

having the same bearing on the practice of management as the natural sciences have on the practice of medicine, and agrees that research in industrial behaviour is an indispensable condition of the growth of management studies. He thinks Dr. Allen is too pessimistic as to the amount and extent of fundamental research in this field. He does not believe that the universities are pushing ahead too quickly and too uncritically. On the contrary, he considers that the new developments give an impression of caution and of conscious experiment: published plans seem prudently tentative, taking different starting points, and ready to try new combinations of disciplines and unfamiliar disciplines.

By and large, the picture of the present position which Mr. D. Freeth, Parliamentary Secretary for Science, gave in the debate in the House of Commons on August 4 on the need for a social sciences research council seems to support Mr. Smith's view rather than that of Dr. Allen. Moreover, Mr. Smith suggests that much of the impetus towards education for management derives from industry's wish to broaden the intellectual outlook of its managers, to take an outside view of the industrial system, particularly in its social and international context. He challenges Dr. Allen's assertion that the universities are simply seeking to meet the desire of the managers to know how to manipulate a labour force under full employment.

The demand for higher education bearing on management is a direct consequence of the growth of large organizations in industry and commerce, and in public administration. The complexities of these organizations pose problems of a high intellectual order: how to control and co-ordinate individuals responsible for diverse activities, how to direct and re-shape these activities in response to technical, economic and social change, how to deal with an increasingly literate and independent labour force. The administration and organization of scientific research and the problems of Government and science are a particular example where there is need for constructive and creative thought and experiment. Mr. Smith points out that if the universities do not take up this challenge, industry must almost certainly attempt to do so alone, and there will then be little chance either that management studies will be liberated from the framework of discussion fixed by industry itself or that the whole subject will be studied with the freedom and objectivity it deserves.

Accordingly, he takes the view that the universities should move much faster; that they are already in a position to develop management studies much more vigorously if they wish; and that there is a core of

subjects now generally agreed to be relevant, and a growing body of research findings to provide, *inter alia*, material for a critical understanding of the industrial system in general, and the management function in particular. He sees nothing in the programmes of existing courses in Britain or in the attitude of those teaching them, which suggests a departure from the high standards claimed for the universities, nor does he believe that real weight is now attached to social harmony rather than conflict, or that social scientists are eager to help managers to manipulate behaviour.

Dr. Allen's objection that management education is directed towards producing an *élite* is treated as more substantial. Many of those receiving it will come to occupy positions of considerable authority and exercise power in large measure over their fellow human beings. The view they take of their responsibilities is a matter of the utmost concern to society, and the role of the universities in shaping that view is highly important. Mr. Smith is undoubtedly right in suggesting that this is no reason for suggesting that the universities should move still more cautiously in this field: rather it is a reason for them coming to terms with management education, and quickly. The real question is not whether there will be a management *élite* but what sort of *élite* it will be. If, as seems certain, this *élite* is increasingly educated in the universities and in the colleges of technology, it follows that those institutions must pay more attention, through research and teaching in the social sciences, and through education for management at the postgraduate-level, to the world in which this increasing proportion of their graduates will spend their working lives. A recent statement issued by the Manchester College of Science and Technology, in connexion with Mr. R. B. Dew's appointment as first visiting professor in industrial administration from October 1, is worth noting here. The statement indicates that the College hopes to expand the work of the Department under Prof. R. W. Revans and affirms a strong belief in the value of management studies. The College believes that a university can make three distinct contributions. First, by its own research, the study of the problems of management and analysis of the consultant's case-book to extract basic teachable ideas; secondly, by communicating these ideas to students so as to encourage them to seek the underlying structure within which the problems of management may be more fully identified and progress more readily controlled; and thirdly, to study the actual processes of management. That statement is both in accord with the general sense of the debate in Parliament on August 4 and with Mr. Smith's argument rather than that of Dr. Allen.

## INDUSTRIAL RESEARCH IN BRITAIN

**R**ESearch FOR INDUSTRY 1960, follows the same pattern as the past three reports on the industrial research associations in the Government scheme\*. The report of the Industrial Grants Committee is followed by a review of the achievements

\* Department of Scientific and Industrial Research. Research for Industry 1960: A Report on Work done by Industrial Research Associations in the Government Scheme. Pp. iv + 148 + 12 plates. (London: H.M.S.O., 1961.) 8s. net.

of the 10 research associations, the terms of grant of which came up for review during the year, and two chapters in which Dr. A. H. Sully reviews the contributions of the research associations to health and safety, and Dr. T. Moran the position of food research in the United Kingdom, including the role of the research associations. The remainder of the report (roughly two-thirds) comprises a list of the associa-

tions, their officers and publications during the year with a brief indication of the scope of their work.

