thermal convection and boiling, and the most recent work on boundary layer flows with dissociation or reactions. With the exception of these topics, all of which came into prominence just at the time of, or after, the author's death, volumes I and II contain essentially all the important fundamental material in the field of heat transfer. These deficiencies are, however, insignificant when one views the total work.

S. P. Kezios has preserved the author's style and intent. We owe him a debt of gratitude for having completed this excellent, up-to-date summary of the science and art of heat transfer. It will take its place in the list of classical treatments which every graduate student must study and master. Max Jakob left us his own monument.

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The Extra Pharmacopoeia. Martindale. vol. I. Published by direction of the Council of the Pharmaceutical Society of Great Britain. Pharmaceutical Press, London, ed. 24, 1958 (order from Rittenhouse Book Store, Philadelphia). xxx + 1695 pp. £3 5s.

Although it is not well known in the United States, *The Extra Pharmacopoeia* has served for 75 years as a useful therapeutic commentary on the official *British Pharmacopoeia* and *British Pharmaceutical Codex*. The new 24th edition contains information on well over 20,000 drug preparations. The general arrangement is alphabetical, but drugs are grouped where possible. Thus, for example, under "quinine," other antimalarials are also considered; in this instance the recording of names, doses, toxic effects, antidotes, contraindications, and uses requires about 30 pages. Short two- or three-sentence abstracts from the literature document many of the points.

This useful and handy book deserves much wider acquaintance in America.

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Organic Colloids. Bruno Jirgensons. Elsevier, Princeton, 1958 (order from Van Nostrand, Princeton, N.J.). xiv + 655 pp. Illus. $16.95.

The purpose of this book is to give an elementary, general survey of a borderline subject. The treatment is divided into two parts. The first 16 chapters give a cursory account of the physics and physical chemistry involved in preparing and studying organic colloids, together with a modicum of their organic chemistry. Deliberately, many of the physical equations are flatly stated, with little or no attempt made to show how they were derived, but, at the end of each chapter, excellent references to the literature are provided. A laudable feature, which might well be widely emulated, is the footnote on each odd-numbered page which guides the reader to these bibliographies.

The next 18 chapters discuss selected groups of organic colloids, including macromolecular hydrocarbons and vinyl derivatives; linear and cross-linked polymers; various detergents, dyes, lipids, pigments, polysaccharides, proteins, and nucleic acids; and some biochemical topics, such as blood, milk, cells and tissues, and biocolloids in disease. In most instances, the chemical formulas are satisfactory, although double bonds are omitted from benzene rings and the Haworth (perspective) formulas for sugars have been shorn of their perspective (without which they are always misleading and sometimes erroneous).

This is essentially a reference book; it has a complete author index (16 pages) and a general subject index (11 pages). It should prove useful to those neophyte biophysicists and physical chemists who need an up-to-date outline of the relevant organic chemistry; similarly, biochemists and organic chemists will find it a convenient source for the physical chemistry involved in this field. Although it cannot be regarded as a textbook, it could well serve for collateral reading.

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Mathematical Foundations of Information Theory. A. I. Khinchin. Translated by R. A. Silverman and M. D. Friedman. Dover, New York, 1957. 120 pp. $1.35.

Dover Publications is to be congratulated on making this translation of two papers by an outstanding Russian authority on probability and statistics available to Westerners unable to hurdle the language barrier. Both papers are largely expository, setting forth the work of Shannon and later results obtained by Feinstein and McMillan, along with some original work. The book is marked by rigor, elegance, and clarity, and the smooth-flowing text betokens an excellent job of translation.

The first paper, "The entropy concept in probability theory," is motivated by the idea that the entropy concept is destined to become a permanent part of probability and statistics and is concerned with its precise formulation and general mathematical properties. This is certainly one of the best places for a mathematically mature reader to get a sound introduction to information theory in a few pages (28).

The second paper, "On the fundamental theorems of information theory," is a masterly presentation of the essential mathematical content of modern information theory, filling logical and mathematical gaps in previously available treatments. While the level is perhaps too difficult for the average engineer, mathematicians, statisticians, theoretical physicists, and information theorists will find the book perhaps the soundest discussion of foundations, and thus the most solid base for further development, available.

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The Senses. Wolfgang von Buddenbrock. Translated by Frank Gaynor. University of Michigan Press, Ann Arbor, 1958. (First published as *Die Welt der Sinne*; ed. 2, Springer, 1953.) 167 pp. Illus. $4.

