RECONNAISSANCE GEOLOGY OF THE SOUTHERN MUGGINS MOUNTAINS YUMA COUNTY, ARIZONA

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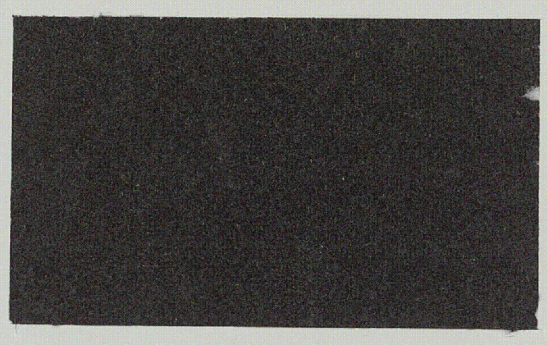

UNITED STATES ATOMIC ENERGY COMMISSION

GRAND JUNCTION OPERATIONS OFFICE

SALT LAKE AREA OFFICE

PHOENIX SUB-OFFICE

RECONNAISSANCE GEOLOGY OF THE SOUTHERN MUGGINS MOUNTAINS YUMA COUNTY, ARIZONA

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GEOGRAPHY AND TOPOGRAPHY

The Muggins Mountains include a roughly oval-shaped area of about 50 square miles situated in southwestern Arizona, a few miles northwest of Wellton. Unimproved roads from Wellton, which lies on the Southern Pacific Railway and U. S. Highway 80, make the area accessible.

Maximum relief is about 1,400 feet, with elevations ranging from 200 to 1,600 feet above sea level. Intermittent streams have dissected the land into an intricate pattern of rounded hills, flat mesas, and deep, steep-walled arroyos. The southern slopes of the range drain to the south directly into the Gila River. Runoff from the northern slopes drains to the north then swings to the southwest and southeast around the range to the Gila River.

The Muggins Mountains are part of a series of eroded mountain ranges in southwestern Arizona which trend northwesterly and rise abruptly from the broad intermontane plains, typical of Basin and Range topography.

GENERAL GEOLOGY

The oldest rocks exposed are schists and gneisses considered to be of Precambrian age.(1) They underlie the northwestern part of the range and occur as small inliers in the south-central portion.

All other rocks range from Tertiary to Recent in age except a series of sandstones, shales, and limestones that crop out over a small area in the extreme eastern end of the range. This series is regarded as Mesozoic.(1)

GEOLOGY OF THE SOUTH-CENTRAL AREA

A schematic, though reasonably accurate, cross-section prepared from a reconnaissance geologic survey from sec. 10, T.8S., R.19W. on the west to sec. 6, T.8S., R.18W., on the east is shown on plate I.

Stratigraphy

The prominent mountains forming the northeast and southwest parts of the range consist of a thick series of acid andesite flows, agglomerates, tuffs, and obsidian. Besides a few inliers of schist and gneiss, designated on Plate I as basement complex, the central area contains a thick section of Tertiary lake sediments intruded by volcanic rocks of basaltic and andesitic to rhyolitic composition. This series is uncomformably overlain by a poorly consolidated conglomerate of probable Pleistocene age.

The lake sediments are divisable into three units. The fine-grained mudstones of the upper and lower units are separated by a reddish brown sandstone unit.

The lower unit consists of greenish mudstones, siltstones, and sandstones with interbedded water-lain ash beds. The unit is dominantly fine-grained and the amount of sandstone present is subordinate to the amount of mudstone. A chalcedonic quartz bed 1-2 feet in thickness is present near the top of the unit and its origin may be related to hot spring activity. The lower unit ranges in thickness from a minimum of 250 feet near the gneissic paleo-shore line in section 6, T.8S., R.18W. to more than 400 feet in thickness farther to the west.

Overlying the lower unit in apparent conformity is a reddish brown sandstone unit that contains sub-rounded to rounded pebbles and cobbles of granite, schist, and white quartz. It also contains a few beds of siltstone, a small amount of volcanic ash, and two 5 foot conglomerate beds.

The upper unit, conformably overlying the sandstone unit, consists of a series of greenish-gray sediments similar to the lower mudstones, siltstones, and sandstones although it appears to contain more sandstone and less volcanic ash. Several thin silic beds are also present. This unit appears to be more than 4000 feet in thickness.

