

an organized coverage. Perhaps it is too early to expect such, but at least there could have been more synthesizing commentary for these 1184 pages than a 1½-page introduction: ideally, about four pages for each group of ten papers or so, to place them in context for the nonspecialist.

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Protozoology as Cell Biology

Protozoology. KARL G. GRELL. Third (first English) edition. Springer-Verlag, New York, 1973. viii, 554 pp., illus. \$43.90.

For well over 100 years, German authorities dominated the field of protozoology, from such early monographers as Ehrenberg through such leaders as Bütschli, Haeckel, R. Hertwig, and Stein to Doflein, Hartmann, Jollos, and Schaudinn at the turn of the century (followed later by Kahl, Reichenow, and others). This dominance was reflected in the outstanding textbook, *Lehrbuch der Protozoenkunde* by Doflein and Reichenow, which held sway—seldom contested—from the time of its first appearance in 1901 until its sixth and last edition in 1949–53. This sturdy, many-paged work stood off such occasional rivals as the generally slimmer volumes of Calkins, Minchin, Wenyon, Hegner, and Kudo and was much copied and imitated. With the advent of World War II, however, and the tremendous postwar surge of interest in protozoological research—especially among American and other English-speaking protozoologists, parasitologists, and cell biologists—the German grip on the field weakened rapidly.

Once again, leadership in the field was reflected in textbook production. Witness the appearance, in the period from 1948 to 1973, of some 20 general treatments, six by American authors, six by Englishmen, the others by Russian, French, Czech, Polish, or Mexican workers. In the same 25 years, over two dozen substantial monographs or books appeared on special protozoan groups or even individual genera (*Amoeba*, *Blepharisma*, *Eimeria*, *Euglena*, *Paramecium*, *Plasmodium*, *Stentor*, *Tetrahymena*, and *Trypanosoma*); numerous invertebrate zoology texts were published (not to mention parasitological treatises heavily stressing pro-

tozoan species and a scattering of taxonomic and ecological booklets on ciliates and flagellates); several review volumes in cell biology and protozoology appeared; and four International Congresses of Protozoology were convened. German leaders in these enterprises have practically been countable on the fingers of one thumb.

Although high-class research in various important aspects of protozoology was being carried on in scattered laboratories in Germany during the postwar period and was published in the best of journals, it remained for Karl Grell to lead the revival of protozoology in his country in the most visible way—by publication of his outstanding, thoroughly modern textbook, first in two German editions (1956, 1968) and now in English.

Grell initially saw his volume as having limited, essentially European, usage, and early demands for an English translation surprised him. By the time he managed to get away from the research bench and the administrator's desk long enough to supervise a translation, he realized that the English version would have to be more than that: it would have to be updated and revised. The result is a pronounced success, in the opinion of this reviewer (and user) of the new edition.

An internationalist well aware of advances in biological research in the major laboratories of the world, Grell was one of the first to sense that protozoology is becoming increasingly wedded to cell biology, especially at the molecular and genetic levels. His innovative book treats the subject in large measure from a cellular approach, emphasizing areas in which he himself has a special interest and firsthand research experience. The outstanding features are easily identifiable: numerous clear and precise drawings and beautiful light and electron micrographs; scholarly and detailed exposition of a variety of cytological and genetic problems closely related to modern cell biology; neat presentation of "developmental cycles" of selected species (mainly parasitic forms); a thorough bibliography, a unique list of protozoological films, and well-prepared subject and generic (including treated species) indexes.

Of a total of 554 pages, Grell devotes 120 to cytology (including nuclear studies), ultrastructure, and selected biochemical-biophysical subjects and 155 to genetics, sexuality in general, cell cycles, and morphogenesis. References

and indexes occupy some 87 pages. On the other hand, only 103 pages are allotted to matters pertaining to taxonomy and classification, including comparative morphology, evolution, phylogeny, and treatment of the dozens of representative groups comprising the major classes; only 73 pages are given to physiology and biochemistry and only 15 to parasitism per se; and there is no exclusive consideration of modern ecological problems. Furthermore, some of the information given on the slighted subjects, such as systematics, is quite dated (though there are scattered excellent exceptions to this) or overweighted in favor of a few select groups, such as the foraminiferans or radiolarians.

But much of the wealth, the usefulness, and the uniqueness of this authoritative textbook of protozoology also derives from the conscious selectivity and fine discrimination of the author. He realizes the goal he set for himself, as both the critic and the user should keep in mind when perusing this handsomely produced volume which restores a leadership role to the country that dominated the field in decades past.

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Protein Anomalies

Alpha-Fetoprotein and Hepatoma. Papers from a symposium, Tokyo, Dec. 1971. HIDE MATSU HIRAI and TORU MIYAJI, Eds. University Park Press, Baltimore, 1973. viii, 320 pp., illus. \$29.50. GANN Monographs on Cancer Research, No. 4.

In a word, this volume is a "must" for anyone interested in developmental biology, genic control of protein synthesis, protein purification and immunochemical assays, or clinical pathology and clinical medicine. An exaggeration? Not really, since such is the nature of the subject: serum α -fetoprotein. Normal synthesis of α -fetoprotein occurs primarily in the embryo or fetus. In the human conceptus, the sites of synthesis are the liver, yolk sac, and gastrointestinal tract, and the rate of synthesis reaches a peak at 10 to 14 weeks of fetal development. At or near birth, synthesis of α -fetoprotein is sharply repressed, and the serum concentration of the protein falls rapidly. Repression is not complete, however, as several papers in this monograph reveal: