

THURSDAY, FEBRUARY 5, 1874

SCIENTIFIC WORTHIES

II.—THOMAS HENRY HUXLEY

THOMAS HENRY HUXLEY was born at Ealing, on May 4, 1825. With the exception of two and-a-half years spent at the semi-public school at Ealing, of which his father was one of the masters, his education was carried on at home, and in his later boyhood, was chiefly the result of his own efforts. In 1842 he entered the medical school attached to Charing Cross Hospital, where, at that time, Mr. Wharton Jones, distinguished alike as a physiologist and oculist, was lecturing on Physiology. In 1845 Mr. Huxley passed the first M.B. examination at the University of London, and was placed second in the list of honours for Anatomy and Physiology, the first place being given to Dr. Ransome, now of Nottingham. After some experience of the duties of his profession among the poor of London, in 1846 he joined the medical service of the Royal Navy, and proceeded to Haslar Hospital. From thence he was selected, through the influence of the distinguished Arctic traveller and naturalist, Sir John Richardson, to occupy the post of Assistant-Surgeon to H.M.S. *Rattlesnake*, then about to proceed on a surveying voyage in the Southern Seas. The *Rattlesnake*, commanded by Captain Owen Stanley, with Mr. MacGillivray as naturalist, sailed from England in the winter of 1846. She surveyed the Inner Route between the Barrier Reef and the East Coast of Australia and New Guinea, and after making a voyage of circumnavigation, returned to England in November 1850. During this period Mr. Huxley investigated with a success known to all naturalists, the fauna of the seas which he traversed, and sent home several communications, some of which were published in the "Philosophical Transactions" of the Royal Society. The first which so appeared, presented by the late Bishop of Norwich, and read June 21, 1849, bears the title "On the Anatomy and Affinities of the Family of the Medusæ." This was, however, not Mr. Huxley's first scientific effort. While yet a student at Charing Cross Hospital, he had sent a brief notice to the *Medical Times and Gazette*, of that layer in the root-sheath of hair which has since borne the name of Huxley's Layer. Shortly after his return he was (June 1851) elected a Fellow of the Royal Society.

In 1853 Mr. Huxley, after vainly endeavouring to obtain the publication by the Government of a part of the work done during his voyage, left the naval service, and in 1854, on the removal of Edward Forbes from the Government School of Mines to the chair of Natural History at Edinburgh, succeeded his distinguished friend as Professor of Natural History in that institution, a post which he has continued to hold up to the present day. Since that time Mr. Huxley has lived in London a life of continued and brilliant labour. From 1863 to 1869 he held the post of Hunterian Professor at the Royal College of Surgeons. He was twice chosen Fullerian Professor of Physiology at the Royal Institution of Great Britain. In 1869 and 1870 he was President of the Geological Society, having previously served as Secretary. During

the same period he was President of the Ethnological Society. In 1870 he filled the office of President of the British Association for the Advancement of Science, and in 1872 was elected Secretary to the Royal Society. He has been elected a corresponding member of the Academies of Berlin, Munich, St. Petersburg, and of other foreign scientific societies, has received honorary degrees from the Universities of Breslau and Edinburgh, and last year was presented with the Order of the Northern Star by the King of Sweden. Since 1870 he has been one of the Members of the Royal Commission on Scientific Instruction and the Advancement of Science. From 1870 to 1872 he served on the London School Board as one of the members for Marylebone, and during that time was Chairman of the Education Committee which arranged the scheme of education adopted in the Board Schools. In 1872 he was elected Lord Rector of the University of Aberdeen.

In this skeleton narrative of the career of this distinguished naturalist we have purposely omitted any list or any critical estimate of his writings; but we have great pleasure in laying before our readers, as a token of what is thought of him by those who are labouring in the same field of Science, the following communication from one who ranks in his own country as well as among ourselves as one of the very first of German naturalists.

The more general, year by year, the interest taken by all educated people in the progress of Natural Science, and the wider, day by day, the field of Science, the more difficult is it for the man of science himself to keep pace with all the advances made—the smaller becomes the number of those who are able to take a bird's-eye view of the whole field of science, and in whose minds the higher interest of the philosophical importance of the whole is not lost amid a crowd of fascinating particulars. Indeed if at the present moment we run over the names distinguished in the several sciences into which Natural Knowledge may be divided—in Physics, in Chemistry, in Botany, in Zoology—we find but few investigators who can be said to have thoroughly mastered the whole range of any one of them. Among these few we must place Thomas Henry Huxley, the distinguished British investigator, who at the present time justly ranks as the first zoologist among his countrymen. When we say the first zoologist, we give the widest and fullest signification to the word "zoology" which the latest developments of this science demand. Zoology is, in this sense, the entire biology of animals; and we accordingly consider as essential parts of it the whole field of Animal Morphology and Physiology, including not only Comparative Anatomy and Embryology, but also Systematic Zoology, Palæontology and Zoological Philosophy. We look upon it as a special merit in Prof. Huxley that he has a thoroughly broad conception of the science in which he labours, and that, with a most careful empirical acquaintance with individual phenomena, he combines a clear philosophical appreciation of general relations.

When we consider the long series of distinguished memoirs with which, during the last quarter of a century, Prof. Huxley has enriched zoological literature, we find that in each of the larger divisions of the animal kingdom we are indebted to him for important discoveries.

