

### Expenditure by Colleges of Advanced Technology in Britain

In a written answer in the House of Commons on May 21, the Minister of Education, Sir David Eccles, estimated the total amount of tuition and residential fees receivable in 1962-63 from students at the colleges of advanced technology to be £660,000. He estimated net recurrent expenditure after allowing for income receivable from fees and sources other than Ministry grant was £7,532,107, besides capital expenditure on new buildings and equipment, towards which a grant from the Ministry was estimated to be about £2 million. For the individual colleges the figures are: Battersea College of Technology, £753,116; Birmingham College of Advanced Technology, £1,274,790; Bradford Institute of Technology, £1,040,060; Bristol College of Science and Technology, £440,205; Brunel College, Acton, £523,205; Chelsea College of Science and Technology, £526,160; Loughborough College of Technology, £501,307; Northampton College of Advanced Technology, London, £735,392; Royal College of Advanced Technology, Salford, £1,147,270; Welsh College of Advanced Technology, Cardiff, £590,702.

### Power from Gas-cooled Reactor Stations

In a written answer in the House of Commons on May 21, the Parliamentary Secretary for Science, Mr. D. Freeth, stated that, assuming a 20-year life, 75 per cent load factor and 6 per cent interest charge, the Atomic Energy Authority estimated that an advanced gas-cooled reactor station of two 500-MW. reactors would produce electricity at rather less than 0.5d. per unit, excluding the recovery of development expenditure. This should fall to 0.45d. per unit and probably lower as the reactor system is developed further and larger reactors are built. If the load factor is taken as 85 per cent, the unit cost would be reduced by about 0.04d. and in addition a station life of 30 years would give a further reduction of 0.03d. These estimates assume that the overheads of industry and the Authority in connexion with these reactors are spread over a series of stations.

### British and American Industrial Research

THE industrial pattern of research and development expenditure is strikingly similar in Britain and America. In both countries, the same group of industries—mainly capital goods and chemicals—account for more than nine-tenths of research expenditure although they employ less than half the total labour force engaged in manufacturing industry. The story is very different, however, when total and relative expenditures are compared. A comparative study of the subject published in the May issue of *Economic Review* shows that after allowing for differences in salaries and other factors, the American effort is more than five times as big as in Britain. In terms of real expenditure per employee, it is about three times as big and as a percentage of output about twice as high. The economy of the United States benefits from more research per worker as from more capital per worker and both contribute to high productivity. There is a marked correlation between research and growth in both countries and this appears to have a common cause. Fundamental discoveries in science and technology dictate the areas in which research and development are likely to be fruitful. Though more expenditure on research will not necessarily yield faster growth in any particular industry, yet it seems certain that any pro-

gramme for faster growth in Britain must include provision for more research expenditure, especially as growth in Britain is inexorably linked with exporting. British industry cannot hope to rival American industry in the absolute volume of industrial research, but *Economic Review* suggests that to some extent British industrialists might be able to compensate for their smaller total resources by greater concentration of effort. Copies of *Economic Review* are obtainable from the National Institute of Economic and Social Research, 2 Dean Trench Street, Smith Square, London, at 12s. 6d. each.

### Management Training Techniques

THE management training techniques used by different organizations vary widely, and, over the past three years, the Management Development Schemes Sub-Committee of the British Institute of Management has been examining the training philosophy and management selection and development policy in a large number of commercial and industrial concerns. At a conference held in London last year under the chairmanship of Mr. C. G. Simpson, director-general of staff, National Coal Board, people individually concerned with four particular training techniques were brought together and asked to explain them. The papers they gave, together with the summing up by Mr. A. R. N. Roberts, are reprinted in *Management Training Techniques* (Pp. 68. London: British Institute of Management, 1962. 9s. 6d.). The four principal papers given were: Dr. W. D. Hargreaves (Richard Thomas and Baldwins Ltd.), "Case Studies and Projects"; Mr. B. Eldon (Shell International Petroleum Co. Ltd.), "The Business Game"; Mr. K. D. O. Cole (Westminster Bank Ltd.), "Role Playing"; and Mr. R. J. Hacon (Joseph Lucas Ltd.), "Group Dynamics".

### Physics Letters

SIMILAR in aim, size and format to *Physical Review Letters*, published by the American Institute of Physics, is the new international letter journal, *Physics Letters*, which is issued bi-monthly commencing with the April number (1, No. 1. Pp. 32. Subscription price per vol., 36 guilders; 62s.; 10 dollars; 40 D.M. Amsterdam: North-Holland Publishing Co.). The editors are G. E. Brown (Copenhagen) and D. Ter Haar (Oxford). Members of the advisory editorial board are drawn from twenty-five countries, including Australia, Canada, France, Great Britain, India, Japan, the United States, the U.S.S.R. and Yugoslavia, but not China. Contributions can be written in English, French or German. The April number contains thirteen letters, two in French and the others in English, which bear dates of communication between January 28 and March 13. They include letters from CERN on a new measurement of the anomalous magnetic moment of the muon; and from CISE (Milan) on an application of silicon detectors to measurements of monoenergetic neutron beams, and on ( $n, \alpha$ ) reactions in heavy elements.

### Photochemistry and Photobiology

A REVIVAL of interest in photobiology in the past few years has resulted in the birth of a new periodical, *Photochemistry and Photobiology*, the first issue of which has recently appeared (1, January-March 1962. Approx. 70 pages. Published quarterly by Pergamon Press, Ltd., Oxford, New York. Annual subscription for personal use 70s., or 10 dollars). The object of this international journal is the publication, in Eng-