One of the obvious difficulties confronting the volume editors was that there was already in existence an excellent book covering an important part of the subject written by one of their members. This problem was ingeniously solved by including "a condensed version of Chapter VII of the authors' [B. Lewis and G. von Elbe] book *Combustion Flames and Explosions of Gases.*" I would like to commend the editors on this decision; the material, which constitutes 96 out of the total of 662 pages, is certainly well worth repetition and, in fact, is a high point of the volume.

Another difficulty faced by the editors is the great diversity in the kind of material necessary to cover the subject. This material ranges from relatively simple and well-understood phenomena where theoretical analysis is powerful and useful to subjects so complicated and poorly understood that a survey of the state of the art is about all that can be accomplished. In general, the multiplicity of authors and corresponding points of view offers an acceptable solution to this problem, although it raises others. One finds, for example, that the author and the subject matter are not always ideally suited.

I found my blood pressure rising slightly when I discovered on page 27 that the outmoded and confusing concept of "friction work" is perpetuated. A subsequent author finds it necessary to square himself with the "friction work" concept by a footnote (page 208), which says: "Here, as is always the case, heat and heat flow are defined so as to complete the energy balance. A modification of the definition of work must be accompanied by a corresponding modification of the definition of heat flow." It is regrettable that such a footnote was necessary.

On pages 346 to 351, a section appears entitled "Turbulence generation by a turbulent flame" in which the author states that, "The intensity of the turbulence generated by the flame may be calculated from the amount of mechanical work developed by the gas as it flows across the pressure drop Δp of the instantaneous flame front *because* this work is the source of additional turbulent energy." (Italics are mine.)

The author notes that the work done by the expanding gas on the surroundings is not equal to $\int p d\left(\frac{1}{\rho}\right)$ and concludes that the discrepancy is the source of turbulence. If this were true, then it would follow that the flow behind any shock wave, where the same discrepancy exists, would show strong turbulence (which it does not). I suggest that it is necessary to look elsewhere for the source of flame-generated turbulence. It appears that the fundamental difficulty here is the failure to distinguish clearly between a flow process and a batch process, between a control volume and a system, between the Eulerian and the La Grangian point of view, however you wish to state it. It is unfortunate that the fine treatment of this problem which appears on pages 203 to 211 is concealed in mathematical symbolism that is unfamiliar to many people.

I am puzzled by the statement on page 211: "Since the theory of irreversible processes is considered in I, J . . ." Does this refer to sections I and J of this volume? A search of these sections and the index fails to show anything of the "theory," or is this perhaps more mathematical symbolism?

The foregoing criticisms are not to be taken as a general comment on what is generally a fine contribution to the literature on combustion. They are more an expression of my perverse delight in finding minor flaws in so formidable a volume.

EDWARD S. TAYLOR
Aeronautical Engineering Department, Massachusetts Institute of Technology

Advances in Electronics and Electron Physics. vol. VII. L. Marton, Ed. Academic Press, New York, 1955. 527 pp. Illus. $11.50.

This volume fully lives up to the very high standards its predecessors have set, and once again the editor has managed to cover a wide variety of topics. The seven contributions to this volume are on the physics of semiconductivity (Burstein and Egli), the theory of the electric properties of Ge and Si (Brooks), characteristic energy losses of electrons (Marton, Leder, and Mendlowitz), sputtering (Wehner), radio astronomy (Wild), analog computers (Vance, Hutter, Lehman, and Wadlin), and electric discharges (Goldstein).

In the first article a thorough survey is given of the experimental data now available on all kinds of semiconductors. The accent is on empiricism and on comparing the various materials. The second article deals with semiconductor theory, especially as applied to Ge and Si. Special attention is paid to scattering mechanisms and optical properties and to recent information about energy band structure. I was rather sorry not to find in this otherwise excellent survey any mention of the recent work on the many-electron model or the polaron model of semiconductors and also hardly any mention of the vast amount of Russian literature—which, unfortunately, is, of course, very difficult to obtain. However, it seems to me that the present state of detailed experimental knowledge makes it necessary to investigate and probably drastically change the basic ideas of semiconductor (and metal) theory rather than change only in detail the 1-electron picture which was adequate, when it was first proposed by Sommerfeld, to a large extent because of the paucity of experimental data.

