the porphyry dyke, there is every reason to believe that the primary ores will be very extensive and of a commercial grade.

The diabase dyke lying between the limestone and the granite is of later origin than the porphyry dyke, and no doubt was intruded after the faulting of the sedimentary rocks. This dyke has had very little mineralizing effect upon the adjacent limestone. The dyke is, however, very much altered near the surface, showing indications of being mineralized below the surface, and it is quite probable that if explored with depth that it will be found to contain primary ores. The old Sisson shaft was sunk on the contact of the diabase and limestone, and it is reported that low grade sulphide ores were encountered in the bottom of the shaft."

GEOLOGY: West Group of Claims.

ROY G. MEAD:

"The geologic formation underlying the area embraced by the west end group is more or less complex owing to extensive faulting and displacement, caused by the numerous

eruptive dykes which traverse the area. Briefly stated, the formation consists of a basal granite and diabase overlain by a sedimentary series consisting of quartzite, limestone, schist and conglomerate. The diabase occurred in the form in intrusions, and displaced the sedimentary beds. After the intrusion of the diabase the formation was subjected to movement and displacement by faults followed by later intrusions of porphyry in the form of strong persistent dykes cutting the granite, diabase and sedimentary beds. The ore disposition followed the intrusion of the porphyry dykes and its source is traceable to the primary mineralization which came up with the porphyry dykes.

There are no less than twelve porphyry dikes traversing the group, all of which have had an important bearing on the mineralization of the area and with exploration at depth will be found to contain primary copper sulphides in sufficient quantity to be commercial ore under the present modern methods of mining and ore reduction.

The dikes vary from fifty to one hundred feet in width, and in many cases are considerably wider. They are, with few exceptions, nearly vertical and traverse the property in a general northeasterly and southwesterly direction. The secondary surface ore bodies occur along the contact of the porphyry and limestone, and are known as contact ore bodies when occurring near the porphyry dikes, and replacements ore bodies when occurring in the limestone.

The surface showings and conditions on the property are quite similar to those on some of the principal copper mines of Arizona, such as Magma Mine, Old Dominion and Copper Queen, where rich surface carbonate ores were found in limestone and other sedimentary rocks, the source of which was traceable to primary sulphide ores occurring at depth in porphyry and diabase dikes."

GEOLOGY:

G. G. WALD:

"The country rocks are quartzite, limestone, diabase, porphyry and granite. The overlying sedimentary formations have been shattered, faulted and tilted by the intrusion of the porphyry and later of the diabase. These eruptive rocks were intruded, in places, into the bedding places of the sedimentaries, and also followed up planes of weakness developed at angles to the bedding planes. These fissures and dikes strike generally in the northeast to southwest direction. There is one marked exception to this general rule, the Climax fault, N 10 degrees E, and dips 60-65 degrees to the NW, cutting the numerous NE-SW faults at angles varying from 45 to 60 degrees. The Climax fault is a strong fissure; on the Climax No. 3 a width of 30 feet between well defined walls was measured. Just north of here the fault swings around into the northwest and widens out. The space between the walls is filled with crushed drag from the quartzite and lime beds it cuts, and both porphyry and diabase have been intruded into the fault. On the surface it is strongly iron stained, and at many places it shows stains and stringers of copper carbonate. At the point at which the shaft is located, the fault material is especially leached and koalinized; further to the north the outcrop is more siliceous.

The fissures and faulting of the sedimentary formations by the intrusion of the igneous rocks has created an ideal condition for the deposition of minerals from mineral bearing solutions. The values consist of carbonates and silicates of copper, and chalcopyrite and chalcocite, the sulphides of copper. As far as developed, this mineralization has been found to consist of replacement ore bodies in the sedimentary beds adjacent to faults of intrusive dikes and of contact ore bodies between igneous rocks or between an igneous rock and the sedimentary deposits. The ores were deposited from vapors and mineral bearing water accompanying and emanating from the igneous intrusions. In this section the porphyry and diabase are both mineral carriers and mineralizing agents. Note the Magma mine, where the ore body is associated with porphyry dike intruded into a fault fissure cutting the sedimentary beds. The diabase is not as favorable for ore deposition, but at Globe and Ray, sulphide and oxide ores have been found in the diabase, usually as a contact.

Development to date, has disclosed several mineralized areas almost exclusively on the NE-SW veins and faults. The Buckeye, Alice and Rattler-Sisson workings are examples of this ore occurrence. Although considerable ore was shipped and smelted, the ore bodies were of low grade and of limited extent.

Pratt Tunnel; On the Pratt tunnel dump, a pure crystalline quartzite, with disseminated values in chalcocite, was found. The tunnel is now inaccessible, and no assay maps are available, at the mine. The map shows that two beds of the brecciated quartzite were cross-cut near the end of the tunnel; the first, 30 feet wide, was drifted on for 120 feet, and the second, 260 feet wide, was drifted on for 80 feet. It is reported that this quartzite ran 2% copper; and the fact that the drifts were driven on the quartzite, and at no other part of the tunnel, indicates that encouraging values were encountered. However, at that time ore of 2% copper content had no commercial value. This quartzite ore could be cheaply milled, and as it will have a high ratio of concentration, would be pay ore today, if a sufficient tonnage was developed. A sample taken of this quartzite on the surface of the dump ran trace copper; a second, taken below the surface, where values had been concentrated by surface waters since the rock was mined, ran 5.1% copper. These samples merely show that there is copper in the quartzite. If the old assay maps or data are extant and show the copper values reported, it would pay to open up the Pratt tunnel, as there is a possibility here of developing a considerable tonnage of low grade ore."

GEOLOGY:

JOHN C. DEVINE:

"The formation consists of limestone, quartzite, granite, diabase, and porphyry. The latter eruptives occur in the form of intrusions, having caused minor displacements in some instances of the overlying sedimentaries. These displacements are usually marked by distinct brecciation, and ore deposits of varying degree of importance are in evidence along these lines of faulting.

Massive outcrops of iron gossan mark the proximity of the mineralized portions on the western half of the property, and on the eastern half, large bodies of magnetic iron are found closely defining the mineral zone."

DEVELOPMENT:

LEO VON ROSENBERG:

"The development done by the former company, consisting of several shafts, a number of levels, tunnels, etc., was largely ill-advised. It is of no particular importance, and probably will be of little use in future operations.

A new plan of development has been inaugurated. Recently a new shaft was started in Climax 2 claim, situated on the south slope of Climax Hill. This shaft has reached a depth of 80 feet. It is in the meta-diabase. The territory embraced in the south slope of Climax Hill shows prominent croppings of hematite. Judging from these surface showings, and from the openings already made, it is reasonable to expect that by further development, large bodies of valuable copper ore will be opened up, in this part of Climax Hill. It is reported that a considerable amount of very rich ore was taken from the shallow workings of Climax 3 claim, and also from the Copper Glance claim. Assays of a number of samples taken from the various openings on Climax Hill showed good copper values.

A new shaft was started on the California claim, situated on the east slope of Climax Hill. This shaft is now 100 feet deep. It is a meta-diabase. In the bottom, the material is heavily mineralized, showing iron pyrite. The shaft should be sunk about 200 feet deeper, cross cuts should then be run about 500 feet northwesterly and about 200 feet southerly. Judging from the surface indications, consisting of heavy gossan (hematite and limonite) about six veins should be intersected by these cross cuts. It is reasonable to assume that some of these veins will be found to carry workable copper ore in quantities.

When the veins have been opened up, levels should then be run on them in a southwesterly direction; ultimately these levels should be connected by cross cuts with the new Climax 2 shaft.

It is reasonable to expect that with the development recommended, a large copper mine will be opened up in Climax Hill."

THE RATTLER MINE:

"The vein of the Rattler is reached by a short tunnel driven in a southerly direction, mainly through diabase and lime. The vein is intersected at a point 150 feet from the mouth. The workings consist of various drifts and a number of large, irregular chambers from which ore has been extracted. The vein is exposed in most of the workings. It lies at an angle of about 20 degrees, dipping to the south. The thickness of the vein varies from 2 to 8 feet. The ore is magnetite. There are a number of faults or slips. Apparently several veins course through the Rattler claim.

According to the assays of a number of samples taken from the ore exposures, the ore carries from 2 to 9% copper; 30% silica; 4% sulphur; 32% iron oxide; 10% magnesia; some alumina and a small amount of lime. The returns of ore shipped in quantity several years ago to the Humboldt Smelter, near Prescott, Arizona, show the average as follows:

Copper 3.55%; Silica 30%; Iron 24%; Lime 0.5%; Sulphur 3.8%

Thirty-two tons of sorted ore shipped as a test, in January 1914, to the smelter of the American Smelting and Refining Company at Hayden, Arizona, contained:

Copper 5.22%; Iron 30.8%; insolubles 19.2%.

The gold and silver contents of the ore amount to about $1.50 a ton.

The indications are that even with a comparatively moderate amount of development work, a considerable tonnage of this class of ore could be made available. The workings of the old Sisson mine, the shaft of which is about 400 feet west of the Rattler mine, are now inaccessible below the first level. On this level at the shaft, a very strong vein of red hematite is exposed. The surface showing in the eastern part of the Copper Reef claim adjoining the Rattler claim on its west end line, is exceedingly favorable. The cropping of rich ore should be followed by an incline. With a moderate amount of prospect work, very likely quite a tonnage of rich ore could be extracted. The vein exposed by the croppings is no doubt a continuation of one of the Rattler veins.

It is reported that very good sulphide ore was encountered in the lower Sisson mine workings. This class of ore, mixed with copper bearing magnetite would made a good smelting product.

The development proposed might be supplemented by diamond core drilling."

DEVELOPMENT: (West group of claims)

ROY G. MEAD:

"The Alice vein traverses the Dime, Alice and Maggie claims, and is a contact vein having a limestone hanging wall and a granite porphyry dike for a footwall. The general strike of the vein is about north 60 degrees east, and the dip about 45% to the northwest. The vein filling is iron oxide accompanied with copper carbonate ores and altered porphyry. This vein has been explored to a depth of about 350 feet by means of the Alice incline shaft and the Pratt tunnel, and a large tonnage of carbonate ores extracted, which had a copper content in excess of 10%. The development work on this vein, while quite extensive work, was done for the purpose of extracting the carbonate ores, and not with the view of developing the primary ore bodies; therefore, sufficient depth has not been attained to reach the primary ores.

In the Pratt tunnel, which reached a distance of 2300 feet, sulphide ore in shattered quartzite was encountered at a distance of about 1600 feet from the portal and at a vertical depth of about 500 feet. The mineralization consists of fine particles of copper sulphide and native copper extending over 50 feet in width near the granite porphyry dike, the average copper content being 2.5%. This mineralization is undoubtedly the Alice vein exposed at a depth below the limestone, and the mineralization in the quartzite is traceable to the granite porphyry dike. The fact that the values are in the quartzite is conclusive evidence that further depth is required in order to reach the primary sulphide ores. The ore developed in the tunnel, is, however, at the present time, commercial ore, although when the tunnel was driven several years ago, it was considered too low grade, as at that time, the possibility of mining low grade ores was not an established fact.

The Alice shaft follows the vein filling between the limestone and porphyry and the ore deposits encountered are typical of the secondary ores worked in the early days by the principal copper mines which are today getting their output from primary sulphides in porphyry. There is no record of the tonnage of carbonate ores obtained from the workings, and the shaft is now inaccessible. A map compiled by the writer several years ago when the ore body was exposed is a geological section of the ore exposure of the shaft of the third and fourth levels. The ore exposed at that time was high grade and assayed from 6 to 12%.

The fact that the mineralization near the surface in the limestone is so pronounced, together with the fact that there is a large area of mineralization in the quartzite, now commercial ore, exposed in the deeper workings, is conclusive evidence that the porphyry will be found to contain workable deposits of primary sulphide ores when developed below the leached zone. The surface showing, together with past developmental work, warrants systematic exploration, which in my opinion will lead to the development of a large copper producing mine."

DEVELOPMENT:

JOHN C. DEVINE:

"For convenience in the discussion of the development I shall divide the property into two groups, viz; the East and West end.

Taking up the east end of the group, the Rattler vein is found traversing the group and prominently outcropping for a distance of several thousand feet. Deposits of low grade ore are in evidence at several points along the outcrop, and on the Rattler claim, whereat most of the development has centered, a large body of magnetite has been opened that carries copper values ranging from 2% to as high as 5%.

Considerable ore has been shipped from this deposit and more is available for shipment at this time.

The vein of magnetite lies on a diabase footwall and beneath an altered limestone hanging wall, the values below the oxidized zone consisting of finely divided particles chalcopyrite and bornite very evenly disseminated throughout the entire mass.

The development as it stands today has exposed considerable ore of milling grade and some more that could be shipped at a profit.

Continued development to the west closely following the ore strata would undoubtedly open an extensive body of commercial ore.

The ore now developed in this end of the property and probable ore that can be readily added to the reserves by following the ore on the second level of the vertical shaft, places this property in the position wherein immediate shipments can be started.

Thousands of tons of low grade milling ore in the mine and stockpiled on the surface offer immediate opportunity for the first unit of a reduction plant, and it can therefore be stated that this end of the property has passed beyond the prospective stage of development, and with little expense it could be placed in the producing class. Proper experiments should be made in order to determine the best and most efficient process of recovering the copper values from these low grade ores. In view of the high percentage of iron or magnetite contained in the ore, the writer believes that separation by magnetic attraction, will give satisfactory results. If flotation seems necessary, this unit could easily be added afterward.

Taking up the west end of the property which embraces all of the area west of the camp, we find the development well advanced, and with comparatively little further development this end of the property could also be made to produce ore, the volume of which would depend entirely on the magnitude of operations.

Traveling west from the camp we come first to the Climax shaft which is equipped with a hoist and compressor and has reached a total depth of 500 feet vertically. This shaft was designed to explore what is known as the Climax fault, an intrusion of porphyry 40 to 50 feet in width, carrying copper values in the oxidized zone in the form of carbonates, and evidencing a very much leached condition and indicating that when the primary zone is reached, high grade copper should be found in quantity.

The prominent features of this fault are its strength and regularity, traceable on its surface as it is for a distance of more than 2000 feet. Copper values are to be seen along the fault at several points where surface work has been done.

The shaft was started in the porphyry but left it within the first 100 feet, the porphyry having pitched sharply to the west. At the 500 foot level a cross cut was started to cut the porphyry, but this work never reached the contact due to the suspension of operations. It is estimated that 150 feet of drifting will cut the vein. This work should be completed and the shaft should be sunk 225 feet deeper and a drift started to the west with the ultimate purpose of exploring the very favorable ground lying between the Climax shaft and the Alice mine.

The approximate cost of finishing the development at this point as indicated would be about $20,000.00 and the work could be accomplished in three to four months after the shaft was unwatered.

The next development of importance on the west end of the property is centered on the Alice and adjoining ground, and is very extensive. However, due to a long period of idleness considerable of this work is inaccessible at this time. Much ore has been mined from this part of the property, mostly high grade copper, and in the writer's opinion, will be the inevitable result of intelligent development through the Pratt tunnel on the west end.

The Pratt tunnel which was driven a distance of about 2000 feet some years ago, has opened up some ore in two different places. The elevation of this tunnel is about 250 feet deeper than the Climax or Alice shaft, and just brings the development to the primary zone where both primary and secondary sulphides are in evidence quite abundantly. The tunnel cut two distinct ore veins, one known as the Klondike vein measuring four feet in width and averaging about 2% copper. Very little work was done on this vein due to the low tenor of the ore which was not considered at that time commercial. The evolution of metallurgical processes however has demonstrated that low grade ores can be made profitable by applying the modern methods of concentration and flotation.

A second area of low grade sulphides was encountered at 400 feet east of the Klondike vein and this was cross cut a total width of 150 feet. The ore here was not developed to any extent either, due to the above reasons. In both instances the ore occurs in a much shattered and brecciated quartz formation, and a fine separation of the values could be obtained by concentration with a very high ratio of recovery.

This part of the property offers a better opportunity than any other for the opening up of a mine of large proportions, and there is no doubt in my mind that any development extended to the east from this tunnel following the present low grade ore, will from time to time encounter deposits of high grade ore, the existence of which was fairly well determined by the work done from the Alice shaft.

The work done on the east side of the Alice shaft on the lowest level cut a porphyry fault running somewhat across the general trend of formations, and it is this fault that produced some very high grade ore and appeared to be making downward with increasing strength. It would require driving the Pratt tunnel five or six hundred feet east in order to cut this ore, and considering the pitch of the orebody, a stopping backing of about 400 feet would result from this development. An approximate estimate of the cost of reopening the Pratt tunnel and driving east to the ore above mentioned would be about seven months."

ECONOMIC CONDITIONS:

JOHN C. DEVINE:

"The property is so situated with relation to the railroad that transportation facilities should be ideal. The embarking point could be located at Erman Siding, one and one-half miles east of Ray Junction and thus reduce the distance from the railroad to the mines, to five miles. Cheap transportation could be obtained by the use of motor trucks and trailers.

It has been suggested in this connection than an aerial tramway might be considered to deliver supplies to the portal of the Pratt tunnel and transport ore from this end of the property to the railroad. The project is entirely feasible and the distance would be reduced to three and one half miles all down grade to the railroad.

The proximity of the Hayden Smelting plant, a unit of the American Smelting and Refining Company's string of smelters, which lies about fifteen miles east of the property is an economic factor of more than ordinary value. The short railroad haul together with the efficient method of transporting ores and concentrates that could be developed, would contribute largely to the profitable marketing of the low grade ores now available on the property, which have been heretofore not considered commercial, due to inadequate transportation facilities."

CONCLUSIONS:

LEO VON ROSENBERG:

"It is reasonable to expect that with development recommended, the existence of large quantities of workable ore will be demonstrated.

Altogether, the future of the property is very bright. It must be borne in mind that the condition of a number of copper properties, which are now large producers, was at one time not at all as encouraging as is the present showing at the Troy mines.

The Troy-Arizona copper property forms a very attractive mining proposition, which with proper development, has every premise of becoming one of the great copper producers of Arizona.

A few weeks ago I visited the property for the third time. After another examination of the property, I am still more convinced of its great possibilities. There can be developed at least three if not more, great copper mines. One or two great mines will be opened up by the development proposed on Climax Hill. The Copper Glance itself will become a great mine. The showing on Climax Hill is most promising, and it is surprising that this part of the property has been so long neglected. The claims southwest of the Tiger can also be expected to contain workable ore bodies.

I am convinced that by the development proposed to be done on the Manhattan group, large and profitable ore bodies will be opened.

I will not go into details, but I will state that I am much impressed with the great possibilities which the property possesses and I urge that drilling and other development recommended in my report of last year, be begun as soon as possible. With an expenditure of from 100,000 to 150,000 dollars several great copper mines will be opened up on the property."

CONCLUSIONS: East group of claims

ROY G. MEAD:
"In my opinion, the future of the property is very bright, and with well directed development work, large bodies of secondary sulphide ores will be developed in the limestone, which in itself will make the property a very large producer of copper. In addition extensive bodies of primary sulphide ores will be developed by exploring the porphyry dike and the Rattler vein at a sufficient depth below the surface."

CONCLUSIONS: West group of claims

ROY G. MEAD:
"All of the previous development work on the property was done with the end in view of obtaining carbonate ores. This was a time when ore carrying less than 7% copper was considered unprofitable to extract, and before the time of working low grade primary sulphide ores. The history of the property is quite similar to numerous other properties in Arizona, all of which are on a steady producing basis, drawing their output from the primary sulphides encountered in the deep-seated eruptive dikes. With the favorable surface showing on this property and its similarity to the other prominent copper properties in Arizona, I feel justified in my opinion that proper development work will result in a large producing copper mine."

CONCLUSIONS:

G. G. WALD:
"The property lies in the mineral belt of the South West, and surface indications and geological conditions are favorable for the mineralization of the Climax vein, especially at its intersection with the various NE to SW cross faults. The fact that the faults intersect at acute angles is a favorable condition as the zone of shattering is larger than if they cut at right angles. These shattering zones, and also the limestone beds, are most likely to contain ore bodies.

The leached zone will be found to be comparatively shallow and the highest grade ore will be found at the water level at the point of transition from oxidized to sulphide ores.

Revenue could doubtless be derived, and cheap development obtained, by letting leases on the carbonate ores exposed on surface and old workings."

CONCLUSIONS:

JOHN C. DEVINE:
"In conclusion it is to be noted that with the expenditure of an amount somewhat less than $100,000.00 on the east and west end of the property combined, the proposition will be converted into a steady producer and in consequence ample justification for a more elaborate plan of operations will inevitably follow.

The limit or volume of ore that could be mined here once the property is properly opened up, should be very extensive, and judging from a comparison of the formations here with those of other large producers in the district, mining costs could be maintained as low or lower than those of any other property now producing on a large scale. Due to the possibility of considerable high grade ore running 10% or better being encountered on cross faults throughout the area, it can be stated beyond the adventure of a doubt, that commercially the property will average better than 5% on a very large scale of operation."

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HOT TAMALE PEAK QUADRANGLE
ARIZONA
7.5 MINUTE SERIES (TOPOGRAPHIC)

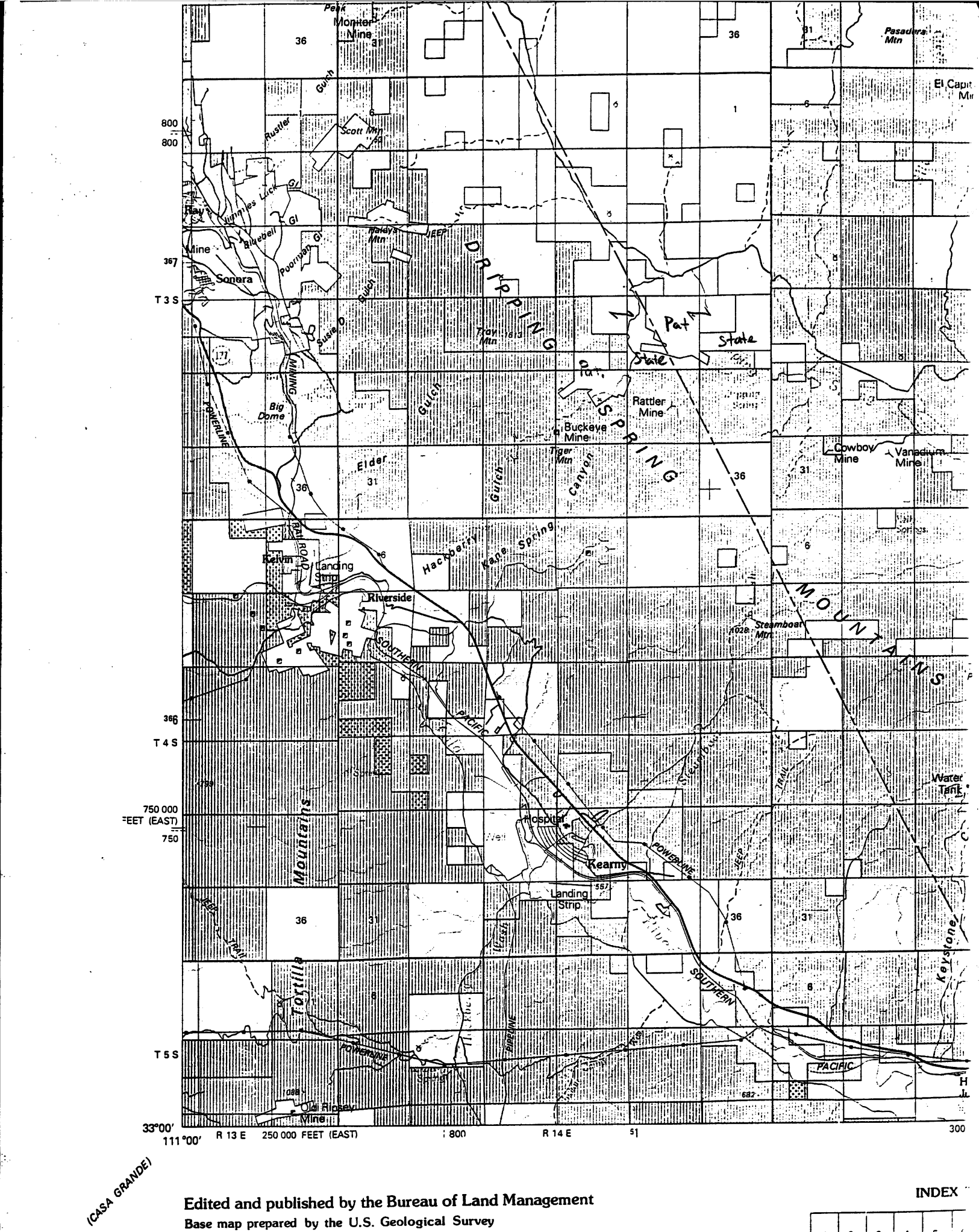
3750 I SE (SUPERIOR)
3850 IV SW (PINAL RANCH)
3850 IV NE (PINAL PEAK)
3750 II NE (TEAPOT MTN)
(EL CAPITAN MTN) 3850 III NE
111°00′
33°15′
250 000 FEET (EAST)
R. 13 E.
R. 14 E.
57′30″
55′
810 000 FEET (CENTRAL)
110°52′30″
12′30″
T. 2 S.
T. 3 S.
10′
810 000 FEET (EAST)
780 000 FEET (CENTRAL)
780 000 FEET (EAST)
Government Mtn
Tillmans Wash
Tillman Spring
Creek
Potters Wash
Mineral Creek
Devils Canyon
Hot Tamale Wash
Hot Tamale Peak
Cottonwood Spring
Laguna Spring
Mill Creek
Cedar Creek
Walnut
Walnut Spring
Canyon
GILA CO
PINAL CO
Indian Spring
Chimney Spring
Woodchopper Spring
Stone Cabin Spring
Stone Cabin Box Spring
Wash
BOUNDARY
Lookout Tank
Slash S Ranch
Stone Cabin Wash
Looney Spring
Dripping Spring Wash
Scott Mtn
Rustler Gulch
Lakel Flat
Calumet Gulch
Gulch
Ray (Site)
Jimmies Gulch
Bluebell Gulch
Haleys Mtn
Haley Spring
Ray Mine
Drill Hole
Cairo Hill
Water Tank
Poorman Gulch
Indian Spring
Sonora (Site)
Sonora Hill
Amanda
Substation
DRIPPING SPRING MOUNTAINS
Camp
Skunk
Ordy Tank
Troy Mountain
Twin Domes
Big Dome
Mineral Creek
Susie Gulch
Burro Spring
Gulch
Troy Ranch
JEEP TRAIL
Rattler Mine
Buckeye Mine
Canyon
Vanadium Springs
Elder
Hackberry
Kane Spring
Wooden Cross
Hagen Ranch
Well
PHOENIX 78 MI. SUPERIOR (U.S. 60 & 70) 13 MI.
6.9 MI. TO ARIZ. 77
3665000m. N.
33°07′30″

Tucson Map and Flag Center

HOT TAMALE PEAK 2-85

Renfro Group ↑

↓ Columbia Mine



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Compiled from USGS 1:24 000 and 1:62 500-scale topographic maps

dated 1945–1968 Planimetry revised from aerial photographs

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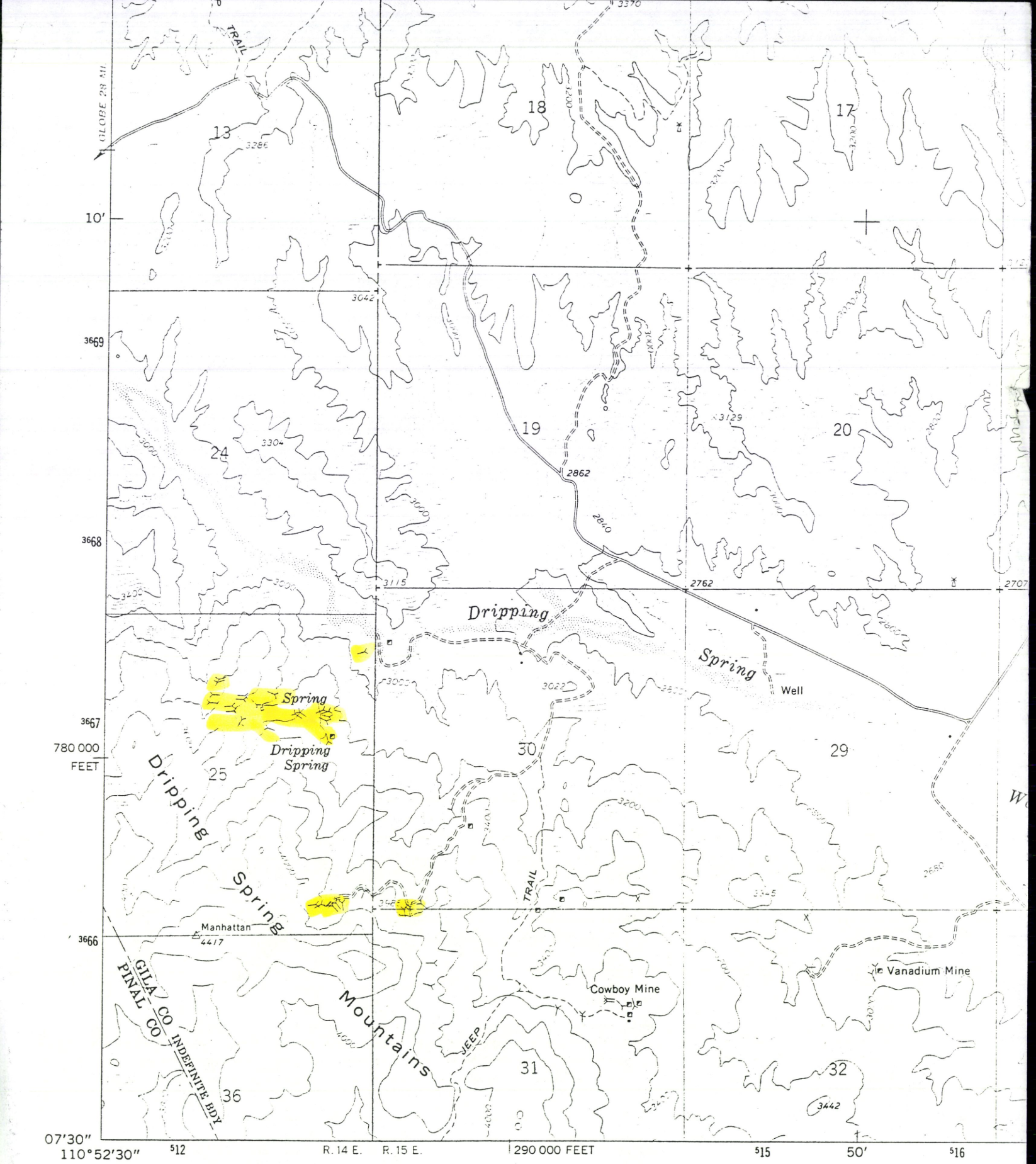
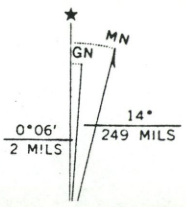


Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1962. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue



1
1000

outcrops of white gypsum filling joint cracks and extending beyond in masses of nearly pure gypsum. (See Pl. XII, *A*.) The mode of formation of these deposits and their relation, if any, to the bodies of disseminated pyrite near by are not known. There is plenty of sulphur, both as sulphide and as sulphate, deposited by hypogene solutions in neighboring ore bodies and calcium is widespread in the rocks of the region. The gypsum of these two deposits may have been precipitated from water of the vadose circulation that had derived its sulphate content from oxidizing sulphides, or from ascending solutions related to those which produced the ore bodies, or from an intermingling of such solutions and descending meteoric water.

CONTACT-METAMORPHIC DEPOSITS

The ore bodies described under the term contact-metamorphic deposits are replacement masses, largely in limestone, which owe their origin to emanations from near-by intrusive rocks. Most of them contain garnet and other characteristic contact-metamorphic minerals. In others such minerals were not found, but the deposits are otherwise so similar to the more typical contact-metamorphic deposits that it seems best to group them together. The deposits thus grouped include those of the Christmas mine, the London-Arizona properties, the Schneider group, and the Gold-Copper, Seventy-nine, Apex, and Columbia mines. The deposits of the Cowboy mine and the C. & B. and Premier prospects may also be related to this group. The deposits on the Scottish American Copper Co.'s property south of the London-Arizona claims are presumably similar, but this company was not operating at the time of visit and so far as could be learned had not done much development work. A large part are in the Tornado limestone, but there are also extensive replacement deposits in the Martin limestone, some in the Troy quartzite, and related deposits in the Mescal limestone and in diabase.

The deposits of this group show greater diversity than those previously described, partly because of original differences in the country rock and partly because of variations in the proportions of the minerals present. Some of the deposits are largely confined to certain limestone beds, others are of irregular outline, and still others are of veinlike form on shear zones. All these variations are due principally to differences in the effect of mineralization on different kinds of rock under what appear to be in other respects fundamentally similar conditions. Some of the deposits are mined for copper; others are mined for lead and silver, or for lead and gold. Parts of some deposits have been mined for the zinc contained, and oxidized portions of a few have been prospected for vanadium. All the deposits were formed by replacement, rather than by the

filling of open spaces, all lie near dikes or similar masses of quartz-mica diorite, and nearly all are known to contain typical contact-metamorphic silicate minerals. The evidence seems clear that most of the deposits on the properties mentioned above were formed by emanations that had their source in the quartz-mica diorite magma and that interacted with susceptible parts of the rocks in contact with the intrusions, forming replacement masses, parts of which contain sufficient quantities of metallic minerals to constitute ore. The diorite near the deposits is itself altered, and apparently a part of the mineralizing emanations welled up through it from the magma until they encountered conditions favorable for spreading out into the inclosing rocks. The alteration in the diorite consists in sericitization and the introduction of pyrite and quartz.

The shape and location of the ore bodies in limestone appear to be controlled in general by the shape, size, and position of the dioritic mass that was the source of mineralization, the character and position of fractures or shear zones in the limestone, and the size and position of beds susceptible of replacement. At some places, as at the Christmas mine, the ore bodies appear to follow the intrusive contacts rather closely. Elsewhere, especially where the dioritic masses exposed are small, the ores are farther from the contact. Most of the deposits afford evidence that the entrance of the mineralizing material was facilitated by fracturing of the rock, and the deposits are more or less localized along such fracture zones. In some places the existence of the fractures can only be inferred from the elongation of the ore bodies in certain directions. Elsewhere evidence of shearing and brecciation can be clearly seen. The places where premineral fracturing can now be discovered are in general those where replacement of the rock has not extended far beyond the fracture zones, and in a number of such places contact-metamorphic minerals were not observed. The fractures and shear zones, both inferred and observed, have steep dips and strike nearly east, many of them somewhat north of east, although there is considerable local variation. The average strike of the fractures thus corresponds to the average strike of the quartz-mica diorite dikes as shown on Plates I and XVI, and the fracturing may be related to the intrusion of the diorite and have taken place at the same time or just prior to the intrusion. At each of the deposits in limestone certain of the beds are more thoroughly replaced than others, and only fractions of the replaced portions are of value as ore. This probably results in part from original differences in composition and in permeability. At the Christmas mine, in the Tornado limestone, the comparatively pure and coarser-grained beds are more thoroughly replaced by ore minerals than the finer-grained rocks with a lower carbonate content, although the

latter are also greatly altered. Such obvious differences in lithologic character do not, however, account for some of the differences noted, as is strikingly illustrated by the bed locally known as the O'Carroll ore bed, near the base of the Martin limestone. Mineralized rock at this horizon occurs at a number of places on a line of outcrop about a mile east of Chilito, but there is little evidence of mineralization at other horizons in the formation where the original lithologic character would seem to have been similar. It is possible that this difference may be partly accounted for by the relations between the limestone and the intrusive rock. The diorite masses that presumably caused most of the contact metamorphism in this vicinity now crop out west of the O'Carroll ore bed and at lower altitudes, and the upper parts, now eroded, may never have reached much above that bed. There are, however, a number of smaller masses of similar diorite that did reach high enough to cut the Martin limestone above this horizon. The lateral limits of the replacement bodies are conceived to have been determined in each place largely by the distance the emanations traveled along a particular bed from the point of access to the point where chemical interaction ceased because of exhaustion of the emanation. The point of exhaustion was in turn dependent on the quantity, character, and physical condition of the material given off by the intrusive magma, and on the readiness with which it was able to react with and permeate the limestone. The points of access were apparently along the contact of the more replaceable bed with an intrusive body of quartz-mica diorite and along fracture zones that cut the bed. The valuable sulphides were in the main localized along the fracture zones and not at the intrusive contact. In the simplest case ore bodies produced as suggested above would have the form of elliptical disks with rounded edges, bounded above and below by beds of shale or other difficultly replaceable material. Between different ore bodies in a single bed and between the ore bodies and the intrusive mass the limestone would be more or less thoroughly replaced by minerals other than the valuable sulphides. As a matter of fact such a shape is never more than approximated, and some of the ore bodies are most irregular in form. The irregularities have resulted from the numerous possible variations in the character and condition of the bed affected, the emanations, the fractures, and the intrusive, as well as from interference between the emanations circulating from neighboring points of access to the same bed. At a number of places there are several beds which proved susceptible of replacement by ore minerals, and as a consequence more or less separate ore bodies have been formed one above another, separated by altered but valueless material. Some complexities resulting from postmineral faulting have been superimposed on the original irregularities, but so far as known these are of minor importance.

