

BIBLIOGRAPHICAL NOTICES.

Lectures on the Comparative Anatomy and Physiology of the Vertebrate Animals : Part I. *Fishes*, being Vol. II. of Hunterian Lectures.
By RICHARD OWEN, F.R.S. London, Longman and Co., 1846.

PREPARED as we had already been from all the former labours of our distinguished author to form high expectations with regard to the present work, we rejoice to find that these have been so richly fulfilled, and that in thus embodying the results of his own investigations and those of others in a definite form, available at once to the student and the matured scientific inquirer, Professor Owen has been at work with the same untiring eye and hand, animated and guided by the same profound and philosophic spirit of analysis when applied to the higher organisms or Vertebrata, as heretofore. As in Vol. I., this, which is devoted exclusively to Fishes, commences as a sequel to the Introductory Lecture with a clear and ample survey of the leading or typical characters by which the Vertebrate animals in general are distinguished from the Invertebrata; allusion is then made to the "amount of concordance which will justify us in predicating unity of organization," between any members of these two great types, and it is shown that to do this we must look to the very beginning of the development of the vertebrated being, in which, "in the mysterious properties of the impregnated germinal vesicle, diffused and distributed by fissiparous multiplication amongst countless nucleated cells, is an organic correspondence to be first traced with the lowest and simplest beginnings of animal life—with the infusorial monads." Attention is next directed to the second stage in the development of the ovum, when with the appearance of the double chord the nascent being is impressed with its vertebrated type; after which follow full descriptions of the several classes of Fishes, Reptiles, Birds and Mammalia, with reference not only to their anatomical, but geological, grade of succession through the various strata of the earth's crust. We pass over the intervening five chapters, designing to reserve their consideration for the last, and are met for the first time in our language with a clear and definite outline at Lecture VII. of the conditions general as well as special displayed by the muscular system of Fishes, although, adds the Professor, "the determination of the special, serial, and general homologies, and the recognition of the various individual adaptive modifications, of the muscles of Fishes, still remains a rich and little-explored field for the labours of the myologist." With the discourse upon the nervous system, as it commences in the Lancelet by a simple continuous chord, more obtuse only at the anterior end, where its homology to the ganglionic brain of the higher species is indicated by connexion with the trigeminal and optic nerves, we have been most especially interested: first and foremost by the adoption of a rational, or the only true kind of scientific nomenclature, for the several parts composing the nervous axis, such, *e. g.* as the terms prosencephalon, mesencephalon and epencephalon, as expressive first of the cerebrum,

secondly of the optic lobes, and thirdly of the medulla oblongata and cerebellum, while the olfactory lobes, as being serially homologous to the optic, have been designated by the apt appellation of rhinencephala; secondly, by the eminently suggestive observations at pp. 187, 190, relative to the functions performed by the different portions of the brain, more especially of the prosencephalon and cerebellum, the last of which, after a careful comparison of its degrees of development as evidenced by the "sluggish Rays" and "vigorous Sharks," our author inclines to believe is very directly subservient to the power of locomotion. How fully were we convinced, upon reading this, of the profound truth of a remark made by Oken in his 'Naturphilosophie,' "that the reason why we have as yet wandered to and fro, without main-stay and without compass, in the pursuit of mental philosophy, rests solely in the disregard that has been paid to the knowledge or science of nature!" Would we essay to decipher the psychical functions and their allotted organs in the human brain, recourse must be had less to experiment than to the study of that organ throughout the Vertebrate series; "since (p. 187) it may well be doubted whether nature ever answers so truly when put to the torture, as she does when speaking voluntarily through her own experiments, if we may so call the ablation and addition of parts which comparative anatomy offers to our contemplation." To follow our author through the rich record of facts and reflective observation contained under the head just alluded to, and including the special organs of sense and electric apparatus, or into the dental and digestive, followed by the vascular, system, a masterly account of the air-bladder in the lecture devoted to the pneumatic and renal organs, or finally into the elaborate description of the generative system and developmental process in the class of Fishes; would be but to multiply quotations and gratify an idle and temporary curiosity on many important points, which, to be fully appreciated, must be read in their proper places along with the context, where each fact and its interpretation form but the linked parts of one great Whole. We hasten therefore at once to indulge in a few words concerning that which has been omitted hitherto, expressly that it might be last mentioned, seeing that it constitutes a large portion of the present volume, and from the objects whereof it treats, and the manner in which that is effected, deservedly forms the most valuable and novel feature, paramount to every other perfection in this goodly contribution to British science, while it lays claim to presaging a new dawn or mental epoch in the career of biological investigation. We allude to that which is the principal subject-matter of Lectures II. to VI. inclusive, where, in considering the skeleton, vertebræ and vertebral column, the skull, with finally the dermal bones, in the different Piscine orders, our author enters learnedly and largely into the determination of the homologies or structural relations of the several parts of the skeleton in Fish, when contrasted in the different members of that class or those belonging to the other great divisions of the Vertebrate series. But let us preface in our author's own words the definition and scope of the term *homology* as applied in the present, and to be

