7-4 Mineralization

It is known that there is a remarkable skarn-type ore deposit of Macutalo in this area. Through the present year's survey, a skarnized alteration zone 90 m wide with the extension of over 500 m has been confirmed around the drill hole No. 53-7. This zone is tentatively called Minitas skarn zone, hereunder in this report. Furthermore, in the Minitas valley to the southwest of the Minitas skarn zone, an indication of copper and zinc bearing vein has been found along the dyke of granite porphyry.

The mineral indications found or confirmed in this sector are as follows.

A) Indication about 1 km east of Mal Paso.

B) Two indications about 1.4 km south of Minitas village.

C) Macutalo ore deposit.

D) Indication about 1 km south of Minitas village.

E) Copper-iron indications in Petoa I block.

F) Minitas skarn zone.

G) Outcrop of mineralization in the Minitas valley.

A) Indication about 1 km east of Mal Peso

Location; This indication is located at the altitude of 450 to 530 m above sea level along a new road on a ridge south of Hacienda Laureles, about 600 m west of Minitas village.

Geology and Mineralization; Medium-grained grey to brown diorite and dark grey massive limestone are distributed irregularly. Ore deposit is of massive contact type with skarn minerals of epidote, chlorite and siderite. Ore mineral is malachite with pyrite. The analysis result of samples collected in the diorite along the wall of the new road is as follows.

Sample No.	Au g/t	Ag g/t	Cu %	Pb %	Zn %
S404 Ore with epidote	0.1	nil	0.04	0.01	0.16
S405 Ore with epidote	0.1	nil	0.19	0.07	0.26

B) Two indications about 1.4 km south of Minitas village.

Location; The indications are located on the ridge at the height of 550 m above sea level, about 800 m southwest of the road along Minitas Valley. Same sort of rolling stones are widespread in the surrounding area.

Ore deposits; Fine-grained massive hard limestone and Medium-grained porphyritic diorite bearing hornblende and plagioclass are distributed in the subject area. With intense weathering, diorite looks to be reddish brown sandy loose rock. Skarn zone is composed of light reddish brown garnet with stringers of calcite. Though not collected in an obvious exposure, samples of rolling-stones close to the mineral indications show the analysis results are follows;

Sample No.	Au g/t	Ag g/t	Cu %	Fe %	S %
A 104	0.1	nil	0.12	10	
S 395	0.1	10	30.90	22.2	0.05
A 105			0.30		
S 394			0.77		0.05

Under microscope, hematite is predominant, but sphalerite and gold grains (sizes of 3 to 12 micron) are observed in addition to geothite.

C) Macutalo ore deposit (Refer to PL. III-1-13)

Location; The ore deposit is located at the height of 650 m above sea level in the valley about 3 km upstream through a small lane in the coffee field along Minitas valley from the mouth. Another access by vehicle road (5 km) from Petoa village is available.

Ore deposit; This is massive skarn-type deposit along the boundary between

weathered medium-grained diorite and fine to medium-grained grey limestone. Skarn minerals are garnet (andradite), epidote, actinolite and chlorite, while ore minerals are chalcopyrite, chalcocite, native gold, pyrite and oxidized copper minerals as malachite and azurite. The width of garnet zone is more than 7 m and contains abundant magnetite. Actinolite zone contains copper minerals mostly, with the width of over 4 m.

Sample No.	Au g/t	Ag g/t	Cu %	Pb %	Zn %	S %	Fe %
TSA 6*	0.1	11	2.14	0.01	0.01	6.08	
S39 **	0.2	1	0.02			0.05	35.8

(* channel sample ** iron rich part)

D) Indication about 1 km south of Minitas village

Location; The indication is located on the hill-side at the west of Quebrada Minitas, at the altitude of 380 m above sea level.

Ore deposit; The contact part with limestone and medium grained granodiorite, discovered the rolling stones of yellow-brown coloured hard rock (say gossan) without outcrops. Some part of the yellow-brown rock indicate like andradite mineral, but mainly consist of hematite and fine grained quartz contain many magnetite grain.

E) Copper-iron indication in Petoa I block

Location; This is located 2.5 km west of Petoa village.

Mineral indication; The vein is east-west direction, and malachite-chalcopyrite-hematite mass in the diorite, and shows 55.2% Fe by chemical analysis. And rock mass of the contact part between diorite and limestone are consisted of magnetite replaced by hematite, include malachite, chalcopyrite and native gold (size 10 microns). This vein are E-W direction, and proved 2 m in width 10 m in length.

F) Minitas skarn zone; This skarnized zone containing garnet, epidote

and actinolite has been confirmed to be extended continuously to the depth of 93 m by the diamond drilling. It has been ascertained that there is a part containing 0.3 to 0.5% Cu and 0.2% Zn in this zone. This zone is proved the skarn alterated zone extending NW-SE direction, and 90 m in width, 500 m length surrounding No. 53-7 drill hole and as the further exploration it is necessary to confirm the features of mineralization by use the diamond drilling, and detailed trenching survey.

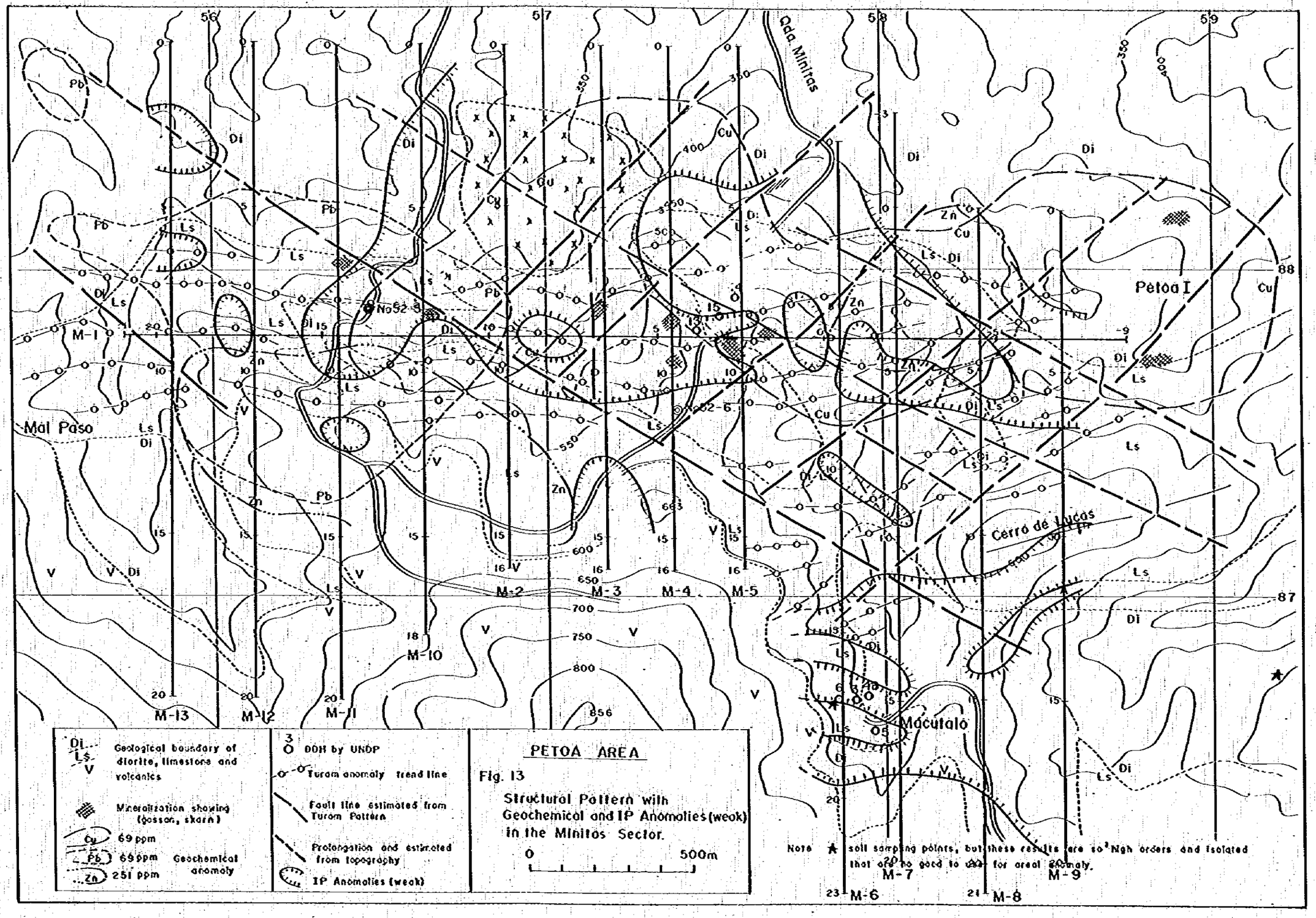
G) Outcrop of mineralization in the Minitas valley; This outcrop is located on the right bank in roughly the middle-stream of the Minitas valley, where vein-like mineralization, 1.75 m wide and over 5 m long, has been found to be exposed extending northwest-southeast along the boundary zone between granite porphyry and limestone. Ore minerals are pyrite, chalcopyrite, as well as covellite and malachite. The latter two ore minerals are observed to have filled the space amidst the grains of gangue mineral of quartz irregularly. Under microscope, corroded goethite is observed to be formed along the margin of malachite, and the ore contains tenorite and gold grains as well.

