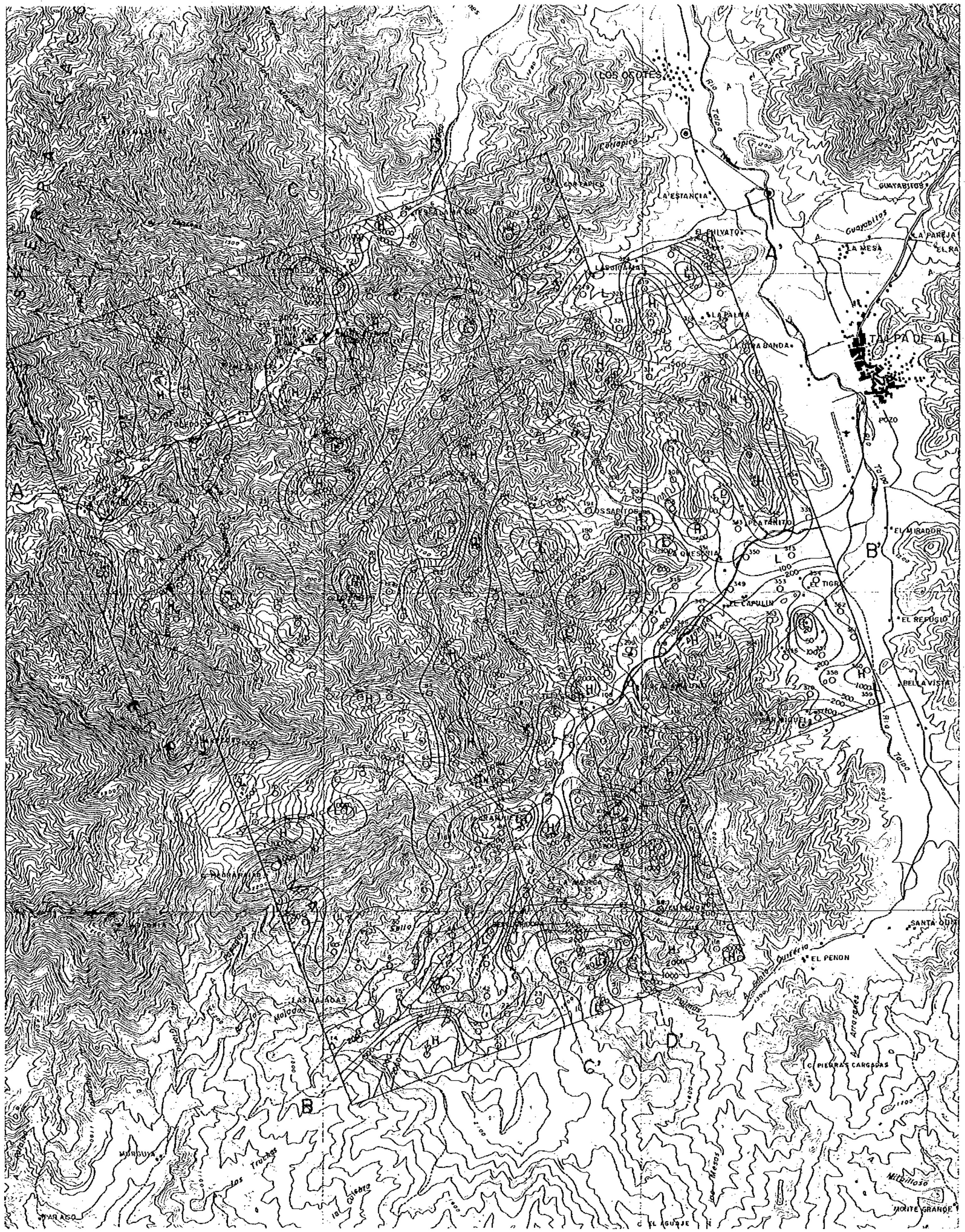


LEGEND

Station Point, No.

Transmitter Bipole

Contour of Apparent Resistivity (Ω-m)

Fig.5-12

Plan of Apparent Resistivity

(256Hz)

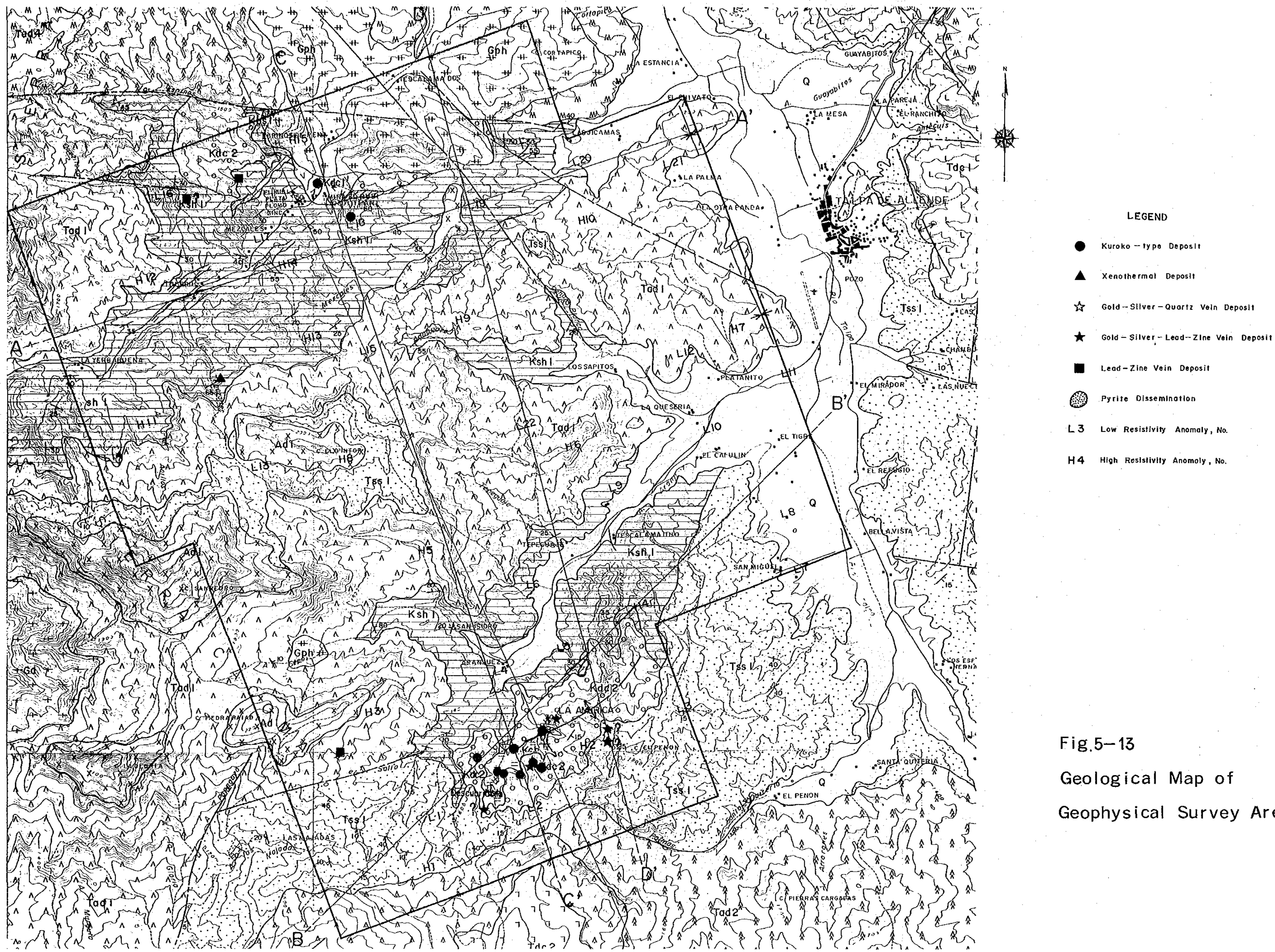


Fig.5–13
Geological Map of
Geophysical Survey Area

(2) Resistivity Pseudo-Sections

These are shown in Pls. 24 to 27 and Figs. 5-14 to 5-17. Features of apparent resistivity for each section are described below estimating 2,048 Hz and 1,024 Hz for the shallow and 512 Hz to 4 Hz for the depths.

. A-A' Section

H12 in the vicinity of Toledo and H14 in the vicinity of the Mezcales stream form a united HAZ in the depth respectively. L18 (LAZ) in the shallow in the vicinity of the point of intersection with C-C' section, which is considered to be a mineralized sign of the Octotitlan tunnel, does not extend down to the depth. L19, L20 and L21 (LAZs) extend down to the depths.

. B-B' Section

L1 (LAZ) extends from the shallow down to the depth, and in the middle of L1 very low resistivity zone (20 Ω-m) is observed. The Descubridora tunnel is located on the east edge of L1, and the La America tunnel is located between L1 and L5 (LAZs).

H4 (HAZ) shows an upheaval structure with a spread in the depth, and seems to wrap L5 (LAZ) in the depth. This corresponds to H4 wrapping circularly in the plan. L8 (LAZ) extends down to the relatively deep part.

. C-C' Section

L18 (LAZ) does not extend down to the depth although it is conspicuous in the shallow, and medium resistivity zones are distributed on the south side of it. L15 (LAZ) extends down to the depth. H5 (HAZ), resistivity of which increases gradually with depth, shows an upheaval structure. From a large point of view, there seems to be a synclinal structure between H5 and H15 in the north of it.

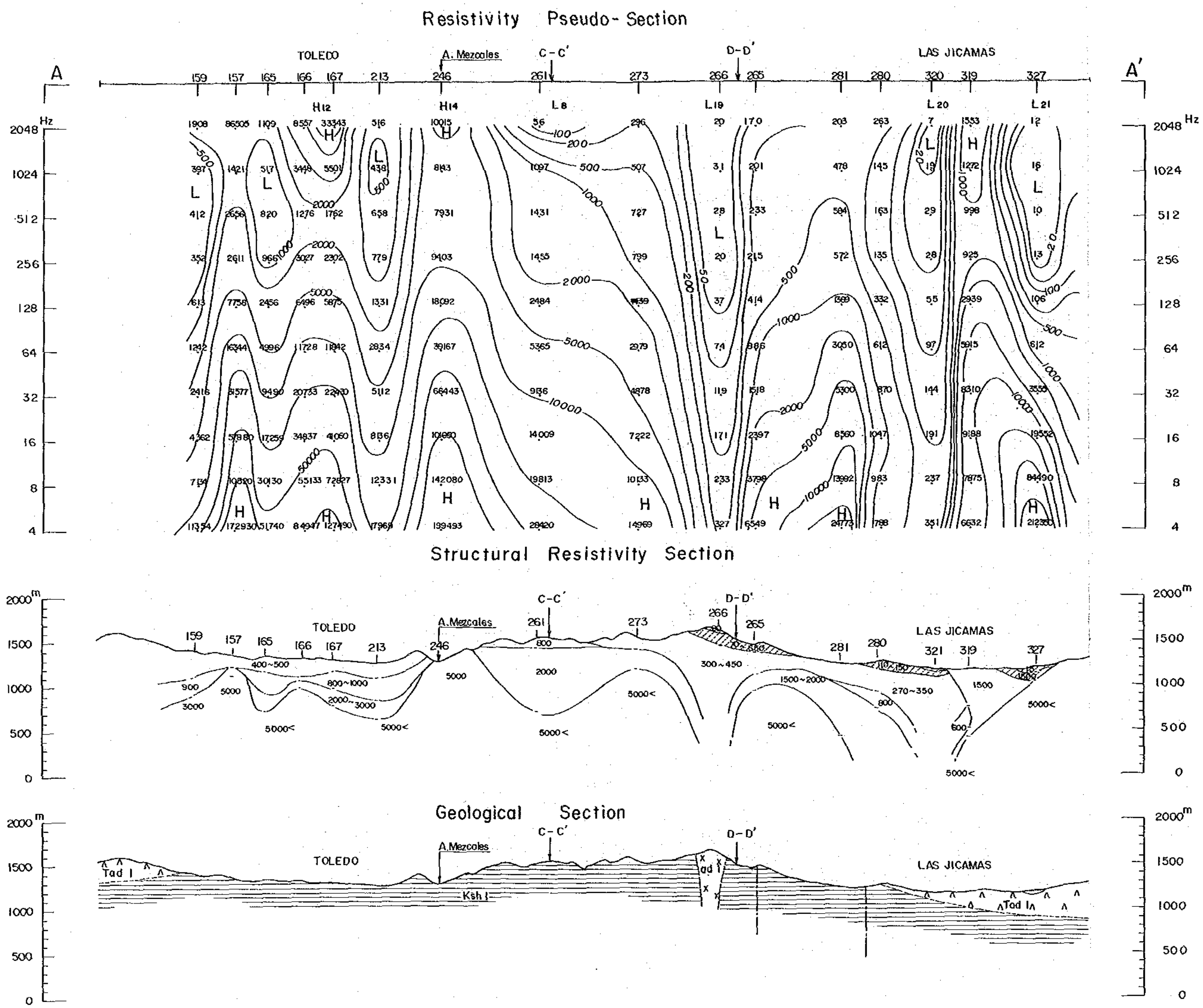
L4 and L2 (LAZs) in the vicinity of Aranjuez are located on the north and south sides of H2 (MAZ/HAZ). H2 indicates a very low resistivity within C-C' section relatively, and the Atalaya tunnel for Kuroko type deposit is located in the crest of H2.

