picture of the whole field. It would be fitting, in a course of "economic mycology," that Gray's book should be used as a text and Ramsbottom's as collateral reading.

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The Cell. Biochemistry, physiology, morphology. vol. 1. Jean Brachet and Alfred E. Mirsky, Eds. Academic Press, New York, 1959. xxi + 816 pp. Illus. $22.

This is the first of a series of three books which will cover most of cell biology in some 40 articles written by well-known workers in the field. This volume is in two parts, the first on methods, the second on general problems. The remaining two volumes will deal with cell constituents and specialized cells. Every biological library should, and no doubt will, buy the series, but its price puts it beyond the means of the individual biologist. The production is excellent and up to the high standards of the publishers. The indexing is good and so are the illustrations (except for the absence of figure captions in Ebert's article).

The best part of this volume is the section on general problems. There is an excellent article by Grobstein on the difficult field of cell differentiation. It is an intractable field at the moment, but it is still the central problem in cell biology. Briggs and King give a good review of the interactions of nucleus and cytoplasm in eggs and embryos and include a summary of their own important work. It is a pity that it could not have been extended to cover recent research with micro-organisms. Ebert gives a clear and critical account of the immunological approach to biological specificity. This is a rapidly developing subject and one of great interest to all biologists, but at the moment the approach is at the level of tissues and whole organisms and has not yet come down to the level of the cell. There are also articles on fertilization, sex determination, radiation effects, and plant cell growth and differentiation (which shows the wide gap between plant and animal cell biologists).

The section on methods is too short to be really useful. The articles cover a wide field and cannot be much more than summaries of the available methods—Wyckoff on optical methods, Gersh on fixation and staining, Glick on microchemical techniques, and White on tissue culture. The best reviews are those which cover a narrower field—Allfrey on cell fractionation, and Walker and Richards on microscopical methods for measuring single cells. In view of the fact that the same publishers are producing a series of books on general cytochemical methods, I doubt whether this section is really necessary.

I must admit that I experience a slight sinking feeling when handling this book: 800 pages are a weight both for mind and hands. Surely it would have been better to split this into half-a-dozen or so smaller books: For the authors, this would mean greater personal responsibility and, more freedom for individual views. For the editors, less pressure to collect contributions by a given date. For the readers, ease of handling, less mental indigestion, and the possibility of buying some of the books. For the librarian, the fact that six books can be read by six different people at the same time. At its price, it is hard to believe that this book would cost much more if it were so divided.

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Soviet Reviews of Nuclear Science. On the 40th anniversary of the October Revolution. Pergamon Press, New York, 1959. 110 pp. Illus. $5.

This slim volume was first published in the U.S.S.R. in November 1957 as a special number of the journal *Atomnaya Energiya* in celebration of the 40th anniversary of the Soviet Revolution. This excellent English translation now appears under the auspices of Pergamon Press.

The volume consists of eight papers, the longest of which is devoted to a review of high-energy particle research in the U.S.S.R. Next in length are reviews of work on low-energy neutron interactions and of the use of radioisotopes in the U.S.S.R. Short, additional papers describe Soviet work in radiochemistry and the development of atomic energy in the Soviet Union.

The quality of the contributed papers is generally proportionate to the length; the Soviet scientists apparently find it difficult to say much in areas where security consciousness still runs high.

The paper on high-energy physics by Dzhelepov and Pontecorvo reviews the use of the synchrocyclotron at the Joint Institute of Nuclear Studies. First completed in December 1949, this accelerator was modified in 1950 and again in 1953 so that it finally achieves proton energies of 680 Mev. The experimental work conducted with this accelerator since 1949 is described in detail. The paper contains a large number of graphs, taken from the Soviet literature, which summarize the experimental findings on high-energy interactions. Much of the apparatus used in these experiments—such as cloud chambers, bubble chambers, and a magnetic spectrometer—is shown in photographs. A clear, running account of the state of the field of high-energy physics at the time of the experiments is given. Non-Soviet work, both theoretical and experimental, is duly noted where necessary.

