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HEINRICHS GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA

WALTER E. HEINRICHS, JR.
E. GROVER HEINRICHS

PHONE: MAIN 2-4202
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671

February 5, 1963

Mr. J. E. R. Wood
1768 East Hastings St.
Vancouver 6, B. C.
Canada

Dear Jerry:

In response to your phone call of 31 January 1963, we contacted Mr. Bud Woolsey and find we are somewhat familiar with the ground but not in detail. It does have fringe area possibilities. Maximum alluvial thickness could range upwards of 1,000' or more, but regional gravity suggests pediments and maximum bedrock depth may vary only between 300 to 700'.

Kennecott drilling is possible, but doubtful to our knowledge. A. S. & R. and Banner drilling is more likely and definitely exists nearby, but we have no specifics. Such would require some research time and effort. A small part of the more regional mobile magnetometer picture we previously obtained is generally confirmed in somewhat greater detail by Den Baar's work. Potential economic significance of this magnetic anomalism is problematical and further study is required to determine if any mineralization relationship may exist. Induced polarization reconnaissance is therefore indicated, at least to help decide where and how to drill (and possibly whether?).

In lieu of discovery of mineral in place on bedrock and under alluvium, we guess title is approximately similar to other similar unpatented federal and state land claims which are on mostly alluvial covered surface, provided of course all other requirements have been reasonably met and there are no adverse claimants. Anymore, a practical analysis of these factors in an area like this, invariably dictates detailed inspection on the ground by someone experienced in addition to competent legal opinion. Section 10 is all state land with a valid 20 year lease on the N $\frac{1}{2}$ in the name of Charles P. Beach. The S $\frac{3}{4}$ may be under prospect permit (?) as apparently are the W $\frac{3}{4}$ of Sec. 34 and Sections 2 & 3. Section 11 is Federal mineral.

Mr. J. E. R. Wood

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February 5, 1963

Our recommendations are:

1. Ground inspection for drill holes, title purposes, geology and associated research, with report. 7 - 10 days & \$1,000 - \$1,500.00.

and if favorable

2. Recon I. P. (including S. P. and resistivity and possibly some additional magnetics) \$10,000 - \$15,000 and 6 weeks time.

I am sorry but we do not grasp the potential significance of your idea to publish a property map of the district, and we therefore look forward to further explanation with considerable curiosity.

We will look to hear from you further about 13 February. Should I be away, both my brother Grover or Frank Seward are familiar with the situation.

Sincerely,

Walter E. Heinrichs, Jr.

WEH: jh

MESA 32 MI.
17 MI. TO ARIZ. 87

FLORENCE 26 MI.
6 MI. TO ARIZ. 87

ARIZONA
(PINAL COUNTY)

