primitive fish groups, this publication will interest not only the specialist but will also find many readers among vertebrate morphologists generally because it presents some interpretations of one of the great, although poorly documented, events in the development of backboned animals—the origin of paired appendages.

From the meticulous preparation of a superb representation of fossil arthrodires, principally from Silurian and Devonian strata of Europe, many anatomical details of the pectoral girdles and fins of these fishes have been determined. From these facts Erik Stensiö has adduced "more or less arbitrarily" many other structural conditions of both the pectoral skeleton and the associated, soft anatomy. Seemingly interpreted in terms of a hypothetically ideal, paired fin fold, the variously modified, observed parts are divided into five defined and named types of pectoral appendages. These considerations, coupled with unpublished observations on cranial morphology, serve as the bases for a proposed, new phyletic classification of the Arthrodira in which the geologically younger members of the group are postulated as being the structural antecedent of the oldest known forms.

In his introduction, Stensiö expresses the hope that these ideas will stimulate additional study of the morphology and embryonic development of the paired fins of fishes. This desire is already realized. Many of his conclusions are the current subject of heated controversy among a number of the students privileged to examine his fossil materials in Stockholm prior to the publication of this volume.

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The Determination of Molecular Structure. P. J. Wheatley, Oxford University Press, New York, 1959. vii + 263 pp. Illus. $5.60.

The student of molecular structure has long needed a volume of this kind. Prefacing his book with J. E. Wertz's parody-phrase "pursuit of the details of molecular structure and molecular environment is the occupation of all chemists part of the time and part of the chemists all of the time," Wheatley presents "an introductory survey of main physico-chemical methods that have been devised for the determination of molecular structures."

Dedicated pursuit of such a goal gives rise to arbitrary decisions regarding depth versus breadth: a kind of literary uncertainty principle is in operation which necessarily sacrifices the clarity achieved by completeness for wide coverage. Any good survey tries to strike a happy compromise between the two. But the situation is further complicated when the text is regarded as "introductory," because this would appear to call for an attempt toward coherent exposition from fundamentals, conveniently and sufficiently referenced. This, in turn, necessarily implies some length. In this book, the limitations imposed by an "introductory survey," together with a remarkably meager referencing job (for a text apparently intended for students), give rise to the only serious defects, apart from style and a few typographical errors (for example, the mislabeling of axes in Fig. 1 on page 96) apparent in a first reading.

In the chapters on spectroscopic methods, diffraction methods, (covering electron, x-ray, and neutron diffraction), classical stereochemical methods, dipole moments, magnetic methods, and nuclear magnetic resonance, the author ably stresses which methods are most suitable for the structure determination of particular molecules (with many explicit examples) and the kind of information (molecular symmetry and molecular parameters) they can be expected to provide. Emphasis is placed throughout on the scope and limitations of the above methods, and instances are cited where one method may be preferable to another. In most cases, brief descriptions of experimental technique are given; these descriptions are helpful, at times, in understanding the basic physics of the method, but at other times they merely get in the way.

The style is dry without being crisp: in the section on symmetry properties and in the many examples introduced to punctuate a point or to explain by example, a deft touch would have provided welcome relief to the necessary detail.

While clearly written for the mature student with some background in quantum mechanics and atomic and molecular structure, the book will probably prove useful in general for its handy distillation of theory, fundamental working technique, and practical experience. These qualities will be especially useful to anyone interested in quickly picking up a working knowledge of the subjects covered. But again the purposes of the student and the requirements of a handy source for reference would have been better served had the author or publisher referenced the volume more carefully.

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Africa. Emil Schulthess. Simon and Schuster, New York, 1959. 384 pp. Illus. $20.

This pictorial volume resulted from the travels of a modern caravan (transported by a small fleet of Willys station wagons with four-wheel drive and cross-country gears) through the heart of the African continent. Schulthess, chief photographer of *Du,* traveled and photographed from the northern tip to the southern tip of the continent. He writes in the preface that "our itinerary and plans took shape. From Tunis to Tripoli we would go on through the Libyan desert to the highlands of Tibesti. From there across wide tracts of desert to Lake Chad, and southward again through French Equatorial Africa to the huge rain forest of the Belgian Congo. Then, after thousands of miles in the interior, we would reach the east coast and a completely different world along the shore of the Indian Ocean. On through Tanganyika and the Rhodesias to South Africa . . . the big city of Johannesburg . . . to a fitting close at the Cape of Good Hope."

The book's first illustration is of Roman ruins at Sabratha, near Tripoli, and the last is made looking south from the southernmost crag of the Cape of Good Hope—the end of Africa. In between are pictures (in color or in black-and-white) of desert and forest, velds and sand dunes, primitive Negro villages and modern production plants, and an endless variety of life.

New Books

Adventurous Alliance. The story of the Agassiz family of Boston. Louise Hall Tharpe. Little, Brown, Boston, 1959. 367 pp. $5.

