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Kinnison

Table Top Region
Geological Reconnaissance Mapping
Pinal County, Arizona

Air Mail

October 30, 1964

Mr. J. H. Courtright
American Smelting & Refining Company
Pinal County, Arizona

Table Top Region
Pinal County, Arizona

Dear Sir:

This will acknowledge receipt of Mr. Sell's report and your covering letter of October 22.

This is a very professional piece of work and Mr. Sell is to be complimented. I am sure that his field observations will be very helpful in regard to some of the geological problems at Sacaton and Santa Cruz. Also, this information should be particularly useful as you carry geologic reconnaissance farther to the west and southwest.

The alteration zone which Mr. Sell found in the north Vaiva Hills is largely surrounded by post mineral cover rocks. In this circumstance, I am wondering if you are planning any recommendations or other work such as geophysics or drilling. As I recall, sometime ago, Mr. Beck picked up a molybdenum anomaly along the southwest side of the Santa Cruz valley. Is this near the alteration zone picked up by Mr. Sell.

Yours very truly,

Kenyon Richard

CC-RJLacy
WESaegart
JRWojcik
DBBeck
KEKinnison
JDSell

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona
October 22, 1964

Mr. K. E. Richard, Chief Geologist
American Smelting and Refining Company
120 Broadway
New York, N. Y. 10005

TABLE TOP REGION
PINAL COUNTY, ARIZONA

Dear Sir:

This transmits Mr. Sell's report with maps on the Table Top Region, lying across the Santa Cruz Valley, about 25 miles southwest of the Sacaton prospect.

This work was undertaken by Mr. Sell as part of the field investigation of the region surrounding the Sacaton prospect. The purpose of this work was to search for clues to the Basement fault and also, clues to any additional zones of porphyry copper mineralization that might be present in the district.

Mr. Sell's report and maps represent the results of a careful and thorough geologic study. Among the more important findings of this study are: 1) a strong shear zone in the hills north of Table Top, which may represent the west-southwest continuation of the structure bounding the northwest side of the Sacaton zone of mineralization, and 2) a zone of alteration and mineralization in granite, partly isolated by alluvium, on the southwest side of the Santa Cruz Valley.

Yours very truly,

Original signed by
J. H. Courtright

J. H. COURTRIGHT

JHC/jk
Encl.
cc: RJLacy, w/encl.
WESaegart, "
JRWojcik, "
DBBeck, "
JEKinnison, "
JDSell, "

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona
September 8, 1964

Mr. J. H. Courtright, Chief Geologist
American Smelting and Refining Company
Southwestern Exploration Department
Tucson, Arizona 85701

Table Top Region
Geological Reconnaissance Mapping
Pinal County, Arizona

Dear Sir:

Following is my report on the subject area:

SUMMARY AND CONCLUSIONS

Reconnaissance geological mapping of the Table Top region was undertaken as part of the continued study of the area surrounding the Sacaton deposit. Information on the location of possible extensions or faulted segments of the Sacaton deposit and direction of major fault movements was the primary objective of the study. Also, the determination of the stratigraphic sequence and history of deposition of the various rock units was essential for continued reconnaissance westward. The objectives have been resolved and the various features are described in the main body of the report.

An outcropping of weakly altered Precambrian granite was found in the Vaiva Hills southeast of Table Top. Geochemical sample results show only low copper-molybdenum values. The limit of the altered zone is only known on the south, where an east-west trending fringe zone is found; thus the outcrop could be a part of an extensive zone covered by post-mineral volcanics and valley alluvium.

Elsewhere, several other areas contain iron and copper values along shears but they are not of sufficient size or value for Company interest.

A major and significant fault is found on the north side of the Table Top area. The fault trends N75°E and is along the projection of a similar fault which limits the mineralization on the north side of the Sacaton deposit. At Table Top, as at the Sacaton deposit, the fault separates Laramide (Coolidge) granite on the north from Precambrian granite (and quartz monzonite in the ore zone) on the south.

Post-ore sedimentation is recorded in a very thick sequence of conglomerates. Imbrication of the pebbles suggest that the source area lies to the southwest of Table Top. Various intrusive and volcanic porphyry fragments are found in the conglomerate but no altered or mineralized fragments were noted. Complex involvement of sedimentary deposition and volcanic activity during Tertiary-Quaternary time has been deciphered for the Table Top region.

James D Sell
JAMES D. SELL

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INTRODUCTION

Geologic mapping in the Table Top Mountain region, western Pinal County, was started January 1, 1964, and completed on June 1, 1964. Mapping was recorded directly on the 15-minute topographic quadrangle sheets at a scale of approximately one inch equals one mile. Mapping has been on the south half of the Antelope Peak Sheet, north third of the Vekol Mountains sheet, and small amount in the common corner of the Casa Grande and Silver Reef Mountains sheets to the east of the first two sheets.

Mapping is complete in the Table Top Mountains and surrounding foothills with coverage starting four miles north of U.S. 84 (Casa Grande-Gila Bend Highway) and continuing southward to the north side of the El Paso Natural Gas Line Road (Casa Grande-Ajo) and with only the northern part of the Vaiva Hills being included. This is approximately 16 miles north-south by 12 miles east-west.

The discussion given in this report includes initial outcrop exposure control on the rock units, mineralization, and structure. Attachment A is the completed geologic map on a topographic base, while Figure 1 shows the quadrangle outlines and approximate mapped geological coverage. Attachments B and C are cross-sections across and through the range. Attachment D contains sketch sections showing salient features of the Tertiary formations.

DESCRIPTIVE GEOLOGY

Reconnaissance mapping of the Table Top Mountain region is recorded on Attachment A while Attachment B contains four cross-sections through the area. Cross-sections through a thick sequence of Tertiary conglomerates are shown on Attachment C. Sketch sections on Attachment D show the sequence of various Tertiary formations.

The Table Top region is dominantly underlain by Older Precambrian granite and schist. The schist is the oldest formation with the original material being sandy and arkosic material. A massive quartzite unit is also present. Separated from the schist is a small body of gneiss with features suggesting that the original material was a granitic rock.

Following the transformation of the original rocks into schist and gneiss, the region was invaded by a vast amount of granite. The granite has been separated into a fine-grained and a coarse-grained variety. The coarse-grained variety is the older and exhibits textural as well as mineral constituent variations.

The land form was beveled by erosion prior to the deposition of the Younger Precambrian Apache Group. In the Table Top region the Apache Group is represented by Scanlan Conglomerate, Pioneer Shale, Barnes Conglomerate and Dripping Spring Quartzite. Mescal Limestone was undoubtably deposited in the area, based on the amount and type found in the nearby Slate and Vekol Mountain ranges, but was completely stripped prior to the deposition of the Troy Quartzite during late Precambrian time.

Cambrian sedimentation is represented by the Bolsa Quartzite and Abrigo Formation. Both are poorly represented in the region and reflects unstable deposition-erosion conditions during this period. Only the Devonian Martin Limestone remains from what probably was extensive Paleozoic marine sedimentation in the region.

Although crustal unrest is evident--igneous intrusive activity during Laramide or early Tertiary time was minor in the main Table Top area. Only small bodies and dikes of granite and other intrusive rocks are present wouth of a major fault structure. This intense shear zone, on the north side of the mapped area, separates Laramide granite, on the north, from Precambrian granite on the south.

During middle (?) Tertiary time the entire area was covered by a thick sequence of conglomeritic sediments set in a tuffaceous matrix. The sediments were derived from an eroding land mass southwest of the area. Fragments of Precambrian and Paleozoic rocks predominate but various Laramide (?) granitic and volcanic porphyry fragments are also incorporated in the sediments. The record shows a complex involvement of sedimentation, vulcanism, and tectonics during late Tertiary time.

The Quaternary has been a time of deep erosion of the former deposits with the exhuming of the Table Top region from its cover of Tertiary units with the subsequent continued filling of the valley basins.

MINERALIZATION AND ALTERATION

North Vaiva Hills

In the middle part of the eastern half of Section 7 (T8S, R4E) is a small outcrop of weakly altered granite (See Porphyry Note File - Vaiva Hills). The importance of this area by itself is insignificant except that it does show an east-west trend to the south edge of the altered portion. Cover to the east, north, and west prevents knowing how far, if any at all, the altered area extends in those directions. Five samples were taken in the area and geochemically analyzed for copper and molybdenum by the ASARCO geochemical research laboratory in Salt Lake City. The results of the one sample in unaltered granite were 25 ppm copper and zero molybdenum, whereas the samples in the altered rock ranged from 12 to 50 ppm copper and zero to four ppm molybdenum. The geology and geochemical results are shown in Figure 2.

Northwest Table Top

Northeast-trending Shear Zone -- This zone is also discussed under **STRUCTURE**. The zone contains scattered hematite and specularite along shear planes and contorted schistosity. This trend is not well defined but does contain numerous hematite shears which trend to the northeast. Intense alteration was not found within the mapped portion. A note of interest is that the only copper occurrence within this northeast trend is found along the projection of the northwest fault which is discussed under Ramrod. However, the dominant trend in the exposed mineralized showings is to the northeast parallel to the mapped crumpled schistosity.

Within the enclosed shear zone, as well as some outside, are numerous reddish-brown "alteration" patches. There is a visual impression that the alteration patches may trend northwesterly or normal to the shear zone direction. This is suggested by the inferred alignment of several "belts" of isolated patches of the reddish-brown alteration; however, the irregular form of the patches and the inferred alignment contain no structural feature suggesting that the alteration patches could be connected in a northwest trend direction.

Ramrod -- An area of iron-manganese-copper mineralization, mainly centered around the north half of Section 4 (T8S, R2E), is found in an alluvial filled drainage northwest of Table Top Mountain. The copper occurs as the silicate and is found as coatings along shears, slips, joints, and small faults. An apparent random nature in the dominant trend of the thickest copper occurrence is shown on the geologic map (Attachment A) by short red lines. In several exposures minor iron and manganese oxides are associated with the copper. The iron appears to be hematite and specularite with few pseudomorphs after pyrite or other sulfides.

In the ASARCO files the area is known as the Ramrod Claims or Hoff Property (See file Aa-16A.13.18). No work at depth has apparently been accomplished since the writing of the examination report on the property in 1917. Subsequent work has been shallow pitting and road building using a bulldozer.

The area is not particularly altered and shows only a slight reddish-brown coloration in the areas of the iron-copper shows. Questionable sericite was noted along a few of the more intensely mineralized shears.

On the large hill, in the west half of Section 8 and west of the copper shows, the mapped crumpled schistosity strikes in the northeast quadrant and dips steeply either to the north or south. To the east of the copper shows, in the NE$\frac{1}{4}$, Section 4, the crumpled schistosity strikes in the same direction but in general dips much flatter, ranging from 20 to 45°, to the southeast. The cause of the rather sudden and noticeable flattening of the dip is in question at this time. However, the impression is that a fault may trend northwestward down the drainage between the two schist masses. Projection of such a trend would nearly pass through the large fault which was mapped on the west flank of Antelope Peak, and passes through the area of copper occurrence within the northeast-trending shear zone discussed in the STRUCTURE section of this report.

ROCK UNITS - PRE ORE

Older Precambrian

Schist (map symbol: sch) -- Schist typical of the Pinal Schist, as known and found throughout southern and central Arizona, occupies the central portion of the Table Top Mountains. It is generally brownish-green in color and has a schistosity trending northwesterly except where cut by intense shear zones. Foliation ranges from shistose to phyllitic with minor gneissic texture. The schist is generally composed of sandy to arkosic fine-grained material, although a more massive quartzitic "member" has been observed. The schist has not been subdivided into various members during this mapping but it should be noted that distinctive features are present which would be useful in more detailed work.

The schist is bounded on the northwest and the southeast by Precambrian granite. The granite either exhibits a sharp edge, apparently vertical contact, or a flat intrusive roof contact with numerous roof pendants of schist and granite gneiss.

Granite gneiss (map symbol: gn) -- A gneissic rock suggestive of being formed from a granitic rock has been separated from the typical schist as noted above. Critical exposures of this unit and the contact with the schist and

Precambrian granite are found in the southern half of Section 32 (T7S, R3E). The stretched granitic gneiss has a salt and pepper appearance. The gneissic structure trends northeast with a steep dip to the northwest.

Coarse-grained granite (map symbol: gr) -- This unit occurs throughout the northern foothills of Table Top Mountain and is well exposed on Antelope Peak. It also crops out extensively in the small hills southeast of Table Top. Coloration ranges from light pinkish gray to reddish with medium to very coarse texture. It is characterized by large, ½ to 1½ inch, orthoclase crystals. The mica is predominantly biotite which occurs as crushed, crumpled and smeared masses, rather than in books. Variations in the granite will be discussed under **PROBLEMS**.

Fine-grained granite (map symbol: f. gr) -- A tight, even textured, fine-grained granite separates the coarse-grained granite from the schist-gneiss in Section 32 (T7S, R3E) and Section 5 (T8S, R3E). Both of the granites intrude the schist-gneiss complex. The fine-grained granite shows a chilled border contact also is in fault contact with the coarse granite in the NW¼, Section 5.

Aplites, Microgranites, and Quartz Pegmatites -- Noted, but not mapped, are numerous stringers, small masses, etc. of aplites, microgranites and quartz pegmatites. They occur mainly in the area of the fine-grained granite outcrops. Such masses cut all the Older Precambrian rocks and are probably late stage features of the fine-grained granite. An extra large, conspicuous quartz pegmatite (paralleling schistosity) was mapped within the schist near the center of Section 31 (T7S, R3E).

Younger Precambrian

All the younger Precambrian units have been designated by the symbol Au on the colored geologic map of Attachment A. However, all the units have been mapped separately, where possible, on the field sheets.

In the northern part of the Vaiva Hills is an interesting, small exposure. It is found in the gully extending SW from the NE corner of Section 18 (T8S, R3E). Here an exposure shows good coarse-grained granite overlain by a layer of white quartz cobbles. An impression is gained that the granite intrudes this cobble layer, yet under the hand lens, some cobbles appear to be set in a matrix of eroded feldspar crystals. The cobble layer is in turn truncated by a thin (one inch) basic rock pebble layer and in turn is overlain by typical Scanlan Conglomerate and Pioneer Shale. The Scanlan Conglomerate beds lie with angular unconformity on the basic pebble layer. Elsewhere, as at the small hills in the center of Section 12 (T8S, R3E), the quartz cobbles are found as erosional debris covering the slopes, but no outcrops were noted.

Scanlan Conglomerate -- Pebble conglomerate beds, assigned to the Scanlan Conglomerate, lie conformably beneath the Pioneer Shale. Where observed the unit is generally less than three feet thick before grading upward into typical Pioneer. An exceptional thickness is in the SW¼, Section 1 (T9S, R2E) where it attains a thickness of ten or more feet and contains granitic fragments.

Pioneer Shale -- Maroon siltstone, and mudstone, containing cream-colored spots typical of the Pioneer Shale, crop out extensively at the base of the Apache Group sediments. Beneath the volcanic cap of Table Top Mountain the Pioneer Shale basal units (with or without a thin Scanlan Conglomerate unit) rest on Pinal Schist whereas in all other exposures they rest upon a surface cut on granite.

Barnes Conglomerate -- Fragments of typical Barnes are found in the drainages, but rarely are they found in outcrop. The best exposures are found in Section 15 (T8S, R3E) where the unit obtains a thickness of 8 to 10 feet. In the low rolling hills the Pioneer-Barnes-Dripping Spring contact is obscured by heavy rubble from the Dripping Spring.

Dripping Spring Quartzite -- Massive beds of cream to light orange quartzite and siltstone of the Dripping Spring crop out between the Vaiva Hills and Table Top Mountain. It is by far the thickest unit within the Apache Group and may approach 1000 feet in thickness.

Mescal Limestone -- No Mescal has been found during the present mapping. Mescal is known in the Vekol Mountains to the south and the northern Slate Mountains to the southeast. Erosion has apparently stripped the Mescal and an unknown amount of Dripping Spring piror to deposition of the Troy Quartzite.

Troy Quartzite -- A thick (600+ feet) sequence of yellow-buff quartzite beds, resembling the upper Troy unit at Superior, Arizona, is found between typical Dripping Spring Quartzite and typical sandy limey Cambrian beds. The only exposures of this unit are found in the SW$\frac{1}{4}$, Section 22 (T8S, R3E). Quartzite beds containing quartz granules and interstitial feldspar are abundant in the outcrop.

Diabase -- Diabase masses are found in the Apache Group outcrop areas but exposures are generally small. Only two areas were large enough to be shown on Attachment A; one is just east of Little Table Top Mountain, Sections 26-27 (T8S, R2E) and the other near the Gas Line Road in Section 2 (T9S, R2E). The diabase generally favors the Dripping Spring and Pioneer Shale horizons as planes of intrusive weakness.

Paleozoic

Paleozoic rocks (map symbol: Pal) crop out only southeast of Table Top. The largest outcrop area has undergone intense faulting with the resultant formation of complicated structures. However, the pattern as shown on Attachment A depicts the general features.

Bolsa Quartzite and Abrigo Limestone -- Outcrop exposures of these units are confined to low hilly areas on dip slopes on some of the large hills. Typical sandy Bolsa type quartzite, ranging in color from cream to reddish, grades rapidly into the sandy limey beds characteristic of the Abrigo Limestone. However, the Cambrian sequence is never extensively exposed and good sections of either unit were not found. Beds of typical Abrigo Limestone (showing intraformation conglomerate) are isolated in the latite masses found in the center of Section 11 (T9S, R2E). The Cambrian section in this area is not as thick as in the Vekol and Slate Mountain area, and may be the result of non-deposition or erosion prior to the Martin Limestone.

Martin Limestone -- Good exposures of medium-bedded, fossiliferous, medium-gray limestones, typical of the Martin, form most of the Paleozoic outcrops in the area. Limestone flow structures are common making generalized dip and strike measurements a necessity.