CASA GRANDE QUADRANGLE

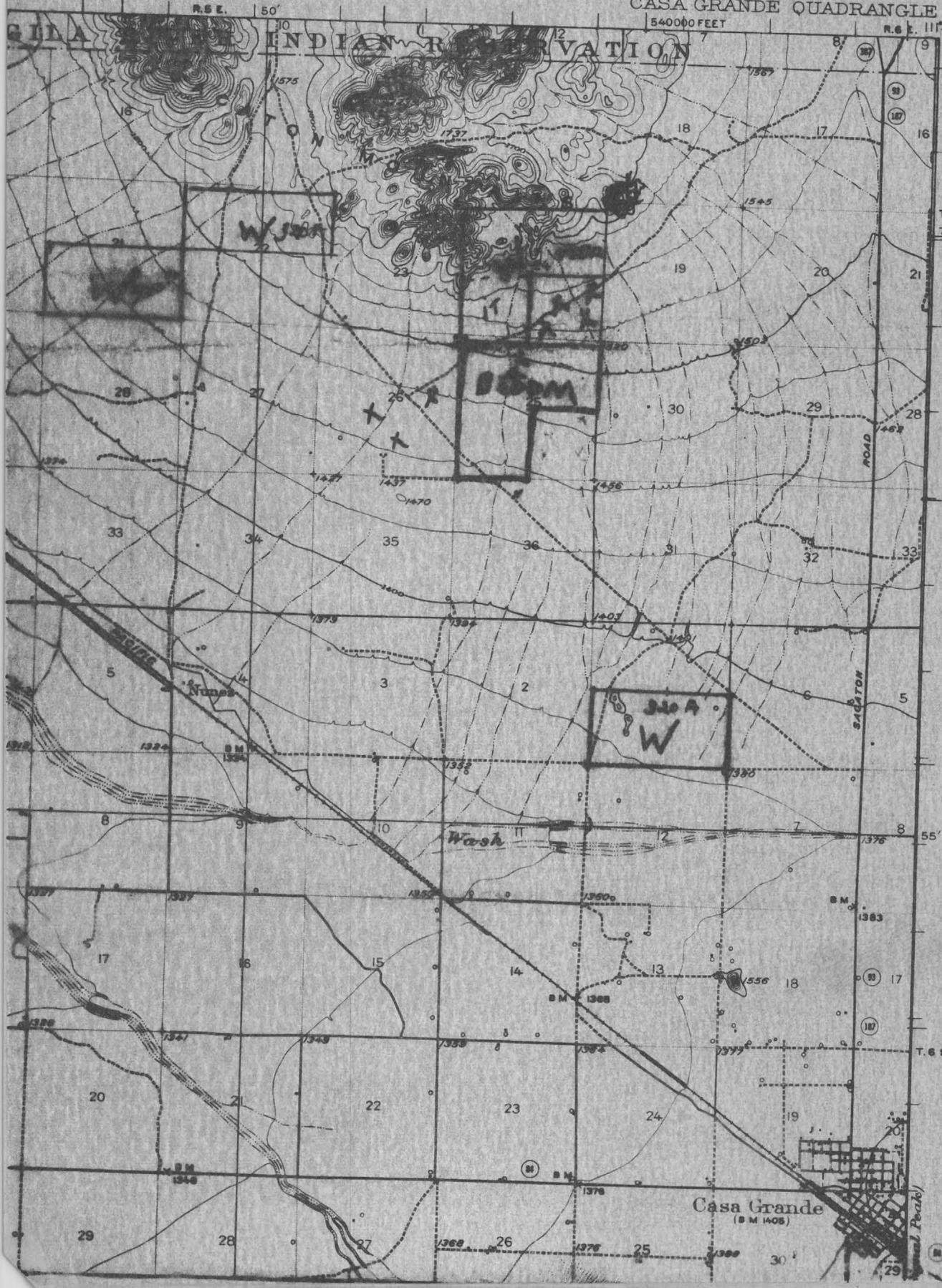
(Sagaton)

