Other papers include an excellent account of the results of the application of diagrammatic perturbation methods to equilibrium statistical mechanics (written by Meeron) with particular attention to the current status of Debye-Hückel theory; accounts of the classification of amplifying and decaying waves in plasmas (by Sturrock and Buneman); a review of magnetohydrodynamics with a discussion of some aerodynamic problems (by Yoler); and articles written on the Bennett pinch, the stability of relativistic self-focusing streams, and on topics relating to microwave interactions with plasmas.

Space does not allow a complete treatment of all the papers in this volume, but they are all at a uniformly high level. I wish that astrophysical plasma phenomena had been discussed and that the same level of generality had been maintained throughout the book. However, these are minor criticisms of an otherwise well executed venture.

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Developments in Mathematical Psychology. Information, learning, and tracking. R. Duncan Luce, Ed. Free Press, Glencoe, Ill., 1960. 294 pp. $7.50.

This volume surveys three areas of recent emphasis in mathematical psychology: information, learning, and tracking. It should have been published about 5 years ago when most of it was written. Many portions are condensed and fragmentary, in the manner of contemporaneous reporting such as is found in the *Annual Review* series. Fortunately, other portions are more didactic and render the volume useful in spite of the time lapse.

The article on information is by R. Duncan Luce; it is divided about evenly between a section on theory, in the Shannon-Wiener tradition, and a section on applications, addressed to many topics in psychology. The section on theory seems rather advanced for a beginner, yet rather sketchy for a professional. An asset is the inclusion of some interesting developments by G. A. Miller, W. R. Garner, and other behavioral scientists, which appeared in the wake of the famous Shannon and Wiener treatments. The section on applications runs the gamut from studies that are direct consequences of information theory (for example, statistical approximations to English) to studies that show little influence beyond an exchange of digital counts for logarithms to the base 2. There is also a sensible treatment of whether or not information theory really earns its keep in behavioral science.

The article on learning, by R. R. Bush, seems particularly out of date. Unlike the other two topics, learning is a central concern in general experimental psychology and has attracted many new efforts, mathematically oriented and otherwise. Bush himself has done later work that contributes to the obsolescence of his article. The presentation is organized as it should be to point up the substantive content of learning research: acquisition, extinction, generalization, and so forth. Models of the Bush-Mosteller variety receive primary emphasis, with the Estes-Burke approach running a close second. Hull is relegated to an appropriate place in history, but there is little indication of later developments by the Hullian school. The article seems just right for a specializing student of learning, who can profit from its many pertinent observations without depending upon it as an overview of the field.

J. C. R. Licklider did the article on tracking, a slice of engineering psychology in which the engineering is far more conspicuous than the psychology. Studies of tracking generally view the human operator as a component in a man-machine system, whose stimuli are mathematically describable inputs from the system and whose motor responses are similarly describable outputs. The Licklider article does well at placing the results of tracking experiments in their appropriate mathematical context. The context itself is developed from the ground up in the first ten pages only; beyond that there is a too-rapid cascading of much that is standard mathematical background for the engineer but not for the psychologist. Well-educated engineers should find the going easy and the treatment informative.

In spite of the limitations indicated, the volume as a whole will probably serve to acquaint a wider audience with some major developments of the past decade. It is welcome.

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Nuclear Forces and the Few-Nucleon Problem. vol. 1 and vol. 2. T. C. Griffith and E. A. Power, Eds. Pergamon Press, New York, 1960. xx + 712 pp. Illus. $30.

As channels for disseminating scientific information, conference proceedings published in book form, are problem children. A scientific conference itself has, in the order of their importance, three aspects, for it enables participants to discuss their work, to hear about the newest developments in the field, and perhaps to hear some general lectures. Thus the most important aspects of a conference—the private discussions between conference participants and the reports on the latest developments—are either not available for publications (the private discussions) or they should be published quickly while the "recent" developments reported still deserve to be called "the latest" (many papers will be published after the conference in the scientific journals). Conference proceedings should, therefore, be published as rapidly as possible in order to report fully on the newest developments in the field. Unfortunately the proceedings under review are the report of a conference held over 1½ years ago (July 1958). Thus, it is to be expected that their novelty value will be somewhat worn. This cannot be denied. But a considerable amount of information is contained in the volumes, and an appreciable fraction of it is up to date.