The review of low-energy neutron interactions was written by Vladimirsky, Panov, Radkevich, and Sokolovsky. After a discussion of the measurements and the instruments used for this work, the state of the field is summarized, including the current knowledge of the distribution of neutron widths and level spacings, the dependence of the strength function, mean level spacing, and radiation width on atomic weight, and the less systematic data on fission parameters. The improvement in the theoretical fit of the strength function, when the asphericity of the nucleus is taken into account, is shown. However, the review is, in some respects, already out-of-date. Thus, the Porter-Thomas model of the statistical distribution of neutron widths has already gained general acceptance, and so has Wigner's model of the distribution of level spacings.

The papers on radioisotopes and radiochemistry will be of interest to workers in these fields, and indicate that the extent of work in these fields is comparable to that in the United States.

The four papers on nuclear reactors are much more sketchy and incomplete. The paper by Nikolaev outlines the development of atomic energy expected in the Soviet Union during the sixth Five Year Plan. The reactors proposed for construction are only briefly described, although further details have since been released. Generally, it is stated that the program in the U.S.S.R. has aims similar to those of the United

States' atomic energy program—to obtain experience with different, full-scale, atomic power plants in order to determine their economic potential. An incentive for atomic power, lacking in the United States, is the higher cost of fuel transportation, since the major use of electric power is in the European part of the U.S.S.R. while the major coal fields are in the East. It is clear that Russian engineers do not agree on the economic aspects of nuclear power any better than their Western counterparts. Nikolaev expects the large pressurized-water reactor to yield electricity at lower costs than coal fired stations, a statement contradicted by other spokesmen for the U.S.S.R.

The remaining papers include a sketch of the superheated-steam, uranium-graphite reactor. Cost figures for the fuel are taken from non-Soviet sources. Similarly, the paper on graphite in nuclear reactors leans heavily on non-Soviet sources of information. Finally, a paper by Novikov on the efficiency of atomic power stations makes the point that regenerative heating plays only a minor role in nuclear power plants compared with the role it plays in conventional steam plants.

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Bumblebees. John B. Free and Colin G. Butler. Macmillan, New York, 1959. xiv + 208 pp. Illus. $5.00.

This readable book, one of the latest (No. 40) in the 'New Naturalist' series, was first published in England. The authors are on the staff of the bee department at the Rothamsted Experimental Station.

In the opening chapters, Free and Butler discuss the bumblebees' life history, including such topics as the founding, growth, and decline of the colony, reproduction, the division of labor, and the enemies of the bumblebees. Subsequent chapters go more deeply into behavior and treat the collection and storage of nectar and pollen, flower relationships, and locality learning. The economic importance of bumblebees in the pollination of certain forage and fruit crops is covered in a separate chapter. The final chapter, "Bumblebees and their relatives," is somewhat mistitled, for almost all of it is devoted to a comparison of the habits of bumblebees with those of only one relative, the honey bee.

The book contains four appendixes. The first and second are treatises on the collection and study of bumblebee colonies and on how to start colonies in captivity. These will be very useful to anyone who wishes to study the behavior of these insects. The other two appendixes, by I. H. H. Yarrow of the British Museum (Natural History) will be of no interest to most American readers, because they contain keys to the British bumblebees and distributional notes on the British species.

Free and Butler are to be congratulated for this admirable compilation of the life history and behavior of bumblebees; the compilation is based on their own observations, as well as on the voluminous scientific literature devoted to these fascinating insects. Bumblebees are of more than ordinary interest because they belong to one of the few groups of insects which have evolved a social life. The enjoyable text is enhanced by Butler's excellent black-and-white photographs showing some of the details of life history and flower visits. The book is a worthy companion to Butler's earlier book in the same series, *The World of the Honeybee.*

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New Books

Germany Rejoins the Powers. Mass opinion, interest groups, and elites in contemporary German foreign policy. Karl W. Deutsch and Lewis J. Edinger. Stanford Univ. Press, Stanford, Calif., 1959. 336 pp. $6.50.

