Book Reviews

The Atoms Within Us. Ernest Borek. Columbia University Press, New York, 1961. xv + 272 pp. Illus. $5.
The Coil of Life. The story of the great discoveries in the life sciences. Ruth Moore. Knopf, New York, 1961. xxvii + 418 pp. Illus. $5.95.

Who should explain science to laymen? Should it be scientists, converted or diverted from their usual work, or should it be journalists, who specialize in science writing? Whether or not there is a general answer, these volumes present an interesting case study of this question. The author of the first is a biochemist, of the second, a journalist. Comparison and contrast have some meaning because both authors are experienced and skillful.

The subject is molecular biology, and both book jackets are ornamented with DNA helices, indicating fairly what lies within. Both authors wisely (I think) approach present problems by the historical route. Ernest Borek traces a path through enzymes, vitamins, intermediary metabolism, isotope techniques, and the architecture of proteins, reaching (after side trips through the blood system and cellular defenses) deoxyribonucleic acid (DNA), with a third of the book to go. Ruth Moore begins with a brief eulogy of DNA and then presents a flashback to Lavoisier and the early days of cell theory and Mendelian genetics. Before she begins the extended discussion of DNA she, too, has used up two-thirds of her book; but unlike Borek, she devotes most of the remaining third to DNA and its ramifications, discussing in considerable detail problems of duplication, of the synthesis of ribonucleic acid (RNA), of coding, and of protein structure. Her book is the larger of the two by some 50 percent.

Although there are many differences in detail, each book deserves high praise for admirably doing the job it sets out to do, namely exhibiting the beauties of molecular biology, including the exciting developments of the last decade, to the man in the street. Whether John Doe will get the message is, of course, another problem. Probably he won't; after his day of quiet desperation, he will probably flee, via television, to "77 Sunset Strip." But Doe's yet unfrustrated son or daughter may pick up one of these books in the high school library, and be rewarded.

Of adverse criticism there is little to offer, but here significant contrasts between the two books are discernible. The faults of the authors spring, I think, from a sort of overcompensation. It is a common complaint that journalists know too little of what they write about. Such a criticism cannot be made about Moore, who had done her homework well. But, aware (I suspect) of this type of critical comment, she has retailed rather too much information, particularly about the early history of biology. There are too many highlights and side lights for the reader easily to see the big picture.

The balance is better in Borek's volume, and his writing also conveys more of a feeling of authority, as one would expect. (Does the layman notice this? One wonders.) But the biochemist commits his own characteristic errors of compensation. Aware, no doubt, of laymen's allergy to diagrams and symbols, Borek announces at the outset: "I use no chemical formulas in this book." This is surely a severe restriction for a book about biochemistry, but he adheres to it for more than a hundred pages, until he takes up the story of the synthesis of insulin by Sanger and his co-workers. Borek tells this detective story very well, but only by using structural formulas. He could hardly do otherwise. Unfortunately, he then apparently remembers his original promise and returns to formula-free exposition. Skilled as Borek's writing is, it is difficult to believe that the reader can get as clear an idea of the hereditary mechanism from words alone as he can get from Moore's diagram-rich text.

So we have the curious contrast of the journalist freely and effectively employing formulas and diagrams, while the scientist avoids them. Borek's motivation and intention are clear and praiseworthy—to avoid parochial cant. But has he not thrown out the baby with the bath? Paraphrasing Willard Gibbs, Borek says (page 114): "Gentlemen, the sciences *are* humanities." But do these humanities not have their own characteristic art forms—namely formulas, diagrams, and graphs? To eschew the appropriate forms is to risk losing the art. In writing his *Essai Philosophique sur les Probabilités*, Laplace achieved the tour de force of describing probability theory without using algebra, but the result has proved useful to neither scientists nor laymen. Laplace's essay is longer, more difficult, and less artistic than the equivalent algebraic exposition would have been. Every artist, and that includes the scientist, must insist on the appropriateness of his tools and media if the audience is to understand what he is trying to say.

One more contrast deserves mention. Borek's book, *The Atoms Within Us*, has no literature citations, whereas *The Coil of Life* closes with a carefully chosen and well-annotated bibliography. For the terminal reader who will pursue the topic no farther (and who admittedly is in the majority), a bibliography is a useless luxury. But for the small fraction of young readers who are fired by an introduction to delve deeper into a subject, such an aid is almost as important as the text itself. If science is, as we think, an endless frontier, we should leave open the paths that lead to it.

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The Geology of the U.S.S.R. A short outline. D. V. Nalivkin. Translated from the Russian by S. I. Tomkeieff. J. E. Richey, Translation Editor. Pergamon, New York, 1960. ix + 170 pp. 2 maps. $15.

A book that summarizes the geology and mineral resources of one-sixth of the land surface of the earth is of paramount interest to geologists and economists, especially when the area involved is one so little known beyond its boundaries as the Soviet Union. Indeed, we could not have read such a book

even in Russian before 1957, and the last comprehensive account, in English, of the geology of Russia is more than a century old, and excluded Siberia.

