

detailed understanding in molecular terms of the interaction between antigens and antibodies. If anything, the experience of the past year, during which there has been some cheerful progress with the X-ray diffraction analysis of tertiary protein structure, suggests that there is an awkward step between the description of a tertiary structure and an understanding of how this influences its function. That said, there is no doubt that strictly practical considerations will spur on attempts to understand in greater detail the mechanism of the immune response.

The year past has seen a further refinement of the genetic code, and, although it is now probably fair to expect that powerful uses will be made of the theoretical structure which has been established in the past few years, only a rash man would predict just what these will be. The experiment in which Professor A. Kornberg was able to replicate in the laboratory an infectious viral DNA is as much a proof of the rudimentary state of DNA chemistry at present as of the more awesome possibilities to which his sponsors at the National Institutes of Health gave some publicity. But if molecular biologists have a hard road ahead, so too do those who now believe that neurophysiology will bring important benefits.

Technologists will not be the only ones to look forward with pleasure to the use of increasingly sophisticated computing machinery. Artificial intelligence may smack too much of science fiction, but the phrase does also accurately suggest the wealth of exciting possibilities now opening up. To begin with, at least, the interest of computing machines which are more than mere automatic abacuses is that they will sharpen the faculties not merely of those who design machines and programmes for them, but of all those with an interest in problems of an essentially analytical character. Who knows, for example, what will be the intellectual consequences of the interest of the machine designers in methods of pattern recognition? By comparison, the development of computing machinery as such may be at present less spectacular, but that is only a relative judgment. The consequences of the continuing trend towards faster and smaller electronic components will also be considerable. By contrast, the excitement which there has often been in recent years about the promise of superconducting materials seems not to have been too vigorously sustained by the experience of the past year, and it will probably be a long time before they are used to any great extent in heavy electrical engineering in the commercial world as distinct from the high-energy physics laboratories. In much the same way, the interest of transport engineers in new devices for moving people from one place to another is likely to be most fruitful in suggesting ways in which transport networks may be constructed. On the experience of the past year, the design of new vehicles as such is likely to be much less productive.

If it is hard to predict particular developments in science or even accurately to assess the significance of events in the recent past, it is, however, possible and even instructive to pick out trends in what seems to

be the temper of science. In this sense, it is important that in the past year there has been a marked slackening of the enthusiasm of governments for the lavish support of scientific research and industrial development. In the United States, for example, it seems as if special historical factors such as the commitment in Vietnam have tightened purse-strings, but the chances are high that, even if it were not for historical circumstances like these, the rapid increase of the science budget in recent decades would by now have slackened. Much the same is true of the way that things have gone in Britain. Although it is at first sight tempting to link the slackening of the growth of the research budget to the continuing economic crisis, there is also a possibility that expenditure would have tailed off even if there had been no external shortage of funds. What seems to be happening is that governments and the scientific institutions responsible for planning strategies of research are more than ever anxious to find criteria for relating the cost of research to the potential benefits. In the long run this is a good development, but it is a great misfortune that the first result has been to reduce the sums being spent on educationally desirable objectives.

## Curriculum Development

THE Nuffield Foundation Science Teaching Projects, which became administratively under Chelsea College University of London in August, have now moved to the temporary quarters of the Centre for Science Education established by the college at Pulton Place, SW6. The director of the centre is to be Professor K. W. Keohane, recently appointed to the chair of science education in the university, who is also co-ordinator of the Nuffield Science Teaching Projects.

A grant of £5,000 per annum for two years has also been received from Charter Consolidation Ltd. for use with the project to enable a study to be made of the ways in which applications of science might be introduced into the Nuffield teaching materials at a level. Dr Mansell has been seconded from Hatfield College of Technology to work with Dr Van Praagh on this work during 1967 when the main emphasis will be on chemistry. Later, similar studies will be undertaken in physics.

## Less to Spend

THERE seems very little danger that the first round of restrictions on the scale of public expenditure in Britain will seriously hamper the prosecution of important projects in research and development. Ever since the devaluation of sterling on November 14, it has been clear that the British Government would have to make considerable economies, and the new Chancellor of the Exchequer announced a few days before Christmas that a total of £71 million would be cut from the expenditure of the nationalized industries in the coming financial year. In practice, however, the collective expenditure of the nationalized industries is so great that £71 million is not an important sum. For many of the industries concerned, the reduction will be most simply obtained by better management—