R. 6 E. 50'

540000 FEET

R. 6 E. 117° 45' 33" 00'

T. 5 S.
720000 FEET

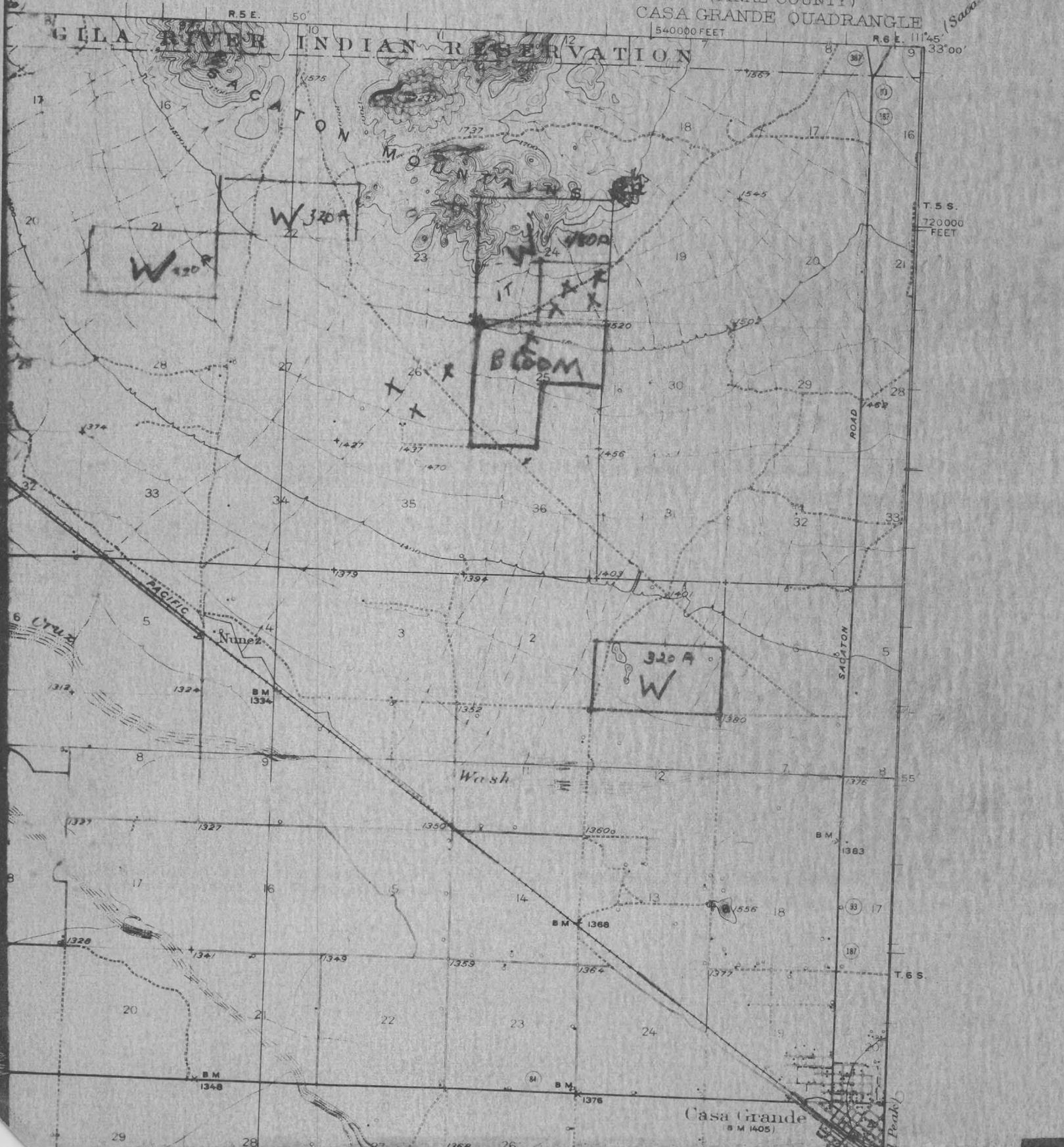


9801

MESA 32 MI.
17 MI. TO ARIZ. 87
FLORENCE 26 MI.
6 MI. TO ARIZ. 87

ARIZONA
(PINAL COUNTY)
CASA GRANDE QUADRANGLE
540000 FEET

(Sacaton)



T. 5 S.
720000
FEET

T. 6 S.

Casa Grande
B.M. 1405

RESULTS OF A MAGNETOMETER SURVEY ON MINING CLAIMS,
THREE MILES EAST OF THE PIMA AND MISSION MINES

PIMA COUNTY, STATE OF ARIZONA.



By: Dirk den Beers.
Consulting Geologist

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Appended Material:

I Cost schedules for diamond drilling.

II Anomaly contour map.

III Property location map.

DEN BAARS & ASSOCIATES
MINERAL EXPLORATION AND RESEARCH CONSULTANTS

DRS. DIRK DEN BAARS
CONSULTING GEOLOGIST
ARIZONA REG. 4032

August 6th, 1962

6318 EAST HAYNE STREET
TUCSON, ARIZONA
AXTEL 8-3551

RESULTS OF A MAGNETOMETER SURVEY ON MINING CLAIMS,
THREE MILES EAST OF THE PIMA AND MISSION MINES

General Information:

The area in question, where the writer completed a magnetometer survey, is located about 19 miles south-south-west of the city of Tucson, State of Arizona. The prospect permits and other claims as described below, are the property of Mr. James A. Woolsey, P.O. Box 4054, Tucson, Arizona. This report was completed at his request and expense.

The State Prospect Permits, issued for exploration to prove a valuable mineral deposit, cover the following area: The $W\frac{1}{2}$ and the $W\frac{1}{2} E\frac{1}{2}$ of section 34, T 16 S, R 13 E, and sections 2, 3 and 10 and the $W\frac{1}{2} W\frac{1}{2}$ of section 1, T 17 S, R 13 E, GASRBAM. Also there are 25 Federal Lode claims in section 14 of the same township and range. All claims are contiguous, comprising of 2958 acres of land in Pima County, Arizona.

The magnetometer work was started on the west side of the property at section corner 33,34,4,3 where depth to bedrock was expected to be shallower than more to the east. Also an initial reconnaissance had shown that magnetic anomalies exist in this particular area.