From the lowest animals, he has gradually extended his investigations up to the highest, and even to man. His earlier labours were, for the most part, occupied with the lower marine animals, especially with the pelagic organisms swimming at the surface of the open sea. He availed himself of an excellent opportunity for the study of these, when on board H.M.S. *Rattlesnake* on a voyage of circumnavigation, which took him to many most interesting parts of tropical oceans little investigated, previously, by the zoologist; especially the coasts of Australia. Here he was able to observe, in their living state, a host of lower pelagic animals, some of which had not at all been studied, others but imperfectly. In the Protozoa, he was the first to lead us to satisfactory conclusions concerning the nature of the puzzling *Thalassicollidæ* and *Sphærozoïda*. Our knowledge of Zoophytes has been greatly extended by his splendid work on "Oceanic Hydrozoa," in which, chiefly, the remarkable *Siphonophora*, with their largely developed polymorphism and the instructive division of labour in their individual organs, are described with very great accuracy.

Already in his first work "On the Anatomy and the Affinities of the Medusæ," 1849, he directed attention to the very important point, that the body of these animals is constructed of two cell layers—of the Ectoderm and the Endoderm—and that these, physiologically and morphologically, may be compared to the two germinal layers of the higher animals. He has made us better acquainted with several interesting members of the class *Vermes*, *Sagitta*, *Lacinularia*, some lower *Annulosa*, &c. He was the first to point out the affinities of *Echinodermata* with *Vermes*. In opposition to the old view, that the *Echinodermata* belong to the *Radiata*, and, on account of their radial type, are to be classed with corals, medusæ, &c., Huxley showed that the whole organisation of the former is essentially different from that of the latter, and that the *Echinoderms* are more nearly related, morphologically, to worms. Further he has essentially enlarged our knowledge of the important group of *Tunicata* by his researches on the *Ascidians*, *Appendicularia*, *Pyrosoma*, *Doliolum*, *Salpa*, &c.

Many important advances in the morphology of the *Mollusca* and *Arthropoda* are also due to him. Thus, *e.g.*, he has greatly elucidated the controverted subject of the homology of regions of the body in the various classes of *Mollusca*. He has considered the generation of vine-fretters from quite a new point of view, based on his "genealogical conception of animal Individuality." But it is the comparative anatomy and classification of the *Vertebrata* which, during the last ten years, he has especially studied and advanced. His excellent "Lectures on the Elements of Comparative Anatomy" afford abundant proof of this, to say nothing of his numerous important monographs, especially those on living and extinct fish, amphibians, reptiles, birds, and mammals.

Huxley's works on the comparative anatomy of the *Vertebrata* are the only ones which can be compared with the otherwise incomparable investigations of Carl Gegenbaur. These two inquirers exhibit, particularly in their peculiar scientific development, many points of relationship. They both belong to that small circle of morphologists which is marked by the names of Caspar Friedrich Wolff, George

Cuvier, Wolfgang Goethe, Johannes Müller, and Carl Ernst von Baer.

More important than any of the individual discoveries which are contained in Huxley's numerous less and greater researches on the most widely different animals are the profound and truly philosophical conceptions which have guided him in his inquiries, have always enabled him to distinguish the essential from the unessential, and to value special empirical facts chiefly as a means of arriving at general ideas. Those views of the two germinal layers of animals which were published as early as 1849 belong to the most important generalisations of comparative anatomy; they already contain in germ, the idea of the "perfect homology of the two primary germinal layers through the whole series of animals (except protozoa)," which first found its complete expression, a short time since, in the "Gastræa theory;" also his researches on animal individuality, his treatment of the celebrated vertebral theory of the skull, in which he first opened out the right track, following which Carl Gegenbaur has recently solved in so brilliant a manner this important problem, and above all his exposition of the Theory of Descent and its consequences, belong to this class. After Charles Darwin had, in 1859, reconstructed this most important biological theory, and by his epoch-making theory of Natural Selection placed it on an entirely new foundation, Huxley was the first who extended it to man, and in 1863, in his celebrated three Lectures on "Man's Place in Nature," admirably worked out its most important developments. With luminous clearness, and convincing certainty, he has here established the fundamental law, that, in every respect, the anatomical differences between man and the highest apes are of less value than those between the highest and the lowest apes. Especially weighty is the evidence adduced, for this law, in the most important of all organs, the brain; and by this, the objections of Prof. Richard Owen are, at the same time, thoroughly refuted. Not only has the Evolution Theory received from Prof. Huxley a complete demonstration of its immense importance, not only has it been largely advanced by his valuable comparative researches, but its spread among the general public has been largely due to his well-known popular writings. In these he has accomplished the difficult task of rendering most fully and clearly intelligible, to an educated public of very various ranks, the highest problems of philosophical Biology. From the lowest to the highest organisms, from *Bathybius* up to man, he has elucidated the connecting law of development.

In these several ways he has, in the struggle for truth, rendered Science a service which must ever rank as one of the highest of his many and great scientific merits.

ERNST HAECKEL

ZOOLOGICAL NOMENCLATURE

The Object and Method of Zoological Nomenclature. By David Sharp. (E. W. Janson and Williams and Norgate, 1873.) Pp. 39.

ZOOLOGISTS and botanists universally adopt what is termed the binomial system of nomenclature invented by Linnæus. The essential principle of this system is, that every species of animal or plant is to have a name made up of two words, the second word—which is