Huxley as Scientist

T. H. Huxley's Place in Natural Science. MARIO A. DI GREGORIO. Yale University Press, New Haven, Conn., 1984. xxii, 253 pp. $25.

The literature relating to Victorian Britain's most visible scientist is now vast. And justifiably so, considering Huxley's largely successful excursions from a base in zoology, paleontology, and science popularization into territories as diverse as politics, religion, anthropology, and educational reform. The work under review includes in its bibliography more than 200 items on Huxley, a list that is not exhaustive. Perhaps it is because Huxley was a controversialist on such a variety of topics that sustained efforts to assess his actual contributions to science have been so rare. *T. H. Huxley's Place in Natural Science* attempts this assessment by examining Huxley's writings, both published and manuscript, on zoology, paleontology, and anthropology. The result is an able synthesis that, though it will not revolutionize our picture of the man, clearly contains some valuable insights.

Huxley's early zoological research focused on the morphology of marine invertebrates. Di Gregorio sees this work as dominated by the outlook of German embryologists like K. E. von Baer and their version of the "type" concept (though shorn of any Platonic or *naturphilosophisch* implications) and by a desire always to pass quickly from narrow details to general conclusions in a relentless quest to confirm nature's order and harmony (one of Huxley's few concessions to apriorism). Unfortunately Di Gregorio's analysis of Huxley's invertebrate morphology and taxonomy is burdened by a degree of technical detail that unnecessarily obscures his leading points. Some details seem to have been included for no other reason that that Huxley stated them. Illustrations from Huxley's work are included (for example, six pages of medusae), but they are not keyed directly to the text and sometimes are not satisfactorily captioned, leaving the reader uncertain as to their purpose. And efforts to show the degree to which Huxley "got it right" seem overly positivistic.

Huxley's propensity for establishing nature's order contributed to his enthusiasm for Darwinism, which in turn carried him from the static "type" concept to the theory of descent (though without clear rejection of the former). But his support of Darwin was always moderated by a dissatisfaction over natural selection's lack of experimental demonstrability and by his political desire to keep all options open. As a result, Huxley did not deploy Darwinism in his scientific memoirs until 1868, nearly a decade after his public defense of the *Origin of Species*. (In the interim he was won over to what he regarded as the more successful evolutionary approach of Darwin's German bulldog, Ernst Haeckel, who stressed the construction of phylogenies and the search for missing links, while sidestepping the question of natural selection's efficacy.) In 1868, a year in Huxley's life which for its productivity and diversity deserves a monograph in itself, he began applying evolutionary arguments to the study of extinct fossil vertebrates, principally to illuminate the relationship between dinosaurs and birds. He remained skeptical of evolution among the invertebrates for another decade. Di Gregorio documents this sequence well.

From zoology and paleontology the author turns to the study of man, the realm of greatest delicacy, and hence greatest curiosity for Victorians. He finds Huxley siding with Linnaeus in stressing the close affinities of humans with the rest of the zoological world. *Man's Place in Nature*, probably Huxley's single most influential work, is the centerpiece of this analysis. In its own time *Man's Place* was little appreciated, but its popularity has increased substantially during the 20th century. The author concludes that the apathy of the 19th century was the more appropriate response, for the essay promised more than it delivered. On the question of the taxonomic status of the races, or "persistent modifications," of mankind, Huxley insisted upon zoology, not philology—the study of anatomical affinities, not linguistic similarities—as the proper approach. From alleged zoological considerations Huxley constructed a classification of the races, but in placing his *Xanthochroi* and *Melanochroi* (northern and southern Europeans respectively) at the top and native Australians at the bottom he introduced the common but non-zoological notions of "higher" and "lower" into his scheme. Di Gregorio emphasizes that Huxley was not immune from the bias of European cultural superiority that dominated his era, but he finds Huxley much less dogmatic on the subject than most of his contemporaries.

Huxley's Place grows increasingly engaging in these later chapters. The conclusion confirms this trend by viewing Huxley's career holistically, seeking its inconsistencies and its motivations. Di Gregorio recognizes correctly that Huxley's theoretical stands were not always consistent; static Baerian "types" are not obviously compatible with a theory of descent, for example. To explain such inconsistencies, Di Gregorio recognizes that one must turn from the ideals of data and theory to the practical, political considerations of achieving stature in the Victorian scientific world. Especially fascinating is the opportunism evidenced in the tabular summary the author provides of the four media Huxley employed for scientific communication—popular works, textbooks, and "liberal" and "conservative" scientific papers—and the individualized theoretical stances he took for each medium. To appreciate the richness and complexity of these "externalities" in Huxley's life, however, the reader should supplement the present work with Adrian Desmond's *Archetypes and Ancestors* (1983).