The third article presents us with a welcome survey of the vast amount of data assembled in the last few years on characteristic energy losses of electrons in solids. It also shows us how far the theoretical interpretation still leaves a lot to be desired. Indeed, one of the greatest virtues of this series of volumes is to my mind their stimulating value to both experimenters and theorists.

The article on sputtering also presents us with a beautiful array of experimental data and with a conclusion that no theory presented up to now has been able to explain the facts. In the article on radio astronomy the experimental point of view is to my mind pushed too far. A few more explanations of the why and wherefore would have been welcome. For instance, the reader might have been told *how* the hydrogen density distribution in our galaxy is determined from the 21-cm line profile.

Analog computers, their construction, components, and use in flight simulation, physics, mathematics, biology, industrial processes, and business and economics are discussed in the next contribution, while a survey of recent developments in the investigation of electric discharges concludes this volume. This last article limits itself to a discussion of the experimental methods that leave the discharge virtually undisturbed and, within its limitation, gives a comprehensive picture. Here also, the way is pointed to further experimental and theoretical research.

D. TER HAAR
Clarendon Laboratory, Oxford

Structure Reports for 1942–1944. vol. 9. A. J. C. Wilson, General Ed. N. C. Baenziger, Ed. for metals; J. M. Bijvoet, Ed. for inorganic compounds; J. M. Robertson, Ed. for organic compounds. Published for the International Union of Crystallography. Oosthoek's Uitgevers MIJ, Utrecht, Netherlands, 1955. 448 pp. Fl. 65.

This volume reduces the gap between *Structurbericht,* 1913 to 1939, and the *Structure Reports* already published, which cover the period 1945 to 1950 in volumes 10 to 13. As in the previous volumes, the reports are distributed in three sections, metals, inorganic compounds, and organic compounds, and an attempt is made to include all the essential structural information relating to solids,

liquids, and gases published in the period. Not unnaturally, there tends to be a somewhat greater emphasis on the results of investigations on crystalline solids than on the electron diffraction of gases, for example. For the crystal structures it is certainly true that it is often not only more convenient but also more informative to read the *Structure Report* than the original paper, for the very competent reporters have not only extracted the essentials but have not hesitated to use their critical faculties where necessary. They have also taken advantage of the previously published reports to refer forward, when it is known that later work on the same structure has been accomplished.

The form of presentation of the data maintains the excellent standards set by the previously published volumes. Without question the whole series of *Structure Reports* is indispensable to the library of every institution or organization where there is an interest in the structure of matter. This volume is somewhat more expensive for its size than the previous ones because the cost of production is no longer subsidized. While it is proper that the price should be set to recover the cost, this fact will be accepted ruefully by crystallographers who agree with me that *Structure Reports* is also indispensable on their own private bookshelves.

G. A. JEFFREY
Department of Chemistry,
University of Pittsburgh

American Foundations and Their Fields. Wilmer Shields Rich. American Foundations Information Service, New York, ed. 7, 1955. xlvii + 744 pp. $35.

A new and excellent directory to a field in which one is interested can always provide fascinating browsing opportunities before it is put on a handy shelf ready for later use. The seventh edition of *American Foundations and Their Fields* is a good example. For each of 4162 foundations it gives the address, legal structure, date of establishment, donor, purpose, character of the gift that established the foundation, limitations on the use of funds, methods and policies regarding grants, current fields of interest, nature of grants, and officers and trustees, or as many of these items of information as were available or pertinent.

The foundations included are those that qualify "in the American understanding of the term: that is to say, one which is a nonprofit, legal entity having a principal fund of its own, or receiving the charitable contributions of a living founder or founders, which is governed by its own trustees or directors and which has been established to serve the welfare of mankind." Excluded are some organizations that include the word *foundation* in their titles, for the directory does not cover foundations that solicit for endowment, those created for the benefit of a single institution or group, those governed by some other institution, and those whose activities are restricted to the furnishing of a clinical or other community service.

The directory is incomplete. It could not be otherwise with the number of foundations increasing as rapidly as it is. Of the 4164 described, only ten were established before 1900, 2502 were established between 1940 and 1949, and 814 were established in 1950 or later. The author estimates that there may be as many as 7300 foundations that meet the definition given in the preceding paragraph.

