On Geikielite, a New Mineral from Ceylon.

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THE mineral which forms the subject of this communication came from the gem mines of Rakwana, Ceylon, and was brought to England by Mr. Joseph Baddeley, who, while superintending operations there, had formed a collection representative, it was believed, of almost every kind of pebble to be found at the works. This collection Mr. Baddeley, on his return home, submitted to Mr. Pringle at the Museum of Practical Geology, London. In looking, from time to time, over the collection, Mr. Pringle had occasion to take the specific gravity of some of the specimens. Amongst those so tested were certain pebbles the sp. g. of which was found to be about 3·98. This result, combined with their other physical characters, having rendered it impossible for Mr. Pringle to assign them to spinel, ilmenite, or other species with which he could compare them, he handed the pebbles over to me for chemical analysis. They weighed about 2 oz. in all, and varied in size from that of a pea to that of a hazel nut. After breaking several I selected for analysis that one which gave the most brilliant cleavage and which seemed nearly quite pure when small fragments were examined under the microscope. It was almost absolutely free from a more transparent yellow mineral which was afterwards obtained in sufficient quantity (0·3 gram) for analysis, and proved to be rutile.

Qualitative analysis showed the new mineral to consist of titanic acid and magnesia, with a small amount of protoxide of iron. The quantitative analysis was made by fusing the finely powdered mineral with excess of bisulphate of potash. The fused mass was completely dissolved by cold water, and the titanic acid precipitated by boiling. It was filtered off and again re-fused with bisulphate of potash to separate any remaining iron or magnesia, again precipitated by boiling after adding a little sulphite of soda, filtered, washed, ignited and weighed. The iron was precipitated from the mixed filtrates after peroxidising with nitric acid, by ammonia, ammonium chloride having been added to retain the magnesia in solution. The oxide of iron was filtered off, washed, ignited and weighed. It still retained a little titanic acid, which, however, was lost by accident.

The magnesia (after concentration of the filtrates) was precipitated by phosphate of ammonia, filtered off, washed with ammoniacal water, ignited and weighed.

The following figures show the results of the analysis :—

Titanic acid	67·74
Magnesia	28·73
Protoxide of iron	3·81

Theoretically, titanate of magnesia should consist of—

Titanic acid	66·66
Magnesia	33·33

taking the atomic weight of titanium as 48, and that of magnesium as 24. The mineral contained no lime.

These figures show clearly the nature of the mineral. It is the magnesian analogue of perofskite (titanate of lime), which it much resembles in colour and lustre, though it differs from it in optical properties. After consultation with Mr. Pringle, we agreed to call the mineral Geikielite, after Sir Archibald Geikie, the Director General of the Geological Survey. The principal characters are as follows :—

Crystalline Form.—Unknown.

Hardness.—About 6. It scratches orthoclase with difficulty, and does not scratch quartz.

Specific Gravity.—3·98 to 4.

Lustre.—Metallic-adamantine on cleavage face.

Cleavage.—Has one brilliant cleavage and an imperfect one nearly at right angles to the former, in other directions hackly-conchoidal suggestive of ilmenite. The mineral is brittle.

Colour.—Blueish black or brownish black, according to the manner in which the light falls upon the mineral. Thin fragments under the microscope transmit a peculiar purplish red light.

Refractive Index.—Owing to the opacity of the mineral and the dark colour of the thinnest fragments it is difficult to form a correct opinion, but the index seems to be high.

Double Refraction.—Very strong. Apparently between that of sphene and rutile. A great many of the thin flakes show between crossed nicols in convergent polarised light a uniaxial figure, the axis just outside the field of view. The character of the double refraction is negative.

Action of Acids.—In fine powder, slowly decomposed by hot strong hydrochloric acid, the titanic acid separating while the magnesia and iron pass into solution. The iron appears to be entirely in the state of protoxide. The mineral is also decomposed by hydrofluoric acid even in the cold in the course of a few hours if finely powdered.

Before the Blowpipe.—Infusible alone. With microcosmic salt gives the characteristic reaction of titanic acid. The small amount of iron scarcely interferes with these reactions. The magnesia does not seem to exert any influence whatever.

Rutile.—All the rolled fragments of the mineral which I have examined under the microscope show, in addition to the characteristic plum-coloured fragments, here and there pale yellow and more transparent fragments resembling rutile. From one of the pebbles containing more than usual of this yellow mineral I picked out under the microscope 0·3 gram for analysis. It yielded 99·2 per cent. titanic acid, and gave a positive uniaxial figure in convergent polarised light, so that there is no doubt the accompanying mineral is rutile. Possibly Geikielite may be found in mineral collections amongst the dark coloured specimens of rutile, from which it will easily be distinguished by the action of acids.