hasty interpretations. These warnings are especially valuable for the novice in the field.

Two appendices give some valuable information on the methodology and a glossary of synonymous morphological terms and phrases. An extensive bibliography concludes the volume.

The book is written in a lucid style and therefore should also be placed on the shelves of high school libraries, where it could serve as a healthy antidote to the textbooks that describe *Paramecium* as a "simple" organism.

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Astronomical Charts

Star Atlas of Reference Stars and Nonstellar Objects. Prepared by the staff of the Smithsonian Astrophysical Observatory. M.I.T. Press, Cambridge, Mass., 1969. 152 loose charts + 24-page booklet, boxed. $18.50.

The primary source for the preparation of this Atlas was the *Smithsonian Astrophysical Observatory* [SAO] *Star Catalog* (1966), which lists 258,997 stars and includes virtually all stars brighter than the visual magnitude 9 with positions and proper motions for the epoch and the equinox 1950.0 on the FK 4 fundamental system. The SAO Catalog was assembled primarily for the purpose of locating reference stars useful in reducing satellite positions on the Baker-Nunn satellite tracking camera plates. However, it has become of increasing importance for other purposes both to professional and to amateur astronomers.

Other objects that have been added to the Atlas are 2000 stars near the south celestial pole for which the proper motions are not known, and all *New General Catalogue* (NGC) and *Index Catalogue* (IC) objects, with those brighter than about magnitude 13 designated with special symbols.

In general format the SAO Atlas resembles the *Bonner Durchmusterung* (BD) and *Cordoba Durchmusterung* (CD) charts. These charts are still extensively used although they are considerably out of date with their coordinate grid for the equinox of 1855.0 and star positions for approximately the same epoch. The SAO Atlas in many cases will undoubtedly replace these old sources of information.

In the SAO Atlas the sky is divided into eleven bands of equal width of declination, and projections most appropriate for each band have been selected—stereographic projection for the celestial poles, Mercator for the equatorial regions, and Lambert conformal conic for the mid-declinations.

The declination grid is in one-degree intervals, and an overlay reseau allows the eye, with the use of magnification, to interpolate positions to approximately one minute of arc.

The scale of the SAO Atlas is 6.95 minutes of arc per millimeter, which is equal to that of a camera with a focal length of 494 millimeters. This is slightly less than half the scale of the Durchmusterung charts. The reduced scale and the increase in the number of sheets of the SAO Atlas make the format more convenient than the Durchmusterung charts, but will require the use of a reading glass—at least where there is low illumination such as dim light in the dome.

The quality of the charts is generally excellent, and since each original chart was plotted on an enlarged scale (1 arc min/mm) on an analog computer, with star and object positions and magnitudes inked in by hand, a minimum of errors should be expected.

Since the stars in the SAO Atlas have precise positions (the average standard deviation of a position in the SAO Catalog is ± 0.5 arc sec) this set of charts makes it extremely convenient for the professional as well as the amateur astronomer to identify and select suitable reference stars for measurement of photographs—whether he is determining the positions of an asteroid, comet, or artificial satellite. Even the professional astronomer, using the SAO Catalog on tape and an on-line plotter, might find the Atlas useful for quick verification of his plot.

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The Physics of Sound

Theoretical Acoustics. PHILIP M. MORSE and K. UNO INGARD. McGraw-Hill, New York, 1968. xxii, 938 pp., illus. $23. International Series in Pure and Applied Physics.

This book is unique. It is a graduate-level textbook covering many aspects of theoretical acoustics with a thoroughness not encountered elsewhere. It includes much of the material contained in Morse's earlier book, *Vibration and Sound*, but is about twice as long. Added to the earlier book are chapters covering the relatively new areas of nonlinear acoustics, acousto-optical effects, plasma acoustics, the acoustics of moving media, and coupled acoustic systems. In addition, there are many new sections illustrating the use of modern theoretical techniques in practical problems.

The first chapter is a nice, gentle introduction, written from a physicist's point of view, to some of the mathematics to be used throughout the rest of the book. The reader is then led in successive steps from an understanding of the simplest vibrating systems to methods of solving intricate acoustical problems. By the time he comes to study sound waves in fluids, he has been introduced to random and transient phenomena, normal modes, the use of Green's functions, the Born approximation, variational techniques, and second-order effects in connection with studies of coupled linear oscillators, flexible- (and stiff-) string waves, and a brief study of transverse waves on bars, membranes, and plates. These theoretical techniques are then used to discuss not only the simpler, standard acoustical problems but also more involved questions such as radiation from violent fluid motions, from random sources, from aircraft propellers, and from pistons set in locally reacting surfaces; scattering from surface irregularities and turbulence; and propagation in ducts with nonrigid walls, in ducts containing sources, scatterers, or discontinuities, in rooms, and in coupled acoustical systems. The last quarter of the book consists of somewhat more qualitative discussions of the acoustics of moving media (including sound generation by turbulence and by flow around rigid bodies, the effect of flow on transducer response, and effects at the interface between moving fluids); plasma acoustics; interactions between light and sound; and nonlinear acoustics.