Escabrosa Limestone -- Massive light-gray beds were found in several places. In one they cap a small hill and lie conformably on typical Martin exposures. No fossils were noted in the outcrops to definitely identify the exposures as Escabrosa, but on visual characteristics they were mapped as Escabrosa in the field.

Naco Limestone -- No beds or units resembling the limey-shaley, thin bedded units of the Naco Limestone were noted in the Paleozoic outcrop area.

Mesozoic

Cretaceous(?) conglomerate -- No Cretaceous conglomerate, or other units referrable to the Cretaceous, were found outcropping in the area. However, large boulders (2-3 feet in diameter) of Cretaceous-type conglomerate are found incorporated in the sediments mapped as Tertiary pebble conglomerates (Ts). To the south, in the Vekol Mountains, thick sequences of the same appearing Cretaceous(?) conglomerate are known and the erosion boulders may be derived from those, or similar, outcrops.

Laramide

Laramide granite (map symbol: Lgr) -- The isolated hill in the north center of Section 23 (T7S, R2E) is composed of granite. The granite is medium-grained, even-textured, white to light gray in color, and contains abundant books of muscovite, rarely biotite, and with few large feldspar crystals. It is referred to the Laramide, although the only contact noted was with Pinal Schist in the large wash south of the main hill (SW$\frac{1}{4}$, Section 23, T7S, R2E).

North of the Casa Grande-Gila Bend Highway and cutting diagonally across Sections 28 and 29 (T6S, R2E) is a well-defined biotite-rich shear zone. Precambrian granite is found south of the zone whereas Laramide granite is found north of the zone. The Laramide granite is megascopically similar to parts of the Coolidge Granite of the Sacaton area and Blackwater district mapped by Blucher, Kinnison and Beck. Several exposures of the Coolidge Granite, surrounded by alluvium, are found to the east and northeast of the main mountain mass.

Andesite (map symbol: La) and Latite (map symbol: Ll) -- Andesite and Latite masses are found in the southern part of the mapped area. The andesite occupies a rather large dike structure in Section 26 (T8S, R2E) which trends to the northwest. It widens somewhat at the southern end.

Further south, in Sections 11 and 12, and extending northward through Section 2 (all in T9S, R2E) are numerous outcrops of latite. One mass persistently acts as a sill structure within the Pioneer Shale. Another mass contains engulfed limestone beds containing intraformational conglomerates typical of the Abrigo Limestone.

The direct ages of the large andesite and latite masses are unknown from the area mapped. However, they undoubtedly belong to the Laramide or early Tertiary intrusive activity.

Diorite (map symbol: Ld) -- The diorite mass surrounded by Laramide granite in Sections 1 and 2 (T6S, R2E) is pre-Laramide granite in age as shown by the biotite-rich borders and gradational features in the granite, but the older limit is not decipherable.

ROCK UNITS - POST ORE

Tertiary

Pebble Conglomerate (map symbol: Ts) -- Faulted deformed and well sorted pebble conglomerate beds with interbedded water-lain biotite tuff beds and lenses occur throughout the mapped area. The conglomerate generally has a tuffaceous matrix and contains fragments of Precambrian granites, schist, Apache Group and Paleozoic sediments, Cretaceous conglomerates, various Laramide(?) granites, latites, and volcanic porphyries. It is cut by a dacitic dike in the outcrop exposure in the NE$\frac{1}{4}$, Section 29 (T7S, R3E). The beds generally strike north to northwesterly and dip 10 to 45 degrees to the west or southwest. Observations of the imbrications of the pebble layers suggest, in all exposures, that the source area lies to the southwest. Excellent exposures are found in the cliff areas under the Tertiary volcanic flows in the higher mountains but good outcrops also are found in Sections 29, 30 (T7S, R3E) and Section 25 (T7S, R2E). The large outcrop pattern in Section 30 (T7S, R3E) has a stratigraphic thickness, assuming no fault repetitions, of over 2500 feet of sediments.

A variation of the conglomerate unit occurs beneath the volcanics on Little Table Top Mountain (Section 27, T8S, R2E). Here the beds are a reddish andesitic cinder deposit containing a twenty-foot thick bed of white pumice. The beds appear to be water-lain, and the matrix of the andesitic cinder-pumice contains volcanic porphyry fragments and some sedimentary fragments. No fragments of the overlying red-speckled andesite or basalt were noted. In this exposure, the evident pre-basalt age coupled with depositional features and pebble alignment suggests correlation of this cinder-pumice unit with the typical pebble conglomerate.

Additional discussion of the pebble conglomerate units will be found in the section on PROBLEMS.

Extrusive Vent (map symbol: Ti) -- A complex or multiple volcanic vent lies at the center of the common section line between Section 24 (T7S, R2E) and Section 19 (T7S, R3E). Within the vent are steep dipping flow features and complex masses of red-speckled andesite, red and black ropy lava, hornblende andesite and dark andesitic basalt. The fault zone filled with rubble of scoria-agglomerate (mentioned under Scoria-agglomerate) is undoubtedly connected with this vent. The dikes of andesite, dacite, and andesite porphyry may all be related to this general period of igneous activity.

Older Volcanics (map symbol: Tov) -- The older sequence of Tertiary vulcanism has been deciphered from scattered outcrops throughout the area. Basically the older sequence can be divided into three units -- red-speckled andesite, scoria-agglomerate, and dacite tuff. Attachment D contains sketch sections showing the relationship of the units.

Red-speckled andesite -- Flaggy, purplish-gray andesite containing abundant, 1/8 inch ±, brownish-red specks (iddingsite alteration of olivine?) overlies the pebble conglomerate (Ts) and has baked the sediments beneath the flow. The andesite in places contains small gas holes and bubbles but rarely are they prominent. The best continuous exposure is on the west face of Double Peaks (West Hill) in NW$\frac{1}{4}$, Section 7 (T8S, R4E). Interbedded with the andesite are numerous lava-scoria beds and scoria-agglomerate beds, some showing a highly oxidized coloration. The red-speckled andesite is very magnetic.

Scoria-agglomerate -- A thick sequence of lava scoria, cinders, and agglomerate beds overlie the red-speckled andesite. These beds range in color from purple-gray to orange to orange-red to purple-red to black. Some individual rubble flows have oxidized tops. This unit contains numerous interbeds of the flaggy, red-speckled andesite, which suggests that vulcanism of the andesite and scoria was a continuous, overlapping event. Excellent exposures of the andesite and scoria-agglomerate are found on the west side of Double Peaks (West Hill) and also on the north side of Double Peaks (East Hill) in the south-center of Section 6 (T8S, R4E). The scoria-agglomerate sequence, with small interbeds of andesite, grades upward into an overlying dacite tuff unit. The sequence is well exposed on the west side of the small isolated hill in the center of Section 6 (T8S, R4E) and on the north side of Double Peaks (East Hill). Note sketch sections (d) and (e) of Attachment D.

In the pebble conglomerate (Ts) exposure in the SE$\frac{1}{4}$, Section 24 (T7S, R2E) is a fault zone filled with scoria-agglomerate. The pebble beds have been offset across the fault and have been baked near the contact of the scoria-agglomerate. At the top of the conglomerate layer, the scoria-agglomerate has broken through the overlying red-speckled andesite and has engulfed and incorporated large block of the andesite as the scoria rubble flowed over the land surface. See sketch section (c) of Attachment D.

Dacite tuff -- Overlying the dark to oxidized colored scoria-agglomerate are water-lain beds of dacite and dacitic tuff. The best exposure is at the small isolated hill in the center of Section 6 (T8S, R4E). The dacite units are generally yellowish to yellow-gray, fine-textured and contain pebbles and boulders of ropy to very scoriaceous red and black lava.

Younger Volcanics -- Basalt (map symbol: Tb) -- In flow contact above the dacitic tuff unit of the Older Volcanics, and also found in isolated erosional remnants of flows, is a dark glassy basalt and dark andesitic basalt. The basalt units lie unconformably on the older units indicating that some tilting took place between the time the older and younger volcanics were extruded. The basalts have been tilted and dissected by erosion and thus are placed in the Tertiary rather than the Quaternary.

The best exposure of the basalt units is found above the dacite units in Section 6 (T8S, R4E).

A rhyolite ignimbrite crops out in Sections 19 and 30 (T6S, R2E) and covers both Laramide granite and questionable Tertiary pebble conglomerate. The rhyolite is probably younger than the basalt but no definite clues are furnished in the Table Top area. On Attachment A, the rhyolites have been placed under the Tb symbol.

Quaternary (?)

Fossilferous Sediments (map symbol: Qfs) -- In the NE$\frac{1}{4}$, Section 24 (T7S, R2E) and north of the extrusive vent complex, is a remnant series of sandy, tuffaceous, fine-grained sandstones and conglomerates. Interbedded with the sandstone are marine limestones containing abundant invertebrate fossil remains. The only fossil specimen collected was sent to the University of Arizona where Dr. Don Bryant tentatively identified it as belonging to the Class Crinoidea. The specimen is now being circulated for positive identification. Even if the stratigraphic-time position of the crinoid cannot be pinpointed it is of some interest to note that these beds probably represent the farthest northeast extension of the seas from the Gulf of Lower California during Tertiary-Quaternary time. The sediments are cut by small caliche-filled faults and joints, and appear to have been covered by the caliche-cemented sediment (Qs) described below. The areal outcrop exposure apparently occupied a small basin formed after the uplift and tilting of the Table Top area. The present bedding has a flat to slight dip. The outcrop is being dissected by present drainage.

