

pressure. The phrase "chemical action" is used, I think, a little too freely in many quarters, by people who make no pretensions to be considered chemists, as a sort of limbo to which to relegate points in petrology which they do not wish to explain.

May I add here a word of congratulation to Mr. W. M. Hutchings on his most valuable researches<sup>1</sup> in the fire-clays of Northumberland? He has given us a mass of facts which prove in a concrete instance, what I have contended for on general grounds (e.g. *op. cit.* pp. 53, 93<sup>2</sup>); and has simply "ripped up" the fallacy, *post hoc ergo propter hoc*, which underlies the assumption so often made, that the development of secondary minerals in cleaved slates and similar rocks is due to "dynamic-metamorphism"; since he has demonstrated their presence, to a large extent as the result of the ever-active laws of chemical change (aided by aqueous diffusion) in a rock which has undergone no dynamic metamorphism whatever.

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#### NOTICES OF MEMOIRS.

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I.—SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS. No. VII. Preliminary Report on the Collection of Mollusca and Brachiopoda obtained in 1887-88. By WILLIAM HEALEY DALL, A.M. Proceedings of the National Museum, Vol. XII. No. 773.

**T**HOUGH the greater part of this Report is devoted to a description of the species obtained, there are some introductory remarks which should not be overlooked by geologists on the conditions of life in the deep sea and on the nature of deep-sea deposits. Some of the most interesting of these notes relate to the "Archibenthal Region," as Mr. Dall terms the area which lies below the limit of Algæ and above the Abyssal Region. In this region "the action of erosion and solution . . . seems less potent than in either the shallower or the deeper parts of the sea. In the shallower parts the excess of motion, in the deeps the excess of the eroding agent, may account for this." Some of the banks in these depths are formed in a way which should be noted, as perhaps accounting for the large quantities of broken shells often found in fine deposits which show little sign of currents. Mr. Dall speaks of "the habit of certain fishes, which exist in vast numbers, of frequenting certain areas where they eject the broken shells . . . which they have cracked, swallowed, and cleansed of their soft tissues by digestion. . . . Now, in examining critically large quantities dredged from the bottom, I have found the material from certain areas almost entirely composed of these ejectamenta."

In some 16 pp. of 'general considerations' on the Pelecypoda, Mr. Dall gives an account of the genesis of the molluscan hinge, and groups the bivalves into three orders, Anomalodesmacea, Prionodesmacea, and Teleodesmacea. It is impossible in a short abstract to

<sup>1</sup> *Vide* GEOL. MAG. for June and July 1890.

<sup>2</sup> See also Appendix ii. Note T.

do justice to this classification; but the shell is recognized as modifying and in various ways being modified by the soft parts of the animal, and therefore as affording a safer basis for classification than any single anatomical character. C. R.

II.—THE GEOLOGY OF THE COUNTRY AROUND INGLEBOROUGH, WITH PARTS OF WENSLEYDALE AND WHARFEDAILE. By J. R. DAKYNS, R. H. TIDDEMAN, W. GUNN, and A. STRAHAN. (With Notes by C. FOX-STRANGWAYS and J. G. GOODCHILD.) 8vo. pp. 103. (London, 1890.) Price 2s.

**T**HIS is an Explanation of Quarter-sheet 97 S.W. (50 New Series). It contains accounts of the Lower and Upper Silurian Rocks of Ingleton, Crummack and Horton-in-Ribblesdale; of the Carboniferous Limestone Series, Millstone Grit and Coal-measures; and of the Glacial and Post-Glacial deposits. Some dykes of Mica-trap penetrate the Lower Silurian rocks near Ingleton, and these intrusive rocks are described by Mr. F. Rutley.

III.—THE GEOLOGY OF PARTS OF NORTH LINCOLNSHIRE AND SOUTH YORKSHIRE. By W. A. E. USSHER. (Parts by C. FOX-STRANGWAYS, A. C. G. CAMERON, C. REID, and A. J. JUKES BROWNE.) 8vo. pp. 231. (London, 1890.) Price 2s.

