

may turn out to be the ideal therapy for inborn errors of metabolism caused by specific enzyme deficiencies, of which 120 are now known. But even if the problems of immune response are overcome, there remains the problem of getting intracellular enzymes into the right cells. Whatman Biochemicals obviously thinks that these problems can be solved, and the company seems to have some ideas how, but it declined to elaborate on them last week.

#### AIRBUS

## One Step Forward, Two Steps Back

THE European Airbus struggles on from one crisis to the next. After last week's exercises in London, the airbus emerged as a new design, with different engines, fewer passengers and a distinctly slimmer chance of getting Government support. It has also changed its designation from A300 to A300B, although it might have led to less confusion if it had been A250. The principal effect of the design changes has been to reduce the capacity of the aircraft from 300 to 250 seats. This has been done to reduce costs, which had run far ahead of the initial estimates. Now, thanks to the reduction of capacity and some tricky work with the engines, the best estimate for the cost of the aeroplane is £170 million.

This represents a reduction in costs of something more than £100 million, and has clearly not been made possible just by the removal of 50 seats. The real economy is the decision not to develop the Rolls-Royce RB207 engine, two of which were intended to power each airbus. The engine was a completely new design, and would have cost £70 million to develop. Instead, the new design makes use of the RB211 engines, already designed and built for the Lockheed airbus. By the time the airbus is ready for the air, the RB211 should have been stretched enough to power it, and thanks to Lockheed it will be much cheaper than the airbus firms have any right to expect. On the face of it, this looks like a sensible way out of a difficult dilemma; the apathy of the airlines had begun to make it clear that the original airbus was a non-starter.

In effect, however, the decision creates a whole new set of dilemmas. For one thing, the three Governments—Britain, France and West Germany—are now no longer bound to lend support to the project, and one or more may welcome the chance of opting out. As Mr Wedgwood Benn made clear in the House of Commons, the British Government has no interest in the project unless the airbus company can stir up a good deal more enthusiasm than it managed for the old design. Most of Britain's contribution to the cost was to have been in the form of launching aid for the RB207; now that this has fallen through, the other countries are certain to want to re-negotiate the contract. Lockheed may not feel very happy that it is helping to finance the engines for a possible rival. And the agreements made between Rolls-Royce and various European companies for sharing the work on the engine will now have to be abandoned.

All this has created, as Mr Benn put it, "a new situation". If the airbus company can produce evidence of real enthusiasm for the new design, the next step would be for the three governments to

negotiate a new memorandum of understanding. Orders approaching 75 would seem to be the absolute minimum for justifying the project. The market in Europe is unlikely to be this big, so the company will have to try to sell the airbus elsewhere—which probably means in the United States. If there is a market for it there, it is more than likely that Boeing will be only too happy to fill it—and the advantage is on its side, because the airbus will in many cases be expected to replace the Boeing 727. The best chance might be to approach airlines which have already bought the Lockheed airbus, because a smaller airbus, using the same engines, might well offer an advantage on some routes.

Even in Europe, the A300B has a far from clear run. The British Aircraft Corporation has been hawking around a design called the BAC 3-11, which is broadly the same kind of aircraft as the A300B. The British Government, at least, will surely be keeping an open mind until it has had the opportunity of assessing airline reaction to the two designs.

#### AGRICULTURE

## Research on the Farm

ENCOURAGING closer associations between the Agricultural Research Council's institutes and the universities is to be one of the central guidelines in the future development of the policy of the ARC, according to the council's report for 1967-68, published on December 12 (HMSO, 10s 6d). It is not so much the policy itself but the extent of its application which is new. Several of the ARC institutes have long-standing formal association with universities, and two or three—the Long Ashton Research Station at Bristol and the Welsh Plant Breeding Station at Aberystwyth, for example—are actually administered as an integral part of the local university.

But the increasing sophistication of agricultural science and of the equipment needed to pursue it—to say nothing of the mutual benefit of the individual scientists concerned—dictates still closer collaboration with the universities. (In the past ten years the rate of growth of the ARC's expenditure on equipment has been double the growth of the council's total spending on the rest of its research service.) Well over half of the 32 institutes with which the ARC is involved have or soon will have a formal association with a university; the remainder, geography permitting, are likely to follow suit in the next few years. And any new ARC institutes will no doubt follow the pattern set by the latest two, the Meat Research Institute at Langford and the Food Research Institute at Norwich which have been built alongside Bristol University and the University of East Anglia. During the financial year 1967-68, the council's budget was £12.468 million, compared with £10.437 million in the previous year. Nearly £5 million was spent on the ARC's ten institutes and fourteen research units, and roughly 40 per cent went on capital expenditure, especially at the new meat and food institutes. Another £6.25 million was spent on the established agricultural research centres such as Rothamsted and Long Ashton, which are only partly supported by the ARC.