Quaternary

Caliche-cemented sediments (map symbol: Qs) -- Extensive deposits mapped as caliche-cemented sediment occur in the area. It is rubble-type material showing layering but poor sorting which generally reflects near source material. The caliche-cemented sediments are not noticeably cut by faults, joints, or slips but contain fragments of vesicular volcanics and red-speckled andesite volcanics. The sediment truncates a dacite dike (mentioned under Pebble Conglomerate) and is generally composed of quite coarse material except where it is composed of reworked and redeposited material from the Pebble Conglomerate.

The major geomorphic feature of this material reflects alluvial fan deposits which has been elevated and slightly tilted. Generally the source area is nearby and from the main mountain mass as suggested by the imbrication features of the pebble layers, the shape of the fans and the angularity of the material. Some of the better exposures are found all along the southern edge of the large fan, starting at the center of Section 21 (T7S, R3E) and extending southwestward to the schist. Good exposures are also found in the deep wash, on the north side of the fan, in the extreme southwest corner of Section 19 (T7S, R2E); as well as at the south quarter-center of Section 9 (T8S, R3E), and NW$\frac{1}{4}$, Section 16 (T8S, R3E). In the later deposits the material is much finer grained and closely resembles the pebble conglomerate. However, they contain abundant Tertiary basalt type volcanics and are cemented by caliche.

Volcanic talus material (map symbol: Qvt) -- This unit forms on elevated slopes and hillsides and includes talus trains as well as debris from erosion of volcanic terrain. As mapped, this unit may contain some volcanic units (scoria-aggomerate, andesite breccia) which appear to have been deposited on steep slopes. One such exposure is found in the SE$\frac{1}{4}$, Section 24 (T7S, R2E). This unit merges with and continues as "Qar" on lower slopes where alluvial material becomes prominent.

Alluvial Pebble Material (map symbol: Qar) -- This unit is generally made of coarse material ranging from pebbles to large boulders with interstitial coarse sand. It is reworked material which may be sorted but more often has the "dumped" or rubble appearance. The alluvial pebble material forms downslope from elevated areas and in present drainage areas. As shown by topographic contours, the material appears to be the main builder of the present day alluvial fans. As mapped, this unit may contain some "Qs" type units.

Alluvial material (map symbol: Qal) -- This material is generally sand size to coarse pebble size and is reworked and sorted material. Generally found in valley areas and overlaps and grades into "Qar" type toward mountains. Also found as the fine filling in many of the graded washes and drainage. The alluvial material has partial soil development in the valleys.

STRUCTURE

Anticlinal Feature

In the group of hills between the Vaiva Hills and Table Top Mountain the outcrop pattern resembles a northwest trending anticline plunging to the northwest. The area is essentially covered by Sections 10, 11, 14, 15, 22, and 23 (T8S, R3E). Here a Precambrian core is partly surrounded by the Apache Group and on the southwest limb the Apache Group is followed by the Paleozoic formations. Further east, in the northern Vaiva Hills, the small remnants of Apache Group complete the anticlinal outcrop pattern. Breaching of the anticlinal crest by faulting was noted at the northwest tongue of granite, in Section 15, where Pioneer Shale of the west flank is apparently in fault contact with Dripping Spring Quartzite on the northern nose. The western limb of the anticline dips much steeper than does the eastern limb.

To the northwest, in the south half of Section 30 and NW$\frac{1}{4}$, Section 31 (T7S, R3E), the Pinal Schist has a schistosity trend to the northwest but shows a reversal in the direction of dip. In the eastern part the dip is to the east and going westward the dip changes to the west. This suggestion of a superimposed northwest-trending anticlinal feature is along the trend of the previously mentioned anticlinal trend in the sediments.

Northeast-Trending Shear Zones and Faults

Five major shear zone and fault structures, belonging to the northeast system, have been mapped in the area.

The first, starting on the northwest side of the area, is the biotite-rich shear zone mapped in Sections 28 and 29 (T6S, R2E) which separates Laramide granite on the north from Precambrian granite on the south. The zone is not mineralized.

A hematite-coated shear zone some 2000 feet wide is found in the schist, starting in the NW$\frac{1}{4}$, Section 5 (T8S, R2E) and extends northeastward into the north half of Section 33 (T7S, R2E). Within this zone the schistosity has been crumpled and turned into the northeast trend by numerous shears so that little remains to indicate an original northwest schistosity trend. The large hill mass of schist, to the southeast, also has the same northeast trend but does not contain the hematite-coating on the shears.

An intense shear-fault zone, 800 feet wide, is found in the north half of Section 31 (T7S, R3E). Drag on the individual strands indicates that the block south of the shear-fault zone has moved to the southwest relative to the northern block. Offset along this shear-fault may be measurable in more than one mile of horizontal movement. Thoughts on the amount of movement along this structure will be discussed later under PROBLEMS. The zone is not mineralized.

In the south half of Section 32 (T7S,R3E) is an inferred fault zone separating typical Pinal Schist on the north from granite gneiss on the south. Drag fold features along the contact suggest that the south block moved to the southwest relative to the north block. This particular fault zone is evidently older than the Precambrian granite as there is no offset where the granite crosscuts both rock types. The fault "line" can be traced into the granite area only by noting the schistosity attitude of small remnant schist and gneiss blocks which cap many of the hills in the granite area. No particular fault feature, along this trend, is noted in the granite itself.

Monzonite and calcite fill a small fault which cuts the fine-grained granite in the NW¼, Section 5 (T8S, R3E). This fault shows offset of the granite gneiss zone; again with the south block moving southwest relative to the north block. The dike-filled structure was not found across the wash to the southwest. This suggests that it has either been faulted off or that it pinches out. No other monzonite-calcite filled fault structure has been noted, in any of the area mapped, to correspond to this structure.

North-South Fault Zones

Three north-south to slightly northwest trending faults have been mapped or inferred.

One fault is on the west flank of Antelope Peak in Section 20 (T7S, R2E) where Tertiary Pebble Conglomerate (Ts) has been dropped against Precambrian granite. The granite and sediments have a decidedly reddish cast adjacent to the fault plane. Also, weak alteration occurs in the granite adjacent to the fault. This suggests that solutions have been introduced along this fault. However, only iron seems to have been introduced as no copper or other ore minerals were found. The fault may continue southward and will be discussed under PROBLEMS.

A ribbon quartz breccia zone is found in the SE¼, Section 5 (T8S, R3E). It is traceable for some distance and may be quite continuous. The zone appears to have a horizontal offset of 1500 feet or more. The inference of movement is based on the isolated outcrops of schist in Section 33 (T7S, R3E) and the outcrops showing the contact between fine-grained and coarse-grained granite in Sections 4 and 5 (T8S, R3E). To adjust these scattered features back into line with the main outcrop pattern would mean that the east side of the ribbon quartz breccia zone must have had horizontal movement to the south relative to the western block.

In the Paleozoic outcrop complex in Sections 27 and 34 (T8S, R3E) are numerous fault structures. The dominant structure appears to be the north-northwest trending structure on the west side of the outcrop pattern. Much dragging and contortion of the beds was noted along this fault.

Thrust(?) Fault

One possible thrust fault remnant was noted in the mapped area. It occurs at the top of the small round hill near the center of the west half of Section 20 (T8S, R3E). Here, extremely broken, sheared, and iron-stained, coarse-grained granite, with abundant feldspar phenocrysts, is topped by relative unbroken, blocky, non-stained, medium-grained, sparce-phenocryst granite. The plane separating the two types strikes N50°W and dips 20° to the northeast.

A similar occurrence is found in the east-central part of Section 36 (T8S, R2E) but further checking along the contact disclosed a variable contact with mutual intrusive features.

DIKES

Dikes were mapped only if they were of sufficient size or of particular structural or stratigraphic importance.

The age relationship of the various dike-filling intrusive material was not wholly deciphered in this reconnaissance. With the exception of some of the diabase and perhaps the quartz diorite, which may be Precambrian, all the rest are Tertiary in age with perhaps a lap over into Late Tertiary time. The earliest may have been the monzonite, andesite, latite, and dacite, followed by the quartz latite, quartz andesite porphyry, and red-speckled andesite, which in turn was followed by the hornblende andesite and the dark andesite basalt. The quartz and calcite appear to be continuous from early to late.

Quartz

Dikes containing quartz were mapped trending in the northeast, north-south, and east-west direction.

Calcite

Massive, brown, rhombohedral cleavage calcite fills east-west, northeast, and northwest trending structures.

Monzonite

Two areas contain dikes filled by monzonitic material. In both areas the trend of the dikes is to the northeast.

One area is the composite monzonite-calcite dike in the NW¼, Section 5 (T8S, R3E) which was previously mentioned under STRUCTURE.

