ters deal with structure deduction. The final chapter discusses the accuracy of x-ray structure analysis.

A crystallographer who reads this volume thoroughly will have covered a large sample of the experience of many years, the best of the art of structure analysis, and a splendid account of mathematical methods. Major emphasis is placed on the surmounting of the phase problem. The recently published monograph by Hauptman and Karle [*Solution of the Phase Problem,* A.C.A. Monogr. No. 3, Wilmington, Del. (1953)], which claims to present "a routine procedure for determining the phases of the structure factors which is valid for all centrosymmetric space groups," is in part erroneous—as Vand and I have shown [*Statistical Approach to X-Ray Structure Analysis,* Penn. State Univ. (1953)]. If it were not, most of Lipson and Cochran's book would be unnecessary. No general solution of the phase problem in x-ray analysis exists, as yet; thus this extremely important field still remains an art, which the present volume beautifully summarizes. It is extremely necessary that analysts not be discouraged from continuing their search for more powerful phase-determining methods. Until these are available, the present collation of available methods is of critical value.

As might be anticipated in a discussion of a field that is growing at a fast rate, which describes methods that are to some extent necessarily selected on the basis of personal preference, the authors occasionally weight certain techniques too much, and underemphasize or ignore others. On page 14, for example, the statement appears, in connection with the interpretation of Patterson syntheses, that "no general method of deducing atomic positions has yet been put forward that will work in any but the simplest crystals." A fairly extensive discussion in Chapter 6 tends to ameliorate this view, which is somewhat shortsighted. Present developments tend to suggest that Patterson-interpretation methods, and particularly those along the lines under development by M. J. Buerger, hold large hope for direct structure analysis. These already have some quite complex structures to their credit and can be shown to have operated successfully when all other known methods have apparently failed.

The discussion on pages 143–144 of the combined use of electron or neutron scattering in conjunction with x-ray scattering is very sketchy and occasionally incorrect and, in general, might have been given more thought. The difficulties of neutron single-crystal diffraction are much less than the authors suggest, and the potentialities of deuterium-hydrogen replacement, for example, are tremendously advantageous for structure-factor phase determination. On the other hand, comparison of x-ray and neutron scattering as a means of phase determination will in general be a difficult matter for structures composed of two or more kinds of atoms, since the x-ray data must be reduced to those for point scatterers if these are to be comparable to neutron data.

The treatment of homometric structures could have been extended, and warnings emphasized on the occurrence of near-homometric structures. An example of such a structure is that of triphenylene [A. Klug, *Acta Cryst.* 3, 165, 176 (1950)]. The published structure, which is remarkable for some reportedly very short intermolecular distances, is actually incorrect [V. Vand and R. Pepinsky, to be published]. Unfortunately this structure is used as an example of the successful application of the molecular transform method (pp. 230–233).

The statement on pages 174–175 that little is to be gained by subtraction of the origin peak in a three-dimensional Patterson is open to serious question. Examples can be presented in which such origin-peak removal is distinctly advantageous. The chief difficulty in origin-peak removal is that it can easily be performed incorrectly if proper care is not taken with the statistics of occurrence of reflections.

More could be said about the determination of noncentrosymmetric structures or structure projections, since these are becoming increasingly possible and important. Some discussion of the special problems of large-molecule analysis would have been advantageous, and it is rather surprising to find it missing.

More could be said, furthermore, about the determination of anisotropic temperature vibrations, the determination of bonding electron distribution, the location of hydrogen and other light atoms, and so forth. The important field of study of crystal transitions is omitted entirely.

The discussion of computing methods is excellent as far as it goes, but it omits important techniques that were surely known to the authors.

These are matters of small moment in a work that provides crystallographers with a wide collation and evaluation of practical structure-analytical methods. It is a volume for which we have long waited and are indeed grateful.

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Amebiasis. Ernest Carroll Faust. Charles C Thomas, Springfield, Ill., 1954. xi + 154 pp. Illus. $4.75.

This short 168-page monograph by a world authority on tropical diseases provides a clear and concise picture of amebiasis.

The author discusses in sequence geographic distribution, natural history, pathogenesis and pathology, manifestations and clinical evidence, diagnosis and treatment, and control. The chapters on manifestations and clinical evidence might have been combined with the chapter on diagnosis and treatment to make it easier to find the clinical picture, diagnosis, and treatment of the various forms of the disease in one section. Portions of these two chapters are redundant, and differential diagnosis is not adequately discussed.