A network of stations was surveyed in, the stations being 100 ft apart and marked with numbered wooden stakes. The instrument used was a Buska Scout magnetometer, measuring vertical intensities. This instrument is of a temperature compensated Schmidt type and has a scale constant of about 20 gammas per scale division.

Attention might be called to the fact that the magnetometer seems to be an excellent tool for prospecting in this area. The discovery of the Pima orebody, three miles west of this area, is one of the major discoveries of a copper porphyry under alluvial cover in the U.S. made with the magnetometer.

The exploration boom that followed this discovery, resulted in three more major discoveries, The Mission mine, the Esperanza mine and the Palo Verde extension of the Banner mine. These mines are all in production to day, but their existence was only suspected six years ago.

Geology of the area:

The geology of the east Sierrita mountains is described in the Southern Arizona guidebook No. 2, by the Arizona Geological Society. Among the better known mines are, the Mineral Hill and Daisy mines, the San Xavier mine, the Pima mine, the Esperanza mine, and the latest discovery, the Mission mine. Numerous other little mines are located in the Twin Buttes district.

According to Dr. Willard C. Lacy, the ore deposits of the east Sierritas can be divided into three categories:

1. Small shallow-seated, low temperature fissure veins with appreciable gold and silver values and a spotty distribution of lead, zinc and copper. Examples: Paymaster and Olivette mines.
2. Pyrometamorphic deposits carrying copper and or lead/zinc mineralization occur in silicified limestone with or without observable contacts with intrusive rocks. Examples: San Xavier, Mineral Hill and Daisy mines.
3. Disseminated copper ores in sedimentary, volcanic and intrusive rocks, occurring in areas of intense fracturing of rocks other than limestone. Syenite, quartz monzonite and monzonite intrusives appear to be closely related to this kind of mineralization. Examples: Pima mine, Mission mine, Esperanza mine.

There is however a close relationship between certain types of pyrometamorphic mineralization and the normal porphyry copper deposit. In the area to be covered in this report, geological conditions can be expected to be similar to those found around the Pima and Mission mines.

The alluvial overburden becomes increasingly deeper toward the east side of the property. At the Pima mine, the main orebody was located under an alluvial cover of about 210 ft. Similar conditions existed at the Mission copper orebody. No rock outcrops or other indications could be used to go by.

The discovery of the Pima copper deposit is described by R.E. Thurmond and W.R. Storms. Information circular No. 7822, U.S. Bureau of Mines. The following information was taken from this bulletin:

The Pima orebody strikes E-W and dips 45° to the south. As mentioned above, there is a minimum overburden of 200 ft. of alluvium, underlain by a caliche conglomerate of up to 25 ft. to bedrock. The magnetic anomaly under these conditions was 400 gammas above normal. The first drill hole hit sulphide ore at 46 ft. below bedrock.

The orezone averaged about 200 ft. in thickness. The lower limit downdip of the orebody has not yet been determined, but was intersected by drillholes at a vertical depth of 800 ft. below the surface. Underlying the main orezone is a persistent breccia zone which is weakly mineralized.

The ore occurs mainly in the carbonate rocks and contains primary sulphides like pyrite, chalcopyrite and some bornite. Secondary minerals consist of chalcocite, native copper, cuprite, tenorite and chrysocolla.

According to Kenyon Richards in "Some geologic features of the Mission copper deposit", the Mission copper orebody occurs mainly in the Fina formation consisting of marble, hornfels, taconite and quartzites and in the Papago formation, consisting of massive argillite, conglomerate and arkosic facies and garnetized limestone beds. Other ore formations are in kaolinized limestone, chloritic limestones and arkose.

In addition to Precambrian Sierrita granite, which forms the basement rock, three igneous formations occur within the deposit. These are pre-ore monzonite porphyry and felsite porphyry and post ore andesite. The felsite porphyry and andesite are in the form of dikes. The monzonite occurs in sill-like bodies and in small irregular stocks.

Largely due to lack of visible bedding within the units, structure is not understood in detail. However gross patterns are apparent. The quartzite beds are moderately folded and dip at low or intermediate angles. Several low-angle faults, such as the bottom thrust are traced through parts of the mineralized zone and some of these faults are associated locally with repetition and thickening of stratigraphic units.

As a group, these faults appear to show thrust relationships. Several high-angle normal faults of appreciable displacement also are recognized, although none of these is shown.