A major portion of the conference was devoted to the nuclear two-body problem. There were introductory lectures on the phenomenological description of the forces by phase shifts and by potentials, on the meson theory of the nuclear forces, on the dispersion relation approach to nuclear forces, and on the experimental status of the nucleon-nucleon interaction.

Furthermore, there were several papers summarizing the work of particular groups and an assortment of shorter reports on experimental and theoretical aspects of the two-body problem. The three- and four-body problem is treated in a large number of shorter papers. Also, more or less extensive treatment is given to the scattering of all pairs of particles with mass between two and four. Finally there are a few papers on the binding energy of some nuclei up to O^{16} as well as some other contributions.

Workers in the field, especially new-

comers, may find it useful to have everything collected and easily accessible, even though a large fraction of the papers have already appeared in the scientific literature. The informal character of the lectures may make this material easier to digest than the corresponding papers published elsewhere.

The editors and publishers have done a beautiful job. Still, I think that speed of publication should be the prime consideration in publishing conference proceedings, and I would gladly sacrifice everything except accuracy to this goal.

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Stars and Stellar Systems. vol. 6, *Stellar Atmospheres*. Jesse L. Greenstein, Ed. University of Chicago Press, Chicago, Ill., 1961. xix + 724 pp. Illus. $17.50.

It has been more than a century since Auguste Comte gazed into the clouded crystal ball and prognosticated: "There are some things of which the human race must remain forever in ignorance, for example, the chemical constitution of the heavenly bodies." We now know, thanks to spectroscopy, that these same heavenly bodies provide us with an infinite variety of strange, experimental, chemical and physical laboratories and that the detailed analysis of electromagnetic radiation originating in *stellar atmospheres* has led to fundamental discoveries far beyond anything that Comte could have envisioned.

The astronomer's approach is primarily an empirical one; first comes the observation which poses a problem that, later, demands theoretical interpretation. New observational knowledge also suggests new observational problems and techniques. The 1961 sun bears little resemblance to the 1941 sun because of new instruments such as the coronagraph, the rocket-borne spectrograph, and the radio telescope. One can predict with confidence that the 1981 stars —and their atmospheres—will be quite different from the 1961 stars, as new space observatories and radio telescopes explore great regions of the electromagnetic spectrum virtually untouched at the present time. Astronomy will continue to be the science of discovery.

This book is one of the first two volumes to appear of a proposed nine-volume "Compendium of Astronomy and Astrophysics" under the general editorship of Gerard P. Kuiper and Barbara M. Middlehurst. The aim of the compendium is to present stellar astronomy and astrophysics as basically *empirical* sciences, coordinated and illuminated by the application of theory. This compendium is intended as an extension of the four-volume "Solar System" series, edited by Kuiper.

Chapters 1 through 5 outline standard methods of theoretical analysis of stellar atmospheres. The next three chapters deal with nonthermal phenomena, magnetic stars, and stellar rotation and turbulence. Chapters 9 through 11 discuss high luminosity stars and extended atmospheres, while the last eight chapters are concerned with composite spectra, long-period variables, red giants, mass loss from red giants, isotopes, novae, dwarf variables, and stars below the main sequence. The normal red dwarf, by far the commonest type of star in space, is, strangely, not discussed.

The choice of both authors and subject matter is excellent, and there is no question but that this well-edited volume will be the primary authority in its field for many years. As such, it should have a profound influence in the training of the many needed future astrophysicists. The price is refreshingly low for a book of this size and quality.

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New Books

Mathematics, Physical Sciences, and Engineering

Industrial Organic Nitrogen Compounds. Melvin J. Astle. Reinhold, New York; Chapman and Hall, London, 1961. 399 pp. $14.