The chapters on natural history and control, although interesting and well written, might have been shortened, and more space might have been allotted to a more critical presenation of the clinical picture

and the difficulties in diagnosis. The statement that "except in emergencies the possibility of amebic etiology of appendicitis should be carefully explored before surgery is decided upon" is to be questioned in caring for most patients with acute abdominal pain.

However, in general, this book provides a great deal of information and an excellent bibliography on the complicated subject of amebiasis. Both the family physician and the specialist will find it a valuable addition to their library.

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The Present State of Physics. A symposium presented 30 Dec. 1949 at New York meeting of AAAS. Arranged by Frederick S. Brackett. AAAS, Washington, D.C., 1954. vi + 265 pp. Illus. $6.75. (Members, $5.75).

The papers here presented give excellent introductions to various fields of research in physics and biophysics on the level of a college graduate.

P. Kusch gives a lucid discussion of the magnetic moment of the electron. He describes the atomic beam method for observation of the hyperfine structure of atomic lines and briefly discusses the correlation of the experimental results with the various steps of the theory, culminating in Schwinger's treatment of the interaction between the electron and the quantized radiation field.

Two papers are devoted to cosmic rays. E. P. Ney discusses the particles and processes that are observed in cloud chambers and emulsions at balloon altitude, that is, around 90,000 ft, where the primary cosmic rays are predominant, and where some heavy primaries are present with abundances at least as great as their abundances in terrestrial or stellar matter. J. C. Street surveys the processes by which the primaries, which (in rare cases) may have energies up to 10^{17} ev, gradually change to the cosmic radiation as observed at sea level. In particular, he discusses the production of π mesons and their decay to μ mesons. The two papers on cosmic rays reproduce numerous very instructive cloud chamber photographs.

An article by K. Lark-Horovitz on "the new electronics" gives a historical outline of semiconductor problems and a special discussion of the electric and optical properties of germanium semiconductors in bulk form as they are affected by chemical impurities and lattice defects. The thoroughness of this article is evident from the fact that it occupies a quarter of the book and gives 352 references.

The next article, by J. Bardeen, is concerned with the transistor. Starting from a brief review of the properties of semiconductors, he presents some of the basic equations governing the flow in semiconductors and applies them to the interpretation of the transistor.

A von Hippel interprets the ferroelectric properties of barium titanate, which, better than any other ferroelectric substance, lends itself to fundamental investigations and applications. Its transparency permits the striking optical demonstration of the "domains" and their changes in an alternating electric field.

P. J. W. Debye investigates the structure of polymers, combining the various experimental methods: scattering of light, index of refraction, depolarization of the scattered light, turbidity, dielectric constant, and viscosity.

The article of R. Lumry and H. Eyring takes us into the field of biophysics. Its title is "Implications of the chemical kinetics of some biological systems." The authors explore to what extent the laws of thermodynamics and chemical kinetics lead to the understanding of certain biological processes.

I feel that the field of biophysics would gain from more active cooperation by physicists. However, physicists are not attracted to biophysics, since here the problems are presented by the biologist, and the collaborating physicist may frequently consider himself a technical assistant. The last two articles will help overcome the reluctance of the physicist by presenting biophysical problems from the biologist's point of view. These articles are by Frank Brink, Jr., "Some physical and chemical properties of axons related to conduction of nerve impulses," and by Frank H. Johnson, "Bioluminescence and the theory of reaction rate control in living systems."

The papers were presented at a symposium 30 Dec. 1949. Only a few papers give any more recent references. In a period of rapid progress, many readers who want to familiarize themselves with the present state of research may try to find more recent sources than this symposium, excellent as the papers are.

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Problems of Consciousness. Transactions of the Fourth Conference, 29–31 Mar. 1953. Harold A. Abramson, Ed. Josiah Macy, Jr. Foundation, New York, 1954. 177 pp. Illus. $3.25.

The interdisciplinary conference on problems of consciousness, sponsored by the Macy Foundation, has now completed its fifth and final annual meeting. Each year a panel of distinguished scientists, mostly from the medical and social sciences, spend 3 days in a leisurely examination of some of the problems of the field. At each meeting there are a few formal presentations, but most of the time is reserved for free discussion, all of which is recorded for subsequent publication.

A serious assessment of the value of the conference should await the appearance of the fifth volume, presumably now in preparation. The fourth report leaves one with some doubts as to the appropriateness of this topic for an interdisciplinary conference, particularly when the membership is notably lacking in people with technical philosophical training. "Consciousness"