

NOTICES OF MEMOIRS.

I.—SKURINGSMÆRKER OG MORENEGRUS EFTERVIST I FINMARKEN FRA EN PERIODE MEGET ÆLDRE END "ISTIDEN." Udgivet af Dr. HANS REUSCH. (Med "An English Summary of the Contents.") Norges geol. undersøgelses Aarbo for 1891, pp. 1-11.

GLACIAL-STRIÆ AND BOULDER-CLAY IN FINMARK, BELONGING TO A PERIOD MUCH OLDER THAN THE "ICE AGE." By Dr. HANS REUSCH, Director of the Geological Survey of Norway.

THE northern shores of the interior of the Varangerfjord, at the far north of the Scandinavian Peninsula, consist of a low range of hills, mainly of sandstone and conglomerate, the beds of this latter rock reaching a thickness of 50 mètres. The conglomerate is entirely unstratified; it is composed of stones and small boulders, about the size of one's head, of Archæan gneiss, granite and diorite, with a slight admixture of fragments of dolomite and quartz, which are irregularly scattered in a ground-mass of reddish clayey sandstone. The general appearance of this rock so much resembled Boulder-clay that Dr. Reusch was induced to search the stones in it carefully, and he found definite well-marked scratches on some of the fragments of dolomite, whilst the surfaces of some of the pieces of harder rock were smooth and even, with traces of striæ. These markings were precisely similar in character to those produced by ice-action on the same kinds of rock in comparatively recent Boulder-clay, and could readily be distinguished from slickenside markings which were found to be present in the conglomerate as well. The evidence of ice-action was further shown by the presence of striæ and grooves on the surface of a hard sandstone immediately beneath the conglomerate, which had been laid bare by the weathering away of this latter. The striæ appeared to belong to two systems, and they could be traced up to and beneath the conglomerate.

The geological age of these ice-marked sandstones and conglomerates has not yet been satisfactorily determined; by Dr. Dahll they are considered as Permian, but Dr. Reusch thinks that they belong more probably to some portion of the Cambro-Silurian series, which prevails so extensively in Scandinavia; hitherto no traces of fossils have been found in them. If this view is correct, the discovery of what appears to be satisfactory and conclusive evidence of the presence of glacial action at this far distant period is a matter of considerable geological interest. In the paper Dr. Reusch gives figures of the scratched stones, with profiles and sketches of the rocks in which they occur.

G. J. H.

II.—NATURAL HISTORY TRANSACTIONS OF NORTHUMBERLAND, DURHAM, AND NEWCASTLE-UPON-TYNE. Vol. X. Part II. (1890.)

TWO important contributions to the Geology of Northumberland and Durham, by Mr. Richard Howse, are comprised in the latest part of these Transactions. The first is a short paper on the South Durham Salt Borings, with remarks on the fossils found in the Magnesian-Limestone cores, and the geological position of the

salt. Mr. Howse attempts to prove the identity of the Upper Limestone in the salt-borings in South Durham with the Brotherton Beds in South Yorkshire, and the identity of both of these with the Plattendolomit of Germany. He also regards the lowest deposit of Rock Salt as of Permian age. The second contribution is a "Catalogue of the Local Fossils in the Museum of the Natural History Society of Newcastle-upon-Tyne," which occupies sixty pages, and was originally issued as a separate publication at the time of the British Association Meeting in 1889. This is interspersed with numerous notes on stratigraphy, which are rendered invaluable by Mr. Howse's long experience in the detailed study of the district. The localities from which the specimens were obtained are mentioned under each species, and a reference is given to the record of its occurrence when already published.

III. — DESCRIPTION DES SYÉNITES NÉPHÉLINIQUES DE POUZAC HAUTES-PYRÉNÉES) ET DE MONTRÉAL (CANADA) ET DE LEURS PHÉNOMÈNES DE CONTACT. By M. A. LACROIX. (Bull. Soc. géol. France (3), xiii. 1890, No. 7, pp. 511-58, pls. ix.-xii.)