**I**N this Memoir we have detailed descriptions of the strata, from the Keuper Sandstones and Marls of the Isle of Axholme, upwards to the Kimeridge Clay that underlies the Cretaceous escarpment. The several divisions of the Neocomian formation and of the Chalk are described, together with the Glacial and other superficial deposits. The Red Chalk is included at the base of the Upper Cretaceous. Long lists of fossils are given from the Jurassic rocks, and these are in part based on the work done by the Rev. J. E. Cross, of Appleby. The deposits of economic importance include the Frodingham Ironstone in the Lower Lias, and the Claxby Ironstone in the Neocomian. The Lincolnshire Limestone at Kirton-in-Lindsey yields a good hydraulic lime, which is sold as "Blue Lias Lime." A number of well-sections and borings are recorded in an Appendix.

IV.—ON THE DISCOVERY OF A JURASSIC FISH-FAUNA IN THE HAWKESBURY BEDS OF NEW SOUTH WALES. By A. SMITH WOODWARD.<sup>1</sup>

**A** LARGE collection of fossil fishes from the Hawkesbury-Wianamatta series of Talbragar, New South Wales, has been forwarded to the author for examination by Messrs. C. S. Wilkinson and R. Etheridge, jun., of the Geological Survey of New South Wales. The final results will appear in a forthcoming memoir to be published by that Survey; but the investigation has already proceeded so far as to justify the announcement of the discovery of a typically Jurassic fish-fauna in Australia. Fine examples of the Palæoniscid genus *Coccolepis* occur, and this has previously been met with only in the Lower Lias of Dorsetshire, the Purbeck Beds of

<sup>1</sup> Abstract of paper read before Section C, British Association, Leeds, 1890.

Wiltshire, and the Lithographic Stone of Bavaria. A new fish allied to *Semionotus*, but with thinner, much imbricating scales, is also conspicuous; and another new form, allied to the Dapedioids, is remarkable from the presence of typical rhombic ganoid scales in the front half of the trunk and deeply overlapping cycloid scales over the whole of the caudal region. A *Leptolepis*-like fish, with a persistent notochord, seems to represent a third unknown generic type. Of *Leptolepis* itself there are many hundreds of individuals in a fine state of preservation. The fishes occur in a hard, ferruginous, fissile matrix, associated with well-preserved remains of plants.

V.—A SKETCH OF THE GEOLOGY OF DEVONSHIRE. By TOWNSHEND M. HALL, F.G.S. [Third edition, 1890. Reprinted from White's History, etc., of the County.]

IN the GEOLOGICAL MAGAZINE for August, 1879, we briefly drew attention to the first edition of this article, which gives a capital condensed account of Devonshire Geology. In the present edition the results of recent researches are noticed, and some accounts of the Mines and Mining are added. We observe, however, that the Bovey beds are classed as Miocene, and nothing is said of Mr. Starkie Gardner's contention that the beds are of Eocene age.

VI.—PRELIMINARY NOTES ON THE PALEOZOIC ELASMOBRANCHS, *Pleuracanthus* AND *Xenacanthus*, FROM THE LOWER PERMIAN OF BOHEMIA. By Dr. ANTON FRITSCH.<sup>1</sup>

THE next part of the author's work, "Fauna der Gaskohle," which will probably appear before the close of the present year, is devoted to further investigations upon *Pleuracanthus* and *Xenacanthus*. Restored figures, first exhibited to the British Association at the Leeds Meeting, have been carefully prepared, being based upon the examination of no less than 200 specimens. The principal result arrived at is, that the three genera, *Orthacanthus*, *Pleuracanthus*, and *Xenacanthus*, are well characterized, and are all true Selachians. The skull is developed as a simple embryonic capsule, showing no ossifications or separate bones: it much resembles that of *Heptanchus*, and indicates that the three genera in question also belong to the Opistharthri of Gill. The branchial arches are likewise seven in number, as in *Heptanchus*. The median fins are embryonic in character, much like those of deep-sea Gadoids (e.g. *Bathygadus*). The pectoral fins are of the most primitive type in *Orthacanthus*, more advanced in *Xenacanthus*, and still more resembling the abbreviated fins of recent sharks in *Pleuracanthus*. There is no pelvic element, the basal part of the pelvic fin of each side being merely a fused mass of parallel cartilaginous rays. The claspers in the male closely resemble those of modern sharks, being formed by a modification of the dorsal or postaxial rays.<sup>2</sup> In the vertebral column, intercalaria are developed both in *Orthacanthus* and *Xenacanthus*.

<sup>1</sup> Abstract of paper read before Section C, British Association, Leeds, 1890.

<sup>2</sup> See figure in Zool. Anzeiger, No. 337 (1890).