

*Riebeckite-rhyolite from northern Kordofan, Sudan.*¹

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WHILE investigating the relics of early habitations at Beraeis, near Jebel Katul, 100 miles N.W. of El Obeid, northern Kordofan, Dr. C. G. Seligman found a number of implements all made of a fine-grained, blue-grey stone, quantities of which he found at the base of Jebel Katul. A fragment of this stone was examined by Dr. G. T. Prior in 1912, and found to be rich in riebeckite.

The rock is compact with smooth conchoidal and sometimes shiny fracture, and slate-blue colour weathering to bluish-grey. Under the microscope, it is seen to consist of a colourless, microcrystalline base through which are evenly distributed abundant very minute (0.01 mm.) flakes of riebeckite. The dark riebeckite flakes gather together in short lines, which often show a roughly parallel arrangement indicating 'flow-structure'. Several patches coarser in grain but similar in composition to the rest of the rock are probably cognate xenoliths. One of these shows sharp angular boundaries round which the lines of riebeckite are seen to curve.

The riebeckite is for the most part fresh, and shows the typical pleochroism. Scattered through the rock are numerous microlites, too small to be identified with certainty but probably referable to riebeckite.

One or two phenocrysts (0.4 × 0.1 mm.) are either orthoclase or anorthoclase. Measurements of extinction-angle gave, cleavage on to $Z = 5^\circ$; crystal-edge probably $[100, 010]$ on to X or $Y = 8\frac{1}{2}^\circ$. Zircon is present as idiomorphic crystals (0.1 mm.) bounded by prism-faces. The section showed two or three such crystals. The colourless base has

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a refractive index between 1.53 and 1.54. Probably it consists of either orthoclase or anorthoclase with quartz, but it is not possible to determine this in the section. Glass is entirely absent.

Dr. Seligman has very kindly allowed me to examine six implements from Beræis made of this stone. Four of them agree closely with the rock just described. They are extremely fine-grained rocks, blue-grey in colour, with smooth, dull or sometimes shiny fracture. They show occasional xenoliths of coarser grain and frequently contain small felspar phenocrysts and light-coloured patches. Two of these have density 2.60, and a third, rather darker blue than the others, gave 2.61. The density of the fragment from Jebel Katul is 2.60.

The other two implements are of rather more pronounced blue colour, and show irregular patches of riebeckite and felspar of slightly coarser grain. The density of these two is 2.63. They may be a rather less acid type than the other specimens.

Provisionally, the rock is described as a riebeckite-rhyolite. The material available does not allow this determination to be verified by chemical analysis.

Two specimens of tinguaitic dykes from Kadoro, 75 miles south of El Obeid, described by Linck,¹ constitute the only previous record of soda-rich rocks in Kordofan. The nearest rocks comparable with the rhyolite of Jebel Katul are the riebeckite-rhyolites of Gilgil, north of Lake Naivasha, in British East Africa,² and the riebeckite-bearing trachytes of Senafé and Fakoda, northern Abyssinia,³ described by Prior. Both these occurrences are on the line of the Great Rift Valley.

Jebel Katul lies far to the west of the Great Rift. It is 350 miles due south-west of the Bayuda volcanic field recently discovered by Dr. Chalmers Mitchell on the *Times* African flight.

Professor J. W. Gregory⁴ has indicated the possibility of a depression running N.E.-S.W., starting from the Red Sea between Adal Qaqa and Jebel Elba, and following the course of the Nile from Abu Hamed to Korti. The occurrence of the riebeckite-rhyolite at Jebel Katul may be connected with a further extension of this depression south-west from Korti.⁵

The other specimens collected by Dr. Seligman were from mounds left by early inhabitants at Faragab, 20 miles east of Bara. They

¹ G. Linck, *Neues Jahrb. Min.*, 1908, B.-Bd. 17, pp. 438-442.

² G. T. Prior, *Mineralog. Mag.*, 1900, vol. 12, pp. 242-244.

³ G. T. Prior, *ibid.*, 1899, vol. 12, pp. 92-95.

⁴ J. W. Gregory, *Nature*, 1920, vol. 104, p. 667.

⁵ See also G. W. Grabham, *Nature*, 1920, vol. 105, p. 199.

included fragments of muscovite-granite, gneiss, sandstone, and a rounded pebble of augite-diorite. None of these were found in situ.

The augite-diorite consists of oligoclase and dark-brown hornblende, the latter often with pale green or pinkish-violet augite enclosed. Apatite occurs as a rare accessory. The hornblende and augite are fresh, but the felspar is altered in patches, giving rise to muscovite and calcite.