the General Post Office, for example, hopes to save £11 million in the coming year by running down its stocks of supplies and by postponing the renewal of various kinds of ancillary equipment—motor vehicles, for example. The postponement of various items of capital expenditure is, however, the most favoured expedient—the railways, for example, will put off the start of the electrification of the line between London and Glasgow for a year, while the British Airports Authority will postpone its scheme for a helicopter terminal for a similar period. The Central Electricity Generating Board will probably take the opportunity afforded by the Government's request to reduce expenditure by £17 million to put off the scheme for building a power station at Seaton Carew in north-east England. In the past few months, there has been some dispute about the fuel to be used for this power station—coal, oil or nuclear power. Coal interests have been urging that it would be unseemly to burn anything but coal in a power station built on the edge of a coalfield, and there seemed at one time to be a possibility that the Prime Minister had given an undertaking that this point of view would not be overlooked. It would be understandable if the Central Electricity Generating Board welcomed the opportunity with which it has now been presented.

Research is likely to be more directly affected by the request for a reduction of expenditure of £3 million in the budget of the Atomic Energy Authority than by any of the other measures, larger though they may have been, which were announced by the Chancellor of the Exchequer. It seems to have been decided that the chief reactor projects will not be affected, which is entirely sensible. It is, however, significant that the Atomic Energy Authority now considers that the Dragon reactor is somewhere near the top of this list, along with the advanced gas-cooled reactor and the fast reactor. Evidently there are now high hopes that the technology of the Dragon will help enormously with future development of the advanced gas-cooled reactor. But if most reactor projects are sacrosanct, it probably follows that the authority will have to look to its research establishments for economies. The trouble here is that most of what could be done to economize at Aldermaston would not count in the authority's favour because it is paid for out of the defence vote, while the fusion laboratory at Culham is already faced with the prospect of trimming its sails by 50 per cent over the next five years.

In the circumstances, it is perhaps inevitable that the main burden of the economies ahead will fall on the laboratory at Harwell. It may even be that the Chancellor of the Exchequer is hoping that the dilemma which he has created will persuade the Minister of Technology finally to decide what should be done about Harwell. His colleagues in the British Government—and certainly those outside who reckon to keep a watch on developments like these—will be hoping that the necessarily stop-gap reductions of expenditure now announced will quickly be followed by policy decisions which promise a more permanent reduction of the scale of government expenditure.

## London Intelligences

THE Research and Intelligence Unit of the Greater London Council has now been in action for nearly a

year, the director of the unit, Dr Bernard Benjamin, having been appointed in 1966. Two divisions of the unit—GLC Statistics, and Research, are well established and a third which will serve the London boroughs will begin work early in 1968. The work of the unit, with particular reference to the field of information and intelligence, was described in a paper by R. G. Dunsmore and R. E. Fry at a recent meeting of the Institute of Information Scientists.

The Research and Intelligence Unit does not have complete responsibility for statistics and research in the GLC, for separate departments such as housing took them over between the setting up of the GLC in 1965 and the formation of the unit. The unit's job, among other things, is to co-ordinate such activities. Mr Fry quoted three other aspects of the original terms of reference of the unit that are particularly important, and discussed the actions taken by the unit in these directions. The purposes mentioned were the setting up of an information system, which would contain statistics for forecasting material trends, and the publishing of a regular series of London statistics.

With the wide range of activities of the GLC involving an annual budget of over £400 million, the unit had to decide what statistics would be most useful. The conclusion was reached that information is required to support the needs of strategic planning in the widest sense. The unit would be the only body within the GLC with a comprehensive view of information kept in the different departments, and because of this could advise on gaps, unnecessary overlaps, coding and classification. One working group that has been set up is seeking agreement between certain GLC departments and the London boroughs on standardization of units for statistical data on transport and land use.

As the clerk to the council, in whose department the unit is located, has recently been up-ranked to director-general, to be the GLC's principal adviser on policy, the unit will be in effect his co-ordinator.

## Schools Council and A-Level

THE Schools Council has at last published the document which embodies its proposals for a new pattern for the sixth form curriculum (*Some Further Proposals for Sixth Form Work*, HMSO, 3s. 6d.). This document has already been circulated to universities and was indeed the subject of the discussion among representatives of the universities at a meeting of the Senate House of the University of London on November 17. The proposals have been circulated to universities by the Standing Conference on University Entrance. The first reaction of the universities at the meeting in November was one of hostility to the Schools Council's proposals, chiefly on the grounds that they do not cater adequately for the need for a broader curriculum in the sixth form. The matter is to be discussed more formally at another meeting in the new year, and the universities are hoping to give the Schools Council a formal reply at Easter or thereabouts. The chances are that the universities will suggest, through the standing conference, an alternative to the sixth form pattern suggested by the Schools Council which takes the form of a broader pattern of studies (see *Nature*, November 25, 1967).

The essence of the new proposals by the Schools Council, which are said to have evolved from the