

million devoted to the forests themselves for research on improving forest growth and minimizing losses by fire, pests and diseases. With the privatization of the forest products laboratories in 1979 virtually all R&D on forest products, including wood products, pulp and paper, is now being carried out by the industrial sector, including research institutes.

**Mineral resources.** All the government's reported science expenditures for mineral resources come under the aegis of the energy, mines and resources department. The earth science services program collects geoscience information about the Canadian land mass and continental shelf.

The Canada Centre for Mineral and Energy Technology (CANMET) carries out most of the R&D in mineral technology. It performs, contracts and co-ordinates research on mining, extraction and utilization of minerals and metals. A mineral research program is concerned with non-energy minerals and metals and carries out research on mining technology, including health and safety and on processes to improve metallurgical operations and develop marginal resources.

A continuing program focuses on expanded usage of mineral-based materials, improved product quality and more diversified use of metals and alloys.

## Oceans

### 14.1.9

Canada has a longer coastline than any other country, much of it arctic or sub-arctic, and a continental shelf larger than the area of most countries. These facts and the extension of fishing zones to 200 nautical miles accentuate the importance of ocean-related research. The objectives of Canada's ocean policy are: to develop participation of Canadian industry in exploitation of offshore resources; to emphasize marine science and technology in resource management, ocean engineering and forecasting weather, ocean currents and ice movement; to excel in operating on and below ice-covered waters and to maintain an information base on renewable and non-renewable offshore resources.

A panel on ocean management was established in 1976 with responsibility for renewable and non-renewable resources, protection of the marine environment, development and control of navigation, defence, and international concerns.

Establishment of the fisheries and oceans department in April 1979 reflected renewed emphasis on ocean-based resources. Major expenditures in oceans science and technology go toward preserving and enhancing the quality of fresh and marine waters and the effective use of ocean resources.

Canada also participates in international programs. It supports the intergovernmental oceanographic commission affiliated with the United Nations; a weather monitoring project organized by a world meteorological organization; and as part of the integrated global ocean system transmits and receives data on sea surface, temperature, salinity and ocean currents through a world ocean data centre in Washington.

The national defence department performs ocean S&T largely in support of needs of its maritime command. Research ranges from ship propulsion, efficient hull design, and underwater acoustics to studies of human performance in the ocean depths.

A major new initiative for NRC in oceans S&T is the establishment of an Arctic vessel and marine research institute on the grounds of Memorial University, St. John's, Nfld., scheduled for completion in 1983.

An oceans-related technology development which has taken place in the last few years is a Canadian ocean data system (CODS) project. A Nova Scotia company, with scientific and technical assistance from NRC and funding from that council and the environment department, was able to develop an ocean data buoy system which is internationally recognized and has penetrated the world market. The system is being developed further toward the possibility of replacing the weatherships used for many years to collect meteorological and oceanographic data in the North Pacific Ocean.

Another Canadian high technology project with government and industry cooperation is known as SEABED. It is designed to develop new methodology for geological mapping of the seabed and 200 metres of the underlying strata.