A Handbook for Dissectors. J. C. Boileau Grant. Williams & Wilkins, Baltimore, Md., ed. 5, 1959. 455 pp. $5.

Industrial Gums. Polysaccharides and their derivatives. Roy L. Whistler, Ed. Academic Press, New York, 1959. 777 pp. $25. Each chapter describes a specific gum. This description includes source, constancy of supply and composition, cost and cost variation, chemical structure and reactions, history, uses, derivatives and their uses, and physical properties, including those of its solutions, gels, and films.

Introduction to the Theory of Quantized Fields. N. N. Bogoliubov and D. V. Shirkov. Authorized English edition, revised and enlarged by the authors. Translated from the Russian by G. M. Volkoff. Interscience, New York, 1959. 736 pp. $17.

Introductory Nuclear Theory. L. R. B. Elton. Interscience, New York, 1959. 297 pp. $6.40.

Life and the Universe. Archibald G. Huntsman. Univ. of Toronto Press, Toronto, Canada, 1959. 122 pp. $3.

Metamorphosis. On the development of affect, perception, attention, and memory. Basic Books, New York, 1959. 352 pp. $6.

Nuclear Electronics. Proceedings of the international symposium on nuclear electronics organized by the French Society of Radioelectricians. International Atomic Energy Agency, Vienna, Austria, 1959 (order from International Publications, 801 Third Ave., New York). 464 pp. $4.

Numerical Methods for Nuclear Reactor Calculations. Gurii Ivanovich Marchuk. Translated from Russian. Consultants Bureau, New York, 1959. 295 pp. $60.

Reflexes to Intelligence. A reader in clinical psychology. Samuel J. Beck and Herman B. Molish. Free Press, Glencoe, Ill., 1959. 683 pp. $8.50.

Reprints

Albert Einstein: Philosopher-Scientist. vols. 1 and 2. Paul Arthur Schlipp. Harper, New York, 1959 (reprint of ed. 1, Tudor, 1949 and 1951). 781 pp. $1.95 each.

Ancient Science and Modern Civilization. George Sarton. Harper, New York, 1959 (reprint of ed. 1, Univ. of Nebraska Press, 1954). 111 pp. $0.95 This book reproduces in full the text of the three Montgomery lectures given by Sarton at the University of Nebraska in 1954. Titles of the lectures are "Euclid and his time," "Ptolemy and his time," and "The end of Greek science and culture."

Beyond Psychology. Otto Rank. Dover, New York, 1959 (reprint of ed. 1, 1941). 291 pp. $1.75.

New Pathways in Science. Sir Arthur Eddington. Univ. of Michigan Press, Ann Arbor, 1959 (reprint of ed. 1, Cambridge Univ. Press, 1934). 333 pp. $1.95. The Messenger lectures which Eddington delivered at Cornell University in 1934 are contained in this volume. Chapters 2 and 8 have been added; the other chapters correspond to the 12 lectures.

Out of the Sky. An introduction to meteoritics. H. H. Nininger. Dover, New York, 1959 (reprint of ed. 1, 1952). 356 pp. $1.85. Nininger, director of the American Meteorite Museum, describes famous meteorite landings and craters, and tells how to locate, identify, and preserve a meteorite that survives its fall through the atmosphere.

Science Since 1500. H. T. Pledge. Harper, New York, 1959 (reprint of ed. 1, Her Britannic Majesty's Stationery Office, London, 1939). 357 pp. $1.85. This short history of mathematics, physics, chemistry, and biology was described by A. R. Hall as "still the outstanding one-volume handbook for the history of science during the last four centuries. . . . For this period Mr. Pledge's book provides an encyclopedic wealth of information and ideas such as can be found nowhere else." Thomas S. Kuhn calls it "the most useful one-volume reference work in English for the general technical history of post-Newtonian science."