authors of this recent biography are bent on making the story glamorous and the language colorful, with the result that the important ideas are not clearly presented. Diesel's original conception is not made clear, nor is the reason why the engine diverged from this conception. The book has much scattered information about varieties of engines and the comings and goings of men, some of it wrong, and a good deal of it unintelligible. It provides background scenery but no explanation of the technical and economic forces at work in the Diesel engine's recent conquest of the fields of marine and railway propulsion.

The book is a reworking of biographical materials already published, mostly by Eugen Diesel, the inventor's son, with irritating artificial coloring added. It has a good index and a full bibliography, but no footnotes. It is an excellent piece of book design and manufacture. I wish it made more of a contribution to our understanding of Diesel and his engine.

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On Form and Style

Style Manual for Biological Journals. Prepared by the Committee on Form and Style of the Conference of Biological Editors. Published for the Conference by the American Institute of Biological Sciences, Washington, D.C., ed. 2, 1964. x + 117 pp. Illus. $3.

The first edition of this manual was published in 1960. The second, appearing only 4 years later, attests to its general acceptance. It is the most useful book of its kind for the biological author, editor, and referee. Nearly half of the volume is devoted to "Writing." Here one finds suggestions, accompanied by examples of good and bad style, for making one's writing a better vehicle for transmitting scientific information. Simple rules for word usage, punctuation, and spelling all have the goal of brief and clear expression. But it does give one a surrealistic feeling to read the first sentence: "Learn to write effectively." Does any author truly believe that he writes ineffectively? I would wager that he has little trouble communicating with himself even in the first rough draft. It would be equally useful to have said: "Learn to be wise."

One also finds in this same section the statement, "Describe your materials and methods in sufficient detail so that another worker can repeat the procedures exactly." Would many editors accept without modification a paper so prepared?

I should like to enter a mild protest with the philosophy that permeates this and similar style manuals. There is too much concern with little things. Considering the problems of scientific writing and publishing today, does it really matter if we write "anesthesia" and not "anaesthesia," "base line" and not "baseline," "eyeball" and not "eye ball," "Florence" and not "Firenze?" Does the gain of a little space warrant a great effort to standardize abbreviations? Abbreviations save space but, when unfamiliar, they waste the reader's time. How many of these standard abbreviations are familiar to *you*: A, a, bl, cor, d, f, f., n, p, p., and T? "Agr" is the accepted abbreviation for Agraire, Agralia, Agrar-, Agrarnyi, Agricol-, and Agrikult- when used in the titles of journals. But conceivably it would assist one in finding the journal if the whole word were given. The finest scientific editor known to me has a simple rule for abbreviations: avoid them.

Style manuals promote uniformity. When the result is improved (and less expensive) communication, fine. But far too often the goal seems to be uniformity for the sake of uniformity. In preference to concern with the latter, I would prefer to have a committee of editors dealing with the bigger problems. Having been an editor myself, I believe that our breed tends to be pica wise and manuscript foolish. Should we not devote our major efforts to more pressing questions? How are we to reduce the number of publications? Cannot we prevent the repeated publication of essentially the same information, and frequently by the same individuals, on the topics of the moment? How should we regard the rapid succession of brief and preliminary notes that form the running diaries of some of our busier biologists? Neither the libraries nor the biologists of today can cope with the deluge of scientific publication—and for this situation we bear a major responsibility.

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Theoretical Physics

Elements of Quantum Electrodynamics. A. I. Akhiezer and V. B. Berestetskii. Translated from the Russian edition (Moscow, ed. 2, 1959) by A. Sen and R. N. Sen. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. viii + 301 pp. Illus. $15.25.

Quantum electrodynamics is the theory of the interaction of photons, the quanta of the electromagnetic field, with electrons and positrons. It is without question the most successful of the theories yet formulated to describe the domain of elementary particles. Consequentially the theory plays a central role as a guide to the development of future theories and as a stepping-stone in the education of future theorists.

Akhiezer and Berestetskii's book is not a new offering in this field. The first edition appeared in Russia in 1953, just four years after the theory took a giant step forward in the work of Schwinger, Feynman, and others. The book was therefore one of the first comprehensive treatments of the subject, and in the late 1950's many graduate students cut their field-theoretic teeth on the English translation provided by the U.S. Atomic Energy Commission. The AEC translation of the complete 1953 edition is still available in practically all physics libraries across the country.

The book under review is a translation of roughly half of the second Russian edition (1959). The translators claim that major portions of the second edition were "virtually rewritten." However, it appears that it would be more correct to say that the material was rearranged; most of the topics treated in this volume are also considered in the AEC translation. More importantly, because in the volume published by the Israel Program for Scientific Translations only half of the second edition was translated, a large number of illuminating applications of the formalism are omitted. It is by no means obvious that this is a pedagogical advantage.