. D-D' Section

L19 (LAZ), placed between H15 and H9 (HAZs), shows a shape which is wide in the shallow and slightly narrow in the depth. L22 (LAZ) is also distributed similarly. Although L5 and L6 seem to be a series of LAZs, L5 extends down to the depth, while L6 exists in the shallow only.

(3) Results of Resistivity Measurement for Rock Samples

Results of measurement for typical rocks and ores distributed within the survey area are shown in Table 5-4.



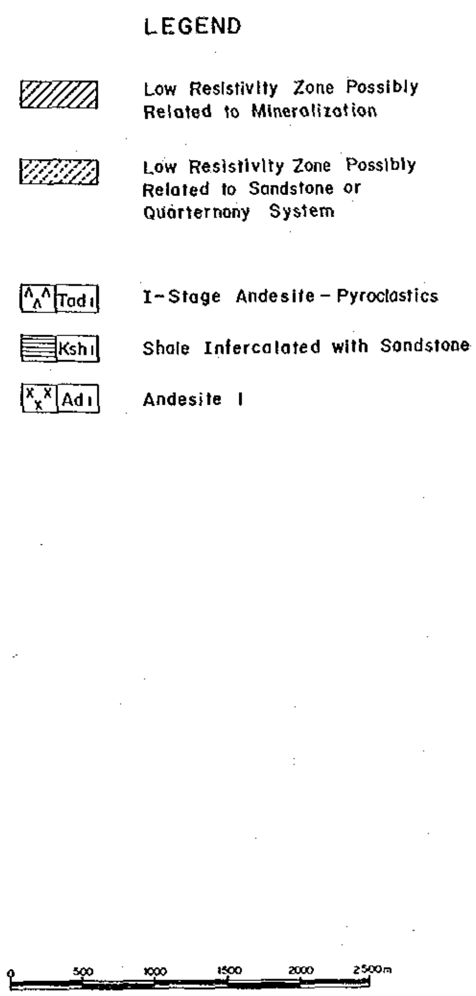
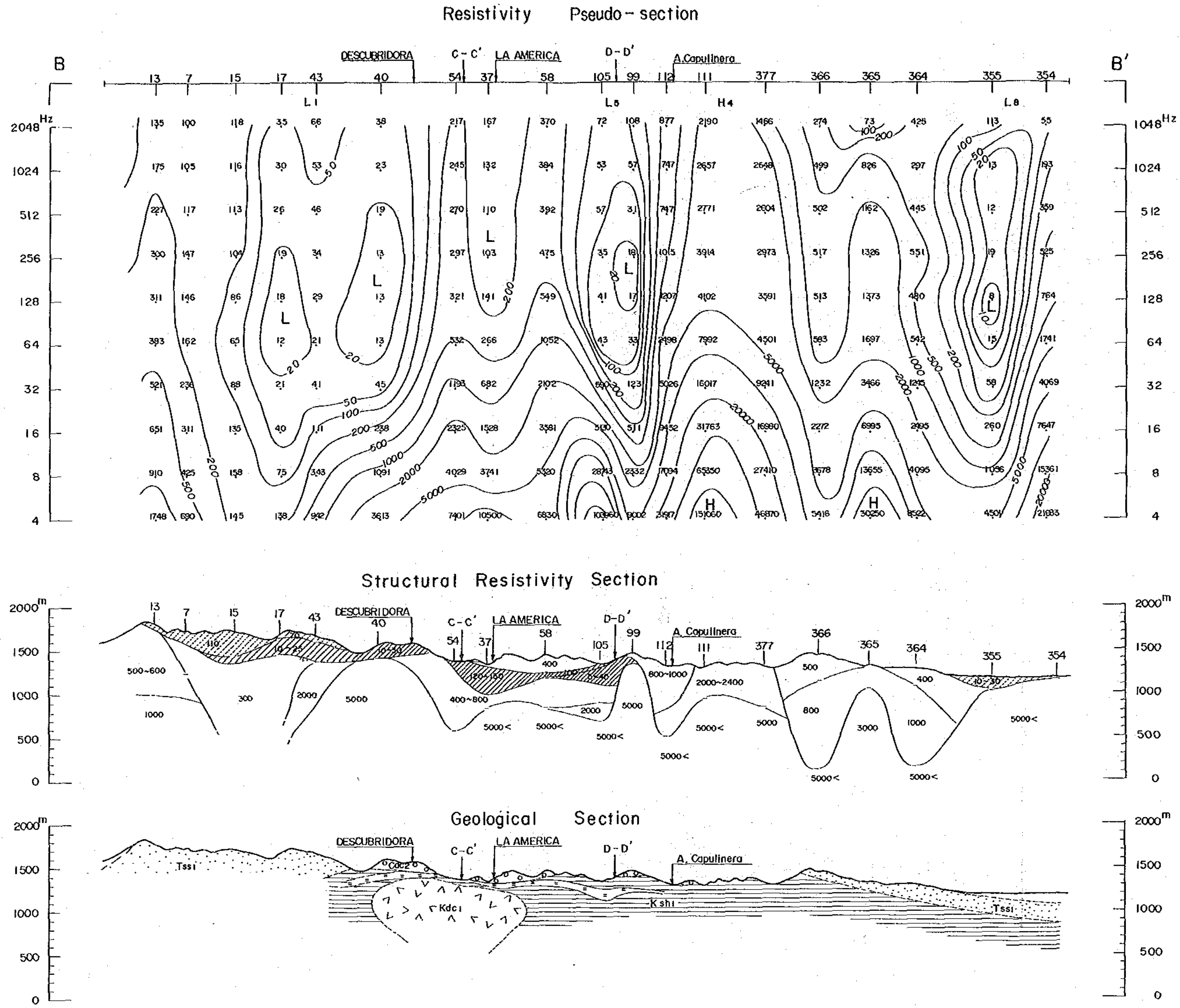