Each chapter is followed by problems that complement the text material, but the solutions are not provided. The index is fairly complete, and there is a useful glossary of symbols. Also included in the back of the book are tables of special functions, impedance charts, and a short bibliography of books and review papers. A shortcoming of the book is the almost total lack of references to original papers.

Because it really shows how to perform calculations for practical acoustical systems, rather than for oversimplified models, this book should be very useful to anyone wishing to learn the techniques of theoretical acoustics. For the same reason, however, it should not be used as a first text in acoustics. Although the expository sections are usually quite lucid, there are sections where, because of the nature of the problems under consideration, the complexity of the algebra tends to obscure the physics behind it. However, there are many texts that fill the needs of the beginner. This is one of the very few that fill the needs of advanced students.

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Books Received

Advances in Chemical Physics. Vols. 17 and 18. I. Prigogine and Stuart A. Rice, Eds. Interscience (Wiley), New York, 1970. Vol. 17, xii, 284 pp., illus., $18.95; vol. 18, xii, 324 pp., illus., $19.95.

Alliance Politics. Richard E. Neustadt. Columbia University Press, New York, 1970. xvi, 168 pp. $5.95.

Antagonists and Nucleic Acids. M. Earl Balis. With a chapter by George B. Brown. North-Holland, Amsterdam; Interscience (Wiley), New York, 1968. xii, 294 pp., illus. Frontiers of Biology, vol. 10.

Biochemical Toxicology of Insecticides. Proceedings of the Fifth U.S.–Japan Cooperative Science Program, Tokyo, June 1969. R. D. O'Brien and Izuru Yamamoto, Eds. Academic Press, New York, 1970. viii, 220 pp., illus. $8.50.

Calculations in Furnace Technology. Clive Davies. Pergamon, New York, 1970. xvi, 270 pp., illus. + plates. Cloth, $6.50; paper, $4.75. Commonwealth and International Library: Division of Materials Science and Technology.

Carnegie Institution of Washington Year Book 68. For 1968–1969. Carnegie Institution of Washington, Washington, D.C., 1970. xii, 716 pp. + plates.

The Chemistry of the Carbon-Nitrogen Double Bond. Saul Patai, Ed. Interscience (Wiley), New York, 1970. xiv, 794 pp., illus. $32.

Cognitive Development in Children. Five Monographs of the Society for Research in Child Development. Introduction by Roger Brown. University of Chicago Press, Chicago, 1970. xii, 700 pp., illus. + plates. $10.75.

Crystal Growth in Gels. Heinz K. Henisch. Pennsylvania State University Press, University Park, 1970. 112 pp., illus. $6.95.

Descriptive Electronics. Ralph R. Huffsey and Charlotte Aull Huffsey. Holt, Rinehart and Winston, New York, 1970. xviii, 366 pp. $9.95.

Diffraction. Structure des images. Influence de la cohérence de la lumière. André Maréchal and Maurice Françon. Masson, Paris, 1970. viii, 206 pp., illus. + plates. Paper, 40 F.

Enzymes and Isoenzymes. Structure, Properties and Function. Vol. 18 of the Fifth Meeting of the Federation of European Biochemical Societies, Prague, July 1968. D. Shugar, Ed. Academic Press, New York, 1970. x, 362 pp., illus. $14.50.

The Evolution of Man and Society. C. D. Darlington. Allen and Unwin, London, 1969. 756 pp., illus.

The Field of Family Therapy. Formulated by the Committee on the Family. Group for the Advancement of Psychiatry, New York, 1970. vi, pp. 525–644. Paper, $3. GAP Report No. 78, vol. 7.

La Forêt. C. Jacquiot. Masson, Paris, 1970. xii, 160 pp., illus. Paper, 50 F. Collection de Monographies de botanique et de biologie végétale, No. 5.

Frontiers of Alcoholism. Morris G. Chafetz, Howard T. Blane, and Marjorie J. Hill, Eds. Science House, New York, 1970. xxii, 426 pp. $12.50.

Further Aerodynamics for Engineering Students. E. L. Houghton and R. P. Boswell. St. Martin's, New York, 1969. viii, 612 pp., illus. $29.

Guide to Cultural Anthropology. Cynthia A. Cone and Pertti J. Pelto. Scott, Foresman, Glenview, Ill., 1969. viii, 152 pp., illus. Paper. Revised version of the 1967 edition. Scott, Foresman Series in Anthropology.

Hydrological Forecasting. Proceedings of a WMO/UNESCO Symposium, Surfers' Paradise, Queensland, Australia, November–December 1967. World Meteorological Organization, Geneva, 1969 (U.S. distributor, UNIPUB, New York). xvi, 328 pp., illus. Paper, $21. Technical Note No. 92.

