in what is essentially a personal appointment—Washington is well used to considerations like that, and it is folly to pretend otherwise. It is also likely that by this time the new President is somewhat embarrassed by the number of people not known as dedicated members of his own party who have been asked to fill quite senior jobs in the Administration. All this can be forgiven or, at least, understood. What will stick for a long time in many people's throats is the way in which the Administration has allowed the intended appointment of Dr Long to become a public issue. Surely the arguments which have now disqualified him should have been exercised at the beginning.

Who is to blame? Although the President has manfully shouldered the responsibility, there seems very little doubt that he would not have been personally involved in the detailed negotiations. That task fell to Dr DuBridge, and the most lasting damage done by this incident is likely to be the damage to the new Science Adviser's credibility. As things now seem, Dr DuBridge has been got at, and has been irresolute in what must have been his initial conviction that Dr Long would be the right man for the National Science Foundation. Quite apart from the difficulty there will now be in talking to other candidates, interested parties on other issues will tend to think of him as pliable. It is true, of course, that all this may be an educative mistake in the initiation of somebody who is new to the real politics of Washington—advisory committees are another matter—but it will be for Dr DuBridge to show that he has learned something from the trouble which he has now created.

This is a misfortune, because Dr DuBridge had seemed to have made a reasonable if somewhat fuzzy beginning. The decision that the National Science Foundation should be given an extra $10 million in the current fiscal year has been widely interpreted as a sign of the way in which the wind would be blowing, while the cuts in the operating budget for the next fiscal year, which President Nixon announced on April 15, have left Federal expenditure on scientific research largely untouched. (The National Science Foundation itself has literally the same budget, and the chief restrictions fall on agencies such as the AEC.) It is true, of course, that Dr DuBridge's appearance before the Daddario sub-committee in March was a disappointment to those who had hoped that he would have something intelligent to say about the future lines of policy towards agencies like the NSF and towards outside institutions such as the universities. It would surely have been possible to say something about the flood of proposals there have been for a more direct acknowledgment of Federal responsibility for graduate education without compromising the development of future policies. But this is the direction in which the machinery of the government of science in the United States now needs to be developed. One essential ingredient in the new pattern should be a stronger National Science Foundation. It will be sad if all this bungling makes that harder to achieve.

ASTRONOMY FUNDING

Feeling the Pinch?

In a year that has already seen the discovery of light flashes and the speeding up of radio bleeps from pulsars, it comes as a surprise that Federal support for ground-based astronomy is decreasing. This is in spite of a gradual increase over the years in the level of support from the National Science Foundation, which distributes roughly half of the Federal funds which go to ground-based astronomy. The reason is that the increase in NSF support is more than overtaken by cuts in spending by the Department of Defense. But radio astronomers are more likely to feel the pinch than their optical colleagues. Federal expenditure on radio astronomy is expected to drop 22 per cent from $7 million in the financial year 1968 to $5·45 million in 1970, while over the same period funds for optical astronomy are to drop by roughly 10 per cent. The $7 million in 1968 was spent by six Federal agencies on seventeen large programmes on radio astronomy in non-Federal institutions.

Expenditure on ground-based astronomy by the NSF in the financial year 1970 is expected to be $6·8 million, compared with a predicted figure of $6·7 million in 1969 and an actual spending of nearly $6·2 million in 1968. But the foundation is going to favour the radio astronomers. Spending on optical astronomy is actually going to decrease from just over $4 million in 1968 to $3·8 million in 1969 and 1970, while in the same period spending on radio astronomy is to go up from just more than $2·1 million to $3 million. The NSF provides most of the astronomy grants to universities, and is responsible for the National Radio Astronomy Observatory at Greenbank, West Virginia, and the optical observatories at Cerro Tololo in Chile and Kitt Peak in Arizona.

NSF spending on ground-based astronomy followed the same pattern in 1968 as in 1967. Most of the grants for optical astronomy were for work on stars, while the grants for radio astronomy were for solar system work, for interstellar matter and for cosmology. But, following the pattern, the percentage of grants for radio astronomy went up from 15 per cent to 25 per cent.

CANADIAN GEOLOGY

Spending the Funds

Canada is a superb laboratory for geology, and the National Advisory Committee on Research in the Geological Sciences exists to make sure that opportunities are not wasted. Each year the committee produces a workmanlike report of the work which it is fostering, with suggestions of further problems which deserve study. The report for 1967–68 is now published (Geological Survey of Canada, $1·50) and announces changes in the committee's philosophy for distributing the money which the Geological Survey has available. Over the years, support for geology from the Canadian National Research Council has risen from next to nothing in 1951 to a predicted $1·8 million in 1968, completely overshadowing the $220,000 distributed last year by the Geological Survey, and it is hardly surprising that the Geological Survey is finding that up to 80 per cent of applicants for its money are already receiving help from the NRC. It

is not that the applicants are greedy—NRC grants on average run to less than two-thirds of the amount asked for—but the Geological Survey understandably feels its cash deserves a better fate than merely to supplement NRC awards. Thus the National Advisory Committee is asking its subcommittees on various aspects of Canadian geology to suggest projects deserving of support once the 20 to 25 per cent of applicants not receiving NRC awards has been looked after. It looks as if many of the recipients of NRC money are going to be harder pushed to find the extra, but the new arrangement should be more rewarding than the present somewhat indiscriminate distribution.