As stated above, in the Minitas area, remarkable skarnization zone has been confirmed and favorable mineralized area has been extracted through the survey.

Further detailed exploration by trenching and diamond drilling will be recommended to delineate the actual mineralized part preferentially on the above-stated three mineralized zones of C, F, G.

7-5 Geophysical Survey (IP method) (Refer to Fig. 13)

In the first year, geophysical prospecting by IP method was carried out in an area of 6 km^2, including Mal Paso, Macutalo and Minitas, establishing



PETOA AREA

Fig. 13

Structural Pattern with Geochemical and IP Anomalies (weak) in the Minitos Sector.

13 survey lines, total length of which was 25.6 km.

The followings can be said as to the geological structure inferred from the anomalies of apparent resistivity.

(1) The metamorphosed andesite and andesitic pyroclastic rocks distributed in the northern part of the area exhibit low apparent resistivity, while the limestone found in the central part of the area shows high apparent resistivity.

(2) The thickness of the limestone distributed in the southern part of the area is small and viewing from the apparent resistivity the limestone would be underlain by low resistivity rocks such as the metamorphosed andesitic pyroclastic rocks.

(3) The limestone beds found in the southeastern side are much thicker.

(4) Geological tectonic line would be present near the survey points 6 to 8 of the M-6 survey line and near the survey points 4 to 5 of the M-7 survey line, as high response body and low response body were detected in contact each other.

As for the geological structure inferred from the FE anomalies, the followings can be said.

(1) Weak FE anomaly is detected in correspondence with geochemical copper anomaly, extending eastward from near the M-10 survey line. On the surface, gossans, skarnization and alteration are recognized in this area of weak anomaly, but the FE anomaly is too weak to infer any underground structure.

(2) In the northern half of the M-2 survey line and the M-3 line, weak FE anomalies are distributed comparatively together. Alteration is found pretty extensively with floats of copper oxide minerals on the surface in the anomalous zone.

(3) It is inferred from the FE anomaly that the indications found at Macutalo would be of massive structure, but that the scale of the indications

would be small. With the electrode-separation of 100 m, no information on the figures etc. has been obtained, and therefore it is thought that they would represent such small anomalous bodies as to be caught only by the electrode-separation of 50 m.

(4) Weak PE anomaly has been detected in the east of the indications at Macutalo, but there is no potentiality that the mineralization found at Macutalo would be extended to the east.

The anomalies detected by the geochemical survey carried out in this area are in good correspondence with PE anomalies.

7-6 Diamond Drilling Survey

Diamond drilling of 2 holes of the total length of 623.30 m was completed in the first year, while that of 3 holes of total length of 901.80 m was done in the second year.

The access from the camp at La Flecha to the area where drilling was conducted is possible by two routes. The one is through the village of San Francisco del Valles 2 km south of the point in the distance of 20 km from La Flecha along the national way running to San Pedro Sula, and the other is by the Santa Barbara route from La Arada located at the point in the distance of 30 km from La Flecha along the national way, passing through the village of Pueblo Nuevo.

The altitude of the mouths of the drill holes are 450 to 600 m above sea level. Mobilization of the drill machines and the materials was by constructing new access road by bulldozers, after the drilling works in the Vueltas del Rio area were finished. However, in the heavy rains, soils were washed out and it was difficult for the vehicle to pass over.
The length and the core recovery of the drill holes are shown in the Table 6-12.

By the results of core logging, which are shown in Fig. 14, not only the geological structure and the history of the igneous activity have been confirmed, but skarn type ore deposits are discovered.

Along the contact zone of the limestones with the older metamorphosed andesitic rock, nothing more than aggregates of hematite, chlorite and epidote have been formed, as seen in the drill hole No. 53-6. No mineralization has been recognized in this case.

The mineralization found along the length of 90 meters from the depth of 6 meters to 96 meters has been confirmed to be the skarnized zone containing quartz, calcite, dolomite and chlorite in addition to garnet, actinolite and epidote, with the insertions of limestone and granite porphyries. Ore minerals are chalcopyrite, sphalerite, galena, magnetite and copper-oxide minerals. Mineralized parts containing marked grade of copper are as follows;

Hole No.	Depth(m)	Length(m)	Skarn mineral	Assay results	
				Cu(%)	Zn(%)
53-7	68-70	2	andradite	0.35	-
53-7	80-82	2	andradite	0.09	0.68
53-7	86-88	2	actinolite	0.68	-
53-7	90-92	2	actinolite	1.21	-

Although the metamorphosed andesitic rocks have been subdivided lithologically into welded tuff, tuff breccia, andesite, microdiorite and dykes intruding them, it has been impossible to presume the geological structure of the basement rocks because the number of the drill holes is not sufficient. However, it has been inferred that the area where remarkable mineralization can be seen is underlain by the basement of complicated structure accompanying abundant dykes, while the geology of the other areas poor in mineralization is structurally and lithologically simple.

7-7 Summary of the Sector

The Minitas Formation, forming the basement in this area, is composed of fine to medium grained metamorphosed andesite and andesitic pyroclastic rocks with granodiorite intruding them. The metamorphosed andesite has various lithofacies from microdiorite to porphyritic rocks, accompanying pyroclastic rocks as metamorphosed tuff, tuff breccia and so on.

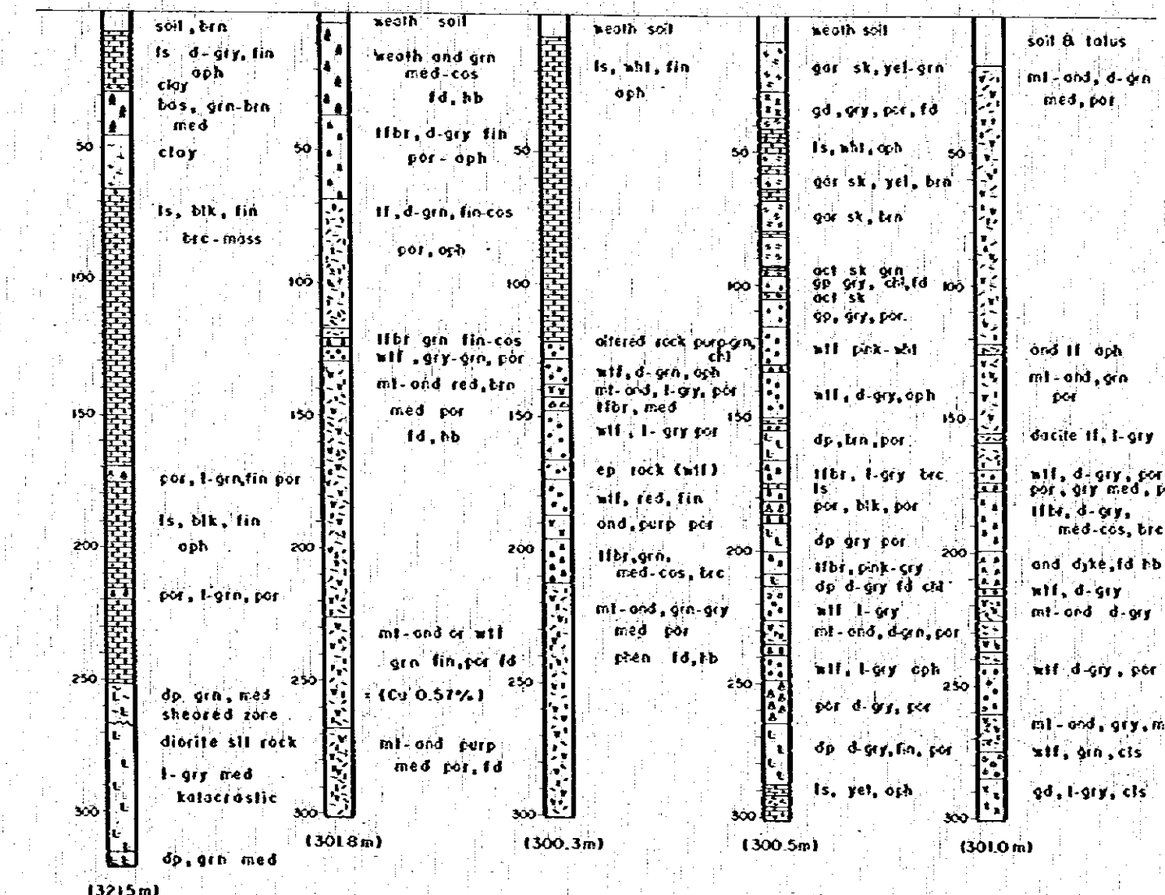
The geohistory of the igneous activities in this area has been ascertained as follows.

Extrusion of andesitic rocks and their pyroclastic rocks --- Intrusion of granodiorite (Extrusion of liparite) --- Metamorphism --- Sedimentation of the limestone bed of the Atima Formation --- Intrusion of the dykes of granite porphyries --- Mineralization.

To say about structure, the metamorphosed andesitic rocks and the granodiorites are developed fundamentarily in the east-west trending, though they are covered unconformably by the Atima limestone beds. The directions of faults and dykes are basically northwest-southeast, which is represented by the results of geochemical survey and geophysical survey.

