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 These considerations, coupled with unpublished observations on cranial morphology, serve as the bases for a proposed, new phyletic classification of the Arthrodira in which the geologically younger members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