Most of the thrust and normal faults are probably of pre-mineral origin, because breccia along most of the faults is locally mineral healed. However the faults usually are marked also by post mineral gouge and breccia, and the relative magnitudes of the pre and post mineral movements are not known.

The orezone is traversed by numberless faults and slips of a definite post mineral age and of diverse, apparently un-systematic orientation. The displacement and continuity of most of these faults are probably insignificant.

Vertical Intensity Magnetic Anomaly:

The anomaly located in the NW corner of section 3, T 17 S, R 13 E has its peak value about 1100 ft. east of section line 4 and 3. The total vertical anomaly has an intensity of about 200 gammas above normal, and occurs over a horizontal distance of approximately 3000 ft in an east-west direction.

Considering the circumstances of overburden, this anomaly is certainly not of a minor magnitude. To analyse the configuration and the profile form of the anomaly more fieldwork and induced potential work is desirable. The preliminary calculations done to determine depth to the top of the basement indicate about 530 ft of alluvial overburden.

The cause of this vertical anomaly can only be determined by drilling. The following possibilities were selected to represent the most plausible causes:

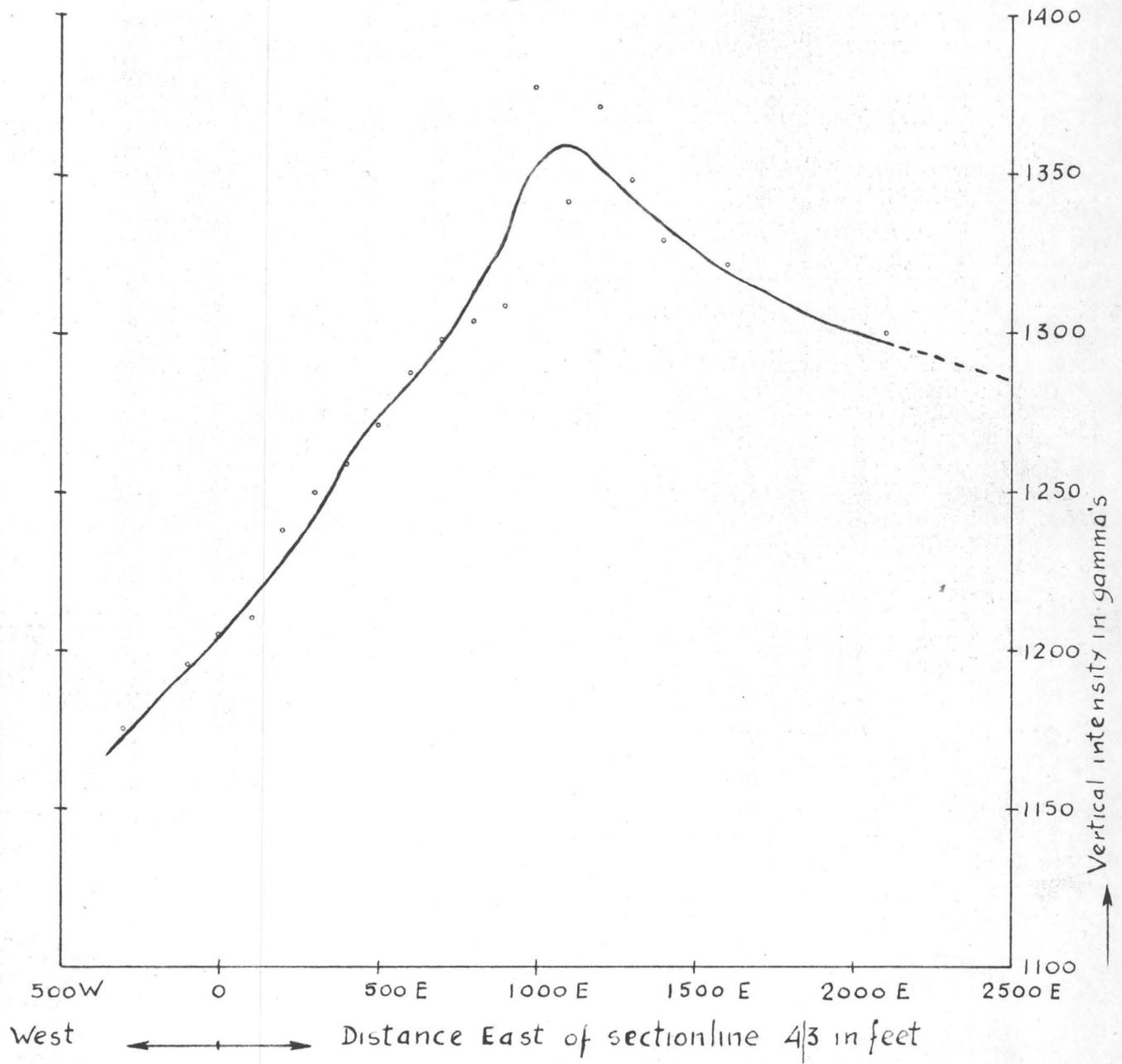
1. An intrusive magmatic body with a higher susceptibility along a fault or other structure, with or without ore mineralization.
2. A north-east trending orebody, dipping to the south-east, of unknown grade and magnitude.
3. A north-east trending fault or thrust, dipping south-east, with an upward displacement of one or both of the blocks.
4. An anticline in the Palaeozoic or Mesozoic formations, with or without pyrometamorphic ore deposits and or faults.
5. A combination of the above mentioned possibilities.

