liquid extraction and so on. The main drawback to this section is that there are scarcely any examples and few good illustrations of the use of the thermodynamic functions. It is not sufficient to give thermodynamic functions, and relations between them, these concepts only become alive when it is clearly shown that they form useful tools. The Gibbs function and the Van Laar equations must be demonstrated to the practical engineer as of real use, and effective illustrations are vital.

The second section on the transport of fluids has more examples and clearly shows the great interest in boundary layer study, in the ideas of turbulence, and the flow and behaviour of compressible fluids. Here again practice is somehow missing, and the examples are rather academic.

This is a valuable book in that it provides the current ideas of the thermodynamic approach to the study of fluids; this has previously not been so clearly available in British texts. The volume suffers from the fact that one is not given the dynamic illustrations of the use of these tools, one does not sense the engineer at work at his practice, but rather that he is being presented with an academic text. How does one really design a large pipe-line, how does one measure the flow of high-pressure and high-temperature fluids, how do engineers really solve their problems? Some actual examples, including failures that had to be corrected, would have been of great value to the practically minded reader.

J. M. COULSON

DRUGS AND THE BRAIN

Psychotropic Drugs

Proceedings of the International Symposium on Psychotropic Drugs, Milan, May 9-11, 1957. Edited by S. Garattini and V. Ghetti. Pp. xiv+606. (Amsterdam: Elsevier Publishing Company; London: Cleaver-Hume Press, Ltd., 1957.) 95s.

THIS expensive and extremely well-produced volume constitutes the proceedings of the International Symposium on Psychotropic Drugs held in Milan during May 9-11, 1957. It was printed in the Netherlands, and editors and printers deserve much praise for the speed with which the work was done and the excellence of the result; it cannot have been an easy task to assemble the final versions of the papers and to set the text in four different languages.

There are approximately 100 reports, roughly half of them quite short, the others of variable length. These reports are grouped into five sections, dealing with the biochemistry of normal and altered cerebral function, the behavioural effects of psychotropic drugs on animals, the electrophysiological basis of normal and altered cerebral function, the pharmacological aspects of centrally acting substances, and lastly clinical experiences. The drugs most widely used in the studies reported are the so-called tranquilizing drugs, in particular reserpine and chlorpromazine; hallucinogens are also well represented, and there are, of course, studies of the more traditional stimulant and depressant drugs as well.

The reader of this book will be impressed by a number of things. In the first place, there is a tremendous range in the simple technical competence of the research workers represented. This expresses itself in many different ways. To take but one example, we find that the psychologists tend to report means

and variances for their experiments; the biochemists tend to state means only; the clinicians tend to rest content with a simple subjective estimate of trends. As the numbers used are normally quite small, and the variability in response to drugs is known to be tremendous, it is clear that for a number of reports no conclusions can be drawn from the figures given, because vital information is withheld and no tests of significance carried out. A second impression relates to the relative isolation of the various groups of workers. Any adequate theory of drug action must surely reconcile and synthesize the findings of biochemists, psychologists, pharmacologists, physiologists and other workers, yet each group tends to remain isolated from the others and ignorant of what is being done elsewhere. Perhaps the series of congresses, of which this was the first, may have the highly desirable effect of bringing these various workers closer together.

Some of the contributions are of such high quality or of such obvious interest that they stand out from the rest. Among them is a paper by A. Hoffer on the relation to mental disease of adrenochrome and adrenolutin; this investigation owes its interest to the similarity in the structure of these two oxidized derivatives of epinephrine to some active indolic hallucinogens. Another is a paper by N. E. Miller on objective techniques for studying motivational effects of drugs on animals; this combines in a remarkable manner a survey of available techniques with an exposition of the writer's own work; it is a gold-mine of information, as well as an admirable presentation of recent methodological advances in this field. B. Delisle Burns, in his paper on the electrophysiological basis of normal and psychotic function, discusses the bearing of his recent work on the physiology of learning, suggesting that traditional hypotheses of facilitation are erroneous. J. Olds and others contribute a chapter on the effects of tranquilizers on self-stimulation of the brain in which the remarkable discoveries of Olds on the rewarding properties of electrical stimulation of certain brain areas are used to discover the effects of a variety of drugs. His main discovery is the highly specific action of most drugs, depending on the precise placement of the electrodes. These are only some of the noteworthy contributions to this volume; others could have been mentioned as well. While having the inevitable defects of any symposium, this collection of papers has succeeded surprisingly well in presenting the reader with a worthwhile prospectus of current work.

H. J. EYSENCK

MICROBES AND THE BIOCHEMIST

Annual Review of Microbiology

Vol. 11. Edited by Charles E. Clifton, in association with Sidney Raffel and Roger Y. Stanier. Pp. viii+536. (Palo Alto, Calif.: Annual Reviews, Inc., 1957.) 7 dollars.

THE time is long past when biochemistry of microorganisms could be covered adequately by a chapter in the "Annual Review of Biochemistry". To-day we have the converse situation, and the microbiology volume has an established place in the biochemist's library. Reviews such as Gale and McQuillen's on nitrogen metabolism might even prove heavy reading for many biochemists; though anyone wishing to understand some of the most exciting