

Didymograptus bifidus beds: blue shales with occasional ashes, passes down into:—

D. hirundo beds: dark calcareous shales, with some ashes.

Calymene ashes, with some calcareous material and occasional shaly beds.

D. balticus flags, quartzose flags with shaly partings.

Basal grit.

Unconformity.

Shumardia shales, passing down into:—

Asaphellus flags.

Bellerophon beds: hard shales, with *Parabolinella Salteri* in upper part.

Dietyonema band, } not well exposed.

Niobe beds,

Peltura beds, with *Niobe* and *Psilcephalus* near the top, and *Peltura* abundant in the middle part. These are separated by thin beds with *Orthis lenticularis* from:—

Parabolina beds, with *P. spinulosa*.

The unconformity marks the base of the Arenig Series. The *Orthis* limestone yields Lower Caradoc Sandstone forms, and dips beneath the great Black Shale Series, which occupies the adjoining belt of country.

The author discusses the relationship of these divisions to corresponding beds of other areas. He gives a description of the intrusive igneous rocks, and some account of the structure of the district and the nature of its glaciation.

CORRESPONDENCE.

CAVITIES IN CRYSTALLINE ROCKS.

SIR,—The cavities in the granite of Madagascar, described by the Rev. R. Baron in your January number, appear to be even more remarkable than those in Corsica and Portugal. But his explanation, though very ingenious, is, I think, attended by difficulties of its own. Between the ordinary drusy cavities and these large smooth hollows the gap seems wide and incompletely bridged by any of comparatively small size. Also, might we not expect that such hollows would sometimes be cut into by quarrying, and then have attracted notice? I cannot remember to have read of their occurrence, and have never met with anything of the kind, though I have been in several quarries, including the one mentioned at Ajaccio itself. Again, several of these hollows at that place occur rather as depressions on the surface of a block than as holes in it, and in positions unfavourable to the idea that any fairly thick slice has been removed from the rock in comparatively recent times. Of such the cavity represented on p. 390 of the *GEOL. MAG.*, August, 1904, may serve as an example, and I remember others in similar positions on the slope behind Ajaccio. Moreover, as the granite is generally in good preservation, showing, as Mr. Baron also remarks, only a little surface-decomposition, it must be weathering away slowly, and it is rather surprising to find the cavities retaining their superficial glaze. His description, however, seems to exclude the explanation of sand blast, and makes that of water corrosion still more difficult. But a serious objection to his own hypothesis has, I think, been overlooked. At least one of the cavities described

by my friend Mr. Tuckett was not in granite but (as described by myself on p. 12 of last year's volume) in a rock which was more nearly allied to the pyroxenites and bore every appearance of having had the structure completely altered by pressure, which should have destroyed any pre-existent cavities. Thus, though deeming myself fortunate in having elicited such an interesting contribution to the discussion, I do not yet see my way to adopting his explanation of the difficulty.

T. G. BONNEY.

THE EASTERN GNEISSES OF THE SCOTTISH HIGHLANDS.

SIR,—Mr. G. Barrow's paper on the Moine Gneisses of the Highlands (Quart. Journ. Geol. Soc., November, 1904) revives memories of old controversies. In 1883 I gave reasons (Q.J.G.S., pp. 355-414) for believing that the thin-bedded gneisses east of the line of the great overthrust were older than the Assynt Series (now proved to be Cambrian), and I proposed to call them 'Caledonian.' Professor Lapworth's brilliant work on the dynamo-metamorphism of the Highland region quickly followed, and it suggested the possibility that the Eastern Gneiss was a *mélange* of rocks of different kinds and ages which had been rolled out in the earth-mill. However, the researches of the Geological Survey seem to have rehabilitated my original contention, since they lead to the conclusion that these gneisses, in the words of Dr. Horne, "represent sediments of siliceous and argillaceous type." Sir A. Geikie in 1891 proposed the name 'Dalradian' for the gneisses and associated rocks of the southern Highlands; but these are now correlated by the Survey with the Moine Gneisses of the north-west, that is, with my *Caledonian*. I held that these rocks were pre-Cambrian, but newer than the Hebridean; and this, I understand, is the view which Dr. Horne is disposed to adopt, when, in the debate on Mr. Barrow's paper, he points out resemblances between them and the pre-Torrionian schist north of Loch Maree. If therefore any name is to be given to these eastern gneisses, I respectfully submit that 'Caledonian' has priority over 'Dalradian.'

Mr. Barrow's memoir suggests another point. In my papers on the "Crystalline Rocks of Malvern" (1887-1893), I contend that black mica is produced from chlorite. This view was received with opposition. The peaceful pages of the GEOLOGICAL MAGAZINE resounded with the weighty artillery of the late Lieut.-General McMahon thundering against "The Rape of the Chlorites." I declined to surrender, and now I am supported by Mr. Barrow, who remarks (p. 414) that "A striking feature of the grey gneisses is seen in the films of felted biotite, derived from original clastic chlorite . . ." If chlorite is changed to biotite in Scotland, why not at Malvern, where too the associated acidic and basic rocks readily account for the necessary potash and iron-oxide? Since my heresy receives such respectable support it would seem to be worthy of reconsideration.

C. CALLAWAY.

CHELTEMHAM.

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