To determine the cause of the anomaly, a minimum of two drillholes are recommended in the following locations:

- I. At a point 1100 ft. east of section line 4 and 3, and 450 ft. south of sectionline 34 and 3, depth of hole about 750 ft.
- II. At a point 75 ft. north of section line 34 and 3, and 1340 feet east of section line 33 and 34, depth of hole about 780 ft.

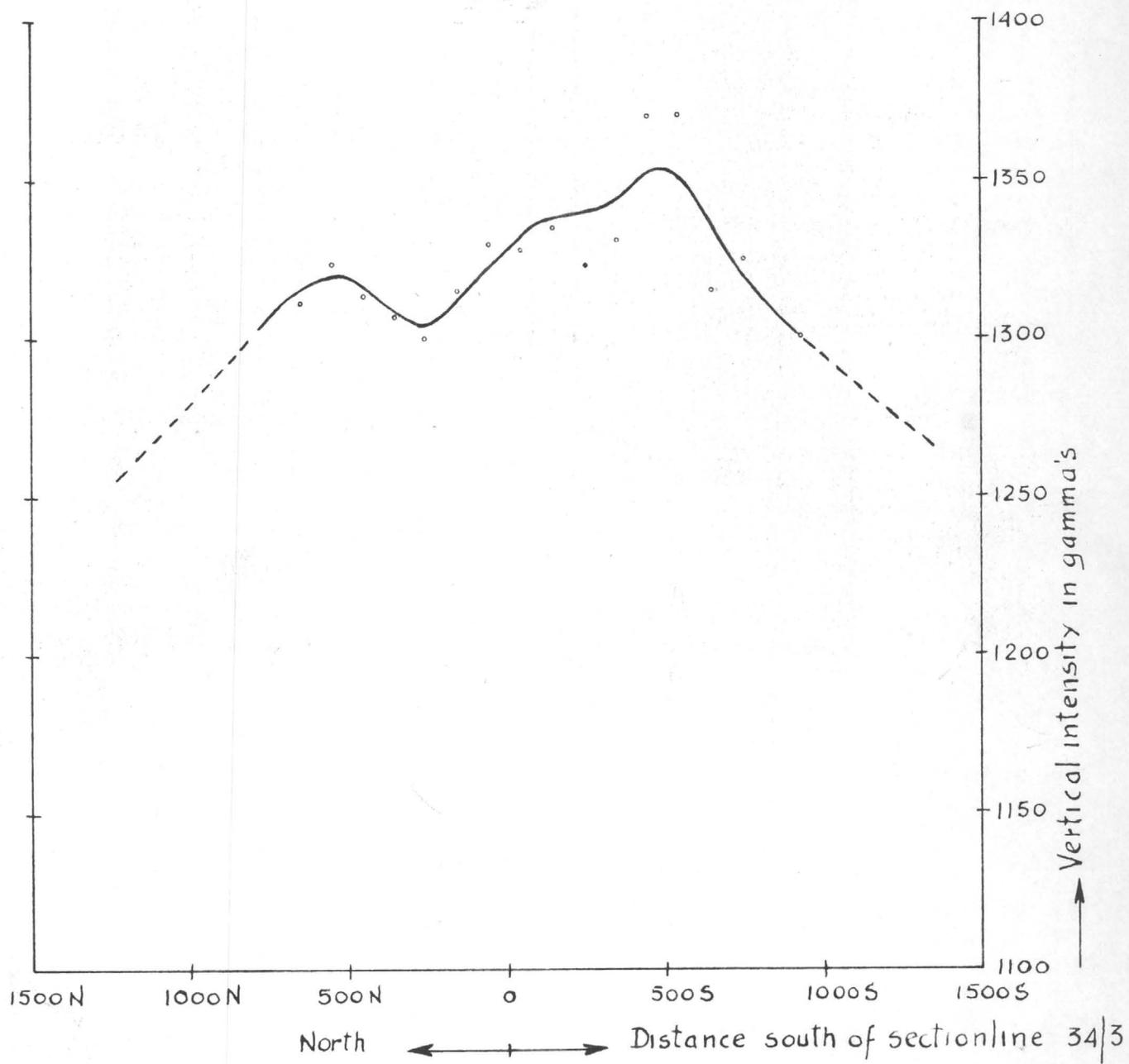
By depth of hole is meant the total depth, of which about 530 to 550 ft of loose overburden and caliche and 200 to 250 ft. of diamond core drilling in hard rock.

