

A Peculiar Copper Ore from Coombing Copper Mine, Carcoar, New South Wales.

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Read September 2nd, 1881.

A dark-grey, almost black, copper bearing mineral, somewhat resembling Redruthite in general appearance, but of a duller lustre and considerably harder; the hardness being between 5 and 6. In parts a bronze tint and lustre is apparent. The specimen exhibits neither crystals nor crystalline structure, it breaks with a well marked conchoidal fracture. Lustre somewhat resinous; streak shining.

Heated in a glass tube it gives off water, having a strongly marked acid reaction, from the sulphurous acid which is evolved. Before the blowpipe it does not fuse, colours the flame green, and acquires a dull black colour. Treated with strong boiling nitric acid it is rapidly acted upon, a bronze coloured residue being left, the residue when examined under the microscope presents a honey-combed appearance; the walls of the irregular cellular cavities are pale-brown and translucent and apparently composed of quartz; when the powdered mineral is boiled with nitric acid, a white residue of silica is left. Concentrated hydrochloric acid also dissolves out the copper, etc., but much more slowly.

The mineral is intimately associated with quartz, both ordinary white vein quartz and a translucent variety of greyish tint; this grey tint seems to be due to diffused very finely divided copper subsulphide.

The specific gravity of a portion quite free from visible quartz was found to be 3.12 at 18°C.

The following analysis was made upon a portion which appeared to be perfectly homogeneous even under a one-inch objective, yet this yielded over 43 % of silica.

Analysis.

Water, combined	2.354
Silica	43.420
Copper subsulphide (Cu ₂ S)	45.196
Iron Sulphide (FeS)	4.931
„ Sesquioxide	3.479
Undetermined and loss620

100.000

The combined water was determined directly by collecting and weighing it in a chloride of calcium tube, a layer of lead oxide being placed in the front part of the combustion tube to arrest any sulphur or sulphur oxides.

The amount of silica soluble in a boiling solution of sodium carbonate was also determined in two other specimens.

	I.	II.
Soluble silica	14.69	19.99
Insoluble	22.13	14.81
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Total silica ..	36.82	34.80

The mineral therefore appears to be merely an intimate mixture of amorphous and crystalline quartz, with copper subsulphide and more or less iron combined with oxygen and sulphur.

III.—On the occurrence of *Linarite* in Slag.

By PATRICK DUDGON, Esq., Cargen, Dumfries.

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WITH reference to Mr. Terrill's notice of "Crystallized products found in smelting operations" (Min. Mag. No. 19, p. 133) it may be interesting to notice the occurrence of *Linarite* in the cavities of the slag from an ancient lead smelting place in this neighbourhood. There are several ancient smelting places in the district where both lead and iron have been smelted, from the remnant of pottery found at the places they are evidently of Roman origin; there are no written records whatever of smelting operations having been carried on in this district, and it is difficult to conjecture where the ores smelted came from, the nearest known lead viens being 40 miles distant, and although insignificant veins of hematite occur in the neighbourhood, it seems impossible that sufficient quantities of the ore could have been collected in the vicinity to account for the very considerable heaps of iron slag found in two or three places. On examining one of the lead smelting places, on the farm of Martingarth, parish of Troqueer, I broke up some of the slag, and in some of the cavities found well-formed crystals of *Linarite*: the crystals are small, not above from 2 to 3 mm. in length, but perfectly defined and unmistakable; it is most probable that the mineral has gradually crystallized in its cavities during the long period the slag has been exposed to the atmosphere, and not that it was formed during the process of smelting. I found no other crystallized minerals in the cavities.

The process of smelting appears to have been very imperfectly carried on, many pieces of unreduced galena and globules of lead being found in the slag.