Fig.5-14

A-A' Section



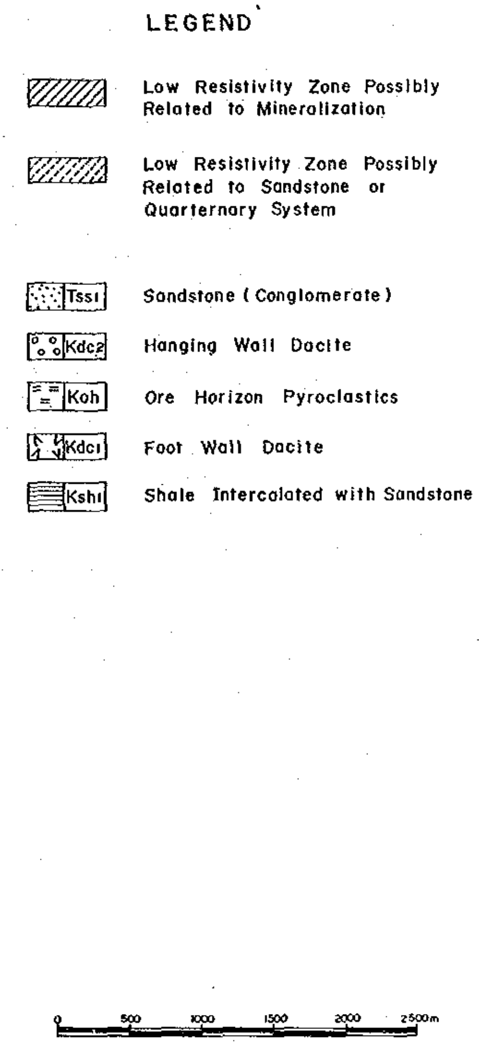


Fig.5-15

B-B' Section

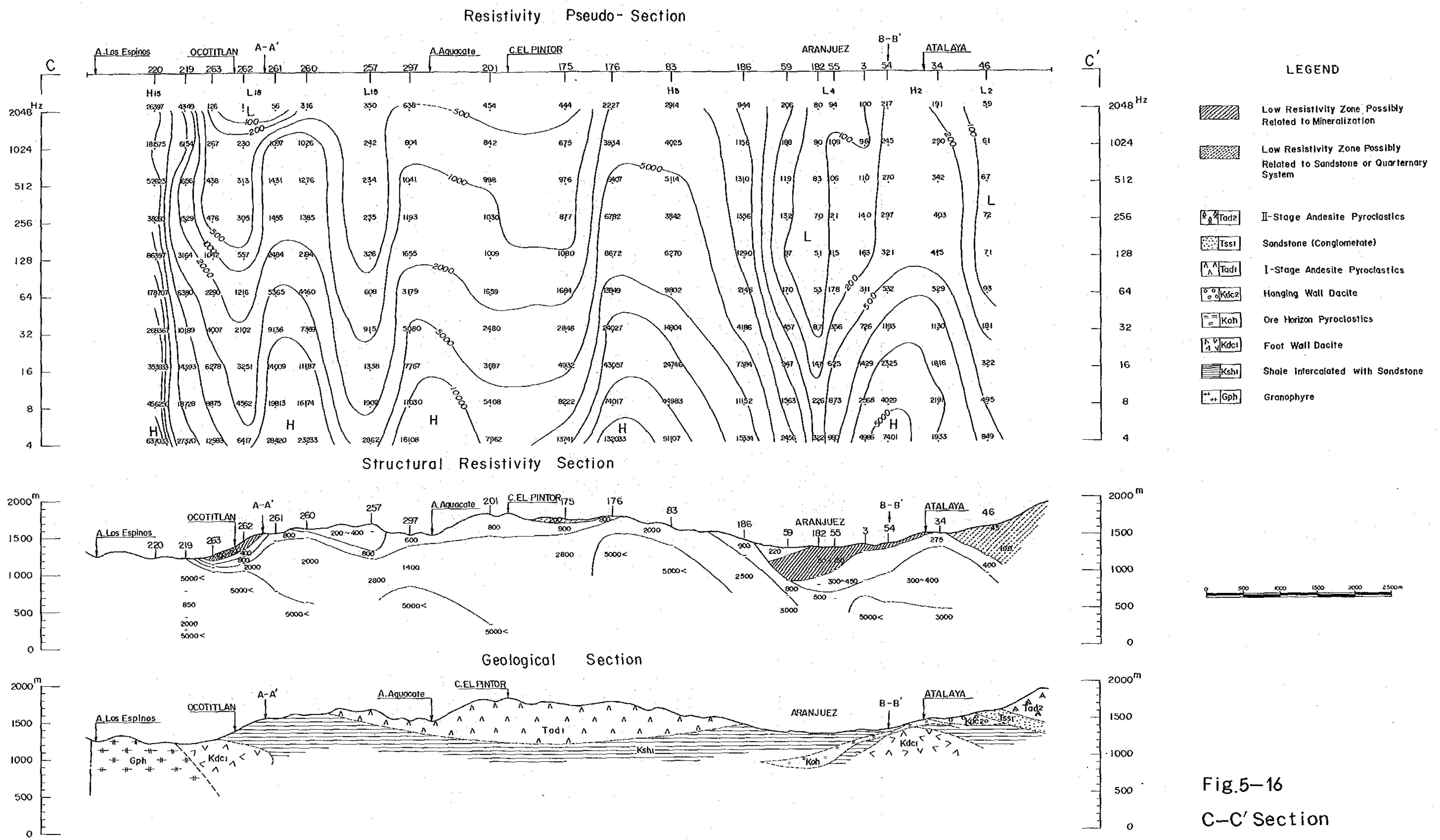


Fig.5–16

C–C' Section

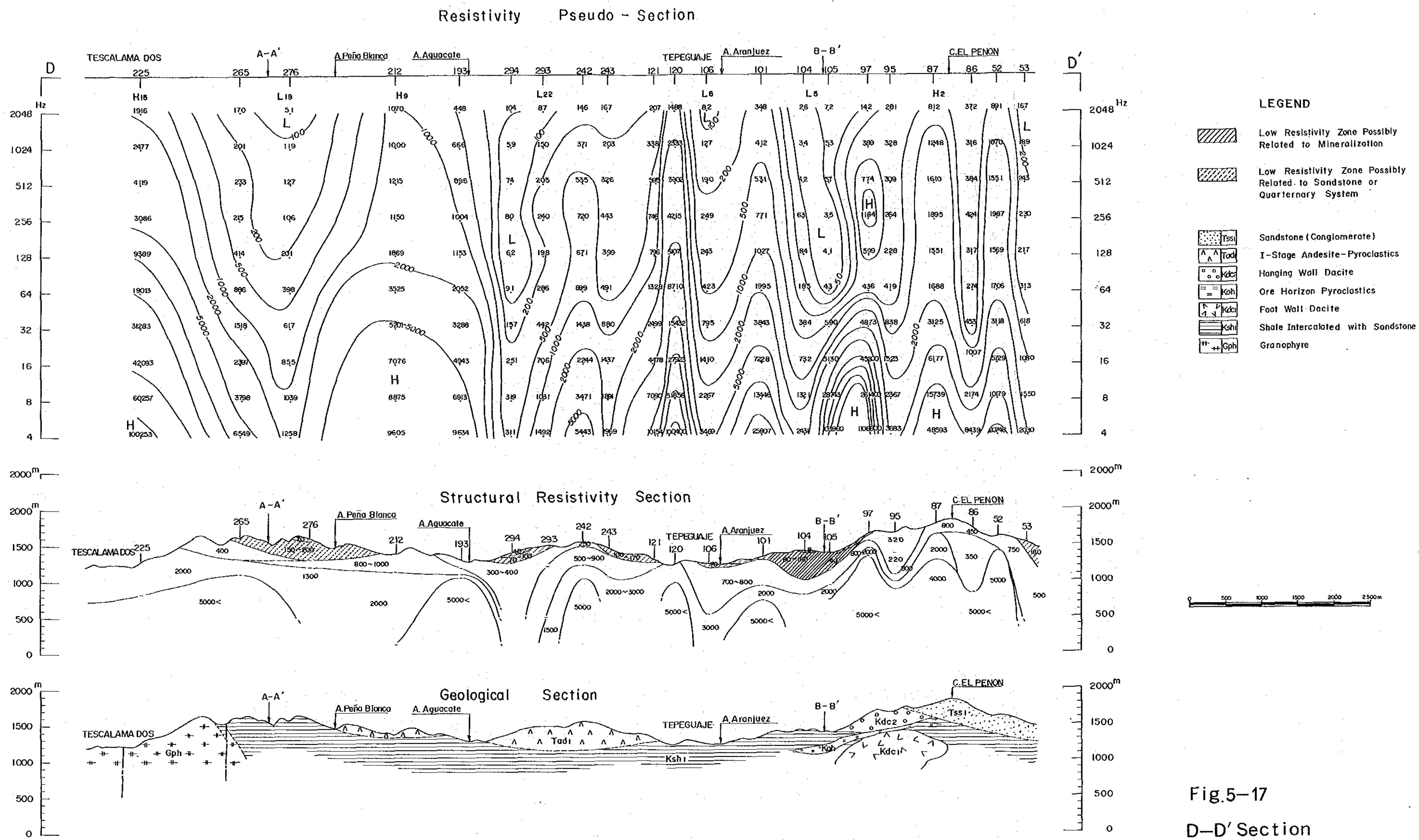


Fig.5–17

D–D' Section

Table 5-4 Resistivity of Ore and Rock Samples

Sample Name (Rock code)	Sample Locality	Number of Samples	Resistivity (Ω−m)	
			Min. ~ Max.	Mean
Sandstone(Conglomerate) (Tss_1)	El Capulin Las Majadas	2	85~522	300
I-Stage Andesite (Tad_1)	Cerro Piedra Raiad	3	2,090~5,750	3,500
Ore Horizon Pyroclastics (Koh)	La America	1	850	850
Shale Intercalated with Sandstone(Ksh_1)	Toledo San Isidro	5	2,660~7,900	6,500
Granophyre (Gph)	Toscalama Dos	3	6,720~11,090	8,300
Black Ore (Bo)	La America	1	66	66
Pyrite (Py)	La America	2	5~6	6

In arranging rocks within the area in order of high resistivity, although it might not always be appropriate because of the limited number of samples and partial samples, the order is as follows: Granophyre (Gph), shale intercalated with sandstone (Ksh_1), I-stage andesite (Tad_1), Ore horizon pyroclastics (Koh), Sandstone-conglomerate (Tss_1), Kuroko (Bo) and pyrite (Py).

5-3-2 Interpretation

Results of simulation analysis for each survey station are listed in Apx. 12. High resistivity anomalies which distribute in the depth on plans of resistivity structure and structural resistivity sections are considered to be influenced by near-field and high resistive formation. Consequently, it is difficult to distinguish between them.

(1) Plans of Resistivity Structure

These are shown in Pls. 19 to 22 and Figs. 5-18 to 5-21. Features of each plan of resistivity structure for 100 m, 200 m, 400 m and 800 m below the surface are described below in the following order: East, south, central and north parts of the area.

Each resistivity zone used in the text shows the following ranges generally, although they are slightly different in each area:

Resistivity Zone	Resistivity (Ω-m)
Low (LRZ)	Less than 200
Medium (MRZ)	200 to 2,000
High (HRZ)	More than 2,000

East part of the area:

HRZs in the plan of resistivity structure (hereinafter called "structure plan") for 100 m below the surface are observed on a small scale in topographical lowlands, such as those in the southeast, northwest and northeast of El Capulin and in La Otrabanda. Among them the LRZ observed in the southeast of El Capulin is of the largest scale. The geology of the area where these LRZs are distributed is on the Quaternary (Q) whose thickness is considered less than 100 m. Since this system is generally not compact, it seems to appear as that of low resistivity. Therefore, it is considered that most of LAZs frequently found in plans of apparent resistivity disappear in the depth more than 100 m below the surface, thus that only LAZ of large scale relatively in the southeast of El Capulin, remains in the depth. In the structure plan 200 m below the surface, the above-mentioned LAZs have become small in scale and shifted in general to higher resistivity. Thus it is considered that this is reflected by shale formation (Ksh_1) being latent under Quaternary (Q) and distributing widely in this vicinity.

The LRZ in the west of San Miguel is considered to be affected by sandstone formation (Tss_1). Also in the structure plan for 400 m below the surface, some LRZs are found nearby San Miguel. However, judging from contrast with the structure plan and geology, this is presumed to be due to the weathered zone in the shallow or loose sandstone formation (Tss_1). No LRZ close to mineralized sign is found in this area.

South part of the area:

In the structure plan for 100 m below the surface, a LRZ (under 200 Ω-m) is located on the north side of the connection between the Descubridora tunnel and the La America tunnel, and distributed like a belt to the northeast parallel to the connection. The northeast end of this LRZ is curved to the southeast. Other LRZs are also found on the south of tunnels in this area. These LRZs are adjacent to a MRZ which is distributed in the direction of east to west with the Descubridora deposit at its west end and the La America deposit at its north end. The central part (over 1,000 Ω-m) of this MRZ is considered to be the center of upheaval for resistivity structure. Corresponding to this zone, hanging wall decite (Kdc_2) is distributed in geology. In the 200 m - structure plan, the LRZ (under 200 Ω-m) on the west side of the Descubridora tunnel corresponds to sandstone formation distributed in the ground surface, and on the east side of the Descubridora deposit, ore horizon tuff (Koh), foot wall dacite, and so on are distributed. Therefore, this zone is an area in which extension of these formations to the west is also fully expected in geology.

A LRZ, distributed from the La America tunnel to Aranjuez on the northwest, and another LRZ (L5 LAZ), 1 km away to the east of Aranjuez, are found as an independent LRZ respectively. As seen in the 400 m -structure plan, the LRZs to the east of La America and in Aranjuez are surrounded by a series of resistivity zones (under 500 Ω-m). The conspicuous LRZ to the east of Aranjuez in the 200 m - structure plan declines in the depth as if it were surrounded by HRZs.

LEGEND

Station Point, No.

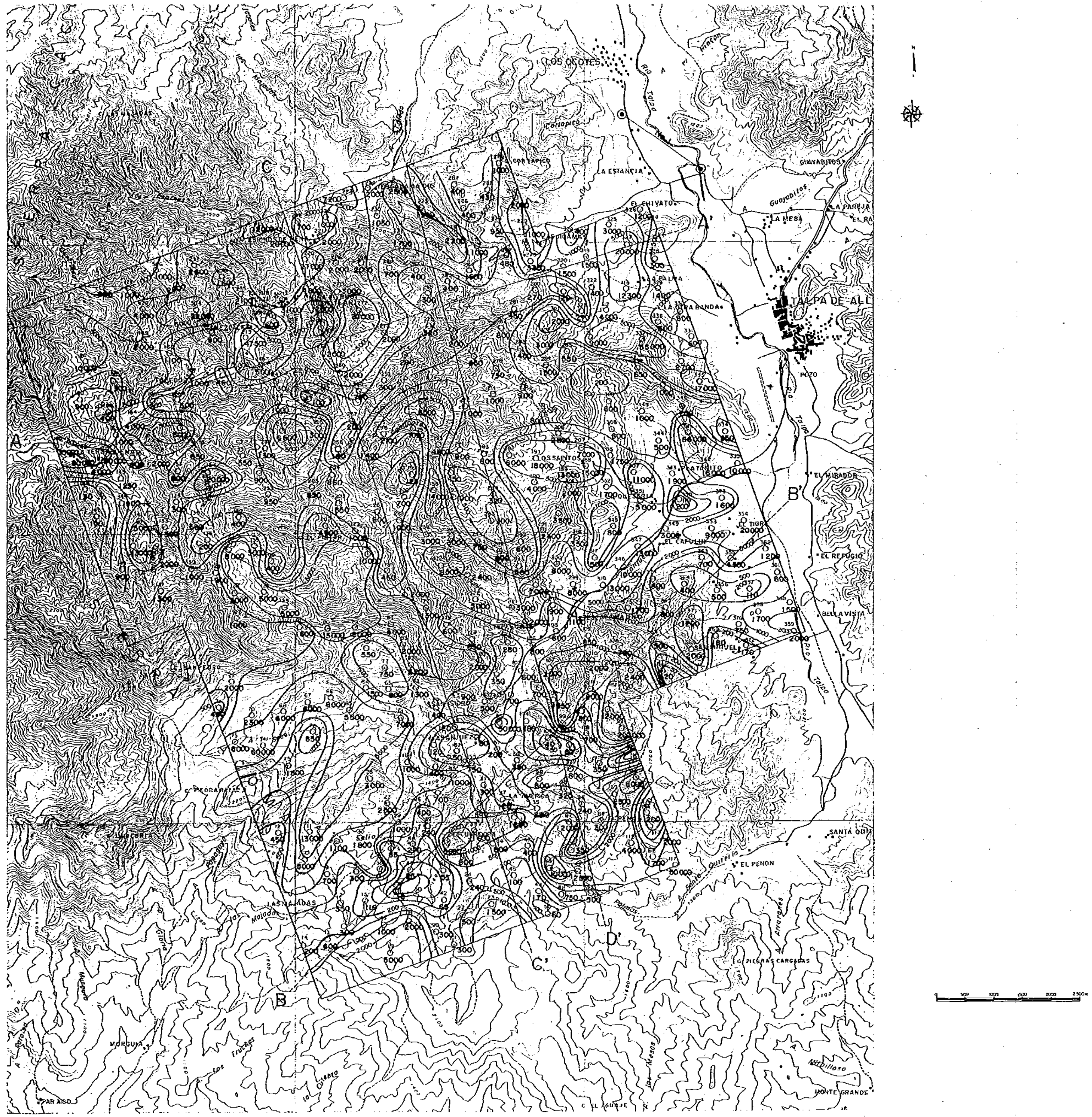
Transmitter Dipole

Contour of Resistivity (Ω-m)

Fig.5-18

Plan of Resistivity Structure

(100m below the surface)



LEGEND

Station Point, No.

