

It is opportune that we should now have a general survey of acoustical relaxation effects; and the authors of this volume, by their researches on both the theoretical and experimental aspects, are well equipped to make it. The plan of the book is succinctly set forth in the introduction. The evidence for relaxation, shown by a frequency-dependent specific heat and consequent excess absorption, is examined in the light of various theories, in particular those based on the idea of a bulk viscosity. From single relaxation times we pass to multiple ones and to interactions between different types of molecules in mixtures.

The weakness of all theories in this field has been that, though the existence of relaxations had been experimentally proved, the relaxation times themselves could not be deduced *a priori*, but in Chapter 7 the probability of energy transfer during the passage of the sound wave is discussed, and calculations made of the ratio of the relaxation time to the mean free time between collisions for a diatomic gas, and hence of the relaxation time itself as a function of temperature.

Later the experimental results for liquids are presented. The relevant theory is much more difficult, and at present one can only discuss the results phenomenologically.

The book is an excellent and detailed account of the present state of ultrasonic propagation in fluids and should be read by all who work in this field or wish to examine the latest theories of relaxation in fluids. There is no discussion of ultrasonic propagation in solids and, in this respect, the title is too general; although, as the authors point out, there exist books which cover the omission.

E. G. RICHARDSON

NUCLEAR POWER TECHNOLOGY

Nuclear Engineering Handbook

Edited by Harold Etherington. (McGraw-Hill Handbooks.) Pp. xv + 1866. (London: McGraw-Hill Publishing Company, Ltd., 1958.) 194s.

Nuclear Power Plant

By E. Openshaw Taylor. Pp. vii + 184. (London: George Newnes, Ltd., 1959.) 30s. net.

Chemistry of Nuclear Power

By Dr. J. K. Dawson and Dr. G. Long. Pp. vi + 208 + 8 plates. (London: George Newnes, Ltd., 1959.) 30s. net.

Physics and Heat Technology of Reactors

Translated from the Russian. (Supplement No. 1 of the Soviet Journal of Atomic Energy, *Atomnaya Energiya*.) Pp. v + 174. (New York: Consultants Bureau, Inc.; London: Chapman and Hall, Ltd., 1958.) 22.50 dollars; 168s. net.

THE "Nuclear Engineering Handbook" is an attempt to collect into one volume theory, formulae and data from the many different branches of science and engineering which have contributed to the development of nuclear fission reactors. The contents include sections on mathematics, nuclear and reactor physics, isotope technology, radiological protection, heat transfer, materials, chemistry and chemical engineering, and mechanical design. The editors have realized how important it is that a handbook should be easy to use and have provided, in addition to an index, an extensive guide.

The handbook contains an immense amount of information, extremely well organized. The kind of information given and the aim in giving it varies considerably from section to section. In the sections on mathematics the reader will find a neat review of algebra, geometry and analysis, starting from the basic arithmetical operations and including the theory of equations, vector analysis, probability, differential and integral equations, integral transforms, the calculus of variations, etc. In spite of its clarity, however, this section is not likely to satisfy either mathematicians or others seeking mathematical assistance in solving practical problems.

In the numerous sections dealing with what might be termed the nucleonics of reactors, a comprehensive treatment is given, starting with nuclear physics and leading to a comparison of reactor design formulae with experimental results.

In the sections on fluid flow, heat transfer and materials, emphasis is placed on the application of information. The fundamentals of fluid flow are sketchily treated, but a large amount of useful data is included in the form of tables, graphs and equations. The designer is also catered for in a section which includes general and detailed drawings of several reactors and components.

In a book of this kind it is not easy to strike a balance between data and text. I would prefer greater emphasis on the former. In spite of these minor criticisms, the book is invaluable to anyone who needs to be constantly in touch with several of the diverse subjects involved in nuclear engineering.

"Nuclear Power Plant" contains an elementary treatment of the principles and problems of nuclear power plant design. The author has assumed that the reader's scientific standard is that of the sixth-form science courses in schools in Britain, and except in relatively unimportant respects he has successfully kept the requirements to this standard. The arrangement is logical, starting with a review of energy requirements and resources, continuing with the scientific and engineering aspects and concluding with a chapter on the economics of nuclear power stations. The important topics both in science and engineering have been well selected, and, although it is inevitable that simplifications are made in a book of this length, they are, in the present case, few and unimportant.

"Chemistry of Nuclear Power" describes the many important roles which chemistry takes in nuclear power technology. Although not written specially for chemists, an elementary knowledge of chemistry is essential to understand some sections. The part which chemistry plays in refining raw materials, in fuel preparation and re-processing, in reactor technology and in disposing of radioactive wastes is clearly indicated, as is the complicated relationship between chemistry and metallurgy. This book should go far to convince a sixth-form or first-year university student that the career of the chemist in nuclear technology is as interesting and important as that of the physicist.

"Physics and Heat Technology of Reactors" contains English translations of nineteen original papers by Soviet authors. The papers on reactor theory will be of special interest to Western readers because of the originality of the Soviet scientist in this field. Those dealing with heat technology are disappointing when seen in relation to the great amount of high-quality research in this subject which Soviet technologists have carried out. W. MURGATROYD