known and invaluable researches in British granites, shewed that the granite of Leinster contains more soda than will satisfy the condition of its having orthoclase as its only feldspar; and in a recent communication to the Royal Society of London, he stated (I quote from memory) that though Albite had never yet been detected in the Leinster granite, its existence could be inferred with considerable probability.

At any time the discovery of this mineral would be of considerable interest, but it is particularly so just now, as it proves the soundness of the conjecture of Professor Haughton, who has done more than any living geologist towards solving the great problem of the origin of granite.

NOTICES OF MEMOIRS.

I.—Abstract of the Proceedings of the Liverpool Geological Society. Session the Tenth, 1868–69.

IN his anniversary address, read before the Liverpool Geological Society on the 13th October, 1868, Mr. R. A. Eskrigge, F.G.S., the retiring President, made a few remarks on the work done by the Society during the past session. They were then entering upon the tenth session, and the number of members, which at first was six, had increased to fifty-six. Still, within the last four years there had been no advance, the withdrawals having slightly exceeded the number of new members. Mr. Eskrigge, however, was inclined to regard the numerical position of the Society as satisfactory, considering the comparatively small attraction presented by the geological features of their immediate neighbourhood. But there was cause for regret and disappointment in noticing how few members took an active part in their Transactions. A meeting of the British Association in Liverpool was anticipated within two or three years, and the President therefore urged them to greater activity, saying that, as on such an occasion prominence would probably be given to the peculiar features of local geology, it behoved the Society to be in readiness for the work which then would fairly devolve upon them.[1]

The volume of Proceedings now before us contains some notes by Dr. C. Ricketts, F.G.S., on the Silurian and Carboniferous rocks in the neighbourhood of Ingleborough. The latter strata repose, except where faulted, in a strictly horizontal position on the highly inclined and contorted Silurian rocks. In the dales, the Carboniferous rocks have been cut through by the action of subaërial denudation, which has exposed and also deeply eroded the older rocks beneath.[2]

Mr. Charles Potter records some observations on the Cheshire Coast. He describes a section of Peat and Silt beds resting on Boulder-clay.

Mr. Robert Bostock contributes a paper on the New Red Sand-

[1] The meeting of the British Association in 1870 will be held in Liverpool.

[2] For a detailed description of the Silurian rocks reference is made to a paper by Mr. T. McKenny Hughes in the Geological Magazine for 1867, p. 346.

stone as a source of Water-supply. His remarks refer to the neighbourhood of Liverpool, and he discusses the origin of the supply of water. Mr. Bostock had long thought that more water was raised from the wells of the district in one month than the rainfall would supply in twelve; and, from his observations, it appears to him beyond all doubt that the bulk of the water supply is drawn from the sea.

Mr. H. Hicks, F.G.S., furnishes some notes on the Arenig rocks (or Skiddaw-slates) in the neighbourhood of St. David's. His remarks refer more particularly to a set of beds underlying the true Arenig rock, and which have been termed the Lower Arenig rocks by Mr. Salter and himself. They rest upon, and, indeed, graduate into the Lingula Flags. Their thickness is about 500 feet, and they are invariably rich in fossils; the absence of Graptolites is noteworthy. Up to the present time about twenty new species have been discovered in these beds. The Brachiopoda were described by Mr. Davidson in the GEOLOGICAL MAGAZINE, Vol. V., 1868.

In the Upper or true Arenig rock, Graptolites begin to prevail. These beds are less fossiliferous than the underlying series, and most of the species in the two groups are entirely distinct.

Mr. G. H. Morton brings forward some preliminary observations on the Carboniferous Limestone in Flintshire. When his investigations are completed the detailed results will be communicated to the Society.

Mr. Norman Tate, F.C.S., in an introductory paper on the Chemistry of the primæval earth, lays before the Society some of the more important facts which were touched upon during the late discussion between Dr. Sterry Hunt and Mr. David Forbes, and he also points out some other matters which he thinks should be taken into consideration in studying the subject.

Mr. Isaac Roberts writes on the wells and water of Liverpool. He describes seven wells, and notices the mineral matter contained ni the waters. The observations on the source of the water, lead him to a conclusion similar to that at which Mr. Bostock has arrived, in the paper previously noticed.

The last paper is by Mr. G. H. Morton, F.G.S., etc., on the geology and mineral veins of the country around Shelve, Shropshire, etc. A notice of this appeared in the November number of the GEOLOGICAL MAGAZINE, p. 519.

II.—REPORT ON MINERAL VEINS IN CARBONIFEROUS LIMESTONE AND THEIR ORGANIC CONTENTS.[1]

By CHARLES MOORE, F.G.S.