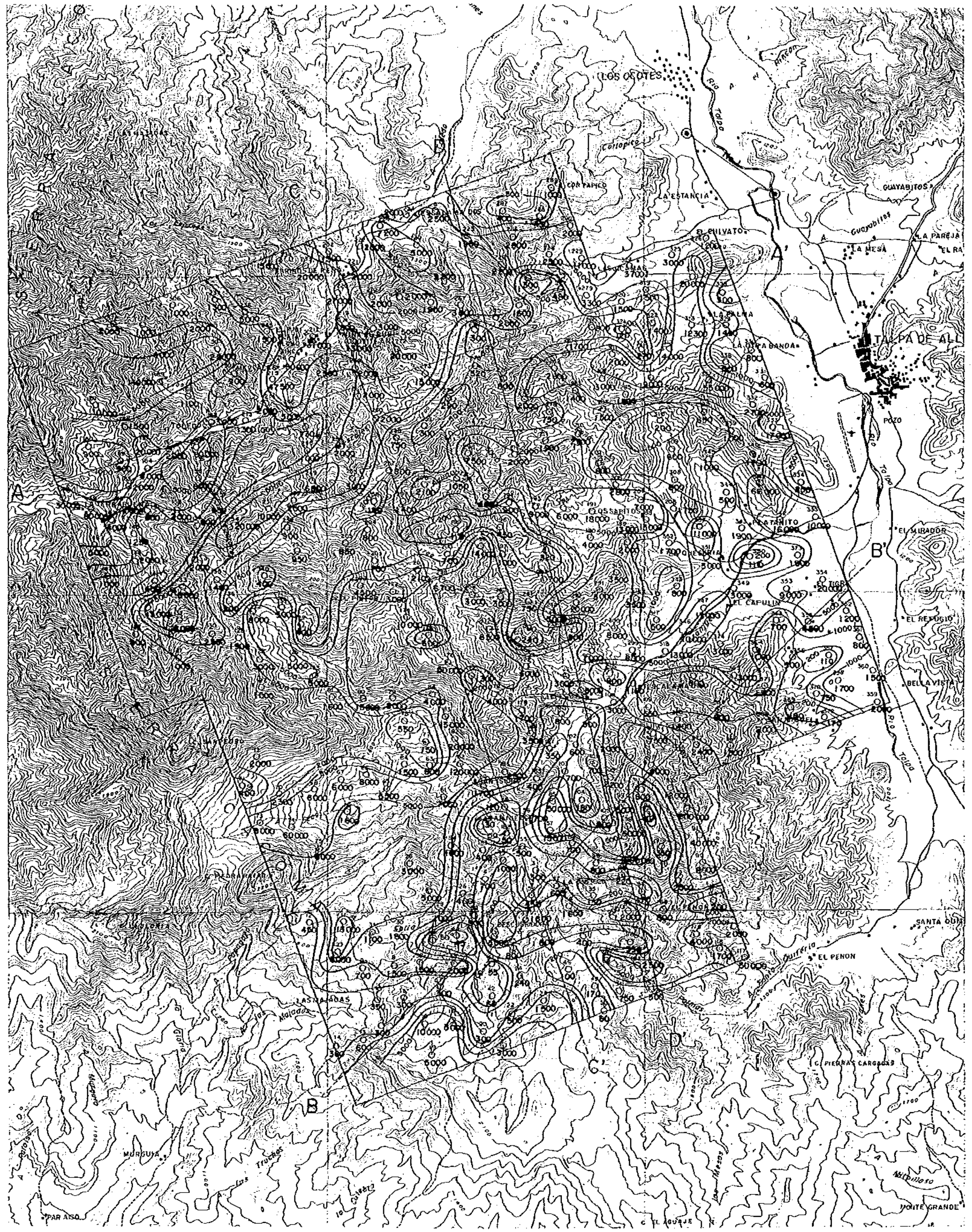
Transmitter Bipole

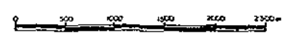
Contour of Resistivity (Ω-m)

Fig.5-19

Plan of Resistivity Structure

(200*m* below the surface)





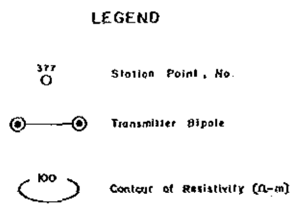


Fig.5–20

Plan of Resistivity Structure

(400m below the surface)

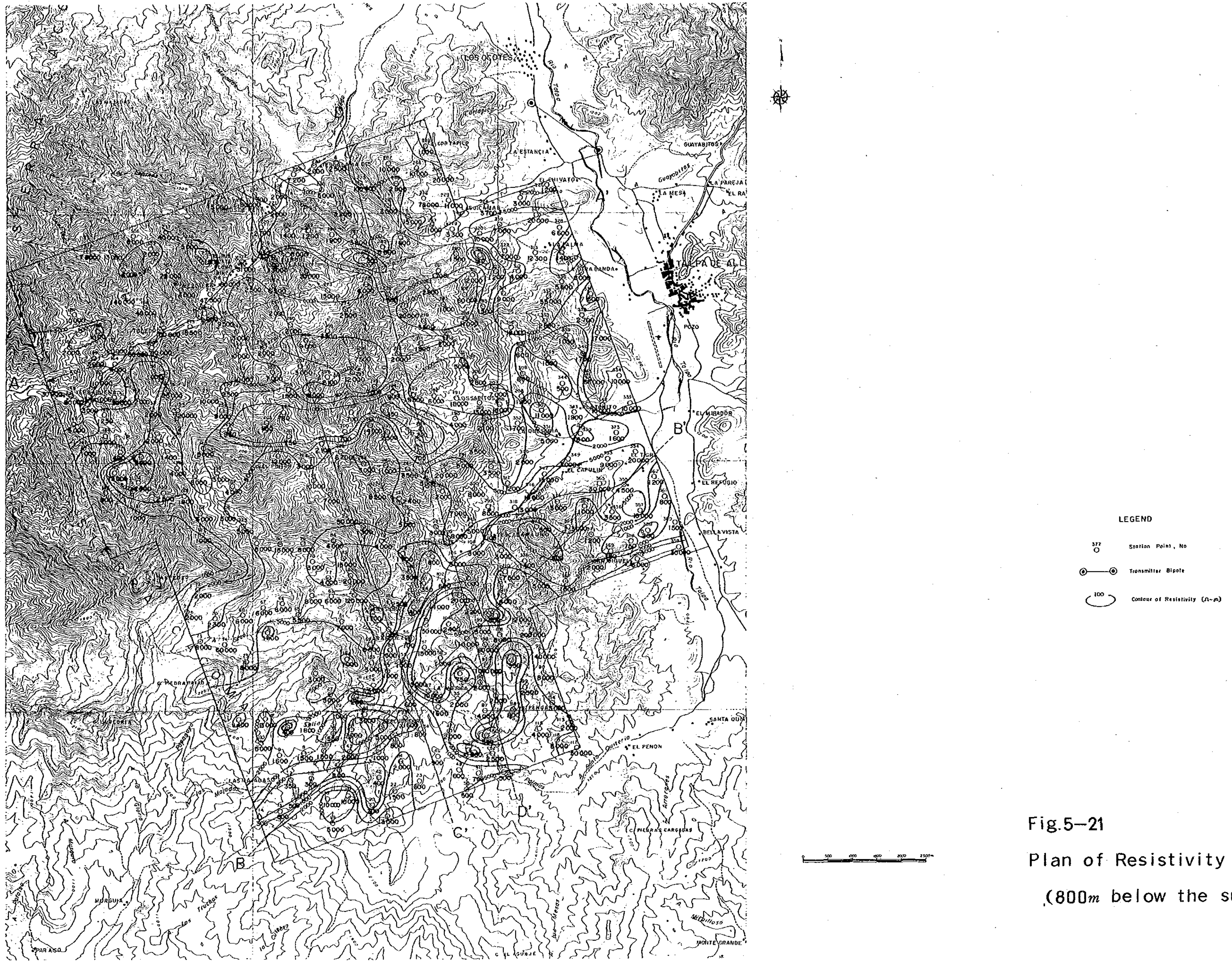


Fig.5—21

Plan of Resistivity Structure

(800m below the surface)

As described above, the LRZs in the vicinity of La America -Descubridora deposits show a complex form of distribution. Roughly speaking, however, they are distributed like a belt along the north west to north edges of the MRZ or HRZ running from east to west. This structure, being also forecasted from geology, is associated with the distribution of ore horizon tuff (Koh), which covers the north to northwest slopes of the foot wall dacite (Kdc_1) forming an anticlinal structure, and these LRZs correspond to the extension of this distribution. Considering the similarity to the arrangement direction of known deposits, these LRZs are considered to be an important guideline from the viewpoint of mineral exploration.

Central part of the area:

There are many small-scale LRZs in the 100 m - structure plan. The LRZ to the west of Cerro El Pintor is distributed in sandstone formation (Tss_1) and andesite intrusive (Ad_1).

The cause for this is considered to be due to the poor solidification of the stratum and cracked zones accompanied by intrusive. Although the LRZ to the west of Los Sapitos is also distributed in I-stage andesite (Tad_1), it gradually disappears down toward the depth. This is probably due to the same cause as in Cerro El Pintor.

In the 400 m and 800 m - structure plan, the effect of near-field is superposed, so that it is difficult to discriminate the structure in the depth.

North part of the area:

The conspicuous LRZ to the east of the Ocotitlan tunnel (El Rubi deposit), that is found in the 100 m - structure plan, also tends to extend to the southwest in the 200 m - and 400 m - structure plans and corresponds to the direction of the extension of andesite intrusive (Ad_1). This probably suggests weathering of intrusive or development of cracked zones accompanied by intrusive.

Judging from the distribution form of LRZ and the positional relationship between ore horizons and LRZ, it is considered that the partial LRZ on the Ocotitlan tunnel is due to the vein type mineralized zone in the shallow, and that the scale is small and the possibility of extension toward the depth is very low.

(2) Structural Resistivity Section

The resistivity distribution obtained by simulation analysis are shown on each section (A-A', B-B', C-C' and D-D') of the Pls. 24 to 27 and Figs. 5-14 to 5-17. Features of resistivity distribution are described below.

. A-A' Section

Shale (Ksh_1) covers along this section mostly, and I-stage andesite lava-pyroclastics (Tad_1) is found in both east and west ends only. A layer with a resistivity of 400 to 500 Ω-m distributes in the shallow depth nearby Toledo on the west side of this section. The deeper the resistivity extends, the more it intensifies and it reaches 2,000 to 3,000 Ω-m. This resistivity zone corresponds to shale (Ksh_1) in the geology of the ground surface. It is presumed that the shallower, the resistivity decreases by getting weathering and being affected with subterranean water, and the deeper, the higher the resistivity becomes, and the geology shifts to compact and solid lithology. The thickness of this formation seems to be about 300 to 600 m. In this vicinity of H14 (HAZ), an upheaval structure of HRZ (over 500 Ω-m) can be seen. This is presumed to reflect dike with the crest part nearby the earth surface or an upheaval structure of igneous rock.

L18 (LAZ) in the central part of the section seems to be due to the vein type mineralized zone in the shallow depth on the Ocotitlan tunnel.

L19 (LAZ) distributed in the top of the mountain is a LRZ (20 to 300 Ω-m) that extends from the shallow depth to the depth. Judging from the geology and the plans of resistivity structure, there is a strong possibility that L19 is due to dike penetrating shale formation (Ksh_1) or to the cracked zone extending to its periphery.

Both L20 and L21 (LAZs) in the vicinity of Las Jicamas, which are distributed in the Quaternary (Q), tend to decline toward the depth.

Judging from the distribution in the plan, the HRZ (20,000 Ω-m) in the east end of the section is also considered to be reflection of the south fall of granophyre (Gph) which extends to the north of the area.

