NORTH AMERICA

Cold Winter Ahead

NOBODY is cheerful about the prospects for publicly supported science in the year ahead, and the discovery that the National Institutes of Health have for the past twenty years or so maintained a private blacklist of people who are never invited to belong to review committees has only helped to make it seem that the fifties are back again. It is a fine piece of irony that Professor S. Luria of MIT should have been discovered on the blacklist only a few days after the President had sent him a fulsome telegram to celebrate his Nobel Prize (see page 399). In the long run, however, it matters more that there is still no prospect that public spending on university research will climb off the plateau to which it has been bound since 1966.

As always, the National Science Foundation's budget is the litmus paper for judging everything else, and one sign of the way the wind is blowing is that the emasculated budget for the current financial year has not yet emerged from Congress. (The chances are that the Senate will be a little more generous than the House of Representatives, and that the foundation will have a little more than $413 million to spend up to the end of June next year, but this is still a long way below the $500 million at which the Administration seemed to be aiming at the beginning of this year.) Already, however, it is clear that the fight for money for the year which begins in July, 1970, is going to be just as hard. This is the stage at which the Administration makes its first internal estimates of what it can reasonably expect to carry through Congress with the new budget in February next year, and there seems to be very little optimism about the way that things will go. The reluctance of the congressional committees to sanction even the modest sums now nearly agreed for the NSF has cast a long shadow over the coming year. For several reasons, Congress has fallen out of love with the universities. Perhaps the best that could happen now is a long period of calm and quiet at the university campuses, and it should help that the Moratorium passed off quietly a week ago.

In Washington, however, the problem remains of how best to map a strategy for the years ahead. The signs that tended to suggest, a year ago, that there would be some change in the present pattern of financing research and development have wilted away again. The report of the National Science Board which, in January this year, proposed a scheme under which university research would be supported by a delicate network of institutional grants seems to have become a dead letter. Hindsight suggests that it could hardly have been more inappropriately timed—too early in the new Administration to escape the odium of the past. The Miller Bill, which would distribute a total of $400 million among universities in a way that would increase the funds available to less successful colleges, is still alive, if only just. Mr E. Daddario has been saying that he will take the Bill to Congress in November—it already has the approval of the House Committee on Science and Astronautics—but that seems merely a recipe for strangulation. Certainly there is no sign that the Administration will support the measure—the sponsors of the Bill have found it necessary to increase the scale of their activities so as to win the support of interested parties, with the result that the Administration is unlikely ever to sign the cheque. But the prospects of a shift of pattern are made still more remote by the appointment of yet another committee to inquire into the pattern of higher education, the task force under Mr R. Finch, the new and enlightened secretary at Health, Education and Welfare. Something good may come of this, but time will first march on.

That there should be some shift in the distribution of influence on research and development between the several agencies in Washington does, however, seem to be more widely accepted now than even a year ago. The case for making the National Science Foundation stronger, even at the expense of mission-oriented agencies, has growing support. The reason is not far to seek. In the past year, both the Department of Defense and the National Aeronautics and Space Administration have been forced by external restraints to be less lavish with what they can spend on basic research, with the result that the impact of the penury at the NSF on the universities has been magnified. When everything is booming, both the sponsors of the agencies and those who look for research money are tempted by the benefits of a diversity of sources for university support but this has always been a fair-weather recipe. It has also had the defect that some kinds of research are harder to support than others. It is thus an unpleasant irony that expenditure on high energy physics in the United States, channelled through the Atomic Energy Commission, should still be buoyant when the radio astronomers are crying to the NSF for better support. In short, the proper coordination

of a research pattern which is made up of the inclinations of several agencies, and which in Washington must be the responsibility of the Office of Science and Technology, is bound to be imperfect. Much depends on the historical accident of whether the President is in the mood to listen to his science adviser. The democratic processes with which, within the NSF or the National Institutes of Health, the scientific community shares out the funds available apply to small decisions but not to big ones.

