points of view. It would be a great boon to scientists individually, to scientific societies in the production of their reports and journals, to the Government in its desperate effort to handle the sea of scientific reports that threatens to engulf a dozen or more governmental research agencies—and, of course, to the scientific book publisher.

Well, why not, indeed? Certainly this would be the ideal solution to the problem. But in his heart the publisher knows that it is not likely to be the real solution. Why should one of the foundations or the Government interest itself in this research problem unless the scientific publishers themselves show more concern and enterprise for its solution? No, the publishers themselves, either individually or collectively, must somehow get the ball a-rolling, even if at first it must be only a small ball with low velocity. They know—or should know—that an industry which says it cannot afford to do any research to improve its processes or products is writing its own death warrant.

So the publishers themselves must finance a research program that at least will outline the technological problem which the industry faces and will reveal promising lines of attack towards a solution. Once this has been done, once the profitable avenues of approach have been more clearly seen, then publishers may reasonably look to the foundations, or even to the Government, for substantial help in financing a much larger program that in good time should push the problem through to solution.

Such a research program should be undertaken, of course, with a long look ahead. Meanwhile, publishers must give more attention to all possible economies in the manufacture of scientific books. Also, they must insist that their authors give much more attention to all possible economies of word, symbol and thought in the writing of scientific books. The surest way of making less expensive books is to make them smaller.

More important, publishers must ask scientists generally to take a more realistic attitude towards the present realities of costs and prices. If scientists are to continue to be served with the number and kind of books that they want and need in their many, many specialties, there must be a general break-through of the psychological barrier of subjectively imposed price "ceilings." And this break-through must come principally in the minds of older rather than younger scientists. The older teacher of a graduate course often finds it much harder to ask his students to buy a specialized treatise of 400 pages at $8.00 than the students do to pay that price for a book they want and need. Usually it is no more difficult for a graduate student to come by $8.00 today than it was for the teacher himself to come by $4.00 or $5.00 twenty or thirty years ago when he was a graduate student. But no one should be surprised at this psychological quirk, for it all depends on your basing points. Most grandmothers in 1910 objected strenuously to paying 30¢ a dozen for eggs, the price of which had soared outrageously from 20¢ at the turn of the century.

Books

Ultrasonics. By P. Vigoureux, 163 pages. John Wiley and Sons, Inc., New York, 1951. $4.00.

One of the interesting aspects of modern acoustics is the great attention currently paid to sound that is not heard by human ears. Inaudible sound was more or less academic in Lord Rayleigh's day, but modern electronic equipment has made it possible to produce with relative ease compressional waves in material media at frequencies exceeding 100 megacycles/sec. This in turn has stimulated research on the properties of such high frequency waves and their various effects on the media through which they pass. An idea of the growth of this subject may be gained from the fact that at a recent international congress on ultrasonics in Rome (June, 1950) ninety-six papers were presented covering not merely the general theory of ultrasonic radiation and its generation, but also its physical properties (e.g. absorption and dispersion in fluids), its engineering applications (e.g. flow detection in metals by the ultrasonic reflectoscope), its biological implications (e.g. the action of ultrasonics on bacteria) and finally its increasing use in medicine (e.g. clinical studies of the employment of ultrasonics in the treatment of nervous disorders).

It is inevitable that this tremendous growth of interest in inaudible sound should stimulate the writing of books on the subject. The volume under review is a welcome addition to the list of those currently available. The author is a well-known British authority on quartz piezoelectric vibrations and underwater sound. In his introduction he states that "the object of the present work is to introduce the reader to the technique and to the simpler aspects of the theory of propagation of ultrasonics in fluids". He has succeeded admirably in producing a book which for its size provides a better introduction to the subject than any other now in print.

Some twenty pages are devoted to the various methods of generating ultrasonic radiation with special reference to piezoelectric and magnetostrictive oscillators. The description is clear and direct and accompanied by helpful diagrams and figures. There is unfortunately no reference to the recent ceramic vibrators like barium titanate.

There is a short chapter on the theory of sound propagation in fluids, including references to viscosity, heat conduction, and relaxation as mechanisms for absorption and dispersion. By far the larger part of the volume is devoted to a discussion of the observational

data on the velocity (including dispersion) and absorption of high frequency sound in gases and liquids. All the standard methods of measurement are explained in detail and much attention is paid to the comparison between experimental results and theoretical predictions. Some of the most interesting features of ultrasonics involve the relation between sound absorption and velocity and other physical properties of fluids, e.g., the relative concentration of components in mixtures. These are very well illustrated, and in fact constitute the most valuable part of the book.

