

Research, for example, has disappeared since the main accounts of the National Physical Laboratory and of Co-operative Research in the British Iron and Steel Industry were written. The Ministry of Science has been transformed. The account of the activities of CERN extends only to 1961. But these are minor matters indeed against the background of the scope and penetration, the quality and the potential usefulness of this book for all those concerned with the organization, the administration, and the structure of establishments devoted to research and development.

CARYL P. HASKINS

TRAINING THE TECHNICIAN

Technicians Today and Tomorrow

By Dr. J. T. Young. Pp. xvii + 222. (London: Sir Isaac Pitman and Sons, Ltd., 1965.) 30s. net.

THE timeliness of Dr. Young's book, which Sir Willis Jackson emphasizes in his foreword, is indicated not only by the establishment of the new training boards under the Industrial Training Act but also by the announcement by the Committee on Manpower Resources for Science and Technology that the triennial survey of manpower will in future cover technical supporting staff, though we may well question that Committee's view that we must await that survey before ascertaining how far the present position for educating and training is sufficient. The Carr Report and other studies of industrial training for skill have tended to concentrate on the apprenticeship system and its shortcomings, but in *Technicians Today and Tomorrow* Dr. Young does something to redress the balance. The book should do much to promote a clear understanding of the function of the technician and a wider recognition of the growing importance of the wide range of such workers. In doing so, it could also assist to alleviate another anxiety of the Committee on Manpower Resources, for such a public understanding is a powerful factor in establishing the greater esteem which could help to attract more young men and women into such careers.

Dr. Young, moreover, is fundamentally pragmatic and his clear analysis of the needs of the technician in education and training indicates the lines on which immediate steps could be taken to fill a serious gap in our provision for technical education. He provides an admirable guide, in fact, to the whole situation, for a chapter on defining the technician, followed by one giving a clear but concise historical review of the developing relations in Britain between education and industrial training, is succeeded by two in which the 1961 White Paper on "Technical Education" and the White Paper of 1962 on "Industrial Training and the Subsequent Industrial Training Act" are summarized and appraised. On this basis, he rests his detailed proposals for meeting the needs of technicians which occupy the next three chapters, and finally he considers the future position of technicians and their needs.

Dr. Young's approach is thus balanced and practical and his comments are no less sane and constructive. He faces the difficulty of defining a technician, recognizing that both the functional (or occupational) approach and the educational approach have their disadvantages. For the purposes of his book, he defines a technician as one "expert in applying specific proven techniques associated with science and technology; in particular, one who has undergone a systematic course of instruction related to those techniques". He attributes the shortage of technicians in Britain, in part at least, to the general academic nature of secondary school curricula and to prevailing attitudes towards technical education as a whole—a point which should not escape the notice of Prof. Dainton's present enquiry or of the Schools Council. He is forthright on the inadequacy of part-time education and its failure to produce results which justify its existence,

and much more than the present nominal support for day release is, in his view, required before sandwich courses become extensively established in this field.

Some trenchant criticism of the British apprenticeship system is less relevant to his main theme, in which insistence on the provision of adequate finance and on the anachronism of the division between education and training recurs repeatedly. Better opportunities in technical education, whether for technicians or for others, cannot be provided on the cheap. Likewise, Dr. Young insists on the necessity of willing co-operation from both sides of industry, and neither the employers nor the trades unions escape criticism. Speedy implementation of the Industrial Training Act, coupled with a massive campaign to illumine its objectives and the urgency of the situation it has been designed to rectify, are imperative. Furthermore, when it comes to practical details, Dr. Young demonstrates that the requirements of technicians are both specific and widely different, so that they must be met by programmes adapted to those needs as well as to the nature of the educational system and the arrangements for industrial training. Here he is challenging as well as constructive, and on the transition from school to work he writes with insight and sensitivity to the needs of the adolescent. Throughout, his book is admirably designed to restore the perspective of the training of technicians which was to some extent distorted by the Robbins Report and to establish the technicians in their rightful place in industry and society, with all that that implies in terms of educational opportunity, status and financial resource. Sir Willis Jackson rightly directs attention to this matter of public esteem, and Dr. Young's book is well designed to apply some corrective to any overshadowing of the technical institutions by institutions at university level. It is a point that those over-anxious to promote equality of opportunity commonly overlook, but unless the difference is appreciated and due allowance is made for it the nation will not reap the full advantage of the services of an increasing number of scientists and technologists because they lack the support of a sufficient number of technicians. Not the least merit of the book is an admirable bibliography, while notes are appended on the emergence of the industrial technician, on the place of the National Certificate, and on the financing of technical education.

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COMPUTERS IN PROCESS CONTROL

Digital Computer Applications to Process Control

Edited by William E. Miller. (Proceedings of the First International Conference held September 21–23, 1964, Stockholm, Sweden, sponsored by the International Federation for Automatic Control and the International Federation for Information Processing.) Pp. xxi + 593. (Pittsburgh, Pa.: Instrument Society of America, 1965. Distributed by Plenum Press, New York.) 17.50 dollars.

THE first application of a digital computer to the on-line control of an industrial process was made in the United States in 1958. It aroused very great interest and was followed by a wave of further applications and of activity by computer manufacturers. Generally speaking, the users were secretive about the results obtained and, at the end of 1964, it was possible to hold either an optimistic or a pessimistic view of benefits and future prospects of this development.

In September 1964 a conference was held under the joint sponsorship of the International Federation for Information Processing and the International Federation for Automatic Control to discuss the experience with these installations. A considerable body of information was released by the users, much of it for the first time, and this record of the conference, therefore, stands as an important landmark. From the published papers a better and more