The second is the persistent dike system located in the central parts of Sections 35 and 36 (T8S, R2E). Although only two dikes are shown on the map, several others occur in the area.

Diabase

Diabase fills northwest-trending openings. The isolated Precambrian granite hills north of the Casa Grande-Gila Bend Highway contain numerous diabase dikes. In the southwestern part of the area, east of Little Table Top Mountain, a large diabase mass tapers into a dike going to the northwest. The sill-like masses intruding lower Apache sediments are typical of the Precambrian diabase of the Vekol and Globe area. However, the small dike-filling structure may be of a later age.

Dacite

A northwest-trending dike filled by dacitic material was found cutting the Tertiary Pebble Conglomerate and in turn was truncated by the Quaternary caliche-cemented sediment. This excellent exposure is in the small "Ts" patch located in the NE$\frac{1}{4}$, Section 29 (T7S, R3E). The dike material has baked the Tertiary sediment and has incorporated chunks of the sediment removed from the walls during emplacement.

Others

Dikes and small masses of red-speckled andesite, quartz andesite porphyry, and quartz latite are found cutting the Precambrian granite in the area of Indian Butte in the north half of Section 19 (T7S, R3E) and the NE$\frac{1}{4}$, Section 24 (T7S, R2E).

In the granite outcrops in the east half of Section 14 (T7S, R2E) are numerous small masses of hornblende andesite.

Dark andesitic basalt fills a wide, north trending zone, cutting granite in the center of Section 16 (T7S, R2E).

Of these dike-filling rock types, the quartz andesite porphyry invariably weakly alters the intruded material. The noticeable feature is the addition of iron oxide giving the intruded material a much redder coloration than usual.

In Section 1 (T7S, R2E) wide dikes of quartz diorite, trending in the northeast quadrant, cut the granite hills. The partial radial pattern of this group suggests that a small feeder plug of intrusive material may be present to the west of the outcrops. The quartz diorite cuts Precambrian granites but no other age relationship can be demonstrated.

An andesite mass trending to the northwest was mapped in the western half of Section 26 (T8S, R2E).

Further south, mainly in Sections 2 and 12 (T9S, R2E), latite masses trending northwest are found. These are not dike masses but occur as sills and small intrusive masses.

DISCUSSION OF PROBLEMS AND FEATURES

Several problems and features were mentioned earlier and further comment on them will be undertaken at this time.

Pebble Conglomerate

Mapping in the Table Top region disclosed rather thick sections of pebble conglomerate beds which were assigned to the Tertiary. Outcrop areas range from the low foothills adjacent to the recent alluvial cover to the highest peak of the range.

Present work and interpretation suggests that during the time of deposition of the pebble conglomerates the deposits conpletely covered most of the Table Top region in thick continuous sheets. The range was then uplifted and the conglomerate beds deformed and probably deeply eroded prior to the outpouring of the Tertiary volcanics. Since that time the area has undergone deep erosion with uncovering or "exhuming" of the mountain range from its cover of pebble conglomerate. Only minor faulting and uplift has taken place since the Tertiary volcanics deposition, as shown by the elevated and dissected alluvial fans of the Quaternary caliche-cemented sediment.

As noted on the geologic map and the accompanying cross-sections, the pebble conglomerates are now resting on Pinal Schist, Precambrian granite, and lower units of the Apache group sediments. The present dip of the bedding is generally quite steep--up to 45°--and reflects acute tilting of the mountain fault block after sedimentation. The bedding now seen is undoubtedly true bedding which originally had a low initial dip during sedimentation--in contrast to the thought that the steep bedding now seen is from fore-set bedding having a high initial dip--as testified by the abundance of imbricated pebble layers, cross-bedding features, inter-bedded water-lain tuff bed units, and graded bedding features.

In all exposures where imbrication features could be identified it was found that the stream directions flowed in the northeast quadrant--ranging from east of north to north of east. Thus the source area for this thick deposit was to the southwest of the Table Top region.

The largest single outcrop area of pebble conglomerate is in Section 25 (T7S, R2E) and Section 30 (T7S, R3E). Here the areal extent, measured perpendicular to the strike, is over one mile. (See Cross-section F-F'; Attachment C) Assuming no repetition by faulting (and none was found), the true thickness of this particular showing is in excess of 2500 feet. The total thickness of the sequence may be many times this amount.

The topography upon which the pebble conglomerate was deposited was very steep and rugged. The present major outcrops may have been deposited in a deeply cut channel as shown in the S½, Section 23 (T7S, R2E) where a rather thick section of pebble conglomerate on the east side of the ridge does not crop out on the west side. The cover of volcanics and talus debris prevents observation of the actual contact, but the suspected results are easily visualized.

It is probable that crustal adjustments in the Table Top region were still going on during pebble conglomerate sedimentation. Angular unconformable contacts between units have been noted in small isolated outcrops. Both units appeared to be of the pebble conglomerate type. Also, the cinder-tuff unit on Little Table Top Mountain suggests a change in the source area from erosion of consolidated rocks to deposition from a volcanic source. The cinder-tuff unit may well be the top of the pebble conglomerate and if so signals the change from sedimentation to volcanic activity.

Also, the conglomerate deposits in Section 30 (T6S, R2E) underlying the rhyolite ignimbrite outcrop (shown as Tb on the geologic map, Attachment A) are different than the bulk of the pebble conglomerate outcrops elsewhere. The units are similar in color, texture, and composition, except that in Section 30 the units contain red-speckled andesite fragments as well as the usual pre-Tertiary rock fragments. Here the units are strongly cut by faults--some with apparent reverse movement. If this outcropping material is a part of the sedimentary units named Pebble Conglomerate in this report, then it indicates that some red-speckled andesite flows had been deposited--and were eroded--during the late stage of Tertiary sedimentation.

Although exposures are poor on Table Top Mountain, due to the heavy talus cover, there are indications that sedimentation and vulcanism in part interfingered. Here, several areas show the conglomerate-andesite contact repeated with one outcrop showing above the other and the intervening area covered by talus. It is not demonstrated whether this actually represents a sequence of conglomerate-andesite-conglomerate-andesite or whether the lower block is a down-dropped fault block from the upper exposure. However, elsewhere the dominant evidence, as shown on the various cross-sections (See Attachments B and C), demonstrates that many of the basal volcanic flows poured out on an eroded and truncated surface of pebble conglomerate.

This overlap of sedimentation-volcanic process is not unique but further studies need to be accomplished before the entire complex history and sequence is deciphered in the Table Top area.

Hematite-Coated Shear Zone

The hematite shear zone in Section 33 (T7S, R2E) should be traced northeastward across the schist area. No particular note of a shear zone trend was found along the probable extension in Section 27 (T7S, R2E) where the granite-schist contact was mapped. However, one small copper show was noted in the zone in Section 33 and further mineralized occurrences may be found elsewhere along the trend.

Offset Along Shear-fault Zone

The narrow, intense northeast-trending shear-fault zone in Section 31 (T7S, R3E) was traced southwestward into Section 36 (T7S, R2E). Mapping of the schistosity on both sides of the structure was undertaken in an effort to obtain the relative amount of apparent horizontal displacement along this shear-fault zone. Basis for determining the displacement hinged on the idea that the counter part of the anticlinal feature found in the schist in the SE¼, Section 30 (T7S, R3E) might be found south of the fault zone.

A tight, anticlinal feature, showing reversal of dip to the schistosity, was found in the SE¼, Section 36 (T7S, R2E). The axis of this feature trends to the southeast and can be mapped into the east half of Section 1 (T8S, R2E) as shown on Attachment A. The measured displacement from crest area to crest area is about 6000 feet, with the south block moving to the southwest relative to the north block.

The south counterpart is a much tighter feature suggesting some vertical component of movement; however, I feel that most of the movement took place in the horizontal component direction.

Extension of the Antelope Peak fault

The northwesterly-trending fault mapped on the west flank of Antelope Peak may be part of a major structure that continues southward, although it has not been mapped as a continuous structure.

As was noted under the Ramrod discussion, the mineralized area is adjacent to a northwesterly-trending gravel-filled drainage. Mapping of the schistosity on both sides of the drainage show a strong change which suggests that a fault may be buried in the gravel channel.

Along the projection of this northwesterly-trending mineralized zone a small copper show was found in the northeasterly-trending hematite shear zone. This copper occurrence was the only one noted in the mapped portion of the hematite zone and may reflect an underlying control by a northwest-trending structure.

Further south, in Section 15 (T8S, R2E), the schist-granite contact makes a strong deflection to the south in an area of poor outcrop.

In Sections 26 and 27 (T8S, R2E) are two strong structures--one filled with diabase and the other with andesite.

Even further south, in Section 36 (T8S, R2E) a set of persistent monzonite dikes have been offset by a northwesterly-trending fault structure.

All of the above features, except the diabase- and andesite-filled dike structures, are along the trend of a possible major fault trending southeastward from the fault on Antelope Peak. Additional work would be necessary to tie all the strands into a single system and also to determine the projected intersection of this northwesterly-trending fault with the shear-fault having the large horizontal offset which extends southwestward from Section 31 (T7S, R3E). The diabase and andesite dikes are parallel to the suspected fault structure and undoubtedly reflect its existence.