The dykes of the granite porphyries are seen in the directions of east-west and northwest-southeast, giving remarkable skarnization in the surrounding rocks. Along the contact zone between the limestone and the metamorphosed andesitic rocks as the basement in this area, mineralization of hematite, chlorite and epidote is sometimes found with the width of several meters though no conspicuous mineralization has been recognized. As for the mineralization in this area, there are many indications of mineralization of copper iron, lead and zinc associated with skarn minerals mainly of garnet along the contact zone between limestone and the dykes of granite porphyry, of which the existence of the remarkable mineralizations have been recognized in the Macutalo area and in the Minitas area.

Fig. 14 SUMMARY OF CORE LOG IN THE MINITAS SECTOR



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Symbol & Original Rock

soil with	soil & weathered rock
bas	basalt
ls	limestone
lf	tuff
ml and mafo	andesite
wlf	welded tuff
lflbr	tuffbreccia
and	andesite
por	porphyrite
dp	diorite porphyry
gp	granite porphyry
gd	granodiorite
sk	skarn
	clay zone

Color

d	dark
l	light
blk	black
brn	brown
grn	green
gry	grey
purp	purple
wht	white
yel	yellow

Remark

act	actinolite
and	andesite
bas	basalt
brc	breccia
ep	epidote
gar	garnet

Texture

aph	aphanitic
brc	brecciated
cls	cataclastic
coll	colloid
grn	granular
por	porphyritic
sac	saccharoidal

Grain size

vfin	very fine
fin	fine
med	medium
cos	coarse

Phenocryst

chl	chlorite
fd	feldspar
hb	hornblende
px	pyroxene
qz	quartz

0 40 80 120 160 200m

Table 6—12 Diamond Drilling Data in the Minitas Sector

First - Second (1977 - 1978)
Synthesize data by drilling work

Years	Drill holes No.	Type of Machine	Working Period			Drilling Length	Core		No. of drilling days and speed					
			Preparation	Drilling	Removing		Length	Recovery	Preparation	Drilling Actual Days	Drilling Speed	Removing	Total Actual Days	Total Speed
First (1977)	No. 52-5	TCM-5A	7th Nov '77~ 23rd Nov '77	24th Nov '77~ 18th Dec '77	19th Dec '77~ 20th Dec '77	321.50	298.50	92.8	9	22	14.61	2	33	9.74
	No. 52-6	"	31st Oct '77~ 17th Nov '77	18th Nov '77~ 13th Dec '77	14th Dec '77~ 17th Dec '77	301.80	288.50	95.6	8	22	13.72	4	34	8.88
	Sub total					623.30	587.00	94.2	17	44	14.17	6	67	9.30
Second (1978)	No. 53-6	TCM-5A	17th Jul '78~ 7th Aug '78	8th Aug '78~ 24th Aug '78	24th Aug '78~ 26th Aug '78	300.30	284.30	94.7	17	14.5	20.71	2.5	34	8.83
	No. 53-7	"	24th Aug '78~ 31st Aug '78	1st Sep '78~ 22nd Sep '78	23rd Sep '78~ 29th Sep '78	300.50	241.90	80.5	7	19	15.82	6	32	9.39
	No. 53-8	"	22nd Aug '78~ 3rd Sep '78	4th Sep '78~ 19th Sep '78	19th Sep '78~ 26th Sep '78	301.00	273.10	90.7	11	12.5	24.08	6.5	30	10.03
	Sub total					901.80	799.30	88.6	35	46	19.60	15	96	9.39
Grand Total						1,525.10	1,386.30	90.9	52	90	16.95	21	163	9.36

Chapter 8 Pueblo Nuevo Sector

8-1 Outline of the Area

The Pueblo Nuevo Sector occupies an area of 4 km^2, 2 km in north-south and 2 km in east-west, at the altitude of 180 to 400 meters above sea level. The area comprises hilly land covered with vegetation of miscellaneous trees, but partly utilized as pasture. In this area geochemical survey, geological survey and geophysical prospecting were performed by the UN team, and also, as a part of this series of surveys, detailed geological survey, geochemical survey and geophysical survey (IP method) were carried out in the first phase, through which indications of copper, lead and zinc mineralization were confirmed at Santa Ines and at Santo Domingo, while the information of the IP high anomaly was obtained to be extending widely to the north of the survey area. In second phase, trenching by bulldozers and detailed geological survey were carried out to confirm precisely the geological structure, which had been uncertain in many points due to thick vegetation and thick soil cover, and to clarify the character of the geophysical anomaly.
The results through the surveys, it has been confirmed by trenching and others that the moderately high anomaly in the northern part, shown by IP method of the geophysical survey is corresponded to the distribution area of the liparite body developed in the northern part. After all no other favorable indication has been found than the mineralizations at Santo Domingo, at Santa Ines and at Esperanza.

8-2 Geology (Refer to PL. III-1-4, III-1-8)

In this area, it is difficult to determine lithofacies of the rocks because of the poor exposures due to heavy weathering, but as completed in the Minitas sector, subdivision of igneous rocks was attempted, the result

of which was then analysed. Upwards from the lowermost, the stratigraphical succession is Minitas Formation composed of metamorphosed andesite and diorite porphyrite, liparite unit distributed in the north, the limestone beds of the Atima Formation covering them, dykes of andesite and porphyrite intruding them, and granodiorite.

(1) Minitas Formation

The Minitas Formation is distributed in the topographically lower portion in the central to southern part of this area. It is composed mainly of fine to medium grained metamorphosed andesite and andesitic pyroclastic rocks, in addition to liparite intruding them and distributed in the northern part of this survey area.

a) Matamorphosed andesite and andesitic pyroclastic rocks: Being dark to greenish black, brownish black hard rock, it has various phases as for grain size from that of andesitic rock to dioritic rock. Quantity and grain size of the phenocrysts of feldspar and mafic minerals are also variable. Lithofacies and alteration are almost similar to those found in the Minitas sector.

b) Liparite: The liparite is grey to yellowish grey, brownish grey in color and is hard compat rock, containing grains of quartz and occasionally small fragments of mica. Partly development of joints is observed but comparatively massive parts are also seen. When weathered, this rock is easily to be crushed to small pieces. Generally it has homogeneous lithofacies, though in places silicification and argillization are found in this rock.

(2) Atima limestone beds: This limestone is grey to greyish white fine grained massive limestone, poorly bedded with rare insertions. It occupies topographically high portion or hillside and forms steep cliffs.

(3) Igneous Activity

In this survey area, there are granodiorite and dykes of andesite and porphyrite, all of which are found to have intruded the liparite belonging to the Minitas Formation. The relation of this liparite to the metamorphosed andesites of the Minitas Formation is not certain in this area, as no exposure showing such relation has been found, but they seem to be in contact with each other bounded by fault. In the Minitas sector, the exposure in which liparite dykes are observed to have intruded the metamorphosed andesites has been found near La Hacienda. The period of the activity of this liparite is not certain --- though it is thought the activity might be at the same period as the intrusion of the granodiorite or at the end of Cretaceous Period when the intrusion of many dykes has been confirmed, viewing from the facts that Williams et al. (1969) grouped the area of the distribution of this liparite into the area of the metamorphosed igneous rocks, and that the liparite is seen to have been intruded by the dykes belonging to the activity at the end of Cretaceous Period. Meanwhile, the dyke of the granodiorite, though it has been confirmed that this dyke intruded the liparite, is seen to have been caught as xenolith-like pieces in the liparite. It is certain that the granodiorite has not intruded the Atima Formation. Therefore, little chronological difference might be there between the activities of the granodiorite and the liparite.

(4) Geological Structure

In the lower portion along valleys and streams, the metamorphosed andesites of the Minitas Formation are distributed, while the limestone overlie them unconformably in the topographically higher portion. Near the boundary plane, the limestone is rather coarse grained and the andesite side is rather hardened with much epidote seen in places.

As remarkable faults, a northeast-southwest trending fault has been found accompanying ore vein at Santo Domingo, and another fault parallel to this can be presumed to run through Agua Caliente. An east-west trending fault is seen in the southern side of the old workings at Esperanza.

No notable fracture zone or tectonic zone can be found in the area occupied by the liparite, but the valleys are tend to run in north-south and in east-west.

8-3 Mineralization

Santa Ines:

The mineralization is seen of a vein, almost horizontal, carrying green copper minerals and chalocopyrite, 2 m thick with the extension of 150 m, which is seen emplaced in the limestone close to the unconformity plane between the liparite and the overlying limestone. The assay results of the samples collected across the vein of the width of 2 m have shown the ore grade of Cu 0.7 to 4% and Zn 0.5 to 0.8%. The limestone is partly pebbly, porous, silicified and dolomitized, and remarkable silicification and limonitization have been found along this indication of the mineralization. More than 5 remains of old pitting are known.

Indication at Santo Domingo:

The ancient pits located near about 200 m east from Santa Ines have been correlated the extended part of the Santa Inés indications, and have scattered copper oxide ores. This is the indication of mineralization located along the valley south of the Santo Domingo village. It is a northeast-southwest trending ore vein 6 m wide with the extension over 50 m as far as traced, which is found to have been emplaced around the contact zone between limestone and liparite.