The Geology of the U.S.S.R. is, in effect, an extended explanation of the English language version of a special edition, on a scale of 1 to 7.5 million, of the new geological map of Russia, prepared for foreign distribution by the Ministry of Geology of the U.S.S.R. The map itself, in full color and excellent registration, is a superb example of geologic cartography. The translation of the text was prepared with the cooperation of Academician Nalivkin himself, dean of Russian geologists and perhaps the only man living or dead who could have written such a book as sole author.

The text consists of a sequence of brief synoptic surveys of major geographic, stratigraphic, tectonic, and magmatic features and of mineral and mineral-fuel resources of each of the ten principal physiographic and geologic subdivisions of the Soviet Union. Such a document can hardly be considered light reading, and few will want to read it from cover to cover. It is, nevertheless, an invaluable source book whose study is facilitated by a detailed index which, in addition to page references, gives the latitude and longitude of localities on the map.

It would be meaningless to attempt here to discuss such condensed subject matter in any detail, but a few items are of sufficiently broad or unusual interest to deserve mention. One is the vast extent of permanently frozen ground in Siberia, much of it with a forest cover, and extending at places to as much as 20 degrees south of the southern limit of Pleistocene continental glaciation. Other matters of special interest include the great thickness and extent of late Precambrian sediments and Nalivkin's opinion that the Siberian archaeocyathids are, after all, mainly Early and not primarily Middle Cambrian as now widely believed. The picture of Soviet mineral resources which emerges from the various sectional accounts is one of unspecified but allegedly ample reserves of most of the important industrial and precious minerals and mineral fuels, with the possible exception of oil.

Incidentally, those who wish to inquire more deeply into the subject of this book will find it treated extensively in a three-volume, multiauthor compendium, *The Geological Structure of the U.S.S.R.*, published in Russian (1959) and available in a French translation from Service d'Information Géologique (B.R.G.G.M., 74 rue de la Fédération, Paris 15). A geological map of the Soviet Union in 18 sheets, at a scale of 1 to 2.5 million, with Russian and English explanations, and published in 1956, is also available from the Soviet Ministry of Geology.

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Mammals of Wisconsin. Hartley H. T. Jackson. University of Wisconsin Press, Madison, 1961. xii + 504 pp. Illus. $12.

The Recent Mammals of Arizona: Their Taxonomy and Distribution. E. Lendell Cockrum. University of Arizona Press, Tucson, 1960. viii + 276 pp. Illus.

Mammals of Wisconsin is the result of more than 3½ years of field work carried out between 1917 and 1951 by Jackson and his associates in the Fish and Wildlife Service and the Wisconsin Conservation Department. Additional years were given to the examination of thousands of specimens (including 6300 Wisconsin specimens), compilation of information from the extensive literature, and selection of hundreds of illustrations. Most of the book (414 pages) is devoted to accounts of the Recent mammals: artificial keys for identifications down to families and sometimes to genera and, for the 84 species or subspecies, sections on common names, descriptions, identification criteria, distribution in the state, status, habits, and specimens examined. There are maps showing state and continental distribution of each kind of mammal, and line drawings and photographs of skulls, teeth, and other diagnostic parts and of tracks, scats, burrows, nests, and so forth. The illustrations have been chosen with great care to show important characteristics of various species. A 46-page bibliography and a 19-page index conclude the volume. In composition, design, and typography it is top-grade but, to keep the cost within reasonable limits, some quality has been sacrificed in reproducing the photographs.

The book is highly readable and is a mine of information on occurrence, habits, economic and other values, and management. It will be invaluable to professional and amateur mammalogists and "mammal-watchers," not only in Wisconsin but throughout the north central states and western Ontario.

Because Arizona is ecologically complex and new facts bearing on the evolution and distribution of mammals are still being uncovered, that state is not ready for a comprehensive treatise. *The Recent Mammals of Arizona* is a summary of known distributional and taxonomic data. An identification key for the 290 species and subspecies currently recognized as occurring in Arizona is followed by an account of each kind of mammal; this account includes synonomy, distribution in the state, specimens examined, and additional records. Collecting localities of the specimens are shown on range maps (111) that are sufficiently large and uncluttered to serve their purpose effectively. There is a 15-page bibliography but no index. Cockrum, a professor of zoology at the University of Arizona, has produced a basic book which will be indispensable to every mammalogist working in Arizona for many years to come.

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Handbook of Textile Testing and Quality Control. Elliot B. Grover and D. S. Hamby. Textile Book Publishers (Interscience), New York, 1960. vi + 614 pp. Illus. $17.50.

In the first nine chapters Grover and Hamby illustrate how to make various statistical calculations from observed data. The formulas are simply given, the meanings of the symbols are stated, but the reader is spared the derivations, which can be found in many standard texts. Numerical data, typical of a textile process or of an experiment, are tabulated, and the numerical calculations are indicated step by step. Results are interpreted in the language of a textile technologist, and their use is illustrated by means of quality control charts with upper and lower control limits. These treatments cover both quantitative and qualitative data, such as the strength of a product and the fraction or percentage found to be defective during a given period or quantity of production. Pertinent problems are included for use in mastering the calculations and in establishing quality control charts, drawing conclusions, and recommending courses of action or remedies.