

main sections, the first dealing with gamma-rays and their attenuation, the second with the neutron physics relevant to shield design, and the third with practical shield design.

The first monograph in the second group is that on heat transfer. Little had been published on reactor core heat transfer in Britain prior to the 1958 Geneva conference. This book is divided into two sections, and most experimenters will be sympathetic in the method of splitting as between fundamental work and work of immediate practical application. The heat-transfer specialist in nuclear power has the twin function of testing fuel-element cans under simulated reactor conditions to give exact design figures, and of carrying out inspired research work to provide the answers for subsequent stages in reactor development. The chapter on fundamentals sets out in a concise form the analytical approach, and describes the various analogies between heat and momentum transfer. The second chapter derives the usual design formulæ for channel heat transfer and pressure drop and ends with a comparison of gaseous coolants and a worked example. The final chapter considers such topics as liquid-metal heat transfer, fin efficiency and a comparison between liquid and gaseous coolants.

The monograph on reactor control and instrumentation is welcomed as providing a basis for later, more detailed, texts on these subjects. The incident at Windscale emphasized the need for comprehensive instrumentation in present reactor designs, and the lecture by Sir John Cockcroft in Tokyo last November mentioned two phenomena, positive moderator temperature coefficient and disturbances in the power distribution in a reactor due to local changes in xenon poisoning, with which the designers of the current stations have to cope. The present monograph must suffice until nearer the commissioning times of the Central Electricity Generating Board and the South of Scotland Electricity Board stations. The subject of control is a complex one ranging from neutron kinetics to the thermal response of a steam-raising unit. The monograph deals with neutron kinetics conventionally. The following chapter on temperature-stabilized reactors is important. As the authors mention, this type of analysis would in practice be carried out using an analogue computer. The numerical and graphical methods described do, however, show the trends. In later editions of these monographs, the final chapter of this book on instrumentation might well prove the basis for a seventh monograph, and then include health physics instrumentation.

The monograph on steam cycles consists of two main sections, one dealing with graphite-moderated, gas-cooled reactors, and the other with water-cooled, water-moderated reactors. It is worth remembering that the dual pressure cycle for the former type of reactor was first suggested in 1948. Since that time considerable effort has been expended in dealing with the number of variables involved. The essential tools are given in the appendixes, but the work involved is laborious. It is to be regretted that some co-operative effort was not made years ago to publish comprehensive graphs of the form given in this book. The section on water-cooled reactors deals with both pressurized-water and boiling-water types, and includes a short section on the use of a coal-, oil- or gas-fired superheater.

The editor of this series is to be congratulated in providing a number of stimulating monographs.

R. VAUX

LOW TEMPERATURES

Low Temperature Physics and Chemistry

Proceedings of the Fifth International Conference on Low Temperature Physics and Chemistry held at the University of Wisconsin, Madison, Wisconsin, August 26-31, 1957. Edited by Joseph R. Dillinger. Pp. xxv+676. (Madison, Wis.: University of Wisconsin Press, 1958.) 6 dollars.

Kältetechnik

Von Prof. Matts Bäckström. Zweite überarbeitete Auflage. Bearbeitet und ins Deutsche übertragen von Dr.-Ing. Eduard Emblik. Pp. xvi+656. (Karlsruhe: Verlag G. Braun; London: K. G. Heyden and Co., Ltd., 1957.) 56 D.M.; 98s.

INTERNATIONAL conferences on the progress of low-temperature physics are held bi-annually. The book, published by the University of Wisconsin Press and edited by Dr. J. R. Dillinger, contains the reports of such a conference held in Madison, Wisconsin, in 1957. The reports were furnished by the speakers and, since it was originally intended to bring out a simple stencilled version quickly, the figures are in many cases rough diagrams. Altogether, more than two hundred reports from all branches of low-temperature research are presented, and it is, of course, quite impossible to give even a rough survey of the contents.

The previous low-temperature conference was held in Paris in 1955 and much of the work reported in Wisconsin is necessarily a continuation of research discussed at the Paris meeting. There were a number of new developments in the field of nuclear orientation. The most outstanding of these are the experiments on the anisotropy of beta emission which provided the proof of the non-conservation of parity postulated by Yang and Lee. Another paper reported the successful orientation of nuclei by the method suggested by Pound in which use is made of the coupling between the lattice electric field and the nuclear quadrupole moment. It is unfortunate that a special lecture by Dr. N. Kurti on nuclear cooling has been published separately and is not included in the book.

An important advance in the theory of superconductivity was made by Bardeen, Cooper and Schrieffer, and a number of papers were read on experimental confirmations of this work. In particular the work on absorption of radiation at wavelengths between 0.1 and 1 mm. and that on the change of ultrasonic attenuation when a metal becomes superconductive deserve mention. The first reports were also submitted on a practical application of superconductivity which may lead to far-reaching developments. This is the use of superconductive switching elements in computers and in memory devices.

A certain amount of new information on liquid helium and especially on the behaviour of the light isotope is noted. Interesting advances have been made in the cryogenic use of the latter and it was regretted that Soviet scientists, who have done much work in this field, had not been able to attend.

Dr. Bäckström's book is a translation into German of the Swedish original. It deals with a great many aspects of refrigeration technique, mainly in the range of interest for food storage. It is not a text-book but rather an information manual which will be of interest to those specializing in this field.

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