

the University of Birmingham will again be measuring electron densities and electron temperatures. Professor T. R. Kaiser from the University of Sheffield will be sending up a combined experiment with Mr F. Horner from the Radio and Space Research Station, to investigate VLF radiation and lightning impulses. Professor F. G. Smith from Jodrell Bank will also be combining with the RSRS in an experiment to measure radio noise. All that is missing from Ariel 3 is the experiment from the Meteorological Office, which studied the vertical distribution of molecular oxygen in the atmosphere.

Excluding launching costs, the satellite will cost £1 million, which is remarkably cheap. This has presumably been possible because UK 4 will use large amounts of material left over from Ariel 3. Five models of Ariel 3 were built, two of which were used for mechanical and electrical tests, and three of which were flight models. As the first launch was a success, two were left over, providing a good opportunity to launch UK 4 cheaply. It is a pity, however, that room aboard was not found for an experiment from outside a narrow circle of British space scientists. Others must be beginning to feel left out.

TELECOMMUNICATIONS

Whose Monopoly?

THE House of Commons Standing Committee on the Post Office Bill is now well into its examination of the proposal to establish the GPO as a public corporation. Under the new bill, the postal, telecommunications, giro, money remittance and data processing functions of the present department are to be run by the new public authority—the Post Office—while public savings will be hived off into a Department for National Savings responsible to the Treasury. A new Ministry of Posts and Telecommunications is to be set up, which will replace the office of Postmaster-General and will oversee the Post Office. The standing committee has been meeting regularly since November and so far has covered the abolition of the office of Postmaster-General and the transfer of his functions to the new ministry.

Discussion has more recently centred on the extent of the monopoly of the Post Office in telecommunications, and in particular the attachment to the telephone system of equipment not belonging to the Post Office. The growing practice of data transmission along telephone lines, which the GPO is belatedly encouraging and which depends on terminal units at present supplied by the GPO, is particularly affected. But the ban applies to all kinds of equipment which could conceivably be connected into the system.

The fear is that badly designed attachments will wreak havoc in the telephone system. This question has been receiving attention in the United States, where the Federal Communications Commission recently ruled that restrictions imposed by American Telephone and Telegraph were unlawful. The doubts of telephone engineers have been overcome by attaching equipment to the system through what amounts to a fuse box, rented from the telephone company (*Nature*, 219, 1097; 1968).

In Britain, the Postmaster-General, Mr John Stonehouse, is by and large sticking to his guns. The GPO

is seeing to what extent a little more freedom in the supply of equipment can be allowed, he said, but the Post Office must have power to control the characteristics of any equipment attached to the network. Nor could the Post Office give up its responsibility for the maintenance, or deterioration would follow. Nevertheless, last week Mr Stonehouse did soften his words by agreeing that in the past the range of Post Office equipment may have been too small. Now there are to be discussions with other interested bodies to see whether the variety of devices which can be connected to the system can be broadened.

The standing committee has been particularly searching in its examination of the monopoly which the new Post Office will have in the telecommunications field. While the Government's line is that the bill merely transfers the monopoly of the present department to the Post Office, others suspect an extension of the monopoly is involved. Much of the discussion has centred over the claim that the new bill does away with a restriction in an earlier Act limiting the monopoly to frequencies below 3×10^{12} Hz, but Mr Stonehouse argued that all the new bill does is to spell out more clearly restrictions which were inherent in earlier legislation. This is intended to prepare the way for developments still in the future. He went on to make some reassuring noises in the direction of the relay services, which are anxious not only that the Post Office may become their principal competitor if present experiments are successful, but more seriously that in future the Post Office will be responsible for granting licences. To appease the relay companies, the Government has promised that there will be no changes before 1976.

COMPUTERS

Competition for Small Users

FOR the best part of a decade, people have been wondering when the Philips company would enter the computer business, and how. The answer came last week, when the company launched a series of desk-size computers on the markets of nineteen countries. The computers, known as the P350 series, are said to be successors to the present generation of mechanical and electrical office equipment. They are designed for invoicing, payrolls, accounting and similar activities.

There are three models in the series, costing £3,000, £3,850 and £5,750. Philips claims that "the performance to cost ratio" of the new computers is several times greater than that for electro-mechanical machines. The smallest has a store of 200 sixteen digit words and the other two have 400 word stores with a capacity for extension up to 1,000 words. Although one or two small companies have already moved into the minicomputer market, it appears that Philips has stolen a useful march over its rivals. International Computers Limited has no immediate plans for a rival machine, and is concentrating instead on a new computer bureau which is to be opened later this year by its subsidiary, International Computer Services. National Cash Register is naturally jealous of any serious inroad into one of its traditional markets, and Philips is already claiming to have three hundred potential customers on its books.

