Book Reviews

Exploration Hydrobiologique du Lac Tanganika (1946–47): *Résultats Scientifiques.* Vol. I: *Le Milieu Géographique et Géophysique* by André Capart, *Le Milieu Biochimique* by Jean Kufferath, *Le Milieu Végétal* by Ludo Van Meel, *Les Invertébrés* by Eugène Leloup, *Les Vertébrés* by Max Poll, 168 pp., illus. + plates. Vol. II, fasc. 1: *Relevé des Stations* by Eugène Leloup, 119 pp., plates + maps. Vol. II, fasc. 2: *Sondages et Carte Bathymétrique* by André Capart, 16 pp., plates + maps. Vol. III, fasc. 1: *Lamellibranches* by Eugène Leloup, 153 pp., illus. + plates. Vol. III, fasc. 2: *Trematoda, Cestoda and Acanthocephala* by Stephen Prudhoe, *Coleoptera Carabidæ* by Pierre Basilewsky, *Bryozoaires* by Adrianus W. Lacourt, *Méduses* by Eugène Leloup, *Cyclopides (Crustacès copépodes)* by Knut Lindberg, 91 pp. tables + plates. Vol. III, fasc. 3: *Amphibiens et Reptiles* by Gaston de Witte, *Hemiptera Homoptera* by Victor Lallemand and Henri Synave, *Coleoptera Lamellicornia* by André Janssens, *Crustacés Décapodes, Brachyures* by André Capart, 67 pp., illus. Vol. III, fasc. 4: *Gastéropodes* by Eugène Leloup, 273 pp., illus. + plates. Brussels: Institut Royal des Sciences Naturelles de Belgique, 1949–53.

Expédition Océanographique Belge dans les Eaux Côtières Africaines de l'Atlantique Sud (1948–49): *Résultats Scientifiques.* Vol. I: *Annexe: Liste des Stations* by André Capart, 65 pp., illus. Vol. II, fasc. 1: *Etude Physique et Chimique du Milieu Marin* by Charles Van Goethem, 152 pp., illus. Vol. III, fasc. 1: *Cumacés* by Louis Fage, *Crustacés Décapodes, Brachyures* by André Capart, 205 pp., illus. + plates. Vol. III, fasc. 2: *Crustacés Décapodes, Macrures* by Lipke Bijdeley Holthuis, 88 pp., illus. Vol. III, fasc. 3: *Céphalopodes* by William Adam, 142 pp. illus. + plates. Vol. IV, fasc. 1: *Poissons: Généralités, Sélaciens et Chimères* by Max Poll, 154 pp., illus. + plates. Brussels: Institut Royal des Sciences Naturelles de Belgique, 1951–52.

It is good to know that in a few places in the world, in this day of inelegant offset and muddy mimeographing, the tradition of fine printing in science is still observed: that some people are still of the old-fashioned opinion that if an expedition is worth financing at all, its reports are worth publication in a suitable manner. Here are two series, both in folio format, on excellent paper with spacious margins, illustrated by excellently reproduced photographs and drawings.

Of the two expeditions, that to Lake Tanganyika is the more significant. When completed, this series will be a contribution to limnology which should make Americans blush with shame whenever they look at their neglected but much more accessible Great Lakes. One of the most interesting aspects of Lake Tanganyika is its gastropod fauna, and this is reported by Leloup in one of the most significant issues of the series, with tables of measurements and illustrations showing the range of variation of many of the species.

The results of the expedition to the coastal waters of west Africa (from the equator to Walvis Bay) will provide much valuable information on a particularly interesting and significant coastal region, and the faunal reports are presented in satisfactory detail. As this was primarily an expedition to study fish, it is perhaps unfair to ask for a more detailed physical and chemical report than the one before us, but a more intensive study of the Walvis Bay region in particular would have added greatly to the value of the report.

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The Biology of Paramecium. Ralph Wichterman. New York–Toronto: Blakiston, 1953. 527 pp. Illus. $9.00.

Tennyson, in his "Flower in the Crannied Wall," expressed the faith that a thorough understanding of one organism would go far toward a general understanding of life. This is the tacit working philosophy of many biologists. It has created a need for a new kind of treatise, summarizing knowledge and supplying full bibliography about a particular organism. Wichterman's book on Paramecium, belonging to this class, is indispensable for investigators working on Paramecium or similar organisms.

Studied for nearly 300 years and long enjoying the status of a laboratory favorite in many and varied fields of biology, Paramecium is the subject of a very large number of papers. Approximately 2000 references are cited in Wichterman's book, more than twice as many as in the 1931 book on the same subject by Kalmus. The bibliography alone confers upon the book great value to researchers and students, and this value is enhanced by the text, which is a helpful introduction to the literature.