The views of the eight subcommittees contained in the report provide a glimpse of the work of Canadian geologists and of the problems they are facing. Overlapping of effort in the development of instruments particularly concerned the subcommittee dealing with the application of geophysical methods; workers in rock mechanics are rediscovering techniques discarded years ago by geophysicists, for example. There is also some anxiety that as the scale of research activity expands, criteria for granting funds may sometimes obscure originality and ability. The subcommittee on mineral resources is asked by the Government whether geologists in the universities and research institutions are too preoccupied with laboratory projects instead of field work, and that on mineralogy, geochemistry and petrology is predicting a shortage of staff for new research laboratories. The subcommittee on scholarship and research training, on the other hand, is worried that the training which foreign students are receiving in Canada is in some cases too specialized to fit them for jobs in their own countries.

The National Advisory Committee is especially proud of its subcommittee on the storage and retrieval of geological data, which has itself now reached the stage of hiving off various activities into a further family of subcommittees. There is to be a national system for dealing with Canadian geological data, and it is hoped to impress visitors to the International Geological Congress planned for Montreal in 1972 with a working data processing display.

BIOLOGICAL RESEARCH

Man and Nature

THE International Biological Programme, now in its second year, is at last showing signs of getting up steam in the United States. Backed by Congressmen G. P. Miller and E. Q. Daddario, in the House of Representatives, and by Senator E. S. Muskie in the Senate, the IBP is to receive $5 million from the National Science Foundation in 1970. This is ten times the NSF support in the current fiscal year, but, even so, it is small beer for the NSF—it is little more than one per cent of the foundation's budget of $499 million for 1970.

The details of projects described in the second of a series of reports from the US IBP committee nevertheless give some measure of the growth of the programme since the first report was published in September 1967. The first report listed five major studies and 104 projects involving a mere eighteen universities and agencies. The second describes eighteen major studies and 162 other projects involving over 2,000 scientists in 142 institutions in forty-six states. The theme of the US programme is man's survival in a changing world, and the eighteen major studies, thirteen of which have been formally accepted and five of which are still at the planning stage, fall into two categories—man's adaptation to the environment and the environment itself. Wisely, the studies are not all devoted to dwindling populations of primitive peoples in a state of nature, although Eskimos, South American Indians and Andean populations are receiving their fair share of attention. The US programme involves two studies nearer home—the ecology of poor migrant labourers moving from the deep south to such places as Chicago and New York, and a study of nutritional adaptation to the environment with particular reference to the worldwide trend of migration from rural to congested urban areas where, as the report puts it, "cultural patterns are confusing and directions of improvements not well established". It also includes a US Army study of the relationship of diet to the performance of the combat soldier designed to discover what the stomach of the marching soldier should be filled with. On the whole, however, overt military research seems to have been excluded from the programme.

Eight of the thirteen proposals accepted and several of the planned studies fall into the environmental management group and range from physiology of colonizing species and convergent and divergent evolution to crop production under stress and nitrogen management and the balance between nitrogen fertilizers and nitrate pollution of food and water. The smaller research projects cover an even wider range of applied and academic research into the environment, but the emphasis is on work with obvious economic potential. The list of the 162 projects abounds with topics such as farmstead windbreaks, crop production in the tropics and breeding disease resistant plants.

MONTREAL UNIVERSITY

Molecular Biology at Montreal

FRENCH Canadians have long resented the hegemony of the English speaking McGill University in the heart of Quebec and French Canada. But Laval University in Quebec City and l'Université de Montreal, the largest French speaking university outside France—perhaps better known outside Canada as the place where President de Gaulle made his "Quebec libre" speech—have in the past several years come into their own. The latest grant announced by the Canadian National Research Council is for $300,000 for a laboratory of molecular biology at the University of Montreal. The grant, spread over the next three years, is one of several awarded by the council since 1967, when it inaugurated a programme to assist Canadian universities to establish research centres in the burgeoning sciences.

To begin with, at least, Montreal's molecular biology laboratory will be centred around Dr G. H. Cousineau's group working on the synthesis of macromolecules in developing and differentiating cells. It hardly needs saying that the aim of the laboratory is to foster interdisciplinary research, with cooperation between the new laboratory and the university's physics and chemistry departments in work on proteins. Apparently, further expansion of molecular biology at the university will very much depend on the success of the laboratory in the next few years.