The total income of the associations has now risen to £7.9 million and the Department's grant to £1.8 million, while the number of organizations is 52. The Research Council has accepted the Industrial Grants Committee's recommendation regarding admission of non-Commonwealth firms to membership: such firms may now be admitted, subject to certain safeguards, but no grant will be payable on income received from such firms. The Committee has also been concerned with the rising cost of research and the minimum level of income needed if the level of research is to be maintained in real terms, particularly in associations serving small industries. The Cutlery Research Council, which first received a grant-in-aid in 1951, is instanced as serving one such industry which has faced this problem and placed the Council on a sounder financial basis by arranging for a statutory levy. The two new associations coming into the scheme during the year are the British Industrial Biological Research Association, incorporated in October 1960, chiefly to examine the effects on health of chemicals likely to be ingested with food, and the British Brush Manufacturers' Research Association, formed in 1946. Stress is laid on the co-ordination of research effort between the associations, and following the formation of the Cotton, Silk and Man-made Fibres Research Association, the Research Association of British Rubber Manufacturers was re-organized to serve the plastics industry also, as from January 1, 1961, under the title "Rubber and Plastics Research Association of Great Britain". Stress is also laid on the application of the results of research, and it appears that the scheme under which the Research Council made available special grants to accelerate applications appears to have had some effect.

Reviewing the work of the Cutlery Research Council, the report notes that the adoption of a higher carbon stainless steel which keeps an edge far longer than traditional non-stainless steel saves at least 75 per cent of the time a butcher normally spends in whetting his knives. A special investigation undertaken to determine the acceptance in the industry of new ideas propagated by the Council revealed the danger of distortion through inaccurate verbal transmission of information, and indicated generally the conditions under which innovations might become acceptable to manufacturers. The British Glass Industry Research Association's work on instruments for controlling quality has led to the production of an improved strain viewer, to more efficient means of calibrating the subsidiary standards known as strain disks, and to the development of an automatic apparatus which will plot a thermal-expansion curve, and other work has indicated that great increases in the strength of glass articles can be produced under laboratory conditions. A new and permanent fire-proofing process for jute cloth, which gives a high degree of protection against fire and afterglow and is unaffected by prolonged immersion in water, has been developed by the British Jute Trade Research Association, which has also found that by careful choice of cloth and by applying a special chemical finish, jute-resin laminates of a wide range of types can be fabricated from jute fabric impregnated with polyester or epoxy resins.

Work by the Linen Industry Research Association has led to the virtually complete change-over in the industry from bleaching linen yarns in the hank to

bleaching in the more economical package form, and very encouraging results have been obtained by blending flax with a proportion of an inherently non-inflammable fibre to give a blend which is itself non-inflammable. A simple method of severe cold-rolling of highly stressed areas of heavily loaded components of motor-cars, such as the fillets of stub-axles and crank-shafts has been shown by the Motor Industry Research Association to increase the fatigue strength by more than 100 per cent, while the Printing, Packaging and Allied Trades Research Association has developed an instrument which measures the resistance to abrasion of two printing surfaces rubbed against each other. Work on cutting and creasing cartons has enabled an important cause of spoilage to be eliminated almost completely, and also increased the speed at which boxes will run on automatic filling machinery, while information acquired in a study of journey hazards in road, rail or mixed goods transport and of the choice of suitable cushioning material is being utilized in the design of packages. The British Scientific Instrument Research Association, besides an ultra-sonic flow-meter, which should be on the market in 1961, has developed a position-sensitive photocell, with 3 or 5 electrodes, which easily detects a movement of 0.01 millionth of an inch, while, besides pioneering work in industrial roofing, the Research and Development Committee of the Timber Development Association designed a prefabricated portable plywood building for the Himalayan Scientific and Mountaineering Expedition, led by Sir Edmund Hilary in 1960, and has used the ultra-sonic pulse technique to trace the extent of decay and insect attack in structural timbers in old buildings. The improved dryers resulting from the Wool Industries Research Association's work on the rate of diffusion of water into fibres are used now by the entire industry, and productivity continues to be improved by the Raper autoleveller and the Raper drawing system. In the study of the structure of keratin the emphasis is now placed on the chemistry of the more reactive amino-acids such as cystine and tryptophan, and fundamental research on the diffusion of dyestuff anions into wool fibre has been linked with the discoloration and variable dyeing properties of wool after storage.

In the debate on science in the House of Commons on July 10, Mr. Aubrey Jones and some other speakers were highly critical of the work of the research associations in general, criticizing the scale of their effort, which was regarded as too small to be effective, and the concentration on fundamental research. This view was not generally accepted in the debate, the preoccupation with fundamental research being flatly denied by Mr. Denzil Freeth, while Mr. J. H. Osborn and others wished to see their activities extended, the use of operational research being specially mentioned. *Research for Industry 1960* is not sufficiently detailed to go far in resolving any doubts expressed in the debate, but it does display something of the range of problems in which co-operative attack promises effective results, and the extent to which the Council for Scientific and Industrial Research is concerned both to see that research effort between different industries, as well as in particular industries, is effectively co-ordinated, and to encourage as much as possible the early utilization of research results in industry. On the educational functions of the associations and the question of research-mindedness in industry, by and large, the report is again silent.