. B-B' Section

The LRZ (under 110 Ω-m) distributed to the west of Descubridora is located in sandstone-conglomerate (Tss_1) shown in the geological section. However, since this zone corresponds to the extension to the west of the Descubridora deposit considering its resistivity structure, it is promising from the viewpoint of mineral exploration. The thickness of sandstone-conglomerate (Tss_1) is presumed to be about under 400 m. In addition, the LRZ (300 to 600 Ω-m) under this seems to reflect the distribution of shale (Ksh_1). In the vicinity of Descubridora tunnel, in terms of the resistivity distribution, the HRZ corresponds to the upheaval structure with the crest in the shallow depth, while the LRZ in the shallow depth corresponds to the mineralized or altered zone. The thickness of the LRZ in the vicinity of Descubridora deposit is presumed to be about 350 m.

The MRZ distributed in the upper periphery of La America mainly corresponds to hanging wall dacite (Kdc_2), and the thickness is relatively thin (under about 200 m).

Judging from its scale and distribution, there is a great possibility that the LRZ distributed thinly under MRZ is a mineralized or altered zone in ore horizon tuff (Koh). The thickness of this LRZ is about 300 m in the vicinity of LA America and about 50 m in thin places. The MRZ, distributed from Descubridora deposit to the Capulinera stream like the bottom of a pan, is considered to correspond to shale (Ksh_1) extending widely in this neighborhood.

The MRZ distributed to the east of the Capulinera stream is considered to correspond to limestone & shale (Ksh_2) which are placed between hanging wall dacite (Kdc_2) and shale (Ksh_1).

The MRZ to the east of Tescalama Uno corresponds to the distribution of sandstone - conglometrate (Tss_1) and shale (Ksh_1), and on the upper side a thinly distributed LRZ is found. This can also be seen to be a loose part formed by instrusive rock.

. C-C' Section

The HRZ to the north corresponds to the distribution of granophyre (Gph). The MRZ between L15 (LAZ) and H5 (HAZ) corresponds to I-stage andesite (Tad_1) covering shale (Ksh_1). The thickness of I-stage andesite (Tad_1) seems to be about 300 m on C-C' Section. The HRZ under the MRZ corresponds to Ksh_1 distributed under I-stage andesite (Tad_1).

The LRZ continues down to a depth of 400 m in Aranjuez, which is the border between shale (Ksh_1) of high resistivity and Quaternary (Q) of low resistivity in geology. The Quaternary (Q) only covers shale (Ksh_1) thinly, and the resistivity structure does not match the geology. Although there is no sign of mineralization or alteration in the earth's surface, there is a strong possibility that ore horizon tuff (Koh) suffered by mineralization exist. The reason for this is that multi-element showing type (composite type) were found in geochemical survey and that the La America-Descubridora tunnel is located in the south edge of the LRZ.

The MRZ/HRZ to the east of the La America- Descubridora deposit seems to reflect an upheaval structure of potential foot wall dacite (Kdc_1).

The LRZ at the south end of the section is presumed to reflect the distribution of sandstone (Tss_1) which extends down to a depth of about 400 m and is relatively weak.

. D-D' Section

The HRZ, corresponding to granophyre (Gph) distributed in the vicinity of Tescalama Dos, tends to decline rapidly in the east of the point of intersection with A-A' Section, and the decreased resistivity of the upper part may suggest suffering weathering slightly.

There is a strong possibility that the LRZ nearby the point of intersection with A-A' Section is due to the dike penetrating shale (Ksh_1) and the cracked zone surrounding it as in A-A' Section. However, since the El Rubi deposit and foot wall dacite (Kdc_1) are distributed on the west side, the existence of mineralized or altered zone along granophyre (Gph) can be possible also.

In the depth of the Pena Blanca stream, a thick layer of a MRZ, compared with shale (Ksh_1), exists. In the Aguacate stream, it is expected that an upheaval structure of HRZ may exist under the MRZ corresponding to shale (Ksh_1).

The LRZ to the south of the Aguacate stream is considered to be due to a vein type mineralized zone of small-scale that exists in I-stage andesite (Tad_1), but there is no sign of mineralization known in the surface.

In Tepeguaje, LRZs are distributed in the shallow depth on the both south and north sides of the stream. The LRZ on the north side, distributed in the upper part of I-stage andesite (Tad_1), is 100 to 200 m in thickness. The existence of mineralized or altered zone or fracture zone, which cause the decline of resistivity in the earth's surface, is not known. In the MRZ under this LRZ, shale (Ksh_1) is considered to be distributed judging from its distribution form. Also, in the Tepeguaje stream, a resistivity pattern, which suggests the existence of intrusive rock of small-scale in this formation, can be seen.

The LRZ existing in the shallow depth in the vicinity of the Aranjuez river may suggest seams of Quaternary (Q). The MRZ distributed under that LRZ is presumed to correspond to shale (Ksh_1) that may be distributed widely in the survey area.

The LRZ (40 to 180 Ω -m) exists in the shallow depth nearby the point of intersection with B-B' Section, while on the east side of the point of intersection, another LRZ (200 Ω -m) of small-scale that is placed between HRZs exists. Either of these LRZs is located in the contacts with hanging wall dacite (Kdc_2) and shale (Ksh_1), and their thickness on the section are estimated to be 50 to 350 m for the former and 200 to 500 m for the latter.

This LRZ is geologically located in the fall extension of the ore horizon tuff (Koh) that covers slope of an anticlinal structure on Descubridora's axis.

This LRZ, in the structural resistivity section, shows a distribution such as it reflects the mineralized or altered zone in both wings of the upheaval structure of foot wall dacite (Kdc_1). It is similar to a resistivity structure pattern that can be seen in Kuroko type deposit of the Cenozoic era in Japan.

In the vicinity of Cerro El Penon, a MRZ (350 to 2,000Ω-m) corresponding to sandstone (Tss_1) and shale (Ksh_1) is thickly distributed. The thickness seems to reach about more than 700 m. In addition, the MRZ is presumed to lean steeply to the south. The lower part shows, in general, a rugged and complex resistivity pattern. The geological anticipated synclinal structure between the El Rubi and La America - Descubridora deposits cound not be detected from the structural resistivity section. This might be due to its gentle slope.

5-4 Discussion

From the view point of Kuroko exploration, general discussion on the survey results is described below with our special attention to LRZs.

(1) The LRZs in the east of the survey area are widely distributed in the shallow depth but shifted to HRZs in a depth of 100 m, and they are distributed in topographically lower places. This is, therefore, considered to be LRZs derived from Quaternary (Q). The thickness is estimated to be 100 to several ten m. It is

anticipated that shale (Ksh_1) exists in the northeast and sandstone (Tss_1) exists in the southeast under Quaternary (Q).

(2) In the south of the survey area, Aranjuez LRZ from the east of the La America deposit to Aranjuez, Aranjuez East LRZ to its east and Descubridora West LRZ to the east of the Descubridora deposit were extracted.

. These are found in the north edge of volcanic rocks (hanging wall dacite (Kdc_2) and fine tuff (Koh)) which are closely related to Kuroko type deposit, and are roughly arranged from the northeast to southwest. Considering geological structure, they are located in the north wing of an anticlinal structure on the axis of the La America deposit area and its location correspond to the places where the existence of ore horizon tuff (Koh), foot wall dacite (Tdc_1), and so on is expected. These LRZs are also located around MRZ/HRZ roughly corresponding to the distribution area of the above mentioned volcanic rocks.

There is a strong possibility in terms of its depth and distribution that Aranjuez LRZ corresponds to the extension of ore horizon tuff (Koh) which has received mineralization or alteration for resistivity structure.

Aranjuez East LRZ is also found in the geological and structural position similar to the above LRZ, and is also similar to Aranjuez LRZ for resistivity structure. Thus, there is a possibility that this LRZ is also derived from the same kind of ore horizon tuff (Koh). Both the above two LRZs roughly correspond to multi-elements showing type which may suggest Kuroko type deposit caught as a result of the geochemical exploration using stream sediments.

Descubridora West LRZ seems to be connected to the LRZ that may be derived from Tertiary sandstone (Tss_1), in terms of comparison with geology. However, the survey of alteration zone and study of alkaline alteration index show that this LRZ corresponds to the southwest extension of intensely altered zone. Further more, also in terms of geological section, this LRZ is located on the extension of ore horizon tuff (Koh) from the Descubridora deposit, and can be considered to be promising from the viewpoint of Kuroko type deposit exploration. The geochemical exploration using stream sediments shows that no anomaly zone is found in this LRZ.

(3) Small-scale LRZs are dotted with in the central part of the survey area. They may suggest the weathered zones extending into I-stage andesite (Tad_1), because they shift rapidly to HRZ in the depth.

(4) In the north part of the survey area, a LRZ, which seems to reflect pyrite dissemination in silicified rock nearby the Ocotitlan tunnel, is found.

This is of small-scale and limited in the shallow depth, and may not correspond to the ore horizon depth. Therefore, it is not considered to be promising low anomaly zone for Kuroko exploration.

(5) Features of resistivity of rocks in Japanese Cenozoic Kuroko area are as follows:

	Resistivity (Ω-m)
Younger rocks than Kuroko deposit:	
Tuff & mudstone	50 to 100
Volcanic rocks	300 to 1,000
Older rocks than Kuroko deposit:	
Fresh volcanic rocks	300 to 1,000
Kuroko deposit and its periphery:	
Clayey altered rock	Less Than 50 (Distributed in wide range)

Thus, in Kuroko type deposit areas in Japan, values of resistivity of altered rock and other rocks form a clear contrast. On the other hand, most of rocks distributed in the survey area are deviated to the higher resistivity side, so that their contrast is not clear. Therefore, there is a strong possibility that the major factor of low resistivity in this survey area is mineralized or altered rock, except for cases where it is caused by sandstone (Tss_1) with bad solidification or fracture zones.

CHAPTER 6 CONCLUSION AND PROPOSITIONS FOR SECOND YEAR'S SURVEY

CHAPTER 6 CONCLUSION AND PROPOSITIONS FOR SECOND YEAR'S SURVEY

6-1 Conclusion

The first year's surveys conducted aiming at selecting out promising regions for exploration of Kuroko type deposits in Jalisco State, the United Mexican States, are geological survey, geochemical exploration on stream sediments and geophysical exploration by CSAMT method.

Conclusions obtained through the survey are described in the following articles.

1. Geological Study

(Geological Features of Cretaceous System)

The Cretaceous system of the studied area spread like a Fenster ranging from the northernwest to the west of the survey area, and is unconformably covered with I-stage andesite (Tad_1) and sandstone formation (Tss_1) of the Tertiary. The main constituent is black shale (Ksh_1) that intercalates sandstones with an additional small amount of intercalated calcarceous shale (Ksh_2). The fact that no mode of occurrence that indicate a sedimentary gap is found in the Cretaceous system may suggest that all Cretaceous sedimentary rocks rest in a conformably depositional relation formed between them. In La America - Descubridora and El Rubi area in which the presence of Kuroko type deposits has been known, dacites form the hanging and the foot wall rocks of Kuroko type deposits, and this implies a strong genetical relation between Kuroko type deposits and these acidic volcanics. Additionally, in both areas, development of acidic tuffs (Koh) and basalts (Kbs_1) is found in ore horizon, which gives us cues to estimate paleotopography in the field of ore deposition.

On the basis of judgment on nannoplanktons found in the black shale (Ksh_1) in the neighborhood of the ore horizon in the basin of Toledo River located in the northwest part of the studied area, it can be concluded that the stage belongs to Campanian stage to Maastrichtian stage (78 to 65 m.y. ago).

(Geological Features of Tertiary System)

The Tertiary system in the studied area mainly consits of andesites and dacites, though it contains sedimentary rocks (sandstone formation, Tss_1). The active age of these volcanics is left for future investigations because of lack of any absolute age measurement. It can be understood, however, that the volcanic activity had progressed without pauses except those found between I-stage andesites (Tad_1) which unconformably cover the Cretaceous system and II-stage andesites (Tad_2), and among basalts (Tbs_1), and III-stage dacite (Tdc_3) and IV-stage andesites. Welded tuffs are seen in IV-stage andesites (Tad_4) which are predominant in the region ranging from the north to the middle of the survey area, and this fact suggests that a circumstance of the volcanic activity had moved from the submarine to the subaerial while the activity had shifted from III-stage andesites (Tad_3) that are distinguished in the southern part of the survey area to Tad_4. These volcanics lie in approximate north-to-south strikes, with additional east-to-west strikes in the southern part.