The minerals resulting from the contact metamorphism in limestone include quartz, two varieties of andradite garnet, vesuvianite, wollastonite, epidote, pargasite or a similar amphibole, chlorite, fluorite, chalcedony, magnetite, specularite, chalcopyrite, pyrite, sphalerite, galena, and perhaps bornite. Calcite has been recrystallized and redistributed. All these minerals, except fluorite, have been found in the Christmas mine. Most of the other deposits are known to contain some of the silicates mentioned, and more of these as well as other minerals as yet unknown in the region will probably be discovered in the course of future development and study. Many of the deposits in limestone visited contain most of the metallic sulphides listed above, but the proportions vary widely. Details of the occurrence of the several minerals are given in the mine descriptions (pp. 41–69).

At the Christmas mine and probably also elsewhere the replacement bodies grade, in most places abruptly, into limestone that has been recrystallized into marble but is otherwise little altered. The alteration in the beds between those containing the ore bodies is largely silicification, although most of the minerals mentioned above can be found in such beds in minor amounts, and epidote and chlorite are rather common in them. Many of these beds still show stratification and are plainly of sedimentary origin; these were doubtless shale and impure limestone. In places, according to Locke and Bjorge, there are sills of fine-grained quartz-mica diorite that are difficult to distinguish from metamorphosed shale. The original character of some of the beds between ore bodies can not be determined. In the Tornado limestone exposed along Gila River immediately south of the south boundary of the Christmas area there are fine-grained sills of dark-green trap like that shown in Plate XI, *B*. Megascopically this rock resembles the diabase that is widely distributed in the Ray quadrangle. Under the microscope it is seen to be altered to an aggregate of quartz, calcite, and indeterminate dark dust. Some of the barren strata in the Christmas mine may be composed of more thoroughly silicified rock of this character.

Little information is available regarding the ore deposits in the Troy quartzite. Ore of good grade has been mined from such rock on Schneider Hill, but the bodies found appear to have been all rather small. It is probable that these ore bodies are replacement deposits similar and closely related genetically to those in limestone just described. The major difference probably is that the quartzite was less favorable for replacement than the limestone, and consequently the ore bodies produced in it were smaller and more irregular.

The deposits in diabase at the Columbia mine differ somewhat from the other deposits described in this section but are probably related genetically to them. They are replacement deposits along shear zones near intrusive bodies of quartz-mica diorite. Contact-metamorphic minerals have not been found in the diabase, but calcareous shale in another part of the mine contains vesuvianite and garnet, and the mineralization is similar to that of the typical contact-metamorphic deposits.

Oxidation has attacked all the contact-metamorphic deposits of the area, and a large part of the ore mined was oxidized material. In most of the deposits, however, residual hypogene sulphides can be found at or near the surface. Oxidation probably nowhere extends more than 100 feet below the surface and in most places less than that. The oxidized minerals include malachite, chrysocolla, azurite, native copper, gold, hydrous manganese oxide, limonite, and kindred iron oxides, copper pitch ore, cerusite, anglesite, plumbojarosite, wulfenite, gypsum, and alunite. Concentration of the oxidized minerals of the valuable metals has taken place to some extent, especially in the lead deposits. The rich gold ore of the Apex and Cowboy mines may have been produced by concentration during oxidation. In both the gold was found in the oxidized part of lead ore bodies, but specimens were not available for examination. Vanadinite has been found associated with wulfenite in oxidized ore at three places in the Banner district. This mineral was not recognized in any of the deposits visited in the present investigation, but wulfenite is known to have been obtained from two of them. It may well be that the vanadinite was formed by the oxidation of lead deposits similar to those of the Seventy-nine mine, for example.

Enrichment by supergene sulphides has taken place in all the copper deposits seen but appears to be sporadic. The principal supergene sulphide is chalcocite. A little covellite was noted. Bornite is present in small veinlets in the ore bodies and might be interpreted as formed either in a late stage of hypogene deposition or early in the production of supergene sulphides, both chalcocite and covellite being later than the bornite. If the bornite is supergene, then enrichment of this character has greatly improved the tenor of the ore at Christmas. Veinlets of chalcocite, almost certainly of supergene origin, penetrate the ore down to at least the 300-foot level, but the amount of enrichment from this source in the ore seen is probably not very large. To judge by the available specimens massive chalcocite was present in the ore of the Schneider Hill deposits and in the tunnels of the London-Arizona mine. These specimens were, however, probably picked from the richer ore, and a considerable part of the ore shipped is believed

to have been oxidized material without large amounts of sulphides of any kind in it.

GENERALIZATIONS AND INFERENCES

A number of generalizations and inferences can be drawn from a study of the ore deposits of the Saddle Mountain and Banner districts, and most of them have a direct bearing on economic problems. The following statements are based on all available evidence, but they must be regarded as expressions of opinion rather than of proved facts.

The ore deposits of the two districts have so many points of similarity that they may be confidently regarded as genetically related products of the same period of mineralization. Some are certainly and the others probably not older than the end of the Cretaceous, and all are of types that are generally regarded as genetically related to igneous rocks. The only igneous rocks known in either district whose character and age would permit their consideration in this connection are the quartz-mica diorite and quartz-hornblende diorite, both believed to be of early Tertiary age. Many of the ore deposits are intimately associated with quartz-mica diorite, and nearly all the known deposits have outcrops of this rock near by, whereas the quartz-hornblende diorite is not known to be associated with any of the ore deposits. Thus the same magmatic source from which the quartz-mica diorite came also supplied the agents of mineralization. Although the mineralizing solutions presumably came for the most part from depths below anything yet exposed by erosion, they rose near and in part through masses of quartz-mica diorite which are so exposed, and ore bodies are therefore to be expected only in the vicinity of such masses. Of course, there may be dioritic dikes with associated ore bodies which through the vagaries of erosion do not crop out. A study of the geologic map of the Christmas area (Pl. I) and of that of the Ray quadrangle, reproduced in part in Plate XVI, brings out some features of the distribution of the intrusions. In the Saddle Mountain district most of the dikes of quartz-mica diorite are included in an area about 4 miles long and 1½ miles wide trending about N. 70° E., which is the average strike of the dikes. The same area includes nearly all the known mineral deposits in the district and all those known to be of any value. In the Banner district the diorite bodies are more scattered, more irregular, and on the average larger. Associated with these are contact-metamorphic and similar ore bodies, a number of which are larger than the deposits of the Saddle Mountain district. In the vicinity of Troy, partly in and partly beyond the limits of the Banner district, there is another group of dikes. These lie in an area about 5 miles long by 2½ miles

wide, trending about N. 80° E., which again is about the average strike of the dikes. The Columbia mine and a number of others are in this area. The strikes of the dikes in both groups are fairly consistent within the group but are independent of the direction of the major faults in the region. The dikes and the veins associated with them appear to occupy fissures and shear zones formed subsequently to much of the faulting in the region, although some of the dikes near Troy seem to follow fissures that form parts of the regional fault pattern. The set of fractures now occupied by the dikes and ore deposits was probably produced at an early stage in the structural disturbance in which the quartz-mica diorite was intruded. Where the fractures were closely spaced the diorite magma may have split up into smaller masses than it could elsewhere. Another possibility is that under the areas of closely spaced dikes there are diorite masses larger than any exposed at the surface and that the force of intrusion of these masses caused the production of fractures in the overlying rocks through which narrow apophyses from the diorite magma were thrust.

As the ore deposits are interrelated, it follows that gradations between them may be expected. It is conceivable that a vein containing no contact-metamorphic minerals might be found to grade into a contact-metamorphic deposit where the conditions were favorable. Typical contact-metamorphic deposits can be formed only in rock susceptible of replacement of that character. In these two districts the rocks known to be suitable for such replacement comprise the purer beds of the Tornado limestone and certain beds in the Martin limestone, especially one near its base. Deposits have also been found in the Troy quartzite and in a rock supposed to belong to the Mescal limestone, but they are of less value. It is probable that valuable contact-metamorphic deposits of any great size will not be found in any of the rocks in the region other than those enumerated above, and that most of the large ore bodies of this type are confined to the Tornado and Martin limestones.

Although all the deposits were produced in the same period of mineralization they were doubtless not all formed simultaneously, and different types were probably formed at slightly different times. The contact-metamorphic deposits were doubtless produced in general at an early stage. The order of formation of the pyritic deposits, disseminated and in shear zones, and the lead-silver veins is not known. If order of deposition of the minerals in the ore is a criterion, then it would seem that the pyritic deposits are younger than those of galena and sphalerite, but other evidence is lacking.

From the facts above set forth something can be inferred as to future possibilities in the exploitation of specific deposits, and examples of such inferences are given below. The Cretaceous strata that form the wall rock of the veins of the Saddle Mountain district are underlain by the Tornado limestone, which is cut by quartz-mica diorite, perhaps by a large mass of this rock. Consequently contact-metamorphic deposits may be expected in the limestone, but it is by no means certain that they lie under the deposits now being worked, which may be underlain by quartz-mica diorite in which there has been little or no valuable mineralization. Before passing out of the Cretaceous rocks the lead-silver veins may grade into pyritic deposits in depth, or the reverse may be true, according to which is the older. At the Christmas mine the bottom of the No. 3 shaft is probably less than 200 feet above the lower limit at which valuable ore bodies are to be expected, but on the downthrown side of the Christmas fault limestone lithologically favorable to the production of ore bodies extends to much greater depths and has not yet been explored.

MINES AND PROSPECTS

ADJUST MINE

Location.—The Adjust mine, owned by the Adjust Mining Co., is on the south side of Deer Creek in secs. 34 and 35, T. 4 S., R. 16 E., about 2½ miles by trail from Christmas station on the Arizona Eastern Railroad. A branch of the road from Winkelman through Old Mill extends to the southern base of the hill on which the mine is situated, the distance being about 8½ miles. At present supplies are brought in by automobile on this road. When ore is shipped it is taken to Christmas station by burro pack train down Deer Creek.

Property.—The Adjust Mining Co., which has recently been reorganized, has 13 unpatented claims, on which there are a number of shafts, adits, and cuts. The principal developments are on the Blue Bird vein, shown in Figure 4, where there are more than 1,500 feet of workings. About 640 tons of ore,[39] principally oxidized material, has been shipped. In May, 1922, after a shutdown of several months, the mine was reopened with the intention of carrying out sufficiently extensive development to determine the value of the ore bodies to a depth of 300 feet or more.

Character of the deposits.—The country rock is principally Cretaceous andesite, but there are some small dikes of gray porphyry, probably quartz-mica diorite. These dikes are too small to show on Plate I, but larger ones have been mapped northwest and southeast of the property. Several veins crop out, but only one, called

[39] Heron, C. M., letter dated July 12, 1922.

SEVENTY NINE MINE

Location.—The Seventy Nine mine is in the Ray quadrangle, a little less than 2 miles northwest of Tornado Peak and 4½ miles northwest of Hayden in air lines. The principal workings and mine buildings are on the northwest side of a wash at an altitude of somewhat more than 3,300 feet above sea level, and there are prospect holes along the streamway above this.

History.—The deposit was located in 1879 by Mike O'Brien and his brother Pat, but little work was done on it until December, 1919. From that date until April 27, 1922, the mine was held by the Continental Commission Co., which is reported to have shipped about 3,000 tons of ore averaging 24 per cent of lead, 1.75 per cent of copper, and 4 ounces of silver and 80 cents in gold to the ton. In April, 1922, the mine was taken over by the Seventy Nine Mining Co., and in June, 1922, the managers reported that shipments of about 50 tons a day were being made of ore averaging about the same as that previously shipped. Recently [52] the mine has been ordered reconveyed to the Continental Commission Co. as a result of litigation.

Property.—The property comprises 23 claims.[53] The mine has been developed by two tunnels, one above the other, with irregular stopes from them. Most of the stoping now in progress starts from the upper tunnel. The ore is sent down chutes to the lower tunnel and trammed to the surface. There is a winze down 70 feet on a 35° slope from the lower tunnel. A short distance up the gulch from the mine are the office, boarding house, and a few other buildings. Not far from the boarding house is a prospect shaft, and a few hundred yards farther upstream is a tunnel from which a little stoping has been done. Other prospect workings are scattered over the property.

Character of the deposits.—The country rock is the Tornado limestone. In the northeastern part of the mine is a dike of altered dioritic rock flanked by fault breccia, and near the mouth of the lower tunnel some irregular masses of comparatively fresh quartz-mica diorite are exposed. The ore has been formed as replacement bodies of galena along certain beds in the limestone separated by silicified beds, perhaps originally somewhat shaly, which are also more or less mineralized in places. About five different beds of ore from 3 to 5 feet thick are reported to have been found. There appears to be more unaltered galena in the upper stopes than below, but throughout the mine a large part of the ore is cerusite. Anglesite and small amounts of azurite and malachite are also present.

[52] Eng. and Min. Jour.-Press, vol. 115, p. 862, 1923.
[53] Weed, W. H., Mines Handbook, vol. 15, p. 254, 1922.

At the shallow shaft near the boarding house the ore, which is an irregular body formed by the replacement of limestone, is thoroughly oxidized. The minerals recognized are wulfenite, cerusite, limonite, andradite garnet, quartz, calcite, and a little hydrous manganese oxide and malachite. There is also a small amount of a yellow powdery material, probably an oxidized lead mineral, but it was impossible to separate enough for a conclusive test. Garnet is also reported in outcrops of some of the ore beds at the main mine. The tunnel farther up the gulch contains oxidized ore, but here copper is the metal sought, and no lead is reported to be present. The ore is stated to carry several ounces of silver to the ton. This deposit is also in the Tornado limestone but appears to have been formed along a fissure instead of along the bedding. The minerals recognized are chrysocolla, malachite, cuprite, black copper oxide, hematite, magnetite, quartz, garnet, and calcite.

COLUMBIA MINE

Location.—The Columbia mine of the Dripping Springs Mines Corporation is in a tributary gulch on the south side of Dripping Spring Valley about three-quarters of a mile west of the point where the highway to Globe swings north out of the valley and 2 miles east of Troy. It is about 18½ miles from Winkelman and 12 miles from the terminus of the Arizona Eastern Railroad at Christmas station.

History.—Most of the claims were located by J. W. Read, part of them in 1901. The Dripping Springs Copper Co. acquired the property about 1915 and was reorganized into the present company about 1920. Most of the development work was done in this year, and some copper ore was shipped. When visited in June, 1922, development work was in progress under Mr. A. T. Copley, superintendent, who kindly furnished the historical and other data regarding the mine. In the fall of 1922 exploration by diamond drilling from the floor of the principal tunnel was started, and an ore body 10 feet wide is reported to have been encountered.[54]

Property.—The Columbia group comprises about 20 claims. The Dripping Springs Mines Corporation also owns the Pearl group [55] of claims, near Mammoth. At the Columbia mine there are a number of buildings, an air compressor, and other equipment. The principal underground workings consist of a tunnel about 550 feet long with a crosscut at the end of the tunnel extending 950 feet south and 350 feet north and a shallow winze at the north end.

[54] Eng. and Min. Jour.-Press, vol. 115, p. 688, 1923.
[55] Weed, W. H., op. cit., p. 265.

Some stoping has been done, and there are several branch drifts off the crosscuts and smaller workings elsewhere.

Character of the deposits.—The rocks in this vicinity are a complex of small fault blocks of Paleozoic sedimentary rocks and intrusive diabase, with intrusions of quartz diorite porphyry and granodiorite only short distances away. Plate XVI shows the general features of the geology, but is on too small a scale to illustrate fully the complexity of the faulting. The rock mapped by Ransome as quartz diorite porphyry is probably equivalent to that called quartz-mica diorite in the present report. Most of the rock exposed underground is diabase, but there is a block of limestone supposed to belong to the Mescal limestone, and at the north end of the crosscut some metamorphosed shaly rock is exposed, perhaps also a part of the Mescal limestone. Mr. Copley states that five fissures showing mineralization are known. They strike in general nearly east and dip 70°–80° S. Gouge and altered country rock without much quartz in belts 3 to 8 feet wide occur along these fissures, widening out into the limestone where this rock forms one of the walls. Small bodies of copper carbonate ore have been found and stoped in places. Mr. Copley states that cuprite was noted in cracks in one of the veins, and small amounts of pyrite and chalcopyrite have been observed. In the altered shale at the north end of the workings a bed about 4 feet thick has been replaced by vesuvianite, magnetite, and doubtless other minerals. Picked samples from this bed are reported to contain 3 to 7 per cent of zinc, but no zinc minerals appear to be present in the specimen collected. Garnet is probably present in places, and some specularite is associated with the magnetite showing incipient replacement along octahedral partings.

McHUR PROSPECT [56]

In Seventy-nine Gulch there was in 1917 a vanadium prospect owned by Mac McHur. The exact location is not known, but it is possible that the deposits are on the ground of the present Seventy Nine Mine. Irregular masses of gossanlike material containing siderite, wulfenite, and vanadinite crop out in the gulch for about a quarter of a mile, and there are shallow workings at intervals. The country rock is the Tornado limestone, with diabase coming in near by and possibly against it in places. About a mile above this is an outcrop of ferruginous quartz at the contact of limestone and diabase, called the Iron Spike vein. A little wulfenite and vanadinite and some copper staining occur here. About a mile below the McHur prospect a small mill has at one time been operated by Mr. Boykin, of Tucson.

[56] From notes by F. L. Hess, of the U. S. Geol. Survey, taken in April, 1917.

PREMIER GROUP [57]

The Premier group, owned by S. O. Stewart, comprises 10 unpatented claims on the south side of Dripping Spring Valley 2 miles northwest of Christmas. The location shown on Plate X is only approximate. The deposit is developed by several pits and by an open cut about 25 feet long, with a drift from one end extending 20 feet to the east and a winze 12 feet deep at the end of the drift. The country rock is the Tornado limestone. The vein strikes about magnetic east, dips nearly vertically, and can be traced for about half a mile on the surface. A dike of quartz porphyry about 60 feet wide cuts the vein at a small angle. It is stained with iron oxide and appears to contain a little vanadinite. At the open cut mentioned the spongy gossan-like material extends out north of the vein and lies nearly flat along the bedding of the limestone. Above the drift the limestone is crushed and recemented by caliche-like material. The vein ranges from 10 inches to 3 feet in width and contains iron-stained, spongy quartz with vugs and cracks lined with thin coatings of vanadinite and wulfenite.

C. & B. GROUP [57]

The C. & B. group, owned by E. E. Cutler and Calvin Bywater, is on the south side of Dripping Spring Valley, about 9 miles above its mouth. It comprises five claims and is developed by a 20-foot shaft and two tunnels, 30 and 60 feet long, with a 10-foot winze below the shorter one. The tunnels are on a vein of oxidized material, striking approximately N. 60° E. and dipping southeast along the contact between limestone and diabase, and the shaft is on a branch of the vein, also on the contact between the limestone block and diabase but striking N. 35° W. and dipping northeast. Near by is a small outcrop of red granitic rock. Movement and brecciation have taken place along the vein fissures. The vein matter is well oxidized and for the most part soft, although silicified in places. Vanadinite and wulfenite are present in the soft material and also form coatings on brecciated diabase for a width of a few feet. Cavities left by galena crystals that had been oxidized and removed were noted at one place. These contain vanadinite. There are some small veins on the property. A little ore has been mined, and some is reported to have been shipped during the war.

[57] From notes by F. L. Hess, of the U. S. Geol. Survey, taken in April, 1917.

NEOUS ROCKS

Tr

lite porphyry
ite porphyry dikes
f Tam o' Shanter
Peak)

artz diorite
porphyry
and small intru-
asses, particularly
ent near Troy and
Tornado Peak)

Tgd

ranodiorite
ntrusive mass in
Troy Basin)

Tqd

artz diorite
and comparatively
intrusive masses)

EARLY TERTIARY ?

Ka

ndesite tuff
nd breccia
y consolidated py-
ic material with
poraneous dikes;
ly includes some
lava flows)

CRETACEOUS ?

db

Diabase
ally a medium-
d ophitic olivini-
diabase or dolerite.
ular sills with many
utting connections;
ed especially in the
l limestone)

MESOZOIC ?

g

Granite
e granite, generally
ly porphyritic and
ling. Batholithic
ive mass extensively
d in the Tortilla
)

PRE-CAMBRIAN

nown fault

obable fault

ncealed fault
ered by younger
deposits)

Dip of fault plane

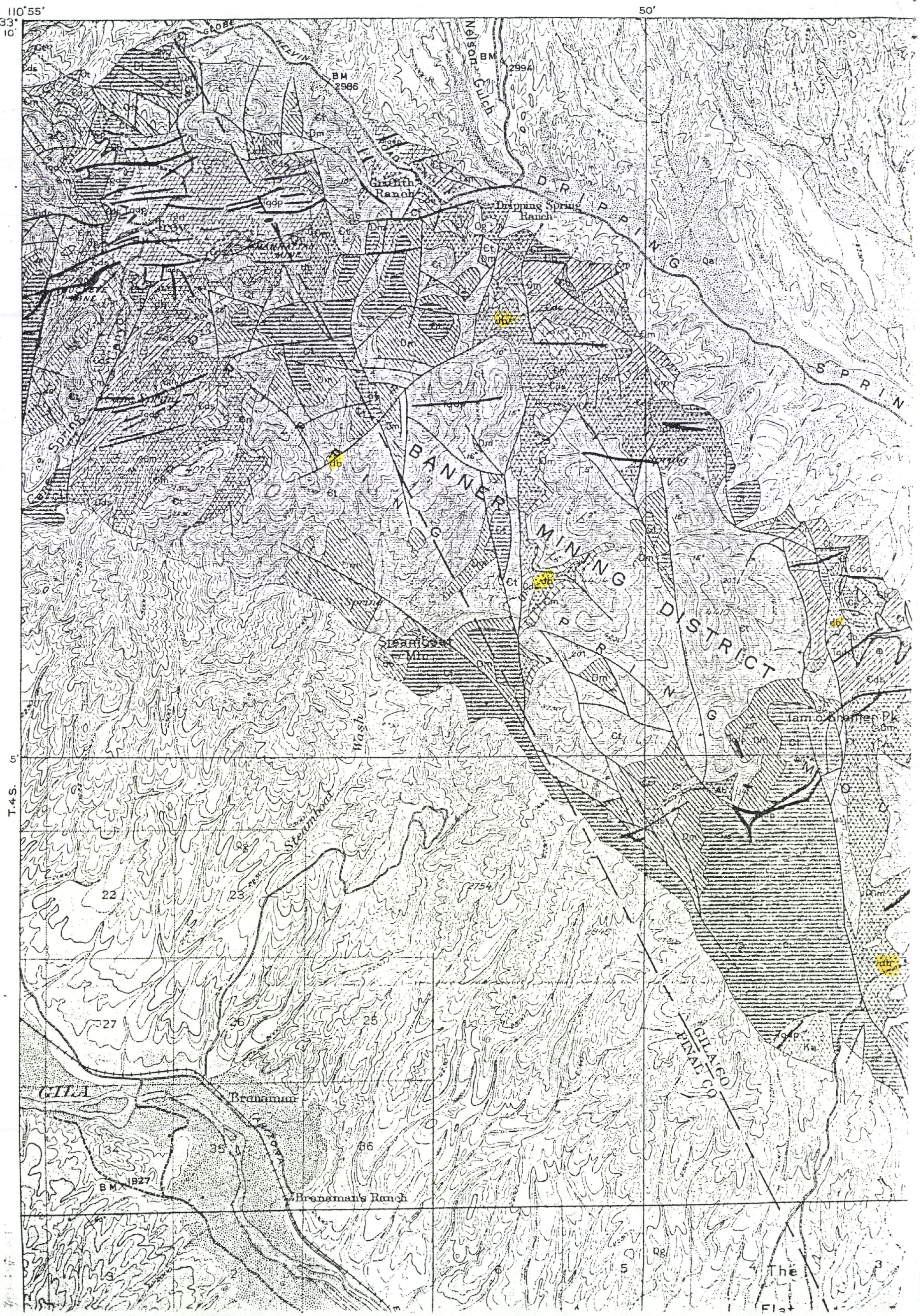
Overthrust side of thrust fault

Strike and dip of stratified rocks

Horizontal bed

Mine

Prospect



the most reactive rocks in the district, and it is inconceivable that the copper could have traveled through these rocks for more than a few hundred feet without being precipitated. The presence of Paleozoic limestones in the downfaulted block east of the Castle Dome ore body practically eliminates the possibility that ground water could have transported the copper from that deposit.

STRUCTURAL CONTROL

In the detailed study of the Globe-Miami district, one is greatly impressed by the prevalence of northeastward structural trends, particularly those related to such deep-seated phenomena as igneous intrusion and mineralization. All the productive mineral deposits of the district, as well as those of the Pioneer (Superior) district a few miles to the southwest, are distributed along a northeastward-trending belt about 6 miles wide (fig. 14). Within this narrow belt, there are 14 mines whose past production and known reserves are valued at more than $1 million for each mine. Of this number, 2 of the mines have already produced more than $30 million each, 4 have or will produce more than $10 million each, and 2 others have produced more than $1 million each. There are many smaller deposits tha have yielded from a few thousand to several hundre thousand dollars in metals. The total production o the Globe-Miami district recently passed the billion dollar mark, and the Pioneer district has produce about $230 million in copper, silver, gold, and zinc.

The northeastward continuation of the belt include the small but rich silver mines of the Richmond Basi district with a total production of a little more tha $1 million. The southwestward extension takes in se eral small silver, lead, and zinc deposits of the Reymer Martinez Canyon, and Mineral Hill districts, whic probably have a total production of about $1 million.

The outcrop of the mineral belt is interrupted in th Globe Valley area between Globe and Miami by a thic cover of Gila conglomerate that is younger that th period of primary copper mineralization. Tertiary(? volcanic rocks, which also are postmineralizatio

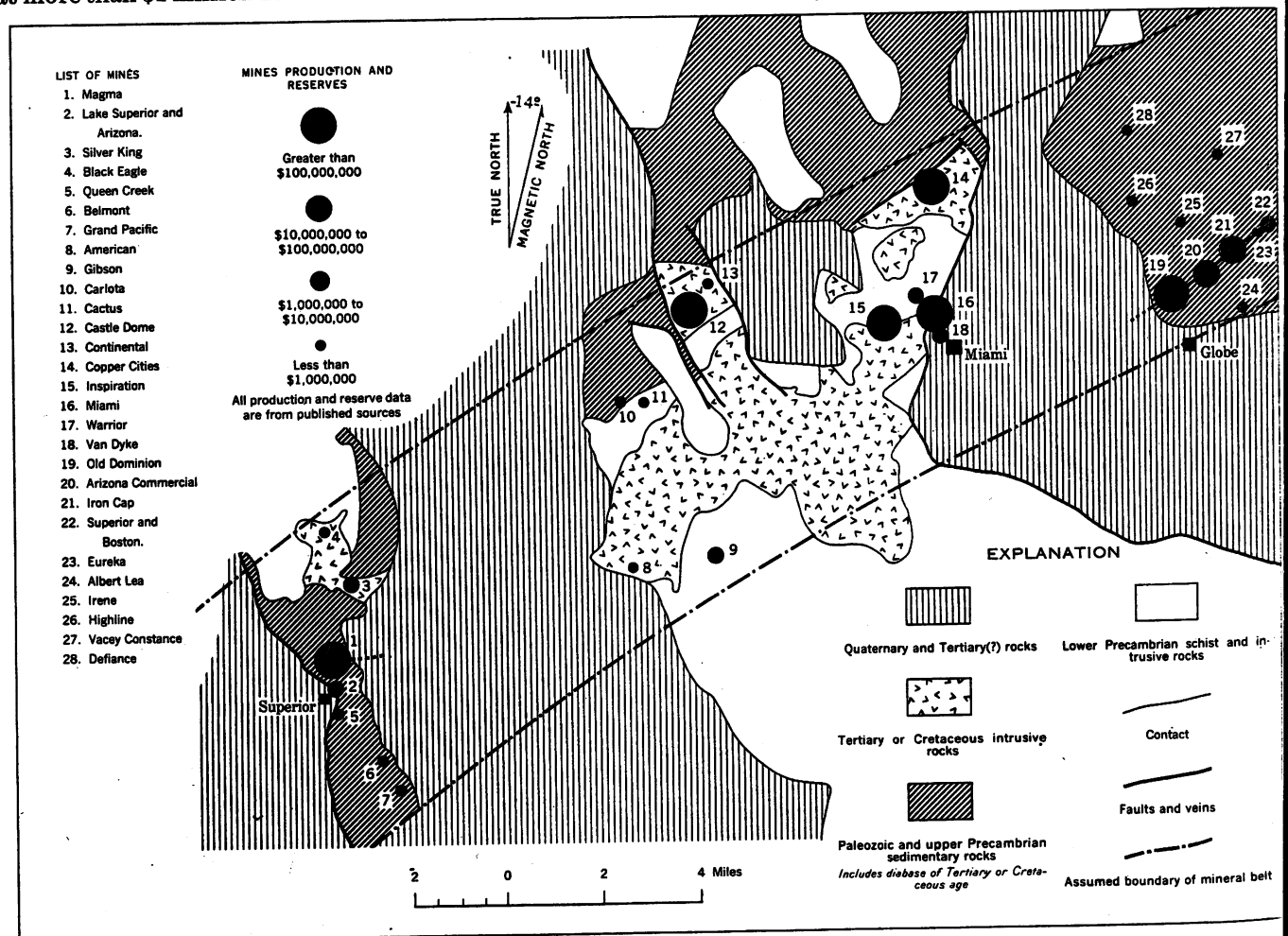


FIGURE 14.—Index map of the Globe-Miami and Pioneer districts showing assumed limits of the mineral belt and the location of the produc tive deposits.

gently east-dipping Apache Leap Tuff of Miocene(?) age in the west corner of the quadrangle. A steep normal fault bounds the west margin of Dripping Spring Valley and has a stratigraphic displacement of more than 2,900 feet, east side down. Diamond-drill holes 800 feet east of bedrock in the northern part of the quadrangle have penetrated more than 2,900 feet of Pliocene and possibly older fanglomerate along the west margin of the valley. At the southeastern corner of the quadrangle, a churn drill hole 900 feet east of bedrock bottomed in gravel at 1,470 feet.

ORE DEPOSITS

The disseminated copper deposit at Ray is the major mineral deposit in the quadrangle. The following description of the deposit is based on recent publications of Metz and Rose (1966), and Metz and others (1968). The Ray deposit covers an area 2 miles long in an east-west direction, and 1½ miles north-south, bounded on the east by the Broken Hill fault, on the west by the West End fault (half a mile west of the quadrangle boundary), on the north by the North End fault, and on the south by the contact between the Pinal Schist and Ruin Granite. Mining activities began about 1870, and since 1911 over 1½ million tons of copper, 40,000 ounces of gold, and 4 million ounces of silver have been recovered. The Kennecott Corp. has been mining the deposit since 1933.

The bulk of the copper thus far produced at Ray has come from secondary, enriched chalcocite in an irregular flat blanket, a few feet to several hundred feet thick, mostly in Pinal Schist. Overlying the chalcocite blanket was an average of 200 feet of leached and hematite-stained schist, which has been removed in open-pit operations. The primary hypogene minerals are pyrite, chalcopyrite, minor bornite and molybdenite, and traces of galena, sphalerite and tennantite. Primary copper, occurring mainly as chalcopyrite, averages 0.1-0.2 percent in the Pinal Schist and Granite Mountain Porphyry and forms large bodies of ore grade (more than 0.4 percent Cu) in the diabase.

Ore bodies in diabase sills underlie the eastern part of the Ray secondary chalcocite deposit and extend eastward from the Diabase fault to the Broken Hill fault. Mining in this area began recently by an eastward extension of the Pearl Handle pit. Schist or quartzite adjacent to ore-grade mineralized diabase is commonly poorly mineralized. Supergene enrichment in the diabase has been negligible, but in the shallower parts of the ore bodies the chalcopyrite has been oxidized to chrysocolla, azurite, and malachite.

The hypogene mineralization was controlled by the permeability and type of host rock and by the arrangement of faults. Copper mineralization is greatest in highly fractured rocks. Diabase, the best host for copper, presumably reacted more strongly with the mineralizing fluids than did the more siliceous rocks.

The zone of supergene copper enrichment is related to major structures, as well as to lithology and distribution of primary sulfides. Copper was leached most thoroughly from areas rich in pyrite, which formed sulfuric acid under oxidizing conditions and acted as a copper solvent. The copper solutions moved downward and laterally along structures in the schist and porphyry, but not in the diabase, which tended to react with and precipitate the copper. The copper precipitated at moderate depths as chalcocite replacing pyrite and chalcopyrite.

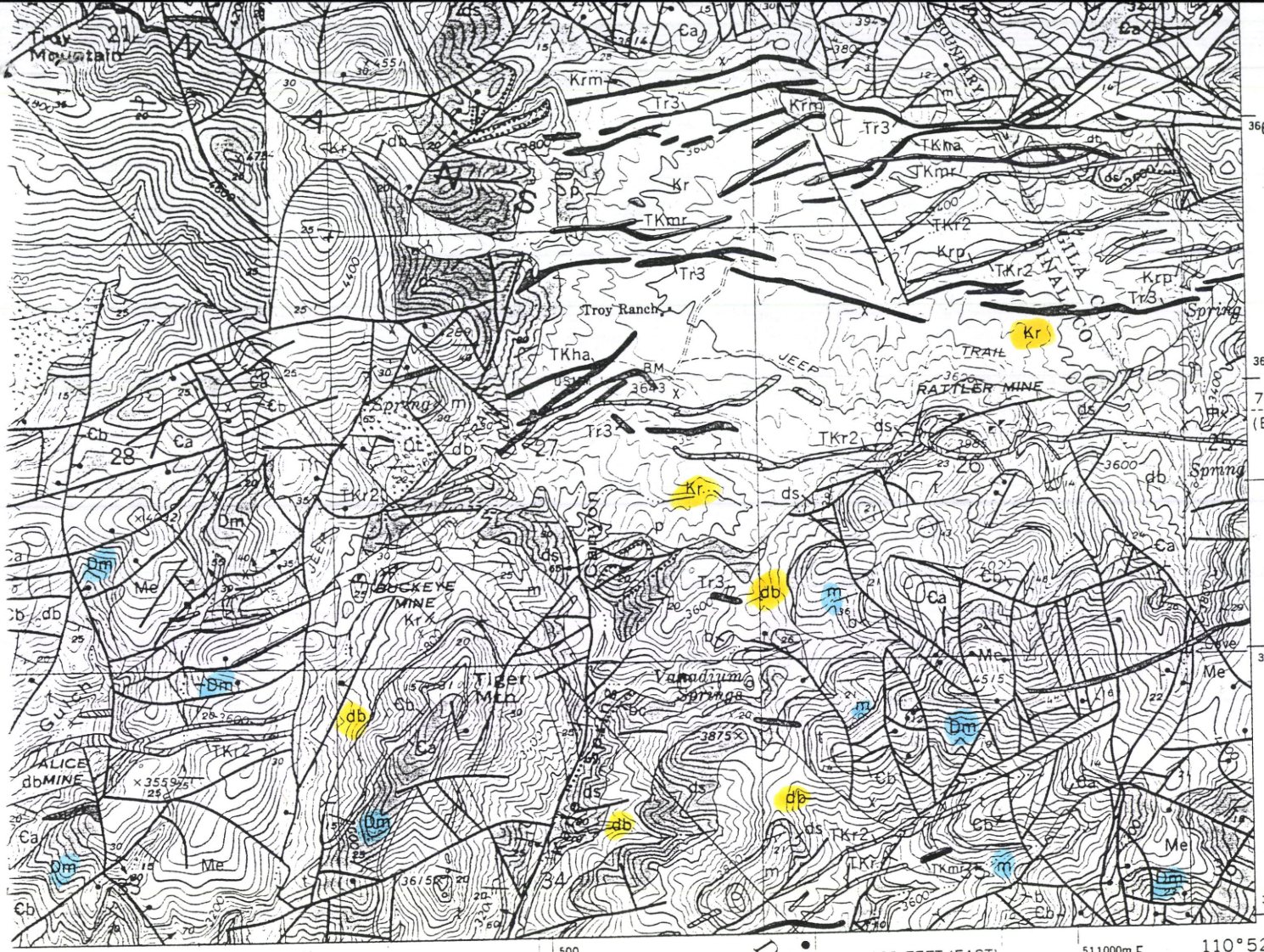
Small deposits of copper sulfides and oxides have been mined in and around the Rattler Granodiorite in the Troy district (southeast corner of quadrangle), and at the Monitor mine, northeast of where the Rustler and Broken Hill faults converge. These deposits consist mainly of sulfides, partly oxidized, in steeply dipping faults and fissures with quartz and calcite gangue. In the Troy district a sizable area in the eastern part of the Rattler Granodiorite and in the host rocks along the southern contact contains disseminations of azurite, malachite, chrysocolla, and copper sulfides.

It is reported that approximately 200,000 tons of ore averaging 2.5 percent Cu have been extracted from the Monitor mine, and the Rattler mine in the Mescal Limestone and diabase near the southeast margin of the Rattler Granodiorite is estimated to contain 2,500,000 tons of material containing 1 to 1.5 percent Cu, mainly as copper oxides.

The Ray silver mine, near the center of the quadrangle, is reported to have produced small amounts of silver, galena, and sphalerite. The sulfides occur along near-vertical west- to northwest-trending faults and fissures, mainly in the Martin Limestone.

Several other showings of copper occur in the quadrangle. The most notable occur along the faults parallel to and north of the Rustler fault system, and along the Broken Hill fault in the central part of the quadrangle.