Table 6—7 List of Ore Deposits and Mineral Indications in Surveyed Area

No.	Location		Name	Kind of Ore	Host rock	Mode of Occurrence	Scale of Mineralization	Amount of Unit Ore-body	Unit Ore body			Ore Mineral	Grade of Ore	Samples No.	Remarks
	X	Y							Length	Width	Direction				
1	61.5	35.1	La Libertad	Mn	sp,ch,sh,sch	bedded	"	"	"	"	"	Mn oxides Au	Mn 13.8%	T92	floats
2	60.1	34.4	El Manguito	Cu	g,dio	disseminated and veinlets	70m×2.5m	2	15m	1.0~2.5m	N50W	cp,cc,cov, mala,as,Au	Cu 2.78~4.00%	N15, N16 N18	out crop, oxidated
3	60.1	30.6	Chiquilar	Fe	sav > sch	contact "	no out crop	"	"	"	"	goe	Cu 0.02%	T148	floats
4	61.7	31.0	Zapotal	Cu	g.d.por	vein	not clear	2	"	2.0m	N40W	Cup,mala as hem,goe Au cp,py,	Cu 2.16~4.08%	V288 V291 V292	out crop
5	63.0	34.0	Vueltas del Rio	Au,Cu	as,sh q.d.por	disseminated and veinlets	1.8km×0.8km	4	200m~ 1,100m	30m~ 300m	N40W	Au,cp py	Au 13.0g/t	N88	Ore reserves by UNDP, 1972 Probable Possible Au 7.5x10^6t (1.3g/t) 10x10^6t (0.95g/t) Cu 4.5x10^6t (0.67%) 6.4x10^6t (0.45%)
6	67.7	37.5	Minitas	Cu	dio,la	contact	(west) 300m×200m (east) 400m×300m	15	2~4m	1~2m	N50W ~E-W	cp,ten,cup py,mala, Au	Cu 0.12~ 30.40%	A104,A105 N394,N395 A404,A405	UN 13 2.8m Cu 0.99% UN 14 1.8m Cu 0.95% UN 15 1.70m Cu 0.62% UN 2 non ore -
7	66.6	34.0	Macutalo	Cu,Fe	dio,la	contact	150m×20~60m	3	60m	20m	E-W ~N70W	cp,py, may,hem Au	Cu 0.02~7.40% Fe 35.8~4.68%	N390 N13 T8A6	UN 3 22.1m Cu 0.34% UN 4mA non ore UN 5 13.1m Cu 0.24% UN 6 13.4m Cu 0.31% UN 4mA non ore
8	60.0	58.3	Minitas Norte	Cu	dio,la	contact	no out crop	"	"	"	"	cp,cc,cov, mala,cup,goe	Cu 10.11%	N204	floats
9	64.1	38.0	Potos I	Fe	dio,la	contact	10m×2m	2	5m	1m	E-W	hem, Au	Fe 55.2%	N212	old pit
10	67.5	61.0	Potos II	Fe	dio,por	vein	6m×2.0m	1	6m	2m	N50W	mala,as	Cu 2.24%	850	old pit
11	49.1	60.1	Pueblo Nuevo	Cu,Pb,Zn	dio,la	vein and contact?	3m×1.0m	4	3m	0.5~1.0m	E-W	mala,limo cup,hem goe, Au	Cu 0.40% Zn 1.00%	N1 N406	old mine La Esperanza Santa Ines Los Mangos Santo Domingo

Abbreviation

Host rock
dio ..... diorite
g.d.por ..... granodiorite porphyry
la ..... limestone
sch ..... schist
sh ..... shale
as ..... sandstone
ep ..... epidote
chl ..... chlorite
ser ..... sericite

Ore Mineral
Au ..... gold
as ..... asurite
cc ..... chalcocite
cov ..... covellite
cp ..... chalcopyrite
goe ..... goethite
hem ..... hematite
limo ..... limonite
mag ..... magnetite
mala ..... malachite
ten ..... tenorite
Mn ..... manganese

Remarks
UN13 ..... drilling hole by UNDP

The assay result of the sample, collected in channel of 0.9 m in length across the vein, reveals the ore grade of Pb 1.57% and Zn 2.04%. The ore minerals are chalcopyrite, hematite, galena, pyrite, sphalerite and goethite. Hematite is most abundant.

Old working at Esperanza:

This old working has been found on the cutting wall along the east side of the road near the junction of the road running between Santa Barbara and La Arada and the road to the Pueblo Nuevo village. The working is 2 m in width, 1.2 m in height and 7 m in length.

The mineralization found there is that of the dissemination of green copper minerals and iron-oxide minerals in the limestone, along the contact of limestone and medium grained hornblende dioritic rock.

8-4 Geophysical Survey (IP Method) (Refer to Fig. 15)

In the first phase, geophysical method carried out as same as former type for the about 2 km^2 area which three lines of N-S direction and one line of E-W direction total four lines, line length 10.4 km in the Pueblo Nuevo Sector.

The measured values of AR in this area are distributed within 6Ω-m minimum and 560Ω-m maximum.

(1) Geological Structure Inferred from AR

The geological structure of this sector inferred from AR may be summarized in the following four points.

a) The limestone observed in the center section of the surveyed area is considered to have high AR values and the high AR zone is presumed to extend to a considerable depth judging from the values and distribution of AR.

b) The layer of limestone observed in the south section of the surveyed

area is presumed to have a very small thickness and a rock body with low AR values such as diorite is considered to be concealed immediately below limestone.

c) The layer of limestone, which can be observed only in part on surface ground in the north section of the surveyed area, has a wide distribution in the deep ground and is highly probable to continue to the outcrop of limestone observed in the east section.

d) The layer of limestone is considered to extend into a deep ground with a small thickness in the south and a large thickness in the north bordering the Santo Domingo fault.

(2) Geological Structure Inferred from FE

Weak FE indications have been detected in the north section of the surveyed area and the geological structure of this sector inferred from these FE indications may be summarized in the following two points.

a) A weak FE indication has been detected in wide distribution in the north section of the surveyed area. The surface geological data shows alteration in the north section as can be assumed from the frequent occurrence of gossan, and this weak FE indication is attributable to such alteration.

b) While no data suggestive of the existence of a large mineralized zone is this sector has been obtained in this survey, the FE indications do not terminate in the north section and in the north-east section of the surveyed sector and moreover a geochemical anomalous zone of copper, land, and zinc has been detected in the north-east section of the surveyed sector, which may be taken as an indication of the possible mineralized zone in this section.

c) The geochemical anomalies obtained by Japanese team in first phase and by UN, are distributed almost coincidely, but the FE indications are almost not detected in these geochemical anomalies zones. It is guessed that there was no sufficient sulphide minerals and clay minerals for accelerate of FE indication in these geochemical anomaly zones. In the FE indication, meanwhile, compared with the distribution are few of sulphide minerals and clay mineralized alteration caused by FE anomaly in the central part, but the northern part are plenty. This is recognized that in the northern part are much plenty of gossan more than the central part when carried out the geological survey on the surface in the area. Otherside, it is supposed that these gossan mainly are not caused by sulphide minerals as low as the geochemical values of Cu, Pb, Zn.