(Intrusives)

There are five sorts of principal intrusives: adamellite (Adm), granodiorite (Gd), granophyre (Gph), andesite (Ad_1 and Ad_2) and dacite (Dc). The former two can be considered they had intruded in the laramide phase (>45 m.y. ago) because of investigation results in the vicinity. The latter three can be understood they had intruded later in the Tertiary from relations with rocks into which the intrusives had intruded.

(Geological Structures)

The Cretaceous system in the survey area had been subjected to foldings with various strikes and dips, but preeminent are northeast to southwest strikes with 30° - 60° dips toward southeast (in the basin of Toledo River) or 30° - 45° dips toward northwest (in the basin of Aranjuez River). On the other hand, the hanging wall decites (Kdc_2) forming competent layers are regarded to rest in very gentle dips (around 10°) from studies on depositional relations with tuffs (Koh) in ore horizon, distribution configurations and interpretation of geological section. Similar relations are found between the shale (Ksh_1) and the hanging wall dacites (Kdc_2) in El Rubi area, thus it can be said that a kind of two-storied structure exists between hanging wall decites (Kdc_2) and both of tuffs (Koh) and sedimentary rocks (Ksh_1). Accordingly, the Cretaceous system in the survey area, like other Mesozoic formations, can be supposed to have a much gentle envelope surface of folding than that seen on the field.

An opened syncline is expected to exist between Toledo and Aranjuez Rivers, with more than 8 km half wave length at its northwest wing and a 4 km half wave length at its southeast wing, thus forming a highly asymetrical fold. A possible reason for this may be the localized upheaval zone that might be caused by doming up of the foot wall dacites (Kdc_1) rather than regional tectionics, because the anticlinal portion at the southeast wing has happened to correspond to the distribution of the acidic volcanics. The vicinity of the volcanics is important as a site for exploration of Kuroko type deposits because of a intimate relation of the foot wall dacites with Kuroko type deposits.

Known fault developed in the survey area are in directions of (1) north-to-south and northeast-to-southwest, (2) east-to-west and (3) nothwest-to-southeast in sequence of creation.

(Mineralization)

In the survey area, Kuroko type deposits are embedded with an intimate time and space relation in volcanics of the Cretaceous. In La America-Descubridora and El Rubi areas, each Kuroko type deposit is sandwiched in between a hanging wall dacite and a foot wall one, and development of tuffs (Koh) and basalts (Kbs_1) suggests that the deposits had been formed in old basins of the submarine. Although ore deposits in the two areas are separated by about 10 km each other, they can be likely considered to belong to the same horizon, because the upper and the lower geological features sandwiching Kuroko type deposits resemble each other and also because of their structural locations.

Alteration studies conducted on hanging wall dacite (Kdc_2) and tuffs (Koh) in ore horizon have indicated, in the hanging wall dacite (Kdc_2) in La America-

Descubridora area, signs for a wide hydrothermal alteration that has been shown in various Kuroko type deposits. Moreover, that hopeful alteration zone does not correspond to the known Kuroko type deposits, so that this result can be understood to suggest a potential presence of an additional Kuroko type deposit. The alteration in El Rubi district can be concluded to be not noteworthy from this investigation.

A remarkable mineralization other than Kuroko type deposits in the survey area is high grade, concha type veins containing gold and silver, and such veins should be regarded as essential also for exploration of Kuroko type deposits, because these veins are found in the hanging wall rocks of Kuroko type deposits.

2. Geochemical Exploration

As a result of the geochemical exploration on stream sediments, geochemical anomalies found in areas where Kuroko type deposits exist are multi-elements showing type, clearly differing from single element showing type anomalies seen in other regions. Because the Kuroko type deposits in the survey area are blind ore deposits, the former anomalies, rather than directly indicating mineralization of Kuroko type deposits by themselves, may be caused, like the above mentioned Concha type veins, by an action that should be called post-mineralization following to Kuroko type main mineralization; thus it has been made clear that the former anomalies can be evaluated to be effective for exploration of Kuroko type deposits, though in an indirect way.

Acidic volcanics in the vicinity of Kuroko type deposits and in the Tertiary system were analyzed for 13 elements, and the results were investigated by alkali alteration index, and principal component and cluster analyses to compare Kuroko type deposits in the survey area with Cenozoic Kuroko deposits in Japan and with Kuroko type deposits in other areas. The conclusion is that hanging wall dacite (Kdc_2) in La America-Descubridora area had been subjected to the most Kuroko-like alteration. Furthermore, the fact that sites hopeful in alteration aspect are out of the vicinity of known Kuroko deposits suggests the presence of additional Kuroko deposits other than known ones.

3. Geophysical Exploration

The geophysical exploration has extracted three low resistivity zones (200 Ω-m or less) that are promising for exploration of Kuroko type deposits (Aranjuez, Aranjuez East and Descubridora West). These three zones, roughly lining up in the northeast-to-southwest direction, are located at the northern edge of the medium resistivity zone (200 to 2,000 Ω-m) that covers La America and Descubridora deposits.

From geological point of view, these three zones exist mainly on the northern flank of the anticlinal structure that takes the neighborhood of La America deposit as its axis. They also correspond to places where developments of ore horizon tuffs (Koh) and foot wall dacite (Kdc_1) are expected.

In the resistivity aspect, Aranjuez low resistivity zone corresponds, due to its depth and distribution, to the development of mineralized and altered tuffs (Koh).

Aranjuez East low resistivity zone is found at a place that geologically and structurally resembling to the above zone, and is expected to correspond to the existence of mineralized and altered tuffs (Koh), due to its similarity of resistivity to that of Aranjuez zone.

Descubridora West low resistivity zone seems to be one of a series of low resistivity zones that had stemmed from the Tertiary sandstone formation (Tss_1). However, this zone is premising for exploration of Kuroko type deposits, because this zone can be understood to correspond to the southwestern extension of the intensely altered zone, which can be judged from the alteration zoning and the alkali alteration index.

No noticeable low resistivity zone was found in the periphery of El Rubi deposit. Low resistivity zones around old workings at Ocotitlan are small, and have probably no meaning for exploration of Kuroko type deposits because their depths do not correspond to those of ore horizon.

6-2 Propositions for Second Year's Survey

For the eastern area, on the basis of the conclusions obtained from the current year's survey and discussions on it, and for the western area, according to the initial plan, propositions for the second year's survey are proposed as follows.

(1) Eastern area

As a result of the first year's geophysical exploration by CSAMT method, promising low resistivity zones (Aranjuez, Aranjuez East and Descubridora West) are located in the periphery of upheavals of acidic volcanics that can be considered to relate in genetical with Kuroko type deposits in La America-Descubridora area, and they can be regarded as places that have high possibility of existence of Kuroko type deposits for exploration in both geological and geochemical aspects. Therefore, recommendation for the second year's survey includes that SIP method that is effective to detect sulfide minerals should be applied at the above mentioned three low resistivity zones plus one altered zone which lies in the northeast-to-southwest direction and partly overlap each other with Aranjuez and Aranjuez East zones, and that drillings should be conducted at the most hopeful sites on the basis of an integrated investigation on all results from SIP method survey, and geological and alteration surveys.

(2) Western area

1 Geological Survey and Geochemical Exploration:

1,000 km^2 Survey Area

The main object is to elucidate the geological structure of the survey area and to pursue that continuity of ore horizon of promising Kuroko type deposit. In addition, the geochemical exploration should be carried out on stream sediments to select hopeful places for various mineral deposits in the survey area.

2 Geophysical Exploration

This exploration should be conducted to pick out low resistivity zones which relate to the presence of Kuroko type deposits.

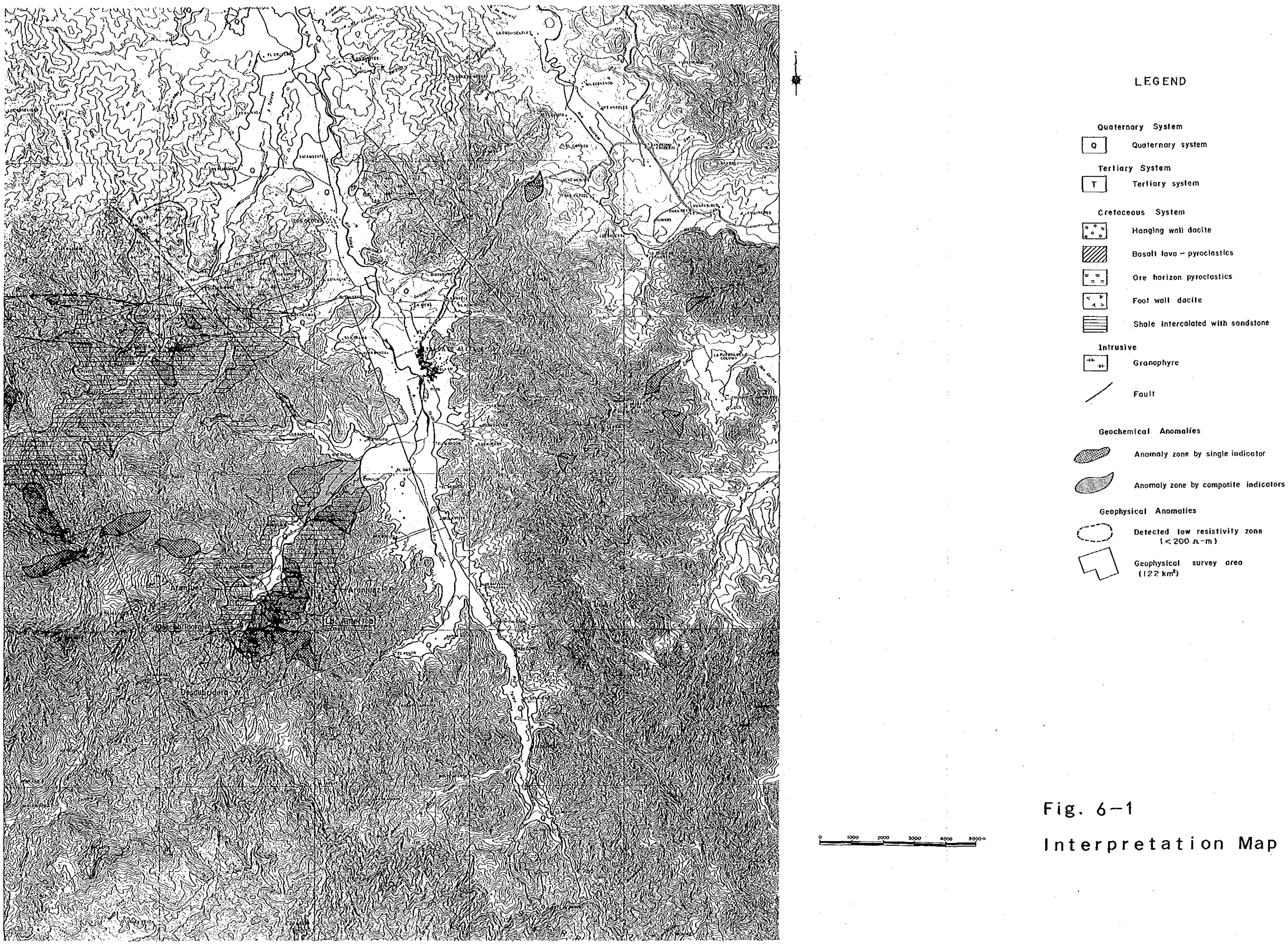


Fig. 6-1

Interpretation Map

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APPENDICES

List of Appendices

Apx. I Analytical Results of Stream Sediments (I)

SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
1	4	2675	39950	0.1	7.2	43.6	79.0	51	4	1700	35950	0.0	23.7	37.4	72.1
2	4	2050	39850	0.1	7.0	42.4	74.3	52	4	2075	36025	0.0	18.5	37.0	75.9
3	4	2075	39675	0.0	8.0	38.7	66.3	53	4	2100	35525	0.2	9.1	46.3	73.9
4	4	2800	39675	0.0	7.4	41.9	76.7	54	4	3800	36250	0.0	9.8	41.0	68.7
5	4	3100	39725	0.0	8.2	50.2	106.2	55	4	3900	36175	0.0	8.6	41.4	65.9
6	5	4175	39725	0.0	6.0	45.0	85.3	56	4	4325	36175	0.0	13.6	45.5	97.9
7	5	4325	39750	0.0	8.6	53.1	76.4	57	4	2125	35200	0.0	17.4	37.2	65.5
8	5	1325	39625	0.1	5.7	41.4	81.5	58	5	5200	39975	0.0	5.7	42.7	56.7
9	5	1250	39525	0.1	4.6	39.2	71.3	59	5	5100	39800	0.1	5.9	38.5	52.8
10	5	1275	39350	0.1	5.8	40.5	82.2	60	5	5525	39575	0.2	5.5	31.8	62.4
11	5	1350	39225	0.2	4.6	39.0	73.7	61	5	5500	39300	0.1	10.3	27.3	68.8
12	4	1575	39325	0.0	8.0	39.0	82.0	62	5	5150	38975	0.0	8.2	40.1	55.7
13	4	1725	39150	0.1	5.9	38.9	87.9	63	5	5650	39000	0.0	0.1	44.2	87.3
14	4	1675	38975	0.0	11.9	36.6	68.3	64	5	6050	38875	0.3	21.3	48.8	93.7
15	4	2775	39525	0.0	10.4	42.0	77.8	65	8	6925	38900	0.1	2.6	41.4	32.0
16	4	3325	38875	0.0	7.8	43.5	74.9	66	8	7125	39625	0.0	0.1	33.6	42.9
17	4	3475	38925	0.0	8.4	48.5	94.1	67	5	5125	38625	0.2	12.7	44.8	83.2
18	4	3925	38900	0.0	8.4	45.2	78.3	68	5	5975	38700	0.1	5.3	37.0	53.0
19	4	4175	38950	0.0	10.4	46.8	101.1	69	8	7425	39050	0.2	8.1	29.9	32.7
20	5	4725	38875	0.0	9.7	39.6	71.5	70	5	5675	38175	0.3	9.3	38.3	76.8
21	5	4900	38925	0.1	5.7	46.3	67.4	71	5	5950	38150	0.5	6.3	38.0	58.6
22	4	2025	38550	0.1	7.5	39.0	75.0	72	5	8375	37950	0.2	6.3	37.7	62.7
23	4	2450	38500	0.1	8.4	29.7	74.9	73	5	5575	37575	0.4	6.6	40.5	84.6
24	4	2675	38625	0.0	11.5	42.3	71.8	74	5	5675	37350	0.3	8.8	40.8	69.3
25	4	2975	38575	0.0	11.3	41.3	68.1	75	5	5475	37175	0.4	9.7	11.0	89.8
26	4	3300	38425	0.0	13.5	39.2	69.2	76	5	5575	36950	0.3	10.7	45.8	87.5
27	4	3525	38575	0.0	7.4	42.8	80.2	77	5	5850	37225	0.3	10.1	40.0	78.9
28	4	3600	38450	0.0	11.6	39.5	76.9	78	5	5975	37350	0.5	13.1	44.7	85.5
29	4	3850	38475	0.0	21.0	40.8	81.6	79	5	7850	37100	0.0	0.1	46.2	96.7
30	4	2600	38350	0.0	9.5	41.2	67.5	80	5	7900	37200	0.4	5.3	53.7	118.5
31	4	2625	38175	0.2	3.0	46.3	96.4	81	5	8925	37000	0.2	10.2	41.3	62.1
32	4	2350	37825	0.0	12.1	70.8	93.6	82	8	9850	37075	0.0	6.8	51.7	78.2
33	4	1825	37700	0.0	11.2	44.8	83.1	83	4	5425	36650	0.3	10.3	43.2	79.0
34	4	4325	37675	0.0	13.0	41.6	83.4	84	5	5625	36425	0.3	9.0	27.8	61.0
35	4	4675	37825	0.0	11.6	39.7	75.6	85	5	6925	36450	0.2	6.8	40.7	63.3
36	5	4825	37600	0.0	8.1	46.6	80.7	86	5	6875	36375	0.2	7.6	42.8	64.9
37	4	4775	37425	0.0	11.3	39.6	72.7	87	5	7875	36325	0.3	7.0	48.4	56.0
38	4	1050	37400	0.1	7.4	40.4	63.9	88	5	8900	36550	0.2	9.3	59.5	111.2
39	5	1000	37250	0.0	13.3	40.3	75.8	89	5	7600	36150	0.1	5.7	43.4	88.1
40	4	1550	37075	0.0	16.1	42.5	71.8	90	4	5350	36025	0.0	7.4	55.4	82.9
41	4	2250	37050	0.0	0.1	51.2	109.8	91	4	5475	36050	0.3	10.3	50.9	83.0
42	4	2175	36900	0.0	7.0	41.7	79.3	92	4	5150	35750	0.5	8.6	43.8	90.4
43	4	3725	37000	0.1	9.9	42.4	82.3	93	4	5050	35400	0.5	13.3	57.2	133.0
44	4	4075	37150	0.0	9.0	42.3	71.6	94	5	6550	35450	0.3	18.7	47.0	108.3
45	4	4200	37075	0.0	8.2	43.5	76.5	95	5	6625	35600	0.0	10.5	39.0	68.1
46	4	3675	36825	0.0	8.4	42.9	76.9	96	5	7375	35675	0.4	7.5	45.7	69.8
47	4	4825	36750	0.0	8.0	42.7	76.3	97	5	7500	35600	0.1	12.5	45.5	92.0
48	4	4950	36600	0.0	6.9	44.0	86.1	98	4	5475	35100	0.4	4.2	38.4	70.2
49	4	1650	36425	0.0	17.8	41.2	65.9	99	8	10550	39800	0.4	7.1	43.8	144.4
50	4	1550	36325	0.0	19.6	42.0	66.6	100	5	10675	39675	0.1	4.7	44.3	91.9

Rock Code : Rock Code Number Shown in Table 4 − 1

(2)

SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
101	5	11650	39625	0.0	4.6	42.0	161.0
102	5	12075	39625	0.2	2.8	46.4	71.6
103	5	12225	39525	0.2	5.6	47.6	112.6
104	5	12450	39650	0.1	7.0	44.8	103.5
105	5	11475	39475	0.0	5.0	43.3	65.8
106	8	10425	38925	0.2	5.1	53.3	123.6
107	4	1875	35650	0.1	0.1	41.8	59.3
108	4	4450	36125	0.1	6.7	48.8	74.9
109	5	14525	39800	0.0	26.6	51.9	65.1
110	5	10925	39200	0.0	5.6	47.9	94.9
111	8	7650	39050	0.3	5.4	37.8	45.9
112	5	13675	37875	0.0	4.4	46.8	81.1
113	8	16800	37525	0.1	5.3	45.8	48.7
114	8	20450	39000	0.0	4.9	45.1	75.5
115	8	11225	38525	0.0	4.5	49.2	87.5
116	5	11600	38550	0.1	0.1	64.6	163.8
117	5	11925	38650	0.1	0.1	51.1	103.7
118	5	12025	38525	0.2	4.1	56.4	131.4
119	5	11850	37950	0.3	4.0	52.6	116.5
120	5	11925	37800	0.1	5.2	54.9	87.2
121	5	12575	37700	0.1	6.2	58.6	136.1
122	5	12625	37825	0.4	37.1	56.5	123.5
123	5	13100	38150	0.2	6.5	57.4	144.4
124	5	13325	38125	0.0	6.0	48.5	77.0
125	5	13650	37975	0.3	3.8	53.2	91.2
126	5	12775	37500	0.1	2.2	54.1	50.3
127	5	13100	37575	0.3	28.4	56.4	94.9
128	5	13350	37725	0.0	4.0	47.4	70.2
129	8	16750	39150	0.0	44.8	54.4	77.6
130	8	10925	36400	0.0	9.9	46.6	98.6
131	5	11975	36900	0.0	6.1	43.6	89.7
132	5	12050	36525	0.0	5.2	40.1	51.0
133	5	11925	36225	0.0	11.8	51.9	71.4
134	8	10875	34800	0.0	17.3	50.2	155.2
135	5	12200	36600	0.2	4.2	40.2	40.5
136	5	11450	36100	0.0	6.3	59.8	168.1
137	5	11450	35225	0.0	4.0	64.5	76.1
138	6	11550	35075	0.0	8.5	46.9	60.0
139	5	12325	35300	0.0	9.7	45.1	63.7
140	5	12250	35125	0.2	10.8	53.2	81.5
141	5	12750	35925	0.1	6.1	34.0	39.0
142	5	12900	35900	0.1	16.1	46.4	84.3
143	5	12800	35475	0.1	0.1	46.8	60.8
144	5	13200	35525	0.0	6.9	46.9	74.4
145	5	13400	35675	0.2	7.9	40.2	62.9
146	5	13475	35550	0.3	38.1	63.6	75.5
147	7	6000	31200	0.0	7.1	69.9	81.7
148	6	12250	32250	0.1	5.7	33.5	35.1
149	5	13025	35650	0.0	7.9	43.0	67.7
150	8	18300	32850	0.1	25.0	45.5	90.0

SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
151	5	15100	39875	0.1	7.5	38.8	41.6
152	8	15625	39925	0.3	53.1	51.6	83.6
153	5	15075	39625	0.2	0.1	46.2	54.1
154	8	15400	39425	0.1	8.7	47.6	79.2
155	5	15425	39175	0.2	14.1	48.8	67.8
156	5	15550	39025	0.1	10.2	45.5	66.9
157	1	550	25175	0.0	69.5	91.3	196.9
158	2	3450	26300	0.0	82.3	75.4	102.7
159	1	9825	29800	0.0	40.2	64.3	116.4
160	8	12625	26525	0.0	45.0	53.9	61.2
161	5	15925	38650	0.2	7.3	46.6	59.5
162	6	16225	38125	0.0	9.0	47.3	61.5
163	8	16325	37725	0.0	12.5	42.8	54.7
164	8	19225	38525	0.3	28.4	71.1	72.6
165	8	17000	37675	0.2	12.1	53.1	66.0
166	6	15600	37250	0.1	3.2	50.2	48.8
167	6	15450	37025	0.2	4.4	53.6	53.1
168	6	15575	36900	0.2	6.0	53.7	68.8
169	8	15850	37050	0.1	7.5	55.2	62.5
170	6	16275	37075	0.2	6.6	49.8	72.0
171	8	16575	37200	0.1	9.1	49.5	57.5
172	6	16550	36925	0.9	46.7	71.3	118.1
173	6	16700	37000	0.2	10.8	64.1	83.1
174	6	17025	37075	0.4	44.6	68.2	89.0
175	6	17300	36850	0.5	29.1	44.9	81.6
176	5	15175	36625	0.1	0.1	47.4	52.2
177	5	15175	36475	0.3	3.5	51.5	57.6
178	6	15300	36425	0.1	3.2	46.6	55.4
179	6	16300	36200	0.4	4.0	49.9	35.9
180	6	16375	36050	0.1	0.1	49.5	80.4
181	6	16525	36125	0.2	5.1	44.7	31.0
182	6	17650	36200	0.2	23.2	47.5	98.6
183	6	17975	35950	0.3	23.5	53.6	78.7
184	8	18350	35600	0.4	25.8	57.7	72.0
185	8	19100	35500	0.5	49.7	59.6	94.1
186	6	16725	35075	0.5	2.7	54.5	110.0
187	6	17800	35375	0.4	26.0	55.3	69.8
188	6	17650	35150	0.4	29.2	58.1	85.8
189	8	20075	38275	0.1	2.9	53.2	75.8
190	8	20150	36525	0.2	6.9	39.5	48.7
191	8	20250	39100	0.0	15.9	48.5	176.5
192	8	20450	39350	0.1	0.1	57.8	93.4
193	8	20625	39350	0.0	6.6	49.6	109.7
194	8	20550	39125	0.1	8.4	41.0	138.9
195	5	21225	39150	0.2	36.2	55.3	58.7
196	5	21325	39000	0.2	35.3	49.7	93.4
197	5	22275	39175	0.3	26.7	53.5	132.2
198	5	23225	38725	0.2	10.1	45.9	96.9
199	5	23575	38700	0.2	11.3	45.4	99.4
200	8	20250	33025	0.0	12.1	45.0	131.6