Base from U.S. Geological Survey, 1964
10,000-foot grids based on Arizona coordina



Geology mapped in 1965–70

1 MILE

LOMETER

QUADRANGLE LOCATION

00′

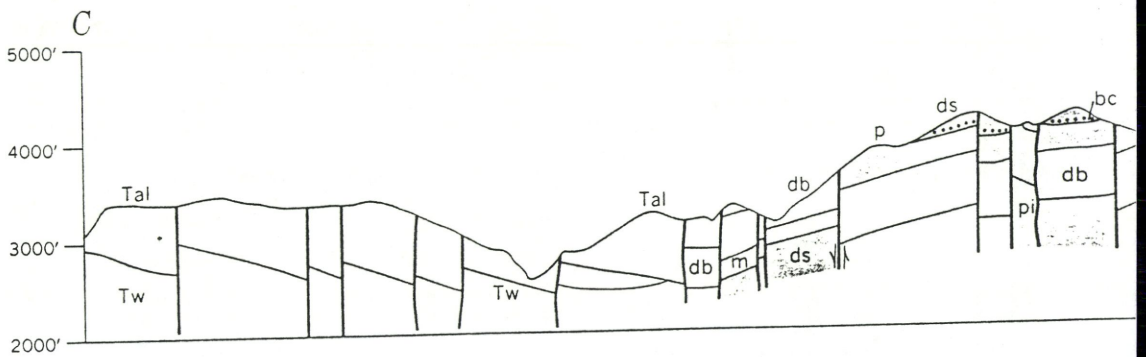
00′

00′

00′

.00′

EA LEVEL



DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine RATTLER GROUP OF COPPER CLAIMS Date April 17, 1944

District Riverside Engineer A. Macfarlane

Subject: Report

Owner: H. R. Scott, Box 2893, Globe, Arizona

Property & Location: Consists of 11 unpatented claims all contiguous, situated on the eastern slope of the Dripping Springs range, and about 2 miles westerly from the Dripping Springs wash, and adjoins the southeasterly limits of the old village of Troy.

The elevation at that point of the road crossing the creek or wash is 2,800 feet while the elevation at the main tunnel of the mine registered 3,500 feet a climb of 700' in this 2 miles.

The mining district of the locality is known as the Riverside and adjoins the south end of the Pioneer district, Pinal County, Arizona

History: These claims were formerly part of the Old Troy mine, discovered and worked many years ago, then in part abandoned by former owners, the present ownership being by location within the past few years.

Record of Ore Output: None of the old records are available now, but examination of the mine openings leads me to state that several hundred tons of hand sorted or selectively mined ores have been marketed.

The present owner has within the past few months, mined and trucked 3 small carlots, the settlement sheets giving copper grade ranging from 3.5% to over 5% copper.

Transportation Roads: From the International smelter at Miami, major and State highways pass within 5 miles of the mine and three or four miles up the Dripping Springs valley are county maintained. The last 2 miles to reach the cabins of the mine are broken with steep grades and much rocky terrain, passable with care for trucks of small capacity.

This last section of the road can be improved at moderate cost. The total distance from smelter to mine is about 36 miles. Another road from the buildings of the Troy village leads westerly and down grade for 6 or 7 miles to Ray Junction. Mr. Scott states that repairs are required to reopen this old road.

Mine Workings: Three tunnels driven from the northeast hill slope in a more or less southwesterly direction have cut the mineral system, and on which some drifting and stoping has at past time been done.

The general course of the stratas are from west to east and dip at varying degrees towards the south and as this examination was made for the purpose of ascertaining the feasibility of immediate copper production, the writer, after looking over the lower surface, decided that the vein as cut in the upper or Session tunnel, offers the best opportunity for copper production.

Session tunnel workings consist of an adit driven for about 100' southerly into the steep hillside, and the vein was cut at this point; thence a winze was sunk to

connect with the intermediate tunnel which is about 130' lower than the Session tunnel.

The vein where cut by the adit and at the top of this winze is fully 4' in width and at this point shows copper content stated by Mr. Scott to assay from 2.5% to about 4%.

The vein should be drifted on and an occasional upraise as lateral work of exploration be made, extending both easterly and westerly from the adit. I feel that this exploration will be justified by opening up an upper level along this horizon of the mineralization and may make available a substantial tonnage of copper.

Three or four hundred feet of development will require the installation of an air drill and compressor plant; this also for the subsequent stoping of the ores, together with ore bin, road improvement, mine trackage, and air pipe line to drilling faces.

Vein Structures: Surface croppings are plainly evident and surface cuts made show continuity of the mineralization. The lower tunnel fully 350' under the general surface of the vein proves the vein structure at that depth, but ores of a lower manor than the Session tunnel zone were opened by the lower explorations, and for that reason I suggest the mining be first directed along the upper ore area.

Geological Features: Primarily a limestone belt has through alterations and powerful intrusive action tilted the limes and formed bodies of the limestones irregular as to dip, but generally with the long axis towards the northwest. The first intrusives of granite later altered and in turn in part dislocated by other igneous forces have provided fractures and joints, wherein subsequent mineralization could deposit which in the original form of cold and deeper hot solutions.

The immediate locality within this geological area is fertile with unconformiable rock formations and veins and gashes.

Mineralization both of copper, silver, gold and vanadium has been discovered in mostly small but variable quantities within this immediate area. Only more extensive explorations may prove the value of the belt as an ore producer.

Tonnage: Many thousand tons of generally from 1 to 2% copper content are visible in the two lower tunnels and extending up to the surface, but as this report only deals with the possibility of mining copper of 3% and upwards, a grade required to meet all costs, the present visible exposures are now calssed as Probable or Inferred tonnage.

The extending of the drifts from near the heading of the Session tunnel and upraises therefrom should place a smelter grade of ore available.

Department of Mineral Resources
Globe Field Office

Need to check Ownership - Globe 1:100,00

(have checked ✓ sample # 39101-107)

DEP_NAME: TROY RANCH PROSPECT
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU MO
MINE_DIST: DRIPPING SPRINGS DISTRICT
TOWNSHIP: 003S
RANGE: 014E
SECTION: 23
SECT_FRACT: S/
POSITION: 1/2 MI N OF RATTLER MINE
LOC_COMM:
MINE_TYPE: S
PROD_SIZE: N
EXPL_COMM: STAKED BY C. MOORE OF GLOBE IN LATE 1960'S. TESTED BY SHALLOW
DEP_TYPES: PORPHYRY COPPER
DEP_SHAPE:
OBY_STRIKE:
OBY_DIP:
DEP_DESCR:
WKGS_COMM:
AGE_HOST: CRET
HOST_ROCK: GRANODIORITE RHYODACITE PORPHYRY DIKES
AGE_IGN: CRET
IGN_ROCK: GRANODIORITE RHYODACITE PORPHYRY DIKES
AGE_MINER: CRET ABOU
MINERALOGY: QUARTZ SERICITE PYRITE K-SPAR BIOTITE
ORE_MATS: CHALCOPYRITE MOLYBDENITE PYRITE BORNITE CU OXIDES
ORE_CONTRL: E-W VEINS DIKES
SIG_ALTER: QUARTZ-SERICITE-PYRITE VEINS CUTTING K-SPAR-BIOTITE-CHALCOPYR
FORM_AGE:
FORM_NAME:
GEOL_COMM:
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS: THIS REPORT WAS TAKEN FROM RECORD M030475 OF JAN WILT IN MOLY
REFERENCES: CORNWALL ET AL 1971 USGS MAP GQ-1021¦KEITH S.B. UNPUB DA
ALT_NAME: MARY ALICE CLAIMS 8-21 NEARBY CLAIMS 2 3 4 7
QUADRANGLE: SONORA
SCALE: 24000
ALTITUDE:
YR_FST_PRD:
YR_LST_PRD:
LAST_OPER:
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-53N
LONGITUDE: 110-53-03W
UTM_N: 3667500
UTM_E: 510040
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 1
REPORTER: PETERSON JOCELYN A
REP_AFFIL: USGS
REP_DATE: 83 04
UPDATE:
REC_TYPE: X1M
REC_NO: M030475

DEP_NAME: BLUE COPPER MINE
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU AGAU
MINE_DIST: DURHAM-SUIZO DISTRICT
TOWNSHIP: 008S
RANGE: 012E
SECTION: 17
SECT_FRACT: SW
POSITION: 1 MILE SE OF NORTH HILL; NORTHERN MOST OF THE DURHAM HILLS
LOC_COMM: UTM IS WHERE 2 ADITS ARE SIDE BY SIDE IN SW 1/4 SECTION 17
MINE_TYPE: B
PROD_SIZE: S
EXPL_COMM: OPERATORS INCLUDED DRAKE ENTERPRIZES GUZMAN AND SCHWARTZ '61
DEP_TYPES: VEIN/SHEAR ZONE
DEP_SHAPE: IRREGULAR
OBY_STRIKE: NW
OBY_DIP: 10-
DEP_DESCR: SOUTH ORE BODY 1200 FT LONG WIDTH IN RANGEOF 75 TO 150 FT-AL
WKGS_COMM: 2 SHAFTS OLD; TUNNEL DRIVEN WESTWARD INTO HILL. SHALLOW AN
AGE_HOST: PREC
HOST_ROCK: SCHIST GRANITE
AGE_IGN: CRET-PALEO
IGN_ROCK: QUARTZ DIORITE APLITE DIKES
AGE_MINER: CRET-PALEO
MINERALOGY: ALONG FRACTURES
ORE_MATS: CHALCOCITE CHRYSOCOLLA MALACHITE AZURITE CHALCOPYRITE
ORE_CONTRL: SCHIST- GRANITE CONTACT FRACTURES WITH VEINLETS
SIG_ALTER: KAOLINIZATION AND SILICIFICATION
FORM_AGE: PREC
FORM_NAME: PINAL SCHIST
GEOL_COMM: ORE HAS HIGHALUMNA CONTENT
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: ADMR BLUE COPPER FILE¦C.F. BARTER 1962. GEOLOGY OF THE OWL
ALT_NAME: DURHAM HILLS MINE BLUEHILL COPPER MINE BIG BULL MINE BUSY B
QUADRANGLE: TORTOLITA MOUNTAINS (1959)
SCALE: 62500
ALTITUDE: 2720 FT
YR_FST_PRD: 1948
YR_LST_PRD: 1962
LAST_OPER: MCFARLAND AND MULLINGER 1966
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 32-43-51N
LONGITUDE: 111-07-56W
UTM_N: 3621250
UTM_E: 487600
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 2
REPORTER: GEST DON E.
REP_AFFIL: ABGMT
REP_DATE: 82 03
UPDATE:
REC_TYPE: X1M
REC_NO: M899898

DEP_NAME: BLUESTAR MINE

CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 32-55-19N
LONGITUDE: 116-50-48W
UTM_N: 3642453
UTM_E: 514336
UTM_ZONE: +11
COUNTRY: US
INFO_SRCE: 1
REPORTER: GEST DON E.
REP_AFFIL: ABGMT
REP_DATE: 82 04
UPDATE:
REC_TYPE: X1M
REC_NO: M241198

DEP_NAME: ALICE MINE
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU AU AG
MINE_DIST: DRIPPING SPRINGS DISTRICT
TOWNSHIP: 003S
RANGE: 014E
SECTION: 33
SECT_FRACT: NO
POSITION: 1 MILE W OF TIGER MTN IN HACKBERRY GULCH
LOC_COMM: LOCATED AND NAMED ON QUADRANGLE. POSSIBLY THE PRATT TUNNEL IS
MINE_TYPE: U
PROD_SIZE: S
EXPL_COMM: MINE DID NOT PAY EXPENSES CLOSED QUICKLY SOMETIME BEFORE 192
DEP_TYPES: VEIN/SHEAR ZONE
DEP_SHAPE:
OBY_STRIKE: NE
OBY_DIP:
DEP_DESCR:
WKGS_COMM: INCLINED SHAFT 45 DEG. THREE LEVELS (1923) 400 FT IN 1916. C
AGE_HOST: PREC
HOST_ROCK: QUARTZITE LIMESTONE
AGE_IGN: CRET-PALEO
IGN_ROCK: RHYODACITIC PORPHYRY DIKE
AGE_MINER: CRET-PALEO
MINERALOGY:
ORE_MATS: CHALCOPYRITE NATIVE GOLD NATIVE SILVER
ORE_CONTRL: FISSURES AND VEINS NEAR RHYODACITE DIKE
SIG_ALTER:
FORM_AGE: PREC¦PREC
FORM_NAME: MESCAL LIMESTONE¦TROY QUARTZITE
GEOL_COMM:
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: RANSOME F.L. 1923. USGS GEOLOGIC ATLAS OF THE U.S. RAY FOL
ALT_NAME: TROY PROPERTY PRATT TUNNEL
QUADRANGLE: SONORA (1964)
SCALE: 24000
ALTITUDE: 3080 FT
YR_FST_PRD: 1900'S
YR_LST_PRD: 1910'S
LAST_OPER:
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-07-56N
LONGITUDE: 110-55-23W
UTM_N: 3665750
UTM_E: 507170
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 1
REPORTER: GEST DON E.
REP_AFFIL: ABGMT
REP_DATE: 82 03
UPDATE:
REC_TYPE: X1M
REC_NO: M899899

DEP_NAME: BUCKEYE MINE GROUP
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU AG AU
MINE_DIST: DRIPPING SPRINGS DISTRICT
TOWNSHIP: 003S
RANGE: 014E
SECTION: 27
SECT_FRACT: SW
POSITION: ONE HALF MILE NW OF TIGER MOUNTAIN
LOC_COMM: UTM IS LOCATION OFBUCKEYE SHAFT OTHER SHAFTS IN GROUP ARE NOR
MINE_TYPE: U
PROD_SIZE: S
EXPL_COMM: OPERATORS INCLUDED TROY ARIZONA COPPER TROY MANHATTAN COMPAN
DEP_TYPES: VEIN/SHEAR ZONE
DEP_SHAPE:
OBY_STRIKE: WNW
OBY_DIP:
DEP_DESCR:
WKGS_COMM: 3 LEVELS AND 150 FT SHAFT IN 1923 ONE LEVEL 1000 FTLONG. SHA
AGE_HOST: PREC
HOST_ROCK: DIABASE LIMESTONE QUARTZITE
AGE_IGN: CRET-PALEO
IGN_ROCK: GRANODIORITE RHYODACITE DIKES
AGE_MINER: CRET-PALEO
MINERALOGY: QUARTZ SERICITE
ORE_MATS: CHALCOPYRITE CHALCOCITE NATIVE SILVER NATIVE GOLD
ORE_CONTRL:
SIG_ALTER:
FORM_AGE: PREC¦PREC
FORM_NAME: MESCAL LIMESTONE¦TROY QUARTZITE
GEOL_COMM: MINERALIZATION ASSOCIATED WITH GRANODIORITE INTRUSION OPENED
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: USGS GQ 1021 1971¦ABGMT-USBM FILEDATA¦ADMR TROY AND RATTLER
ALT_NAME: CLIMAX TROY PROPERTY TROY-ARIZONA
QUADRANGLE: SONORA (1964)
SCALE: 24000
ALTITUDE: 3600 FT
YR_FST_PRD: 1903
YR_LST_PRD: 1951
LAST_OPER:
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-14N
LONGITUDE: 110-54-40W
UTM_N: 3666320
UTM_E: 508290
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 1
REPORTER: GEST DON E.

REP_AFFIL: ABGMT
REP_DATE: 82 03
UPDATE:
REC_TYPE: X1M
REC_NO: M899870

DEP_NAME: NINETY-ONE MINE
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU PB MO V
MINE_DIST: DRIPPING SPRINGS DISTRICT
TOWNSHIP: 003S
RANGE: 014E
SECTION: 27
SECT_FRACT: SW
POSITION: 1/2 MI SW OF TROY SITE 1/4 MI NE OF BUCKEYE MINE
LOC_COMM:
MINE_TYPE: U
PROD_SIZE: S
EXPL_COMM:
DEP_TYPES: REPLACEMENT
DEP_SHAPE: LENTICULAR BUNCHES
OBY_STRIKE:
OBY_DIP:
DEP_DESCR:
WKGS_COMM: SHAFT WAS APPARENTLY 150 FT DEEP WITH 3 LEVELS
AGE_HOST: PREC
HOST_ROCK: LIMESTONE DIABASE QUARTZITE
AGE_IGN:
IGN_ROCK:
AGE_MINER: LCRET-TERT
MINERALOGY:
ORE_MATS: OXIDE MINERALS OF CU PB MO & V WULFENITE
ORE_CONTRL: ALONG BEDDING PLANES IN LIMESTONE AS INCLUSIONS IN DIABASE
SIG_ALTER:
FORM_AGE: PREC
FORM_NAME: MESCAL LIMESTONE & DRIPPING SPRING QUARTZITE OF APACHE GROUP
GEOL_COMM: WULFENITE IS AN OXIDATION PRODUCT OCCURING IN JOINTS IN QUART
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS: THIS RECORD WAS TAKEN FROM RECORD M000385 OF JAN WILT IN MOLY
REFERENCES: RANSOME 1923 USGS FOLIO 217¦ABM FILE DATA¦CORNWALL ET AL
ALT_NAME:
QUADRANGLE: SONORA
SCALE: 24000
ALTITUDE: 3795 FT
YR_FST_PRD:
YR_LST_PRD:
LAST_OPER:
CUM_PROD: 1945-1955¦1945-1955¦1945-1955
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-18N
LONGITUDE: 110-54-28W
UTM_N:
UTM_E:
UTM_ZONE:
COUNTRY: US
INFO_SRCE: 1
REPORTER: PETERSON JOCELYN A
REP_AFFIL: USGS
REP_DATE: 83 04
UPDATE:
REC_TYPE: X1M
REC_NO: M000385

DEP_NAME: RATTLER MINE
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU AG AU
MINE_DIST: DRIPPING SPRINGS DISTRICT
TOWNSHIP: 003S
RANGE: 014E
SECTION: 26
SECT_FRACT:
POSITION: 1 1/2 MILES NE OF TIGER MOUNTAIN
LOC_COMM: 1/4MILE W OF PINAL-GILA COUNTY LINE
MINE_TYPE: U
PROD_SIZE: S
EXPL_COMM: 13 UNPATENTED CLAIMS IN 1956. ENTIRE GROUP INTO GILA CTY INC
DEP_TYPES: VEIN/SHEAR ZONE
DEP_SHAPE: TABULAR/IRREGULAR
OBY_STRIKE:
OBY_DIP:
DEP_DESCR:
WKGS_COMM: 3 TUNNELS AT LEAST ONE ADIT 160 FT DEEP IN 1944
AGE_HOST: PREC
HOST_ROCK: LIMESTONE QUARTZITE
AGE_IGN: CRET-PALEO
IGN_ROCK: RHYOLITE OR RHYODACITE PORPHYRY
AGE_MINER: CRET-PALEO
MINERALOGY: QUARTZ SERICITE
ORE_MATS: CHALCOPYRITE CHALCOCITE BORNITE MALACHITE NATIVE SILVER N
ORE_CONTRL: FISSURES AND VEINS NEAR RHYOLITE DIKES
SIG_ALTER:
FORM_AGE: PREC¦CAMB
FORM_NAME: MESCAL LIMESTONE DRIPPING SPRINGS QUARTZITE TROY QUARTZITE¦
GEOL_COMM: PROBABLY ASSOCIATED WITH GRANODIORITE INTRUSION OR AT LEAST
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: USGS GQ 1021 1971¦ABGMT-USBM FILE DATA¦ADMR TROY AND RATTLE
ALT_NAME: TROY TROY-MANHATTAN TROY-ARIZONA
QUADRANGLE: SONORA (1964)
SCALE: 24000
ALTITUDE: 3750 FT
YR_FST_PRD: 1903
YR_LST_PRD: 1940'S
LAST_OPER: INSPIRATION COPPER COMPANY 1965
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-31N
LONGITUDE: 110-53-07W
UTM_N: 3666840
UTM_E: 510700
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 1
REPORTER: GEST DON E.
REP_AFFIL: ABGMT
REP_DATE: 82 03
UPDATE:
REC_TYPE: X1M
REC_NO: M899871

DEP_NAME: TROY RANCH PROSPECT
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU MO
MINE_DIST: DRIPPING SPRINGS DISTRICT
TOWNSHIP: 003S
RANGE: 014E
SECTION: 23
SECT_FRACT: S/
POSITION: 1/2 MI N OF RATTLER MINE
LOC_COMM:
MINE_TYPE: S
PROD_SIZE: N
EXPL_COMM: STAKED BY C. MOORE OF GLOBE IN LATE 1960'S. TESTED BY SHALLOW
DEP_TYPES: PORPHYRY COPPER
DEP_SHAPE:
OBY_STRIKE:
OBY_DIP:
DEP_DESCR:
WKGS_COMM:
AGE_HOST: CRET
HOST_ROCK: GRANODIORITE RHYODACITE PORPHYRY DIKES
AGE_IGN: CRET
IGN_ROCK: GRANODIORITE RHYODACITE PORPHYRY DIKES
AGE_MINER: CRET ABOU
MINERALOGY: QUARTZ SERICITE PYRITE K-SPAR BIOTITE
ORE_MATS: CHALCOPYRITE MOLYBDENITE PYRITE BORNITE CU OXIDES
ORE_CONTRL: E-W VEINS DIKES
SIG_ALTER: QUARTZ-SERICITE-PYRITE VEINS CUTTING K-SPAR-BIOTITE-CHALCOPYR
FORM_AGE:
FORM_NAME:
GEOL_COMM:
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS: THIS REPORT WAS TAKEN FROM RECORD M030475 OF JAN WILT IN MOLY
REFERENCES: CORNWALL ET AL 1971 USGS MAP GQ-1021¦KEITH S.B. UNPUB DA
ALT_NAME: MARY ALICE CLAIMS 8-21 NEARBY CLAIMS 2 3 4 7
QUADRANGLE: SONORA
SCALE: 24000
ALTITUDE:
YR_FST_PRD:
YR_LST_PRD:
LAST_OPER:
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-53N
LONGITUDE: 110-53-03W
UTM_N: 3667500
UTM_E: 510040
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 1
REPORTER: PETERSON JOCELYN A
REP_AFFIL: USGS
REP_DATE: 83 04
UPDATE:
REC_TYPE: X1M
REC_NO: M030475

DEP_NAME: BLUE COPPER MINE
STATE_CODE: AZ
COUNTY: PINAL
COMMODITY: CU AGAU
MINE_DIST: DURHAM-SUIZO DISTRICT
TOWNSHIP: 008S
RANGE: 012E
SECTION: 17
SECT_FRACT: SW
POSITION: 1 MILE SE OF NORTH HILL; NORTHERN MOST OF THE DURHAM HILLS
LOC_COMM: UTM IS WHERE 2 ADITS ARE SIDE BY SIDE IN SW 1/4 SECTION 17
MINE_TYPE: B
PROD_SIZE: S
EXPL_COMM: OPERATORS INCLUDED DRAKE ENTERPRIZES GUZMAN AND SCHWARTZ '61
DEP_TYPES: VEIN/SHEAR ZONE
DEP_SHAPE: IRREGULAR
OBY_STRIKE: NW
OBY_DIP: 10-
DEP_DESCR: SOUTH ORE BODY 1200 FT LONG WIDTH IN RANGEOF 75 TO 150 FT-AL
WKGS_COMM: 2 SHAFTS OLD; TUNNEL DRIVEN WESTWARD INTO HILL. SHALLOW AN
AGE_HOST: PREC
HOST_ROCK: SCHIST GRANITE
AGE_IGN: CRET-PALEO
IGN_ROCK: QUARTZ DIORITE APLITE DIKES
AGE_MINER: CRET-PALEO
MINERALOGY: ALONG FRACTURES
ORE_MATS: CHALCOCITE CHRYSOCOLLA MALACHITE AZURITE CHALCOPYRITE
ORE_CONTRL: SCHIST- GRANITE CONTACT FRACTURES WITH VEINLETS
SIG_ALTER: KAOLINIZATION AND SILICIFICATION
FORM_AGE: PREC
FORM_NAME: PINAL SCHIST
GEOL_COMM: ORE HAS HIGHALUMNA CONTENT
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: ADMR BLUE COPPER FILE¦C.F. BARTER 1962. GEOLOGY OF THE OWL
ALT_NAME: DURHAM HILLS MINE BLUEHILL COPPER MINE BIG BULL MINE BUSY B
QUADRANGLE: TORTOLITA MOUNTAINS (1959)
SCALE: 62500
ALTITUDE: 2720 FT
YR_FST_PRD: 1948
YR_LST_PRD: 1962
LAST_OPER: MCFARLAND AND MULLINGER 1966
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 32-43-51N
LONGITUDE: 111-07-56W
UTM_N: 3621250
UTM_E: 487600
UTM_ZONE: +12
COUNTRY: US
INFO_SRCE: 2
REPORTER: GEST DON E.
REP_AFFIL: ABGMT
REP_DATE: 82 03
UPDATE:
REC_TYPE: X1M
REC_NO: M899898

DEP_NAME: BLUESTAR MINE

DEP_NAME: RENFRO GROUP
MINE_DIST: DRIPPING SPRINGS DISTRICT
COUNTY: GILA
COMMODITY: CU AG AU
TOWNSHIP: 003S
RANGE: 014E
SECTION: 25
SECT_FRACT: NW
POSITION: 1 MILE NNW OF MANHATTAN MOUNTAIN (4417 FT) DRIPPING SPRINGS MOUNTAINS
LOC_COMM: 1/4 MILE E OF GILA-PINAL COUNTY BOUNDARY 1 1/4 MILES E OF TROY RANCH
MINE_TYPE: U
PROD_SIZE: S
EXPL_COMM: PINAL DEVELOPMENT COMPANY AND F. M. POOL WERE PAST OPERATORS. 47 CLAIMS IN 1922
DEP_TYPES: REPLACEMENT/SHEAR ZONE
DEP_SHAPE:
OBY_STRIKE:
OBY_DIP:
DEP_DESCR: 15 FT THICK ORE HORIZONON LIMESTONE
WKGS_COMM: MAIN TUNNEL 1600 FT. LONG DEPTH 600 FT (MINES HANDBOOK 1922) ADMR REPORT (1907) DESCRIBES VARIOUS SMALL SHAFTS; 220 FT OF WORKINGS ON THE GOLDEN EAGLE A 150 FT TUNNEL AND A 43 FT. SHAFT IN GRANITE.
AGE_HOST: PREC
HOST_ROCK: DIABASE LIMESTONE
AGE_IGN: LCRET-TERT
IGN_ROCK: RHYODACITE PORPHYRY
AGE_MINER: LCRET-TERT
MINERALOGY:
ORE_MATS: CUPRITE CHRYSOCOLLA
ORE_CONTRL: DIABASE-LIMESTONE CONTACT DIABASE UNDERLIES LIMESTONE ALSO ALONG SMALL FAULT FISSURES
SIG_ALTER:
FORM_AGE: PREC
FORM_NAME: MESCAL LIMESTONE
GEOL_COMM: LCRET RATTLERGRANODIORITE INTRUSION IS 1/8 MILE W OF MINE AND MINERALIZATION AND/OR FISSURING IS PROBABLY RELATED TO THIS INTRUSION. RHYODACITE POSTDATES INTRUSION DOWNTHROWN SIDE IS THE SOUTHERN SIDE ON MOST OF THE FRACTURES IN THE AREA
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: ADMR RENFRO GROUP FILE|ABGMT-USBM FILE DATA|USGS GEOLOGIC QUADRANGLE GQ-10218 1971|REED W. H. MINES HANDBOOK VOLUME XV 1922 P364
ALT_NAME: ROMAN EAGLE SHAFT
QUADRANGLE: SONORA (1964)
SCALE: 24000
ALTITUDE: 3400 FT
YR_FST_PRD: 1913
YR_LST_PRD: 1918
LAST_OPER:
CUM_PROD:
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-51N
LONGITUDE: 110-52-39W
UTM_N: 36674540
UTM_E: 5114240
UTM_ZONE: +12
INFO_SRCE: 1
REPORTER: GEST DON E.
REP_AFFIL: ABGMT
REP_DATE: 82 05
UPDATE:
REC_TYPE: X1M
REC_NO: M241244

REC_NO: M000500

DEP_NAME: COLUMBIA MINE
MINE_DIST: DRIPPING SPRINGS DISTRICT
COUNTY: GILA
COMMODITY: CU AG AU
TOWNSHIP: 003S
RANGE: 014E
SECTION: 25
SECT_FRACT:
POSITION: 2 MILES EAST OF TROY
LOC_COMM:
MINE_TYPE: U
PROD_SIZE: S
EXPL_COMM:
DEP_TYPES: VEIN
DEP_SHAPE: LINEAR
OBY_STRIKE: N 89E
OBY_DIP: 75
DEP_DESCR:
WKGS_COMM:
AGE_HOST: PREC
HOST_ROCK: LIMESTONE
AGE_IGN: ETERT
IGN_ROCK: QUARTZ DIORITE PORPHYRY
AGE_MINER: ETERT
MINERALOGY:
ORE_MATS: CU CARBONATES CUPRITE PYRITE CHALCOPYRITE
ORE_CONTRL:
SIG_ALTER:
FORM_AGE:
FORM_NAME:
GEOL_COMM:
GEOL_ENV:
GEOL_NOTES:
GEN_COMMS:
REFERENCES: ROSS C. P. 1925 ORE DEPOSITS OF THE SADDLE MOUNTAIN AND BANNER MINING DISTRICTS ARIZONA: USGS BULLETIN 771 .|HEINEMAN R. E. S. ELSING M. J. ARIZONA METAL PRODUCTION ARIZONA BUREAU OF MINES ECONOMIC SERIES NO. 19 BULLETIN NO. 14
ALT_NAME:
QUADRANGLE: EL CAPITAN MTN.
SCALE: 24000
ALTITUDE: 3320 FT
YR_FST_PRD:
YR_LST_PRD:
LAST_OPER:
CUM_PROD: 1882|1932 - 1936|1932 - 1936
CUM_P_COMM:
COMMENTS:
LATITUDE: 33-08-36N
LONGITUDE: 110-51-46W
UTM_N: 3666980O
UTM_E: 5128100
UTM_ZONE: +12
INFO_SRCE: 1
REPORTER: GERE W.
REP_AFFIL: USGS
REP_DATE: 72 04
UPDATE: 79 05
REC_TYPE: X1M
REC_NO: M000383

Troy Peak Sec. 23, 26, T 3S, R 14E

Rentfro Group Sec. 25 T 3S R 14E

Chalcito T 4S, R 15E, Secs. 22, 23
- ASARCO + Inspir. Claims
+ Volcano claims

REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

LEGAL DESCRIPTION TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	22	SW	7 21	2	56053	LD	TROY MTN 12	MOORE CARLEY	56020	398;541	8/17/1964	1985	4/13/1987
			SW	7 21		56054	LD	TROY MTN 13		56020	398;542	8/17/1964	1985	4/13/1987
			SW	7 21		56055	LD	TROY MTN. 14		56020	398;543	8/17/1964	1985	4/13/1987
			SW	7 21		56056	LD	TROY MTN. 15		56020	398;544	8/17/1964	1985	4/13/1987
			SW	7 21		56057	LD	TROY MTN. 16		56020	398;545	8/17/1964	1985	4/13/1987
			SW	7 21		56062	LD	TROY MTN. 22		56020	398;551	8/17/1964	1985	4/13/1987
			S2	7 21		56063	LD	TROY MTN. 24		56020	398;553	8/17/1964	1985	4/13/1987
			SE	7 21		56064	LD	TROY MTN. 26		56020	398;555	8/17/1964	1985	4/13/1987
			SE	7 21		56065	LD	TROY MTN. 28		56020	398;557	8/17/1964	1985	4/13/1987
			SE	7 21		56066	LD	TROY MTN. 29		56020	398;558	8/17/1964	1985	4/13/1987
			SE	7 21		56067	LD	TROY MTN. 30		56020	398;559	8/17/1964	1985	4/13/1987
			SE	7 21		56068	LD	TROY MTN 31		56020	398;560	8/18/1964	1985	4/13/1987
			SE	7 21		56069	LD	TROY MTN 32		56020	398;561	8/18/1964	1985	4/13/1987
			W2	7 21		67233	LD	YORT NO 107	KENNECOTT CORP	66892	673;480	5/24/1972	1985	4/03/1987
			NW	7 21		67244	LD	YORT NO 129		66892	673;491	5/17/1972	1985	4/03/1987
			NW	7 21		67245	LD	YORT NO 131		66892	673;492	5/17/1972	1985	4/03/1987
			NW	7 21		67246	LD	YORT NO 133		66892	673;493	5/17/1972	1985	4/03/1987
			NW	7 21		67247	LD	YORT NO 135		66892	673;494	5/17/1972	1985	4/03/1987
			ALL	7 21		67248	LD	YORT NO 192		66892	676;111	7/26/1972	1985	4/03/1987
		23	S2	7 21	4	56074	LD	HORSE 5	MOORE CARLEY	56020	525;77	10/02/1967	1985	4/13/1987
			SE	7 21		56075	LD	HORSE 6		56020	221;196	10/02/1967	1985	4/13/1987
			SE	7 21		56076	LD	HORSE 7		56020	221;197	10/02/1967	1985	4/13/1987

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ADMINISTRATIVE STATE: ARIZONA BUREAU OF LAND MANAGEMENT PCN: LT892PP1

GEOGRAPHIC INDEX MERIDIAN: GILA-SALT R.
ALL CLAIMS

TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK;PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	23	SE	7 21	4	56077	LD	HORSE 8	MOORE CARLEY	56020	221;198	10/02/1967	1985	4/13/1987
			SE	7 21		56078	LD	HORSE 9		56020	221;199	10/02/1967	1985	4/13/1987
			NW	7 21		116639	LD	YELLOW ROSE GR NO1	ANGLIN ALBERT		1037;441	11/13/1980	0000	8/08/1985
			NW	7 21		126325	LD	YELLOW ROSE NO 2	ANGLIN WOODROW ANGLIN ALBERT ANGLIN WOODROW		1053;226	3/13/1981	0000	8/08/1985
		24	S2	7		11392*LD		CEDAR TREE NO 1	REIFSNYDER SYLVESTER		152;157	6/16/1963	1990	
			S2	7		11393*LD		CEDAR TREE NO 2		11392	152;158	6/16/1963	1990	
			SE	7		11394*LD		CEDAR TREE NO 3		11392	152;159	6/16/1963	1990	
			SE	7		11395*LD		CEDAR TREE NO 4		11392	152;160	6/29/1963	1990	
			SE	7		11396*LD		CEDAR TREE NO 5		11392	152;161	6/29/1963	1987	7/15/1988
			SE	7		11397*LD		CEDAR TREE NO 6		11392	152;162	6/16/1963	1987	7/15/1988
			N2	7		67197*LD		RAY SOUTHERN NO 40	ASARCO	66892	455;87	6/07/1956	1990	
			SW	7		232425*PL		DSW #4	MAXWELL DANIEL MAXWELL LAWRENCE MAXWELL NELLIE MAXWELL BRIAN VILLALOBOS LARRY SAUTTI SCOTT OERTER PAUL JOHNSON WAYNE	232422	636;886	10/27/1984	1987	5/19/1989
			SE	7		232426*PL		DSW #5	MAXWELL DANIEL MAXWELL LAWRENCE MAXWELL NELLIE MAXWELL BRIAN VILLALOBOS LARRY SAUTTI SCOTT OERTER PAUL JOHNSON WAYNE	232422	636;888	10/27/1984	1987	5/19/1989
		25	SW	7 21		55960	LD	TROY #29	VIA CLARENCE MOORE CARLEY		321;831	3/21/1972	1984	5/23/1986
			SW	7 21		55961	LD	TROY #30	VIA CLARENCE MOORE CARLEY	55960	321;832	3/21/1972	1984	5/23/1986
			SE	7 21		55962	LD	TROY #31	VIA CLARENCE MOORE CARLEY	55960	321;833	3/21/1972	1984	5/23/1986
			SE	7 21		55963	LD	TROY #32	VIA CLARENCE MOORE CARLEY	55960	321;834	3/21/1972	1984	5/23/1986
			SE	7 21		55964	LD	TROY #33	VIA CLARENCE MOORE CARLEY	55960	321;835	3/21/1972	1984	5/23/1986
			SE	7 21		55965	LD	TROY #34	VIA CLARENCE MOORE CARLEY	55960	321;836	3/21/1972	1984	5/23/1986
			SE	7		55966	LD	TROY #35	VIA CLARENCE	55960	321;837	3/21/1972	1984	5/23/1986

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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
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GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

