NOBEL AWARD FOR PHYSICS—1956

THIS year's Nobel Prize for Physics has been awarded jointly to Drs. William Shockley, John Bardeen and Walter Brattain, members of the research staff of the Bell Telephone Laboratories, U.S.A., for their outstanding work on the electron physics of solids, especially semi-conductors, culminating in the recent development of the transistor, which is finding increasing application in electronics and communications.

Dr Shockley, who is Director of Physics and Transistor Research in Bell Telephones, has made important contributions to our understanding of dislocations in relation to the plastic properties of metals, and has been responsible for the discovery of the transition to metallic characteristics in silicon and germanium on the addition of foreign atoms. He carried out several military assignments as expert consultant during the Second World War, and is the author of the book, "Electrons and Holes in Semiconductors". He was awarded the Leibmann Prize (1952), Buckley Prize (1953) and Comstock Prize (1954), in recognition of his distinguished work.

Dr. Bardeen has worked on the problem of diffusion in alloys, besides his collaboration in the development of the transistor. Before joining the Bell Telephone Laboratories in 1945, he was for some time a geophysicist in the Gulf Research and Development Corporation and served also in the U.S. Naval Ordnance Laboratory, Washington. Since 1951, he is professor of electronic engineering and physics, Illinois.

Dr. Brattain has studied the effects of charged particles on semiconducting materials in addition to the teamwork on transistor action. He was awarded the Ballentine Medal of the Franklin Institute in 1952.

The transistor was no accidental discovery, but actually one of the results of the intensive work on the physics of the solid state which has been vigorously studied for the past two decades. In addition to dislocations, which clarified our knowledge of the strength of metals and alloys, several other types of imperfections are now well recognised. Our present understanding of phenomena like luminescence, electrolytic conduction in crystals, photographic sensitivity, are only a few of the other results that have emerged from such a study. It is interesting to note that in the recent Bristol Conference (1954), the interest has shifted to irradiation effects in crystalline solids.

Since Dr. Shockley and his co-workers reported the thermionic valve-like characteristics of the transistor, several types have been perfected and it has come to stay as a standard component in electronic practice. The advantages of the transistor are small size, absence of a heater and possibility of operation with voltage and current of either polarity. The main drawbacks are appreciable interelectrode capacitance, limited power (less than a watt) and frequency (100 Kc/s.) ranges, which may be overcome by improved design. A fundamental obstacle to transistor development is the narrow tolerances in electrode spacings that require precision engineering. However, transistors are widely used nowadays in switching circuits of portable equipment, telephony and computers, where their compact size and limited power requirements offer special advantages in circuit design.

It is interesting to notice that the Nobel-Laureates of this year are found in an industrial organisation. Perhaps it is a sign of the beneficial results of the participation of men of science in an enlightened industry.

K. S. CHANDRASEKHARAN.

CATALOGUE OF NUCLEAR REACTORS

THE Chalk River Project of Atomic Energy of Canada, Ltd., with the co-operation of the Atomic Energy Research Establishment, Harwell, has prepared a "Catalogue of Nuclear Reactors, 1955" (AECL No. 220; CRR-590. Pp. 60. London: H.M.S.O., 1955; 4 *sh.* 6 *d.* net), which has been compiled from the unclassified literature and refers to reactors that are known to have reached criticality by July 1955. The catalogue includes reactors in Canada, France, Great Britain, Norway, Sweden, Switzerland, the United States and the U.S.S.R. The details given for each reactor consist of brief notes covering six items—neutron speed; fuel configuration; kind of moderator; purpose (research, power, etc.); thermal power; and neutron flux—as well as constructional details and one or two useful references. Additions to, and revisions of, the catalogue will be prepared from time to time in order to keep the collection of data up-to-date.