

NOTICES OF MEMOIRS.

I.—NOTE ON THE OCCURRENCE OF LEUCITE AT ETNA.¹ By H. J. JOHNSTON-LAVIS, M.D., F.G.S.

SOME years since, whilst on a visit to Etna, my attention was drawn to some superficially placed tuffs of a chocolate to a coffee-brown colour. In these tuffs, near the Casa del Bosco, are observable included pieces of scoriaceous lava which to the naked eye are evidently leucitic; that mineral occurring in well-formed crystals attaining to some millimetres in diameter, and brilliantly white as the result of fairly advanced kaolinization. In consequence of this change the rock is excessively friable, and, therefore, difficult to sectionize. A section of it, however, was exhibited at the meeting, and also two photo-micrographs therefrom. In these it will be seen that kaolinization has extended along the fracture planes of the leucites, whilst the beautifully formed pyroxene crystals are unaltered, and the triclinic felspars are fairly in a normal condition. The base is a microlitic net-work of felspar and pyroxene, together with beautifully minute cubes and octahedra of magnetite, rendering the substance intervening between the crystals almost opaque, even in thin sections. The pyroxene is often enveloped in a casing of leucite, as at Vesuvius, Roccamonfina, etc., confirming what I have asserted in other places, namely, that leucite is one of, if not the latest mineral to crystallize.

I regret that I have not the opportunity of investigating the question of the origin and age of this rock more completely, as on writing to my friend Prof. O. Silvestri, inquiring if leucite had yet been encountered at Etna, I received a categorical answer in the negative which, coming from such an authority, must be taken as conclusive as to the rarity of leucitic rocks being produced from Etna.

The discovery of this mineral at Etna is what one would have looked for, knowing as we do its wide distribution in nearly all the other late basic volcanoes of Italy.

II.—AN IGNEOUS SUCCESSION IN SHROPSHIRE.¹ By W. W. WATTS, M.A., F.G.S., Fellow of Sidney College, Cambridge.

THE author described the succession of igneous rocks in the Shelve and Corndon district of Shropshire. 1. There is a series of *andesitic* ashes interbedded at two principal horizons in the Ordovician sequence. These have a percentage of silica varying from 63–60. 2. Then come three sets of intrusive masses. *a. Andesites* (59–54 per cent. of silica); these are intruded into Ordovician rocks and never touch the Silurian of the district. *b. Dolerites* (49–47 per cent. of silica), which are post-Silurian in date. *c. Picrites* (40–34 per cent. of silica), of later date. There are undoubtedly rocks intermediate in age and composition, but it is difficult to be quite sure of this where the differences in composition are so slight. One,

¹ Read before Section C. (Geology) British Association, Bath, September, 1888.

however, the dolerite of Llanfawr, is a very basic dolerite, coming between the normal dolerites and picrites. In minerals a similar transition is to be noted. The andesites are rich in hypersthene, the dolerites rather richer in augite, while olivine and brown mica occur in the picrites. The author believed that the felspars became most basic in the more basic rocks, but he had not yet fully investigated this point. Another curious point was that the mineral aggregates in the glomero-porphyrific andesites are practically pieces of the ophitic dolerites. The determination of the specific gravities gave a similar sequence, the lighter rocks having been intruded last. Each of the irruptive rocks occurred in laccolites along the main anticline of the district, and also in the dykes and fault lines.

III.—ON THE LOWER CARBONIFEROUS ROCKS OF GLOUCESTERSHIRE.¹

By E. WETHERED, F.G.S., F.C.S., F.R.M.S.