On the next two pages are shown a north-south and an east-west profile of the anomaly, their location is also indicated on the isodynamic contour map. See appendix II.



East-West profile along line A-A looking North

- 6 -



North-South profile along line B-B looking East

As has been mentioned previously in this report, the vertical magnetic anomaly over the Pima orebody was about 400 gammas, at a vertical distance of about 250 ft. above the ore.

It is significant to note here, that the intensity of any magnetic anomaly will decrease with the distance to the body causing the anomaly.

Therefore, the observed anomaly of 200 gammas over more than 500 ft. of alluvial overburden, can be compared favorably, and should not remain unexplored.

Other Anomalies and References:

Reference is made to a mobile magnetometer survey, done on the same property by Heinrichs Geosurveying Co. The total intensity map shows magnetic anomalies in the south-east quarter of section 10, also on the section line 10/11 and in the south-west quarter of section 15, all in T 17 S, R 13 E.

It would be advisable to do a more detailed hand magnetometer survey on each of these anomalies. This should be done on a surveyed grid on 50 or 100 ft. centers, to pin point the target for eventual drilling, as was done on the anomaly described in this report.

Further reference is made to an excellent summary of the geology of this district by John R. Cooper, named "Some geologic features of the Pima Mining district", Geologic survey bulletin No. 1112-c, 1960.

The main results of Coopers work are a geological map of the area and a Hypothesis regarding displacement of the area along the San Xavier thrust in a north-northwest direction.

On page 95 Cooper says: If the field evidence has been interpreted correctly and the San Xavier thrust has offset the Helmet conglomerate, then movement on the thrust must have taken place after ore formation.

A post mineralization thrust of this magnitude is so important to the interpretation of the overall structure of the district that the evidence bearing on its age will be reviewed in detail.

This San Xavier thrust outlines a trough, extending from the San Xavier mine to the west to a line running through the west halves of section 3 and 10 of this property, to the east, which is assumed to be displaced about 6½ miles to the NNW.

All three major copperporphyry discoveries are located within this trough, with the exception of the Esperanza mine.

Recommendations and Costs:

The estimated costs for drilling a minimum of two holes to a depth of about 800 ft. each on the anomaly as described earlier in this report, including sampling, assays and geological services are from \$ 12,000.00 to \$ 15,000.00

Additional hand magnetometer work is recommended on the other anomalies in section 10 of the property. This work, and the drilling on each major anomaly will cost an estimated \$ 15,000.00 to \$ 18,000.00

If ore is discovered, additional drilling should be done on 100 or 200 ft. centers and depending on the size of the orebody the initial drilling might need 15 to 20 holes before development, at a cost of up to \$ 100,000.00 including sampling, assaying and engineering.

It is the writers opinion and that of other professional geologists in the country, that the east slope of the Sierrita mountains offer excellent possibilities for additional discoveries of porphyry copper deposits.

Practically all the major copper producing companies are engaged in the search and exploration for new deposits in this district. Anomalies have been located and drilled out in the past 5 years, some of these have developed into major copper producers, others are still to be found.



Respectfully submitted,

Dirk den Baars.
Consulting Geologist.

Tucson, Arizona.
August 6th, 1962

APPENDIX I

COST SCHEDULES FOR DIAMOND DRILLING:

1. Boyles Bros.

1321 South Main St. Salt Lake City 15, Utah.

DRILLING AX, BX, NX, NC.