-LEGAL DESCRIPTION- TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	25	SE	21	4	55966	LD	TROY #35	MOORE CARLEY	55960	321;837	3/21/1972	1984	5/23/1986
			SE	7 21		55967	LD	TROY #36	VIA CLARENCE	55960	321;838	3/21/1972	1984	5/23/1986
			SE	7 21		55968	LD	TROY #37	MOORE CARLEY VIA CLARENCE MOORE CARLEY	55960	321;839	3/18/1972	1984	5/23/1986
			SE	7 21		55969	LD	TROY #38	VIA CLARENCE MOORE CARLEY	55960	321;840	3/18/1972	1984	5/23/1986
			SE	7 21		55970	LD	TROY #39	VIA CLARENCE	55960	321;841	3/18/1972	1984	5/23/1986
			SE	7 21		55971	LD	TROY #40	MOORE CARLEY VIA CLARENCE MOORE CARLEY	55960	321;842	3/18/1972	1984	5/23/1986
			S2	7 21		56116	LD	YORT NO. 162	MOORE CARLEY	56020	676;105	6/27/1972	1985	4/13/1987
			NE	7 21		106168	PL	WATER	ROBINSON S	106165	497;432	3/31/1980	0000	10/17/1985
			NE	7 21		106169	PL	AIR		106165	497;430	3/31/1980	0000	10/17/1985
			NE	7 21		232423*	PL	DSW #2	MAXWELL DANIEL MAXWELL LAWRENCE MAXWELL NELLIE MAXWELL BRIAN VILLALOBOS LARRY SAUTTI SCOTT OERTER PAUL JOHNSON WAYNE	232422	636;882	10/27/1984	1987	5/19/1989
			NW	7 21		232424*	PL	DSW #3	MAXWELL DANIEL MAXWELL LAWRENCE MAXWELL NELLIE MAXWELL BRIAN VILLALOBOS LARRY SAUTTI SCOTT OERTER PAUL JOHNSON WAYNE	232422	636;884	10/27/1984	1987	5/19/1989
			W2	7 21		249192*	LD	WASP #II	RUSSELL CARI.	249191	664;222	1/01/1986	1987	6/13/1989
			SE	7 21		249193*	LD	WASP #V		249191	664;224	1/01/1986	1987	12/07/1987
			S2	7 21		249194*	LD	WASP #VI		249191	664;220	1/01/1986	1987	12/07/1987
			SW	7 21		249195*	LD	WASP #VII		249191	664;216	1/01/1986	1987	12/07/1987
			SE	7 21		268063*	LD	DSM #1	VANSLAMBROUCK THOMAS LYNN FRANK	268063	0699;0056	3/01/1987	1990	
			SE	7		268064*	LD	DSM #2	VANSLAMBROUCK THOMAS	268063	0699;0057	3/01/1987	1990	

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REPORT DATE: AUG 8, 1991
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GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

--LEGAL DESCRIPTION-- TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	25	SE	21	4	268064*LD	DSM #2		LYNN FRANK	268063	0699:0057	3/01/1987	1990	
			NE	7		270779*LD	CB NO 1		MURPHY ROBERT	270779	706:71	6/06/1987	1990	
			ALL	21 7 21		270780*LD	CB NO 2		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	270779	706:73	6/06/1987	1990	
			E2	7 21		270781*LD	CB NO 3		MURPHY ROBERT WITHERS CHARLES	270779	706:75	6/06/1987	1990	
			E2	7		270782*LD	CB NO 4		MURPHY ROBERT	270779	706:77	6/06/1987	1990	
			S2	21 7 21		271863*LD	CB #5		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	271863	0708:0833	7/01/1987	1990	
			SE	7		271864*LD	CB #6		MURPHY ROBERT	271863	0708:0835	7/01/1987	1990	
			SE	21 7		271865*LD	CB #7		WITHERS CHARLES MURPHY ROBERT	271863	0708:0837	7/01/1987	1990	
			SE	21 7 21		271866*LD	CB #8		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	271863	0708:0839	7/01/1987	1990	
			E2	7		271867*LD	CB #9		MURPHY ROBERT	271863	0708:0841	7/01/1987	1990	
			SW	21 7		271868*LD	CB #10		WITHERS CHARLES MURPHY ROBERT	271863	0708:0843	7/01/1987	1990	
			SW	21 7 21		271869*LD	CB #11		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	271863	0708:0845	7/01/1987	1990	
			SE	7		271870*LD	CB #12		MURPHY ROBERT	271863	0708:0847	7/01/1987	1990	
			SE	21 7		271871*LD	CB #13		WITHERS CHARLES MURPHY ROBERT	271863	0708:0849	7/01/1987	1990	
			SE	21 7 21		274839*LD	CB #14		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	274839	0715:0951	9/25/1987	1989	5/22/1991
			SE	7		274840*LD	CB #15		MURPHY ROBERT	274839	0715:0953	9/25/1987	1989	5/22/1991
			SE	21 7		274841*LD	CB #16		WITHERS CHARLES MURPHY ROBERT	274839	0715:0955	9/25/1987	1989	5/22/1991
			SE	21 7 21		274842*LD	CB #17		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	274839	0715:0957	9/25/1987	1989	5/22/1991
			S2	7		274847*LD	CB #22		MURPHY ROBERT	274839	0715:0967	9/25/1987	1990	
			SE	21 7		274848*LD	CB #23		WITHERS CHARLES MURPHY ROBERT	274339	0715:0969	9/25/1987	1990	
			E2	21 7 21		274849*LD	CB #24		WITHERS CHARLES MURPHY ROBERT WITHERS CHARLES	274839	0715:0971	9/25/1987	1990	
			N2	7		274885*LD	TROY 1		NICHOLS MONTY	274885	0715:0880	9/22/1987	1989	5/13/1991
			N2	21 7		274886*LD	TROY 2		SUMPTER LAVERN NICHOLS MONTY	274885	0715:0882	9/22/1987	1989	5/13/1991

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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

-LEGAL DESCRIPTION- TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	25	N2	21	4	274886*LD		TROY 2	SUMPTER LAVERN	274885	0715:0882	9/22/1987	1989	5/13/1991
			N2	7		274887*LD		TROY 3	NICHOLS MONTY	274885	0715:0884	9/22/1987	1989	5/13/1991
			NW	21 7		274888*LD		TROY 4	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0886	9/22/1987	1989	5/13/1991
			ALL	21 7		274889*LD		TROY 5	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0888	9/22/1987	1989	5/13/1991
			S2	21 7		274890*LD		TROY 6	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0890	9/22/1987	1989	5/13/1991
			NW	21 7		274891*LD		TROY 7	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0892	9/22/1987	1989	5/13/1991
			NW	21 7		274892*LD		TROY 8	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0894	9/22/1987	1989	5/13/1991
			NW	21 7		274893*LD		TROY 9	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0896	9/22/1987	1989	5/13/1991
			NW	21 7		274894*LD		TROY 10	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0898	9/22/1987	1989	5/13/1991
			W2	21 7		274895*LD		TROY 11	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0900	9/22/1987	1989	5/13/1991
			SW	21 7		274896*LD		TROY 12	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0434	9/22/1987	1989	5/13/1991
			SE	21 7		279857*LD		C B 30	SUMPTER LAVERN MURPHY ROBERT WITHERS CHARLES	279856	0715:0902 726:302	2/01/1988	1989	5/22/1991
			SE	21 7		305164*LD		C B NO 14	MURPHY ROBERT M WITHERS CHARLES C	305164	0802:0672	6/13/1990	1990	
			SE	21 7		305165*LD		C B NO 17	MURPHY ROBERT M WITHERS CHARLES C	305164	0802:0674	6/13/1990	1990	
		26	NW	21 7	2	56070 LD		HORSE 1	MOORE CARLEY	56020	508:210	4/07/1967	1985	4/13/1987
			NW	21 7		56071 LD		HORSE 2		56020	508:211	4/07/1967	1985	4/13/1987
			NW	21 7		56072 LD		HORSE 3		56020	508:212	4/07/1967	1985	4/13/1987
			NW	21 7		56073 LD		HORSE 4		56020	508:213	4/07/1967	1985	4/13/1987
			N2	21 7		56074 LD		HORSE 5		56020	525:77	10/02/1967	1985	4/13/1987
			NE	21 7		56075 LD		HORSE 6		56020	221:196	10/02/1967	1985	4/13/1987
			NE	21 7		56076 LD		HORSE 7		56020	221:197	10/02/1967	1985	4/13/1987
			NE	21 7		56077 LD		HORSE 8		56020	221:198	10/02/1967	1985	4/13/1987
			NE	21 7		56078 LD		HORSE 9		56020	221:199	10/02/1967	1985	4/13/1987
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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

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GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

LEGAL DESCRIPTION TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	26	NE	7 21	2	56079	LD	HORSE 10	MOORE CARLEY	56020	221;200	10/02/1967	1985	4/13/1987
			W2	7 21		56082	LD	RUSTY NO 3		56020	676;115	7/20/1972	1985	4/13/1987
			W2	7 21		56083	LD	RUSTY NO. 4		56020	676;116	7/20/1972	1985	4/13/1987
			W2	7 21		56084	LD	RUSTY NO. 5		56020	676;117	7/20/1972	1985	4/13/1987
			W2	7 21		56085	LD	RUSTY NO. 6		56020	676;118	7/20/1972	1985	4/13/1987
			ALL	7 21		56086	LD	RUSTY NO. 7		56020	676;119	7/20/1972	1985	4/13/1987
			E2	7 21		56087	LD	RUSTY NO. 8		56020	676;120	7/20/1972	1985	4/13/1987
			E2	7 21		56088	LD	RUSTY NO. 9		56020	676;121	7/20/1972	1985	4/13/1987
			E2	7 21		56089	LD	RUSTY NO. 10		56020	676;122	7/20/1972	1985	4/13/1987
			E2	7 21		56090	LD	RUSTY NO. 11		56020	676;123	7/20/1972	1985	4/13/1987
			N2	7 21		56091	LD	RUSTY NO. 12		56020	676;124	7/20/1972	1985	4/13/1987
			NW	7 21		56092	LD	RUSTY NO. 13		56020	676;125	7/20/1972	1985	4/13/1987
			NW	7 21		56093	LD	RUSTY NO. 14		56020	676;126	7/20/1972	1985	4/13/1987
			SW	7 21		56109	LD	YORT NO. 148		56020	676;98	6/27/1972	1985	4/13/1987
			SW	7 21		56110	LD	YORT NO. 150		56020	676;99	6/27/1972	1985	4/13/1987
			SW	7 21		56111	LD	YORT NO. 152		56020	676;100	6/27/1972	1985	4/13/1987
			S2	7 21		56112	LD	YORT NO. 154		56020	676;101	6/27/1972	1985	4/13/1987
			SE	7 21		56113	LD	YORT NO. 156		56020	676;102	6/27/1972	1985	4/13/1987
			SE	7 21		56114	LD	YORT NO. 158		56020	676;103	6/27/1972	1985	4/13/1987
			SW	7 21		56115	LD	YORT NO. 160		56020	676;104	6/27/1972	1985	4/13/1987
			SW	7 21		56117	LD	YORT NO. 187		56020	676;106	6/27/1972	1985	4/13/1987
			NE	7		274897*	LD	TROY 13	RAMSEY CAROL ELDER LAWERENCE NICHOLS MONTY	274885	1474;0436	9/22/1987	1989	5/13/1991

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GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

LEGAL DESCRIPTION TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	26	NE	21	2	274897*LD		TROY 13	SUMPTER LAVERN	274885	0715:0904	9/22/1987	1989	5/13/1991
			NE	7		274898*LD		TROY 14	NICHOLS MONTY	274885	1474:0438	9/22/1987	1989	5/13/1991
			NE	21 7		274899*LD		TROY 15	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0906 1474:0440	9/22/1987	1989	5/13/1991
			NE	21 7		274900*LD		TROY 16	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0908 1474:0442	9/22/1987	1989	5/13/1991
			E2	21 7		274901*LD		TROY 17	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0910 1474:0446	9/22/1987	1989	5/13/1991
			SE	21 7		274902*LD		TROY 18	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0912 1474:0446	9/22/1987	1989	5/13/1991
			SE	21 7		274903*LD		TROY 19	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0448	9/22/1987	1989	5/13/1991
			SE	21 7		274904*LD		TROY 20	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0450	9/22/1987	1989	5/13/1991
			N2	21 7		274905*LD		TROY 21	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0450	9/22/1987	1989	5/13/1991
			N2	21 7		274906*LD		TROY 22	SUMPTER LAVERN NICHOLS MONTY	274885	0715:0914 1474:0454	9/22/1987	1989	5/13/1991
			N2	21 7		274907*LD		TROY 23	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0456	9/22/1987	1989	5/13/1991
			N2	21 7		274908*LD		TROY 24	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0458	9/22/1987	1989	5/13/1991
			ALL	21 7		274909*LD		TROY 25	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0460	9/22/1987	1989	5/13/1991
			S2	21 7		274910*LD		TROY 26	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0462	9/22/1987	1989	5/13/1991
			S2	21 7		274911*LD		TROY 27	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0464	9/22/1987	1989	5/13/1991
			S2	21 7		274912*LD		TROY 28	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0466	9/22/1987	1989	5/13/1991
			NW	21 7		274913*LD		TROY 29	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0468	9/22/1987	1989	5/13/1991
			NW	21 7		274914*LD		TROY 30	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0470	9/22/1987	1989	5/13/1991
			NW	21 7		274915*LD		TROY 31	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0472	9/22/1987	1989	5/13/1991
			NW	21 7		274916*LD		TROY 32	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0474	9/22/1987	1989	5/13/1991
			W2	21 7		274917*LD		TROY 33	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0476	9/22/1987	1989	5/13/1991
			SW	21 7		274918*LD		TROY 34	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0478	9/22/1987	1989	5/13/1991
			SW	21 7		274919*LD		TROY 35	SUMPTER LAVERN NICHOLS MONTY	274885	1474:0480	9/22/1987	1989	5/13/1991

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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

PAGE NO: 12562
PCN: LT892PP1

GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

LEGAL DESCRIPTION TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	26	SW	21	2	274919*LD		TROY 35	SUMPTER LAVERN	274885	1474:0480	9/22/1987	1989	5/13/1991
			SW	7 21		274920*LD		TROY 36	NICHOLS MONTY	274885	1474:0482	9/22/1987	1989	5/13/1991
			NW	7 21		274921*LD		TROY 37	SUMPTER LAVERN NICHOLS MONTY SUMPTER LAVERN	274885	1474:0484	9/22/1987	1989	5/13/1991
			NW	7 21		274922*LD		TROY 38	NICHOLS MONTY SUMPTER LAVERN	274885	1474:0486	9/22/1987	1989	5/13/1991
			NW	7 21		274923*LD		TROY 39	NICHOLS MONTY SUMPTER LAVERN	274885	1474:0488	9/22/1987	1989	5/13/1991
			NW	7 21		274924*LD		TROY 40	NICHOLS MONTY SUMPTER LAVERN	274885	1474:0490	9/22/1987	1989	5/13/1991
			W2	7 21		275214*LD		TROY 41	NICHOLS MONTY	275214	1474:492	9/22/1987	1989	5/13/1991
			SW	7 21		275215*LD		TROY 42	SUMPTER LAVERNJR NICHOLS MONTY	275214	1474:494	9/22/1987	1989	5/13/1991
			SW	7 21		275216*LD		TROY 43	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:496	9/22/1987	1989	5/13/1991
			SW	7 21		275217*LD		TROY 44	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:498	9/22/1987	1989	5/13/1991
		27	SW	21		56035 LD		ALICE NO 4	MOORE CARLEY	56020	278:240	11/14/1960	1985	4/13/1987
			S2	21		56036 LD		ALICE NO 5	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:241	11/14/1960	1985	4/13/1987
			SW	21		56037 LD		ALICE #6	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:242	11/14/1960	1985	4/13/1987
			W2	21		56038 LD		ALICE #8	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:244	11/14/1960	1985	4/13/1987
			W2	21		56039 LD		ALICE NO 9	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:245	11/14/1960	1985	4/13/1987
			NW	21		56040 LD		ALICE NO. 10	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:246	11/14/1960	1985	4/13/1987
			W2	21		56041 LD		ALICE NO 11	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:247	11/14/1960	1985	4/13/1987
			S2	21		56042 LD		MARY ALICE #1	RAMSEY CAROL ELDER LAWERENCE MOORE CARLEY	56020	278:222	11/14/1960	1985	4/13/1987
			SW	21		56043 LD		MARY ALICE #2		56020	278:223	11/14/1960	1985	4/13/1987
			S2	21		56046 LD		MARY ALICE NO 7		56020	278:228	11/14/1960	1985	4/13/1987
			NW	21		56047 LD		TROY MIN. 1		56020	403:275	12/14/1964	1985	4/13/1987

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3 S 14 E 27 NW

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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

LEGAL DESCRIPTION TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	27	NW	21	2	56048	LD	TROY MTN. 2	MOORE CARLEY	56020	403:276	12/14/1964	1985	4/13/1987
			NW	21		56049	LD	TROY MTN. 3		56020	403:277	12/14/1964	1985	4/13/1987
			NW	21		56052	LD	TROY MTN 11		56020	398:540	8/17/1964	1985	4/13/1987
			NW	21		56054	LD	TROY MTN 13		56020	398:542	8/17/1964	1985	4/13/1987
			NW	21		56056	LD	TROY MTN. 15		56020	398:544	8/17/1964	1985	4/13/1987
			NE	21		56070	LD	HORSE 1		56020	508:210	4/07/1967	1985	4/13/1987
			E2	21		56080	LD	RUSTY NO. 1		56020	676:113	7/20/1972	1985	4/13/1987
			E2	21		56081	LD	RUSTY NO. 2		56020	676:114	7/20/1972	1985	4/13/1987
			NE	21		56093	LD	RUSTY NO. 14		56020	676:126	7/20/1972	1985	4/13/1987
			SE	21		56094	LD	YORT NO. 12		56020	673:411	4/23/1972	1985	4/13/1987
									RAMSEY CAROL					
			SE	21		56095	LD	YORT NO. 13	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:412	4/23/1972	1985	4/13/1987
			SE	21		56096	LD	YORT NO. 14	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:413	4/23/1972	1985	4/13/1987
			SE	21		56097	LD	YORT NO. 15	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:414	4/23/1972	1985	4/13/1987
			SE	21		56098	LD	YORT NO. 18	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:417	4/23/1972	1985	4/13/1987
			SE	21		56099	LD	YORT NO. 19	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:418	4/23/1972	1985	4/13/1987
			SE	21		56100	LD	YORT NO. 20	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:419	4/23/1972	1985	4/13/1987
			E2	21		56101	LD	YORT NO. 138	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:496	6/16/1972	1985	4/13/1987
			E2	21		56102	LD	YORT NO. 139	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:497	6/16/1972	1985	4/13/1987
			ALL	21		56103	LD	YORT NO. 140	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:498	6/16/1972	1985	4/13/1987
			W2	21		56104	LD	YORT NO. 141	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:499	6/16/1972	1985	4/13/1987
			NW	21		56106	LD	YORT NO. 144	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:502	6/17/1972	1985	4/13/1987
									ELDER LAWERENCE					

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3 S 14 E 27 NW

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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
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PAGE NO: 12564
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GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

-LEGAL DESCRIPTION- TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	27	NW	21	2	56107	LD	YORT NO. 145	MOORE CARLEY RAMSEY CAROL	56020	673:503	6/22/1972	1985	4/13/1987
			W2	21		56108	LD	YORT NO. 146	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	673:504	6/22/1972	1985	4/13/1987
			ALL	21		56118	LD	YORT NO. 188	ELDER LAWERENCE MOORE CARLEY RAMSEY CAROL	56020	676:107	7/21/1972	1985	4/13/1987
			NE	21		274921*	LD	TROY 37	ELDER LAWERENCE NICHOLS MONTY SUMPTER LAVERN	274885	1474:0484	9/22/1987	1989	5/13/1991
			NE	21		274922*	LD	TROY 38	NICHOLS MONTY SUMPTER LAVERN	274885	1474:0486	9/22/1987	1989	5/13/1991
			NE	21		274923*	LD	TROY 39	NICHOLS MONTY SUMPTER LAVERN	274885	1474:0488	9/22/1987	1989	5/13/1991
			NE	21		274924*	LD	TROY 40	NICHOLS MONTY SUMPTER LAVERN	274885	1474:0490	9/22/1987	1989	5/13/1991
			E2	21		275214*	LD	TROY 41	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:492	9/22/1987	1989	5/13/1991
			SE	21		275215*	LD	TROY 42	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:494	9/22/1987	1989	5/13/1991
			SE	21		275216*	LD	TROY 43	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:496	9/22/1987	1989	5/13/1991
			SE	21		275217*	LD	TROY 44	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:498	9/22/1987	1989	5/13/1991
			NE	21		275218*	LD	TROY 45	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:500	9/22/1987	1989	10/20/1987
			NE	21		275219*	LD	TROY 46	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:502	9/22/1987	1989	10/20/1987
			NE	21		275220*	LD	TROY 47	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:504	9/22/1987	1989	5/13/1991
			NE	21		275221*	LD	TROY 48	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:506	9/22/1987	1989	5/13/1991
			E2	21		275222*	LD	TROY 49	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:508	9/22/1987	1989	5/13/1991
			SE	21		275223*	LD	TROY 50	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:510	9/22/1987	1989	5/13/1991
			SE	21		275224*	LD	TROY 51	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:512	9/22/1987	1989	5/13/1991
			SE	21		275225*	LD	TROY 52	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:514	9/22/1987	1989	5/13/1991
			NW	21		275226*	LD	TROY 53	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474:516	9/22/1987	1989	10/20/1987
			NW	21		275227*	LD	TROY 54	NICHOLS MONTY	275214	1474:518	9/22/1987	1989	10/20/1987

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REPORT DATE: AUG 8, 1991
ADMINISTRATIVE STATE: ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

PAGE NO: 12565
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GEOGRAPHIC INDEX
ALL CLAIMS

MERIDIAN: GILA-SALT R.

LEGAL DESCRIPTION TWNSHP	RANGE	SEC	SUBDV	GEO CTY	BLM DIST	SERIAL NO.	CASE TYPE	CLAIM NAME/NUMBER	CLAIMANT(S)	LEAD FILE	COUNTY BOOK:PAGE	LOCATION DATE	LATEST ASSMT-YR	CASE CLOSED
3 S	14 E	27	NW		2	275227*LD		TROY 54	SUMPTER LAVERNJR	275214	1474;518	9/22/1987	1989	10/20/1987
			NW	21		275228*LD		TROY 55	NICHOLS MONTY	275214	1474;520	9/22/1987	1989	5/13/1991
			NW	21		275229*LD		TROY 56	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;522	9/22/1987	1989	5/13/1991
			W2	21		275230*LD		TROY 57	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;524	9/22/1987	1989	5/13/1991
			SW	21		275231*LD		TROY 58	NICHOLS MONTY	275214	1474;526	9/22/1987	1989	5/13/1991
			SW	21		275232*LD		TROY 59	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;528	9/22/1987	1989	5/13/1991
			SW	21		275233*LD		TROY 60	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;530	9/22/1987	1989	5/13/1991
			NW	21		275234*LD		TROY 61	NICHOLS MONTY	275214	1474;532	9/22/1987	1989	5/13/1991
			NW	21		275235*LD		TROY 62	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;534	9/22/1987	1989	5/13/1991
			NW	21		275236*LD		TROY 63	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;536	9/22/1987	1989	5/13/1991
			NW	21		275237*LD		TROY 64	NICHOLS MONTY	275214	1474;538	9/22/1987	1989	5/13/1991
			W2	21		275238*LD		TROY 65	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;540	9/22/1987	1989	5/13/1991
			SW	21		275239*LD		TROY 66	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;542	9/22/1987	1989	5/13/1991
			SW	21		275240*LD		TROY 67	NICHOLS MONTY	275214	1474;544	9/22/1987	1989	5/13/1991
			SW	21		275241*LD		TROY 68	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;546	9/22/1987	1989	5/13/1991
			NW	21		275242*LD		TROY 69	NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;548	9/22/1987	1989	5/13/1991
			W2	21		275243*LD		TROY 70	NICHOLS MONTY	275214	1474;550	9/22/1987	1989	5/13/1991
			SW	21		275244*LD		TROY 71	SUMPTER LAVERNJR NICHOLS MONTY SUMPTER LAVERNJR	275214	1474;552	9/22/1987	1989	5/13/1991
		28	S2	21		21126*LD		ALICE #3	GAYLOR JAMES E	21124	52;322	4/15/1942	1990	
			SE	21		21127*LD		ALICE #4		21124	52;327	4/15/1942	1990	
			N2,SE	21		21128*LD		ALICE #5		21124	52;327	4/15/1942	1990	
			SE	21		21129*LD		ALICE #6		21124	52;327	4/15/1942	1990	
			SE	21		21131*LD		WHITE TAIL DEER		21124	52;330	4/15/1942	1990	
			SW	21		21132*LD		PRATT SPRING		21124	52;329	4/15/1942	1990	
			S2	21		21133*LD		JOHNNY BOY		21124	52;329	4/15/1942	1990	
			S2	21		21134*LD		ALTO		21124	52;328	4/15/1942	1990	
			SW	21		21135*LD		BURRO		21124	52;329	4/15/1942	1990	

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8-132 X 84 10-6

GAYLOR ENTERPRISES

James E. Gaylor, Pres.
June E. Thiele, V-Pres.

6742-D Calle La Paz
Tucson, Arizona 85715

Phone: (602) 886-9663

GEOLOGY DEPARTMENT

December 14, 1987

Gentlemen: Re: Offer of Copper Mining Claims

I am offering my 45 copper mining claims for sale. There is a good showing of silver and traces of gold on these 900 acres. They are in the prime copper mining area of Arizona that produced in 1925 74% of United States copper for $1,300,000,000.00. Gold and silver are by-products of such mining; 3,900,000 ounces of silver and 52,000 ounces of gold.

These claims are ideally situated for mining; just two miles from the Gila River with the highway and railroad on my side of the river. Also, just two miles to the Kennecott open pit at Ray (now owned by ASARCO). See "Kennecott" sheet attached. My claims include the old Alice Mine workings and the half-mile long Pratt Tunnel (1902 to 1907). High grade carbonate ore was mined from the Alice mine running from 8% to 16% copper and some gold. Work was discontinued because of a 31% drop in the price of copper at that time. They could not process sulfide ore at the turn of the century so the 200 feet of 2% sulfide ore in the Pratt tunnel was too "low grade" for them to consider at that time. Today it is considered "high grade" ore by anybody's standards.

The only two drill holes on the 900 acres went through 200 feet of trace copper and silver. The holes did not hit the targeted ore body; however, the good mineralization in the holes indicated that we were close to the ore body.

Enclosed is a report by F. L. Croteau, Ltd. In addition to this report I have a safe full of reports, maps, charts, and other such data at my home that can be examined at our mutual convenience.

The depletion of the U.S. National Defense stockpile of copper, the new scientific requirements for copper, to say nothing of the population explosion, has doubled the price of copper in the last few months. The demand and price of copper can only go up from now on.

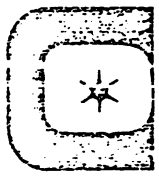
If interested in this property you and your geologist will be shown every courtesy. However, no lengthy free option for drilling will be given. These claims are firmed up legally and filed with the Bureau of Land Management. I am the sole owner of these unpatented claims. I am asking $2,250,000, with $50,000 at the time of signing of the contract, with the balance negotiable.

Very sincerely yours,

James E. Gaylor

JEG/jet

James E. Gaylor, President



PRELIMINARY GEOLOGICAL REPORT
on
"TROY" CLAIM GROUP
PINAL COUNTY, ARIZONA

F.L. Croteau February 15, 1971

F. L. CROTEAU LTD.

PRELIMINARY GEOLOGICAL REPORT

on

"TROY" CLAIM GROUP

PINAL COUNTY, ARIZONA

by

F.L. Croteau, B.Sc.
P.Eng. P.Geol.

Vancouver, B.C.
February 15, 1971

INTRODUCTION

Acting under instruction from Mr. J. Abrams of Shawnex Mines Ltd. (N.P.L.) of Calgary, Alberta, I have carried out a reconnaissance geological survey of certain mining claims, commonly known as the "Troy" group, located approximately 60 miles northerly from Tuscon, Arizona. The prime purpose of the examination was to ascertain geological conditions, check location of the older workings, examine the area from an accessibility standpoint and to recommend, if advisable, a future program of operations. The area was visited on February 4 and 5, 1971. Messrs. Abrams and J. Gaylor were present during examination of the property. Weather conditions were satisfactory for field examination.

LOCATION

The claim group is located in the Riverside Mining District in Pinal County in the State of Arizona. Paved roads extend to within 10 miles of the property (Highways 80 and 77) after which a winding, variable elevation trail continues to the claim group. A four-wheel drive vehicle is advisable over the latter portion of the trail. The nearest town where nominal supplies can be obtained is Winkelman. Mining and major supplies would be secured from Tuscon or Phoenix. Good airline services are available at Tucson.

There are no power lines in the immediate vicinity of the property but adequate power is available in the general area and

would necessitate connections less than 10 miles in length.

There are indications of minor springs and some water seepage from former mine workings but any substantial demand for water would have to be met from the Gila River, a distance of approximately 3 miles from the claims.

CLAIMS

original now approx 85 claims

The "Troy" group consists of 14 unpatented lode mining claims, the location notices of which are recorded in the office of the County Recorder of Pinal County, Arizona, in the Book and at the Pages of "Record of Mines" set opposite their respective names as follows:

Name of Claim	Book Number	Page
Alice #1	52	331
Alice #2	52	322
Alice #3	52	322
Alice #4	52	327
Alice #5	52	327
Alice #6	52	327
Alice Annex	52	328
Alto	52	328
Burro	52	329
Johnny Boy	52	329
Pratt Spring	52	329
Skyline	52	330
White Tail Deer	52	330
Gaylor		

31 additional claims have been added to this group

All claims are contiguous and are staked in accordance with the laws and regulations governing Mineral Rights in the State of Arizona.

ACREAGE

There are 280 acres, more or less, included in the 14 claim block.

TITLE

The claims are currently held by Shawnex Mines Ltd. and associates under an option agreement with Mr. James E. Gaylor. Mr. Gaylor is the owner of, subject only to the paramount title of the United States of America, those certain fourteen (14) unpatented lode mining claims NOW A TOTAL OF 45 CLAIMS described in the above section under title of "Claims". The claims are held under the laws and regulations governing Mineral Rights in the State of Arizona.

HISTORY

Historical records indicate that mining activity in the "Troy" area commenced sometime prior to 1900 but the first recorded information shows in the "Copper Handbook", Volume 2, dated 1902. Between this latter period and 1925 considerable mining was carried out in the area. There were numerous company changes and various mining engineers and mining personnel reported on activities that took place on the "Troy" and adjoining claim groups.

A number of shafts, adits, winzes and underground workings were developed on the various properties, none of which are fully accessible today. However records show that a considerable amount of copper oxide ore was removed from the area.

It would appear that finances and widely varying demand and pricing for copper created an unstable media for mining in the area. Transportation and lack of nearby smelting facilities in 1902 were also adverse factors.

Comments made through various mining reports indicate that various engineers were conscious of the possibility of copper sulphide ore at depth in the area. This assumption has been proven to be a correct one in various nearby mining operations in southern Arizona.

TOPOGRAPHY

The general claim area can be described as rugged but is not mountainous. The general elevation of the country increases when one proceeds westward from Highway 77 and leads into an area known locally as the Dripping Spring Mountains. Elevations in the area reach a maximum of 4800 feet but on the claim group are closer to a maximum of 3600 feet above mean sea level.

The area is quite arid and there is little or no tree growth on the claims. Fault action has created a number of sharply

incised valleys and canyons. There are a few springs in existence in the claim area but a main water source would have to be obtained from the Gila River, a distance of three miles westward from the subject property.

Present access to the property is from an easterly direction over a winding road with variable but not severe grades. It would appear that a much shorter route with more equitable grades would be possible.

There is a limited soil cover in the claim area and a general strip mining operation would not necessitate a high stripping ratio to reach rock surfaces.

AREAL GEOLOGY

The general area under consideration has been one where most developments of ore have originated as carbonate replacement bodies in the limestone and ultimately these have given way to potential sulphide ore bodies in the deeper seated intrusive bodies.

The general geology is represented by a predominantly sedimentary series of rocks which are underlain by rocks of an intrusive nature. Locally there may be some reversal or juxtaposition of the above sequence due to faulting and other structural causes.

Sedimentary rocks in evidence were quartzite, limestone, phyllitic schist and conglomerate. Intrusives present were diabase, dacite porphyry and granite which ranged to altered granodiorite in composition. The porphyry and diabase occur from reasonable sized dykes to more broad intrusions (diabase) in form. Brecciation is not an uncommon characteristic of the rock formations.

There is considerable evidence of alteration both in the sediments and in the intrusives and can be attributed to the metamorphic and hydrothermal action associated with the intrusive rock formations. The most important alteration effect, associated with the development of ore bodies, is the lime-silicate alteration sequence.

STRUCTURAL GEOLOGY

The main copper bearing areas of Arizona have been subjected to considerable faulting and fissuring which originated from broad tectonic movements and from the more local intrusions of igneous rock. The faults and fissures thus created have proven to be excellent sources for ore deposition within the sedimentary rock sequence. The intrusive diabase and porphyry bodies were the likely carriers of primary sulphide material from the main igneous mass and should act as focal points for copper ore concentration.

The "Troy" area shows pronounced faulting to occur in a northeast-southwest trending direction and this together with the

resultant fissuring has proved to be the locus for the ore bodies, that occurred in the "Alice" mine. A pronounced north-southerly fault occurs in the more westerly portion of the claim block and creates a sharp demarkation line between the limestone and quartzite bodies and gives definite indication that the quartzite body to the west formed the up-thrown side of the fault.

CLAIM GEOLOGY

A reasonable portion of the claim block is exposed as rock outcrop and a fair idea can be secured of rock sequence and some of the structural controls. The main area of previous exploration and mining was centred around the "Alice" shaft which is located in the north-easterly corner of the Alice No. 2 claim. Later, in an effort to reach the "Alice" orebody at greater depth, an adit known as the "Pratt" tunnel was driven from a point in the east central portion of Alice No. 1. (These locations can be more readily seen on the accompanying maps.)

The presently known ore body lies along and may well have been associated with the NE-SW trending "Climax" fault.

Previous geological work reported from the "Alice" mine workings and the "Pratt" tunnel indicate a descending series comprised as follows:

Martin Limestone (Devonian)
Troy Quartzite (Cambrian)
Diabase Sill (Mesozoic)
Troy Quartzite (Cambrian)

with the entire above series intruded intermittently and irregularly by Quartz Monzonite Porphyry (possibly of Tertiary age) occurring both fairly massively and as definite dykes.

Ore in the "Alice" shaft occurred along and adjoining a contact zone between the Martin Limestone and a prominent Quartz Monzonite Porphyry dyke. A fault zone was the apparent locus for the Quartz Monzonite Porphyry intrusion.

The sedimentary formations are well developed and readily distinguishable. The limestone is a dark grey, fossiliferous formation, massive in nature and thus readily subject to fracture. The quartzite is a dense, clean silica type and shows a well developed conglomerate base. Specimens of intrusive material seen on the "Pratt" tunnel dump were relatively fresh in appearance while surface outcrop specimens showed marked weathering effects.

A local zone approximating a phyllitic schist occurs on surface at the approximate position where the vertically upward extension of the "Pratt" tunnel would intersect the main N-S fault separating the limestone and quartzite bodies. This may be an occurrence of Pinal Schist (Pre Cambrian).

ECONOMIC GEOLOGY

There is no record of the mining activity or production that may have taken place in the Troy area previous to 1900. Records show that mining was actively in progress in 1900 and that a vein 3.0 to 11.0 feet wide was being mined from a 400 foot shaft with a number of supporting levels. Grade of copper was 12 per cent and 3000 tons of ore were reported stockpiled at the "Alice" mine. In 1901 production was reported at 120,000 pounds of copper secured from a 500 ton shipment of ore. Similar production averaging in the 8.0 to 16.0 per cent copper range carried on intermittently until about 1922.

It was apparent in the early 1920's that unstable copper prices and the likelihood that the oxide ore in the "Alice" workings may have been decreasing in volume and grade. The latter assumption is made on the basis of a 1917 newspaper report which stated "The Alice shaft is down 400 feet and passed through 50 feet of 4.0 per cent sulphide ore, too low grade to be handled profitably at the time it was opened. This ore will be developed through what is known as the Pratt tunnel".

Other mines in the area known as the Buckeye, Manhattan, and Rattler were productive but to what extent is unknown to the writer.

Ore mined from the area was essentially copper oxide and little or no effort was made to mine or to advance exploration of sulphide bodies. Conversation with technical personnel has indicated that oxide bodies vary widely in size and that when any accumulation occurs the general area should be closely examined for deeper seated or repeat bodies that may be quite extensive in nature. It has also been proven in Arizona that oxide bodies commonly give way to primary sulphide bodies which form the majority of the "porphyry copper" bodies of that state.

The subject claim block occurs near the boundary between Pinal and Gila counties and some generalized descriptions of ore occurrences in those areas is as follows:

1. Vein deposit with some replacement ore in limestone. Underground.

2. Chalcocite blanket in schist and chalcopyrite in diabase. Open Pit.

3. Disseminated in granite and monzonite porphyry. Underground.

4. Disseminated in quartz monzonite. Open cut.

5. Vein deposit with some supergene enrichment. Underground.

6. Limestone replacement deposits. Underground.

Understandingly grades vary over a considerable rang and in general enrichment is associated with the main fault and fissure areas of the formation.

CONCLUSIONS

1. The subject area has a record of production from oxide ore bodies and old reports indicate that primary sulphi were encountered during extraction of the oxide ores.

2. Structural conditions on the property are favourable for the accumulation of ore bodies.

3. The broad sedimentary cover on the property has been subject to fault activity and to substantial igneous intru- sion.

4. The igneous intrusives are essentially diabase, which appears to occur as a sill or flatly bedded deposit, and Quartz Monzonite Porphyry which occurs as small mas and more particularly as dykes ranging from a few feet thickness to around 200 feet.

5. Ore occurrences appear to be a function of fault action. The fault areas having opened the channels along which igneous intrusion took place carrying the copper sulph

into areas where ultimate near surface oxidation took place.