True Schistosity Direction

Another problem is the question of true schistosity direction in the areas showing crumpled schistosity. The crumpled schistosity direction as shown on the map may, in actuality, be only a shear direction and not at all the true schistosity direction. Even though the quartz bands and other planar features now trend to the northeast along with the shearing (schistosity) certain features cast doubt on this being the true schistosity direction.

In Section 31 (T7S, R3E) an 800-foot wide shear-fault zone was mapped. Outside this shear zone, the well-developed, unbroken schistosity trends to the northwest; but, as the shear zone is entered, the "schistosity" makes a right angle turn and passes into a very highly sheared and crumpled state. Here, the quartz bands are turned and sheared along with the enclosing schist features. In the above section the shear zone is tight and quite well defined, although other small shears (some as small as six inches wide) have been observed outside the main shear. Within the wide shear zone are areas of schist showing the original northwesterly trend. The areas are composed of the sandstone or quartzite schist which apparently resisted the intense shearing and rotational movement of the shear zone.

Similarly, on the west side of the mountains, in the Ramrod area, small zones of schist have a faint northwesterly remnant schistosity. Invariably such exposures contain the quartzitic or highly arenaceous type schist.

My present opinion is that a high development of isoclinal and chevron folding was developed in the schist and upon continued development the elongated shearing took place to form the highly crumpled "schistosity" as presently mapped.

Variations in the Granite

Forty-five hand specimens of granite were collected, some of which were cut with a diamond saw and coated with clear enamel, and studied for possible significant variations. Seven of the samples were from north of the biotite-rich shear zone, i.e. Coolidge granite type, and one from suspected Laramide granite south of the shear zone. All the remaining samples were from either the normal coarse-grained Precambrian granite or the fine-grained phase.

In general, the Laramide granites have a medium granular texture with the individual mineral size ranging from 1/16" to 1/8" in diameter. All constituents of feldspar and quartz are essentially in an equigranular mosaic. The clear quartz and white feldspar mosaic gives the rock outcrops a decided whitish appearance with a speckling of shiny black or greenish black from the biotite mica. The biotite tends to form bookish plates but are not, generally, well developed in the area mapped. Biotite ranges from 30% to 50% of the phenocryst mass. In shear zones, the biotite tends to elongate and smear in planar directions but retains a bright coloration. In the northern part of the area, Section 1 (T6S, R2E), the granite has a heavy black biotite border phase against a diorite mass. The border phase has a smaller granular texture than the main type and contains abundant (60+%) shiny, platty, black biotite.

In Section 23 (T7S, R2E), several small outcrops of granite have been assigned to the Laramide. They are not as typical of the Coolidge granite as the granite masses described above. The grain size is still equigranular but slightly finer and tighter texture with a pinkish-white coloration. The mica is predominantly muscovite in hard, shiny plates. Small, rounded crystals of brown-red garnets are found scattered in the mass.

The Precambrian granites are grayish to pinkish gray in coloration, increasing in reddish-pink toward the south. They are medium to coarse (1/8" to 1/4") textured with unequal crystal distribution as seen in the outcrop. Characteristically the granites contain large (½" to 1½") individual orthoclase crystals distributed in the remaining material. Individual areas often show a complex relationship with intergrowths of several feldspar types, quartz, and included biotite as an enity in the granular make-up of the specimen.

The biotite in the Precambrian granite is highly variable in amount and is dull black to greenish in crumpled, contorted, smeared, non-bookish masses. They quite often show a halo of iron staining around each mass. Apparent grain size in the weathered outcrop is highly variable and is primarily a function of the amount, size and distribution of the extra large feldspar crystals.

The fine-grained phase has a "tight" aplitic or microgranite texture with less mica than the coarse-grained granite. The mica is generally muscovite.

South of the shear-fault zone in Section 31 (T7S, R3E), the granite became much pinker or reddish in color. This is caused by an increase in pink feldspar and also from veinlets of hair-line cracks of hematite. The hematite is often restricted to breaks in the feldspars and does not crosscut the other constituents, that is, local feldspar fracturing, rather than general fracturing of the granite.

Near the intrusive borders, such as adjacent to the quartz diorite dikes in Section 1 (T7S, R2E), or erosion surfaces, such as the Apache Group sediments were deposited on, the granite is harder in character and contains solid pink feldspar in a crystalline mosaic.

James D. Sell

JAMES D. SELL

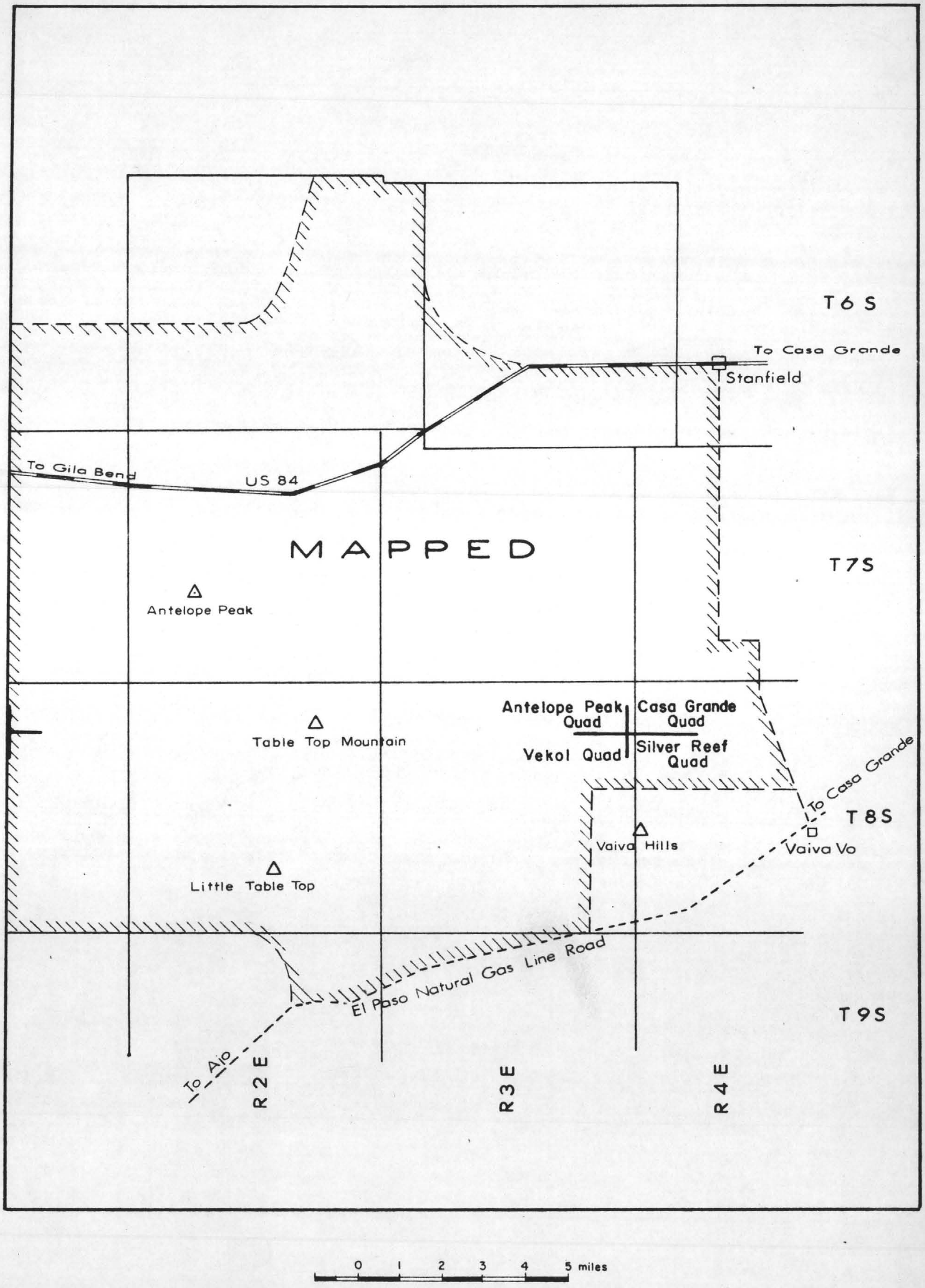


Figure 1. Sketch map showing geological coverage in the Table Top region

Site	Sample Number	ppm Cu	ppm Mo
	GOC - VH - 1	25	Zero
	GOC - VH - 2	12	4.0
	GOC - VH - 3	50	Zero
	GOC - VH - 4	25	Zero
	GOC - VH - 5	25	2.0