This book is the latest number in the Ann Arbor Science Library. All of the titles that have appeared so far in this series are translations from the well-known German series of brief popularizations, *Verständliche Wissenschaft,* published by Springer-Verlag.

Wolfgang von Buddenbrock is emeritus professor of zoology at the University of Mainz. He has written several books on comparative physiology, including some popularizations.

The book attempts to describe the role of the senses in animal and human behavior, drawing examples from a wide variety of species. The first part takes up general questions concerning all the senses; the second part has individual chapters on eight different senses. In the brief compass of the text there can be no attempt at completeness; material is selected for mention because it is important or because it is intriguing. The presentation is simple, informal, and lively, and the reader who is unacquainted with the field will undoubtedly pick up much information.

Unfortunately, such a reader will pick up many errors as well. One striking case is due to the translation: ". . . we . . . confront the lowest with the highest when we compare the nervous system of an octopus with the inexplorable seat of the soul of man, his brain" (page 34). Here the German referred not to an octopus, which actually has a highly developed nervous system, but to "eines Polypen"—a coelenterate—which has a primitive nerve net. (The reader can de-

cide for himself whether the brain is the inexplorable seat of the soul.)

Most of the inadequacies are found in the German as well as the English version. For example, the author states, "So we perceive the sensation known as 'black' when no light impinges on our eyes" (page 86). It has long been known that black is perceived only through contrast, either spatial or temporal, between more and less brightly illuminated areas. Thus, some illumination is required if black is to be perceived. To give one more example, the author states that it has never been scientifically explained how people can detect obstacles in the dark without physical contact (page 125). Several experimenters have demonstrated that hearing plays the largest part in such performance; thus human beings have some of the ability of the echolocating bats which von Buddenbrock has described a little earlier (page 103).

A useful index has been added in the translation, but there are neither references nor suggestions for further reading.

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Inorganic Syntheses. vol. V. Therald Moeller, Ed. McGraw-Hill, New York, 1957. xiv + 265 pp. Illus. $6.

Inorganic Syntheses, volume 5, is a worthy addition to this useful series. It contains 63 numbered syntheses, many of them representing several compounds. Four volumes have now appeared since the war, at intervals of from 3 to 4 years, reflecting the continued activity in inorganic chemistry.

The contents reflect current research interests. There are, for example, preparations of several carbonyls and of carrier-free I^{131}. Rare-earth chemistry is well represented. A number of broadly useful reagents are found, including N_2O_4, HOCl, $Co_2(SO_4)_3 \cdot 18H_2O$, and $BeCl_2$. Some procedures are merely improvements on older ones. There also is a review of polyhalogen complex salts, followed by several preparations.

The subject index and the formula index include complete entries to all volumes in the series. The content of each volume is random because each procedure is volunteered more or less independently of the others, but the cumulative effect leads to comprehensive coverage. For example, four binary phosphorus halides are listed, but not more than two in any one volume. The formula index now contains upwards of 600 compounds, so that the series is approaching the more encyclopedic handbooks published in Germany a number of years ago.

The checking procedure continues to be a valuable feature. The checkers are always independent of the original contributors, their names are published, and frequently their suggestions for improvements are mentioned.

I noted very few obvious errors in reading the text. It is unlikely that serious chemical errors occur, simply because so many hands have been on each procedure. The format seems overly conservative, but it conforms with that of previous volumes and is useful.

This book is highly recommended to any who have need of dependable procedures for preparing inorganic compounds.

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Rutgers University

Miscellaneous Publications

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

Meteorological Utilization of Images of the Earth's Surface Transmitted from a Satellite Vehicle. ASTIA-AD-146764. Arnold H. Glaser. 145 pp. *Particle Size Distribution in Rain and Snow Inferred from Z-R Relations.* Meteorol. Radar Studies No. 7. ASTIA-AD-146765. Raymond Wexler. 8 pp. *A System for Recording Eight Meteorological Elements Simultaneously on Moving Film (Weatherlog).* AFCRC-TN-58-227. G. K. Thompson. Meteorol. Radar Studies No. 8. 59 pp. *Vertical Structure of Continuous Streamer-form Precipitation.* AFCRC-TN-58-401. Meteorol. Radar Studies No. 10. Raymond Wexler and David Atlas. Blue Hill Meteorological Observatory, Milton 86, Mass., 1958. 38 pp.

