

species, firstly, by its circular outline; secondly, by the nuchal notch reaching backwards nearly to the centre of the carapace; thirdly, by the different slope of the nuchal suture.

The fauna of the "Colonie Haidinger" shows the same composition as the lowest Graptolitic horizon of stage E—e 1. The most common fossils of this "colony" being *Monograptus Becki*, Barr., and *Rastrites peregrinus*, Barr.

Having no sufficient materials, I will not discuss the question if the shields called *Discinocaris* should be regarded as opercula of Cephalopods or carapaces of Phyllopodiform Crustaceans; but it must be remarked that no trace of Cephalopods has yet been discovered in the "Colonie Haidinger."

III.—A NEW BRITISH PHONOLITE.

By FREDERICK H. HATCH, PH.D., F.G.S.

(By permission of the Director-General of the Geological Survey.)

IN working out, at the request of Sir Archibald Geikie, the petrography of the Lower Carboniferous Volcanic rocks in Had-dingtonshire (the results of which I propose shortly to publish), I have been led to examine the igneous material that builds up the isolated hills (*necks*), situated on the margin of the volcanic area of the Garlton Hills. Among these, the rock of Traprain Law especially attracted my attention. It is a close-grained, dark brown to grey rock. Some varieties have a glistening or greasy surface, and are speckled over with dark spots, while others show glancing cleavage surfaces of a clear glassy felspar (sanidine).

The stone is quarried at the foot of the hill. On examining the broken material in the quarry, I noticed a tendency to split into rather thin plates. This "platy fracture," taken in conjunction with the fact that the stone has a remarkably sonorous ring under the hammer, and gives a metallic clink when small fragments are rattled together, might perhaps have suggested its real nature. But it was not until I had studied a series of thin sections that the true character of the rock became apparent. Microscopic examination shows that the rock is a *trachytic phonolite*, and thus adds another to the sparsely developed nepheline-rocks of the British Isles.

As I intend to describe this occurrence more fully elsewhere, I will confine myself in this place to a brief description. The rock bears no resemblance to the well-known phonolite of the Wolf Rock, described by Mr. Allport in 1871. It differs from that rock in the absence of members of the hauyn-nosean group, and by an inferior development of nepheline.

Instead of occurring in clearly discernible crystals, as in the Cornish rock, the nepheline of the Traprain Law phonolite is confined to small colourless to cloudy patches, or is interstitially wedged in between the felspar-lathes of the ground-mass. The satisfactory identification of nepheline when thus developed is the source of much trouble and vexation of spirit. Taking refuge in micro-chemical methods, I found that a drop of hydrochloric acid,

placed on a smooth surface of the rock, rapidly produced gelatinization, and that the jelly, when dried and treated with acetate of uranium, developed abundant characteristic crystals of the double acetate of uranium and sodium. The presence of a sodium-bearing mineral in the rock was thus placed beyond doubt. By treating a section with hydrochloric acid, and staining with fuchsin, after washing off the acid, the nepheline-patches were fairly well defined. Finally, to make quite sure of the matter, I sent a specimen of the rock to Professor Rosenbusch, of Heidelberg, who was good enough to have a very thin slice prepared, in which he succeeded in detecting the presence of small four- and six-sided sections of nepheline. Prof. Rosenbusch confirms my diagnosis of the rock, and refers it to the trachytoid division of the phonolites in his classification (*Physiographie der massigen Gesteine*, vol. ii. p. 622).

The main portion of the rock is made up of small lath-shaped crystals of sanidine, presenting in their mode of arrangement a marked micro-fluidal structure. Porphyritic crystals of sanidine also occur, but not very frequently. The only other constituent of any moment is a green augite giving high extinction angles. The presence of aegirine has not been detected. Apatite and sphene also occur in isolated granules. In the nepheline-patches the alteration of that mineral has given rise, as usual, to the formation of zeolites (analcime and natrolite).

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IV.—DRIFT COAL IN SANDSTONE.

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THE most exclusive advocates of the hypothesis of the terrestrial origin of Coal admit that those small irregular patches, veins, and nests of the same occurring in beds of sandstone are formed of drift vegetation. And admitting this, it is difficult to draw the line until we have ascribed a similar origin to certain definite coal seams of considerable extent. Granting this much, however, is obviously a different thing from the belief that *all* coal seams are to be ascribed to drift vegetation; and while the following remarks are intended to show what a strong argument such drift coal in sandstone furnishes for the *probable* drift origin of *certain* coals, there is no intention of ascribing such an origin to *coal in general*.

Such drift coal in sandstone is of very common occurrence in the Coal-measures, and good examples are to be seen in the coast-section of the Northumberland coal-field. It seems strictly analogous to those similar patches of shale which are also common in sandstone, and the same origin must be ascribed to both.

The explanation in the case of the shale is, that the currents which brought the coarser material of the sandstone failed at intervals, and that consequently the finer sediment—which would otherwise have been carried further and laid down by itself—was allowed to settle in hollows among the coarser, and was in turn overlaid by it when