In addition to the details available on individual foundations—from the Ford Foundation and the other big ones to the Stuart "Four-Square" Fund (with assets of $25,847), the Vanguard Fund (with assets of $3712), and hundreds of other small ones—there are tables and sections showing such things as geographic distribution, size distribution, number and location of community foundations and trusts, different types of organization, suggestions on how to prepare a request to a foundation, and sample legal forms for establishing a foundation.

The basic organization is by states. An alphabetical list of names serves as an index if the location of the principal office is not known. An index of fields identifies foundations interested in each of a number of fields, from *accounting, aesthetics,* and *Africa* to *youth* and *zoology.*

The first guide to American foundations was prepared by the Twentieth Century Fund for its own use. But the information was of such obvious value to others that the Twentieth Century Fund published three such directories between 1931 and 1935. The next three in the series were published by Raymond Rich Associates in 1939, 1942, and 1948. The seventh edition is the first to appear under the auspices of American Foundations Information Service. It continues and extends a valuable reference service. —D. W.

New Books

Die Pathologie des Kindlichen Pankreas. Gerhard Seifert. Thieme, Leipzig, 1956. 151 pp. DM. 52.

Determination of Organic Compounds. K. G. Stone. McGraw-Hill, New York, 1956. 233 pp. $5.

Numerical Analysis. Proceedings of symposia in applied mathematics. vol. VI. John H. Curtiss, Ed. McGraw-Hill, New York, 1956. 303 pp. $9.75.

On the Early Development of Mind. Selected papers on psycho-analysis. vol. I. Edward Glover. International Universities Press, New York, 1956. 483 pp. $7.50.

Child Development and Personality. Paul H. Mussen and John J. Conger. Harper, New York, 1956. 569 pp. $6.

Epilepsy and the Law. A proposal for legal reform in the light of medical progress. Roscoe L. Barrow and Howard D. Fabing. Hoeber-Harper, New York, 1956. 177 pp. $5.50.

Nuclear Fuels. David H. Gurinsky and G. J. Dienes. Van Nostrand, Princeton, N.J., 1956. 364 pp. $7.50.

Handbook of South American Geology. An explanation of the geologic map of South America. Geological Society of America Mem. 65. W. William F. Jenks, Ed. Geological Society of America, New York 27, 1956. 378 pp.

Anatomy of the Honey Bee. R. E. Snodgrass. Comstock Division of Cornell University Press, Ithaca, New York, 1956. 334 pp. $6.

Atoms and Energy. H. S. W. Massey. Philosophical Library, New York, 1956. 174 pp. $4.75.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Experimental Treatment of Tumors in Mice. Floyd C. Turner. The Author, Box 807, Boulder Creek, Calif. 1956. 117 pp.

Symposium on Structure of Enzymes and Proteins. Given at Research Conference for Biology and Medicine of the Atomic Energy Commission. Sponsored by the Biology Division, Oak Ridge National Laboratory, Gatlinburg, Tenn., Apr. 4–6, 1955. Oak Ridge National Laboratory. Wistar Institute of Anatomy and Biology, Philadelphia, 1956. 294 pp. (Reprinted from *Journal of Cellular and Comparative Physiology,* vol. 47, Suppl. 1)

Vibration and Stresses in Girder Bridges. Highway Research Board Bull. 124. 134 pp. $2.55. *The Biological Effects of Atomic Radiation.* Summary reports. 108 pp. *The Biological Effects of Atomic Radiation.* A report to the public. 40 pp. National Academy of Sciences–National Research Council, Washington 25, D.C.

Australian and New Zealand Association for the Advancement of Science. Report of the 30th meeting, Canberra; Jan. 1954. C. S. Daley, Honorary Ed. Australian and New Zealand Association for the Advancement of Science, Sydney, Australia, 1955. 370 pp. Illus.

The Examination of New Organic Compounds. Macro and semimicro analytical methods. A laboratory manual. Walter T. Smith, Jr., and Ralph L. Shriner. Wiley, New York; Chapman & Hall, London, 1956. 136 pp. $3.50.

Technion Yearbook, vol. 13. 1956 ed. American Technion Society, New York 28, N.Y., 1956. 203 pp.