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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Technical Letter
Saudi Arabian Mineral
Exploration - 31
November 9, 1965

Dr. Fadil K. Kabbani
Deputy Minister for Mineral Resources
Directorate General for Mineral Resources
Ministry of Petroleum and Mineral Resources
Jiddah, Saudi Arabia

Dear Dr. Kabbani:

Transmitted here with are 10 copies of:

TECHNICAL LETTER NUMBER 31
REPORT ON ALLANITE
OCCURRENCE NEAR HAMDHA
ON WADI TATHLITH

by

Glen F. Brown*

Sincerely,

Glen F. Brown

Glen F. Brown, Chief
Saudi Arabian Mineral Exploration Project

* U. S. Geological Survey, Jiddah, Saudi Arabia

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REPORT ON ALLANITE
OCCURRENCE NEAR HAMDTHA
ON WADI TATHLITH

by

Glen F. Brown*

Allanite near Hamdtha

On March 6, 1952, I visited a granitic area near Hamdtha. A gray granite intruded by a swarm of NWW-trending basic dikes is exposed on pediments and low rounded domes from Hamdtha towards the northwest. This granite constitutes a southwestern prong of a more gneissic gray granite with lineation in a NNE direction. The gray granite grades into a pink porphyritic granite along the western part of the tongue. There is much schistosity and shearing along the east side of the complex granitic mass and xenoliths of hornblende which appear dark on the aerial photographs are scattered throughout the area. In a northwestern direction the granite grades into mafic metamorphic rocks. Along the west side a series of fine-grained basic igneous rocks are intruded by the granite, and in Jebal Sinaiblah, a high conical peak to the west composed of andesite in the upper third of the cone, the base being granite. A few quartz-orthoclase pegmatitic veins contain minor amounts of magnetite and a black glassy mineral which also is scattered in lag gravel throughout the plain was identified as follows by Mr. Jerome Stone of the U. S. Geological Survey:

The chemical composition as revealed by a spectroscopic analysis resembles allanite. The physical and optical properties also match those of allanite. The mineral is black and has a conchoidal fracture. Small fragments of the crushed sample are green, sometimes red. In plane polarized light the mineral is pale green. It is isotropic and has an index of refraction of 1.70 ± 0.05 . The mineral did not yield an X-ray pattern before heating.

* U. S. Geological Survey, Jiddah, Saudi Arabia

After heating a pattern which suggested the presence of cerium oxide and iron oxide was obtained. A semi-quantitative spectroscopic analysis by Katherine E. Valentine revealed:

	%	
over	10	Fe, Si
	5-10	Ce, Al
	1-5	Ca, Ha, Mn, Nd, Th
	0.5-1	Pr, Y, Ti, Pr
	0.1-0.5	Y, Mg, Ti, Cd, Dy, Mg

Mr. Thomas Stern of the Geological Survey analyzed the mineral and calculated the age as 576 million years. In view of this youngest Precambrian age it would seem that the orthoclase granite, at least, is a younger intrusive and possibly correlative with the Jabal Sa'ad and the Sawaween granites which are enriched in some of the above elements. On the other hand the only pegmatites seen elsewhere in the Asir containing anything except orthoclase, quartz, and mica are sheared and associated with the oldest gneissic granite. Because of the intimate relations the two granite types were not separated on the Asir geologic map except where intervening rocks occur, I believe the geology of the area warrants further study by someone specialized in the occurrence of radioactive, rare earth, and niobium minerals, and if anything worthwhile is found a detailed map showing granite types and mineral distribution be prepared.