

FULBRIGHT GRANTS

Fellowships at Home

THE United States-United Kingdom Educational Commission announced last week that it will be unable to offer any Fulbright Travel Grants in the academic year 1969-70. The Fulbright programme is the world's most important educational exchange agency—it awarded 3,600 grants for the current academic year—and the change in policy is somewhat abrupt.

The United States Congress has cut funds to the programme by an overall 30 per cent, from \$46 million to \$31 million. Money for American scholars to travel abroad has been docked by 70 per cent, while funds for grants to be held within the United States have suffered less—they have been cut by 20 per cent. Reasonably, given the overall cut in funds, the State Department is trying to maintain the flow of grants towards the poorer nations at the necessary expense of the richer. The British end of the programme has consequently suffered drastically, with funds cut from \$860,000 in the current year to \$170,000 in the next.

Out of this has to come salaries for the staff of the United States-United Kingdom Educational Commission, the body which administers the use of Fulbright funds in Britain, money for a schoolteachers interchange programme and some funds to maintain scholarships begun this year but unavoidably extended into 1969-70. The residue would only have supported a derisory exchange programme, and the commission decided that it was better to cancel the 1969-70 programme altogether.

This year, 200 grants were awarded to Britons, half for graduate students and half for faculty members. More than half the recipients were scientists. No one knows how long the present stringent economic conditions will last, but the commission hopes to be able to offer grants again in 1970.

Though voices have been raised in Congress criticizing Fulbright exchanges on the grounds that they encourage the mobility of dissidents, the motives for the cutback in financial support seem straightforwardly economic. Many American scientific agencies abroad have had their budgets cut and staffs are also being reduced at embassies—hardly centres of dissidence. Where the Fulbright programme is concerned, the irony is that it should have foundered on the current balance of payments crisis in the United States, which has itself been provoked by the cost of the Vietnam war; originally in 1946, the intention was that the international exchange programme should be financed out of the sale of surplus military equipment abroad.

SATELLITES

Esro off the Ground

ESRO I, the second satellite of the European Space Research Organization (ESRO), was successfully launched on October 3 by a Scout missile from the Vandenberg Air Base. The satellite is functioning well; its orbit is close to that planned, though apparently a little low on perigee, and it has already transmitted its first set of data.

Esro I is moving in an orbit that takes it nearly over the poles and is designed to study the polar ionosphere and auroras. It carries instruments prepared by

several European laboratories, and if it remains in orbit for the year that is planned, should transmit the most comprehensive data yet obtained for the polar ionosphere. The experiments on board are designed to record the types and distribution of ionospheric electrons and ions and their daily and yearly variations as well as those affected by the solar cycle.

The Radio and Space Research Station at Slough has devised an experiment to measure the differences between electrons trapped in the Earth's magnetic field and those precipitated away from it. A second experiment from Slough will record the flux of protons absorbed at the polar caps some three hours after a solar flare. The University of Oslo has provided photometers to study the auroras in the northern hemisphere. These are best seen during the dark or dusk of the northern winter, which was what determined the timing of the satellite's launching.

University College, London, has designed an experiment to measure electron temperature and density; this is a continuation of measurements begun with the launching of the Ariel I satellite in 1962 and which it was hoped, until ESRO's cancellation of the TD2 satellite, would be extended throughout a whole solar cycle. University College is also monitoring the distribution of positive ions and their variation with the expansion of the atmosphere during the solar cycle.

Esro II, the first ESRO satellite, was launched earlier this year and is continuing to send back data on solar radiation and cosmic rays. Esro I was intended to be launched a year ago; true to tradition its successful launching has now been marked with a renaming. ESRO has decided to call the satellite *Aurora*, the Latin name doubtless being designed either to stress the unity of science or to avoid the dissensions created by the final "e" of *Concorde*.

EUROPEAN SPACE

Another Melting Pot for ELDO

WHAT was expected to be the decisive ELDO ministerial conference opened in Paris last week with all seven member countries apparently anxious to keep open their options. When all is said and done, the Blue Streak booster remains the only credible means of obtaining an independent space launcher capability. But there was this tiresome question of money and objectives—the topics on which ELDO's recurrent crises centre. As things turned out, money was hardly mentioned from start to finish. And the meeting was perhaps more indecisive than almost any previous ELDO crisis meeting. Even the final communiqué was not unanimous.

The meeting opened with a report from the conference chairman, M. Théo Lefèvre, Belgian Science Policy Minister, based on a fact-finding tour of the ELDO capitals and their science ministers. This had established that there was complete deadlock between the British and French Governments. But M. Lefèvre had found a consensus, among the six Ministers canvassed, on the need for better integration of technological programmes on a continental scale in an economic and industrial policy, and also fair agreement on the methods required to do it.