6. As a consequence of Item 5 the main areas of exploratory concentration should be those embracing faults and intrusive rock formation.

7. Recorded information shows that minor copper oxide occurrences will commonly lead to major bodies both in the horizontal and vertical planes, and that oxidation is not merely a near surface phenomenon.

8. The substantiation of primary sulphide bodies on the claim group is a feature that requires deep seated geophysical techniques.

9. No useful purpose would be served through conducting a geochemical survey.

10. Sufficient water for diamond drill purposes should be available due to a limited seepage from the Pratt tunnel.

11. No useful purpose would presently be served by any attempt to rehabilitate the "Alice" shaft or the "Pratt" tunnel.

12. Old maps indicate that there may be linkage between the former "Alice" mine workings and the "Pratt" tunnel.

This would appear from maps and conversation with local individuals to be a rambling type of decline as opposed to a standard winze. This must be classed as conjecture since no formal record exists.

RECOMMENDATIONS

1. A program embracing 10 line miles of Induced Potential geophysical surveying which would explore to a 1000 foot vertical depth should be carried out to establish the primary sulphide potential of the property.

2. Regardless of any negative results that may be obtained from the above geophysical survey it will be necessary to carry out a diamond drilling program that would approximate 2000 feet and cover 4 holes of 500 foot depth. This must be done to adequately test for possible copper oxide bodies since they will not respond to geophysical methods.

3. Check the current status of all corner and location monuments.

4. Some road improvements are necessary and will become more so when moving in a diamond drill.

5. Should geophysical survey indications be favourable an immediate investigation should be made in regard to further land acquisition.

The approximate cost to carry out the above recommendations would be as follows:

Geophysical survey 10 miles @ $400 per mile	$ 4,000
Diamond Drilling 2000 feet @ $10 per foot	$20,000
Road improvement	$ 2,000
Assay, sampling, etc.	$ 500
Transportation and camp maintenance	$ 3,000
Engineering and supervision	$ 2,500
	$32,000

Respectfully submitted,

F.L. Croteau, B.Sc.
P.Eng. P.Geol.

Vancouver, B.C.
February 15, 1971

CERTIFICATE

I, F.L. Croteau, of 1055 West Hastings Street, Vancouver, in the Province of British Columbia, certify that:

1. I am a graduate of the University of Saskatchewan and hold the degree of B.Sc. in Mining Geology. Year of graduation was 1936.

2. I am a Registered Professional Engineer in the Province of British Columbia and in the Yukon Territory, a Registered Professional Geologist in the Province of Alberta and hold a licence to practise Professional Engineering in the Province of Saskatchewan.

3. I have practised my profession in Canada, the United States, Mexico and the West Indies since 1936.

4. That the claims are properly staked under the Mining Regulations of the State of Arizona.

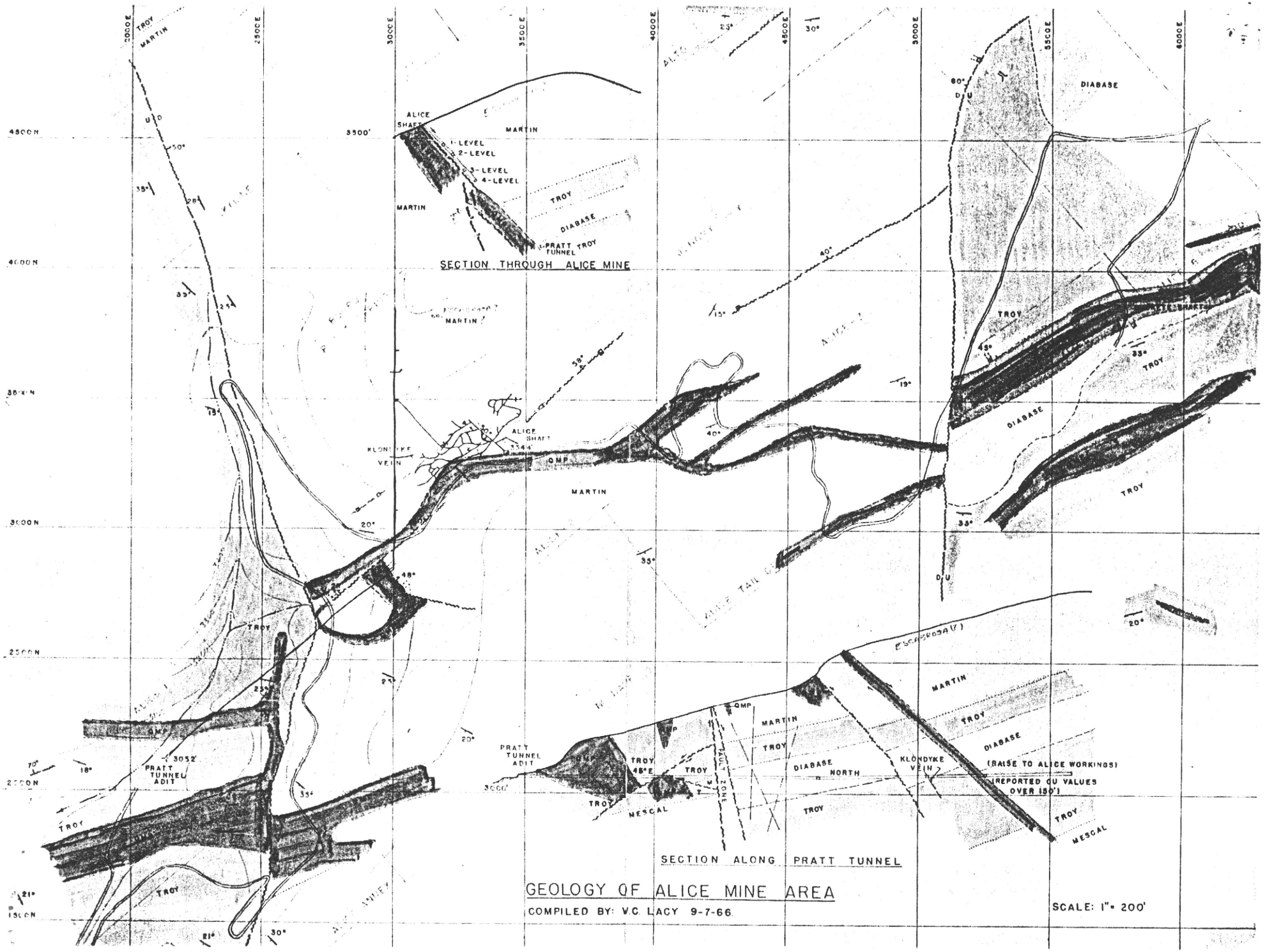
5. I have no interest direct or indirect in the lands or securities of Shawnex Mines Ltd. (N.P.L.)

6. That the material in this report is based on personal inspection of the claims, perusal of numerous reports and maps and personal discussion with technical personnel at the University of Arizona.

Respectfully submitted,

F.L. Croteau, B.Sc.
P.Eng. P.Geol.

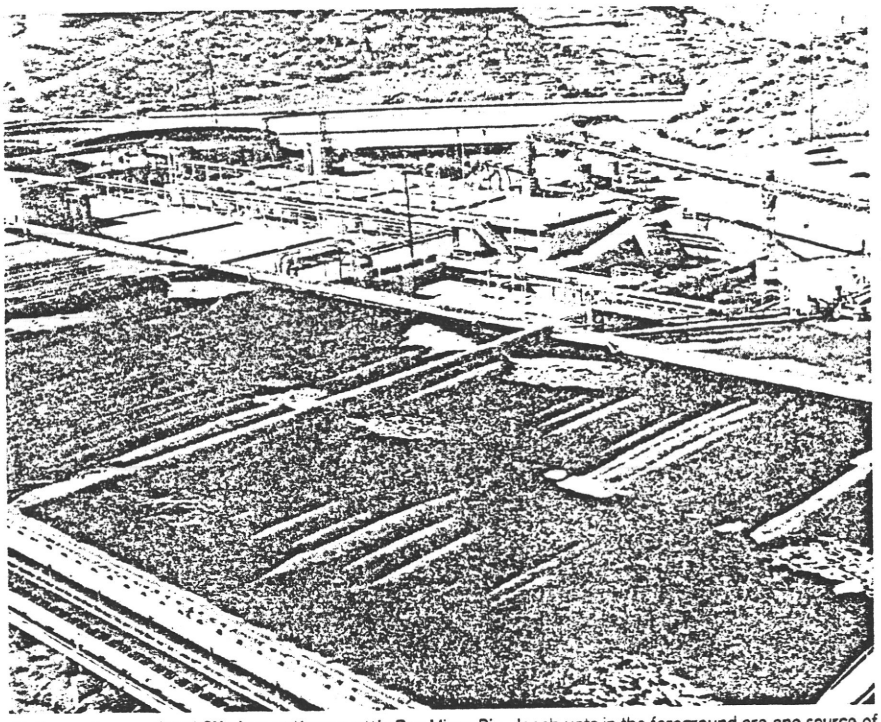
Vancouver, B.C.
February 15, 1971



GEOLOGY OF ALICE MINE AREA

COMPILED BY: V.C. LACY 9-7-66

SCALE: 1" = 200'



At the newly completed SX plant at Kennecott's Ray Mines Div., leach vats in the foreground are one source of the pregnant solutions fed through the two trains in the center, and from there to the electrowinning building stretching across the top of the picture. (Kennecott Corp. photograph by Don Green.)

Kennecott's new SX plant on stream

Kennecott Corp.'s new copper solvent extraction (SX) plant has started up at the 11-year-old silicate ore leaching plant (SOLP) of Ray Mines Div. near Hayden, Ariz. The SX addition is expected to produce a more concentrated and purified copper electrolyte for the tankhouse than the vat leach liquor formerly presented to the electrowinning plant. Improvements are also anticipated in cathode quality as a result.

The new SX plant will also process pregnant copper solution from an agitation leach circuit installed several years after the original SOLP system was activated. Copper was precipitated from agitation leach liquor by iron, and thus required smelting and refining. The new SX plant will, therefore, release additional smelting and refining capacity for sulphide concentrates.

Production at the SX plant, designed by Jacobs Engineering Group for a maximum capacity of 108 stpd, is now approaching 90 stpd. The path to production was a long one, hinging on commercial development of a reagent that could handle the high sulphuric acid content of the ore leach solution. Construction of the plant within the tight confines of the existing plant site also presented problems.

Development of a new reagent was necessary because the acid concentrations are far higher than at other SX plants, up to about 30 gpl for the leach vat solutions. However, those are mixed with solutions from a fines leaching circuit, which runs about 8 gpl, and wash water from the vats. The acid content of the SX plant feed is 8-10 gpl. "That's still high compared with other leach circuits, but it's about as far as we can reduce the acid and get the copper leached out of the ore," said Jack Larimore, plant engineer.

Working with Kennecott's research center in Salt Lake City in 1977, three companies came out with new reagents. After bench testing, Kennecott selected P-5100, a product of Acorga Ltd. The final extractant is the P-5100 (10%) plus a diluent (90%) that is essentially a high-purity kerosene, Escade's SK 200. The extractant was run through a 50-gpm pilot plant operation on the SOLP site for about six months, and these tests became the basis for design of the SX plant.

When the SOLP plant went on stream in 1969, the leaching system consisted of 14 vats, 100 x 110 x 20 ft deep, each holding about 10,000 st of ore. The vat solution advanced directly to an electrowinning circuit. During leaching, aluminum salts, iron, and other contaminants detrimental to electrowinning were dissolved. The impurities were impacting negatively on cathode quality.

In 1976, an agitation leaching facility was constructed to work in conjunction with the vat system. This facility increased the amount of ore that could be

(Continued on p 39)

30 So. Main St.
P. O. Box 1389

JACOBS ASSAY OFFICE

Phone 2-0813

REGISTERED ASSAYERS

DUPLICATE

Certificate No. 53452 Tucson, Arizona, April 4th, 1958

Sample Submitted by Mr. Universal Copper Co

SERIAL	SAMPLE MARKED	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per cent Wet Assay
			$				
156231	0				3.04		
32	1				2.12		
33	2				2.01		
34	3				2.42		
35	4				0.42		
36	5				1.47		
37	6				5.00		
38	7				5.14		
39	8				5.70		
40	9				4.73		
41	T1				0.18		
42	2				0.20		
43	3				0.44		
44	4				21.25		
45	5				7.50		
46	6				7.45		
47	7				3.41		

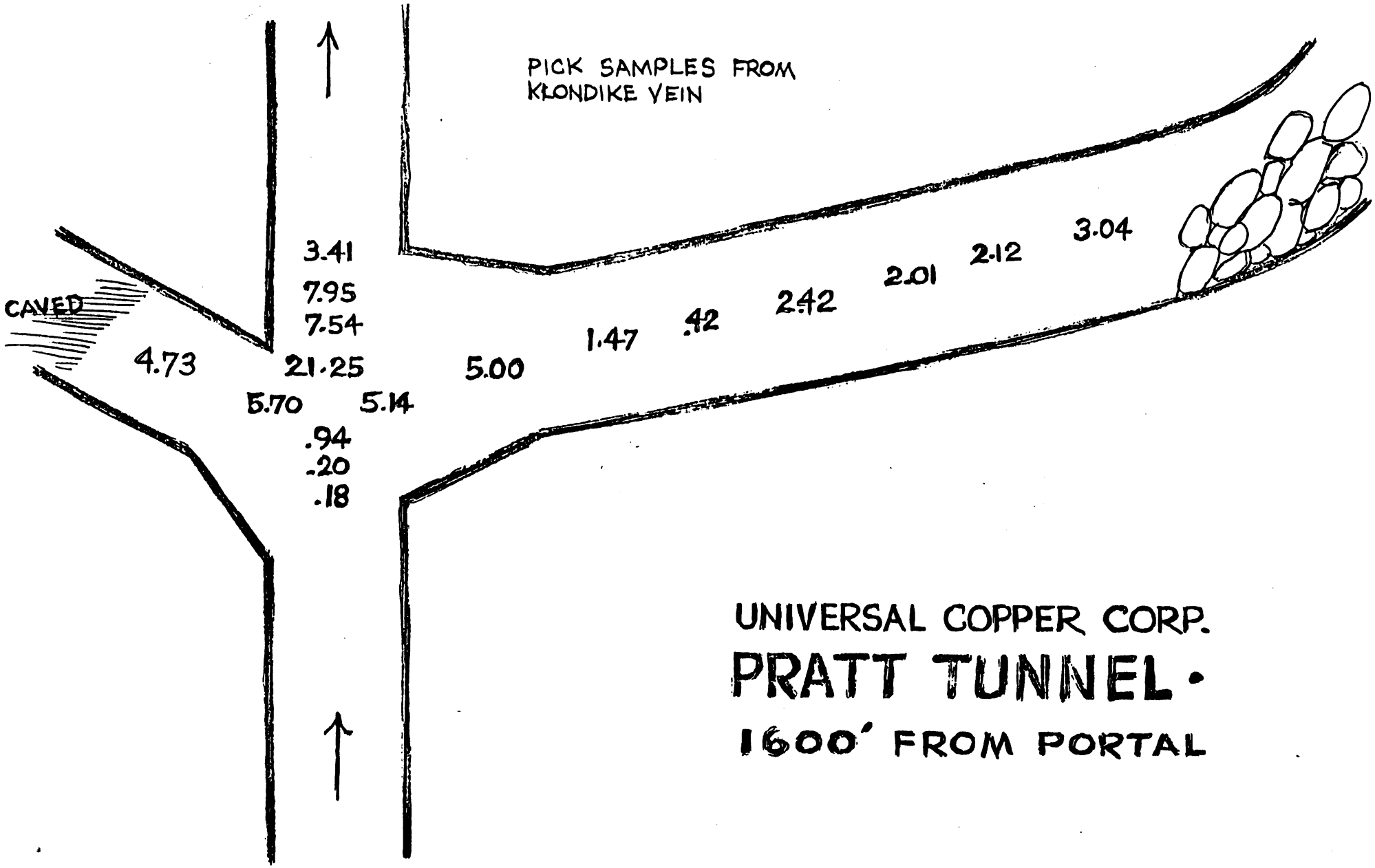
* Gold Figured $35.00 per oz. Troy

Charges $ 25.50

Very respectfully,

Jacobs

This would be # 500 ore in 1989

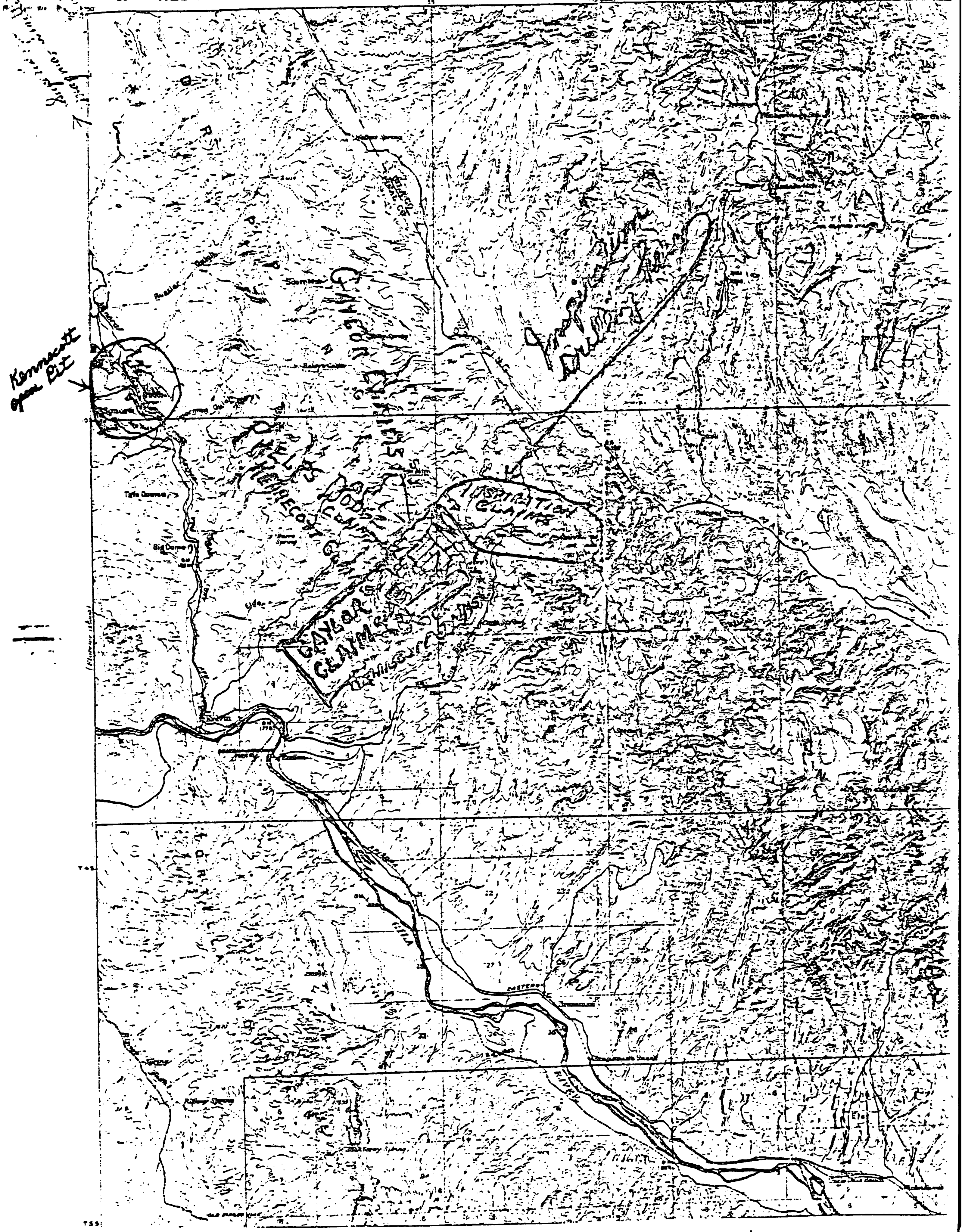


UNIVERSAL COPPER CORP.

PRATT TUNNEL.

1600' FROM PORTAL

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



fractured, and was intruded by dikes
ɔ) that is intermediate in composition
. quartz diorite.
ɜts of 45-65 percent subhedral to euhedral
mm long, 15-30 percent subhedral to
n long, 10-20 percent anhedral ortho-
ɔhedral biotite as much as 5 mm in
ıornblende as much as 4 mm long, 1-4
etite-ilmenite as much as 1 mm in
apatite, sphene, and zircon. K-Ar age
L. Silberman (written commun., 1971)
y. for a biotite separate, and 74 ±2 m.y.
e.

)RITE—Small stock-like masses in the
ıdrangle that are cut by rhyodacite por-
trude all rocks older than and including
) Limestone in the quadrangle. Many
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ɜition ranges from pyroxene-hornblende
ornblende quartz diorite (tonalite).
l porphyritic facies with euhedral pheno-
.ornblende up to 3 cm across is a common
ype. The most common type is medium-
-grained hypidiomorphic-granular rock,
ıately 50-60 percent subhedral labra-
ubhedral augite, hornblende, and biotite
ɔ percent subhedral magnetite-ilmenite;
l orthoclase that, like quartz, commonly
nuous masses up to 10 times the average
:; and 5-15 percent quartz. Accessory
·con, and sphene. M. L. Silberman (writ-
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.TE PORPHYRY—Occurs in two small
sec. 30, T. 3 S., R. 14 E., where it cuts
Vinkelman quadrangle it is cut by rhyo-
(M. Kreiger, oral commun., 1970); most
s; K-Ar age is 128 m.y. (M. L. Silberman,
ι). Phenocrysts make up 10-30 percent
.rtly glomeroporphyritic, blocky euhedral
ɔlorite up to 2 mm long (10-25 percent),
nenite up to 0.5 mm in diameter (0.5-1.5
. rounded glomeroporphyritic hornblende
: percent), euhedral colorless augite up to
l percent). Groundmass comprises 70-90
gray to black, aphanitic with trachytic to
d consists of plagioclase laths (40-70 per-
(3 percent), subhedral magnetite-ilmenite
:d light-green glass (10-15 percent).
Occurs as sills with rare connecting dikes,
:ween the Abrigo, Martin, Escabrosa, and
at several horizons in the Escabrosa and
w the fossiliferous limestone bed in the
n to map. Thin sills and selvages on sills
are very variable in color and appearance
degree of alteration. They range from
-rocks through harder gray and brown

db DIABASE—Diabase sills and some discordant bodies are common to abundant in all the Precambrian rocks, but especially in the Mescal Limestone and Dripping Spring Quartzite. The sills range in thickness from a few feet to 1,000 feet or more. The thicker sills are probably composite. The rock is dark gray to olive gray, fine to coarse grained with diabasic to ophitic texture. The thicker sills have pegmatitic schlieren and irregular masses. The diabase disintegrates on weathering and forms slopes and flat areas veneered by yellowish-brown granular soil and rounded boulders. The least altered diabase is composed of laths of labradorite partly altered to sericite and kaolinite poikilitically included in augite and pigeonite, and olivine plus accessory magnetite-ilmenite. The ferromagnesian minerals are partly altered to bowlingite, antigorite, limonite, iddingsite, and magnetite-ilmenite. Much of the diabase has been altered to some degree, with the development of hornblende, biotite, quartz, epidote, and pumpellyite. Some diabase contains graphic intergrowths of quartz and K-feldspar.

t TROY QUARTZITE (300-800 ft)—The Troy Quartzite in the Sonora quadrangle and surrounding area has been correlated by Shride (1967, p. 44-46) with the Chediski Sandstone Member of the formation, and the three sections we measured support this correlation. On the top of Troy Mountain, however, where the formation is 800 feet thick, remnants of an upper medium-grained very light gray vitreous quartzite resemble the quartzite member (Shride, 1967, p. 51-52). The main body of Troy in this quadrangle is quartzite and sandstone that range in color from grayish pink and white to light brown and grayish orange and consist of medium to coarse subangular to rounded sand with variable amounts of feldspar, limonite, and dark accessories. The quartzite is interbedded in varying proportions with thin layers and lenses of poorly to well-sorted pebble and granule conglomerates. Matrix is siliceous with some clay. Beds range in thickness from laminated to very thin but are arranged in thin to thick composite tabular to lenticular sets. Crossbedding is locally prominent.

The base of the formation consists of 5-10 feet of conglomerate with angular to rounded pebbles and cobbles of white quartz, several types of sandstone and quartzite, Mescal Limestone, chert, red and pink jasper, basalt, and Pinal Schist in a poorly sorted reddish-orange to light-brown matrix, medium to coarse grained, well cemented, siliceous and ferruginous. Conglomerate beds, 2-6 feet thick, are also scattered through the formation, particularly toward the top. The predominant quartzites of the Troy form bold cliffs with intervening slopes underlain by more friable sandstone.

APACHE GROUP:

The Apache Group includes the Pioneer Formation, Dripping Spring Quartzite, Mescal Limestone, and basalt.

b BASALT (0-100 ft)—One or more flows of porphyritic basalt, grayish to blackish red or brown, with vesicular, amygdular tops. Phenocrysts are plagioclase, partly glomeroporphyritic, 2-8 mm long. Groundmass is grayish or blackish red or brown, fine grained, and consists predominantly of plagioclase laths 0.1-0.3 mm long in intersertal relations with pyroxene, olivine, and magnetite. Plagioclase has composition of about An_{50}. The basalt has been intensely altered to chlorite, sericite, calcite, epidote, quartz, hematite, kaolinite, limonite and some K-feldspar; pyroxene and olivine have been almost completely replaced.

m MESCAL LIMESTONE (270-340 ft)—Formation consists of pale-pink to light-brown and brownish-gray dolomite, partly calcareous, thinly laminated to thin-bedded, sublithographic to fine grained, partly medium to coarse grained. Black, white, and pinkish-gray chert, aphanitic to microcrystalline, is abundant in some beds as uneven layers, lenses, and nodules. Stromatolitic algal beds are abundant above the middle of the formation and massive bedlike layers of sandstone and quartzite

aplite, the stock cooled, fractured, and was intruded by dikes of porphyritic rock (Krp) that is intermediate in composition between granodiorite and quartz diorite.

The main rock type consists of 45-65 percent subhedral to euhedral andesine as much as 6 mm long, 15-30 percent subhedral to anhedral quartz, 2-7 mm long, 10-20 percent anhedral orthoclase, 0-13 percent subhedral biotite as much as 5 mm in diameter, 0-11 percent hornblende as much as 4 mm long, 1-4 percent euhedral magnetite-ilmenite as much as 1 mm in diameter, and accessory apatite, sphene, and zircon. K-Ar age determinations by M. L. Silberman (written commun., 1971) give an age of 70 ±2 m.y. for a biotite separate, and 74 ±2 m.y. for a hornblende separate.

Kt TORTILLA QUARTZ DIORITE—Small stock-like masses in the southern half of the quadrangle that are cut by rhyodacite porphyry (TKr) and that intrude all rocks older than and including the Pennsylvanian Naco Limestone in the quadrangle. Many stocks of identical rock are found south of Sonora quadrangle, especially along the axis of the Tortilla Mountains. This quartz diorite, previously informally called Sonora diorite by local geologists, is here formally named the Tortilla Quartz Diorite for widespread exposures in the Tortilla Mountains in the adjacent Kearny quadrangle. The rock, although slightly variable in appearance and composition from stock to stock, is for the most part a quartz diorite, both modally and chemically. Its type section is in sec. 2, T. 4 S., R. 13 E., north of the Gila River and west of Mineral Creek in the Kearny quadrangle. Within and between separate stocks, composition ranges from pyroxene-hornblende diorite through biotite-hornblende quartz diorite (tonalite).

An abruptly gradational porphyritic facies with euhedral phenocrysts of pyroxene and hornblende up to 3 cm across is a common but not dominant rock type. The most common type is medium-gray fine- to medium-grained hypidiomorphic-granular rock, composed of approximately 50-60 percent subhedral labradorite; 25-30 percent subhedral augite, hornblende, and biotite in varying amounts; 5 percent subhedral magnetite-ilmenite; 5-10 percent interstitial orthoclase that, like quartz, commonly occurs in optically continuous masses up to 10 times the average grain size of the rock; and 5-15 percent quartz. Accessory minerals are apatite, zircon, and sphene. M. L. Silberman (written commun., 1971) has obtained K-Ar ages of 71 ±2 m.y. and 83 ±2 m.y. for coexisting biotite and hornblende, respectively. Although these ages are discordant the true age is presumably Late Cretaceous since both fall in this range.

Tha HORNBLENDE ANDESITE PORPHYRY—Occurs in two small exposures in the NW¼ sec. 30, T. 3 S., R. 14 E., where it cuts diabase (db). In the Winkelman quadrangle it is cut by rhyodacite porphyry (TKr2) (M. Kreiger, oral commun., 1970); most mafic of Laramide dikes; K-Ar age is 128 m.y. (M. L. Silberman, written commun., 1971). Phenocrysts make up 10-30 percent of rock as follows: partly glomeroporphyritic, blocky euhedral partially altered labradorite up to 2 mm long (10-25 percent), subhedral magnetite-ilmenite up to 0.5 mm in diameter (0.5-1.5 percent), euhedral and rounded glomeroporphyritic hornblende up to 1.5 cm long (0-4 percent), euhedral colorless augite up to 1 mm in diameter (0-1 percent). Groundmass comprises 70-90 percent of rock and is gray to black, aphanitic with trachytic to hyalopilitic texture, and consists of plagioclase laths (40-70 percent), anhedral sphene (3 percent), subhedral magnetite-ilmenite (6-7 percent), devitrified light-green glass (10-15 percent).

Tbp BASALT PORPHYRY—Occurs as sills with rare connecting dikes, usually at contacts between the Abrigo, Martin, Escabrosa, and Naco Formations, and at several horizons in the Escabrosa and near and usually below the fossiliferous limestone bed in the Martin; usually too thin to map. Thin sills and selvages on sills more than 5 feet thick are very variable in color and appearance owing to variations in degree of alteration. They range from punky yellowish-white rocks through harder gray and brown

db DIABASE—Diabase sills and some discordant bodies mon to abundant in all the Precambrian rocks, but in the Mescal Limestone and Dripping Spring The sills range in thickness from a few feet to 1,000 fe The thicker sills are probably composite. The rock is to olive gray, fine to coarse grained with diabasic texture. The thicker sills have pegmatitic schlieren ular masses. The diabase disintegrates on weatl forms slopes and flat areas veneered by yellowish-br ular soil and rounded boulders. The least altered composed of laths of labradorite partly altered to s kaolinite poikilitically included in augite and pige olivine plus accessory magnetite-ilmenite. The ferr minerals are partly altered to bowlingite, antigorit iddingsite, and magnetite-ilmenite. Much of the d been altered to some degree, with the developmen blende, biotite, quartz, epidote, and pumpellyit diabase contains graphic intergrowths of quartz and K-

t TROY QUARTZITE (300-800 ft)—The Troy Quartz Sonora quadrangle and surrounding area has been by Shride (1967, p. 44-46) with the Chediski Sandsto of the formation, and the three sections we measur this correlation. On the top of Troy Mountain, howe the formation is 800 feet thick, remnants of an upp grained very light gray vitreous quartzite resemble th member (Shride, 1967, p. 51-52). The main body this quadrangle is quartzite and sandstone that ran from grayish pink and white to light brown and gray and consist of medium to coarse subangular to rou with variable amounts of feldspar, limonite, and d sories. The quartzite is interbedded in varying with thin layers and lenses of poorly to well-sorted granule conglomerates. Matrix is siliceous with s Beds range in thickness from laminated to very thi arranged in thin to thick composite tabular to lenti Crossbedding is locally prominent.

The base of the formation consists of 5-10 feet of co with angular to rounded pebbles and cobbles of wh several types of sandstone and quartzite, Mescal chert, red and pink jasper, basalt, and Pinal Schist i sorted reddish-orange to light-brown matrix, medium grained, well cemented, siliceous and ferruginous. erate beds, 2-6 feet thick, are also scattered throug mation, particularly toward the top. The predomina ites of the Troy form bold cliffs with intervening slo lain by more friable sandstone.

APACHE GROUP:

The Apache Group includes the Pioneer Formation, Spring Quartzite, Mescal Limestone, and basalt.

b BASALT (0-100 ft)—One or more flows of porphyri grayish to blackish red or brown, with vesicular, tops. Phenocrysts are plagioclase, partly glomerop 2-8 mm long. Groundmass is grayish or blackish red fine grained, and consists predominantly of plagioc 0.1-0.3 mm long in intersertal relations with pyroxen and magnetite. Plagioclase has composition of about basalt has been intensely altered to chlorite, sericit epidote, quartz, hematite, kaolinite, limonite and feldspar; pyroxene and olivine have been almost replaced.

m MESCAL LIMESTONE (270-340 ft)—Formation co pale-pink to light-brown and brownish-gray dolomi calcareous, thinly laminated to thin-bedded, sublit to fine grained, partly medium to coarse grained. Bla and pinkish-gray chert, aphanitic to microcrystalline. dant in some beds as uneven layers, lenses, and nodu matolitic algal beds are abundant above the middle o mation and massive bedlike layers of sandstone and

ruthrown side. Sawteeth on plate of thrust fault

Anticline

Syncline

20 — Inclined

75 — Overturned

Strike and dip of beds

⊕ Horizontal beds

Pearl Handle pit

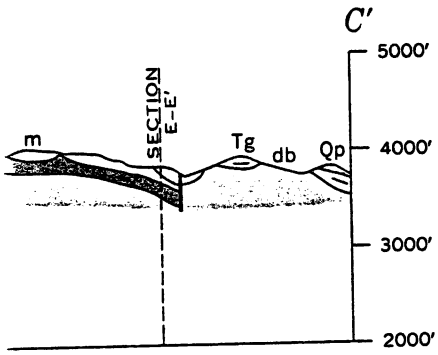
x Prospect pit

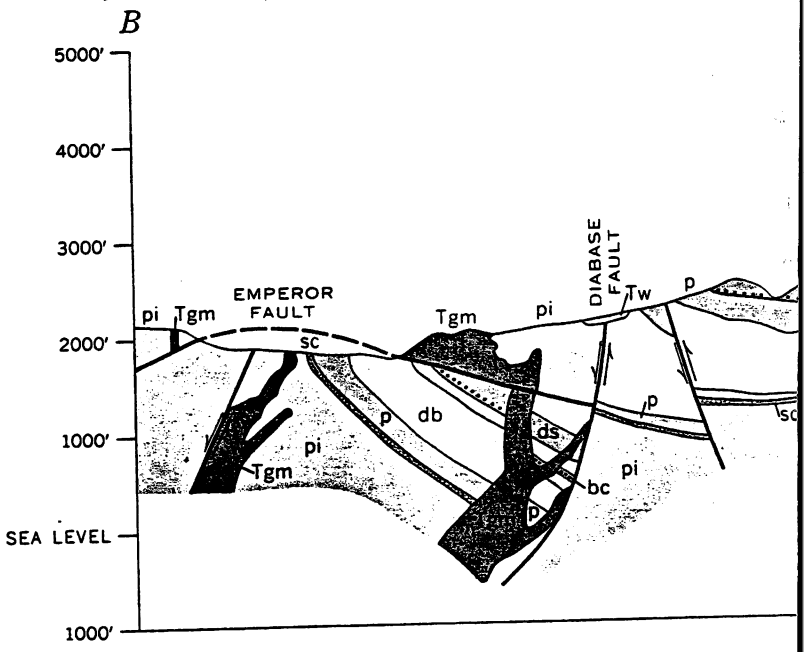
DDH 2919' — Diamond drill hole *Showing vertical depth*

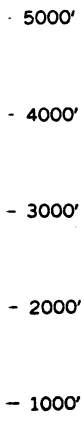
CDH 1470' — Churn drill hole *Showing vertical depth*

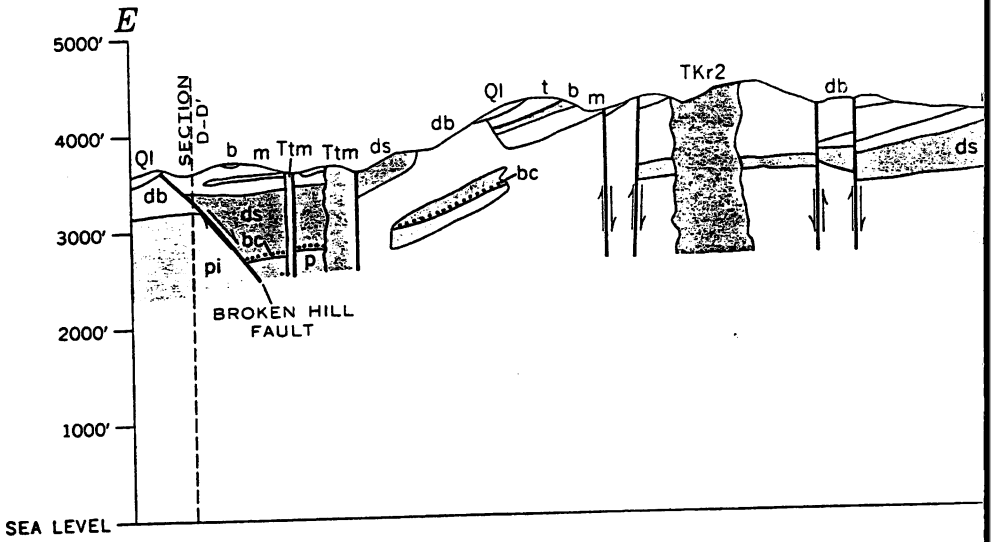
percent), magnetite-ilmenite (5 percent), K-feldspar partially as plagioclase replacement (10 percent); accessory sphene, apatite, and zircon.