Integration for Engineers and Scientists. William Squire. Elsevier, New York, 1970. xvi, 304 pp., illus. $14.75. Modern Analytic and Computational Methods in Science and Mathematics, No. 21.

Introduction to Quantum Concepts in Spectroscopy. W. G. Laidlaw. McGraw-Hill, New York, 1970. xx, 244 pp., illus. $9.95. McGraw-Hill Series in Undergraduate Chemistry.

Island at the Center of the World. New Light on Easter Island. Sebastian Englert. Translated and edited by William Mulloy. Photographs by George Holton. Scribner, New York, 1970. 192 pp. $14.95.

Kirk-Othmer Encyclopedia of Chemical Technology. Vol. 18, Shale Oil to Steroids. Herman F. Mark, John J. McKetta, Jr., Donald F. Othmer, and Anthony Standen, Eds. Interscience (Wiley), New York, 1969. xiv, 898 pp., illus.

Man and His Environment: The Ecological Limits of Optimism. R. S. Miller, G. M. Woodwell, W. R. Burch, P. A. Jordan, and R. L. Means. François Mergen, Ed. Yale University Press, New Haven, Conn., 1970. ii, 78 pp., illus. Paper, $2. Yale University School of Forestry, Bulletin No. 76.

Missile Madness. Herbert Scoville and Robert Osborn. Houghton Mifflin, Boston, 1970. xvi, 80 pp., illus. $4.95.

National Formulary. Thirteenth edition, official from 1 September 1970. American Pharmaceutical Association, Washington, D.C., 1970. lxxiv, 1014 pp., illus.

Nouveau traité de chimie minérale. Paul Pascal, Ed. Vol. 15, part 5, Transuraniens (Compléments). M. Elston *et al.* Masson, Paris, 1970. xliv, 812 pp., illus. 220 F.

Opportunities in Industrial Design Careers. Arthur J. Pulos. Universal, New York, 1970. 160 pp. + plates. Cloth, $3.75; paper, $1.95. Vocational Guidance Manuals: Career Series.

Power in Ica. The Structural History of a Peruvian Community. E. A. Hammel. Little, Brown, Boston, 1969. xviii, 142 pp., illus. Paper. Latin American Case Study.

Précis de physique. Francis Halbwachs. Presses Universitaires de France, Paris, 1969, 1970. Vol. 1, Rappels d'optique Electromagnétisme. Physique relativiste. 336 pp., illus. Paper. Vol. 2, Physique quantique. 352 pp., illus. Paper. Le Physicien, vols. 3 and 4.

Probability and Statistical Inference. Richard G. Krutchkoff. Gordon and Breach, New York, 1970. xiv, 294 pp., illus. Reference edition, $24.50; professional, $12.50.

Process Analysis by Statistical Methods. David M. Himmelblau. Wiley, New York, 1970. xii, 464 pp., illus. $19.95.

Racism and American Education. A Dialogue and Agenda for Action. Harold Howe, Kenneth B. Clark, James E. Allen *et al.* Harper and Row, New York, 1970. xii, 164 pp. $5.95. Urban Affairs Series.

Resistance to Knowledge. Hans Gaffron. Salk Institute for Biological Studies, San Diego, Calif., 1970. ii, 66 pp. Paper. Salk Institute Occasional Papers 2.

Schering Workshop on Steroid Metabolism. "In vitro versus in vivo." Berlin, December 1968. Gerhard Raspé, Ed. Pergamon, New York; Vieweg, Braunschweig, 1969. viii, 212 pp., illus. Paper, $12.50.

Systems Psychology. Kenyon B. De Green, Ed. McGraw-Hill, New York, 1970. xiv, 594 pp., illus. $18.50.

Territoire et domaine vital. A meeting. Chizé, July 1967. G. Richard, Ed. Masson, Paris, 1970. x, 128 pp., illus. Paper, 60 F. Série Ecologie et Ethologie, No. 1.

Transportation Noises. A Symposium on Acceptability Criteria. Seattle, March 1969. James D. Chalupnik, Ed. University of Washington Press, Seattle, 1970. xiv, 362 pp., illus. $14.50.

Universities and Research. Observations on the United States and Sweden. Gunnar Boalt and Herman Lantz. Interscience (Wiley), New York, 1970. 160 pp. $6.95.

The Western Lithic Co-Tradition. E. L. Davis, C. W. Brott, and D. L. Weide. San Diego Museum of Man, San Diego, Calif., 1969. xiv+ 98 pp., illus. Paper. San Diego Museum Papers, No. 6.

What Price Vigilance? The Burdens of National Defense. Bruce M. Russett. Yale University Press, New Haven, 1970. xii, 262 pp., illus. Paper, $2.45. Yale Fastback.

The Work of WHO 1969. Annual Report of the Director-General to the World Health Assembly and to the United Nations. World Health Organization, Geneva, 1970 (U.S. distributor, American Public Health Association, New York). xvi, 282 pp. + plates. Paper, $2.25. Official Records of the World Health Organization, No. 180.