

for amounts totalling \$100,000 and although all but a few of them were deserving cases, the funds available permitted us to accept only 25. Quite apart from their other benefits, the grants encourage the students to remain in Canada, a very desirable feature. We are finding also that they are tending to encourage private companies and organizations to provide grants.

To finance the activities of our mines branch, we are asking for approximately \$3.8 million for fiscal year 1959-60.

Demands for technical assistance from this branch have been increasing and solving of the problems arising from these demands is requiring greater attention to basic research. Among the more important of these problems is that of ground stress in the deeper underground workings. Much of our mineral wealth is obtained from mines that have already reached considerable depths. For this and other reasons, studies into the phenomena of ground stress are a necessity and the branch has been devoting much attention to such work.

Other long-term research of potential value to the mineral industry under way in the branch includes work on: the development of a pressure leaching technique which makes it possible to recover elemental sulphur from Sudbury nickel ores along with nickel and copper; an economical method for extracting manganese from certain low-grade manganese deposits; and direct methods for the reduction of Canadian iron ore.

In its study of Canada's non-metallic minerals the branch now has some ten major research projects under way. In one of these a comprehensive examination and study is being made of Canadian clays and shales. This information will provide assistance to brick and tile manufacturers and to other producers of ceramic products on processing problems and will be of aid in the selection of suitable raw materials.

Research on the fossil fuels, especially in relation to their production, beneficiation and utilization, will continue to receive major attention from the branch. The bituminous sand deposits of northern Alberta loom large in this field of endeavour. The branch, in cooperation with the United States Atomic Energy Commission and Richfield Oil Corporation, is now giving careful study to the feasibility of a nuclear explosion as a means of recovering the oil in the sands.

In its work on metals and alloys the branch is continuing its endeavours to improve the behaviour of existing alloys and to develop new alloys associated with such projects as missiles and atomic energy applications. In cooperation with the primary and secondary zinc producers and users in Canada it has initiated work under the name of the Canadian Zinc Research and Development Committee. It has undertaken two research projects to increase our knowledge of the behaviour of zinc and its alloys in certain applications, to produce better alloys, and to enhance the reputation and sales of Canadian zinc through technological advances.

In our estimates for 1959-60 is an amount of approximately \$1.6 million to finance the activities of the Dominion Observatories.

Studies of outer space have been very much to the forefront in recent years and in Canada the dominion observatories is the organization chiefly interested in such studies. As a further contribution to this work we now have under construction near Penticton, British Columbia, a radio telescope 84 feet in diameter. This instrument will enable a study of the hydrogen clouds that are the most characteristic features of the more distant parts of outer space, in which stars and planets have their origin. The same instrument will probably be used to some extent to investigate the physics of the atmospheres of the planets Mars, Jupiter, Saturn and other members of our solar system.

At Ottawa we are developing a new mirror transit instrument never