MR. MOORE has for a long time made the phenomena attending Mineral veins in different parts of England, and the Organic remains he has found in them, his special study. In his paper, he first referred to the prevalent ideas which were entertained as to the origin of minerals in veins, some supposing them to be due to sub-

[1] Read before the British Association, Section C., Exeter, August, 1869.

limation, others to segregation. In the first instance, it is believed, they are due to the passage upwards, through the veins, of vapours holding the minerals from the heated interior of the earth; in the latter that they have been extracted from and drawn together from the matrix forming the walls of the veins, and re-deposited therein. The difficulties attending both these popular ideas were then noticed. Referring to Mr. Wallace's theory, that many of the veins had been filled, and the minerals segregated by atmospheric and hydrous agency from the circulation through them of large bodies of water since the Glacial period, he pointed out that in this case the organic remains in the veins would be comparatively recent, and that the remote age of all the fossils was against it. Mr. Moore's view was, that the mineral veins were at first open fissures, in immediate connexion, and filled with the waters of the ocean; and that there would be necessary for the subsequent deposition of minerals therein, the presence of certain minerals in the ancient seas favourable to electrical conditions, and time for their precipitation; and it was stated to be an established fact that the minerals now found in veins are known to be present in solution in the waters of the ocean. The organic remains he had discovered were strongly confirmatory of his view, and the age of different mineral veins could be determined by their presence. Thus, on the Mendips, Liassic fish and testacea in the veins proved the minerals of that district, although enclosed in walls of Carboniferous limestone, to be as young as the Lias, although no Liassic rocks are to be found for several miles; and, in the North of England, some of the veins were shewn to be subsequent to the coal period. The organic remains which were described at length by Mr. Moore, were of the most varied kinds. *Flemingites gracilis*, a small Lycopodiaceous seed of the Coal-measures, had been found in several mines. *Conodonts* (never before observed above Silurian strata), very minute bodies not unlike fish-jaws and spines, but which were supposed by the author of the paper to be either teeth or spines of Nudibranchiate Mollusca, occurred in the veins in considerable numbers, presenting a most remarkable series of forms; and *Entomostraca* of the genera *Bairdia*, *Beyrichia*, *Cythere*, *Cytherella*, *Kirkbya*, and *Moorea*, of about thirty species. *Foraminifera* were abundant, representing five genera, the chief interest attaching to *Involutina*, of which until lately only one species was known, but of which Mr. Moore had found eleven species. Of this class he had also obtained from the lead veins, species of *Dentalina*, *Textularia*, and *Tinoporus*, which had lived on from the Palæozoic age to the present time. Not the least important of his nine explorations had been the discovery of a land and fresh-water fauna. Until lately, the only known terrestrial shell below the Secondary beds was the *Pupa vetusta*, found by Sir Charles Lyell and Dr. Dawson in the Coal-measures of Nova Scotia, but he had now nine genera of land and fresh-water shells from the lead mines of this country, all of them probably of Carboniferous limestone age. These include *Helix*, *Vertigo*, and *Proserpina* land-shells from the Mendip mines, as well as the fresh-water genera of *Planorbis* and *Valvata*, to which, from

the North of England mines, are to be added *Hydrobia, Bythinia, Lithoglyphus*, and *Pisidium*. Fish remains were often found. Under these peculiar circumstances, from mineral veins and fissures of different ages in the Carboniferous limestone, he had discovered the oldest known Mammalia, about thirty-two species of fish, and eight of Reptilia, the oldest land and fresh-water Mollusca, and numerous other remains, numbering in the whole about 267 species.

Mr. H. B. Brady, who had made a special examination of the Foraminifera discovered by Mr. Moore, referred to the great interest attaching to the genus *Involutina*, from the remarkable variety of form his series presented, which had not hitherto been recognized in connexion with the genus.

REVIEWS.

I.—Mr. Waterhouse Hawkins's Restorations of Extinct American Dinosauria.

"THE Twelfth Annual Report of the Board of Commissioners of the Central Park (New York), for the year ending December 31, 1868," gives an account of the progress in the construction and ornamentation of this well-designed and noble work, which is to comprehend all that is agreeable to the healthy recreation of the citizens and serviceable for their intellectual activity. The landscape-gardener, sculptor, and architect have already been successful in carrying out designs, both of high art and of picturesque rusticity. The Naturalist has his Zoological Garden, which is to be useful also to the Cattle-breeder and the Acclimatization Society. The Botanist, the Astronomer, and the Meteorologist are to find aids here in their researches. The Antiquary and Historian will find a Library and Museum. Nor is Geology lost sight of. The ground itself of the Park is not destitute of geological interest; for the labour of upwards of 200 rockmen and blasters,—required to quarry and cut for ponds, rivulets, and roads,—open out sections worth looking at; but the Commissioners determined to increase the value of the Park in an educational point of view by availing themselves of the scientific assistance of Mr. B. Waterhouse Hawkins, F.G.S., well known as the talented constructor of the restorations of Extinct Quadrupeds at the Crystal Palace, in modelling some of the great American creatures of bygone times, of natural size and in life-like form. This Report tells us of the already successful labours of Mr. B. W. Hawkins, in visiting the Museums at Washington, New Brunswick, Albany, New Haven, and Philadelphia, especially the latter, studying these "rich storehouses of fossil treasures, of special value for the purpose of illustrating the gigantic forms of life that originally inhabited this Continent," and reproducing in iron, plaster, and such like materials, the wonderfully bizarre and, as it were, monstrous Dinosaurian forms, cousin-german to our Iguanodons, Hylæosaurs, Scelidosaurs, Megalosaurs, and other Mesozoic Reptiles.

Mr. Hawkins has chosen for his first American restorations *Hadro-*