As has already been emphasized, the author makes no pretense of having produced a treatise on ultrasonics as a whole. The book contains, for example, no reference to the important problems of high frequency transmission in solids, and the whole field of ultrasonic application is absent. Nevertheless all those interested in ultrasonics and in particular all investigators in fluid acoustics will find this volume a very useful one.

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Scientific Manpower

A survey of *Employment, Education, and Earnings of American Men of Science* has recently been published by the U. S. Department of Labor's Bureau of Labor Statistics in cooperation with the Department of Defense. Covering 42,000 of the 50,000 scientists listed in the 1949 edition of *American Men of Science*, the report deals predominantly with research workers and teachers. Information for the study was collected for the Department of Defense by the National Research Council, in cooperation with the publisher of *American Men of Science*. The report (Bureau of Labor Statistics Bulletin No. 1027) may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for $0.45 per copy.

International Trade

Trade Barriers to Knowledge, compiled by the Division of Free Flow of Information of Unesco's Department of Mass Communication, with the aid of the Intelligence Unit of the *Economist*, London, and published by Unesco, cites the regulations affecting international trade in educational, scientific, and cultural materials. The manual covers 43 countries and gives detailed data on tariffs, sales taxes, exchange controls, licensings, quota, and export regulations. *Trade Barriers to Knowledge* is on sale at the Columbia University Press, New York, for $1.00 per copy.

Radiological Protection

Recently published by the National Bureau of Standards, NBS Handbook 47, *Recommendations of the International Commission of Radiological Protection and of the International Commission on Radiological Units, 1950* (vi, 29 pp. supplement), presents recommendations adopted at the Sixth International Congress of Radiology. Copies are available from the Government Printing Office, Washington 25, D. C., for 15 cents.

Books Received

Introduction to Modern Algebra and Matrix Theory. By O. Schreier and E. Sperner. 378 pp. Chelsea Publishing Company, New York, 1951. $4.95.

Positivism: A Study in Human Understanding. By Richard von Mises. 404 pp. Harvard University Press, Cambridge, Massachusetts, 1951. $6.00.

Calculus and Analytic Geometry. By George B. Thomas, Jr. 685 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1951. $6.00.

Heat and Thermodynamics (Third Edition). By Mark W. Zemansky. 465 pp. McGraw-Hill Book Company, New York, 1951. $6.00.

Astrophysics. A Topical Symposium. Edited by J. A. Hynek. 703 pp. McGraw-Hill Book Company, Inc., New York, 1951. $12.00.

Introduction to Number Theory. By Trygve Nagell. 309 pp. John Wiley and Sons, Inc., New York, 1951. $5.00.

The Classical Theory of Fields. By L. Landau and E. Lifshitz. 354 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1951. $7.50.

Panorama of Science, 1951. Annual Supplement to the Smithsonian Series for 1951. Compiled and Edited by Webster Prentiss True. 416 pp. The Series Publishers, Inc., New York, 1951. $5.50.

Phase Microscopy. Principles and Applications. By Alva H. Bennett, Helen Jupnik, Harold Osterberg, and Oscar W. Richards. 320 pp. John Wiley and Sons, Inc., New York, 1951. $7.50.

Statistical Methodology Reviews 1941–1950. Edited by Oscar Krisen Buros. 340 pp. John Wiley and Sons, Inc., New York, 1951. $7.00.

Tensor Analysis for Physicists. By J. A. Schouten. 275 pp. Oxford University Press, New York, 1951. $6.00.

How to Study How to Solve Arithmetic—Calculus (Second Edition). By H. M. Dadourian. 121 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1951. $0.60.

Magnetic Materials. By F. Brailsford. 156 pp. John Wiley and Sons, Inc., New York, 1951. $1.50.

Radiologic Physics (Second Edition). By Charles Weyl and S. Reid Warren, Jr. 491 pp. Charles C Thomas Publisher, Springfield, Illinois, 1951. $10.50.

X-Ray Analysis of Crystals. By J. M. Bijvoet, the late N. H. Kolkmeyer, and Caroline H. Maggillavry. 304 pp. Interscience Publishers, Inc., New York, 1951. $6.50.

Fundamentals of Electronics. By F. H. Mitchell. 243 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1951. $4.50.

An Introduction to Acoustics. By Robert H. Randall. 340 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1951. $6.00.

An Introduction to Thermodynamics, the Kinetic Theory of Gases, and Statistical Mechanics. By Francis Weston Sears. 348 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1950. $6.00.

Time's Arrow and Evolution. By Harold F. Blum. 222 pp. Princeton University Press, Princeton, New Jersey, 1951. $4.00.

Annual Review of Physical Chemistry. Volume II, 1951. Edited by G. K. Rollefson and R. E. Powell. 462 pp. Annual Reviews, Inc., Stanford, California, 1951. $6.00.