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SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
201	8	14075	27600	0.1	23.6	42.2	66.8
202	5	21300	38000	0.4	41.3	64.3	133.6
203	5	21625	38150	0.5	55.6	64.4	102.7
204	5	23875	38250	0.5	3.6	47.4	126.0
205	8	23975	38350	0.2	3.4	46.1	70.9
206	5	22200	37725	0.2	6.9	68.5	218.2
207	5	22175	37575	0.5	8.6	65.3	81.4
208	5	22975	37825	0.2	9.1	52.3	99.0
209	5	23000	37625	0.3	6.4	67.1	222.1
210	5	22875	37575	0.5	3.1	63.7	137.6
211	5	23775	35800	0.0	8.9	53.0	77.8
212	8	20775	37150	0.3	34.5	76.1	66.3
213	8	20900	37075	0.4	3.3	52.9	127.7
214	8	20600	36700	0.6	13.7	44.8	189.1
215	8	21775	35925	0.0	10.3	50.5	158.3
216	5	21950	35925	0.1	7.9	55.8	114.3
217	8	21900	35475	0.1	12.6	57.9	149.8
218	8	22925	35450	0.5	42.3	77.0	84.0
219	5	23025	35725	0.2	4.7	55.9	125.5
220	5	23175	36450	0.0	10.4	53.3	109.5
221	5	23325	35850	0.0	6.7	66.2	175.6
222	5	23400	35750	0.2	21.9	71.5	139.6
223	5	23900	36475	0.3	22.1	74.1	111.4
224	5	24100	36225	0.4	33.4	79.2	63.1
225	5	24275	36275	0.4	36.8	83.2	68.4
226	5	24800	36675	0.4	33.5	92.8	52.6
227	5	24500	35950	0.3	32.1	81.0	69.9
228	5	24600	35900	0.2	35.3	80.2	74.8
229	5	1175	35000	0.0	9.9	61.4	105.9
230	5	1400	34950	0.0	16.7	62.5	67.4
231	4	1900	34900	0.0	16.9	62.4	75.1
232	4	2100	34925	0.1	4.9	62.0	62.8
233	4	2225	34975	0.0	3.8	90.8	81.9
234	4	2500	34900	0.0	3.6	64.1	80.8
235	4	1125	34775	0.0	14.3	51.1	74.0
236	4	1150	34675	0.0	15.5	60.0	70.8
237	4	1750	34775	0.0	17.2	62.6	73.2
238	4	2375	34700	0.0	9.8	79.2	91.3
239	4	775	34500	0.1	18.1	66.9	185.8
240	4	625	34300	0.0	4.3	65.0	70.9
241	4	2775	34450	0.0	1.8	90.1	93.3
242	4	2900	34325	0.2	5.9	89.0	87.2
243	4	2925	34175	0.2	3.7	65.6	75.2
244	4	2475	34100	0.0	9.9	70.9	83.9
245	4	2675	34100	0.5	6.2	79.6	79.4
246	4	775	34025	0.1	27.2	67.9	76.1
247	4	600	33975	0.0	28.0	60.7	107.8
248	4	800	33825	0.0	19.6	58.7	72.4
249	4	650	33575	0.0	17.8	56.9	63.3
250	4	325	33525	0.1	18.5	59.7	82.0

SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
251	4	575	33500	0.0	6.4	50.4	52.3
252	4	350	33225	0.2	47.1	45.6	86.8
253	4	50	33325	0.1	0.1	49.0	62.8
254	4	75	33175	0.0	11.7	50.4	47.2
255	4	100	33025	0.2	25.7	60.7	76.4
256	4	2000	33850	0.0	11.1	48.8	64.1
257	4	1975	33625	0.0	13.0	45.8	50.3
258	4	2150	33550	0.1	21.1	64.2	191.3
259	4	2075	33225	0.0	9.8	55.2	86.7
260	4	2325	33250	0.1	25.6	63.3	227.6
261	4	2075	32975	0.1	20.2	58.1	67.3
262	4	2250	32875	0.0	11.5	48.6	80.6
263	4	4175	33800	0.0	9.7	59.9	81.6
264	4	4100	33700	0.0	4.5	61.4	69.3
265	4	4750	33700	0.0	11.2	54.5	81.1
266	7	4775	33500	0.0	10.2	51.7	92.8
267	4	3725	33475	0.2	8.6	94.1	93.3
268	4	3700	33325	0.5	7.9	106.4	104.7
269	4	4125	32900	0.1	8.2	65.1	62.8
270	4	4250	32700	0.0	6.3	51.3	77.6
271	7	4550	32600	0.0	7.1	46.8	75.9
272	7	4825	32450	0.2	7.2	98.3	99.9
273	4	1825	37575	0.0	8.3	55.2	65.7
274	4	2100	37050	0.0	12.1	56.7	71.7
275	4	1375	36875	0.0	4.0	75.9	70.0
276	5	1375	36625	0.1	0.1	51.6	66.8
277	6	17050	29225	0.0	7.3	64.4	80.3
278	1	4200	29150	0.0	15.5	72.5	75.3
279	8	21725	29225	0.1	0.1	52.1	55.0
280	7	4350	31950	0.0	4.8	53.6	70.6
281	7	4425	31775	0.2	8.3	43.1	138.3
282	2	325	30250	0.4	46.9	59.7	160.3
283	2	425	30325	0.3	57.0	59.3	194.4
284	2	725	30100	0.1	21.4	26.3	88.9
285	1	3500	29500	0.2	44.6	48.3	134.0
286	4	2575	30875	0.1	11.1	49.6	86.8
287	4	2400	30775	0.2	50.7	52.4	194.6
288	4	2075	30900	0.1	40.1	48.3	220.3
289	4	2375	31150	0.1	9.5	53.6	98.6
290	4	2500	31125	0.0	9.7	61.2	106.1
291	1	2050	30750	0.2	58.9	62.7	192.1
292	1	2525	30725	0.1	31.5	65.5	174.4
293	1	2800	30750	0.0	0.1	56.4	129.7
294	4	3150	30850	0.0	7.4	50.3	88.6
295	4	3300	30875	0.0	6.6	53.6	85.5
296	1	3625	30550	0.0	18.6	51.5	129.1
297	1	3800	30425	0.0	23.2	42.9	141.6
298	1	4125	30575	0.0	20.3	54.2	126.9
299	1	4200	30125	0.0	6.1	47.9	48.0
300	7	4850	30500	0.0	9.1	45.6	130.9

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SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
301	7	4700	30425	0.1	4.5	38.6	70.4
302	1	4750	30225	0.0	7.1	34.3	112.7
303	5	5950	34725	0.1	2.4	52.5	57.2
304	4	5950	34575	0.0	5.1	48.3	68.7
305	5	6075	34275	0.0	4.9	51.2	86.7
306	4	6175	34125	0.1	9.5	56.4	69.4
307	5	6625	34400	0.0	8.0	58.4	77.3
308	5	6725	34475	0.0	5.8	46.9	72.8
309	5	7425	34700	0.0	7.4	51.0	78.9
310	5	8875	34500	0.1	2.6	30.5	34.6
311	8	9800	34000	0.4	36.8	52.9	82.0
312	4	5150	33825	0.1	3.9	55.5	80.6
313	4	5100	33700	0.1	1.7	45.0	58.5
314	7	5175	33650	0.0	8.5	51.1	78.1
315	4	5625	33800	0.0	7.7	60.5	73.9
316	5	6750	33625	0.1	5.4	47.8	58.7
317	5	6875	33175	0.0	10.7	63.2	101.9
318	5	7925	33475	0.0	0.9	35.8	44.8
319	1	1250	29300	0.0	0.1	71.4	114.3
320	4	2500	34750	0.2	4.0	75.1	74.1
321	5	8225	33675	0.1	3.5	33.6	45.5
322	5	6725	32600	0.0	13.6	58.3	80.2
323	5	6750	32475	0.0	12.2	63.5	117.3
324	5	7425	32750	0.0	21.3	60.5	176.1
325	5	7475	32200	0.0	7.9	48.1	56.9
326	5	9700	32825	0.0	4.8	46.0	66.8
327	5	9750	32650	0.0	4.8	44.6	52.8
328	7	5050	32075	0.0	4.1	57.1	71.6
329	7	5250	31900	0.3	3.2	53.5	79.5
330	7	5425	31950	0.0	6.9	89.3	91.5
331	7	5350	31750	0.0	1.2	43.1	71.7
332	7	5500	31825	0.1	10.1	50.6	74.9
333	7	5500	31600	0.1	1.4	55.8	97.4
334	7	5750	31525	0.1	6.3	54.8	88.6
335	5	7350	31975	0.0	8.4	44.7	57.6
336	7	7275	31825	0.1	13.0	50.5	136.0
337	2	1550	30650	0.5	46.4	70.4	214.5
338	8	16725	15575	0.0	17.0	58.3	87.5
339	7	5600	30750	0.1	2.4	50.6	82.1
340	7	5550	30675	0.0	3.0	60.4	87.1
341	7	6000	30625	0.1	2.5	51.3	76.4
342	7	6275	30675	0.0	73.8	56.7	116.8
343	7	6500	30825	0.1	3.1	50.5	81.5
344	7	6125	31225	0.0	5.7	46.8	86.1
345	7	6875	31075	0.0	6.4	54.8	83.5
346	7	7225	30775	0.0	0.1	53.1	64.3
347	7	7250	30625	0.2	12.3	59.6	112.2
348	7	5425	30150	0.1	12.1	44.7	123.9
349	7	5750	30125	0.7	46.6	44.7	391.0
350	1	7825	30025	0.1	1.5	44.6	70.3

SAMPLE NO.	ROCK CODE	COORDINATE X	COORDINATE Y	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)
351	1	8500	30225	0.0	43.2	63.7	114.1
352	1	8750	30275	0.0	6.5	39.5	44.4
353	5	9275	30400	0.0	9.8	42.5	59.3
354	1	9675	30325	0.1	8.6	46.2	61.7
355	5	9975	30700	0.2	2.7	33.4	48.4
356	8	11325	33725	0.2	2.5	27.3	33.9
357	8	11650	33650	0.3	3.3	30.5	22.4
358	6	12225	33400	0.2	5.8	43.2	46.9
359	6	12175	33250	0.2	5.2	34.8	35.8
360	6	12525	33625	0.2	9.3	43.4	63.5
361	6	12900	33525	0.2	9.4	45.5	63.6
362	5	13600	34025	0.2	9.3	41.1	51.8
363	5	13675	33975	0.1	15.1	52.3	80.1
364	5	13525	33450	0.3	8.0	40.9	56.9
365	5	13525	33350	0.3	5.3	44.3	86.4
366	5	13900	33425	0.3	5.3	42.1	87.4
367	5	13950	33300	0.4	5.8	45.4	83.0
368	5	9925	32825	0.2	2.6	34.0	55.0
369	5	10025	32025	0.1	6.2	35.7	55.5
370	8	10750	31275	0.2	4.9	27.0	36.8
371	6	12400	32250	0.3	3.4	46.0	52.8
372	6	12250	31625	0.4	5.9	42.8	57.3
373	6	12775	31750	0.0	27.5	42.6	116.7
374	8	12450	31150	0.1	28.7	48.2	63.8
375	6	13450	31375	0.2	4.3	42.9	57.7
376	6	13975	31200	0.2	4.0	33.8	31.4
377	6	14425	31525	0.2	25.4	49.1	70.6
378	6	14500	31625	0.2	18.0	44.7	65.1
379	6	14625	31550	0.0	27.1	64.7	108.8
380	6	14750	31825	0.1	23.4	51.8	67.6
381	6	14850	31950	0.2	20.7	48.3	76.5
382	6	14925	31525	0.3	19.1	54.9	61.1
383	8	13425	30625	0.0	42.2	52.6	58.7
384	8	14725	30050	0.2	8.8	65.4	118.1
385	6	16650	34950	0.3	1.0	36.6	52.9
386	5	15900	34300	0.2	2.3	48.7	94.1
387	5	15850	34175	0.2	2.1	45.5	73.6
388	6	16550	34475	0.4	3.5	51.1	101.2
389	6	17075	34700	0.2	5.6	48.4	76.0
390	6	17250	34625	0.6	40.6	77.5	93.5
391	6	16350	34000	0.2	4.2	38.4	54.4
392	5	16375	33775	0.2	2.8	52.5	79.5
393	8	17875	33950	0.1	33.1	47.6	61.2
394	8	18000	33850	0.1	15.8	42.2	83.6
395	8	19200	33725	0.3	13.7	46.6	72.1
396	5	15850	33375	0.2	2.7	47.1	94.9
397	5	15925	33250	0.1	25.6	62.2	134.2
398	5	15075	32650	0.2	10.9	34.7	58.8
399	5	15175	32625	0.2	9.4	37.5	84.2
400	5	15550	32300	0.2	10.6	47.9	59.3