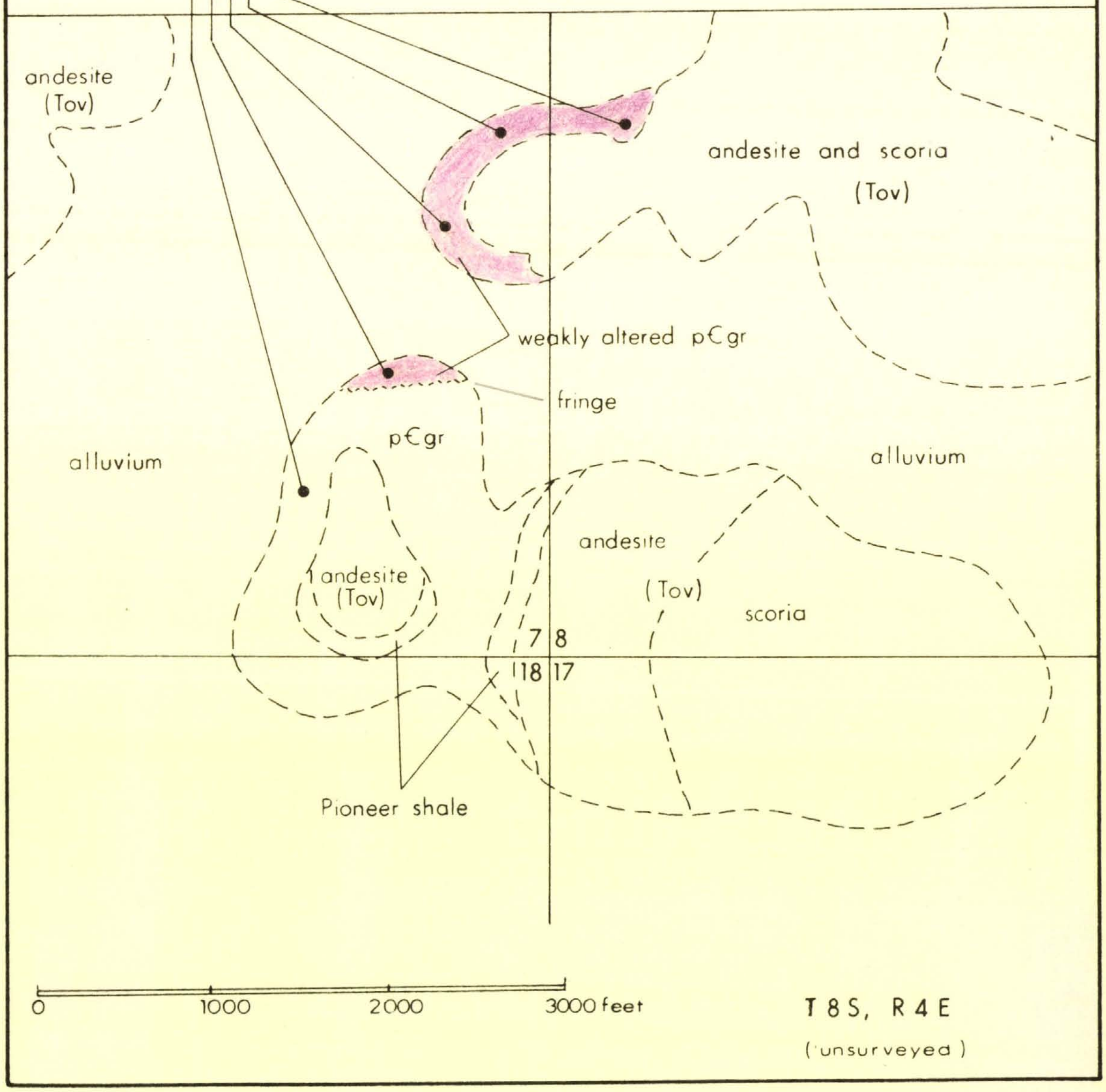
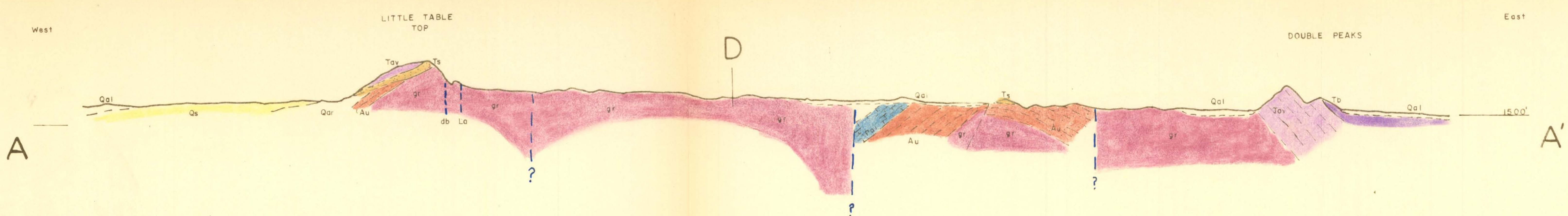
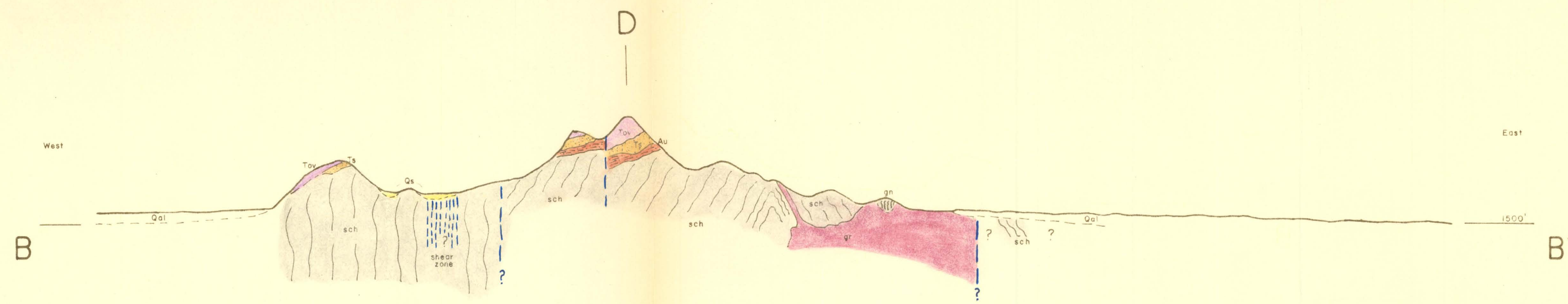