Kr **RATTLER GRANODIORITE**—A pear-shaped stock in the southeastern corner of the quadrangle; cuts Paleozoic sedimentary rocks and is cut by many of the Laramide dikes. It is here named the Rattler Granodiorite for exposures in the vicinity of the Rattler mine, sec. 26, T. 3 S., R. 14 E., its type locality, on the south-center margin of the intrusion. The intrusive is composite and ranges from quartz diorite to sodic granite aplite. The main rock type is granodiorite, granitic in texture, and fairly constant in composition except for the amount of hornblende and biotite, which vary inversely. The main rock type grades into very small patches of a melanocratic facies (Krm), and into a porphyritic facies that is chemically identical with the main rock and is found in the eastern lobe of the stock. Prior to the intrusion of









ES, ARIZONA

RENFRO GROUP

PINAL & GILA COUNTIES

See: BANNER DISTRICT MISCELLANEOUS (Geology File)

Approx. Sec. 25, 26, T3S, R14E
Dripping Springs Dist

PRELIMINARY REPORT ON RENFRO GROUP.

INTRODUCTION

The facts that neither a topogrpahic map of the area covered by this report,nor satisfactory surveys of the claims themselves ,were available, rendered its study difficult and conclusions tentative. Never the less, I shall attempt to depict the salient geological features in their bearing on ore deposition. The interpretation of the relations of the main rock masses is made easy by the rugged topography,bare slopes and numerous well defined contacts. As above stated the absence of an adequate map alone makes the presentation vague.

TOPOGRAPHY.

Rising precipitately from Dripping Springs Wash at a point where the canon begins to box,a continuous ridge comprised of thick bedded quartzites and limestones runs in a northerly direction and forms in general way a natural eastern boundary to the area.To the north further high ridges predominate.Westerly a series of smaller,usually rounded hillocks fade into the peneplain on which Troy is situated.In a southerly direction the Dripping Springs Wash defines the area.Erosion has carved a deep wash,which emanating from the ridges to the south has to the east exposed the entire sedimentary series,while to the west and south denudation has almost completely removed them.This eroded vally forms in a general way the center line of the area and enters the Drpping Springs Wash . Minor depressions characterize the steep eastern slope usually instigated by lines of faulting.As a result of the weathering of quartzites the slopes are usually covered with small angular fragments of rock.The relatively more rapid weathering of the limestone overlying the quartzite often throw the latter rock into shapr relief and produce steep projecting promontories.A large mass of intrusive diabase now exposed by erosion produces smoothly rounded slopes.

GENERAL GEOLOGY.

The sedimentary rocks attain a total thickness of some 800 feet and comprise quartzites,quartzite conglomerate,limestones and highly metamprphic slates and schists. The quartzite occupies nearly one half of the sedimentary area and was derived from the metamorphism of thick bedded,fine grained sandstone,although conglomeratic developments occurr locally.It is overlain by 80-ft of fine bedded sediments originally consisting of alternating shale and limestone,with occassional quartz or sandy layers. Metamorphic processes have altered the shale partly to chlorite schist,the limestone to talc and other hydrous silicates of magnesia, and the sandstone fo quartzite.Capping this heterogeneous series and attaining in greatest development a thickness of 325-ft there obtains the massive,compact,dark colored dolomitic limestone series that forms the crest of all the higher ridges.

Beneath the quartzite there appears locally and eminently in the northern half of the area,a lenticular mass of older sediments composed of highly altered limestones and schists resting uncomformably beneath the other sediments. This local series,a remnant left by erosion in the sea of igneous roack will be considered more in detail later.

The igneous rocks comprise granites,granite porphyry and diabase. The two former are strongly developed in the southern part of the area and are different textural phases of the same parent magma.They are the oldest igneous rocks in the region and were intruded while the area was still burried under the thicker mass of sedimants.Portions of the magma were squeeezed upward through the sedimentary rocks along lines of weakness,giving rise by more rapid cooling to porphyritic phases.The normal granite is a relatively fine grained,holocrystaline mass of quartz,orthoclase and biotite.Weather has either altered the mica to chlorite,or removed it entirely, giving the rock a vesicular appearance.The feldspar is quite often changed to sericite. At a considerably later period the region was invaded by a batholitic intrusion of diabase,which spread from the central stock in generally easterly and westerly directions,along lines of faulting produced during the earlier granitic intrusions.Where exposed by erosion it presents every textural gradation from a coarse crystalline, ophitic aggregate of plagioclase feldspar and augite to a compact,crypto-crystalline greenish mass.It was a most important mineralizing agent.

The combined effect of both plutonic invasions produced a tilting of the sediments to an angle of 20 to 30 degrees to the southeast,developed a series of approximately east-west fractures,and profoundly modified the chemical and mineral

characters of the sedimentary rocks.And it is along these fractures thus formed that ore bearing solutions have made their ingress. As mentioned under topography,erosion has to the north entirely removed the sedimentary series,in the central area exposed the diabase,while to the south the thick sedimentary capping still remains. For convenience in the discussion of the ore deposits,I shall group the forty-three claims under consideration as follows:

(a) Those within the granite area
(b) Those lying in the diabase zone
(c) Those capped with sedimentaries

ORE DEPOSITS.

(a) Under this heading I include the Outlet,Los Angeles,Anaconda,Port Arthur, Saar and Garter,W.E.Bryan and Paris,and to a lesser degree the Mother Lode,and East Extention of the Bryan. All of those are full claims.The major portion of the included area is granite,with very subordinate diabase to the north,and quartzite to the east. Approximately 300-ft of development work has been done,of which nearly half is on the Port Arthur.The deepest opening is an inclined shaft 43-ft deep.The ore is developed along a series of fractures in the granite,striking north 70 degrees west,and dipping quite steeply to the north.These fractures are true faults although of relatively slight displacement,and not mere joint planes in the granite.The ore consists almost wholly of chrysocolla with subordinate cuprite.The fractures are mineralized for several inches on each side and samples taken at various points showed copper content from three to fifteen percent.The oxidized ore persists to the deepest workings.How extensive these deposits are acnnot be predicted from the present shallow openings. The period of mineralization was earlier than on claims subsequently to be described and the character of the ore and gangue different.I would strongly suggest sinking a shaft preferrably in the northeast corner of the Port Arthur claim on the quite prominent fault that passes through that point.This shaft would demonstrate the persistence of this type of ore body and determine that this mineralization which covers a large area is practically a continuation of the Rattler ore body on the Troy Arizona property adjoining the group.I regard these claims as a very favorable group in themselves and undoubtedly will warrant extensive development.

(b) Under this heading I shall group the West Extention of the Bryan,Oversight Cedar Springs Extention and a second eastward extention of the Cedar Springs, Copper Boom,Copper Fleece and Promotor. Also the Eastward Extantion of the Prince of Wales and the Kentucky.All are full claims with the exception of thw Oversight and the Kentucky. The former is a fraction 600 x 600 feet; the latter a small triangular section in the southwest corner of the Prince of Wales.The predominant rock mass is diabase,which intrudes itself into the granite to the north,and the quartzite to the east and south. From the field evidence it seems quite cettain that the intrusion represents one single eruption.It tilted the sediments to the south and induced tensionsal strains and resulted in extensive fracturing and displacement of the sedimentaries along eastward planes.And it is along this series of major fractures seen in their strongest development to the southwest that the two large orebodies have been openeed up,as will be considered more fully later.It is due to hot ascending solutions rising along these fault planes and metasomatically replacing limestone with ore that copper minerals have been introduced.And since in the are a under consideration the sedimentaries have been largely removed,the importance from the economic standpoint hinges mainly on the persistence of those major fractures in the diabase and the degree to which precipitation has taken place from ascending solutions.In Globe the conditionsnare very much the same,and at that place the best development of sulphides has been along similar fractures and entirely in the diabase,this rock being apparently as favorable to ore deposition as the overlying sediments.Present development on the claims under consideration seems to make conditions analagous.Along the line of fracture there has in every case been developed masses of magnetite,hematite,calcite together with the copper minerals and from the abundance and richness of the latter it seems quite advisable to develop this group of claims beyond their present prospect stage.

In particular I would suggest the very careful prospecting of the Oversight claim and further work on the second eastward extention of the Cedar Springs.

(c) The third and by far the most important group of claims both from the standpoint of present development and immediate possibilities include the Cedar Springs No 2, Golden Rule,Roman Eagle, Good Luck, Old Year, New Year, Independent,Helen,Ashler, Golden Fleece and Uncle Sam. All with the exception of the Good Luck are full claims.

Development work embraces 220 feet of tunnels and adits on the Roman Eagle, a 40 ft shaft on the New Year and considerably more than the required amount of assessment work on the remainder.All lie eminently in the zone of sedimentary rocks. Three prominent and roughly parallel fractures strongly mineralized and accompanied by extensive replacement of the adjacent sedimentaries cross the area.The most powerful a and northerly strikes in a northerly direction north 75 degrees west across the Roman Eagle,Golden Rule,and Cedar Springs No.2. Some 400 ft south a second fracture determines the orebody in the New Year,Old Year and Good Luck. A third crosses the Helen and Independent. All three faults are normal with the downfall on the south or hangingwall side.I propose to discuss the features of the Roman Eagle fault at some length and the same remarks will apply with modification to the others.The fracture is exposed by a 150,ft tunnel driven along the hanging wall to a point 250 feet from the apex of the hill.At the fact of the 150 ft tunnel a winze 60 ft has been sunk on ore,while the lower tunnel is at present being extended to intercept the winze A shorter tunnel exposed the footwall at a 25 foot lower elevation.Three short adits open up the foot wall immediately above the main tunnel.The foot wall rock is all of limestone.The hanging wall rock is all schistose material.The total displacement is approximately 80 feet.From three to six inches of gouge indicate the strength of the faulting movement.The ore consists of massive cuprite and chrysocolla disseminations in a calcareous gangue.The former mode predominates on the hanging walls,the latter on the foot walls.Ten feet of high grade ore lie exposed on the footwall and unquestionable 100 tons of ore are now ready for shipment.This claim is beyond the prospect stage.The ore body is characteristic of replacements deposits similar to Globe,Bisbee and other Arizona camps.The ore bearing solutions ascending along fault fissures have precipitated their metallic content either in the fissure or in the adjacent rocks.At a lower level any shaft must pass through a considerable thickness of quartzite bust as aside from the tightening of the fissure I see no rreason for dimimution in the value This vein and its westward equivalent on the Golden Rule should be energetically developed.

CONCLUSIONS.

I have attempted to demonstrate in the above report that from a geological standpoint the included area is favorable for the development of copper deposits of considerable magnitude.That the conclusions drawn should be verified by a more elaborate study with the aid of maps I deem essential.It is a significant fact that mines of proven value exist both east and west along the line of the general system of fracturing.

Respectfully submitted,

(Signed) Irwin E.Adams,M.E.

1907

Final Development Company

INCORPORATED UNDER THE LAWS OF ARIZONA

Capital Stock
$1,500,000.00
Par Value
$1.00

OFFICERS

PRESIDENT AND TREASURER

J. C. DEVINE — RAY, ARIZONA

VICE-PRESIDENT

CHARLES [illegible] — RAY, ARIZONA

SECRETARY

[illegible] — RAY, ARIZONA

GENERAL OFFICES

Ray - - - - - Arizona

WE want this prospectus to catch the eye, rivet the attention, and appeal to the best judgment of just one, big, broad-guaged business man, a man with enough discrimination in his make up to see an opportunity and sufficient push and enterprise to take advantage of it.

FORTUNES ARE MADE, not SAVED. A lifetime of SAVING will not make you as MUCH as ONE GOOD INVESTMENT.

The Pinal Development Company

THE COMPANY

IS a newly organized corporation, incorporated under the laws of Arizona, with an authorized capital stock of One Million Five Hundred Thousand Dollars, divided into One Million Five Hundred Thousand shares of the par value of one dollar each. The stock is fully paid and non-assessable and all stock-holders of this corporation and their private property shall be exempt from the corporate debts and obligations of this corporation.

MANAGEMENT

The Board of Directors comprise the following:

MR. J. C. DEVINE
MR. C. T. CARPENTER
MR. E. M. BLAKE
MR. J. H. ROBINSON
MR. R. H. BOXALL
MR. CHARLES HOLLISTER
MR. F. C. NORMAN

Mr. Devine is President and Treasurer and is personally directing the development of the property, and stock-holders are assured that not only will every cent go in the ground, but that the Company will have the advantage of Mr. Devine's knowledge and experience in economical management. The Company is ably directed. Mr. C. T. Carpenter is Secretary. The members of the board of directors are men of extensive and varied mining experience and men of executive ability. The Company very respectfully refers to the Gila

Arizona mines during year 1915 produced 450,000,000 pounds :-: of copper :-:

Pinal Development Company

Developing

The Renfro Group of Mining Claims

LOCATION

IN the Mescal Mountains, 4000 feet above the sea, and lying in the County of Pinal, State of Arizona, is the Dripping Springs Mining District, a highly mineralized belt, copper predominating, the course of which embraces such large producing properties as Ray Consolidated Copper Co., Globe, Miami, , Superior and others. THE RENFRO GROUP OF MINING CLAIMS is situated in this district and is being energetically developed by the Pinal Development Company. This property is four miles from the Arizona & Eastern R. R., being accessible by a good automobile road direct to the portal of the mine, and is fifteen miles from the smelter of the American Smelting & Refining Company, at Hayden, Arizona.

TOPOGRAPHY

The Renfro property consists of forty-three claims, or an area of about 860 acres. A general outline of the topography of the claims herein follows:
Rising precipitately from Dripping Springs Wash, at a point where the canyon begins to box, a continuous ridge comprised of thick bedded quartzites and limestone runs in the southerly direction and forms in a general way a natural eastern boundary to the property. To the north, further high ridges predominate. Westerly a series of smaller, usually rounded hillocks grad-

Invest in Copper.
Invest with new Corporations.
Invest with Pinal Development Company.

In Conclusion

THIS is a very attractive proposition and is placed before the public, not as a prospect for it is far beyond the prospect stage, but as a property only requiring sufficient development to make it another large producing Arizona Copper Mine. Without hesitation it may be said that as far as humanly possible with any mines in their early stages, the element of risk has been eliminated.

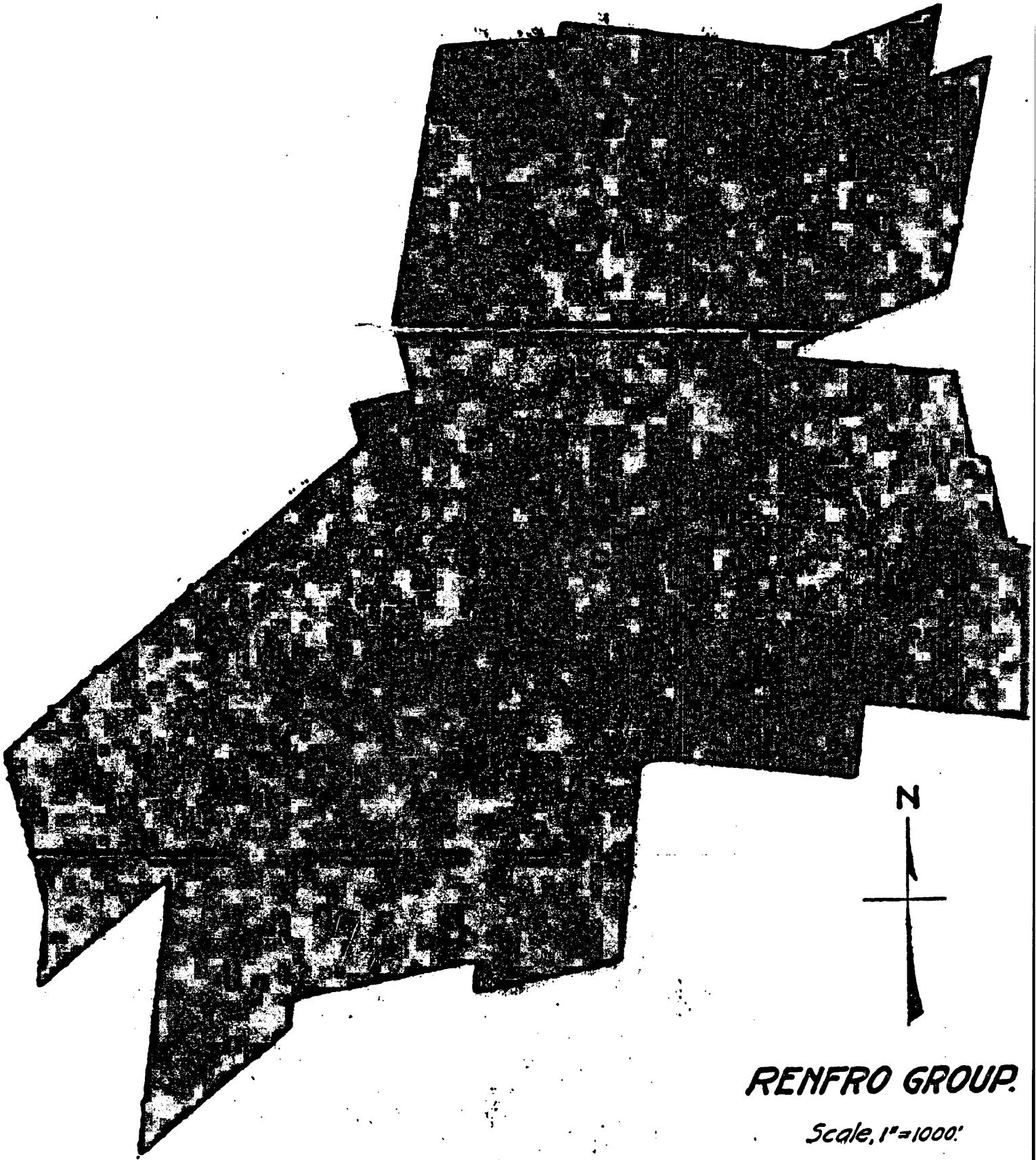
Therefore, to those desiring to invest in a good mining stock, we feel that in offering you this opportunity that not only are we expeditiously developing the mine but are eventually returning to the investor many times his investment. We respectfully invite all desiring to presonally look over the ground to communicate with us and we will make arrangements accordingly. If there is any information you may desire that is not contained in this prospectus, kindly let us forward same to you.

Respectfully Submitted,

PINAL DEVELOPMENT COMPANY.

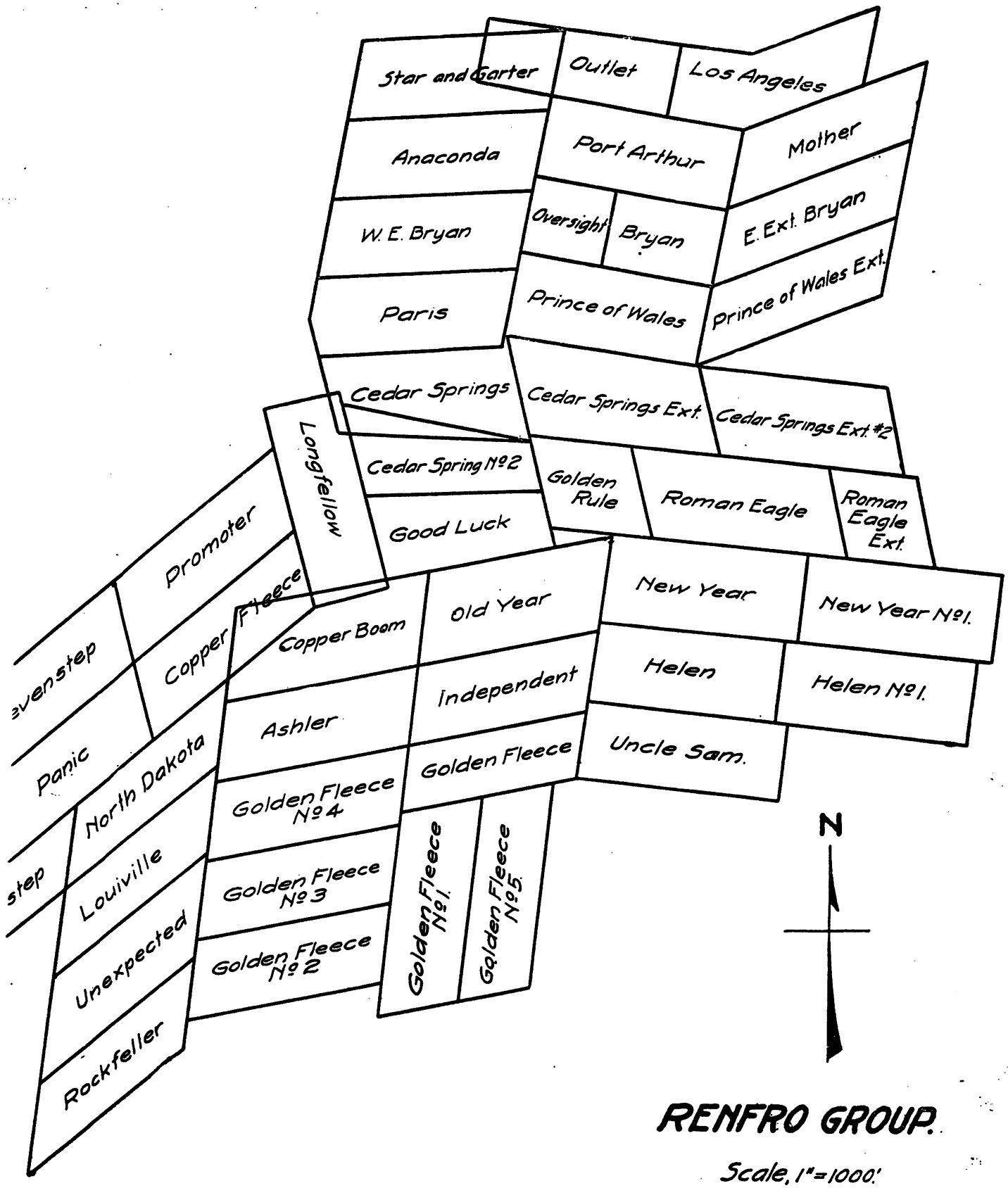
J. C. DEVINE,
President.

C. T. CARPENTER,
Secretary.



RENFRO GROUP.

Scale, 1" = 1000'



RENFRO GROUP.

Scale, 1" = 1000'

05/12/87

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

@ Dripping Spgs. Dist.

PRIMARY NAME: RATTLER MINE , See Also Rentro Group and Dripping Springs (Columbia) Mines

ALTERNATE NAMES:
TROY COPPER CO. PROPERTY

/Also Check Buckeye Mine

PINAL COUNTY MILS NUMBER: 134

LOCATION: TOWNSHIP 3 S RANGE 14 E SECTION 26 QUARTER C
LATITUDE: N 33DEG 08MIN 31SEC LONGITUDE: W 110DEG 53MIN 08SEC
TOPO MAP NAME: SONORA - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER

BIBLIOGRAPHY:

ADMMR RATTLER MINE FILE
ADMMR TROY MINE FILE
RANSOME, F.L., RAY FOLIO 1923, P. 22
ADMMR U FILE PINAL CU21 (USBM NO 463.2/15083)
USGS MAP GQ 1021; 1971

*GENERAL REFERENCES

REFERENCE 1 F1 <USGS GQ 1021, 1971>

REFERENCE 2 F2 <ABGMT - USBM FILE DATA>

REFERENCE 3 F3 <ADMR TROY AND RATTLER MINE FILES>

REFERENCE 4 F4 <RANSOME, F.L. USGS GEOLOGIC ATLAS OF THE U.S., RAY FOLIO, 1923 MAP AND P 22.>

D10 <PRODUCTION INCLUDED UNDER TROY IN ABGMT-USBM FILE DATA>

mds 134

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 <> *RECORD TYPE B20 <X,1,M> DEPOSIT NUMBER B40 <>

*REPORT DATE G1 <8,3,X,0,3> (YR. MO.) *INFORMATION SOURCE B30 <1,2> *FILE LINK IDENT. B50 <USBM-004 021003>

*REPORTER(SUPERVISOR) G2 <GEST, DON E (last, first, middle initial)> ((last, first, middle initial))

REPORTER AFFILIATION G6 <ABGMT> *SITE NAME A10 <RATTLER MINE>

SYNONYMS A11 <TROY, TROY - MANHATTAN, TROY - ARIZONA>

LOCATION

MINING DISTRICT/AREA A30 <ORIPPING SPRINGS DISTRICT>

COUNTY A60 <PINAL> *STATE A50 <A,Z> *COUNTRY A40 <U,S,>

PHYSIOGRAPHIC PROV A63 <1,2,X,>

DRAINAGE AREA A62 <1,5,0,5,0,1,0,0,X, LOWER COLORADO> *LAND STATUS A64 <4,9,X,,,X,(,1,9,7,9,)>

QUADRANGLE NAME A90 <SONORA (,1,9,6,4,)> *QUADRANGLE SCALE A100 <2,4,0,0,0,>

SECOND QUAD NAME A92 <( )> SECOND QUAD SCALE A91 <>

ELEVATION A107 <3,7,5,0,X,F,T,>

UTM

NORTHING A120 <3,6,6,8,4,0,>

EASTING A130 <5,1,0,7,0,0,>

ZONE NUMBER A110 <+,1,2>

*ACCURACY

ACCURATE ACC (circle)

ESTIMATED (EST) <CENTER OF GROUP OF 4 ADITS>

GEODETIC

*LATITUDE A70 < - - N,>

*LONGITUDE A80 < - - W,>

CADASTRAL

TOWNSHIP(S) A77 <0,0,3,S,:,X, :,X, :,X, :,X,> *RANGE(S) A78 <0,1,4,E,:,X, :,X, :,X, :,X,>

SECTION(S) A79 <26 :,X, :,X, :,X,>

SECTION FRACTION(S) A76 <>

MERIDIAN(S) A81 <GILA AND SALT RIVER>

POSITION FROM NEAREST PROMINENT LOCALITY A82 <1 1/2 MILES NE OF TIGER MOUNTAIN>

LOCATION COMMENTS A83 <1/4 MILE W OF PINAL-GILA COUNTY LINE>

ESSENTIAL INFORMATION
ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

Y

COMMODITIES PRESENT C10 <...>

*ORE MINERALS C30 <CHALCOPYRITE, CHALCOCITE, BORNITE, MALACHITE, NATIVE SILVER, NATIVE GOLD>

COMMODITY SUBTYPES C41 <>

*GEN. ANALYTICAL DATA C43 <>

COM. INFO. COMMENTS C50 <>

* SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR <CU, ...>	MAIN COMMODITIES PRESENT C11 <...>
MINOR PRODUCTS	MINOR <AG, ..., AU, ...>	MINOR COMMODITIES PRESENT C12 <...>
POTENTIAL PRODUCTS	POTEN <...>	
OCCURRENCES	OCCUR <...>	OCCURRENCES OCCUR <...>

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SMALL) MED LGE (circle one)	PRODUCTION UNKD (NO) (circle one)

EXPLORATION OR DEVELOPMENT

*STATUS

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 <4>	STATUS AND ACTIVITY A20 <>

*DISCOVERER L20 <>

*YEAR OF DISCOVERY L10 <> *NATURE OF DISCOVERY L30 <> *YEAR OF FIRST PRODUCTION L40 <1903> *YEAR OF LAST PRODUCTION L45 <1940's>

*PRESENT/LAST OWNER A12 <>

*PRESENT/LAST OPERATOR A13 <INSPIRATION COPPER COMPANY, 1965>

EXPL./DEV.COMMENTS L110 <13 UNPATENTED CLAIMS IN 1956. BALTIRE GROUP INTO GILA CITY, INCLUDES 54 CLAIMS. OPERATORS INCLUDED UNIVERSAL COPPER CORP., TROY COPPER COMPANY, TROY MANHATTAN COMPANY>

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 <VEIN/SHEAR ZONE>

DEPOSIT FORM/SHAPE M10 <TABULAR/IRREGULAR>

*DEPTH TO TOP M20 <> *UNITS M21 <> *MAXIMUM LENGTH M40 <> *UNITS M41 <>

*DEPTH TO BOTTOM M30 <> *UNITS M31 <> *MAXIMUM WIDTH M50 <> *UNITS M51 <>

*DEPOSIT SIZE M15 (SMALL) M15 (MEDIUM) M15 (LARGE) (circle one) *MAXIMUM THICKNESS M60 <> *UNITS M61 <>

*STRIKE M70 <> *DIP M80 <>

*DIRECTION OF PLUNGE M100 <> *PLUNGE M90 <>

*DEP. DESC. COMMENTS M110 <>

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one) *OVERALL LENGTH M190 <> *UNITS M191 <>

*DEPTH BELOW SURFACE M160 <> *UNITS M161 <> *OVERALL WIDTH M200 <> *UNITS M201 <>

*LENGTH OF WORKINGS M170 <2000> *UNITS M171 <FT> *OVERALL AREA M210 <> *UNITS M211 <>

DESC. OF WORK. COM. M220 <3 TUNNELS, AT LEAST ONE ADIT 160 FT DEEP IN 1944>

GEOLOGY

*AGE OF HOST ROCK(S) K1 <P,R,PC, ..., W,>

*HOST ROCK TYPE(S) K1A <LIMESTONE, QUARTZITE>

*AGE OF IGNEOUS ROCK(S) K2 <C,R,E,T,-,P,A,L,E,O,W,>

*IGNEOUS ROCK TYPE(S) K2A <RHYOLITE OR RHYODACITE PORPHYRY>

*AGE OF MINERALIZATION K3 <C,R,E,T,-,P,A,L,E,O,W,>

*PERT. MINERALS (NOT ORE) K4 <QUARTZ, & SERICITE>

*ORE CONTROL/LOCUS K5 <FISSURES AND VEINS, NEAR RHYOLITE DIKES>

*MAJ. REG. TRENDS/STRUCT. N15 <STRATA STRIKE EW, DIPS>

*TECTONIC SETTING N15 <>

*SIGNIFICANT LOCAL STRUCT. N70 <WORKINGS ADJACENT TO ENE TRENDING FAULT, RHYODACITE PORPHYRY DIKE TRENDS EW>

*SIGNIFICANT ALTERATION N75 <>

*PROCESS OF CONC./ENRICH. N80 <>

*FORMATION AGE N30 <P,R,PC, ..., W,>

*FORMATION NAME N30A <MESCAL LIMESTONE, DRIPPING SPRINGS QUARTZITE, TROY QUARTZITE>

SECOND FM AGE N35 <C,A,M,B, ..., W,>

SECOND FM NAME N35A <TROY QUARTZITE>

*IGNEOUS UNIT AGE N50 <L,C,R,E,T, ..., W,>

*IGNEOUS UNIT NAME N50A <RATTLER GRANODIORITE>

SECOND IG. UNIT AGE N55 <..., W,>

SECOND IG. UNIT NAME N55A <>

GEOLOGY COMMENTS N85 <PROBABLY ASSOCIATED WITH GRANODIORITE INTRUSION, OR AT LEAST INTRUSION CAUSED CHANNELS FOR LATER MINERALIZATION>

GENERAL COMMENTS

GENERAL COMMENTS GEN <>

INVENTORY OF THE RATTLER MINE EQUIPMENT
AS OF FEBRUARY 1, 1945

3	Redwood tanks	$150.00
2	Steel tanks	100.00
1	2" deep well pump	150.00
1	1-1/2" Pressure pump	100.00
1	2" Pressure pump	200.00
1	1-1/2 H.P. Fairbanks Morse Engine	100.00
1	1-1/2 H.P. Whitte Engine #340540	100.00
1	8 H.P. Stover Engine #94997	200.00
1	30 H.P. Foos Hoist & Cable	500.00
1	Grizzly complete	50.00
1	Water tank 450 Gals.	75.00
1	D.C. elec. Generator & Board #221551 Type B.C.	150.00
1	Light plant & batteries, Engine #17536	200.00
1	Model A. Ford Truck 1-1/2 ton	200.00
1	International Dump Truck 1-1/2	150.00
1	V'8 Ford pick-up '36	350.00
1	Blacksmith forge & tools	150.00
	Mining tools, Miscl.	250.00
	Hand tools, Miscl.	250.00
3	Mine cars 18" gauge	100.00
	1-1/2 Ton mine rails	60.00
1	Tent house	150.00
1	Tool house	100.00
1	3-room house	350.00
1	Air receiver	100.00
3	Ore buckets	100.00
1	Sheve wheel	35.00
	Leaching plant already installed	
5	Wooden tanks for precipitation	150.00
1	Furnace Burner	25.00
1	Circulating pump & engine #B-51147	50.00
	Foundation for tanks and labor	250.00
	Labor 2 men installing leaching plant	650.00
		$5,545.00

DEPARTMENT OF MINERAL RESOURCES

REPORT

Of The RATTLER GROUP OF COPPER CLAIMS

H. R. Scott Owner, Box 2893 Globe, Arizona.

Globe, Arizona. April 17th, 1944

Property & Location ; Consists of 11 unpatented claims all contiguous, situated on the eastern slope of the Dripping Springs range, and about 2 miles westerly from the Dripping Springs wash, and ajoins the south-easterly limits of the old village of Troy.

The elevation at that point of the road crossing the creek or wash is 2,200 feet while the elevation at the main tunnel of the mine registered 3,500 feet a climb of 700' in this 2 miles.

The mining district of the locality is known as the Riverside and ~~there are 11 unpatented claims in the Rattler group.~~ ajoins the south end of the Pioneer district, Pinal Co. Ariz.

History; These claims were formerly part of the Old Troy mine, discovered and worked many years ago, then in part abandoned by former owners, the present ownership being by location, within the past few years.

Record Of Ore Output; None of the old records are available now, but examination of the mine openings, leads me to state that several hundred tons of hand sorted or selectively mined ores have been marketed.

The present owner has within the past few months, mined and trucked 3 small carlots, the settlement sheets, giving copper grade ranging from 3.5% to over 5% copper.

Transportation Roads ; From the International smelter at Miami, major and State highways pass within 5 miles of the mine and three or four miles up the Dripping Springs valley, are County maintained, the last 2 miles to reach the cabins of the mine are broken with steep grades and much rocky terrain, passable with care for trucks of small capacity.

This last section of the road can be improved at moderate cost; the total distance from smelter to mine is about 36 miles. Another road from the buildings of the Troy village, leads westerly and down grade for 6 or 7 miles, to Hay Junction, Mr Scott states that repairs are required to reopen this old road.

Mine Workings ; Three tunnels driven from the northeast hill slope in a more or less southwesterly direction, have cut the mineral system, and on which some drifting and stoping has at past time been done.

The general course of the ~~fissures is~~ strata are from west to east and dips at varying degrees towards the south and as this examination was made for the purpose of asertaining, the feasibility of immediate copper productio , the writer after looking over the lower surface, decided that the vein as cut in the upper or Session tunnel, offers the best opportunity for copper production.

Session Tunnel workings consists of an adit driven for about 100' southerly into the steep hill side, and the vein was cut at this p int; thence a winz

was sunk to connect with the intermediate tunnel which is about 130' lower than the Session tunnel.

The vein where cut by the adit and at the top of this winze is fully 4' in width and at this point shows copper content stated by Mr Scott to assay from 2.5% to about 4.%

The vein should be drifted on and an occassional upraise as lateral work of exploration be made, extending both easterly and westerly from the adit, I feel that this exploration will be justified by opening up an upper level along ~~it~~ this horizon of the mineralization, may make available a substantial tonnage of copper.

Three or four hundred feet of development, will require the installation of an air drill and compressor plant, this also for the subsequent stoping of the ores, together with ore bin, road improvement, mine trackage, and air pipe line to drilling faces.

Vein Structures ; Surface croppings are plainly evident and surface cuts made shows continuity of the ~~fissureing~~ mineralization; the lower tunnel fully 350' under the general surface of the vein, proves the vein structure ~~to~~ that depth, but ores of a lower tenor than the Session tunnel zone, were opened by the lower explorations; and for that reason, I suggest the mining be first directed along the upper ore area.

Geological Features ; Primarily a limestone belt has thru alterations and powerfull intrusive action ~~has~~ tilted the limes and formed bodies of the limestones irregular as to dip, but generally with the long axis towards the northwest. The first intrusives of granite later altered and in turn in part dislocated by other igneous forces, all provided fractures and joints ,wherein subsequent mineralization, could deposit, both in the original form of cold and deeper hot solutions.

The immediate locality within this geological area is fertile with unconformiable rock formations and veins and gashes.

Mineralization both of copper, silver, gold and vanadium has been discovered in mostly small but variable quantities, within this immediate area, only more extensive explorations may prove the value of the belt, as an ore producer.

Ore Tonnage ; Many thousand tons of generally from 1 to 2% copper content are visible in the two lower tunnels and extending up to the surface, but as this report only deals with the possibility of mining copper of 3% and upwards, a grade required to pay all costs, the present visible exposures are now classed as Probable or Inferred ore.

The extending of the drifts from near the heading of the Session tunnel and upraises therefrom, should place a smelter grade of ore available.

Department Of Mineral Resources
Globe Field Office.

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date May 28 1945

Name of Mine Rattler

Owner or Operator H.R. Scott

Address Box 2893

Mine Location Troy Gila Co. Ariz.

File System

File No.

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production ✓; Development ✓; Financing ; Sale of mine ;

Experimental (sampling) ✓; Owner's occasional trip ✓;

Other (specify)

PRODUCTION: Past and Future.