IN Gloucestershire there are two Coal-fields, namely, that of Bristol and the Forest of Dean. The Carboniferous Limestone Series of Gloucestershire was long ago divided by Sir H. De La Beche as follows :

UPPER MIXTURE OF SANDSTONES.		Clifton.	Forest of Dean.
		Feet.	Feet.
Marls and Limestones	400	146
Central Portion...	1438	480
Lower Shales	500	165
		2338	791

The author has proposed some detailed alterations with regard to the Bristol Coal-field which are stated in the Quart. Journ. Geol. Soc. for 1888, p. 187, but the above divisions have been generally accepted under the terms Lower Limestone Shales, Carboniferous Limestone, and Upper Limestone Shales. Professor Hull has given a classification of the Carboniferous Series throughout the country (Quart. Journ. Geol. Soc. 1877), based on the various stages which occurred during the deposition of the rocks. The author supports the principle of that classification, and is of opinion that the Lower Carboniferous rocks of Gloucestershire might be correlated with the same formation in the North of England. If this could be done, it might be possible to adopt terms for the respective stages which would apply to the North and South of England, and thus avoid the complication of terms now in use.

The author then recited the stages which occur in the Carboniferous Limestone of Gloucestershire. Above the Old Red Conglomerate there appears a series of sandy beds which are best developed in the Forest of Dean. These consist of micaceous green shales and red, purple and yellow sandstones. Some are calciferous and readily effervesce when treated with acid. No fossils have been found, but quartz pebbles occur in some of the beds.

The strata just referred to pass up into limestone and shales, the

¹ Read before Section C. (Geology) British Association, Bath, September, 1888.

so-called Lower Limestone Shales. In the Forest of Dean the limestones are largely made up of the valves of Ostracoda, among which the following have been determined: *Kirkbya variabilis*, *K. plicata*, *Cytherella extuberata*, *Bythocypris sublnata*, and *Darwinula berniciana* (?). Among the other fossils which are numerous may be mentioned *Athyris Royssii*, *Rhynchonella pleurodon*, *Encrinites*, and *Polyzoa*. Among the latter the following have been determined: *Rhabdomeson gracile*, Phill., and *Fenestella tuberculocarinata*, Ether. jun. In the Lower Limestone Shales of the Bristol Coal-field Ostracoda are not so plentiful, though in some beds the valves of these small Crustacea are numerous. *Rhynchonella pleurodon*, *Athyris Royssii*, *Productus*, *Spirifera*, Crinoids, and *Polyzoa* occur. At Clifton the Lower Shales are followed by a Crinoidal Limestone known as the Black Rock, which is about 490 feet thick and is not represented in the Forest of Dean. The Black Rock series are followed by 70 feet of Dolomite, and then by about 100 feet of white oolitic limestone which the author regards as the true base of the Middle or Carboniferous Limestone. The author has grouped the Lower Limestone Shales with the Black Rock under the term Lower Limestones, and he considers the stage to occupy the horizon of the Tuedian and Calciferous series of the North of England and Scotland. As to the sandy beds which lie between the Old Red Conglomerate and Lower Limestone Shales, the author regards them as the equivalent of the lower portion of the Transitional series of Phillips and the Calciferous of Scotland. The true upper limits of the Old Red Sandstone should be drawn at the Old Red Conglomerate.

As to the Middle Limestone there can be no doubt that it is the equivalent of the Carboniferous Limestone as generally understood, a term which the author thinks objectionable, and he would term the whole series Carboniferous Limestone. The Middle Limestone is largely made up of *Foraminifera* and *Calcisphæra*, but Corals, *Polyzoa*, Crinoids, and shells occur, sometimes in quantity. In the Forest of Dean the Middle Limestone is extensively dolomitized.

Coming to the Upper Limestones; at Clifton it is difficult to draw the line at which the series should commence, as there is little alteration in the structure from that of the Middle Limestones. Corals are more numerous, coarse oolitic beds appear, and the beds become mixed with Millstone-grit. In the Forest of Dean the upper stage is well and clearly defined by two characteristic limestones known as 'Crease' and 'Whitehead.' The former of these has become partially crystallized, but in some beds shells of *Productus* are numerous, and also *Calcisphæra*.

The Millstone-grit is about 900 feet thick in the Bristol Coal-field, and is a hard, slightly pink-coloured quartzite. In the Forest of Dean it is about 270 feet, and is a loose yellow, red and mottled sandstone made up of well-rounded grains of quartz. The lowest beds are argillaceous, and contain remains of *Lepidodendra*.