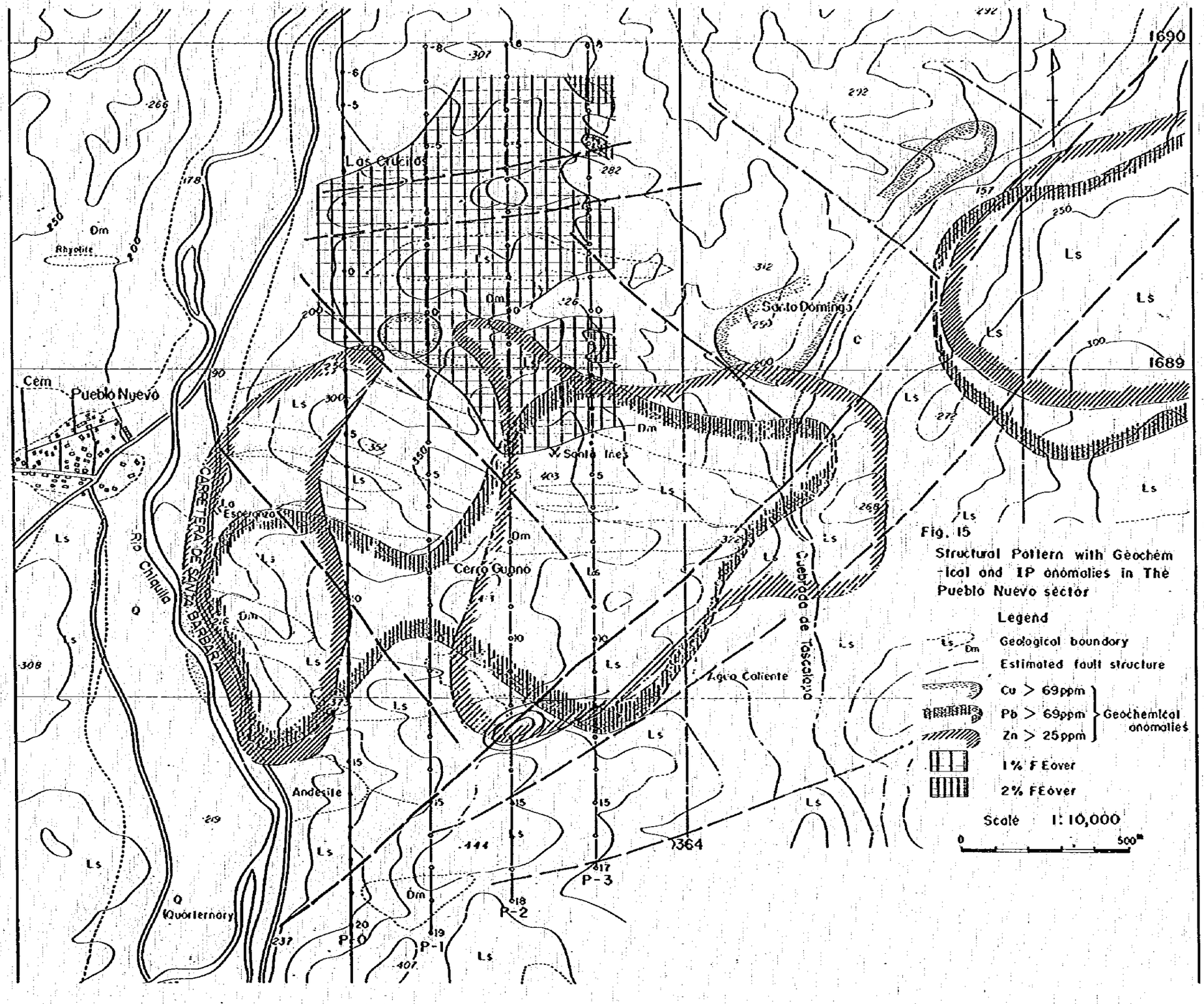


Fig. 15

Structural Pattern with Geochemical and IP anomalies in The Pueblo Nuevo sector

Legend

- Geological boundary
- Estimated fault structure
- Cu > 69ppm
- Pb > 69ppm
- Zn > 25ppm
- Geochemical anomalies
- 1% F Eover
- 2% F Eover

Scale 1: 10,000

0 500m

Chapter 9 Conclusion and a View to Future Program

9-1 Conclusion

9-1-1 Way of Surveys

A) The survey area is located in a mountainous land in the State of Santa Barbara, in the northwestern part of the Republic of Honduras, and occupies an area of 1,000 km^2, 50 km in east and west, and 20 km in north and south.

In the first year, outline of the geology of the whole of this subject area was comprehended by geological survey and by geochemical survey, and two areas totalling about 110 km^2, Chamerecon area and Petoa area, were extracted so the most favorable areas for the potentiality of emplacement of mineral deposits, where the precise investigations such as detailed geological survey, geochemical survey, geophysical survey (IP method) and diamond drilling were carried out. And occurrences and characteristics of the indications of mineralization in Vueltas del Rio, in Zapotal III, in Minitas and in Pueblo Nuevo were confirmed by them.

B) In the second year, detailed geological survey accompanying trenching was carried out in the 4 areas of Vueltas del Rio, Laguna Seca, Minitas and Pueblo Nuevo, while the lithofacies and the geological structures at depth were confirmed by diamond drilling in the central part of Vueltas del Rio area and in the central part of Minitas area. New indications of copper skarn type and of gold-copper vein type were discovered through these investigations.

C) In the third year, detailed geological survey accompanying trenching and diamond drilling were carried out in the central part of Vueltas del Rio area, and new indications of gold and copper mineralization as well as autochthonous residual gold ore deposit were found.

D) The way of investigation by the combination of geological survey,

geochemical survey, geophysical survey, diamond drilling etc. for the extraction of favorable areas step by step, which were employed in the present surveys, are thought to be most appropriate as the survey methods in this survey area.

9-1-2 Geology

A) In all of the area, from the north side to the south side the following formations are distributed in this order; Paleozoic mica schists, Vueltas del Rio Formation and Minitas Formation which are estimated to be at the end of the Paleozoic, alteration of limestone and shale of the Cantarranas Formation belonging to the Mesozoic Yojoa Group, limestone beds of the Atima Formation, alteration of limestone and shale of the Cuare Formation, Calcareous sedimentary rocks of the Mesozoic Valle de Angeles Formation and pyroclastic rocks of the Tertiary Matagalpa Formation.

B) The Paleozoic rocks are bounded with other formations as the Mesozoic beds by the Pueblo Nuevo overthrust, which is running roughly in the direction of east and west. In a zone of east and west, within 5 km along the southern side of this fault, are distributed intrusive rocks at the end of Paleozoic Era or in late Cretaceous period such as diabase, granodiorite, andesite and quartz-diorite porphyry.

C) The Paleozoic mica schists are composed mainly of mica schists, with insertions of graphite schist, chlorite schist and crystalline limestone. They are complicatedly folded with the main axis in the direction of east and west. They are gneissose in the east. The Vueltas del Rio Formation is composed of metamorphic volcanic rocks and pyroclastic rocks, forming a synclinorium with the axis of east and west, while the Minitas Formation is constituted by the metamorphosed volcanic rock and granodioritic rocks intruding the diorite porphyries. The Mesozoic beds of the Yojoa Group and the Valle de Angeles Formation are gently folded with the axis in the

direction of east and west.

In the area, faults are developed in east-west, in northeast-southwest and in northwest-southeast. The direction of north-south is seen to confine the distribution of the Matagalpa Formation and represents comparatively younger tectonic lines.

D) Diabase, granodiorite and liparite are found to have intruded the Vueltas del Rio Formation and the Minitas Formation, and their ages are thought to be at the end of the Paleozoic Era, which has been partly confirmed by the isotopic age determination. Dykes of andesite, granite porphyry and quartz porphyry are observed to have intruded the Vueltas del Rio Formation, but no concrete relation has been confirmed with these dykes to the mineralization in this area. Also, the dykes of granite porphyry and quartz porphyry are recognized to have intruded the Minitas Formation and the limestones of the Atima Formation, accompanying skarnized portion partially. They are inferred to be the igneous activity in late Cretaceous period, related to the mineralization in this area.

9-1-3 Ore Deposits and Indications of Mineralization

Ore deposits and indications of mineralization found in the survey area are of copper vein and dissemination type, of iron-copper-lead-zinc contact replacement type, of gold-copper-lead-zinc ore vein type and of residual secondary enrichment gold type. They are distributed limitedly in a zone along the southern side of the Pueblo Nuevo fault. This zone contains the fault and is about 5 km in width in the direction of east and west, corresponding with the area where intrusive rocks are distributed and where most of the anomalies detected by the geochemical survey carried out by UNDP are distributed.

A) In the Vueltas del Rio area, residual gold ore deposits in the secondary enrichment zone are found in an area containing San Martin old workings and

Nelson trenches. The ore deposits are found contain quartz-clay veins bearing electrum (grain size 10 to 100 micron) in the metamorphosed pyroclastic rocks which are remarkably weathered and altered. The ore reserves are roughly estimated to be several hundred thousand tons. (Au 1.47 g/t in average.)

B) By the diamond drilling in the Vueltas del Rio area, indications of gold, copper and zinc minaralization of ore vein type have been confirmed. They are quartz-calcite-clay veins in the metamorphosed tuff and tuff breccia. Parts of dissemination of chalcopyrite are recognized, too. The indications of the above mineralization are mostly found in rather shallow part at the depth of less than 200 m. Chalcopyrite, chalcocite, sphalerite, galena, electrum as well as pyrite and oxides as green copper minerals are recognized to be contained.

C) In the Minitas area, other than the Macutalo ore deposits where exploration works by the diamond drilling were carried out by UNDP, copper ore deposit in skarnized portion composed of garnet and actinolite has been confirmed in the drill hole No. 53-7. They are skarn type ore deposits containing chalcopyrite, sphalerite and galena formed in the contact zone of dyke rocks as granite porphyry with limestones of the Atima Formation.

D) In the Pueblo Nuevo area, three indications of mineralization have been confirmed at Santa Ines, at Santo Domingo and at Esperanza. They are indications of copper, zinc and lead mineralization in the forms of veins or beds in the limestone near the contact zone of the Minitas Formation and the limestones of the Atima Formation.

E) Indications of various kinds of mineralization of copper, manganese and iron such as indication of dyke-like form copper and zinc mineralization along the Minitas valley in the Minitas area, indications of iron vein type mineralization in Petoa area and exposures of copper ore veins in Zapotal

area are found, and also anomalies detected by the geochemical survey carried out by UNDP are known in many places, which would require further analysis.

9-2 A View to Future Program

Through the Basic Geological Survey for the Development of Mineral Resources carried out for these three years, close mutual cooperation system between the Republic of Honduras and Japan has been confirmed and the interchange of exploration technique for the mineral resources have been well conducted. Geology and geological structure in the survey area have been well defined and the results of the investigation are shown on the geological map and in the report.

In the survey area, autochthonous residual gold ore deposits in the secondary enrichment zone, containing gold ore veins, are found in a zone about 300 m in north-south and about 1,200 m in east-west, including San Martin old workings and Nelson trenches, in the Vueltas del Rio area. It would be possible to estimate ore reserves of several hundred thousand tons. (Au grade is roughly 1.47 g/t) By this estimation, the ore deposits would be feasible according to the gold price and to the method of development. Therefore, exploration works as shown below are necessary for the development of the ore deposits. Further detailed investigations such as trenching and precise sampling, followed by the shallow drilling in the grid system of the interval of 50 m are necessary for the analysis of the variation of gold grade in accordance with depth for more detailed re-estimation of ore reserves, to assure the accuracy of the estimated ore reserves by improving them to proved ore reserves. Furthermore, detailed study of the features of minerals concerning gold and the consideration over the methods of concentration would be necessary. Also, concentration test would be required

for the information as to recovery and for the determination of the method of concentration. By the results of these investigations and tests, feasibility reports should be prepared, giving consideration to mining, transportation, milling, watering, market prices, customers' condition etc. for the determination of the development. In case the results of these investigations and considerations are favorable, it is necessary to carry out environment survey, bulk treatment test including field tests and determination of flow sheet and to proceed with feasibility study including consideration of initial expenses and operation cost as well as of income and expenditure, to consider over the determination of the development of the ore deposits.