By a rather fragile line of reasoning, Di Gregorio finds Calvinism to be the primary energizer of Huxley's workaholism. A simpler argument, stressing Huxley's rigorous mechanistic materialism, religious skepticism, preference for order over process in nature, and desire for the diffusion of scientific knowledge throughout society, would demonstrate his attachment to the program of the Enlightenment *philosophes*. Aren't Huxley's roots perhaps as much French as German?

PHILIP F. REHBOCK
Departments of History and General Science, University of Hawaii, Honolulu, 96822

A Brazilian Biologist

A Permanência de Rodolpho von Ihering. Livro Jubilar pela Passagem do Primeiro Centenário do Sue Nascimento (1883–1983). MELQUÍADES PINTO PAIVA, Ed. Fundação Brasileira para a Conservação de Natureza, Rio de Janeiro, Brazil, 1984. 212 pp., illus. Paper, $8.

This slim volume is presented as a tribute to the Brazilian biologist Rodolpho von Ihering on the centenary of his birth in 1883. It contains brief outlines of his life and the importance of his scientific work presented (in Portuguese) by some 20 Brazilian scientists, many of whom knew him and worked with him before his death in 1939.

To understand von Ihering's importance in the history of Brazilian biology, one must recognize the breadth of his educational background and the limita-

tions of these subjects in Brazil (and elsewhere) during his lifetime. Rodolpho essentially was educated by studying at the side of his father, Hermann von Ihering, a physician–natural-historian immigrant from Germany. Hermann von Ihering was an important and innovative Brazilian biologist, founder in 1895 of the Museu Paulista in São Paulo and its director for the next 22 years. Rodolpho was raised in a tradition of work, ambition, social consciousness, and scientific intellectual curiosity, with a special interest and experience in the natural-history sciences. By 1903 Rodolpho was publishing his first papers in entomology on wasps and bees. From 1905 to 1907 he was in Europe, mainly in Heidelberg, to extend his education. From entomology his interests and publications spread over many fields of Brazilian natural history, especially ichthyology and ecology, but also herpetology and ornithology. Owing to the intense feeling against Germans during World War I in Brazil, Hermann von Ihering was forced to retire from the Museu Paulista. In sympathy, Rodolpho also left the museum. Rodolpho left biology altogether for the next ten years and established a small manufacturing business. He did, however, continue to publish popular articles and booklets on natural history, especially for schoolchildren. He also continued his interest in biology, particularly its application in improving the lives of his countrymen.

In 1926, through the encouragement of Laurindo Travassos and other Brazilian biologists, Rodolpho was persuaded to return to biology in the position of chief of the zoology section of the newly created Biological Institute in São Paulo. In 1932 he was given charge of the Technical Commission for Fish Culture of the Northeast, and in 1937 he became chief of the National Fisheries Service. It was during this period, 1926 through 1939, that his greatest contributions to Brazilian biology were made.

Von Ihering had always favored the use of Brazil's abundant native fish fauna for development of freshwater fisheries in association with the establishment of artificial reservoirs in the drought-stricken areas of northeastern Brazil, rather than the introduction into the natural fishery of carp and other foreign fishes that alter the habitat. However, artificial propagation (and thus the maintenance of adequate supplies) of native migratory freshwater fishes had so far been unsuccessful. Between 1934 and 1935 von Ihering and his co-workers developed a method for inducing spawning in captive freshwater fishes through the use of fish pituitary gland extract. This allowed the introduction of adequate supplies of native fishes into the reservoirs and became a model for the solution of similar problems in other parts of the world.

It is not just the specific scientific contributions made by Rodolpho von Ihering, however, that are important to the natural-history sciences in Brazil. Rather, it is the legacy of an attitude toward science and scientific progress and his advocacy of a blend of conservation with land and water use. Brazilian natural historians and scientists are to be commended for honoring this Brazilian pioneer of their science.

M. J. WEITZMAN
S. H. WEITZMAN
Department of Vertebrate Zoology (Fishes), Smithsonian Institution, Washington, D.C. 20560

Avian Architecture

Nest Building and Bird Behavior. NICHOLAS E. COLLIAS and ELSIE C. COLLIAS. Princeton University Press, Princeton, N.J., 1984. xx, 337 pp., illus. $45; paper, $16.50.