American Research on Russia. Harold H. Fisher, Ed. Indiana Univ. Press, Bloomington, 1959. 254 pp. $5.

The Armchair Science Reader. Isabel S. Gordon and Sophie Sorkin, Eds. Simon

and Schuster, New York, 1959. 853 pp. $7.95. This anthology roams from fantasy, through fact, to fiction and offers a collection of short stories, plays, selections from novels, poetry, biography, and articles of explanation and comment. The contents include selections such as E. B. White's "The door," William Beebe's "A descent into perpetual night," and Ogden Nash's "Lines in dispraise of dispraise."

Chemical Analysis of Resin-Based Coating Materials. C. P. A. Kappelmeier. Interscience, New York, 1959. 657 pp. $19.50.

Dana's Manual of Mineralogy. Revised by Cornelius S. Hurlbut, Jr. Wiley, New York; Chapman & Hall, London, ed. 17, 1959. 620 pp. $11.50.

Eye, Film, and Camera in Color Photography. Ralph M. Evans. Wiley, New York; Chapman & Hall, London, 1959. 422 pp. $8.95.

From Hiroshima to the Moon. Chronicles of life in the atomic age. Daniel Lang. Simon and Schuster, New York, 1959. 508 pp. $5.95.

The Garden Flowers of China. H. L. Li. Ronald Press, New York, 1959. 246 pp. $6.50.

A History of Cytology. Arthur Hughes. Abelard-Schuman, New York, 1959. 168 pp. $5.

Human Nutrition and Dietetics. Sir Stanley Davidson, A. P. Meiklejohn, R. Passmore. Williams and Wilkins, Baltimore, Md., 1959. 856 pp. $15.

The Importance of Wearing Clothes. Lawrence Langer. Hastings House, New York, 1959. 364 pp. $7.50. Lawrence Langer, founder of the Theater Guild, the American Shakespeare Festival Theater and Academy (Stratford, Conn.), and the National Inventors Council, discusses the history and psychology of clothing.

Liquid-Metal Heat Transfer Media. Translated from the Russian. Supplement No. 2, *Soviet Journal of Atomic Energy.* S. S. Kutateladze, V. M. Borishanskii, I. I. Novikov, O. S. Fedynskii. Consultants Bureau, New York; Chapman & Hall, London, 1959. 149 pp. $22.50.

Mechanism and Structure in Organic Chemistry. Edwin S. Gould. Holt, New York, 1959. 780 pp.

Midwestern Conference on Fluid Mechanics. Proceedings of the sixth conference. Univ. of Texas, Austin, 1959. 474 pp.

Midwestern Conference on Solid Mechanics. Proceedings of the fourth conference. Univ. of Texas, Austin, 1959. 539 pp.

Our Sun. Donald H. Menzel. Harvard Univ. Press, Cambridge, Mass., ed. 2, 1959. 360 pp. $7.50.

The Papers of Benjamin Franklin. vol. 1. 6 January 1706 through 31 December 1734. Leonard W. Labaree, Ed. Yale Univ. Press, New Haven, Conn., 1959. 488 pp. $7.50.

Plant Pathology. An advanced treatise. vol. 1, *The Diseased Plant.* J. G. Horsfall and A. E. Dimond, Eds. Academic Press, New York, 1959. 688 pp. $22.

Pictorial History of Philosophy. Dagobert D. Runes. Philosophical Library, New York, 1959. 416 pp. $15.

Principles of Nutrition. Eva D. Wilson, Katherine H. Fisher, Mary E. Fuqua. Wiley, New York; Chapman & Hall, London, 1959. 495 pp. $5.95.

Reading for Life. Developing the college student's lifetime reading interest. Jacob M. Price, Ed. Univ. of Michigan, Ann Arbor, 1959. 279 pp. $6.

Reproduction in Domestic Animals. vol. 2. H. H. Cole and P. T. Cupps, Eds. Academic Press, New York, 1959. 462 pp. $13.

The Sun. Karl Kiepenheur. Univ. of Michigan Press, Ann Arbor, 1959. 160 pp. $5.

Space Age Dictionary. Charles McLaughlin, Ed. Van Nostrand, Princeton, N.J., 1959. 136 pp. $5.95.

Statistical Methods in Biology. Norman T. Bailey, Wiley, New York, 1959. 209 pp. $4.50.

Symposium on Evolution. Held at Duquesne University, 4 April 1959, in commemoration of the centenary of Charles Darwin's *The Origin of Species.* Duquesne Univ., Pittsburgh, Pa., 1959. 119 pp. $3. Contents: "Evolution and viruses," F. C. Bawden; "Human organic evolution; fact or fancy," G. O. Lang; "Philosophical aspects of evolution," A. G. van Melsen; "Evolution and the Bible," C. Vollert.

Syntheses of Heterocyclic Compounds. vols. 1 and 2. A. L. Mndzhoian, Ed. Translated from Russian by A. E. Stubbs. Consultants Bureau, New York; Chapman & Hall, London, 1959. 84 pp. $6.

