

## VI.—NOTE ON POST-GLACIAL LAKE-BASINS IN WESTMORELAND.

By S. R. PATTISON, F.G.S.

**T**HE little village of Crossby-Garrett, near Brough, appears to occupy the site of a Post-glacial lake. Lower Carboniferous strata compose the fell to the south, the lowest beds being yellow earthy limestones. Below this, in all the gorges, are deep red shales of the uppermost Old Red, and on the summits of some of the hills to the south are outliers of the New Red; the Drift lies in patches and contains mud, sandstone, and numerous blocks of Shap granite. The gullies coming down from Crossby fell converge at the gate of the village, and show excavation in Boulder drift. The bed of the torrent is dry during the greater part of the year, it receives only the surface water, which, as it falls swiftly down the valley through the Drift, makes rough work of its sides every freshet. Underneath the church hill, at the lower end of the village, the remains are visible of the dam which once enlaked the little valley. It has been clean cut through by the bursting of the Lake, and the banks of the excavation, and bottom of the old lake are now occupied by cottages and gardens. Another small lake existed near the village, in fields still called the tarn-fields, but whilst the former must have been drained, probably in pre-historic times (judging from the subsequent work of the torrent), the latter has disappeared by artificial drainage into the Smardale beck within a century.

The lower limestones where they are exposed in the ravines, are more than usually holed into pots and pans; a notable instance occurs at Great Asby, where the principal pothole in the present course of the stream is 14 feet deep, worked smooth, in the shape of an old oil jar. Close to this are some caves in the limestone, one extending for two miles, which deserves thorough exploration. I saw no trace of cave earth or remains near the entrance. The caves form the outlet for water during much of the year, but there may be remains preserved under some of the upright fissures, in the cheeks of the cavern.

I endeavoured to ascertain the rate of progress in the boring of the pots and pans, but beyond the fact that the breaking in and breaking down of some, had changed the course of the stream within living memory, and that those now receiving the water had sensibly increased within recollection, I could get no fact worth recording. The aspect of these valleys so pitted with bench marks made by the torrents, during many thousand years at least, is worthy of note.

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NOTICES OF MEMOIRS.

I.—LEONHARD UND GEINITZ'S NEUES JAHRBUCH FÜR MINERALOGIE, GEOLOGIE, UND PALEONTOLOGIE. Jahrgang, 1868; Hefte 6 und 7. Jahrgang, 1869; Erstes Heft.

**B**ARRANDE, on the Silurian Fossils of Hof, in Bavaria; Zirkel, on the Distribution of Microscopic Nepheline; Zaddach and

Runge, on the Tertiary Rocks (with Brown-coal, Amber, etc.) of the Samland in the Baltic; Zeuschner, on the Devonian Dolomite between Sandomierz and Chenciny (Poland); Blunn, on some Pseudomorphs; Scharf, on Rock-crystal, from Carrara; Credner, on the Native Copper of Lake Superior; Roemer's account of the Meeting of German Geologists at Hildesheim, and of some other meetings of Naturalists in Germany and Switzerland; Von Haver's notice of the summer work of the Austrian Geological Survey, in 1868; Petersen, on the Basalt and Hydrotrachlyt of Rossdorf, near Darmstadt; Fuchs, on Vesuvian Lavas; and numerous letters by good observers and deep thinkers, on original and casual subjects, constitute the chief matter of these three numbers of the Jahrbuch, besides the usual valuable concise notices of current Geological and Mineralogical Literature. There are several illustrations.

Our German brethren evidently lose nothing of their love of mineralogy and of patient research in the character and history of rock-masses;—subjects that are not widely studied in the British Isles. We see, however, that fossils and geology are not at all neglected, and are well represented in the papers before us. Indeed, we have much to thank the editors and writers of the Jahrbuch for: much new information, carefully worked out, being given in the current parts of this valuable magazine. We hope that its circulation among scientific men in Britain is on the increase.

II. DESCRIPTION OF *PARKERIA* AND *LOFTUSIA*, TWO GIGANTIC TYPES OF ARENACEOUS FORAMINIFERA. By Dr. CARPENTER, V.P.R.S., and H. B. BRADY, F.L.S.