Nicholas and Elsie Collias are well known to ornithologists everywhere for their years of devotion to nest-building behavior in weaverbirds, master builders of the most highly evolved nests known among vertebrates. Now they have given us a comprehensive picture of nests and nest-building in all birds, analyzed from an evolutionary perspective. No other study of its kind exists. This is a work of fine scholarship that gives insight into the selective forces involved in the evolution of the diverse array of nest types, ranging from a simple depression on the bare ground through excavated cavity nests, open cup-shaped nests, domed nests, and woven nests to the elaborate avian apartments built by the most social of the weaverbirds.

The Collias approach starts with prolonged and detailed field observations, but includes careful experimentation with captive birds in large aviaries. They have succeeded in providing a convincing picture of the general evolution of bird nests, detailed analysis of adaptive radiation and the selective forces involved in their own special group, the weaverbirds, and also an account of the ontogeny of nest-building. In a nutshell, the general picture is that the entire process is genetically programmed, but the expression of the behavior requires access to appropriate environmental stimuli at appropriate stages of the bird's life. Not surprisingly, within the range of nest-building expertise shown by different individuals of species building complex nests, the most skilled performers are usually also the most experienced.

Not all structures built by birds are receptacles for eggs. Bowerbirds of the Australian region build beautiful structures of twigs, often decorated with flowers, berries, bright stones, bottle caps, and the like, to facilitate courtship and mating. Other birds build nests for roosting. Some build decoy nests or nest compartments to deceive predators. All of this and much more gets careful attention from Collias and Collias as they summarize the vast literature on birds' nests. The book concludes with two appendixes, one listing all bird families of the world and their nest types and the other telling where to find photographs of bird nests.

HARRISON B. TORDOFF
Bell Museum of Natural History, University of Minnesota, Minneapolis 55455

Books Received

Applied Developmental Psychology. Vol. 1. Frederick J. Morrison, Catherine Lord, and Daniel P. Keating, Eds. Academic Press, Orlando, Fla., 1984. xiv, 300 pp., illus. $35.

Applied Sociolinguistics. Peter Trudgill, Ed. Academic Press, Orlando, Fla., 1984. xii, 271 pp. $30. Applied Language Studies.

Asthma. Physiology, Immunopharmacology, and Treatment. A. Barry Day, K. Frank Austen, and Lawrence M. Lichtenstein, Eds. Academic Press, Orlando, Fla., 1984. xxviii, 442 pp., illus. $79. From a conference, Oxford, England, May 1983.

The Astronomical Scrapbook. Skywatchers, Pioneers, and Seekers in Astronomy. Joseph Ashbrook. Leif J. Robinson, Ed. Sky Publishing, Cambridge, Mass., and Cambridge University Press, New York, 1984. xii, 468 pp., illus. $19.95. Reprinted from *Sky and Telescope*.

Asymmetric Synthesis. Vol. 4, The Chiral Carbon Pool and Chiral Sulfur, Nitrogen, Phosphorus, and Silicon Centers. James D. Morrison and John W. Scott, Eds. Academic Press, Orlando, Fla., 1984. xii, 380 pp., illus. $85.

An Atlas of Past and Present Pollen Maps for Europe: 0–13,000 Years Ago. B. Huntley and H. J. B. Birks. Cambridge University Press, New York, 1983. xiv, 667 pp. + overlay maps. In slipcase, $175.

Chemistry and Physics of Solid Surfaces V. R. Vanselow and R. Howe, Eds. Springer-Verlag, New York, 1984. xxii, 554 pp., illus. $45.50. Springer Series in Chemical Physics, 35. From an institute, Milwaukee, Aug. 1983.

Chicano Psychology. Joe L. Martinez, Jr., and Richard H. Mendoza, Eds. 2nd ed. Academic Press, Orlando, Fla., 1984. xxiv, 456 pp. $37.50.

The Climate of Europe. Past, Present and Future. Natural and Man-Induced Climatic Changes: A European Perspective. Hermann Flohn and Roberto Fantechi, Eds. Reidel, Boston, 1984 (distributor, Kluwer Boston, Hingham, Mass.). x, 357 pp., illus. $49. Atmospheric Sciences Library.

Clinical Biochemistry. Contemporary Theories and Techniques. Vol. 3. Herbert E. Spiegel, Ed. Academic Press, Orlando, Fla., 1984. xviii, 271 pp., illus. $42.

Clinical Toxicology of Commercial Products. Robert E. Gosselin, Roger P. Smith, and Harold C. Hodge, with Jeannette E. Braddock. 5th ed. Williams and Wilkins, Baltimore, 1984. Variously paged. $95.

Computer-Based Energy Management Systems. Technology and Applications. Chun H. Cho. Academic Press, Orlando, Fla., 1984. xviii, 242 pp., illus. $45. Energy Science and Engineering.