In the Vueltas del Rio area, there are many indications of gold, copper and zinc mineralization of vein type, found by the drilling. As to these indications, those which have the wider width and are located the closer to the surface should be checked for the relation to the mineralized zone on the surface (trenching, detailed geological mapping), and by the addition of short drilling in the surrounding area, characteristics of the veins, extension and variation of width and ore grade should be confirmed. By the results of such investigations, it is required to employ most appropriate methods for the further exploration.

In Minitas area, as to the indication of skarn type mineralization found in the drill hole No. 53-7, detailed geological survey, trenching and short drilling would be necessary in the surrounding area of the dykes of the granite porphyry for the confirmation of vertical and lateral extension of copper mineralization and skarnization as well as for the confirmation of the relation to the surface indication. Also, as to Macutalo ore deposits, trenching and detailed geological survey on the surface are necessary in the first place, and in the order of the exploration as shown in the case of the survey program for the indication at Minitas, it is necessary to confirm ore

reserves there. As to three indications of copper, lead and zinc mineralization in the Pueblo Nuevo area, confirmation of lateral extension of the known mineralization found around the margin of the limestone would be necessary in the first place, and it would be desirable to start exploration for the subsurface mineralization after confirmation of the variation of lateral extension.

As to various indications recognized in the other areas, it is desirable to proceed with exploration works to improve accuracy of the possibility of emplacement of ore deposits by such methods as inexpensive as possible, considering particularities of the mineralization in each area, and referring to the results of the explorations to be carried out in the above-stated areas.

Chapter 10 Olancho Area

10-1 Circumstances of the Survey

The subject area is located in the State of Olancho in the central part of the Republic of Honduras, occupying an approximate area of 4,708 km^2, about 53.5 km in east-west and about 88 km in northern south, limited by the lines of north latitude 15°23'45" and 14°36'25" as well as west longitude of 86°30 and 87°00.

In this area, DGMH of the Republic of Honduras carried out geochemical surveys, and extracted 30 favorable areas where many geochemical anomalies of copper lead and zinc are distributed. Partially, detailed geochemical surveys have been kept continued. In January of 1979, in response to the request by the Government of the Republic of Honduras for the Basic Geological Survey for the Development of Mineral Resources, the present survey was commenced in order to extract favorable areas where further investigations would be warranted.

This area is located in the mountainous land including watershed, which divides the Caribbean Sea side from the Pacific Ocean side. The access to the northern part of the area is possible by reaching the town of Jocon from San Pedro Sula, through Yoro. In the southern part, there is a route from the town of Tegucigalpa to Concordia, through Campamento, but the access to the central part is by an only route to La Union and to Mangulile, through Salama, and the access is difficult.

The rainy season is from June to September, and the temperature is usually 10° to 30°C. The area is covered with pine trees and other miscellaneous woods, and the lands are poorly populated and are utilized for agriculture, stock-framing and forestry.

10-2 Outline of the Geology

In this area, almost no reports nor studies on the geology and the ore deposits have been known but the reports of the study of Mesozoic sedimentary rocks by Mills et al. (1967) and of the study chiefly of volcanic rocks by McBirney et al. (1969) Geological Survey covering whole of the area has not been carried out yet.

There is a publicized report on the geochemical survey with detailed geochemical survey in some selected areas, which were carried out by DGMH of the Republic of Honduras in two years from May, 1974 to December, 1975.

Outline of the geology in this area has been confirmed through the geological survey carried out mainly in the 30 areas extracted by the geochemical survey over whole of the area. This geochemical survey was performed by soil and stream sediment samples, with indicative elements of copper (Cu), lead (Pb), Zinc (Zn), gold (Au) and silver (Ag).

10-2-1 Outline of the Geology (Refer to Fig. III-2)

The area belongs to a geo-structural unit of Sierra of Northern Central America, and is underlain by Paleozoic metamorphic rocks, Mesozoic sedimentary rocks and igneous rocks intruding them, with volcanic rocks of Tertiary period, covering parts of the above rocks. In the southern part of the area, Paleozoic metamorphic rocks are distributed with intermediate intrusive rocks in the northern side. The Paleozoic metamorphic rocks are also distributed extensively in the central to northern part of the area. The metamorphic rocks are composed mainly of mica schists, including muscovite schist, two mica schist, with minor chlorite schist, graphite schist, quartz schist and crystalline limestone. They are well stratified in many parts and tightly folded. In the area between the Paleozoic metamorphic rocks in the central part and those in the southern part, Mesozoic sedimentary rocks are distributed, which reveal apparently geosynclinal

sedimentation structure, with the folding axis of east and west.

El Plan Formation: This formation comprises marine clastic rocks composed of sandstone, black shale and minor quartzite distributed in an around Jutiapa and Valle de Ulua basins, partly exposed in a small scale in Mangulile and in the west of La Union. Tightly folded and well stratified, the formation is correlated to Jurassic system of the Mesozoic group.

Todos Santos Formation: The formation comprises clastic rocks composed of alternation of brown sandstone, shale and conglomerate. It is correlated chronologically to late Jurassic period.

Yojoa Group: The beds of this group are distributed as inliers occupying several small areas in the west of Guayape and in the central part of the area. This group is composed of alternation of calcareous shale, calcareous sandstone, conglomerate bearing limestone pebbles, and stratified limestone, and is correlated to Cantarranas Formation of the lower Cretaceous system. Overlying the group, massive limestone beds are distributed scattering in the northwest of Conce. By Mills and others, the age of this group are determined to be Albian on the basis of the fossils produced.

Valle de Angeles Formation: The formation is distributed in the central to northern part of the area, overlying the metamorphic rocks with unconformity. It is composed conglomerate, with the basal conglomerate bed containing quartzite, at the bottom. They are observed in Jocon and Perico area in the northern part and in Yocon area--Mangulile--La Unión area in the central part. As an upper part of this formation, agglomerate and andesites are distributed in a zone east of La Union to Salama. Overlying the above beds, brownish purple conglomerate beds containing limestone pebbles are found in the west of Guayape.

These beds are thought to have been accumulated in middle to later Cretaceous period, and are composed of clastic rocks including pyroclastic rocks.

Esquias Formation: The formation is distributed in the east side and in the northeastern side of Valle de Ulua, and is composed of dark grey massive limestone, correlated to the upper part of the Cretaceous system or to the Eocene series. They are also found overlying the metamorphic rocks, in the northern part of the area.

Matagalpa Formation: The formation is distributed in the north of Concordia and at the southwestern end of the area, occupying small areas, and is composed of volcanic rocks and pyroclastic rocks. The formation is correlated to Tertiary system.

Sands and pebbles of the Quaternary system are distributed along Aguan river and in Orica as well as in small basins located in many places.

10-2-2 Geological Structure

The distribution of the metamorphic rocks in roughly in the direction of east and west, and structurally folding axes are east and west in many cases. The geology and the structure in this area can be said to be predominated by the tectonic elements in the direction of east and west.

As to the sedimentary rocks developed in the central to southern part of the area, the older layers as El Plan Formation is distributed close to the metamorphic rocks and the younger beds, Yojoa Group and Valle de Angeles Formation, are found in good order toward the south overlying the above formation. They are revealing a sort of geosynclinal sedimentary structure with the axis in the direction of east and west.

In the central to northern part of this survey area, Valle de Angeles Formation and the limestones of Esquias Formation are distributed in small basins in the direction of east-west or partly of northeast-southwest.

In a zone of north and south including La Union, there are many faults of north-south trend. In the southern part, faults are developed in three directions --- north-north-west and south-south-east, east and west, and northeast and southwest.

10-2-3 Igneous Activity

The intrusive rocks found in this area are what is called southern igneous body of intermediate composition, which is composed of diorite porphyry, granodiorite, diorite, andesitic porphyry, quartz porphyry and gabbro, distributed along the northern side of the metamorphic rocks, occupying an area 3 to 8 km in north-south and 35 km in extension in the direction of west-north-west and east-south-east. The southern igneous body is found to have intruded the metamorphic rocks, and to be covered with El Plan Formation. In the Perico area in the northern part of the survey area, there is an igneous body composed of granite, granodiorite and partly quartz porphyry. Also, in the Carrizal area in the northeastern part of the survey area, an igneous body mainly of granite is there. These igneous bodies are found to have intruded the metamorphic rocks and to be overlain by Valle de Angeles Formation. The period of the intrusion of these igneous bodies are thought to be at the end of Paleozoic Era. Their distribution is recognized limitedly along the periphery of the metamorphic rocks. In the Conce area, acidic fine grained stock-like rocks such as quartz porphyry, aplite and felsitic porphyry are found. They are subjected to remarkable alteration and are recognized to have intruded in dyke-like form around the skarn ore bodies in the El Plan Formation. Therefore, it is thought that these igneous rocks would be related to the mineralization, and that the period of the intrusion would be late Cretaceous.