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	350
Anticipated rate next 3 months	500
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	~~Miles~~ Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks			
air comp. ~~Over-Hauling Trucks~~	40	220	200
Compressors crusher	15	220	210
Other Mine or Mill Eqpt. Pump, 1 1/2"	3	240	80
			490

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper

REMARKS:

Operating Copper Leaching mill. Mining Tailings ore 20 Tons daily
I Recommend for 3 Mos. 1500 Gal

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By A. MacFarlane

SUMMARY REPORT OF RATTLER MINE

February 27, 1945

Management

Mr. H. R. Scott of Globe, Arizona, is known as an experienced and industrious miner and small mine operator, who, being the owner of the Rattler copper property, proposes to manage the mining and leaching of the ores, assisted by a man with assaying experience.

Property Description

Consists principally of an adit tunnel and drifts, upraises, incline and winzes therefrom; in all several thousand linear feet of underground workings, the development of two copper bearing stratas. (See mine maps).

Plant

Just below the floor of the above stated adit tunnel is now installed a pilot copper leaching plant consisting of 3 Redwood tanks, diameter 10' x 5' in height, and just underneath the tank floors are two lines of compartmented Redwood precipitating boxes filled with cleaned cans and iron scrap.

A small sump just lower than the last scrap iron box is equipped with a small acid proof pump for the return of the solutions to top of the 3 leaching tanks.

It is proposed by the owner to build a copper leaching tankage with rock cement tanks with an 8-hour capacity of 50 tons, this proposed plant to consist principally of:

2 stone cement thick walled and floored tanks 20' wide by 25' to 30' long. Constructed with doors of plank and some type of packing sheet at the "ends centers" of the stone tanks, in order to discharge the leached and percolated tailings by slusher scraper to dump.

An 8" x 8" timber bridge floor above center of the 2 stone tanks, whereon is to be installed a jaw crusher of type to crush to 1/2" to 1" size, and high enough above the tanks to allow of their filling directly by distributing launder from under crusher jaw.

The present pilot tanks will serve as water and solution storage above the leaching. Beneath the leaching tank floors will be placed the scrap iron precipitation boxes and the sump with an acid proof pump for the return of all solution to mill head. On the level of the sump and precipitating boxes will be the drying and clean up floor and facilities.

Market

The Hayden copper smelter situated 30 miles southerly on good road is a purchaser of cement or copper sludge, as well as ores and concentrates. The International smelter near Miami, Arizona, distant 55 miles, provides another market for this product.

Estimate of Production Costs

Mining, tramming, crushing	@ $1.30	per ton
Leaching, labor, supplies, water, power	" .75	" "
Overhead, accounting, etc.	" .20	" "
Direct Production Costs	$2.25	per ton amended cost estimate

Property Survey and Appraisal

Mines opened during 1880 to 1910.
Pilot leaching plant was built late 1944.
Buildings consist of 5 room mine cabin and small shop, situated about 1/2 mile west of adit tunnel.
Power at present - none used. Will be small semi Diesel unit.

Present value and cost of surface improvements	$3,500.00.
Cost of proposed copper leaching plant	10,000.00.
Mine developments now usable estimated at	50,000.00.

Operations and Earnings

1. The proposed unit of 50 tons daily is believed to be adequate to recover 75% to 85% of the copper in the ores to be leached.

2. There are visible and available ores within the tunnel and it is believed that Mr. H. R. Scott is sincere and with sufficient ability to manage the work, and by his engaging an elderly man with sufficient experience in making copper determination and titrations the project can be operated efficiently.

3. The above estimate for completed 50-ton plant seems fair at $13,500.00.

4. As only from 5 to 10 elderly miners and millmen are required, these are available in Globe or Winkelman - men rejects of the large copper producers.

NAME OF MINE: RATTLER

COUNTY: PINAL
DISTRICT:
METALS: CU

OPERATOR AND ADDRESS: DATE:		MINE STATUS DATE:	
5/1/44	H.R.Scott, Box ~~2893~~ 2893, Globe	5/1/44	Mining
		5/16/44	Shipping per Mact.
		1/45	Shipping occasionly
		10/45	Idle
		1/46	Developing

Report on file by McFarlane

H. R. Scott, Box 872, Globe, Arizona, D. P. McGarvin, c/o Arizona Tours, First Street and Monroe, Phoenix, Arizona, and John A. Devine, Box 872, Globe, are reported to be installing a 30-ton leaching plant at the Troy Copper Company's Rattler group of claims located about one mile east of Troy, Arizona, in the Dripping Springs district of Pinal County. The mine is said to carry a quantity of copper sulphate which is amenable to treatment by the leaching process. Scott is manager of the project which is said to be financed by eastern interests. Production is expected to be started at the property in about 60 days. - MINING JOURNAL - 10-15-44

[redacted] GROUP

Cu

Pinal 11 - 3 T 3 S, R 1[redacted] E

H. R. Scott, Box 2893, Globe '44

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine	Rattler Group of Copper Claims and the Pilot Copper Leaching Plant Thereon	Date	February 15, 1945
District	Riverside	Engineer	A. Macfarlane

Subject: Report

On April 17, 1944 the field engineer for the Eastern area of the State examined this property and his report of that date is now part of this second examination and report.

The second examination was confined to a study of the lower tunnel workings and the 8-ton Pilot copper leaching plant recently installed just beneath the outer portal of the main or adit tunnel.

Mine Workings: The attached maps show over 60' of adit driven southward from portal through what appears to be a diabase, barren of mineralization, until the limestone here is reached. About one hundred feet within tunnel from portal a strate conforming to the limestone bedding planes is visible as a body of low grade copper, having a dip of 10° towards the south and the lateral continuance being easterly and westerly from the stopes and tunnel sides.

There are approximately 900 linear feet of exploration under ground workings now open for inspection, and probably as much more at present caved and not now accessable.

Measurable Ore Tonnage: I estimate the visible workings of the adit tunnel to now contain upwards of 10,000 tons, and in order to obtain a practical estimate of the copper content, I dug 4 holes into the dump made from former stoping of the tunnel copper body.

This dump contains about 2,000 tons mostly copper in carbonate and sulfate form and the assay gave a copper content of 1.29%. As this dump was made by a long past operation, it is likely some higher grade was sorted out and shipped to one of the smelters then.

The presumption of 1.3% copper seems fair as a basis for further estimates covering the mining and leaching of the ores from the area and copper strata of the adit tunnel.

The Session ore body is stratagraphly about 250' higher than the adit tunnel and seems to have a much steeper dip again towards the south. These separate copper stratas are connected to the lower or adit level by a winze from floor of upper tunnel and by the Session shaft which has a depth vertically below collar of nearly 300 feet, thence drifts and crosscuts connecting with the adit tunnel.

In all many thousand tons of leachable copper ores are opened by the large amount of mine developments made during the latter part of the 19th Century on this property, all mineable through the lower or adit tunnel.

Mine Costs: No further mine developments need be considered now, the old workings containing both in the stope faces and gobbing an ample ore reserve for one or more years.

Mine tracking is required and a few ore chutes. The limestone hanging wall is firm and only occasional pillars and stulls will be required to safely sustain same. The copper ore stratas varies in thickness from 3' to 6'.

On basis of mining, tramming and crushing 100 tons in the day shift of 8 hours,

cost @	$1.10 per ton
Leaching, labor, supplies, water, power	.70
Overhead and emergency	.20
All direct operating expense	$2.00 per ton

Estimate of Outcome: Assume a recovery of 25 pounds copper per ton of ore; copper @ 17 cents less marketing cost of 3 cents, we have 25# at 14 cents net, or a gross per ton of $3.50, or if 20# recovered @ 14 cents, a gross per ton of $2.80. In either assumption, a substantial margin of $.80 to $1.50 per ton may be earned in order to repay the plant investment.

Pilot Leaching Plant: During the past 4 months the owner of the Rattler Mine, Mr. H. R. Scott, has purchased and installed a small leaching unit consisting of 3 redwood tanks. Capacity of around 8 tons ore and solution per tank. Also 2 wooden precipitating boxes made into compartments with perforated shelf 4" above bottom, holding about 1,000 pounds scrap iron. The pregnant solution drawn from near bottom of the leaching tanks at 36 to 48 hour periods, circulates through the scrap and discharges into a small sump, thence pumped back into the leaching tanks. A 2% sodium bi-sulfate solution is used in the leaching tanks to liberate the copper from the crude ore.

The ore as trammed into the leaching tanks heretofore has not been crushed and ranges in size from fines to pieces barely passing a 4" ring. No accurate sampling and assaying has been made on the heads and tails other than a dump sample assaying 1.3% cu, probably a close assay of the 30 tons crude ore fed into the leaching tanks.

At request of the writer the sludge or precipitating boxes were cleaned up, the cement copper dried and weighed. A sample of this first lot assayed 52% cu and the total dried weight of 1,200 pounds figures 624 pounds metallic copper from 30 tons crude ore, equals 21 pounds per ton recovered and is 81% of the copper originally in the ore.

Recommendations: It is of paramount importance to the smaller copper mines of Arizona and elsewhere that a leaching unit of 50 to 100 tons daily capacity shall be designed and made workable through tanks. This method of copper leaching may be done with a small and limited water supply, the consumption of same may not exceed 1/2 ton water per ton crude ore, and by proper sampling and analysis the proper quantity of activating acid will be determined and the time of leaching required to convert the copper into solution.

The above practical on the ground experiment No. 1 indicates that better copper recovery can be made by crushing all ore through a 1/2" to 1" size and again the activating acid, whether the sodium bi-sulfate, or sulfuric acid, shall prove most efficient, are problems yet to be determined.

All the large copper operators of southern Arizona commonly known use sulfuric acid as the principal activating agent. The application of sodium bi-sulfate may not be affected by the very low percent of free lime in an altered limestone, and might well

be tried out further, and in the event the sulfuric acid method proves cheaper and more efficient it will cost very little to change the solvent.

Plant of Commercial Size: It is now desirable to instal a 50-ton "per 8 hour unit" and the following estimates may approximate a workable plant and costs thereof erected on a mill site underneath the adit tunnel.
Required 2 rock and cement leaching tanks 20' x 25' x 5' each. Each tank will have a capacity of 100 tons ore and solution.

Cost built on the mill site $1,500 each	$3,000.00
Ore crusher designed to crush fine installed above tanks, together with bridging and power	2,000.00
Additional scrap iron precipitating boxes	500.00
Hillside grading and retaining walls	500.00
Iron cleaning furnace and burner complete	500.00
Titrating and cleaning up floor and building	500.00
2 acid proof solution pumps and power	700.00
1 drying tray and furnace burner	300.00
1 slusher with adequate guide and tail (pulleys, cable,etc. installed to unload leaching tanks)	1,000.00
Contingent needs and reserve	2,000.00
Total plant erected and maintained in operation for 2 months	$8,000.00

Mine Preparation: As the gob is cleaned out along the tunnel floor, 8# to 12# tee rail used, with 24" x 4" x 6" ties will be laid from crusher to mine headings, in all about 1,000 linear feet of mine trackage. Most of the mine gob left by a former operation is copper ore and will be trammed direct to the leaching tanks. Trackage will cost $1,000.00.

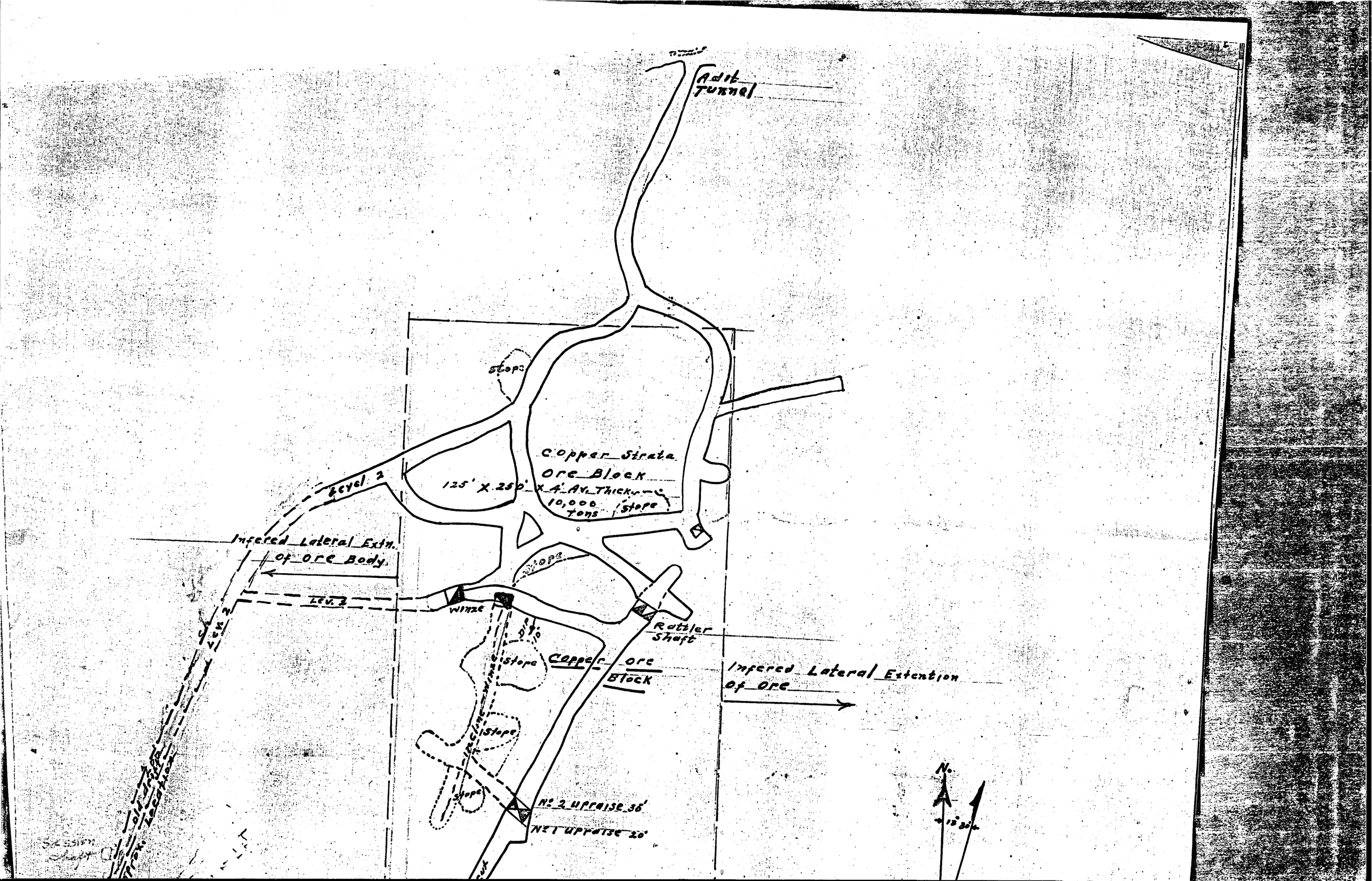
	$1,000.00
On completing the mine cleaning a 3 or 4 drill capacity air compressor with all accessories, piping, etc. will be required, a used plant may be secured costing	2,000.00
Mine timbers, shop and reserve for 60 days operation	2,000.00
Total mine reconditioning	$5,000.00

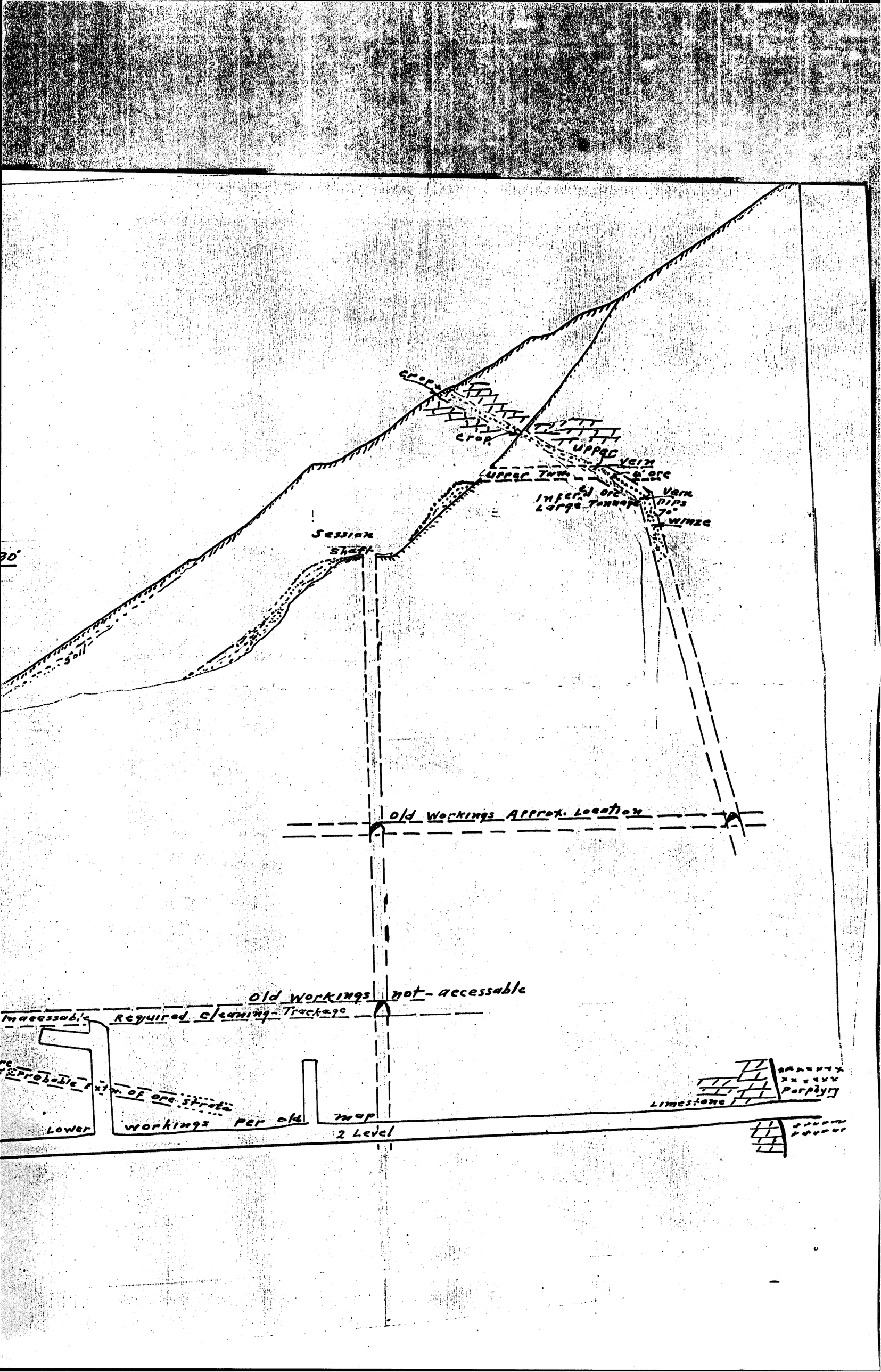
Road: A good state road distant 5 miles from the Rattler leads to the Hayden smelter situated about 25 miles south. From the point on state highway nearest a piece of new road should be built to pass the Cocerham gold mine, thence westerly some 2 miles to the Rattler pilot mill. Application to the access road department will be made for this new piece of road. The property is now connected to this highway by a rough but passable road leading from the Rattler mine via Troy to the Winkelman-Globe road. Water is pumped from over a ridge distant 1/2 mile, in sufficient volume to provide the anticipated leaching plant.

Conclusion: Due to the extensive mine development work of many years ago in a former effort to ship higher grade copper to smelters. This work has made available and visible through the adit tunnel a large tonnage of low grade copper carbonate ores.

Within the lower workings where dampness contacts the ore chemical change to sulfate is very noticeable, suggesting adaptability to leaching.

It is a step in the right direction to develop a small sized copper leaching plant at this Rattler mine. Only such plants may treat copper carbonate ores of less than 2.5% to 3% copper. There is a very large tonnage of such ores in Arizona, which must be depended upon to provide work and the useful copper product as a post war measure.

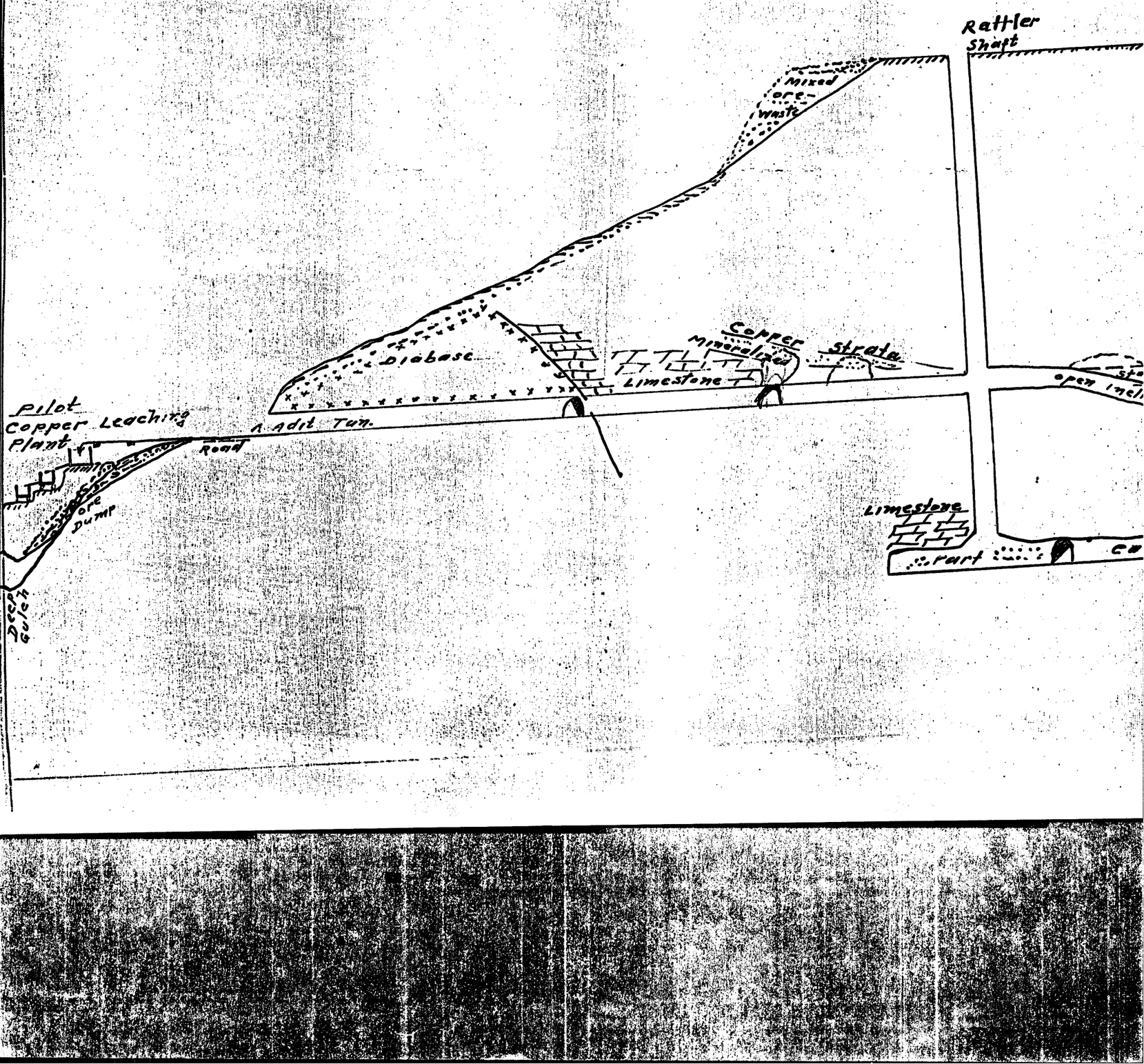

Adit Tunnel
stope
Copper Strata
Ore Block
125' X 250' X 4' Av. Thickness
10,000 Tons
stope
level 2
Infered Lateral Extn.
of Ore Body
Level 2
winze
stope
Rattler Shaft
Copper Ore
Block
Infered Lateral Estention
of Ore
stope
stope
No 2 Uprise 36'
Net Uprise 20'
N.
15° 30'


Crop
Crop
Upper vein & ore
Upper Tunnel
Inferred ore Large Tonnage
Vein dips 70°
Winze
Session Shaft
Soil
Old Workings Approx. Location
Old Workings not accessable
Inaccessable
Required cleaning Trackage
Probable ext. of ore strata
Lower workings per old map
2 Level
Limestone
Porphyry

LONGITUDINAL PROJECTION Lo

RATTLER MINE WORK

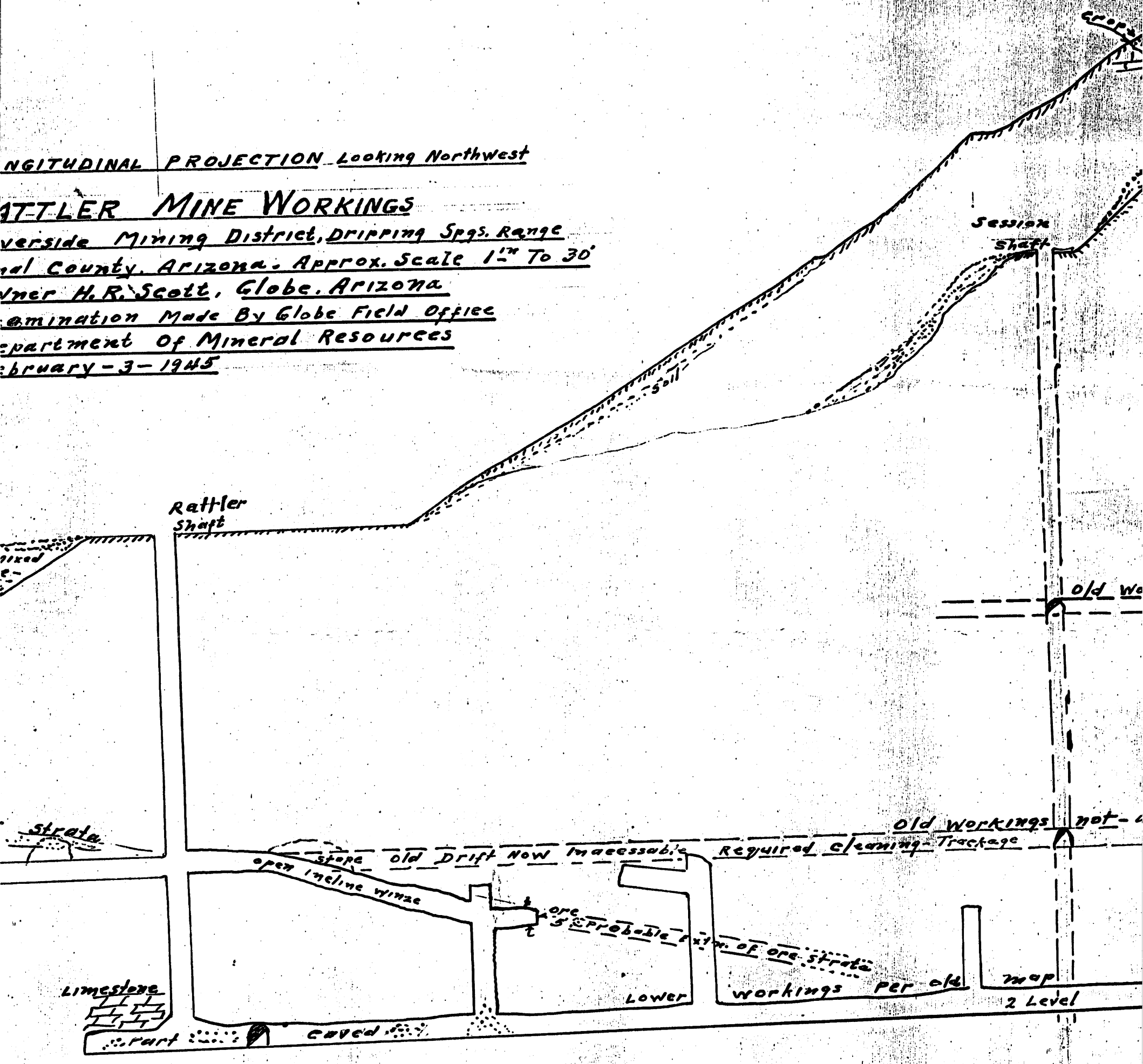
Riverside Mining District, Dr
Pinal County, Arizona. Appr
Owner H. R. Scott, Globe, A
Examination Made By Globe
Department Of Mineral Re
February - 3 - 1945

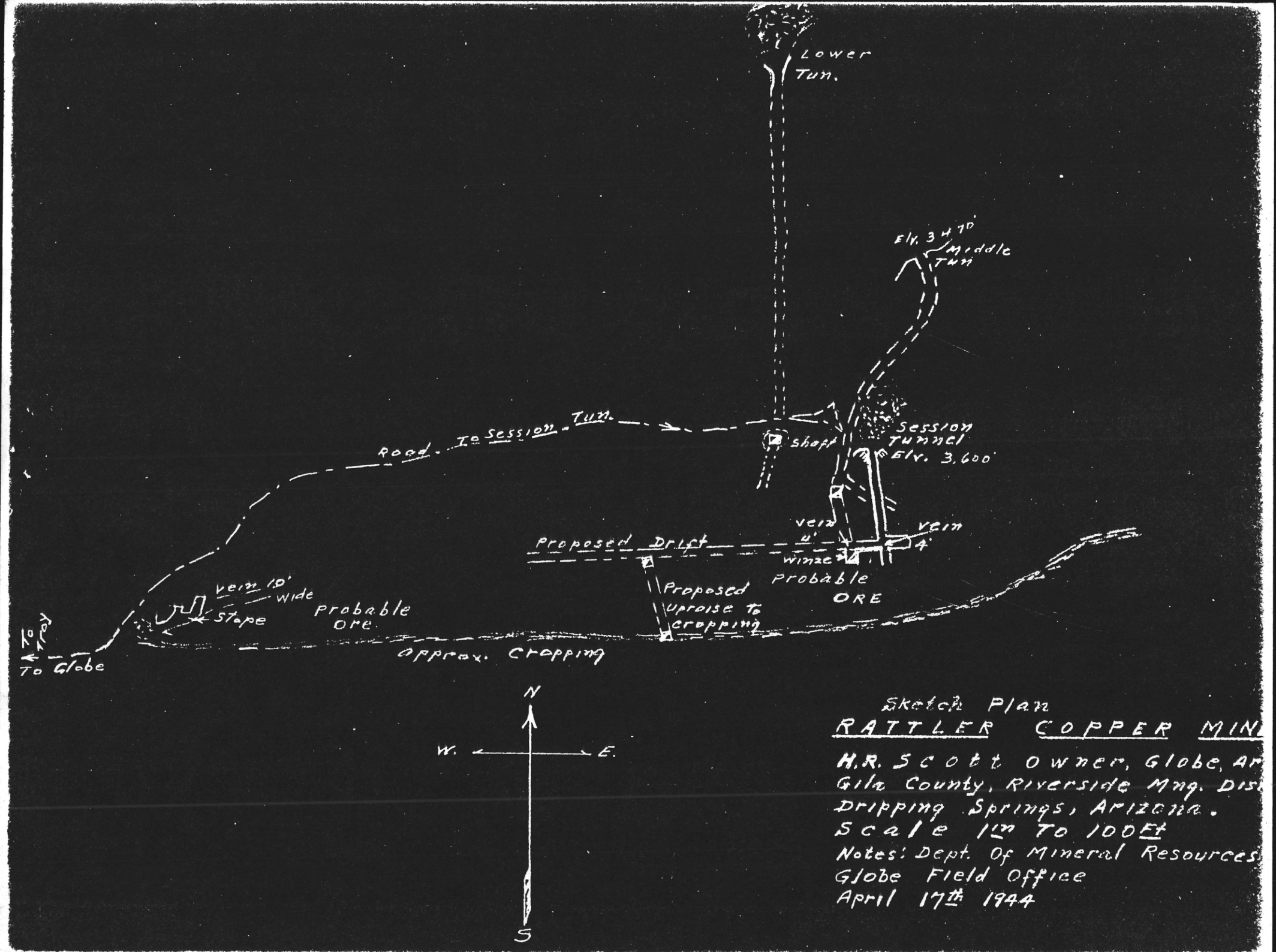


NGITUDINAL PROJECTION Looking Northwest

ATTLER MINE WORKINGS

verside Mining District, Dripping Spgs. Range
al County, Arizona. Approx. Scale 1" To 30'
vner H. R. Scott, Globe, Arizona
amination Made By Globe Field Office
epartment Of Mineral Resources
ebruary - 3 - 1945

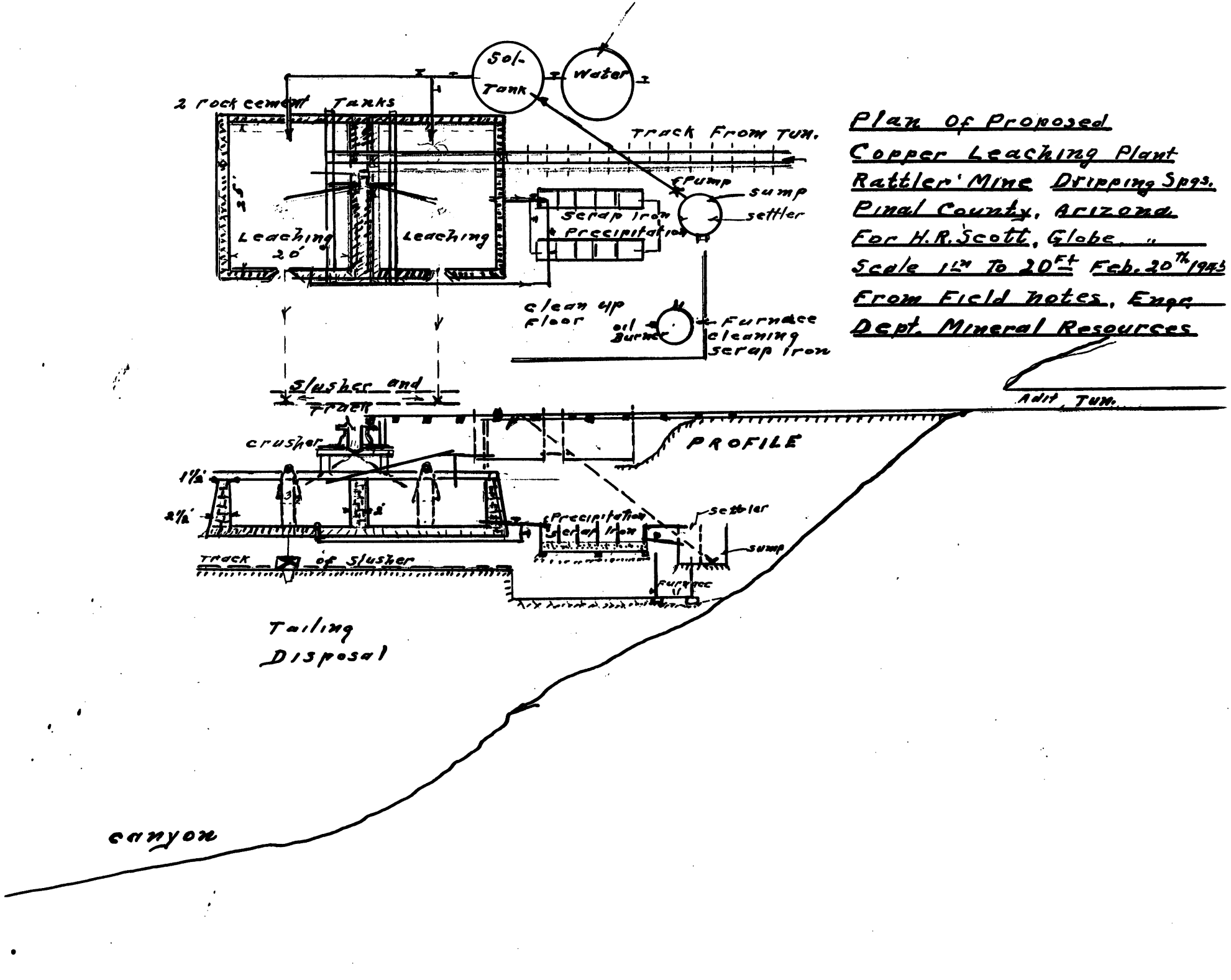




Sketch Plan

RATTLER COPPER MIN

H.R. Scott Owner, Globe, Ar
Gila County, Riverside Mng. Dis
Dripping Springs, Arizona.
Scale 1in To 100Ft
Notes: Dept. Of Mineral Resources
Globe Field Office
April 17th 1944



Plan of Proposed Copper Leaching Plant Rattler Mine Dripping Spgs. Pinal County, Arizona For H.R. Scott, Globe, "
Scale 1" To 20 Ft Feb. 20th 1943
From Field notes, Engr. Dept. Mineral Resources

600 m, east side north.

One of these faults is Precambrian, as shown by the fact that it has a Precambrian diabase dike along part of its length. The greatest tectonic activity, however, must have occurred after the Paleozoic Era because of the major involvement of Paleozoic rocks, and faulting probably continued into middle or late Tertiary time as indicated by the substantial horizontal offset of the early Tertiary rhyodacite dike, mentioned above.

The southwest margin of the Dripping Spring Valley is bounded by a major normal fault (see section *D - D'*), north side down, probably of Miocene age, forming the basin that was filled with Tertiary alluvial and lakebed deposits. A churn drill hole in Dripping Spring Wash, 180 m west of the quadrangle boundary, penetrated 448 m of Tertiary conglomerate and did not reach the bottom of the basin even though the older rocks of the basement crop out 300 m to the southwest. The Tertiary alluvial basin in the northeast corner of the quadrangle must be underlain by a concealed west-trending normal fault, north side down, because of the position and attitude of Paleozoic sediments to the north (see section *E - E'*) in an area of Precambrian rocks.