Figure 2. Geochemical Samples and Results — North Vaiva Hills



CROSS SECTION A–A′

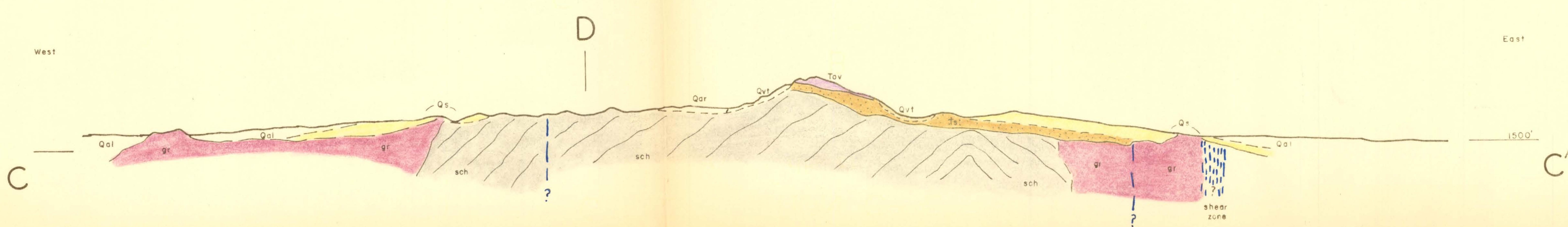
Looking Northwest



CROSS SECTION B–B′

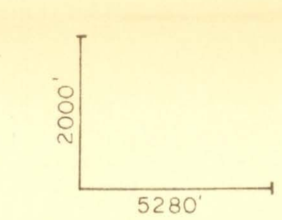
Looking Northwest

TO ACCOMPANY Report
DATED Sept. 8, 1964
BY J. D. Sell

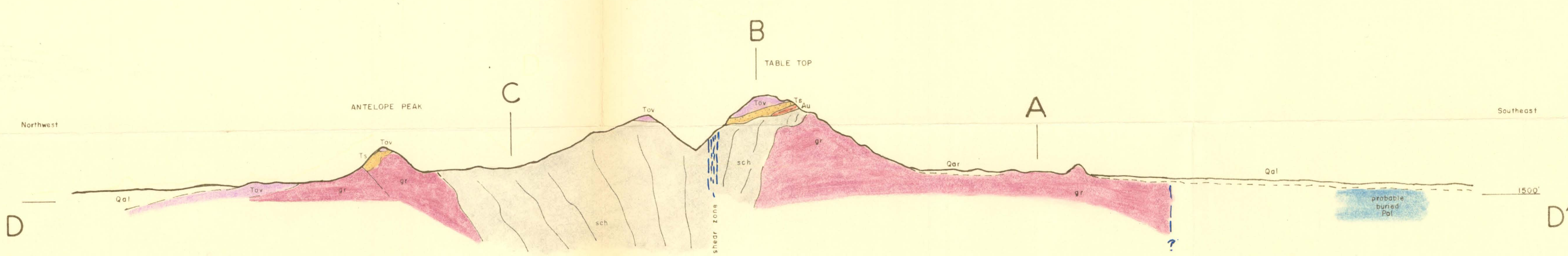


CROSS SECTION C–C′

Looking Northwest



SCALE



CROSS SECTION D–D′

Looking Northeast

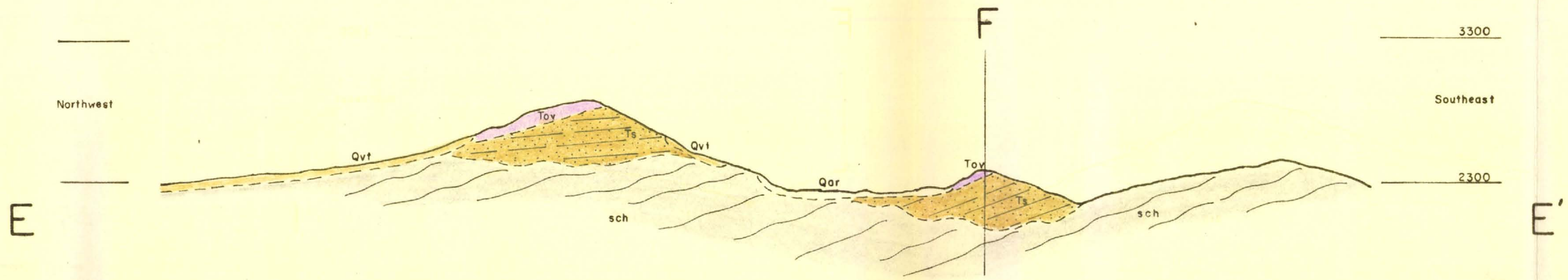
TABLE TOP REGION

SCALE AS INDICATED

1633 A

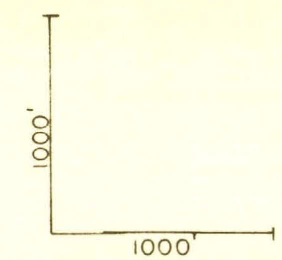

ATTACHMENT A
R2E
R3E
R4E
R5E
T6S
T7S
T8S
MARICOPA COUNTY
FINAL COUNTY
North Branch Santa Cruz
Stanfield
CASA GRANDE
TABLE TOP MOUNTAINS
PAPAGO INDIAN RESERVATION
VAIVA HILLS
Vaiva Vo
Chuichu
SILVER REEF MOUNTAINS
gneissic Lgr shear zone
biotite shear zone
EXPLANATION
Quaternary
Qal Alluvium
Qar Alluvial pebble material
Qvt Volcanic talus material
Qs Caliche-cemented sediments (Dissected alluvial fans)
Qfs Fossiliferous sediments
Tertiary
Tb Basalt
Tov Older volcanics (red speckled andesite, scoria-agglomerate and dacite tuff)
Ti Extrusive vent
Ts Pebble conglomerate
POST-ORE
PRE-ORE
Laramide
La / Ll Andesite and latite
Lgr Granite
Ld / qd Diorite and quartz diorite (age relationship not established, except older than Laramide granite)
Paleozoic
Pal Paleozoic sediments
Younger Precambrian
db Diabase
Au Apache Group sediments
Older Precambrian
fgr / gr Fine grained granite and coarse-grained granite
sch Pinal schist
gn Granite gneiss
Dike
Fault
Mineralization
Schistosity
Crumpled or contorted schistosity
Bedding
TO ACCOMPANY Report
DATED Sept. 8, 1964
BY J. D. Sell
GEOLOGICAL RECONNAISSANCE MAP
TABLE TOP REGION
Pinal County, Arizona
Scale 1 inch = 1mile (approx)
Base – U.S.G.S. Topographic Sheets
J. D. Sell
August, 1964
1632

ATTACHMENT C



CROSS SECTION E—E'

Looking Northeast



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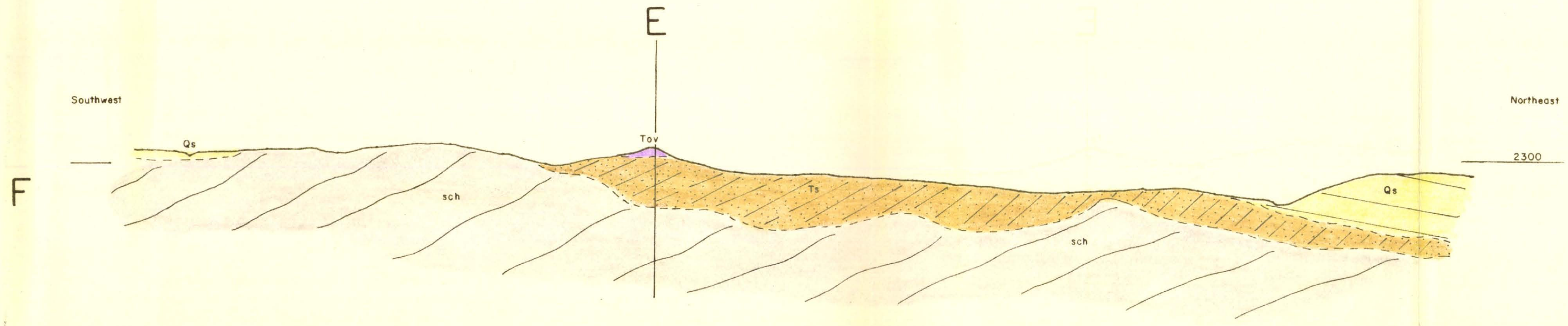


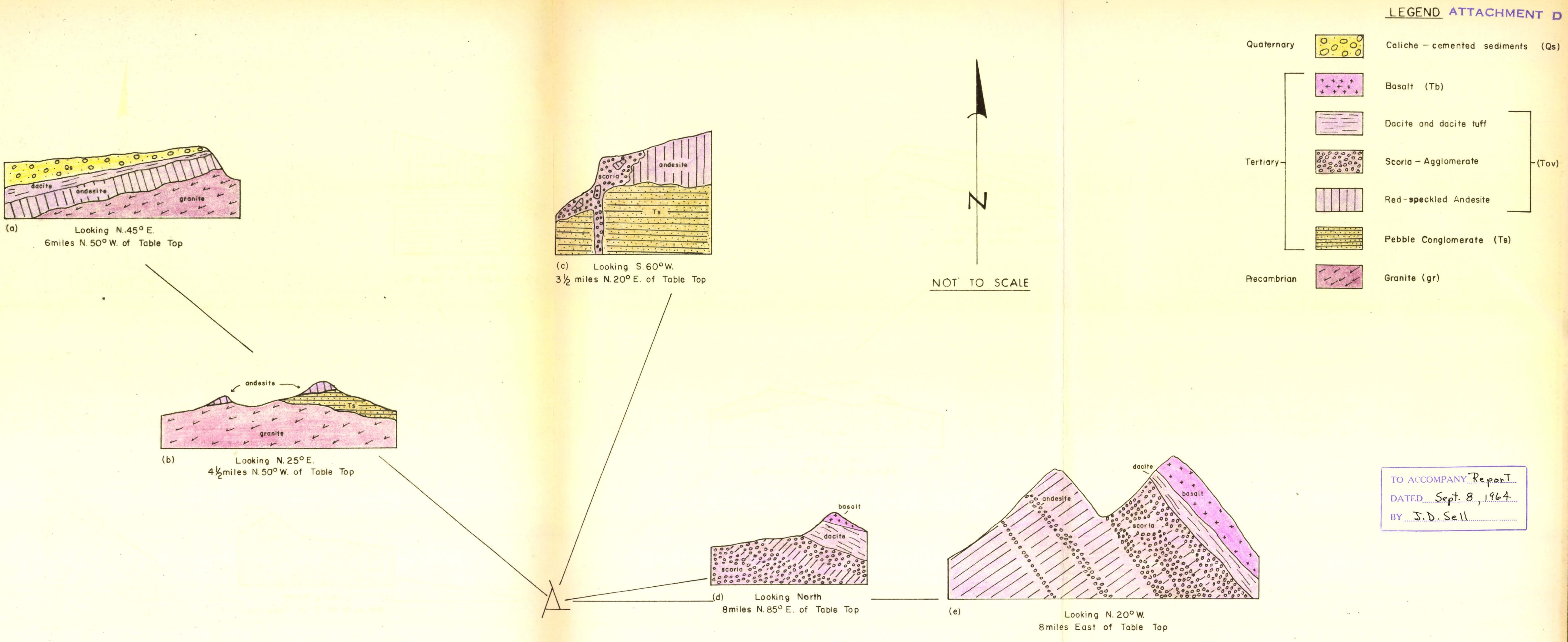
TO ACCOMPANY Report
DATED Sept. 8, 1964
BY J. D. Sell

CROSS SECTION F—F'

Looking Northwest

TABLE TOP REGION

SCALE AS INDICATED



SKETCH SECTIONS

In Various Parts Of The Table Top Region
Showing Relationship of the Tertiary Units
with other Formations

Map No. 1633