

## TECHNOLOGICAL INITIATIVE

### Pilot Plants, Models, and Scale-up Methods in Chemical Engineering

By Dr. Robert Edgeworth Johnstone and Prof. Meredith W. Thring. (McGraw-Hill Series in Chemical Engineering.) Pp. xi+307. (London: McGraw-Hill Publishing Company, Ltd., 1957.) 71s. 6d.

ONE of the legacies of the war years has been a noticeable decline in technological initiative in many of Britain's basic industries, with a consequent growing dependence upon foreign sources for new plant, processes and products. While this trend may in part be attributed to the dislocation of industry resulting from the War, one cannot avoid a suspicion that, with full order-books, there is still a disinclination on the part of manufacturers to embark upon the onerous and often costly development work associated with innovations to existing practice. It is argued that both time and money are saved by allowing someone else to do the development work and thereafter buying the new process on a royalty basis.

From a long-term point of view such a policy has little to recommend it; not only is purchased 'know-how' always out of date but, in addition, British technologists are deprived of unique opportunities for acquiring that experience which is only to be obtained by pioneering work in new fields.

In Britain there are many circumstances favourable to the encouragement of initiative in industry. Our scientists are still in the van of fundamental research and discovery, we have a large and varied manufacturing potential and we have an unrivalled body of craftsmen with a long tradition of skill and resource behind them. Nor need we be too apprehensive as to the cost of development work.

Recent advances in chemical engineering science have greatly simplified the task of designing new plant, and the introduction of scientific methods of scaling-up, together with the application of statistical methods for the programming of experiments, have considerably reduced the cost of pilot-plant trials and in some instances have rendered them unnecessary. Furthermore, model theory as applied to process work has enabled the behaviour of full-sized plants to be studied systematically in the laboratory.

The significance of these new methods is perhaps not yet fully appreciated by industry, and it is for this reason that Dr. Edgeworth Johnstone and Prof. M. W. Thring's book is both timely and welcome.

In their own words, the authors have sought "to systematize and present in a usable form such quantitative methods as are available for predicting the performance of large-scale process plant from small-scale experiments". To this end they deal at some length with theoretical aspects of the subject including the principle of similarity, similarity criteria for various types of regime and scale equations. They then proceed to deal in detail with the applications of the theory to a variety of plant including heat exchangers, packed towers, chemical reactors, furnaces and kilns, ball mills and mixers. The treatment is comprehensive, quantitative and in a form which is immediately usable by the designer. A number of well-selected examples are fully worked out and serve to illustrate practical procedure.

A final chapter deals with the general theory and application of analogue models to chemical engineering problems.

Taken as a whole, the book presents a well-balanced picture of the present state of knowledge of the theory and practice of scaling-up. It emphasizes the difficulties associated with mixed regimes in which both chemical and dynamic processes are involved and it gives valuable practical guidance in the design and use of pilot plants and models in the process industries. D. M. NEWITT

## THE STUDY OF BACTERIAL PLANT PATHOGENS

### Plant Diseases due to Bacteria

By Dr. W. J. Dowson. Second edition. Pp. xv+232+30 plates and 21 maps. (Cambridge: At the University Press, 1957.) 32s. 6d. net.

MOST plant pathologists know how to set about identifying the fungi and viruses that cause plant diseases, even if they sometimes get the wrong answer, and many have more than a nodding acquaintance with common bacterial plant diseases, but there are still too few who have learnt how to grow and study bacteria in pure culture or how to assess the significance of different morphological and cultural characters when trying to identify and classify them. This is no doubt partly due to the relative unimportance in Britain of plant diseases caused by bacteria, but there has been little or no instruction in the subject in most universities and there was no book suitable for advanced students. Indeed, such books as did exist until recently were out of date, costly, and not easy to come by.

For those interested Dowson provided the necessary guidance in his book published in 1949, and the fact that a second edition has been called for within ten years is a striking but not surprising tribute to its value, bearing in mind the narrowly specialized nature of the subject. For twenty-five years Dowson has studied bacteria and bacterial plant diseases at Cambridge and has passed his knowledge on to generations of students. He has also produced a classification of plant pathogenic bacteria which is basically sound and likely to endure. His book is a valuable one if only for the fully documented and profusely illustrated descriptions of bacterial plant diseases, which occupy rather more than half the text. Nevertheless, its primary concern is with the bacteria themselves, and in the early chapters on the classification and behaviour of bacteria, on methods of staining and studying them, and on suitable culture media, there is a wealth of information illuminated by long practical experience.

In the second edition, issued under a new name and from a different publisher, the general plan is unchanged, but the text has been revised and enlarged, and a new chapter on the preservation of bacterial cultures added. The decision of the International Committee on Bacterial Nomenclature in 1953 to invalidate the generic name *Bacterium*, without proposing an alternative, added to the difficulties in classifying the Enterobacteriaceae, which includes a number of bacteria pathogenic to plants. As a temporary measure the author has adopted the names *Erwinia* and *Pectobacterium* for the Gram-negative coliform plant pathogens, among them the familiar soft-rot organisms, now put under *P. carotovorum* (Jones) Waldee, and the crown gall bacterium, for which the new combination *Erwinia tumefaciens*