[Communicated to the Royal Society, April 22nd, 1869.]

THE authors of this Memoir commence by referring to the separation of the series of *Arenaceous* Foraminifera from the *Imperforate* or *Porcellanous*, and from the *Tubular* or *Vitreous*, first distinctly propounded in Dr. Carpenter's "Introduction to the Study of the Foraminifera" (1862), on the basis of the special researches of Messrs. Parker and T. Rupert Jones, who had pointed out that whilst there are several genera in some forms of which a cementation of sand-grains into the substance of the calcareous shell is a common occurrence, there are certain genera in which a "test" formed entirely of an aggregation of sand-grains takes the place of a calcareous shell; and that these genera constitute a distinct family, to which important additions might probably be made by further research.

The propriety of this separation of the *Arenacea* from the calcareous-shelled Foraminifera has been fully recognized by Prof. Reuss, the highest Continental authority upon the group; who had come to accept the principle laid down in Dr. Carpenter's successive Memoirs (Phil. Trans. 1856-1860), that the *texture of the shell* is a character of fundamental importance in the classification of this group, the *plan of growth* (taken by M. d'Orbigny as his primary character) being of very subordinate value; and who had, on this basis, independently worked out a systematic arrangement of the entire group, which presents a

most remarkable correspondence with that propounded by Dr. Carpenter and his coadjutors. And their anticipation of important additions to the Arenaceous series has been fully borne out, on the one hand by the discovery of several most remarkable new forms at present existing at great depths in the ocean, which has been made by the dredgings of M. Sars, jun., and those of the "Lightning" Expedition; and on the other by the determination of the real characters of two fossils, one of the Cretaceous, and the other probably of the earlier Tertiary period, which prove to be gigantic examples of the same type.

The first of these, discovered by Prof. Morris more than twenty years ago in the Upper Greensand near Cambridge, was long supposed to be a Sponge; but his more recent discovery of two specimens which had been but little changed by fossilization, led him to suspect their Foraminiferal character; and this suspicion has been fully confirmed by the careful examination made of their structure by Dr. Carpenter, to whom he committed the inquiry, and by whom, with his concurrence, the name *Parkeria* was assigned to the genus. The second, which was obtained by the late Mr. W. K. Loftus from "a hard rock of blue marly limestone" between the N.E. corner of the Persian Gulf and Ispahan, bears so strong a resemblance in its general form and mode of increase to the genus *Alveolina*, that its Foraminiferal character was from the first recognized by the discoverer; but as all the specimens brought by Mr. Loftus had undergone considerable alteration by fossilization, their minute structure, though carefully studied by means of transparent sections, could not in the first instance be satisfactorily made out. When, however, Dr. Carpenter's investigation of *Parkeria*, with the full advantage of specimens but little changed by fossilization, revealed the very remarkable plan of its structure, the investigation of this type was resumed by Mr. Brady (who assigned to it the name *Loftusia*), with the new light thence derived: for as transparent sections of infiltrated *Parkeria* furnish a middle term of comparison between specimens of the same type which retain their original character, and transparent sections of infiltrated *Loftusia*, the last-mentioned can now be interpreted by reference to the preceding; so that the obscurities which previously hung over their minute structure have been almost entirely dissipated.—The description of the structure of *Parkeria* in this memoir is by Dr. Carpenter, and that of the structure of *Loftusia* by Mr. H. B. Brady; but each has gone over the work of the other, and can testify to its correctness.

The specimens of *Parkeria*, which have been collected by Prof. Morris, are spheres varying in diameter from about 3-4ths of an inch to about 1½ inch. But Mr. Henry Woodward has placed in the author's hands a specimen from the Upper Greensand of Ventnor, in the Isle of Wight, which is not less than 2½ inches in diameter. It is interesting to remark that the "nucleus" of a smaller specimen in the cabinet of J. Starkie Gardner, Esq., F.G.S., from the same locality, consists of a considerable number of chambers arranged in a *spire*, the structure of its concentric spherical layers being exactly the same as in the specimens described. A detailed description, with plates, will shortly be published by Messrs. Carpenter and Brady.