

applicable to gear and angle measurements, which depends on the use of sinusoidal magnetic impressions recorded on tapes or bands as highly sensitive and accurate angle-measuring devices. A paper in Volume 3 on the calibration and examination of electronic and visual pyrometers in the U.S.S.R. refers to pyrometers which are available for measuring temperatures up to 10,000° C. to an accuracy of 0.1 per cent (0.05 per cent at the gold point, 1,063° C.). Another paper discusses the measurement of radiation energy with a platinum bolometer sensitive to 10<sup>-10</sup> W. Indeed, a very large proportion of the papers in Volumes 3 and 4 describe special instruments and techniques developed for use in the various fields of measurement covered. The U.S.S.R. paper on reference measurements for the ionizing radiations (Volume 5) shows that standards and measurements in this important field are well controlled by the work of the national standards laboratory in Leningrad. Contributions to Section 3 in Volume 5 reveal the intense interest, especially in the U.S.S.R. and the associated countries, in the applications of automation to methods of production and the control of inspection.

It is difficult for a single reviewer to give in brief an adequate indication of the wide scope and interest of the papers appearing in these five volumes. There is no doubt that, on the whole, they will amply repay notice by all those interested in the present-day trends of metrology and instrument technology. Preparations are in hand to hold another conference of the same kind during 1961 (June 25–July 9).

H. BARRELL

## FLUCTUATION NOISE IN RADIO CIRCUITS

### Electrical Noise

*Fundamentals and Physical Mechanism.* By Dr. D. A. Bell. Pp. x+342. (London: D. Van Nostrand Company, Ltd.; Princeton, N.J.: D. Van Nostrand Company, Inc., 1960.) 50s.

TO the electrical engineer, the title "Electrical Noise" might convey the impression that this book deals with unwanted radiation causing interference with telecommunications. The author is not, however, concerned with this field; and his book deals comprehensively with the fluctuation-type noise which arises within the apparatus and components used in the generation and reception of radio signals. It summarizes the results of more than twenty years experimental and theoretical research on the random fluctuations of current which arise from various causes in electrical circuits over a very wide range of frequencies.

Following introductory sections on mathematical techniques and general noise theorems, there are chapters on noise in diodes, grid-controlled amplifying valves, and the more recently developed beam, maser and parametric amplifiers. Current noise, which is generated when a direct current passes through a semiconducting material, is then discussed in considerable detail; and it is shown that the satisfactory explanation of the origin of such noise is an important outstanding theoretical problem. Further chapters deal with the types of noise which arise in thin metal films, in rectifiers and transistors, and in ferromagnetic materials. A chapter on "Radiation Detectors" shows that the measurement of noise can

be applied to useful ends in, for example, radio astronomy, temperature measurement, and photoelectric detectors.

The book is to be welcomed as a specialist monograph presenting a detailed review of the current state of knowledge of a subject in which there has been a certain amount of confused thought and much controversy in the past. Although the author has on occasions appeared to be in conflict with his contemporary workers in parts of this controversy, this has not materially affected the scope or presentation in the book under review. A good selection of references is given at the end of each chapter; these will enable the serious student to explore any part of the field and examine the points of view of other advanced research workers. The book has a few short-comings in that the chapter sub-headings are inadequate in some cases, and some of the diagrams are by no means self-explanatory. Apart from such limitations, however, the book is welcomed as a very useful survey of knowledge in this rather complex field.

R. L. SMITH-ROSE

## PLANT PATHOLOGY

### Plant Pathology

*An Advanced Treatise.* Edited by J. C. Horsfall and A. E. Dimond. Vol. 3: *The Diseased Population, Epidemics and Control.* Pp. xiii+675. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1960.) 27 dollars.

AS the editors make clear in their prologue, this third and final volume of their comprehensive theoretical treatment of plant pathology covers the newer or younger aspects of the subject, and to that extent it is truly theoretical in places. After a stimulating discourse by S. D. Garrett on the various forms of inoculum and on inoculum potential, there are chapters dealing with the natural spread of inoculum in soil, seeds and planting material, by animal and insect (mainly virus), and by air and water, including take-off, flight and landing. Other chapters deal with the analysis of factors and processes involved in primary and secondary disease epidemics, the possibility and value of predicting epidemics, and the biological factors that affect or interfere with them. The rest of the volume is concerned with the basic principles of disease control by cultural practices, soil treatment, the use of fungicides, the breeding of resistant varieties and plant legislation. Plant legislation, concealed under the misnomer "Quarantines", includes a useful account of recent international efforts to ensure that essential regulations are uniform, justifiable and soundly based biologically. The intricacies of this subject are, however, largely a closed book to all but a few officials, and many readers would no doubt have welcomed a reasoned exposition of the basic principles and problems involved, especially by one so well qualified to prepare it.

The international nature of the treatise is well maintained, with six contributions from the United States, four from the United Kingdom and single ones from Germany, Denmark, France and South Africa. The treatise is intended for the creative worker and advanced student of plant pathology, but even he will not get wholly by without more than a nodding acquaintance with mathematics and chemistry. But those who can spare £25 for the three volumes will find that the fifty distinguished contributors have given them plenty to think about. W. C. MOORE