The 432 pages of text (exclusive of bibliography and indices) are roughly distributed as follows: about 100 pages on classification, morphology, collection, culture, and sterilization; about 150 pages on physical and chemical properties and physiology; about 100 pages on reproduction, cytology, genetics, and sexuality; and the remaining 80 pages on vitality and the life cycle, serology, parasites, techniques, and problems.

A student of Paramecium for more than 20 years, Wichterman has used his unsurpassed acquaintance with the literature to portray it faithfully. Unfortunately, however, the literature includes a great deal that is in need of more than faithful portrayal. To be sure, it includes the works of a number of acute

observers, rigorous experimenters, and logical and imaginative thinkers, such as R. Hertwig, Maupas, and Jennings, among those no longer alive. But it also includes a very large amount of nonsense. This in considerable measure stems from observers, often excellent observers, who are innocent of the rigorous basis, experimental or logical or both, required for drawing sound conclusions and who commonly appear to be unaware that their conclusions are not obvious consequences of, or even identical with, their observations. Perhaps Wichterman conceived his task to be primarily to inform his reader of what the literature contains, not to sit in judgment on it. That he is capable of analysis, synthesis, and judgment, however, is repeatedly shown in the book (for example, the discussions of the status of autogamy and of taxonomy). It is greatly to be regretted that a similar approach was not consistently followed throughout the book and in all its details. Nevertheless, the book is a mine of information which will doubtless prove interesting, stimulating, and fruitful to investigators and students as it has already to the reviewer.

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Low Temperature Physics: Four Lectures. F. E. Simon *et al.* New York: Academic Press; London: Pergamon Press, 1952. 132 pp. Illus. $3.50.

These four nonmathematical lectures, by outstanding research experimentalists in the field of low temperature physics, were originally given at the Royal Institution, London, in the winter of 1950 as a short course for young students preparing to specialize in the field and as a general survey for those whose interest in low-temperature physics is less direct.

The style of the lecture is maintained by all four writers. Useful bibliographies and references have been appended. As the publication followed some two years after the lectures were given, reports on work of more recent date than 1950 are included, notably on the achievement of nuclear alignment at low temperatures in 1951 (see lecture 2).

The first lecture by F. E. Simon, Professor of Thermodynamics in the University of Oxford, is a general survey. In it he surveys the general principles of attaining low temperatures and the significant role played in such considerations by the third law of thermodynamics, which he describes as the most important guiding principle in low-temperature research. He makes a brief outline of the importance of the zero point energy in the behavior of liquid helium and of electrons in metals, and sketches the significance of low-temperature research to our understanding of many of the thermal, mechanical, and magnetic properties of matter, including those concerned with the general phase diagram of fluids. Although this general outline of necessity is short, it is well balanced and serves as an excellent background for the three succeeding lectures.

The second lecture by N. Kurti, also of the University of Oxford, is on the temperature range below 1° absolute. In it the author justifies the separation of this particular range of temperature from other ranges of low-temperature research mainly on the grounds that it is approachable generally only by magnetic cooling methods. He then describes the method of magnetic cooling using paramagnetic salts, giving interesting practical information and giving some data on the properties of the salts themselves. A longer section is devoted to the possible techniques to be used for future nuclear magnetic cooling, for obtaining temperatures still lower than those reached using paramagnetic salts. To date, however, such nuclear cooling has not been achieved. The lecture gives a satisfactory general introduction to the extensive work that has been done in the temperature range below 1° K during the past two decades.

The third lecture, entitled "Liquid Helium," by J. F. Allen, Professor of Natural Philosophy in the University of St. Andrews, gives a nonmathematical description of the main properties of the fluid. The phase diagram and the significance of the zero point energy are first discussed, and then the main transport and film properties of the superfluid phase are presented and discussed in the light of the current two fluid model of the liquid. In such a brief outline many interesting features, as, for example, that of second sound, could be treated only lightly; nevertheless, no items of fundamental importance have been omitted. The lecture should stimulate its readers to further study of the many interesting facets of the problem of liquid helium.

Superconductivity forms the subject of the fourth lecture by K. Mendelssohn, also of the University of Oxford. The author has compressed the more significant results of over 40 years' work by a great number of investigators on the phenomenon of superconductivity into one very readable lecture. He outlines the salient experimental features of superconductivity, namely the distribution of the effect among elements and alloys, the magnetic properties, the magnetic penetration depth, heat conductivity, etc. He devotes a larger section to the thermodynamics of the effect and the resulting thermal data that can be obtained therefrom and another to interesting transition phenomena such as time effects. It is not surprising that with so much compression of material, only a cursory statement is made of the theoretical problems involved.

All four lectures maintain an even level among themselves and are presented in a manner easily assimilable by nonspecialist students. For a quick glance at many of the important and active branches of current low-temperature research, they form an accurate and authoritative introduction. Moreover, the bibliographies and references accompanying each lecture serve as useful guides for more detailed study.

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