Although *Elements of Quantum Electrodynamics* is a venerable text, it is unlikely to assume a prominent position in the classroom. The treatment of the subject matter is extremely concise and little motivation is provided in its development. Furthermore, a number of excellent textbooks on quantum electrodynamics have been pub-

lished recently. Instead, this book should serve as a splendid reference volume. The usefulness of the present version is severely impaired by the lack of an index. Otherwise, the rendition into English is quite readable, although the typography must be characterized as only fair. It is to be hoped that a fully indexed translation of the complete 1959 edition will be published shortly.

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A Review for Specialists

The Theory and Practice of Scintillation Counting. J. B. Birks. Pergamon, London; Macmillan, New York, 1964. xx + 662 pp. Illus. $17.50.

The use of scintillation counters has come to be of enormous importance in many fields, including nuclear physics, medicine, space physics, chemistry, biology, geophysics, and geology. Therefore, a comprehensive treatise like this one will find many potential readers. The present volume, which is separated by an 11-year interval from Birk's first book, *Scintillation Counters*, consists of a documentation and discussion of the very large literature from papers, conference proceedings, review articles, and similar sources. The author's field of specialty is organic scintillators, and much of the text deals with research results on the fundamental process of scintillation in organic materials, both liquid and solid. The book is organized in 16 chapters, each of which includes a reference bibliography aimed at being extremely comprehensive. The introductory chapter includes a general bibliography, as well.

Various types of nuclear detectors and the early history and principles of scintillation counting are covered in the introduction. This is followed by a useful chapter on the interaction of radiation with matter, including range-energy curves for various particles and a discussion of the photoelectric and Compton processes with applications to scintillation materials. Chapters 3 and 4 outline the theory of the scintillation process in organic and inorganic crystals. In the chapter on the detection of scintillations (chapter 5), phototubes, light pipes, and the reflectivity of surfaces used for light gathering are treated, and there is an interesting discussion of the meaning of line width as seen in the usual way on the output of a photomultiplier, a discussion of the pulse shape and time resolution of photomultipliers, and a lengthy table (14 pp.) on the characteristics of commercial photomultipliers, including some of Soviet manufacture. In chapters 6 through 10 additional details of organic scintillators, both crystalline and plastic, and their applications are considered. This section of the book comprises 246 pages. Birks then devotes further discussion to the scintillation process in inorganic crystals, and this is followed by chapters on alkali halides and other inorganic solids, such as zinc sulfide and cadmium sulfide. Scintillations in gases and the applications of gas scintillators are discussed in chapter 14. The book has a short concluding chapter, and an extensive postscript which describes important work that came to the author's attention after the completion of the original manuscript. This postscript with its reference list of 103 papers, almost all of which were published in 1962 and 1963, testifies to the enormous current activity in the field of scintillation counting.

Because the book is in the nature of a greatly enlarged review article, it will be of most use to specialists in the field of scintillation counting. It will be of particular use to research workers who are encountering new problems in the development of scintillation materials and for them will be an important sourcebook.

However, the book is not organized for use as a reference handbook by those who are interested in the quick solution of a practical problem in scintillation counting. This is because the author covers such a large amount of material but has not digested and presented the material so that it is easy to find specific information on a particular topic. For example, while I was examining the book, a current application problem arose in the laboratory —we needed to find the relative merits of sodium iodide and anthracene for detecting charged particles. The many curves showing the efficiency of anthracene and the separate curves for the inorganic materials were not presented on the same basis, and we could not find a single figure or table in the book which compared the relative efficiencies of these scintillation materials for different kinds of radiation. The answer was finally obtained from curves given in a manufacturer's brochure. The book lacks a subject index, and despite the author's statement that he could not compile one, a subject index, even an incomplete one, would add greatly to the book's usefulness. The working physicist might wish for a chapter which would serve as a "handbook of scintillation counting" and which would represent the author's digestion and condensation of the vast amount of research material documented in *The Theory and Practice of Scintillation Counting.*

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Analytical Chemistry

The Geochemistry of Oil and Oil Deposits. L. A. Gulyaeva, Ed. Translated from the Russian edition (Moscow, 1962) by S. Caspari. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. iv + 220 pp. Illus. $7.50.

Works translated into the English from the Russian language are frequently difficult to read and comprehend, and whether reading *The Geochemistry of Oil and Oil Deposits* is worth the effort depends on the validity of the conclusions reached by the investigators. The book is divided into two sections: (i) discussion of the compositions of the organic materials in petroleum and sedimentary rocks and the behavior of petroleum-like components in rocks under the action of compressed gases; and (ii) presentation and interpretation of analyses of rocks and waters from oil fields.

Although the investigators purportedly used modern methods of investigation, they did not fully exploit the capabilities of modern instruments and techniques, and their analyses of organic materials are usually reported in percentages of poorly defined substances such as bitumens, benzene-alcohol extracts, oily components, asphaltenes, or humic acids. Many of the conclusions that are presented by the various authors appear to be more strongly supported by presumptions than by analytical data. Nevertheless, some of these conclusions deserve further attention. The analyses of halogen compounds in bitumens and crude oils and of organic solutes in formation waters, which are described in the book, are novel and are potentially of theoret-