

Note on the Occurrence of Melanterite in the Upper Eocene Strata of the Thames Basin.

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UNDER the name of "Copperas" Bristow describes melanterite as occurring, among other localities, in the Bagshot formation in Dorsetshire (Glossary of Mineralogy). In Naumann-Zirkel's Mineralogie (p. 491) it is stated that it seldom occurs distinctly crystallised in Nature. Its derivation from iron pyrites, by the combined action of water and the atmospheric oxygen carried into the ground in solution in rain-water, is well known.

The purpose of the present note is to record its occurrence in the Upper Eocene or Bagshot strata of the London Basin. Last winter a well was dug near Wellington College Station on the South-Eastern Railway into the uppermost beds of the so-called Bracklesham or Middle Bagshot. At this horizon beds of sand and clay, often constituting a very good "brick-earth," when well mixed, are of common occurrence. In the present instance thin bands of a very hard puce-coloured clay were interlaminated with thin bands of rather coarse sand, which was coloured in many places with a bright green. Grains of glauconite might be detected, but the generally-diffused green colour of the sand-layers could not be attributed to the presence of that mineral; the colour, moreover, was a bottle-green rather than the dark olive-green of glauconite. The beds in question were met with at a depth of 5 to 13 ft. from the surface of the ground, and contained layers of lignite, a common accompaniment of FeS_2 in this formation.

A considerable quantity of the material of the beds described was reserved and exposed to atmospheric desiccation indoors. The result was that in a few weeks the diffused green colour disappeared for the most part, giving place to a rusty brown, as sulphate of iron is known to do when

exposed to the air for a time, through the peroxidation of the base of the salt. This change at once suggested the presence of a native hydrated sulphate of iron; and this proved to be the case, ordinary qualitative analysis showing the presence of both iron and sulphuric acid.

A partial quantitative analysis was then made of a portion of the sandy material collected from the small patches which still retained a distinctly green colour. In order to avoid the risk of any loss of sulphuric acid from the substance by dry distillation it was thought best not to dry the substance at such a temperature as should secure the expulsion of all the water before weighing the sample dealt with; preliminary weighing was therefore dispensed with. The sample was digested in excess of distilled water for a day or two, then filtered.

The *residue* from this was dried at 120°C . in an ordinary drying-oven, and on being weighed gave 1.695 grams of a clean gritty sand, with a trace of argillaceous and carbonaceous material. The green tint had entirely gone even before it was dried.

In the *filtrate* the sulphate was precipitated by BaCl_2 , with the usual precautions and 0.16 gram of BaSO_4 was obtained. By a simple calculation the equivalent weight of anhydrous FeSO_4 was found to be 0.104 gram. Adding now $7\text{H}_2\text{O}$ for the water of hydration of the native mineral, we get 0.19 gram of the hydrated salt as the equivalent of the 0.104 gram of the anhydrous salt. This gives 12.4 per cent. nearly as the proportion of the mineral melanterite in the sample examined.

The result is interesting, as throwing light in some cases upon the origin of the diffused green colour met with at various horizons in the sands of this and other geological formations; and this must be the excuse for the appearance of the present short note.