CORRESPONDENCE

What to do About Manpower

SIR,—The comments of your six university contributors on the aspects of the Committee on Manpower Resources for Science and Technology and of Prof. Swann's Working Group on Manpower Parameters for Scientific Growth are valuable supplements to these reports, and seem to me broadly to endorse the conclusions drawn by the two Committees on the admittedly limited data available to them. I hope that similar contributors are being sought from representatives of industry.

The only comment which I feel calls for immediate response is that by Dr. Christopherson. I accept that the main report might desirably have spelled out some points more deliberately and strongly, and it would have done this had the Committee not decided that they were better left for fuller attention in the Swann report. Even so, it can scarcely be said to depict the present position as satisfactory when it remarks in paragraph 33, and shows in Table VI, that the forecast demand of employers up to 1968 amounts to a 23.9 increase over the active stock of 1965, whereas the growth of this stock from new supply is not expected to exceed 14.6 per cent; and that whereas the employment of scientists, technologists and engineers in schools rose over 1962–65 by only 5 per cent (within an overall growth of total active stock of 14.6 per cent), paragraph 23, the demand of the schools by 1968 (Table V) calls for an increase of 21 per cent over the 1965 employment figure.

It should have been mentioned that this teaching requirement was not derived from direct enquiry of the schools, but from data provided by the Council on the Supply and Training of Teachers. The Committee is extremely concerned about the school situation for the very reasons given by Dr. Christopherson, and the matter, in respect both of science teachers and of the factors affecting the choice of subjects of study in the Sixth Forms and at the Universities, is under urgent consideration by the Dainton Committee.

Dr. Christopherson concluded with the sentence, "There is a great risk that, if the argument is used that people must be forced out of the universities into industry by reducing university grants, the sole effect may be to increase proportionally the stream of migration to the United States". I do not think that either of the Committees suggests such a reduction—what they do suggest is the consideration of means by which these grants can be used to assist the achievement of a closer partnership between the universities and industry, and a larger flow of the best graduates into this sphere of employment. Moreover, they have tried to stress the point that a crucial factor in this endeavour will be the ability of industry to state more clearly the help it would like to receive from the universities, and to establish procedures for the induction, adaptation and utilization of graduate scientists, technologists and engineers which will be seen by the best of them to afford and to ensure attractive, stimulating and rewarding careers. The recent report of the Bosworth Committee made an important contribution in these directions.

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The Numbers Game

SIR,—One of the serious questions occupying the Council for Scientific Policy is the distribution of funds for Government support of scientific research and development among the various disciplines. There may not be a "best" answer to this question and a certain amount of personal

opinion may have to enter into the decision, but in the meantime the usefulness of the amount which is spent on physics and related applied subjects could be improved without unnecessarily altering the total proportion or sum spent in their support.

It is essential to support efforts to retain the British position in original contributions to fundamental scientific ideas and developments and also to make sure that the application of physics and related applied sciences is guided efficiently to improve our industrial efficiency. Moreover, we have to ensure that our defence technology is adequate to maintain our military commitments.

In broad outline we can divide our effort into three categories: (1) the pursuit of original and fundamental study; (2) improvement of the use of fundamental science and development into industrial practice and techniques; (3) research in the application of discoveries and developments in defence technology.

This division is broadly paralleled by the usual arrangement for the organization of research and development, as follows: (1) the pursuit of fundamental science is mainly furthered in the universities; (2) the application of scientific principles to industrial improvements is mainly the role of research associations and industrial establishments; (3) the maintenance of the country's technical position in defence is the role of the Government's defence establishments.

The organization and financing of research and development should conform as far as possible to this natural division. Attempts to rearrange the role of the existing organization and of existing establishments to correspond more nearly to our need are necessarily wasteful. We know that considerable resources are deployed in a number of establishments to further the course of pure fundamental science. At the same time, the universities, both in "big" physics and in "little" physics and applied science, are short of both staff and funds. This shortage could be alleviated if some of the financial and manpower resources at present devoted to Government establishments (such as those of the Ministry of Defence and some of those of the Ministry of Technology) were transferred to the universities.

Similarly, research in physics and technology to improve industrial processes and products might be much better utilized by increasing the financial support given to laboratories attached to the larger and more viable industrial enterprises. The present short term policy of encouraging defence establishments to take part in civil research should be discouraged because the development of industrial techniques outside industrial establishments is inefficient. For one thing, these research establishments are unconnected with industrial production, and hence lack the necessary practical experience and equipment. Then intolerable and costly loss in lead-time results when processes or ideas have to be transferred from a distant research laboratory to the actual development and production stage.

An understanding of the latest fundamental principles and results is obviously required in the defence field. This must therefore not be denied high-quality scientists. However, this usually involves knowledge necessary to decide about applications of existing principles and need not involve large programmes designed towards fundamental research which are normally the province of university departments. The present size and cost of defence and Government establishments might be critically examined and adjusted to meet their true functions.

A gradual re-orientation of scientific organization in Britain in the sense indicated in this brief sketch would considerably alleviate the difficulties at present experienced by universities and would improve the technical strength of our industries.

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