

handicap to their use. It is mitigated to some extent by the fact that a coal-based economy requires a great investment in railroads and coal mines, so the overall picture must be considered. This point was also emphasized by Prof. H. J. Bhabha in his address to the British Association in Dublin.

The production of radioactive isotopes is not likely to be economically worth while in the smaller underdeveloped countries owing to the high cost of processing laboratories and the relatively low cost and easy availability of radioisotopes from countries such as Britain.

The principal use of radioisotopes is thought to be in agriculture and medicine. The radiation preservation of food is briefly discussed, but it is clear that much more extensive surveys of the advantages and storage arrangements in individual countries are required.

The application to medicine in underdeveloped countries similarly awaits identification and detailed study of the medical and public health problems of individual countries. A section on reactors gives details of the capital and operating costs of particular reactors and makes the point that they are only of use if there are institutions and research workers capable of carrying out research or teaching. There are far too many cases to-day of research reactors being installed as a result of high-pressure salesmanship where these conditions are entirely lacking.

In general, then, this survey does no more than pose the problems. They can only be answered by an 'on the job' study. The Baghdad Pact Nuclear Training Centre seems to be the first centre where a serious attempt is being made to investigate these questions.

J. D. COCKCROFT

SEMICONDUCTORS AND TRANSISTORS

Semiconductor Abstracts, Vol. 3—1955 Issue

Compiled by Battelle Memorial Institute. Edited by E. Paskell. (Abstracts of Literature on Semiconducting and Luminescent Materials and their Applications.) Pp. viii+322. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1957.) 80s. net.

Progress in Semiconductors, Vol. 2

Edited by Dr. Alan F. Gibson, Prof. R. E. Burgess and Prof. P. Aigrain. Pp. vii+280. (London: Heywood and Company, Ltd., 1957.) 63s. net.

Fundamental Principles of Transistors

By Dr. J. Evans. Pp. xii+255. (London: Heywood and Company, Ltd., 1957.) 45s. net.

Transistor Electronics

By David Dewitt and Arthur L. Rossoff. Pp. xii+381. (London: McGraw-Hill Publishing Company, Ltd., 1957.) 60s.

THE subject of semiconductors was, not so long ago, a small, rather untidy, corner of physics. It has grown rapidly in the past ten years and spread into other branches of science under the impetus of several important discoveries, of adequate theories in support and of much improved material technology. Because progress in one of the branches is often dependent on progress in another, many physicists, chemists, metallurgists and engineers engaged in the subject regularly follow one another's journals, where necessary by way of the monthly

parts of the well-established, but broadly based, abstracting journals. The annual "Semiconductor Abstracts" of the Electrochemical Society cannot be published quickly enough to form an alternative early collection of references, but they can serve other purposes; they are a compact source, useful alike to newcomers and to anyone making a detailed study of a particular line of research. They are well laid out and, in part, original; they include papers read at American meetings, not necessarily published, and emphasize numerical results. A study of Volume 3 shows that the period covered was largely one of consolidation, although there were some important papers, particularly from the Massachusetts Institute of Technology, the Bell Telephone Laboratories and the Philips Laboratories.

"Progress in Semiconductors" is another recent annual publication, designed to keep readers well informed by authoritative reviews. Its first volume was welcomed, even though some of the reviews were insufficiently searching or, apparently, hurriedly written. The second volume, for which important subjects have again been chosen, suffers from no such blemishes. Without exception all eight contributions are informative, critical and adequately illustrated. The first two deal with materials; that on semiconductor alloys deals largely with the silicon-germanium system and is directed mainly at experts, but that on the compounds of Group III and Group V elements should appeal more widely. The third summarizes the many investigations made of the effects of irradiation of semiconductors and the fourth analyses the factors controlling that important property, the life-time of minority carriers. There follow a very good description, with some excellent plates, of the production of monocrystalline germanium of high physical perfection and an account of the behaviour of small amounts of impurities, of many elements, in germanium. The last two papers deal with effects at high electric fields, the first with the motion of carriers and the departure from ohmic conductance and the second with theories of luminescence, which postulate a supply of electrons, their acceleration and their collision with luminescence centres. The editors have set themselves a hard task if they are to maintain the standard set by this volume; there is no shortage of subjects worthy of attention, and we can surely look forward to future volumes.

Dr. Evans's book, though likely to be most used by physicists and engineers embarking on the theory, design or manufacture of transistors, can be widely read with interest. It is well balanced, except for a small over-emphasis on point-contact transistors, and presents its facts concisely. It has little space for detail, but should encourage readers to follow up the references given.

American authors have written some of the very best books about the thermionic valve, and its uses, and recent evidence suggests they are beginning to do the same with the transistor. "Transistor Electronics" is a good pointer. It may have its faults—perhaps it makes insufficient distinction between the more important and the less important and could be more quantitative in places—but the descriptions it gives of the internal behaviour of transistors in physical terms, of the external behaviour in electrical terms, and of the elementary circuits in common use, fulfil the authors' purpose that the book should prepare engineers to use the transistor with understanding and confidence.

J. R. TILLMAN