10-3 Indications of Mineralization

The known indications of mineralization in the survey area are shown in the Table III-1.

In the Conce area in the southern part of the survey area, there are indications at Conce, at Portillo and at Concordia, where DGMH carried out detailed geochemical survey. The indication of mineralization found at Conce are massive copper and iron ore deposits of skarn type containing actinolite and garnet, produced through the replacement of limestone. The indications at Suyapita are of the same type as above. The indications at Concordia South are those of copper mineralization of veinlet and dissemination type contained in quartz diorite. They were explored by 2 holes of short drilling. The indications at Portillo and at Llano Mejia are copper ore veins found in the dioritic porphyry. Hydrothermal copper mineralization of moderate to high temperature would be expected in the southern part of the survey area. In La Union--Mangulile area in the central part of the survey area, antimony ore veins in the tuffaceous sandstone of Valle de Angeles Formation, copper ore vein and dissemination in the andesites, gold ore veins in the mica schists are known, and mesothermal to epithermal mineralization would be expected in this area. These indications are distributed along the peripheral zone of the metamorphic rocks, near the unconformity plane with the sedimentary rocks, and along the contact zone of igneous rocks with other rocks. It is thought that the age of mineralization would be at the end of Cretaceous period. No indication of mineralization has been known in the area where intrusive rocks are found in the northern part of the survey area.

10-4 Extraction of the Survey Area

In this survey area, on the basis of the geological map prepared by

DGMH of the Republic of Honduras, consideration and analysis have been attempted through the present survey, for the geology and mineralization. Regarding the purpose of further investigation essentially as the comprehension of the features of the indications of mineralization in addition to the consideration of the background geology, the following two areas are extracted.

A) Conce-Concordia Area

This area is situated in the peripheral zone of the metamorphic rocks distributed in the southern part of the survey area and the indications of skarn type copper mineralization at Conce and at Suyapita and the indications of vein and dissemination type of copper mineralization around Concordia are included in this area. In the area, tectonic elements in the direction of northwest-southeast are well developed, and the sedimentary rocks are complicatedly distributed, in addition to the presence of the intrusive igneous rocks and the intense alteration zone. Emplacement of hydrothermal ore deposits of high to medium temperature would be expected in this area. The extracted area is as extensive as 590 km^2, 13 km wide in north and south, 45 km in length.

B) La Union-Mangulile Area

This area is situated in the southern peripheral zone of the metamorphic rocks distributed in the central part of the survey area, including antimony mine and the indications of copper mineralization near La Union, and the mineralization zone of gold ore veins near Mangulile. In this area, the sedimentary rocks as Valle de Angeles Formation are distributed, and the faults and the fissures in the directions of northeast-southwest and north-south are well developed. No acidic igneous intrusive rock has been confirmed yet. The extracted area is as extensive as 250 km^2, approximately 8 km in north-south and 27 km in east-west direction, where emplacement of epithermal gold-antimony ore veins would be expected.

It would be necessary to proceed with further investigation as follows, as a proposal resulted from the present survey.

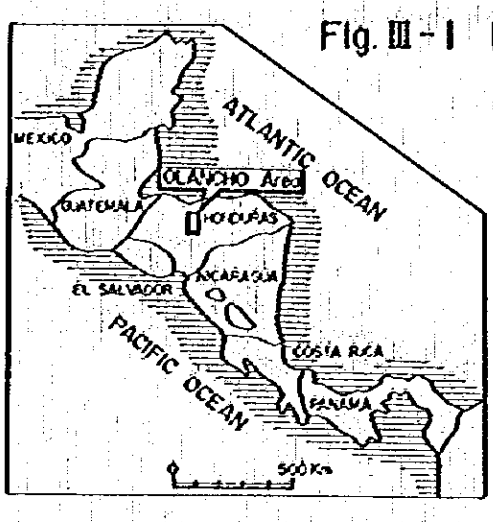
A) The indications of mineralization at Conce are the most superior with scale and alteration in the two extracted areas, which should be taken up in the first place for further explorations such as detailed geological survey and diamond drilling for the comprehension of the mineralization. And in order to investigate geological structure of the sedimentary rocks and role of the igneous intrusive rocks, the subject survey area for the detailed geological survey should be extended outward from near the indications at Conce to the whole of the Conce-Concordia area.

B) Meanshile, in La Union area, detailed geological survey should be carried out around the indications of mineralization, as is the case in the above area, and the subject survey area should be extended outward from near such indications.

C) As for the methods of investigations, detailed geological survey, petrological and mineralogical study, chemical analysis, geophysical survey (IP method, electromagnetic survey, magnetic survey, detailed gravity survey etc.) and diamond drilling should be employed in correspondence with variation of the characters of the indications of mineralization.

D) Through the above-stated investigations, additional information on the mineralization, on the geological structure, on the stratigraphy and on the characters of the igneous rocks would be obtained, by which some consideration should be given to the revise and the increase of area for exploration. Furthermore, new area for further exploration should be extracted for the extension of the area for the investigation of ore minerals.

