

first to the social sciences and humanities and second to the life sciences.

Described as "a drastic change in priorities", this shift of emphasis would take place because the social sciences and the life sciences have consistently been singled out as poor cousins in many of the reports on basic science in Canada, while the physical sciences have carried off the bulk of funding for basic research. And, as an extra sting in the tail for the physical sciences, the committee suggests that Canada should keep out of big science projects funded on a national basis, and that grants should go chiefly to projects that employ only one or two researchers in a single discipline. (Although the committee adds that if interdisciplinary research projects look like proving successful, they should be supported.)

The proposed foundations would concern themselves only with giving grants for basic, curiosity-oriented research, and the committee suggests that the actual operation of government research establishments should be turned over to another new body—a national research academy, in which would be concentrated all the research activities of the government. Moreover, echoing the Rothschild report, the committee suggests that a substantial proportion of the work of the proposed academy should be performed for government and private industry on a contract basis.

The committee is, however, chiefly concerned with the relatively low level of investment in research and development in Canadian manufacturing industry, an environment which it calls "unconducive to industrial innovations". To help stimulate industrial research and development, the committee puts forward a multi-pronged line of attack, which aims to transfer some of the government's applied research activities to private industry and to the universities, and to make available the risk capital necessary to launch technological innovations.

In short, what the committee proposes is that the Minister of State for Science and Technology should take stock of all the research and development programmes of government departments, to see which should be dropped or contracted out to universities and industries. In the longer term, all grants and other devices aimed at stimulating research and development in industry should be integrated into one programme administered by the Department of Industry, Trade and Commerce. Industrial organizations should themselves set up task forces to look at ways to improve the efficiency, innovative capacity and international competitiveness of individual firms through mergers and so on. The aim of the enterprise would be to create a better environment for innovation and to shift more of the burden for

financing research and development from the shoulders of the government to industry.

As for manpower, Canada is at present suffering similar experiences to her North American neighbour, and the prospect seems to be that the output of qualified scientists and technologists from the universities will greatly exceed the supply of jobs in the years ahead. But imprinted on the overall unemployment situation is what the Senate committee describes as "some curiously convoluted details". For one thing, many industrialists claim that they must look abroad for a substantial proportion of their personnel for industrial research, and that "while an abnormal number of fellows in the physical sciences come from abroad to take advantage of financial assistance in Canada, a high proportion of young Canadian social scientists use their scholarships to go abroad". The whole situation, the committee believes, represents "a serious misallocation of national funds", and it suggests that the Minister of State for Science and Technology should conduct a thorough reappraisal of the government's scholarship and fellowship schemes, taking into account the likely effect of the Senate committee's own proposals on the manpower situation.

In short, the report calls for closer integration of the government's activities in research and development, and an overall shift of emphasis towards industrial research and development, with private industry taking a greater share of the funding. In some respects, the Canadian government has already gone

a short way towards meeting these objectives by setting up a new ministry concerned with science and technology; the new minister, Mr Alistair Gillespie, an economist, was appointed in August last year. One thing Mr Gillespie will not be short of is advice—the Senate committee is aiming to produce two more volumes of its report, and the Science Council of Canada also reports to him. The heated discussion which this report will doubtless spark off in the universities could be as much of a help in defining objectives for the 1970s as the report itself.

ASTRONOMY

VLA Welcomed

by our Washington Correspondent

REACTION among astronomers to the Administration's decision to give the green light to the Very Large Array system of antennas has generally been one of approval. But it has also been tinged with regret that the decision was not made five years ago when the proposal was first seriously put forward. Nevertheless, the decision to proceed with construction in the 1973 financial year, if Congress approves, should give radio astronomy a much needed boost.

The Administration's approval came in the form of a \$3 million request in the budget of the National Science Foundation, which will be the first instalment of about \$63 million for the instrument. It is expected to take between five and ten years to build, depending on how quickly the funds are made available, and although no definite site has yet been designated the south-western part of the United States will be the most likely area. The siting is constrained by the need for a flat area of 35 km as far south and as high as possible to eliminate atmospheric disturbances.

The instrument will consist essentially of 27 antennas mounted on tracks in a Y-shaped formation, and it is described by the National Radio Astronomy Observatory (which will take charge of the instrument) as the radio version of the 200-inch telescope—a high-resolution image forming instrument capable of producing pictures of radio sources comparable with the finest optical telescopes.

The VLA will be used to study the physics of extragalactic radio sources, stellar structure and evolution and eventually also for interstellar spectroscopy. Initially, it will operate with a resolution of 1 second of arc at 2,695 MHz and 0.35 seconds of arc at 8,085 MHz, producing more than 10,000 picture elements in less than 12 hours. When interstellar spectroscopy is added, the instrument will also operate at another wavelength, but firm decisions have not yet been made.

AMERICAN PHYSICAL SOCIETY

Panofsky Elected

DR WOLFGANG K. H. PANOFSKY, Professor of Physics at the Stanford Linear Accelerator Center, was voted vice president elect of the American Physical Society at the society's annual meeting last week. This means that Panofsky automatically becomes vice president next year and president in 1974. Director of SLAC since 1961, Panofsky is an active advocate of arms control. He is a consultant to the Arms Control and Disarmament Agency, and a vocal opponent of the Safeguard anti-ballistic missile system. Among his scientific credentials are membership of the National Academy of Sciences, recipient of the E. O. Lawrence Memorial Award and the National Medal of Science. Philip M. Morse of MIT took office as President of the APS for 1972 at the same meeting.