Mobilization and demobilization \$ 200.00

Drilling	AX	BX	NX	NC
0 - 250 ft.	\$ 6.60	7.00	8.20	8.60
250 - 500 ft.	7.00	7.40	8.60	
500 - 750 ft.	7.40	7.80		
750 - 1000 ft.	8.20			

(All prices per foot.)

Reaming: \$ 3.50 per ft. for all sizes

Cementing: \$ 10.60 per hour plus cost of materials.

Water haul: Truck rental \$ 225.00 per month plus \$ 0.12 per mile, plus drivers wages, plus taxes.

Access roads and stations at no cost to driller.

2. Den Bears & Associates.

6318 East Hayne Street, Tucson, Ariz.

DRILLING AX OR EX.

Mobilization and demobilization \$ 150.00

Drilling	EX	AX	Overburden
0 - 250 ft	\$ 5.75	6.25	\$ 3.50
250 - 500 ft.	6.25	6.75	3.50
500 - 750 ft.	6.75	7.25	4.50
750 - 1000 ft.	7.25	7.75	5.00

Reaming: \$ 3.00 per ft. for all sizes

Cementing: \$ 9.50 per hour plus cost of materials.

Casing if needed will be supplied and put in at cost.

Water haul: At no extra cost to client.

Access roads to the drill location at no cost to driller.

DEN BAARS & ASSOC.

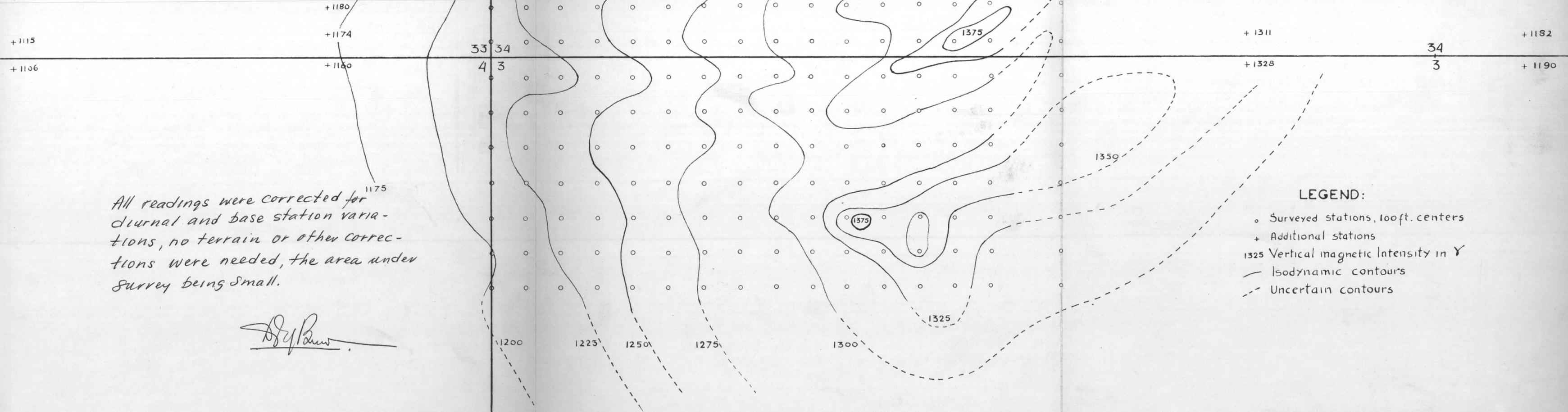
mining consultants
Tucson, Arizona

Instrument used: Ruska Scout
Sensitivity - 20.7 gammas



PRELIMINARY RESULTS OF A MAGNETOMETER SURVEY
of section 34, T16S, R13E and section 3, T17S, R13E
Pima County, Arizona
By Dirk den Baars

Scale 1"=200'



All readings were corrected for diurnal and base station variations, no terrain or other corrections were needed, the area under survey being small.

Dirk den Baars

- LEGEND:**
- Surveyed stations, 100ft. centers
 - + Additional stations
 - 1325 Vertical magnetic Intensity in γ
 - Isodynamic contours
 - - - Uncertain contours

INDIAN RESERVATION

"A.S.R."

TWIN BUTTES QUADRANGLE
ARIZONA-PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)

A.S.R.
PAPPAS