Information Retrieval and Machine Translation. pt. 1. Allen Kent, Ed. Interscience, New York, 1960. 701 pp. Illus. $23. First part of a two-volume work which will record the papers and discussions of the International Conference for Standards on a Common Language for Machine Searching and Translation, September 1959.

Integral Quadratic Forms. G. L. Watson. Cambridge Univ. Press, New York, 1960. 155 pp. $5.

Kinetics and Mechanism. A study of homogeneous chemical reactions. Arthur A. Frost and Ralph G. Pearson. Wiley, New York, ed. 2, 1961. 414 pp. Illus. $11.

Linear Graphs and Electrical Networks. Sundaram Seshu and Myril B. Reed. Addison-Wesley, Reading, Mass., 1961. 325 pp. Illus. $9.75.

Manual of Cotton Spinning. vol. 2, pt. 1, *The Characteristics of Raw Cotton*. E. Lord. Textile Book (Interscience), New York; Butterworths, London, 1961. 345 pp. $8.50.

Materials for Nuclear Engineers. A. B. McIntosh and T. J. Heal, Eds. Interscience, New York, 1960. 382 pp. Illus. $11.85.

Mathematical Methods for Engineers and Technologists. P. I. Romanovskii. Translated from the Russian by M. Slater. T. Kövàry, Ed. Pergamon, New York, 1961. 265 pp. Illus. $8.50.

Matheson Gas Data Book. Matheson, East Rutherford, N.J., ed. 3, 1961. 438 pp. Illus. $8.

Mechanics of Solids and Fluids. Robert R. Long. Prentice-Hall, Englewood Cliffs, N.J., 1961. 166 pp. Illus. Trade, $9; text, $6.75.

Notes on Quantum Mechanics. A course given by Enrico Fermi. Univ. of Chicago Press, Chicago, Ill., 1961. 171 pp. Paper, $1.50. Lecture notes as prepared by Fermi for a course in early 1954.

NMR and EPR Spectrocsopy. By the staff of Varian Associates. Pergamon, New York, 1960. 296 pp. $12. A large part of the material presented at the third annual workshop sponsored by Varian, October 1959.

Optical Spectrometric Measurements of High Temperatures. Philip J. Dickerman, Ed. Univ. of Chicago Press, Chicago, Ill., 1961. 276 pp. Illus. $12.50. A series of papers and accounts of related discussions resulting from a symposium at the University of Chicago, March 1960.

The Philosophy of Physics. Vincent Edward Smith, Ed. St. John's Univ. Press, Jamaica, N.Y., 1961. 85 pp. Paper. St. John's Univ. Studies, Philosophical Series, 2.

Physical Chemistry. Farrington Daniels and Robert A. Alberty. Wiley, New York, ed, 2, 1961. 754 pp. Illus. $8.75.

Physical Gas Dynamics. A. S. Predvoditelev, Ed. Translated from the Russian by R. C. Murray and D. R. H. Phillips. Pergamon, New York, 1961. 187 pp. Plates. $7.50.

Physics and Archaeology. M. J. Aitken. Interscience, New York, 1961. 191 pp. Illus. $6.

Polynomials Orthogonal on a Circle and Interval. Ya. L. Geronimus. Translated from the Russian by D. E. Brown. Ian N. Sneddon, Ed. Pergamon, New York, 1960. 219 pp. $8.50.

Polypropylene. Theodore O. J. Kresser. Reinhold, New York; Chapman and Hall, London, 1960. 280 pp. Illus. $6.50.

Porcelain Enamels. The preparation, application, and properties of enamels. Andrew I. Andrews. Garrard Press, Champaign, Ill., ed. 2, 1961. 659 pp. Illus. $12.

Radiation Protection and Recovery. Alexander Hollaender, Ed. Pergamon, New York, 1960. 397 pp. Illus. $10.

Transistor Circuit Analysis. Maurice V. Joyce and Kenneth K. Clarke. Addison-Wesley, Reading, Mass., 1961. 475 pp. Illus. $10.75.