Overlying the lake sediments and older rocks with angular unconformity is a nearly flat-lying conglomerate which covers much of the area. It is rather loosely consolidated and varies in granularity from fine-grained sandstone to coarse boulder conglomerate. Angular talus debris appears to be present locally. Cobbles composed of gneiss, schist, and granite dominate. This conglomerate is probably Pleistocene in age.

Structure

The seiments have been subjected to gentle folding and faulting accompanied by late volcanic activity, as illustrated in Plate I. Beds dip from 5 to 15 degrees in general but increase to 60 degrees in section 6, T.8S., R.18W. Folds strike northwest and appear to plunge southeast while the dominant fault trend is N35°W with essentially vertical movement of less than 100 feet.

Fossils

Silicified twigs or roots are present in the lower mudstone unit. Silicified palm-type wood has been observed as float and in place near the top of the lower mudstone unit associated with copper carbonates and uranium.

Abundant fragmental vertebrate material in the lake sediments is present in T.8S., R.18W. and was first brought to our attention in August 1955 by Messers. Richard Vaughn, L. M. Hanson, and P. W. Jacobs of Yuma, Arizona. Dr. John F. Lance, University of Arizona, has identified a camel, genus Stenomylus. Dr. Lance says [2] of the fossil material, ".....", and although it is still all fragmentary, I can say with a high degree of confidence that the age is Lower Miocene".

SUMMARY AND CONCLUSIONS

More than 4000 feet of Lower Miocene lake sediments were deposited upon a gneissic basement rock, at least locally. The sediments have been gently folded into broad anticlines and synclines and have been cut by high-angle faults with displacements on the order of 100 feet. Both basaltic (?) and acid andesitic lavas have intruded the sediments.

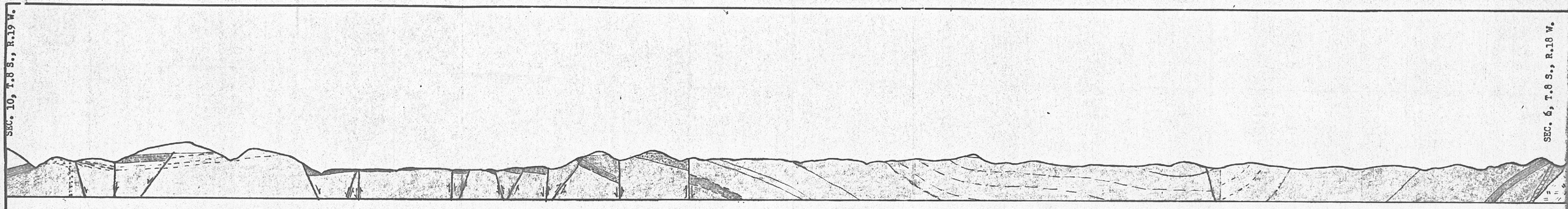
A Pleistocene (?) conglomerate unconformably overlies all older exposed rocks.

The lake sediments were considered to overlie the adjacent thick series of andesite flows [1]. This was not established by a cursory examination. The sediments appeared to be in fault contact with the lavas although the relationship was always obscured by the younger conglomerate or alluvial cover. Since a dike of this acid andesitic composition was observed cutting the sediments, there is a possibility that the lake sediments are older than or contemporaneous with the thick extrusive andesite series.

REFERENCES

1. Wilson, Eldred D., Geology and Mineral Deposits of Southern Yuma County, Arizona, Univ. Ariz. Bull. 134, 1933, pp. 218-219.

2. Lance, John F., personal communication.



SCHEMATIC CROSS SECTION - SECTION 10, T. 8 S., R. 19 W. TO SECTION 6, T. 8 S., R. 18 W.

LOOKING NORTHWEST

MUGGINS MOUNTAINS, YUMA COUNTY, ARIZONA

PLATE I.

Scale 1" = Approx. 1000'

Sedimentary Rocks
- Quaternary Sandstone & Conglomerate
- Upper Mudstone
- Reddish-Brown Sandstone — Tertiary
- Lower Mudstone
- Siliceous Beds

Igneous Rocks
- Andesite (?)
- Basalt(?) Dike — Tertiary (?)
- Basement Complex — Pre-cambrian (?)

= = = Bedding

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