strictly regarded in such a sense throughout his forthcoming, labours among the remaining classes of Vertebrata. "The great aim of the philosophical osteologist is to determine by natural characters, the natural groups of bones of which a vertebrate skeleton typically consists; and next, the relations of individual simple bones to each other in those primary groups, and to define the general serial and special homologies of each bone throughout the Vertebrate series. By general homology I mean the relation in which a bone stands to the primary segment of the skeleton of which it is a part; thus, when the basi-occipital bone (basilar process of the os occipitis in anthropotomy) is said to be the centrum or body of the occipital or posterior cranial vertebra, its *general* homology is enunciated. When it is said to repeat in its vertebra, or to answer to the basi-sphenoid in the parietal vertebra, or to the body or centrum in the atlas, dentata, or any other of the vertebral segments of the skeleton, its *serial* homology is indicated; when the essential correspondence of the basilar process of the occipital bone in Man with the distinct bone called 'basi-occipital' in a Crocodile or Fish is shown, its *special* homology is determined." With the above clear and exact formula of the object and the course to be pursued in its attainment, we must pause, for the space allotted in this Journal will not admit of our entering into detail; and, as a sufficient plea for our silence, will simply remind the reader of what has been observed by Oken, to whom is unquestionably due the honour of having first announced in an essay, published in 1807, and entitled 'Ueber die Bedeutung der Schädelknochen,' the relations of identity existing between the cranial bones and the other segments of the vertebral column: "It is *bona fide*," says he, "remarkable what it costs in order to bring but *one* problem of philosophical anatomy into a pure state, or that of solution. He who has not been engaged in such a task remains without conception of its difficulties. Without knowing the what, how and why, one may stand not for hours nor days, but weeks, before a Fish's skull, and vacantly stare at its calcareo-stalactitic forms." Now, in the work of Prof. Owen, the diligent reader alone will be in a capacity to appreciate the force of the above quotation; when, after having worked his way, and this from the striking precision of our author's language, he will effect with pleasure instead of toil to himself, and, if resident in London, availed himself of the opportunity of comparing and testing the text by skeletons of fish now mounted and labelled with appropriate catalogues of the homological terms in the College of Surgeons' Museum, he next turns to the table of synonyms of the bones of the head of Fishes, according to their special homologies, at pp. 158—162, and in the contrast of our countryman's nomenclature with those of prior zootomists, such as the great Cuvier, Geoffroy, Bojanus, Spix, Meckel, Carus, and others, there discerns the great and priceless boon that has been conferred upon subsequent inquirers by this unravelling of a false, because in many respects unmeaning and artificial terminology, and the substitution in its place by the Professor of scientific words intelligible from their appositely compound or connotative character,

as *e. g.* basio-occipital for the basilaire, and meso-, pre- and hypotympanic instead of the symplectique, tympanal and jugal bones of Cuvier. Again, we repeat, a new epoch dawns upon the science of Comparative Anatomy. For, should the views of Prof. Owen, when critically analysed, receive the general assent of British and continental observers, it is not going too far to predict the important influence they must inevitably exercise in simplifying the acquirement by the student, not only of the osseous system of animals, but of Man; their conducing to a gradual recognition and accordant naming of the primary ganglionic portions of the brain in harmony with its corresponding skeletal segments, and finally, carried yet further and associated with other generalizations, laying the logical groundwork of a natural classification of the animal kingdom. In fine, to Prof. Owen, in his investigation of homological relations, is due the rare merit of having been the first to grapple with, and carry into amplitude of detail, a principle, which though only partially evolved, was boldly announced as if irrefragable, by Oken; while rejected by Agassiz and discussed or enlarged upon by other writers, the question has at length devolved to the cautious and inductive reasoning of the worthy successor of John Hunter, for ultimate extrication from its labyrinth, and thus implantation upon a true philosophic basis. Before such a statement of plain historical fact, the usually knotty points touching priority of discovery must dissolve in the mind of the candid and liberal reader, who, revering Truth for her sake alone, will rest content with adjudging the crown of honour to him who has struggled best in behalf of her cause.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

May 24, 1846.—The Lord Bishop of Norwich, President, in the Chair.

This day, the Anniversary of the birth of Linnaeus, and that appointed by the Charter for the election of Council and Officers, the President opened the business of the Meeting and stated the number of Members whom the Society had lost during the past year, of some of whom the Secretary read the following notices:—

James Hussey Abraham, Esq., for nearly half a century the conductor of the most flourishing seminary in the town of Sheffield, was well-skilled in various branches of Natural Philosophy, especially Electricity and Magnetism, and possessed a large and valuable collection of apparatus with which he illustrated his lectures on these and allied branches of science. In the course of his magnetic experiments, the idea suggested itself to him that the minute particles of steel evolved in the dry grinding of forks, needles, &c., the inhalation of which is so deleterious to the workmen engaged in those trades, might be intercepted by means of a wire-gauze mask, or caught by a chaplet of magnets worn about the mouth of the ope-



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