THE many important contributions to our knowledge of the nepheline syenites made during the past few years by Brögger Tornebohm, Van Werwerke, Derby, and others, have received an important accession in the above Memoir by M. Lacroix. He here describes in detail the nepheline syenites of Pouzac and Montreal and their contact phenomena. At the former the rock is intrusive into a limestone, which is probably Cretaceous; the rock is of especial interest in connection with the alteration products. Thus the nepheline has given rise to (1) zeolites such as mesotype and hydronephelinite; (2) to white mica (gieseckite); (3) to garnets (of the ouwarowite type), which either replace the whole of the nepheline or are developed along the cleavage-planes; (4) to cancrinite; the amphibole (barkevicite) is altered to green mica, and the pyroxene is often surrounded by a zone of aegyrine. On the selvage the rock passes into a variety in which the magnetite, apatite, sphene, etc., and the ferromagnesian minerals (that is to say, those of the first two phases of the first stage of consolidation) are absent, and the sodic minerals (nepheline and sodalite) are replaced by a felspathic microlitic growth; the result is a rock comparable to the tinguaites of Prof. Rosenbusch, which in Brazil and Portugal are regarded as apophyses from nepheline syenite. Dipyre, actinolite, and pyrites occur in the limestone at the contact.

The nepheline syenite of Mont Royal, Montreal, pierces the Trenton limestone, and is itself of Silurian age. It is the principal member of a group of igneous rocks which includes some diabases, teschenites, and porphyrites. The diabases and teschenites both belong to a series resulting from the solidification of the same magma; the teschenites differ from the diabases in the presence of nepheline and sodalite; when olivine also occurs, the rock becomes one of the true teschenites (of Fouqué and Michel-Lévy) or theralites of Rosenbusch.

The normal porphyrites are probably microlitic forms of the diabase, just as the nephelinites with which the former are associated (occurring especially at the Mile End Quarries) are of the teschenites. At St. Anne there is a melilite of the same age as the other rocks of this group—a point of interest, as this variety has hitherto been regarded as confined to the Cainozoic.

The dominant type of the nepheline syenite is a rock with granitic structure and composed of grey or pink felspar, nepheline, sodalite, amphibole, pyroxene, and mica. The complete list of minerals numbers twenty-one, and these are all described in detail; the alteration products are similar to those of Pouzac. There are also some pegmatitic veins. Amongst the most important points in the memoir are those connected with the contact alteration of the rock: at places the normal structure is retained at the junction, but in other cases the rock is profoundly altered for a distance of some metres; the variations afford a complete transition from the granitic (grenu) to the trachytic types of structure, *i.e.* from the normal syenite to the “microsyenite”—a term he proposes owing to the analogy between this rock and the microgranites. The large dyke gives off small branches which traverse the limestone, and these are often composed of many alternating zones of the granitic and trachytic rocks. These dykes further lead to the mica porphyrites; the sodalite and nepheline are absent either owing to original poverty in soda, or to the greater influence of the endomorphic alterations on these thinner veins. The extent of the alteration of the limestone at the contact varies greatly; the minerals developed in the limestone are diopside, wollastonite, garnet, perowskite, and more rarely biotite, sphene, zircon, and felspars. The junction is sometimes marked by a band of cancrinite; but when the felspar is abundant, a zone occurs which may belong to either the eruptive or metamorphic rock.

The memoir is illustrated by twenty-six figures of rock-sections, while the great range in the variations of the rocks is further well brought out by the abundant use of M. Michel-Lévy's formulæ. M. Lacroix, it is interesting to note, rejects at the outset the use of the term *elaolite* syenite, and he lays special stress in his concluding paragraph on the identity in structure and mineralogical composition of rocks of Silurian age in Canada with those intrusive in the Cretaceous Limestone of the Pyrenees. J. W. G.

IV.—PHENOMENA OF THE GLACIAL EPOCH. PART II. THE GREAT SUBMERGENCE. By DUGALD BELL. Trans. Geol. Soc. Glasgow, Vol. IX. pp. 100-138.

BY this Memoir the author has added another name to the growing list of papers written in opposition to the supposed glacial submergence of England and Wales to the depth of over 1300 feet. He summarizes all the evidence in favour of this view, and then subjects it to a careful examination, with the result of dismissing it as absolutely valueless. A submergence of 500 feet is admitted, but this the author attributes to the elevation of the sea-level by the attraction of the polar ice-cap heaping up the water in the northern latitudes. J. W. G.