Fig. III-1 LOCATION MAP OF THE OLANCHO AREA



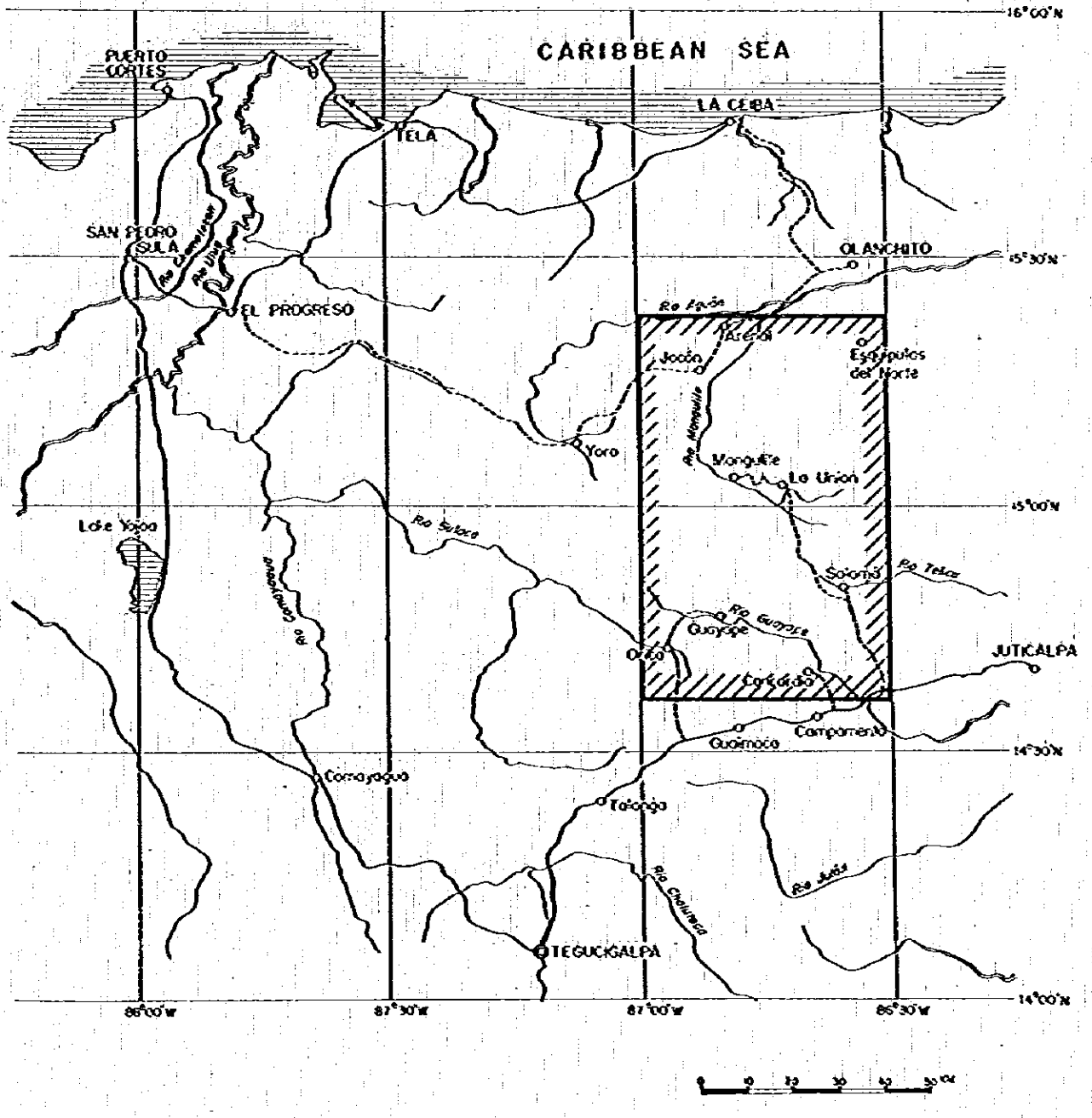


Fig. III - 2 Schematic Geological Column of the Olancho Area

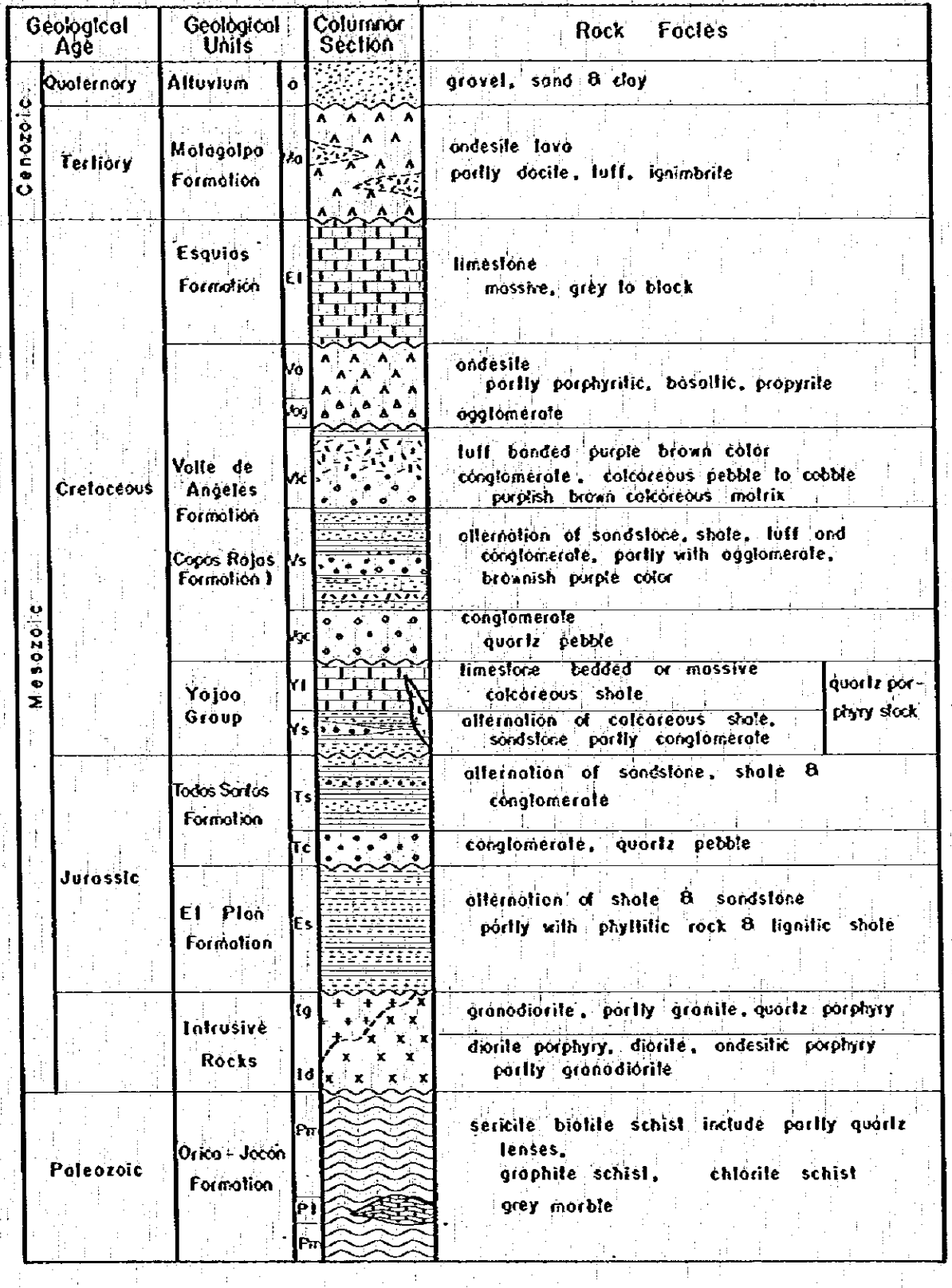


Fig. Ⅲ-3 TRAFFIC MAP IN THE OLANCHO AREA

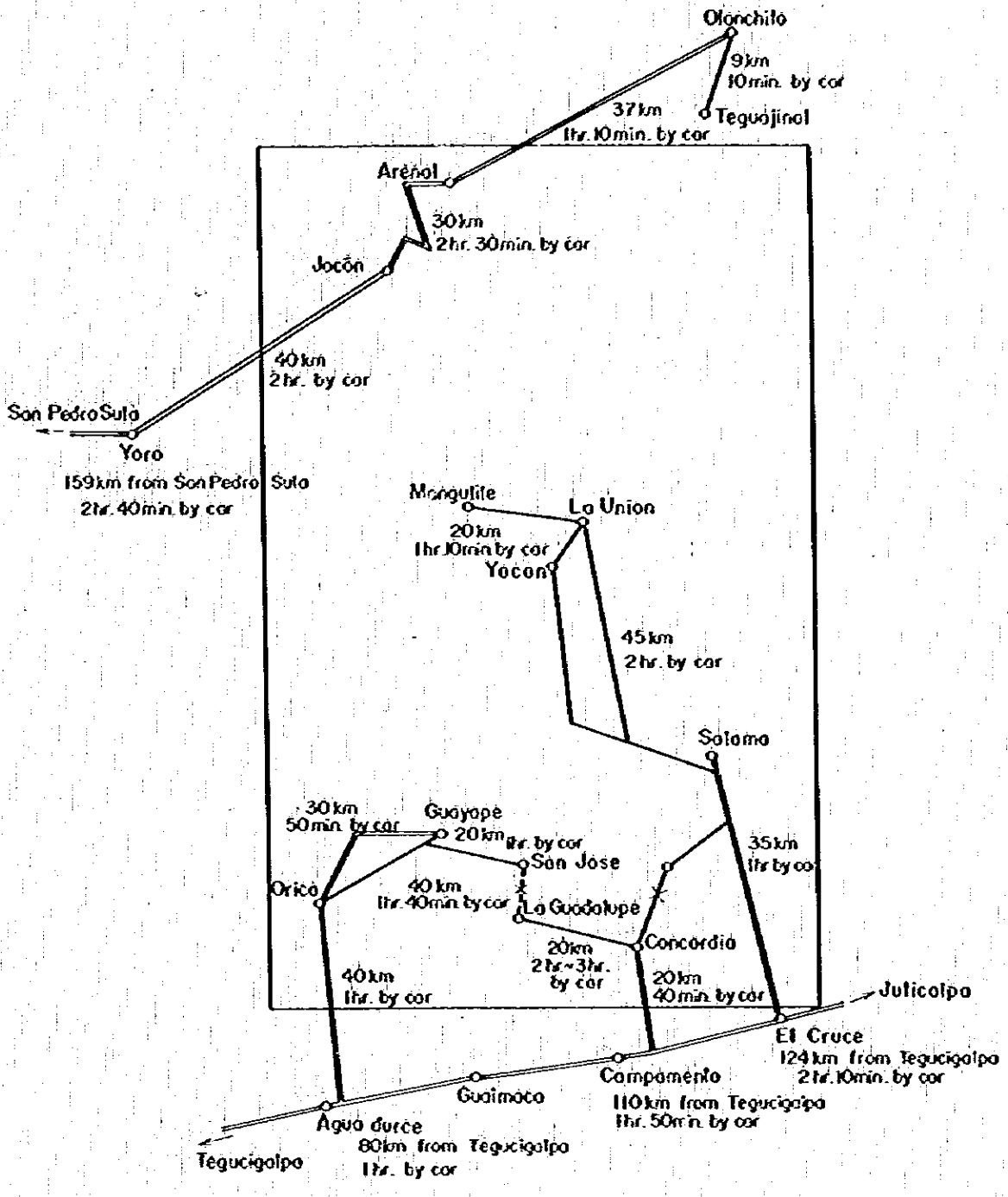


Table III—1 List of Mineralized Zone in the Olancho Area

Area	Name of Mineralized zone	Location	Host rock	Metal	Type of Mineralization	Exploration & Development
Conce	Conce	9km SE of Guayape	Quartz porphyry, Limestone Sandstone, Conglomerate	Cu , Fe	Skarn	Under the detailed survey by DGMH, large outcrop consists of garnet, actinolite
	Suyapita	2km North of Guayape	Shale, Sandstone, Limestone, Diorite porphyry	Cu , Au	Skarn	Garnet skarn etc, silicified, like manto
	Concordia South	0.2km South of Concordia	Quartzdiorite	Cu	Dissemination	2 short drillings carried out in the silicified, orgillized zones by United Nations
	Portillo	5km East of Concordia	Diorite porphyry	Cu , Fe	Vein	Some trenches
	Llano Mejia	3km West of Concordia	Diorite porphyry	Cu	Vein	3 old openings
	Talanqueras	10km NNW of Guayape	Andesite	Cu	Vein	Only outcrop
Union	Tata Angel	7km NW of La Union	Tuff, Tuffaceous sandstone	Sb	Vein	Temporary mining, 3 old openings 200 meter in length
	Chica Leona	5km SE of La Union	Andesite	Cu	Dissemination	Outcrop and old openings
	Playas de Arena	7km North of Mangulile	Sericite schist	Au	Vein	No accessable old openings
	La Lola	6km North of Mangulile	Sericite schist	Au	Vein	More than 3 old openings Quartz vein
	Lupe California	5km North of Mangulile	Sericite schist	Au	Vein	2 old openings Quartz vein