

## SHORT REVIEWS

**Logic, Computing Machines, and Automation**

By Alice Mary Hilton. Pp. xxi+427. (Washington, D.C.: Spartan Books; London: Cleaver-Hume Press, Ltd., 1963.) 72s.

**M**ATHEMATICAL logic is an essential component in the basic theory of computers and automatic controllers. However, to-day these subjects are in their early stages and the most erudite specialist would find it impossible to write a book explaining adequately all the connexions between logic and these applications. It is, therefore, a very difficult undertaking to give some notion of these connexions to the general reader, which is what *Logic, Computing Machines, and Automation* sets out to do. The book is a succession of summaries of mathematical logic, some parts of mathematics, the operation and programming of computers, and a small section on automation. Parts of these summaries are quite good, but the real problem is to link them together so as to give the reader a coherent picture. Little attempt is made at this linking; for example, the reader has two pages in which to struggle with the ideas of material implication, conditional implication, and strict implication; if he succeeds in mastering them he then finds that they lead nowhere. A good exposition for the general reader remains to be written; when it comes it will be much less ambitious, and much more attuned to the way that people absorb difficult technical material. J. J. FLORENTIN

**Electrical Instruments and Measurements**

By W. Alexander. Second edition. (Cleaver-Hume Electrical Series, No. 5.) Pp. 350. (London: Cleaver-Hume Press, Ltd., 1962.) 25s. net.

**T**HIS book was first published in 1951 and has now been revised for the second edition. It is primarily intended for the use of technicians, and the small size of the pages makes it easy to carry about in one's pocket. The only obvious disadvantage of the small page size is that some of the detail of the diagrams and photographs is difficult to see clearly.

The book opens with a very readable chapter on fundamental principles and this is followed with simple descriptions of ammeters, voltmeters, wattmeters, power-factor meters, frequency meters, quantity meters and energy meters. The nature of the quantities measured is described with a minimum of mathematics and plentiful diagrams, and there are useful chapters on the testing of instruments and circuits. A few test questions and numerical answers are included. The material is generally well chosen, but the measurement of three-phase volt-amperes and power factor is inadequately covered and the possibility of obtaining widely different results according to the definition of volt-amperes does not appear to be mentioned.

Instrument transformers are discussed as a means of extending the range of voltage and current measurement, but the testing of these devices is not described. The only method of compensating errors given is "turns compensation" for ratio, and on p. 87 the author denies the existence of methods for compensating phase error, which is astonishing.

Apart from these minor blemishes the book is excellent and should prove very popular. A. H. M. ARNOLD

**Electronic Properties of Diamonds**

By Prof. F. C. Champion. Pp. vii+132. (London: Butterworth and Co. (Publishers), Ltd., 1963.) 25s.

**T**HIS scholarly small monograph on the present state of knowledge about the electronic properties of the diamond crystal is most welcome. There are two important research schools concerned with the electro-optical properties of diamonds, that of Prof. Ditchburn at Reading, and that of Prof. Champion himself at London, and as might be expected this account is authoritative. Diamond, despite its chemical simplicity, is a crystal which seems to exhibit an enormous range of physical structural complexities, and from the bewildering mass of published data the author has produced a readable summary which will be invaluable to all scientists (and there are many) engaged on the investigation of the physical properties of diamond.

The book is divided into two roughly equal parts. The first part consists of eight brief chapters which review a formidable amount of already reported experimental material concerning: (a) optical properties of theoretically perfect and of real diamonds; (b) electrical and photo-conductivity; (c) diamonds as scintillation and as conduction counters for radiations; (d) radiation damage to diamond; (e) semi-conducting diamonds; (f) electro-luminescence.

The second part is a novel contribution for a monograph of this size, since it is in effect an original attempt to explain a considerable number of the physical properties of diamond in terms of structural defects and energy-levels. Prof. Champion achieves a fair measure of success with his theory and accounts for numerous specific properties in some detail. Undoubtedly a stimulating section, much of which seems very sound to me.

A very useful brief monograph indeed. S. TOLANSKY

**The Application of Mathematical Statistics to Chemical Analysis**

By V. V. Nalimov. Translated by Prasenjit Basu. Pp. ix+294. (Oxford, London, Paris and Frankfurt: Pergamon Press, 1963.) 84s.

**T**HE title of this book will immediately catch the eye of any chemist seeking instruction in the use of statistics in his work. The newcomer to statistical methods will, however, find the book heavy going and would do well to obtain his primary background in the subject from some simpler English text-book. On the other hand, those chemists who already possess some knowledge of statistical methods will appreciate the value of a book applying statistics to their particular problems.

Our old friends, the Normal, Binomial and Poisson distributions, the *t* test and the  $\chi^2$  test, are all described with reference to chemical analysis. The analysis of variance is applied to the problem of variance between and within laboratories. The statistics of regression are applied to the standard graphs widely used in modern analysis and, in this connexion, the attention given to the correlation between the parameters of the regression equation is interesting as this correlation is not usually discussed in our elementary monographs. Another technique which may be fresh ground to some chemists is that