ECONOMIC GEOLOGY

Mineral exploration in the El Capitan Mountain quadrangle started about 1870 and has continued intermittently to the present. Mining activity, especially in the early days, focused on silver and gold, which are associated with copper, lead, and zinc sulfides in fissure veins and replacements of carbonate sedimentary rocks. The deposits for the most part occur along or near major north- to northeast-trending high-angle faults in areas of moderate to intense deformation. There has been a small production from several mines. Between 1915 and 1926 one mine produced some vanadium associated with lead and silver. In the 1950's intensive uranium exploration in the western United States identified two deposits in this quadrangle, one of which produced a small amount. The mineral resource potential of this quadrangle is probably favorable for base metals, silver, and gold. The chances are quite good for the discovery of small- to moderate-sized deposits of these metals. Descriptions of individual deposits are given below.

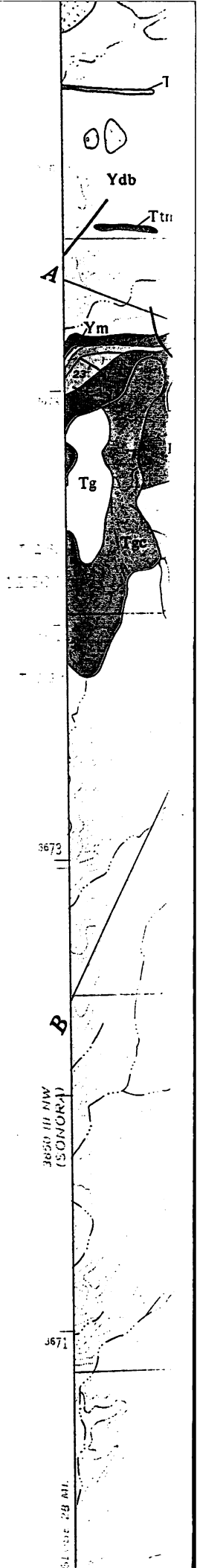
The Cowboy gold mine (NE¼ sec. 31, T. 3 S., R. 15 E.) consists of two shallow shafts and several pits and adits along a shear zone striking N. 80° W. and dipping 80° S. occupied by a rhyodacite porphyry dike, and a vertical crosscutting shear zone striking N. 25° E. The deposit occurs in Mescal Limestone and the rhyodacite dike, and along the contact of a large diabase intrusion to the south. Vein material on the dumps and in the workings consists of vuggy quartz stained with iron and manganese oxides, and variable amounts of limonite, jarosite, specularite, malachite, chrysocolla, ankerite, wulfenite, and hemimorphite. Ransome (1923, p. 23), in discussing the mine, stated: "According to Mr. C. W. McGraw, the owner and operator, much of the gold is in coarse wire form and occurs erratically in pockets, particularly where the vein is in limestone. A sample of concentrate sent by Mr. McGraw to the Geological Survey shows the presence of a lead vanadate, probably descloizite. The total output of the Cowboy mine to the end of 1918 is estimated at about $25,000 in gold, with a little silver and lead."

A gold placer was worked in the early 1930's in the wash that runs east from the Cowboy mine into Dripping Spring Wash (J. T. Eastlick, Chief Resident Geologist, Inspiration Consolidated Copper Co., written commun., 1976). A small amount of gold was recovered from a 1-m streak at the bottom of the stream channel, 9 - 12 m below the surface, near where the wash enters Dripping Spring Wash. The gravel contained $2.00 in gold per cubic yard.

The Dripping Spring mine (sec. 25, T. 3 S., R. 14 E., and NW¼ sec. 30, T. 3 S., R. 15 E.), called the Columbia mine of the Dripping Springs Mines Corporation by Ross (1925, p. 67 - 68) and, according to him, consisting of about 20 claims, was located by J. W. Read about 1901; it was taken over by the Dripping Springs Copper Co. about 1915, which then explored with a number of adits, shafts, stopes, and drill holes through the early 1920's. The workings are shallow in the oxidized zone, and mineralization consists mostly of copper oxides, carbonates, and silicates (mostly malachite and chrysocolla) together with some zinc (reported by Ross but minerals not identified). Limonite, specularite, quartz, and calcite are also present in the copper-bearing veins, which occur mainly in east-striking, steeply south-dipping faults and shear zones where they cross the contact between the Abrigo Formation and the Martin Limestone.

The Amax Exploration Company claims (sec. 30, T. 3 S., R. 15 E., and SE¼ sec 25, T. 3 S., R. 14 E.) were explored by that company in 1972 with several diamond drill holes. In this area there are a number of older prospects, mainly adits near the contact between the flat-lying Martin Limestone and Abrigo Formation. Mineralization in these workings consists of oxidized copper minerals (chrysocolla and malachite) plus limonite, quartz, and calcite in fissures and faults, mostly dipping steeply.

The Vanadium mine (N½ sec. 32, T. 3 S., R. 15 E.), called C and B group by Ross (1925, p. 69), consists of a vertical shaft several hundred feet deep, two adits, and an open stope. Stoping was along two 1-m shear zones; the main one strikes N. 50° E. and dips 45° S., and the other strikes north-south and dips 50° E. Mineralization is mainly along contacts of lenses of Mescal Limestone included in Precambrian diabase. Exposed mineralized rock is in the oxidized zone and contains cerussite, vanadinite, wulfenite, quartz, and calcite. Ross (1925, p. 69) stated that some ore was mined and shipped during World War I. The property was examined by C. L. Beckwith of the Inspiration Consolidated Copper Company in 1926 (J. T. Eastlick, written commun., 1976). Beckwith stated that one small car of ore was shipped to the smelter that year. Beckwith also reported that the ore minerals cerussite and vanadinite occur in bunches through the vein material, which is altered limestone. He cut four channel samples in mineralized rock; three averaged 0.33 oz silver per ton, 1.92 percent vanadium, and 6.2 percent lead, and the fourth contained 0.17 percent vanadium and traces of silver and lead.



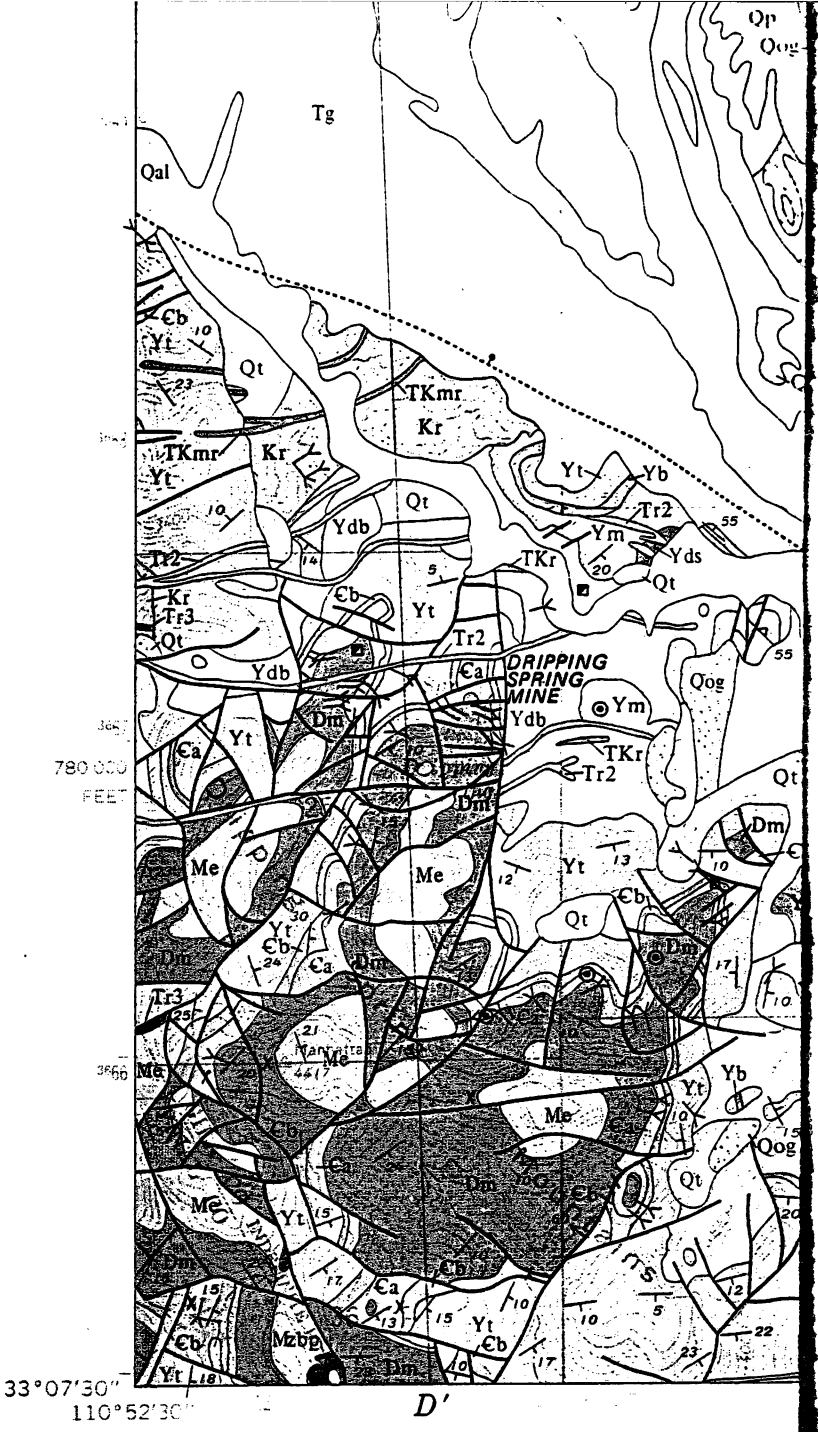
olidated Copper Company mapped and sampled the workings in 1968 (J. T. commun., 1976). Their investigation indicates that an adit follows the r zone for 120 m. Four channel samples 1 – 2 m long across the vein aver- er per ton and 0.92 percent copper. One sample assayed 2.25 percent lead. ie mine (NW¼ sec. 3, T. 3 S., R. 15 E.) consists of three adits, a shallow n the siltstone member of the Dripping Spring Quartzite, which is crosscut . Vein fragments on the dumps are quartz and altered siltstone with abun- ns, and limonite in part as pseudomorphs after pyrite. No production has

ek mine (W½ sec. 34, T. 2 S., R. 15 E.) consists of several adits and pits st-striking fault zone dipping 60° – 70° S. that separates the siltstone mem- ing Spring Quartzite on the north from diabase on the south. Mineraliza- ine-grained quartzite, consists of sphalerite, galena, azurite, malachite, and stlick (written commun., 1976) reported that a grab sample of vein material ayed 4.18 oz silver per ton, trace of gold, 2.5 percent lead, 2.3 percent zinc, t copper. There is no recorded production.

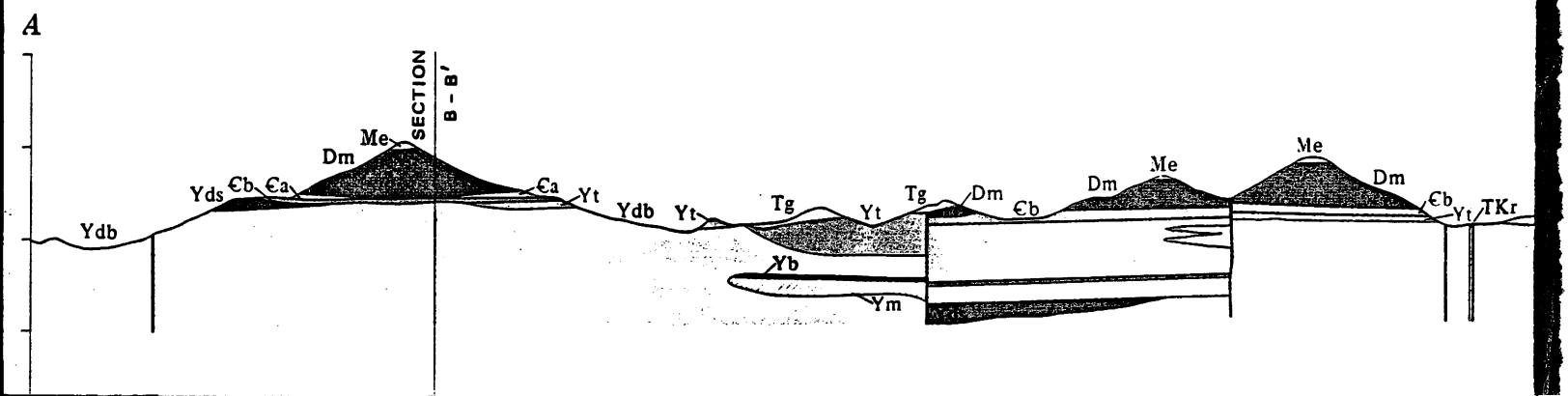
ine (NW¼ sec. 29, T. 2 S., R. 15 E.) was active in the 1880's,according to , p. 23). There are two shafts, an adit, and two narrow open stopes along N. 30° – 50° E., dipping vertical to 75° W., and cutting across diabase, Quartzite, and Pioneer Shale. J. S. Conpal (written commun., 1927) re- ing started in the early 1870's; production through 1927 amounted to about inly silver, averaging about 25 oz per ton, from oxidized ores mined to 90 m. Below this depth unoxidized sulfides, mostly galena and sphalerite, cult to treat economically by methods available at that time. Conpal stated ree major, roughly parallel, northeast-striking veins plus several minor ones, ntaining silver, lead, zinc, and copper sulfides plus minor gold. Vein frag- mps contain sphalerite, galena, quartz, barite, and calcite. There was also vity in the area in the late 1940's, and several holes were diamond drilled.

y uranium deposit (secs. 31, 32, T. 2 S., R. 15 E.), described by Granger , p. 472; 1969, p. 68 – 70, figs. 23, 36, 38), occurs in a chlorite-filled shear thick parallel to bedding in locally bleached dark-gray siltstone of the upper Dripping Spring Quartzite. Metatorbernite associated with limonite is abun- t radioactive parts of the deposit. It is estimated that 2,000 – 4,000 tons g 0.1 – 0.2 percent U_3O_8 were mined between 1954 and 1957. Granger , p. 79) stated that the uranium in the unoxidized parts of these deposits Spring Quartzite "*** occurs principally in several varieties of uraninite but on nontronite, chlorite, and, more rarely, graphite." They believed that the rived from diabase that intruded the Dripping Spring Quartzite about 1,050 o (1969, p. 76). The uraninite was concentrated in the carbon-rich siltstone ation in deuteric solutions that emanated from the diabase.

um prospect (SW¼ sec. 2, T. 3 S., R. 15 E.), described by Granger and Raup occurs near a discordant diabase body in dark-gray shale and siltstone of the of the Dripping Spring Quartzite. Radioactivity is abnormally high for sev- t near the base of the upper member and has been explored by several pits ill holes. Metatorbernite, malachite, limonite, pyrite, and gypsum occur and bedding planes. No minable ore body has been found, however.



Base from U.S. Geological Survey, 1964
10,000-foot grid based on Arizona coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue



TEAPOT MOUNTAIN PORPHYRY (Paleocene) – A discontinuous east-west-trending gray to light-brownish-gray quartz latite dike in the northwestern part of the quadrangle (SW¼ sec. 25, T. 2 S., R. 14 E.) in Precambrian Y diabase contains scattered 5- to 25-mm phenocrysts of pink potassium feldspar and 1 – 8 mm phenocrysts of plagioclase, quartz, and green biotite in a fine-grained to aphanitic groundmass of the same minerals plus magnetite-ilmenite, hornblende, apatite, calcite, and zircon. The feldspars are moderately to intensely altered to sericite, calcite, montmorillonite, and kaolinite, and the biotite and hornblende to chlorite, epidote, calcite, and hematite. S. C. Creasey (oral commun., 1970) has obtained a potassium-argon date of 63± 2 m.y. (Paleocene) for potassium feldspar from the porphyry in the Teapot Mountain quadrangle to the west.

RHYODACITE PORPHYRY – Vertical dikes of light-brownish to medium-gray rhyodacite with prominent but locally sparse quartz phenocrysts. Phenocrysts, 1 – 6 mm in diameter, making up approximately half of the rock, are in decreasing order of abundance plagioclase (An_{25-40}), partly glomeroporphyritic, biotite, hornblende, and quartz. The groundmass, anhedral-granular in 0.01 – 0.4 mm grains, consists of potassium feldspar and magnetite-ilmenite plus the other minerals listed above and accessory apatite, zircon, sphene, and allanite. The plagioclase is partly altered to sericite, montmorillonite, kaolinite, calcite, and epidote, and the biotite and hornblende to chlorite and epidote. A typical mode (volume percent) is: andesine 54, quartz 20, potassium feldspar 19, biotite 3.5, hornblende 3, and magnetite-ilmenite 0.5. These distinctive dikes are also common in nearby quadrangles to the west and south. In the Grayback quadrangle (Cornwall and Krieger, 1975b) dikes of this type cut the Tea Cup Granodiorite of Paleocene age and are thus Tertiary, probably Paleocene, in age

MELANOCRATIC RHYODACITE PORPHYRY – Several vertical dikes in the southwest corner of the quadrangle cut the Troy Quartzite and Rattler Granodiorite. Medium- to dark-gray and brownish-gray fine-grained porphyry with phenocrysts, making up roughly one-third of the rock, of andesine, hornblende, and quartz, as much as 1 cm in longest dimension. Groundmass consists of the same minerals plus magnetite-ilmenite, potassium feldspar, and accessory apatite, sphene, and zircon. Plagioclase (andesine) is rather intensely altered to montmorillonite, kaolinite, sericite, calcite, and epidote; hornblende and biotite are partly altered to chlorite, epidote, calcite, and sphene. These distinctive dikes are also common in nearby quadrangles to the west and south

RHYODACITE PORPHYRY – Generally forms dikes but locally occurs as sill-like bodies in the Pioneer Formation. Light- to medium-gray and brownish-gray fine-grained porphyry with 1 – 3 mm phenocrysts of andesine, hornblende, biotite, and locally quartz in a groundmass of the same minerals plus potassium feldspar, magnetite-ilmenite, and minor apatite and calcite. The plagioclase (andesine) is partly to entirely altered to montmorillonite, kaolinite, sericite, and minor epidote; the biotite and hornblende are partly altered to chlorite and epidote

RATTLER GRANODIORITE (Upper Cretaceous) – A pear-shaped composite

GEOLOGIC QUADRANGLE MAP
EL CAPITAN MOUNTAIN, ARIZONA
GQ – 1442

intergrowths. One sill (NW¼ sec. 33, T. 2 S., R. 15 E.) has conspicuous 1- to 10-mm dark-gray veins mostly parallel to the plane of the sill but also perpendicular to it, probably along joints, composed of hornblende with some chlorite, biotite, and apatite, As suggested by Granger and Raup (1969, p. 21 – 23), who studied similar diabase in the Sierra Ancha, north of the El Capitan Mountain area, these hornblende-rich veins were probably formed deuterically by hydrothermal solutions derived by differentiation from the diabase magma

Yt

TROY QUARTZITE (Precambrian Y) – 125 – 325 m of quartzite, sandstone, and minor conglomerate; probably correlates with the Chediski Sandstone Member as suggested by Shride (1967, p. 44 – 46). Sandstone and quartzite range in color from grayish pink and white to light brown and grayish orange and consist of medium to very coarse subangular to rounded quartz grains with variable amounts of feldspar, limonite, and dark accessory minerals in a matrix of finer quartz and clay. Thin layers and lenses of poorly to well-sorted pebbles and granules are interbedded in the sandstone and quartzite. Beds are laminated to thin bedded and arranged in thin to thick composite tabular to lenticular sets, locally crossbedded or convolute. Conglomerate 1 – 4 m thick occurs at the base of the formation with angular to rounded pebbles and cobbles of white quartz, various sandstones, quartzites, and cherts, basalt, Mescal Limestone, and Pinal Schist. Conglomerate beds 0.3 – 2 m thick are scattered through the formation, particularly toward the top. The predominant quartzites of the Troy form bold cliffs with intervening slopes underlain by more friable sandstones

APACHE GROUP (Precambrian Y): Includes in ascending order the Pioneer Formation, Dripping Spring Quartzite, Mescal Limestone, and basalt

Yb

BASALT – 20 – 65 m of mostly porphyritic dark-gray to grayish-red or brown basalt, one or more flows, vesicular tops with amygdules of calcite, chlorite, potassium feldspar, and epidote. Plagioclase phenocrysts, partly glomeroporphyritic, are 2 – 8 mm long. Groundmass is fine grained (0.05 – 0.3 mm) and consists of plagioclase (An_{50}), pyroxene, olivine, and magnetite-ilmenite intensely altered to chlorite, sericite, calcite, epidote, quartz, hematite, limonite, bowlingite, kaolinite, and some potassium feldspar

Ym

MESCAL LIMESTONE – 80 – 120 m of light-pink, brown, and brownish-gray dolomite, partly calcareous, thinly laminated to thin bedded, very fine grained to coarse grained. Some beds contain abundant black, white, and pink chert lenses and nodules. Stromatolitic algal beds occur above the middle of the formation, and layers of sandstone and quartzite near the middle in some areas. The formation has been metamorphosed by diabase to marble and calc-silicates in many places, and certain beds have been replaced locally by magnetite, tremolite, and serpentine

Yd

DRIPPING SPRING QUARTZITE – 245 m of siltstone, sandstone, quartzite, and conglomerate; includes the following members in descending order:

Siltstone member (145 – 170 m). – Siltstone interbedded with shale and fine-grained arkosic sandstone, laminated to thin bedded with low-angle cross-laminae; light to dark gray, olive gray, dusky brown, and grayish

Troy Mining Area Ray Folio - #217, 1923
Dripping Springs Dist.

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ECONOMIC GEOLOGY.

GENERAL CHARACTER OF RESOURCES.

The rough and generally rocky or stony surface of the Ray quadrangle, with its scanty desert vegetation, although utilizable in part for the grazing of cattle and the browsing of goats, offers little inducement to human occupancy or industry. The economic development of the area depends almost entirely upon its mineral resources, and of these copper is supreme. The Ray copper district, which is in the northwestern part of the quadrangle and extends in small part into the adjoining Florence quadrangle, on the west, contains one of the largest deposits of copper ore in Arizona. This ore is being mined on a large scale, and most of it is reduced to metal within the Ray quadrangle. Some copper ore is produced also near Troy and at and near the London-Arizona mine, in the Dripping Spring Range; and on the south side of the Gila, near Kelvin.

The area also contains ores that yield gold, silver, lead, zinc, and vanadium.

HISTORY OF MINING.

Apparently the first mines to be worked in the Ray quadrangle were those which yielded silver-gold ore near Pioneer, in the northeast corner of the quadrangle, and perhaps the Ripsey mine, in the southwest corner. The argentiferous ore of the El Capitan mine, south of Old Baldy, in the Mescal Range, was probably also worked in this early period, during the eighties. Very little definite information is now obtainable concerning these pioneer efforts in what was then a wild and remote region. The Republic mine, at Pioneer, had a mill and apparently was operated successfully for a number of years.

Some mining was done also about 1880 on Mineral Creek, near the site of the present town of Ray. At that time the Mineral Creek Mining Co. built a 5-stamp mill and did some work, presumably on the Mineral Creek claim, north of Copper Gulch. The subsequent history of mining development on the the ground now owned by the Ray Consolidated Copper Co., is given elsewhere.[61]

The Arizona Hercules Copper Co., whose ore-bearing ground is almost inclosed by the claims of the Ray Consolidated Copper Co. and contains the eastward extension of the Ray ore body, began exploration by drilling a little later than the Ray company. The existence of ore was soon ascertained, but it was not until 1916 that active steps were taken to mine it. In that year two shafts were sunk and levels were run preparatory to extensive mining. The shafts were completely equipped with first-class machinery and a coarse-crushing plant was built at the mine, railway connections were made, and at the settlement of Belgravia, 6 miles from the mine, near Kelvin, a 2,700-kilowatt power house and a 1,500-ton concentration mill were constructed in 1917 and 1918. Production of copper on a large scale began in 1918.

Active mining development at Troy began about the year 1900 by the Troy Copper Co., a Boston corporation organized under the laws of Maine and capitalized at $1,000,000. About the same time the Manhattan Copper Co., of New York, capitalized at $1,500,000, entered the field. The Troy company had about 30 claims lying chiefly in the western part of the Troy district and including the '91, Buckeye, Climax, and Alice. The Manhattan had about 15 claims, including the Rattler. Most of the development work appears to have been done between 1901 and 1903. In 1902 the two companies consolidated as the Troy-Manhattan Copper Co., capitalized under the laws of Maine at $3,000,000. A 60-ton smelter, at River- Gila, had been completed early in 1901 and was

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PRODUCTION.

The total production of metals in the Ray quadrangle can not be given, as no records of output prior to the extensive mining near Ray are available. The older yield, however, can not have been large.

on general grounds rather than from any definite evidence, is supposed to have taken place at the end of the Mesozoic era. It appears reasonable to regard the intrusion of the granitic porphyries as an early Tertiary event, but it must be admitted that this is little more than conjecture. The deposition of the protore certainly took place after the laying down of the Tornado (Mississippian and Pennsylvanian) limestone and before the eruption of the dacite.

TROY DISTRICT.

The intrusion of the granodiorite of the Troy Basin was followed by pronounced contact metamorphism and by considerable metallization. The granodiorite is closely related to the Schultze granite and the Granite Mountain and Teapot Mountain porphyries and was intruded at about the same time as those rocks. It is associated with many dikes and is surrounded by much fissured rocks, including limestone, which differ in no essential respect from rocks elsewhere ore-bearing in the same general region. In short, Troy would seem to be a decidedly favorable place for ore deposition. Yet those who have acted on this apparently reasonable supposition have thus far been disappointed. There has been extensive prospecting, and some ore has been found, but the returns have not equaled the outlay.

The principal development has been on the Rattler claim, 1 mile in a direction a little south of east of Troy, and on the '91, Buckeye, and Alice claims, one-half, three-fourths, and 1½ miles southwest, respectively, of the now practically abandoned settlement. When the visits were made in 1910 and 1914 the underground workings were only in small part accessible.

The workings of the Rattler mine comprise the Sisson shaft, which is an incline of 65° to the south and 300 feet in depth, connected with three levels, the first of which is an adit. The levels run nearly east-northeast and west-southwest and open a section of ground about 700 feet long. A second shaft, east of the Sisson, extends only about 50 feet below the adit level. There is no vein, the ore occurring as bunches and lenses that follow more or less closely the bedding of the Mescal limestone in which it occurs. The limestone at the Rattler mine is an inclusion in diabase, the original igneous contact being modified in some places by faulting. Granodiorite was not seen in the workings, but as shown on the geologic map it is not far away and has effected considerable contact metamorphism in the diabase, which sparkles with secondary biotite. The ore zone dips 20° S. 15° W. and from a point in the main tunnel about 100 feet in has been followed in an inclined winze for about 95 feet to a point where it appears to be cut off by a rather obscure fault. There is apparently no large quantity of ore available. The Sisson shaft appears to be entirely in diabase below the first level.

The ore of the Rattler mine is chiefly a dark fine-grained aggregate of magnetite and chalcopyrite with varying quantities of silicate minerals derived by metamorphism from the inclosing limestone. With increasing proportions of these silicates the ore grades into the metamorphosed limestone. Analyses of the ore recorded in the books of the Troy Arizona Copper Co. and its predecessors show from 3 to 3.7 per cent of copper, a maximum of 0.04 ounce of gold and 0.7 ounce of silver per ton, from 27 to 30 per cent of silica, about the same proportion of iron, about 1 per cent of calcium oxide, and 20 per cent of magnesium oxide.

Very little could be seen of the '91 mine, as the shaft had caved in. It apparently is about 150 feet deep, and the maps show three short levels. The little copper ore that was found in this mine appears to have occurred, as at the Rattler, as small lenticular bunches in the Mescal limestone. The

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ve been permeability of the rocks affected
ly of the active solutions.

own by a study of the protore, was due
inute irregular fissuring. This fissuring
the formation of larger fissures along
lace.

elieved, was favored also by irregularity
ıct and by the presence of little tongues
y extending out into the schist. The act
ve caused some disturbance of the schist,
such tongues and dikes, by introducing
e rock mass, probably made for further
xtent provided communicating channels
g igneous material and the zone of sul-
me probability is given to this suggestion
l dikes and irregular protrusions of por-
in the metallized ground. This is partic-
ut Humboldt Hill, where the ore body
thickness. That thickness, however, it
ed, is probably due more to enrichment
ition.

neralizing solutions available at any place
probably depended to a large extent also
deep-seated mass of magma from which
ss, however, is entirely beyond our ken,
nain, for the present at least, unknown.

OF VARIATIONS IN COUNTRY ROCK.

be no regular or significant difference
re and porphyry protore as regards tenor
yrite, however, if not more abundant, is in
uous constituent of the porphyry protore
otore. Molybdenite also seems to be more
y than in schist. At Ray the mineralized
ears to carry more pyrite and chalcopy-
ther higher in copper than the average
rotore. (See p. 21.) This is not surpris-
mbered that the diabase contains a much
on originally present as oxide and silicate
and also, as has been shown in a previous
ined originally a little copper. Practically
nated ore had been mined in diabase in the
ne field work for this folio was completed,
o be no reason why, under suitable condi-
the mineralized diabase should not have
nsequently it would not be surprising if
ound in that rock east of Mineral Creek.

RFACE EXISTENT AT THE TIME OF DEPOSITION.

ıt at the time the protore was deposited at
k lay above the present surface, and it is
nat the thickness was several times the figure
ystallinity of the granite porphyry and the
tamorphism that accompanied or followed
oth indicative of the solidification of the
ly thick cover. In the Miami district the
self, at the present day, is in places fully
e the ore.

GEOLOGIC AGE.

f the protore probably followed closely the
nite porphyry, but no facts are known that
his event definitely in geologic time. The
younger than the diabase, whose intrusion,

The principal development has been on the Rattler claim, 1 mile in a direction a little south of east of Troy, and on the '91, Buckeye, and Alice claims, one-half, three-fourths, and 1½ miles southwest, respectively, of the now practically abandoned settlement. When the visits were made in 1910 and 1914 the underground workings were only in small part accessible.

The workings of the Rattler mine comprise the Sisson shaft, which is an incline of 65° to the south and 300 feet in depth, connected with three levels, the first of which is an adit. The levels run nearly east-northeast and west-southwest and open a section of ground about 700 feet long. A second shaft, east of the Sisson, extends only about 50 feet below the adit level. There is no vein, the ore occurring as bunches and lenses that follow more or less closely the bedding of the Mescal limestone in which it occurs. The limestone at the Rattler mine is an inclusion in diabase, the original igneous contact being modified in some places by faulting. Granodiorite was not seen in the workings, but as shown on the geologic map it is not far away and has effected considerable contact metamorphism in the diabase, which sparkles with secondary biotite. The ore zone dips 20° S. 15° W. and from a point in the main tunnel about 100 feet in has been followed in an inclined winze for about 95 feet to a point where it appears to be cut off by a rather obscure fault. There is apparently no large quantity of ore available. The Sisson shaft appears to be entirely in diabase below the first level.

The ore of the Rattler mine is chiefly a dark fine-grained aggregate of magnetite and chalcopyrite with varying quantities of silicate minerals derived by metamorphism from the inclosing limestone. With increasing proportions of these silicates the ore grades into the metamorphosed limestone. Analyses of the ore recorded in the books of the Troy Arizona Copper Co. and its predecessors show from 3 to 3.7 per cent of copper, a maximum of 0.04 ounce of gold and 0.7 ounce of silver per ton, from 27 to 30 per cent of silica, about the same proportion of iron, about 1 per cent of calcium oxide, and 20 per cent of magnesium oxide.

Very little could be seen of the '91 mine, as the shaft had caved in. It apparently is about 150 feet deep, and the maps show three short levels. The little copper ore that was found in this mine appears to have occurred, as at the Rattler, as small lenticular bunches in the Mescal limestone. The wulfenite in the '91 mine, concentration of which was at one time attempted, occurs in joints in fractured Dripping Spring quartzite.

The Buckeye mine is situated on a nearly east and west branch of the same porphyry dike complex on which is the Alice mine, at a point where the dike complex cuts through Dripping Spring quartzite, Mescal limestone, and Troy quartzite. These stratified rocks appear to be underlain and overlain by intrusive sheets of diabase. The dump of the shaft, which is apparently about 150 feet deep, with three levels, is chiefly diabase. These levels trend generally west-northwest. The first level has a length of about 1,000 feet, but each of the other two is less than 300 feet. The Buckeye at one time had a little oxidized copper ore near the surface and alongside of the porphyry dike. This ore was reduced in a small furnace at the mine.

The Alice mine was worked through a shaft inclined at 45° with three levels, the lowest of which is about 200 feet vertically below the collar. As shown by the mine map the general trend of the levels is northeast and the length of the block of ground explored by them about 350 feet. The shaft is sunk on a porphyry dike at a point where Tornado limestone on the north is faulted down against Martin limestone on the south. A few small bunches of ore were found in limestone near the dike, but the mine did not pay expenses. It could not be entered when the geologic field work on which this folio is

Prof. Paper 12, p. 12, 1903.

based was in progress. The mine maps show that connection was made with the Pratt tunnel by an inclined raise of about 200 feet vertical height.

about ½ mi. north of the Buckeye mine?

Since the last visit the Troy Arizona Copper Co. has done additional prospecting and is reported to have sunk a 500-foot shaft on the Climax claim, about three-quarters of a mile west-southwest of Troy, and in 1917 some ore was being shipped.

On the Renfro group of 47 claims, about 1½ miles east-southeast of Troy, considerable ore was visible in 1912 in the lower part of the Martin limestone at a point near the crest of a steep spur where the limestone beds, which dip at a low angle to the east, are stepped down toward the south by four or five small faults the throw of which is apparently nowhere over 40 to 50 feet. The ore, mostly chrysocolla and carbonates, occurs as irregular layers 6 inches in maximum thickness, which lie parallel with the bedding of the limestone and occur as small replacement masses near fissures. From the ravine to the west of these exposures of ore on the ridge, and about 400 feet below them, a tunnel 900 feet in length had been driven in 1912 entirely in diabase, which here underlies the Troy quartzite and Martin limestone of the crest of the ridge. The tunnel follows a nearly vertical fissure and runs southeast. No ore had been found in this tunnel in 1912. Since that year the ground has been worked by the Pinal Development Co., which began production in 1917. The ore shipped is oxidized and presumably comes from the replacement deposits in limestone previously mentioned. The main tunnel is stated[71] to be 1,600 feet long and to connect with about 2,500 feet of underground workings with a maximum depth of 600 feet.

OTHER COPPER DEPOSITS.

London-Arizona mine.—The London-Arizona mine is in the southeastern part of the quadrangle, about 4 miles north of Hayden, on the north side of Tornado Peak.

The lowest rock exposed in the canyon, in which are the mine buildings, is diabase, apparently in a sheet several hundred feet thick, which was intruded at approximately the horizon of the Mescal limestone. Overlying the diabase in succession are the Troy quartzite, the Martin limestone, and the Tornado limestone. All these rocks are cut by dikes and small intrusive masses of quartz diorite porphyry. The diabase in the vicinity of the mine buildings is conspicuously metamorphosed by the porphyry and in places is a sparkling dark biotitic schist, generally containing disseminated pyrite and chalcopyrite.

On the south side of the ravine the lower part of the Devonian Martin limestone, as at other places in the quadrangle, shows metallization by copper, especially near dikes of quartz diorite porphyry, and since the time of visit considerable oxidized copper ore has been shipped to the Hayden smelter from flat-lying lenticular deposits in this limestone. In 1913 about 1,000 tons of 16 per cent ore was sent to the smelter and in 1916 about 6,000 tons of 4½ per cent ore. This ore was probably mined through tunnels or inclines on the south side of the ravine. A few thousand tons of lead ore was also mined. In 1910 exploration was in progress from the Curtin shaft, which was sunk in the Tornado limestone south of the ravine in order to reach the ore-bearing zone in the Martin limestone or to cut any ore bodies that might possibly occur at higher horizons in the limestones near one of the porphyry dikes. The shaft at that time was 270 feet deep, and no ore had been found in the workings connected with it.

Christmas deposits.—The interesting contact-metamorphic deposits at Christmas, although they lie in the adjoining Christmas quadrangle, about 4 miles east of the London-

Average of eight analyses of

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Fe	
CaO	
SiO_2	

Schneider group.—Th
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Canon Consolidated Co

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ravine. This tunnel ru
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It is chiefly in diabase
porphyry. Small irreg
and quartz were observ
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Since then considera
1917 the main tunnel v
ore were shipped weekl
of about $200,000 to th

Kelvin-Sultana mine.
the Kelvin-Sultana Co
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The shaft is sunk i
intrusive into pre-Cam
quartz diorite porphyr
that trend nearly east a
tical or dip south at hi
oxidized copper ore n
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workings, now abando
shaft is about 800 feet

At the time of the fir
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At the second visit, i
although it was being k
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and a wire-rope tramwa
A power plant had als
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The mine has since
not been in continuous

GOLD A

Pioneer mines.—In
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underground work don
settlement of Pioneer.
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and barite, but rich se
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Ray folio — #217

AREAL GEOLOGY