

SPECIAL REPORTS ON THE MINERAL RESOURCES OF GREAT BRITAIN.  
VOL. XXIX. IRON ORES: BEDDED ORES OF ENGLAND AND WALES. PETROGRAPHY AND CHEMISTRY. By A. F. HALLIMOND, with an Appendix by F. R. ENNOS and R. SUTCLIFFE. pp. v + 139, with 8 plates and 3 text-figures. Mem. Geol. Survey, 1925. Price 3s. net.

FOR many years past there has been much discussion as to the origin of sedimentary ironstones in general and of the oolitic varieties in particular. Till recently the opinion certainly prevailed that oolitic ironstones were derived by metasomatic replacement from limestones at a date often long subsequent to their formation. The whole trend of recent work, however, has been to discredit this hypothesis; both Cayeux, in his monumental work on the Lorraine ores, and Hayes, in his descriptions of the Newfoundland stone, have pronounced strongly in favour of the view that they are now substantially in their original condition, and that the iron is essentially a primary constituent.

The painstaking and detailed work carried out by the author of this excellent memoir has led him to adopt a precisely similar view, and it really seems that the older metasomatic theory will have to be definitely abandoned, much as this is to be regretted, owing to its beautiful simplicity and air of probability, but facts are too strong for it, and experimental work yields only negative results.

In this work Mr. Hallimond has devised a scheme of classification for sedimentary iron ores, based solely on mineralogical and chemical characters without regard to theories of origin. In most cases the form in which the iron occurs has been definitely identified, and a clear distinction arises between the ferrous ores with siderite and chamosite on the one hand, and the ferric ores with limonite or other ferric oxide, magnetite, and pyrite. In all the green ores, whether oolitic or not, a chlorite, nearly always chamosite, is present. Thuringite has only been recognized doubtfully in the magnetite ore of Rosedale, an altogether peculiar and aberrant type. In the fresh Middle Lias and Inferior Oolite ores the iron is present as chamosite or siderite, usually both.

The conditions of formation of all the types are very fully discussed, some being marine, some freshwater (mainly from the Coal Measures), while some are assigned to the lagoon facies. This section is too long to be summarized here, and an abstract in any case would fail to do it justice. The chapter should be carefully read by all who are interested. Essentially all the ores are considered to be inorganic chemical precipitates, although it is recognized that bacteria or other organisms may have played an important part. The conditions of precipitation for each mineral are carefully considered on the basis of the ionization theory, and the whole subject is treated mainly from the chemical point of view, employing a very large number of new analyses carried out by methods devised by Messrs. Ennos

and Sutcliffe, who contribute a useful appendix describing these methods. Many analyses from other sources are also utilized, being as a rule recalculated into minerals.

The memoir is illustrated by a large number of excellent photographs of micro-sections.

---

SPECIAL REPORTS ON THE MINERAL RESOURCES OF GREAT BRITAIN.

VOL. XXX: THE COPPER ORES OF THE MIDLANDS, WALES, THE LAKE DISTRICT, AND THE ISLE OF MAN. By H. DEWEY and T. EASTWOOD. pp. v + 87, with 6 plates. Mem. Geol. Survey, 1925. Price 2s. net.

**I**N this volume are gathered together accounts of all the copper ores of England and Wales not yet described in this series of Reports. They form rather a miscellaneous collection of widely scattered occurrence and varying origin, but show several points of interest. The most peculiar type is the copper ore disseminated in Trias sandstones, such as that of Alderley Edge. Of these a very full account is given, though no very definite conclusion is reached as to their origin, which is one of the puzzles of geology. Other small occurrences of the same kind are numerous in the Midlands, though of little importance.

Many of the more important copper deposits of the Lower Palaeozoic rocks also yield lead and zinc, so that there is bound to be a certain amount of overlap between different memoirs of this series, but this repetition has wisely been avoided as much as possible. The question of the age and relationships of these ore-deposits is still rather obscure, and its investigation is now rendered difficult by the closing of most of the mines. The writer of this review recently visited some of the old mines of the Lake District with a view to work on this point, but found little except scenes of desolation. It is difficult now to believe that 100 years ago British copper dominated the world's market; the Parys mine in Anglesey was perhaps then the most important copper mine in the world.

The authors of this memoir have done their work well in correlating all available information as to what appears to be a vanishing industry, and it will be of great value as a record and a starting point for new developments should conditions ever improve.

---

A STRATIGRAPHICAL SURVEY OF THE PLIOCENE DEPOSITS AT TJÖRNES, IN NORTHERN ICELAND. By G. G. BARDARSON. K. Dansk Vid. Selskab. (Biol. Medd., IV, 5), 1925. 118 pp., views, and section. Price 9 kr. 75.

**M**R. BARDARSON, who spent some months in England in 1924, has produced a valuable memoir on these late Tertiary beds, with a section between Kaldakvisl and Höskuldsvik at Tjörnes, on a scale of about 50 metres to 1 inch. He estimates the beds at