The report has much to say about recent developments at several of the institutes which were visited

by the council during the year, but 1967 will be remembered by British agriculturalists for the serious foot and mouth outbreak and its aftermath. The ARC and the Animal Virus Research Institute have naturally been among the chief witnesses to the Duke of Northumberland's Committee—the Duke was until May this year chairman of the ARC. The report states briefly that during the outbreak the virus was, for the first time, found locally in milk in farm storage tanks and tankers before the disease had become overt in the local herds.

#### TOYS

### Fun for Fathers

THIS Christmas, children can make fascinating shapes by blowing plastic or build themselves a digital or analogue computer to make their homework fun. More and more sophisticated and realistic toys are being designed, probably half with an eye to fathers, but others, based on ingeniously simple ideas, are possibly more fun for children.

Scientific kits on sale in London range from the computer kits costing about eight pounds to a simple amplifier for picking up car and aeroplane noises. The series of 'Radionic' electronic sets teaches children how to build circuits from the simplest to the most complex using a transparent insulating board on which colour coded components are laid out and connected exactly as in the wiring diagram. With Philips 'Compact Electronic Engineer' kits, thirteen year olds can build burglar alarms, time switches, amplifiers and even medium-wave radios.

War toys are as popular as ever—tanks are more ferocious and "life-like" and volatile soldiers issue commands, but space-age toys are beginning to compete. A balloon controlled by a stream of air blown by a steerable fan makes an ingenious "space-probe" and a two-stage rocket works with water as fuel and an air pump to build up pressure. The battery operated Space Express has cogged wheels and can travel vertically up or upside down on a cogged track. These all cost three or four pounds.

'Scalectrix' sets with electric racing cars running over powered tracks are still very much in vogue and are becoming increasingly complex. Remote control cars can be parked and made to negotiate obstacle courses, and a new and expensive toy is a radio-controlled car for which a radio operator's licence is necessary. A nice idea is the track system—a parallel pair of moving springs—into which any 'Matchbox' toy with a pair of metal pins fixed underneath can be fitted. 'Lego' manufacturers have devised a small unit with a microphone and a motor which can be fitted to any 'Lego' toy so that it stops or starts at a flick of the fingers or a whistle. Reserved for maharajahs' children is a £150 petrol engined model car.

#### WOLFSON FOUNDATION

### Money for Projects

THE Wolfson Foundation announced this week the first recipients of the grants it has set up to support technology at British universities. The foundation is spending £1 million in British universities on projects

which will, in its judgment, "help the modernization of British industry and improve the commercial and economic position of the UK". After the announcement of the awards last year, about 150 applications were received, and they have now been assessed by a panel under the chairmanship of Sir Solly Zuckerman. The panel, distinguished scientists all, was assisted by assessors from industry and commerce. The result is a list of sixteen universities which are to receive the money.

Top of the list, in terms of the grant given, is the Department of Metallurgy at the University of Nottingham, which is to receive just over a quarter of a million pounds to set up an institute for the study of interfacial phenomena. This is to include work on the interfaces between solids, liquids and gases—a wide field, but one in which there are great strides to be made. Other large items include a grant to the Department of Electrical Engineering at Edinburgh University to set up a micro-electronics liaison unit. This department is particularly well known for its work with industry, and the grant is worth £130,700. The Department of Engineering at Cambridge has been given £20,000 to apply modern control theory to models of the national economy (which sounds a tall order), and Imperial College has £65,000 to compile a geochemical atlas of part of the British Isles. Other grants include £132,000 to Surrey University for a centre for research and development in bio-analytical instrumentation and a similar sum to the University of Wales to set up a centre for the technology of soft magnetic materials and their applications.

To judge from the list of grants, the foundation seems to have managed the difficult task of avoiding overlap with the Ministry of Technology without at the same time supporting trivial projects. The universities will be pleased to have the money for projects which might otherwise have been lost, and may feel doubly grateful for money which has the effect of diversifying their sources of finance. It is reassuring for them to know that not all their finance is coming from the same barrel, and perhaps other foundations could be persuaded to follow the Wolfson example.

#### JOURNALS

### Core Journals

MORE support for the contention that most of the published literature which is valuable is to be found in a small number of core journals is provided by a report by two members of the Aslib Research Department (*An Evaluation of British Scientific Journals*, Aslib Occasional Publications, No. 1, 1968; 15s). The authors of the report, John Martyn and Alan Gilchrist, ranked British journals in science and technology using the criterion that citation of a document indicates use of it by the citing author. They found that 165 British journals provide the "core". On the assumption that British scientific journal literature is a representative sample of the world's scientific literature, they conclude that the number of the world's "core" journals lies between 2,300 and 3,200—a definite reduction in the "information explosion".

To find the British "core" journals, they used the resources of the 1965 issue of *Science Citation Index* which contains in the source index a record of every