## *On the Discovery of Leucite in Australia.*

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THE mineral Leucite has for so long a period been considered as one of the most remarkable examples of limited distribution both in space and time, that the discovery in Australia of a rock largely composed of this mineral, by Mr. T. W. Edgeworth David, F.G.S., of the Geological Survey of New South Wales, is one that appears deserving of being at once placed upon record.

Leucite-crystals, under the head of "white garnet," or "white schorls," appear to have been known from a very early period; and, indeed, the fine examples from Somma could scarcely fail to attract the attention of the older mineralogists. Subsequently it was found that the mineral occurs in other parts of Italy, and especially the neighbourhood of Rome, as well as at the Laacher See and the Kaiserstuhl.

In 1868 Zirkel published his *Basaltgesteine*, in which work it was shown that leucite is an important constituent of many lavas in Saxony, Bohemia, the Rhön Mountains and Thüringer Wald. It was not till 1874, however, that an extra-European locality for the mineral was announced by Vogelsang; that author showing that it occurs in a basalt from the small island of Bawean, North of Java.[1] Two years later Prof. F. Zirkel was able to announce its occurrence at a single isolated locality in North America, which has received the name of the "Leucite Hills,"[2] and is situated in Wyoming Territory, at a point north-west of the Point of Rocks.

It is only quite recently that Prof. O. Derby has been able to state, on the authority of Prof. Rosenbusch, that a basalt from Brazil contains leucite, and he points out that this rock is almost certainly of palæozoic age.[3] To the successive discovery of the mineral in the Asiatic, the North American, and the South American continents, we are able to add

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[1] *Neues. Jahrb. für Min. u. s. w.* 1875, p. 175.

[2] *Microscopical Petrography, U.S. Geol. Expl. of 40th Parallel* (1876), p. 259. Pl. V. fig. 4.

[3] *Quart. Journ. Geol. Soc.* Vol. xliii. (1887), p. 463.

that of its occurrence in the Australian, and it now only remains to be detected in Africa.

On hearing from my friend Mr. T. W. Edgeworth David of his important discovery, I at once asked him to furnish me with a definite statement concerning the particulars of it; and in answer to my request he writes as follows:—"The leucite-rock occurs at *Byrock*, near Bourke, in the Colony of New South Wales, about 450 miles north-west from Sydney. The lava-sheet from which I took the specimens is between 300 and 400 miles distant from the nearest sea, but, as near as I can recollect, is only about 500 feet above sea-level; and in Cretaceous times the sea must have extended from the Gulf of Carpentaria to the base of the low hill of granite on which this leucite-rock rests. I think that the sheet was about a mile long and half-a-mile broad. I was unable to spend more than a few minutes at the spot, but I hope on some future occasion to have the opportunity of making a detailed examination."

The examination of two slices of the rock, kindly sent to me by Mr. T. Edgeworth David, shows that the rock has many points of resemblance with that of the Capo di Bove near Rome and that of the Leucite Hills in Wyoming, U.S.A. The leucite-crystals are small, and occasionally exhibit the symmetrically-arranged inclusions so characteristic of the more minute rock-forming leucites; on the other hand, they only rarely exhibit the anomalous double refraction so constantly found in large porphyritic crystals of the same mineral. The leucite-crystals of the Byrock-lava contain crystals of apatite and occasionally of augite as inclusions.

The minerals associated with the leucite are augite, which occurs in minute prisms, and with the leucite grains makes up the bulk of the rock; and a peculiar biotite, of a yellow colour and distinguished by its feeble absorption and pleochroism, occurring in large irregular crystals which enclose the smaller individuals of leucite and augite: a very similar biotite also occurs in the Capo di Bove and Leucite Hills rocks. Melilite crystals I failed to detect, but olivine granules of considerable size are prominent among the porphyritic constituents of the rock. As the rock contains so considerable a quantity of olivine, it must be called, if we follow the nomenclature of Rosenbusch, a "leucite-basalt," while the Capo di Bove and Leucite Hills rocks belong to the group of the "Leucitites."

The lava contains a few inclusions of a foreign material, but a fuller description of these and of other peculiarities of this interesting rock may be deferred till other specimens of it have been obtained.