A Textbook of General Physiology. Hugh Davson. Little, Brown, Boston, Mass., ed. 2, 1959. 862 pp. $14.50.

Theories of History. Patrick Gardiner, Ed. Allen and Unwin, London; Free Press, Glencoe, Ill., 1959. 558 pp. $8.50.

The Transits of Venus. A study of eighteenth-century science. Harry Woolf. Princeton Univ. Press, Princeton, N.J., 1959. 271 pp. $6.

Reprints

Algebraic Theories. Leonard E. Dickson. Dover, New York, 1959 (unabridged republication of *Modern Algebraic Theories,* 1926). 285 pp. $1.50.

Introduction to Mathematical Thinking. The formation of concepts in modern mathematics. Friedrich Waismann. Harper, New York, 1959 (reprint of volume published by Unger, 1951, translated from *Einfuhrung in das Matematische Denken*). 271 pp. $1.40. Beginning with the natural numbers and the fundamental laws of arithmetic, the account is carried through the problems of the real-number continuum and the concepts of calculus.

Readings in the Literature of Science. Being extracts from the writings of men of science to illustrate the development of scientific thought. Arranged by William C. Dampier and Margaret Dampier. Harper, New York, 1959 (reprinted by arrangement with Cambridge Univ. Press). 285 pp. $1.50.

Space, Time and Gravitation. An outline of the general relativity theory. Sir Arthur Eddington. Harper, New York, 1959 (reprint of original edition, 1920). 222 pp. $1.35.

The Theory of Numbers. Robert D. Carmichael. Dover, New York, 1959 (unabridged republication of the latest edition of *The Theory of Numbers* and *Diophantine Analysis,* c 1914 and 1915). 118 pp. $1.35.

A Treatise on Algebraic Plane Curves. Julian Lowell Coolidge. Dover, New York, 1959 (unabridged republication of ed. 1). 538 pp. $2.45.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

American Philosophical Society, Transactions. vol. 49, pt. 5, *The Anatomy of Callimico Goeldii (Thomas).* W. C. Osman Hill. American Philosophical Society, Philadelphia, Pa., 1959. 116 pp. $2.50.

Annals of the New York Academy of Sciences. vol. 59, art. 3, *The Relation of Immunology to Tissue Homotransplantation,* Blair O. Rogers, Ed., 190 pp.; vol. 72, art. 12, *Metabolic Factors in Cardiac Contractility,* Menard M. Gertler, Ed., 202 pp.; vol. 78, art. 1, *Germfree Vertebrates: Present Status,* James A. Reyniers, Ed., 400 pp.; vol. 79, art. 4, *Modes and Natural Frequencies of Suspension-Bridge Oscillations,* D. B. Steinman, 32 pp., $2.50; vol. 79, art. 5, *On the Design of Structural Models to Study the Thermal Stress Phenomenon,* L. Albert Scipio, II, 14 pp., $2; vol. 80, art. 3, *Amine Oxidase Inhibitors,* E. A. Zeller, Ed., 494 pp., $5; vol. 80, art. 4, *Modern Aspects of the Geology of New York City and Environs,* Kurt E. Lowe, Ed., 124 pp., $2.50; vol. 82, art. 2, *Current Trends in Research and Clinical Management of Diabetes,* Peter H. Forsham, Ed., 454 pp., $4.50. New York Acad. of Sciences, New York, 1959.

Bulletin of the British Museum (Natural History), Entomology. vol. 8. No. 1, *Check-List and Keys to the Families and Subfamilies of the Hemiptera-Heteroptera,* W. E. China and N. C. E. Miller, 45 pp., 15s; No. 2, *A New Subfamily, New Genera and New Species of Reduviidae (Hemiptera-Heteroptera),* N. C. E. Miller, 70 pp., 20s; No. 3, *Additions to Descriptions of New Olethreutinae and Carposinidae in the British Museum (Natural History),* A. Diakonoff, 7 pp., 8s; No. 4, *A Revision of the Termites of the Ethiopian Region (Isoptera, Termitidae, Amitermitinae),* W. A. Sands, 29 pp., 10s. British Museum (Natural History), London, 1959.

Expédition Océanographique Belge dans les Eaux Côtières Africaines de l'Atlantique Sud (1948–1949). Résultats scientifiques. vol. 4, fasc. 5, *Annélides Polychètes non Pélagiques.* Second note, *Polychètes sédentaires.* Fidel Jeldes and Sylvain Lefevere. Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium, 1959. 40 pp.

The Natural History of Rennell Island, British Solomon Islands. vol. 2, *Invertebrates, Pars.* Scientific results of the Danish Rennell expedition, 1951, and the British Museum expedition, 1953. Danish Science Press, Copenhagen, 1959 (order from British Museum (Natural History), London). 234 pp. £2 10s.