

attending the large-scale production of edible fungi and urge greater consideration of the use of the higher fungi to convert carbohydrate-containing wastes into foods rich in fat and protein. In the three articles concerned with the use of micro-organisms as synthetic tools D. Perlmann gives a comprehensive and fully documented account of the biosynthesis of vitamin B₁₂ and its analogues, A. L. Demain contributes a critical discussion of the biosynthetic pathway leading to penicillin, with particular reference to the synthesis of the β -lactam-thiazolidine ring nucleus, and S. Kinoshita introduces the new and rapidly developing field, largely pioneered in Japan, of amino-acid production by fermentation processes.

Articles dealing with the control of micro-organisms include a discussion of the antimicrobial activity of phenols by E. O. Bennett, a brief review of the use and mode of action of antibiotics in the control of plant diseases by D. Pramer, and a general outline of some of the problems associated with the application of radiation preservation to food and pharmaceutical products by W. D. Bellamy. A. W. Phillips and J. E. Smith trace the development of the methods used for the rearing of germ-free animals, list their characteristics and consider some of the many uses to which such animals have been, or can be, put. In the remaining chapter, S. R. Dutky contributes a valuable discussion of the application of specific micro-organisms in the control of insects, a procedure that eliminates many of the hazards to plants and animals presented by the use of insecticides.

The eleven chapters in this book deal with a representative selection of topics, and the diversity of the subjects is no doubt responsible for some of the differences apparent in the level of treatment in individual articles. The book is well presented, adequately indexed and should surely be welcomed as the first of a useful series.

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TRAINING APPRENTICES

Apprenticeship

An Enquiry into Its Adequacy under Modern Conditions. By Kate Liepmann. (International Library of Sociology and Social Reconstruction.) Pp. x + 204. (London: Routledge and Kegan Paul; New York: The Humanities Press, Ltd., 1960.) 23s. net.

FOR two years a small group of investigators from the University of Bristol made an inquiry into systems of apprenticeships in firms in the Bristol area and in an agricultural area in North Somerset. Information was obtained from both the managerial and trade union sides of industry, as well as from technical colleges and relevant Government departments. Dr. Kate Liepmann was directly responsible for the study and here sets down details of the way the inquiry was made and a record of the findings.

The industries investigated—engineering, printing and building—were selected because of their local importance and because of significant differences in apprenticeship conditions, degrees of mechanization, 'de-skilling' and attractiveness to boys. An industry without apprenticeship, boot and shoe manufacture, was included for comparison. Most of the firms approached readily provided the information requested by the investigators. One large printing firm

refused any information after a preliminary interview. Another big printing firm and the area's biggest engineering firm allowed the research workers access to certain senior executives but to no other employees. Information from these was obtained in other ways, but the omissions detracted from the value of the survey.

There is no reason to reject Dr. Liepmann's belief that the observations made during her Bristol survey would not be applicable to Britain as a whole. Its value is that this is an investigation carried out by professional research workers with no axe to grind, holding allegiance neither to employers, trade unions, technical college principals, nor Government agencies, and concerned only to record their findings quite impartially.

From the nation's point of view the scene described is depressing to contemplate. Instead of a means to build up the quality of human beings and to increase the country's resources of skilled craftsmen, the apprenticeship system is used by both sides of industry to further their respective sectional interest. "All the modifications made in adjustment to technical and other developments have been made in such a manner as to preserve the power of employers and trade unions to bend apprenticeship to their own ends".

The criteria for judging the workings of the apprenticeship system should be examined to see whether it supplies sufficient workers with the requisite skills, is efficient and economical to operate, and its effect on productivity. Dr. Liepmann's investigations show that industry is not training nearly enough apprentices with a wide degree of skill which will enable them to adapt themselves to changing technological needs. Nearly every firm looks after its particular interest and many of them rely on 'poaching' craftsmen from other firms to supply their needs. She rightly concludes that it is not in the best interests of the community that the number of apprentices should be determined by industry itself.

As a contribution to productivity the apprenticeship system leaves much to be desired. Although, as part of their training, apprentices make some contribution to productivity, the apprenticeship scheme leads to a widespread system of restrictive practices; rigid demarcation between trades impedes good manpower utilization, thereby lowering efficiency and increasing the cost of production: and, unfortunately, the demarcation which was formerly exclusive to apprenticed craftsmen is now being extended to a much wider class of workers, with further damage to productivity.

Despite the hope that some developments in the trade union movement may lead to the emergence of an attitude more in line with modern conditions, Dr. Liepmann concludes her inquiry with the firm belief that the State should take the prime responsibility for training for industry, both in its quantitative and qualitative aspects.

This is the second of two recent studies of the workings of the apprenticeship system by academic workers. Their observations are almost identical and should cause wide-spread concern. If the Ministers of Labour and of Education could be persuaded to read this or Lady Williams's book, they would see that the exhortations to industry of their predecessors have been so much wasted breath. Without a change in policy for the training of young workers, within twenty years Britain may face grave shortages of skilled and adaptable craftsmen.