

Books

Proceedings of the Symposium on Operations Research in Business and Industry. Sponsored by Midwest Research Institute. Edited by David Hughes. 185 pp. Midwest Research Institute, Kansas City, Mo., 1954. \$5.00. *Reviewed by Philip M. Morse, Massachusetts Institute of Technology.*

Almost every month, now, one hears of another conference on operations research. This is mildly heartening to persons interested in the field, for it evidences a widespread interest. But it also has its disquieting aspects and, to anyone attending more than one of them, the end effect is close to boredom. The chief trouble seems to be that most of the time of most such conferences is taken up with attempts to define operations research and to persuade others to try it. I am not sure that physicists would care to attend many conferences where most of the time is spent in defining physics research and in showing that physics research is a Good Thing.

Of course operations research has two (at least!) handicaps compared to physics research. It is a new field, and therefore its aims must be explained from time to time in order to obtain support and to attract new workers. Also the subject matter of the research, the operation, is not the inorganic phenomenon studied by the physicist or chemist. An operation is a team of men and machines doing an assigned (and usually a repetitive) job. To study such a phenomenon, particularly to carry out controlled experiments on it, requires the consent of the human participants and particularly of its "boss", the director of the operation. The feed-back between the observer and the observed is thus much greater and much more complex than in quantum physics. So, unfortunately, there is a need for exposition even before research. One can only hope that, as industry becomes aware of the aims and the successes of operations research, these conferences can become more and more true scientific meetings, where results are reported rather than definitions proclaimed.

The *Proceedings* reviewed here are typical of recent conferences. A paper by Ackoff on production and inventory control in a chemical process, one by Orchard-Hays on some aspects of linear programming and one by Prager on some transportation problems, are interesting reports of research in progress or completed; the rest is less rewarding. For the physicist who wishes to learn about actual research in the field, the *Proceedings* of the Case Conference on Operations Re-

search in Production and Inventory Control (Case Institute, Cleveland, 1954) would provide more real meat. Even better, however, would be any of the issues of the *Journal of the Operations Research Society of America*.

Annual Review of Nuclear Science. Volume 4. James G. Beckerley, editor, and Martin D. Kamen, and Leonard I. Schiff, associate editors. 483 pp. Annual Reviews, Inc., Stanford, Calif., 1954. \$7.00. *Reviewed by Bernard T. Feld, Massachusetts Institute of Technology.*

This volume is perhaps the most impressive to date of the series. The articles are uniformly thorough and critical. The subjects covered are timely in interest and, for the most part, progress has been sufficient to warrant critical review and summary at this stage.

The main emphasis of this volume is on recent progress in techniques, theory, and information in the field of elementary particle and high-energy physics. Articles which fall, partially or wholly, in this category are (this list is not in the order in which they appear in the volume): (1) Penetration of Heavy Charged Particles in Matter, by E. A. Uehling, a summary of recent theoretical developments. (2) Nuclear Particle Detection (Fast Electronics), by R. E. Bell. (3) Nuclear Particle Detection (Characteristics of Scintillators), by R. K. Swank. (4) Nuclear Particle Detection (Characteristics of Cerenkov Counters), by J. Marshall. These three articles form an excellent comprehensive review and discussion of the present status of the techniques of high energy particle counting. (5) Recent Developments in Proton Synchrotrons, by J. P. Blewett, a brief survey of existing, imminent, and contemplated ultrahigh-energy accelerators. (6) Positronium, by S. De Benedetti and H. C. Corben, a brief, clear and complete summary of the theory of positronium and of the (excellent) status of its experimental verification. (7) The Interactions Between π -Mesons and Nucleons, by M. Gell-Mann and K. M. Watson, a review of the status of the phenomenological approach to the pion-nucleon interaction, with emphasis on the success and usefulness of the concept of a "resonance" in the state of isotopic spin $3/2$, angular momentum $3/2$, positive parity. Also included is a short discussion of the possible bearing of this approach on meson field theories. (8) Heavy Mesons, by C. Dilworth, G. P. S. Occhialini, and L. Scarsi, an admirably critical review of a situation about which it may be aptly quoted: "It's always darkest just before the dawn."

Articles involving low- and intermediate-energy nuclear physics include: (9) Radiofrequency and Microwave Spectroscopy of Nuclei, by G. E. Pake, mainly a summary of recent developments in universal detection schemes (that of Hin Lew) and in the polarization of nuclei by the Overhauser effect. (10) Alpha Radioactivity, by I. Perlman and F. Asaro, describing the remarkable recent elucidation of α -decay systematics and the understanding of the energy levels of