How will these new machines meet the needs of smaller companies for computer time? ICL is hoping

that the larger accounting departments will be attracted to a computer bureau because of the wide range of programs and facilities that such a system can offer, while Philips hopes to persuade larger companies to split up their departments into smaller and more self-contained units. The cost of a P350 computer will be much less than that of renting time at a bureau, and many companies satisfied with a modest range of accounting facilities will eye the Philips series with keen interest.

An impressive aspect of the new computers is the speed of printing. By making the printer move instead of the carriage, a print-out rate of 22.5 characters a second has been achieved—about three times the normal rate. For multiple small calculations as are carried out in accounting, the time of operation is due almost entirely to the time taken to print out the results, giving this speed particular significance.

ANALYTICAL CHEMISTRY

Mail Order Analysis

THE UK Atomic Energy Authority and the Science Research Council have set up a small Physico-Chemical Measurement Unit to provide industry and the universities with a mail order service for the refined analysis of organic chemicals. The unit will operate from the Atomic Energy Research Establishment, Harwell, and the Atomic Weapons Research Establishment, Aldermaston, and will be primarily concerned with the spectral and structural analysis of such chemicals as pharmaceuticals, polymers, oils, pesticides, waxes and plastics. The unit will be equipped for infrared absorption spectroscopy, nuclear magnetic resonance spectrometry and organic mass spectrometry.

The formation of the unit was prompted by the recommendation of a committee under Professor G. Porter, Director of the Royal Institution, set up to determine the best way of making modern analytic instruments available to industrial, university and government laboratories. Although no more than twenty people will be involved, the unit represents a further diversification of activities at Harwell. It will operate on a normal commercial basis, charging between £10 and £20 an hour for obtaining spectral data and a further fee for interpretation. This scheme follows closely the pattern of the Analytical Research and Development Unit established at Harwell in June 1968 to undertake research and development under contract to industry, and the two units are intended to keep in close touch. For the time being, the SRC intends to foot the running costs of the unit for work carried out on behalf of the universities and other SRC users. Industry will be charged for the service directly by the Atomic Energy Authority.

INTERNATIONAL MEETINGS

FEBS Undaunted

POLITICS are outwardly somewhat quieter in Spain just now. The University of Madrid has reopened, and plans are going ahead for the sixth meeting of the Federation of European Biochemical Societies there in April. Some national societies had suggested cancelling the meeting and reconvening it in a more liberal climate. As reported last week, however, Professors H. R. V. Arnstein and S. P. Datta of FEBS visited

Madrid some days ago to see the lie of the land, and their opinion is that the meeting should go ahead.

They have now issued a report of their visit, for the benefit of their members and for the wider attention of scientific societies faced with the intrusion of politics into their affairs. As well as making specific comments on the current situation in the academic circles of Madrid, the report does two things. It stresses that FEBS is a non-political organization, with member societies in countries of very varied political complexion, from Portugal to Bulgaria to Israel. To allow purely political considerations to affect the location of meetings would, in Professor Arnstein's words, "set a very dangerous precedent" for the future health of the society.

Only the most committed political activists will quarrel with this statement, though even for them the ethics of the situation are not crystal clear. It is obviously an ambivalent tactic to protest against the politics of a country by excluding that country's scientists from the international commerce of ideas. It is much the same as not eating South African oranges or not taking holidays in Greece—your actions tend to harm most those you most want to help. A biochemist who is boycotting the FEBS meeting countered this piece of liberal revisionism earlier in the week by referring to the propaganda use the Hitler regime made of scientific meetings held in its territory.

The report's second concern is to frame criteria for the practicability of a scientific meeting in delicate political conditions. The report suggests the following principles as necessary and sufficient guarantees: (1) Freedom for all foreign participants to enter and leave the country; (2) complete freedom of speech on scientific matters at the meeting—political, religious or racial questions should not be discussed at official sessions; (3) freedom of movement in the city where the meeting is being held, both for foreigners and for participant citizens of the host country.

The Spanish authorities have apparently guaranteed these three conditions for the FEBS meeting, though a politically active German biochemist said this week that he had qualms about the safety of scientific visitors in Madrid just now. Foreigners have been arrested for expressing with some forthrightness in public even the mildest liberal sentiments.

On the surface, Spanish politics are calmer, and April is unlikely to see the elders of European biochemistry, convened in an island of calm in Madrid University, manfully running through the minutiae of their subject in the midst of a screaming mob. But there are signs of intense underground activity. Several academics at the Universities of Madrid and Barcelona have been imprisoned or exiled to remote parts of Spain. The case of one exiled Madrid intellectual is being taken up with the Spanish Embassy by Lord Robbins, Sir Karl Popper and Maurice Cranston of LSE.

It is difficult to assess the nature of the student activity that was the immediate cause of the closure of Madrid and Barcelona Universities. "Oh, trouble just like your LSE", said a gently regretful voice at the Spanish Embassy this week, though observers here find this unlikely. The Spanish authorities have perhaps most reason to be worried by the rapid growth of underground workers' committees in the industrial cities. Genuine trade unions have been illegal in Spain for thirty years and, whether in consequence or