Nuclear Power Systems

An Introductory Text. By C. D. Gregg King. Pp. xiv + 480. (New York: The Macmillan Company; London: Collier-Macmillan Limited, 1964.) 100*s*.

WHAT real purpose is served by adding yet another to the already considerable number of introductory texts in nuclear engineering is difficult to see. There is little new to say and no really different way of saying it, but still the books come.

Nuclear Power Systems adds nothing at all to the existing texts. It covers the, by now, conventional ground of nuclear and reactor physics, reactor control, shielding, materials, reactor types, thermodynamics, steam turbines, fluid mechanics, heat transfer and nuclear power plant design. It is even more conventional than most, in that much of the material in the latter half of the book is standard revision of the topics and is scarcely related to nuclear reactors at all.

There is a certain lack of exactness in some of the sections, which must inevitably lead to wrong impressions being given to someone using the book as an introduction to the subject. For example, in the first mention of the multiplication factor, the critical condition is given that it shall be equal to unity, without any qualification that this either relates to its effective value or to an infinite system. There is a statement that "all neutrons in the moderator entering the fuel lump having the resonance energies are absorbed in the outer portions of the fuel lump". Then, as another example, what is now almost a standard schoolboy howler is repeated. This is the mistaken belief that the reason that Xe-135 builds up on shut-down of a reactor is because the I-135 half-life is less than the Xe-135 half-life. Despite the fact that the book is well produced it cannot really be recommended, bearing in mind the number of excellent texts there are already covering very similar ground. J. F. HILL

Die Rohstoffe des Pflanzenreichs

Von Julius von Wiesner. Fünfte Auflage herausgegeben von Constantin von Regel. Lieferung 3: Organic Acids. By G. C. Whiting. Pp. 194. (Weinheim: Verlag von J. Cramer, 1964.) n.p.

THIS paper-backed volume reviews the properties, distribution and, in some cases, the industrial importance of the organic acids occurring in plants. Aliphatic and alicyclic acids are accorded the most space (some 54 and 20 pages, respectively) while aromatic, heterocyclic and amino-acids take up the remainder (6, 8 and 10 pages, respectively). The literature list includes 1,157 references, but few publications subsequent to 1961 are given. Plant names and the organic acids are separately and fairly fully indexed.

The book should be of considerable value as an information source, but the coverage is rather uneven and is clearly not comprehensive; unfortunately, no indication is given of the intended scope of this monograph. The approach is classical in its factual emphasis and there is little mention of the overall biochemical significance of the acids and their distribution. G. EGLINTON

The Problem of the Minimum of a Quadratic Functional

By S. G. Mikhlin. Translated by A. Feinstein. (Holden-Day Series in Mathematical Physics.) Pp. ix + 155. (San Francisco, London and Amsterdam: Holden-Day Inc., 1965.) 8·95 dollars.

THE process of solving a linear partial differential equation with given boundary conditions by minimizing a suitable integral has a history which goes back at least as far as Riemann's method for solving Dirichlet's problem for Laplace's equation; Euler's variational condition leads back from the integral to the differential equation. More generally, there is a connexion between the linear differential equation and the minimal condition for a quadratic functional; and quadratic functionals at once suggest the use of Hilbert space and the cognate theory of operators. Moreover, it is reasonable to hope that this concept may help in dealing with a delicate existence problem: Does the minimizing function possess derivatives of an order sufficiently high to ensure that the terms in the differential equation have a meaning and that the equation is satisfied?

A number of Prof. Mikhlin's books have already been translated into English, and this is a welcome addition. In the first chapter he sets the variational scene; the second chapter contains some preliminary work, chiefly about operators. The meat of the book is in Chapters 3 and 4, where the method is first applied to equations of elliptic type and then shown in action in solving the basic partial differential equations of elastic equilibrium under prescribed conditions on the boundary displacements or stresses.

The reader needs to know something about the theory of operators in Hilbert space, and in addition might well be helped by making a parallel study of Sobolev's monograph on the applications of functional analysis in mathematical physics, recently translated for the American Mathematical Society. The clarifying and systematizing power of functional analysis makes it one of the most efficient tools of the present-day mathematician, in both pure and applied mathematics. T. A. A. BROADBENT

Annual Review of Microbiology

Vol. 18. Edited by Charles E. Clifton, in association with Sidney Raffel and Mortimer P. Starr. Pp. vii + 394. (Palo Alto, Calif.: Annual Reviews, Inc., 1964.) 8.50 dollars.

THIS volume continues the annual series of reviews which by now is so well known among research workers and university teachers as to require no introduction. The reviews, as is usually the case with volumes in this series, are written in an extremely condensed manner, which means that, although most of the relevant literature is adequately discussed, the reviews make rather daunting reading.

The precedent of the earlier issues is continued by covering a wide range of microbiological topics of interest to workers in both the pure and applied aspects of the subject. In all, fourteen topics are reviewed, three mainly of virological interest, two genetic, five biochemical, one immunological and two taxonomic.

It is virtually impossible for one person to give a critical review of a collection of articles of this kind, quite apart from the question of whether it is desirable to review a review. Enquiry among specialists in the various topics covered by the volume suggests that each one is valuable and covers the ground well. The articles on the "Genetic Aspects of Metabolic Control" by W. K. Maas and E. McFall and on "Biochemical Mechanisms of Drug Resistance" by H. S. Moyed are of particular interest to me. The review on metabolic control is valuable in that it attempts to define the terms 'feed-back inhibition', 'repression' and 'induction', and then to present the experiments which throw light on the biochemical nature of these processes. In this field, the work of the group at the Institut Pasteur on the synthesis of β-galactosidase in *E. coli* has, in the past, often been discussed in reviews of this kind at the expense of work on other inducible and repressible enzyme systems in bacteria. This review goes a long way to correct this imbalance.

In the review on the "Biochemical Mechanisms of Drug Resistance", the author gives a full account of the methods whereby micro-organisms may become resistant to growth inhibitors. The review fails to consider, however, the frequency with which these various types of resistant strain arise. This is unfortunate, since information is highly important when considering the properties of successful antibacterial agents.

M. H. RICHMOND