He therefore put forward a proposal placing European launcher development (and ELDO) in a larger

framework of advanced technology, and set out three principles which technological cooperation in Europe should satisfy.

"(1) It would extend to the major subjects of advanced technology such as space, nuclear energy, data-processing and computers, aviation, transport and telecommunications; (2) it would be based on the establishment of industrial consortia which would be granted, on the one hand, the support of research and development contracts and, on the other, that of public orders coordinated among our governments; (3) it would ensure that each country has its fair share in the new jobs, flows of business and stimuli to progress which will result from joint action, this fair share applying to the programmes as a whole and not to each of them in particular, which assumes that our efforts should be established on a continuous and durable basis."

This thoroughly sensible and constructive approach got nowhere in spite of—or perhaps because of—a prompt British welcome. After a day and a half of mumbling, a resolution reintroducing the Lefèvre principles but linked with the specifically ELDO problem was re-introduced by the British delegate, Mr J. P. W. Mallalieu, Minister of State at the Ministry of Technology, but was voted against by France and Germany. A German resolution to do much the same but woollier in its terms was finally adopted with Britain and Australia abstaining.

The result is that there will be another committee of officials representing ELDO government ministers to draw up proposals for a European space programme. It is to take into account work already done, applications satellites for Europe, and available resources—and to report back by November 11. It looks like the Causse Report all over again except that the Causse inquiry drew strength from the ESRO countries as well as the ELDO countries. "The Causse Report minus", some officials were calling it. This seems to be one of the British Government's objections to the terms of the final resolution. It would like to have seen the inquiry opened up to all countries in Western Europe with an interest in space and in collaboration in advanced technology. The national appointments to the new committee (which is to meet in Brussels under a Belgian chairman) must be made by October 12. It is not quite clear yet whether Britain will send a nominee.

PLANETARY ASTRONOMY

The Stay-at-homes

Is it necessary to venture into space to study the planets or can they be observed more comfortably and at leisure by staying at home? The Panel on Planetary Astronomy of the United States National Academy of Sciences' Space Sciences Board argues that ground based measurements are often as effective and are almost always considerably less expensive than measurements made in space and should therefore play an important part in any programme of planetary study. Thus the panel throws its weight behind the stay-at-homes in a report now published (which can be had from the National Academy in Washington). The panel, under the chairmanship of J. S. Hall, the director of Lowell Observatory, was asked to survey

the current state of knowledge in planetary astronomy, to indicate potentially productive fields for ground based research and to survey the available techniques. The fields of research they considered include the dynamics of planetary motion, the study of planetary surfaces and atmospheres and the gathering of information on the interiors of planets and their associated magnetic fields. Ground based instruments have the advantages that they can handle data much faster than space instruments can and they have much longer effective life-times. Their relative design flexibility means that recent technological developments can be incorporated to good effect. Time is an important factor because information from ground based studies is used in planning space programmes and also because the planets can most usefully be observed only for certain periods. The limitations on such instruments are caused largely by the Earth's atmosphere—its opacity to radiation of all but a few wavelength bands and its turbulence. Some of these restrictions are already being overcome by the use of better observing sites, image scanning and image enhancement devices and, most importantly, by the use of radio and radar techniques. Here the limitations are purely instrumental and there is scope for order of magnitude improvements.

The panel makes eight specific recommendations for improving the efficiency of ground based studies. It asks that a 60-inch optical telescope designed for spectroscopy, interferometry, photography and photometry of the planets should be erected as soon as possible in the southern hemisphere. Two reflectors for the infrared would be useful—one with a 120-inch aperture at a site with very low water vapour content and the other with a 36-inch aperture installed in the Convair 990 aircraft operating from the Ames research centre. Existing facilities for planetary radar observations should be more extensively used, the panel says, and a large filled-aperture instrument for use at millimetre wavelengths and a high resolution one for use at 3 cm to millimetre wavelengths should be built. The recommendation of the Whitford Committee for construction of large radio telescope arrays by the National Radio Astronomy Observatory and the California Institute of Technology is endorsed. Fourier interferometers with resolutions of at least 10,000 should be developed and "the importance of technological development should be recognized by ensuring that funds are available to support it". The establishment of a "worldwide photographic planetary patrol" distributed in longitude to ensure adequate coverage for the period from January 1960 to January 1974 was recommended. The panel emphasizes the need for a solution to the thorny problem of how to provide experts who also have a comprehensive knowledge of the field as a whole.

METEOROLOGICAL RESEARCH

Set Fair at Bracknell

THE completion of a series of research projects on the Earth's atmosphere and a noteworthy advance in international cooperation are highlights of the Annual Report of the Meteorological Office for 1967 (HMSO, 11s.). On a budget of £7.5 million, the Meteorological Office seems to have pushed ahead with modernizing