What is the solution? There is no reason why Congress should not consider seriously proposals to transfer from other agencies to the NSF and NIH responsibility for certain kinds of basic research. To be sure, this will fly in the face of what has become the American equivalent of the British Haldane doctrine—the belief that agencies of government with missions to accomplish can only do their job effectively if they are able to support the basic research on which their future will depend. As a general principle, this sounds well, but is there really a good reason why the Department of Defense, with this rubric to guide it, should be providing direct institutional support for universities under the label of Project Themis? By the same test, is it proper, let alone wise, that NASA should be the chief source of funds for the kind of basic research that has in the past ten years demonstrated the intricacy of the relationship between the Sun and the Earth? Is it sensible that support for oceanography should come from a host of agencies, ranging from the US Navy to the NSF? The advantages of a more tidy pattern would be not merely that the strategy would be better coordinated but that the quality of the work supported would often be improved. To be sure, it would make no sense to ask that the NSF should promptly become the custodian of all the basic research at present supported by other agencies. Obviously it would be better that obligations already undertaken should stay with the agencies concerned. But there is the strongest possible case for asking that new spending on basic research, even at the instance of a mission oriented agency, should be channelled through the NSF.

But will not this incur the opposition of the powerful committees of Congress? Certainly it is hard to think that the Joint Committee on Atomic Energy would willingly give up its long association with the support for high energy physics. Moreover, the AEC has proved to be an efficient and liberal protector of this cause. But is there any reason why these links should not be preserved if high energy physics became a pensioner of the NSF? The Congressional committees and the agencies at present responsible for large slices of basic research like this could surely continue to have a say in the long-term planning of these projects without being involved in providing money for them. Indeed, they would under such a system usually find that detailed questions about the rightness or wrongness of particular proposals would be answered in advance by the internal processes of assessment for which the research agencies have won confidence in the past few years. It follows that in what seems almost certain to be a prolonged period without growth in the scientific budget, Dr L. DuBridge's most useful role would be not so much that of a cheerleader on behalf of the principle that all research is worthwhile as that of a tactician concerned to create the mechanism for support that will function best when times are more favourable for spending.

SATELLITE ASTRONOMY

Orbiting 120-inch Urged

from our Astronomy Correspondent

THE Space Science Board of the National Academy of Sciences and the National Research Council has come out strongly if belatedly for a 120-inch optical telescope in Earth orbit in its latest report, *Scientific Uses of the Large Space Telescope*, published last week. The report is the work of an *ad hoc* committee set up as a continuation of the board's working group on optical astronomy, which put forward the case for a 120-inch space telescope in a 1965 study of priorities in space research (*Space Research, Directions for the Future*, National Academy of Sciences; 1966). Since then, the committee has organized three meetings during 1966 and 1967 devoted to astronomical questions which would benefit from the telescope, and the present report is a distillation of what was said. Although the last of the meetings was in March 1967, no explanation is given for the delay in publication. One likely possibility is that the Space Science Board has been prompted to broadcast the committee's recommendations now to coincide with the discussions going on in the United States on the future of the space programme. Only two months ago the board staked a powerful claim on behalf of the scientific community for greater participation in the space programme with the report *The Outer Solar System, a Program for Exploration* (see *Nature*, **223**, 661; 1969).

The 120-inch telescope which the board would like to see would be able to observe objects down to visual magnitude 29, a hundred times fainter than anything which can be seen from the ground, producing images less than 0·1 seconds of arc in diameter compared with about 0·5 seconds of arc for the 200-inch telescope on Palomar Mountain. By choosing the right kind of coating for the mirror, it ought to be possible to operate at wavelengths from 900 Å to about 1 mm, while from the Earth anything between 10,000 Å and 1 mm, and less than 3000 Å, is inaccessible. To obtain the maximum benefit from the resolution of the telescope, it will have to be held steady during exposures to better than 0·004 seconds of arc, but, according to the report, experience with balloon-borne telescopes suggests that this ought to be feasible.

The bulk of the report is devoted to a discussion of the areas in astronomy where such a telescope would be most useful. The authors are particularly taken with the impact which the telescope would have on cosmology. For example, detailed studies of the structure of galaxies which the high resolution would make possible should throw light on the way galaxies evolve. And the observation of really distant galaxies should provide values for the scale and curvature of the universe.