Study of Synoptic-dynamic Influences on the Nature of Cloud and Precipitation Echoes, October 1953–February 1958. AFCRC-TR-58244. Meteorol. Radar Studies, Final Report. 36 pp. Blue Hill Meteorological Observatory, Harvard Univ., Milton 86, Mass., 1958.

Anthropology as a Career. William C. Sturtevant. 18 pp. *Mississippian Fauna in Northwestern Sonora Mexico.* Misc. Collections, vol. 119, No. 3. W. H. Easton, John E. Sanders, J. Brookes Knight, Arthur K. Miller. 96 pp. *New American Paleozoic Echinoids.* Misc. Collections, vol. 135, No. 9. Porter M. Kier, 26 pp. *A Review of the Copepod Genus* Ridgewayia (Calanoida) *with Descriptions of New Species from the Dry Tortugas, Florida.* Proceedings of the U.S. National Museum, vol. 108. Mildred Stratton Wilson. 42 pp. *The Statistics of Meteors in the Earth's Atmosphere.* Contribs. to Astrophysics, vol. 2, No. 11. Gerald S. Hawkins and Richard B. Southworth. 16 pp. Smithsonian Institution, Washington, 1958.

The Descent of Satellite 1957 Beta One. Spec. Rept. No. 15. Optical Satellite Tracking Program. 13 pp. *Position of Satellite 1957 Beta One During the First 100 Revolutions.* Spec. Rept. No. 16. 22 pp. *Reports and Analyses of Satellite Observations.* Spec. Rept. No. 14. 43 pp. Smithsonian Institution, Astrophysical Observatory, Cambridge, Mass., 1958.

The Self-Glazing Phenomenon Associated with Shales and Clays Containing Small Amounts of Soluble Salts. Bull. No. 65. James T. Tanner. 21 pp. $1. *A Tensile Impact Test for Plastics.* Bull. No. 67. P. H. McDonald, Jr., and J. A. Edwards, 17 pp. $1. Dept. of Engineering Research, North Carolina State College, Raleigh, 1958.

Admission Requirements of American Medical Colleges, Including Canada, 1958–59. Compiled by Helen Hofer Gee and E. Shepley Nourse. Assoc. of American Medical Colleges, Evanston, Ill., 1958. 235 pp. $2.

Applied Mechanics in Engineering. An inaugural lecture delivered at University College, London, 23 January 1958. R. E. D. Bishop. Lewis, London, 1958. 24 pp. 2s. 6d.

Atomic Energy Commission, Twenty-fourth Semiannual Report. U.S. Atomic Energy Commission, Washington 25, 1958. 410 pp.

The Advancement of Medical Research and Education Through the Department of Health, Education, and Welfare. Final report of the Secretary's consultants on medical research and education. Office of the Secretary, Department of Health, Education, and Welfare, Washington, 1958. 82 pp.

A Bibliography of Avian Mycosis (partially annotated). Misc. Publ. 631. H. L. Chute and D. C. O'Meara. Maine Agricultural Experiment Station and Lederle Laboratories, Orono, Maine, 1957. 44 pp.

Bibliography of the Arabian Peninsula. Eric Macro. Univ. of Miami Press, Coral Gables, Fla., 1958. 94 pp.

Bibliography on Medical Electronics. Prepared by Medical Electronics Center of the Rockefeller Institute. Professional Group on Medical Electronics, Inst. of Radio Engineers, New York, 1958. 91 pp. $2.50.

The Behavioral, Ecological and Morphological Characteristics of Two Populations of Alder Flycatcher, Empidonax traillii (*Audubon*). Bull. No. 371. Robert Carrington Stein. New York State Museum and Science Service, Albany, 1958. 63 pp.

The Butterflies of Mississippi. Studies in Zoology, vol. 6, No. 2. Bryant Mather and Katharine Mather. Tulane Univ., New Orleans, La., 1958. $1. 46 pp.

Chloroplast Pigments and Chromatographic Analysis. Thirty-second annual Priestley lectures. Harold H. Strain. Phi Lambda Upsilon and associated departments, Pennsylvania State Univ., University Park, 1958. 180 pp. $2.50.

Educators Guide to Free Slidefilms. Mary Foley Horkheimer and John W. Diffor. ed. 10. 205 pp. $6. *Elementary Teachers Guide to Free Curriculum Materials.* Patricia H. Suttles, Ed. ed. 15. 318 pp. $6.50. Educators Progress Service, Randolph, Wis., 1958.

Forest and Range Influences Publications, 1956–1957. Personnel of the Forest Service. U.S. Dept. of Agriculture, Washington, 1958. 20 pp.