The Bedford Institute

Canada is a leader in oceanographic research.

The federal government spends $72.4 million a year gathering information about the oceans. The Department of Fisheries and Oceans, the Department of Energy, Mines and Resources, and the Canadian Forces are all engaged; and the Bedford Institute of Oceanography in Dartmouth, Nova Scotia, which is government-supported, is one of three major oceanic research centres in the world. (The others are Woods Hole in Massachusetts and the Scripps Institution in California.)

Bedford has more than 1,000 employees and is part of a public complex that includes the Nova Scotia Research Foundation, the Micmac Lake Centre, the Technological University of Nova Scotia and Dalhousie University.

It has 12,000 books, 11,000 reports and 100 on-line data bases in its library; three major research ships, *CSS Hudson*, *CSS Baffin* and *CSS Dolphin*, and various auxiliary vessels scattered around the waters of the world. It also has the Batfish, a remote-control underwater monitor that measures temperature, salt, light, chlorophyll, fluorescence and conductivity. The Batfish has an electrically-powered hardrock drill that can bore holes in seabed rock 10,000 feet deep.

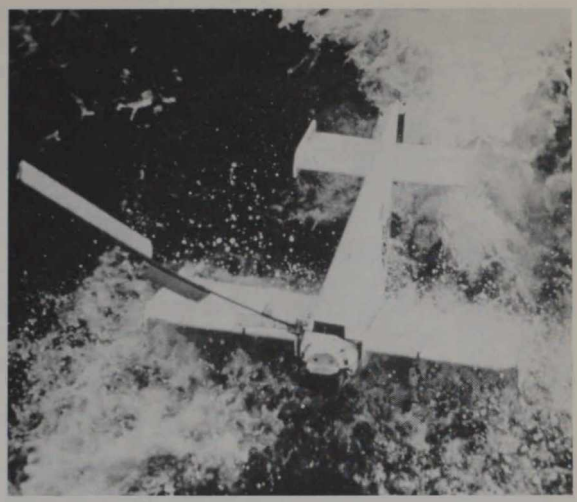
Much of the Institute's research, such as the gathering of information on the circulation of the oceans' waters, is basic and long-term; some, such as that dealing with fish populations and movements, has immediate application.

Last summer the Institute and Dalhousie were hosts to about 700 scientists from all over the world at the Joint Oceanographic Assembly, the first assembly held in North America. It focused on weather and water. Kenneth Hare, a meteorologist at the University of Toronto and co-chairman of the National Academy of Sciences and the Royal Society of Canada's Joint Committee on Acid Precipitation, gave the keynote address. He predicted that if mankind continues to burn fossil fuels at present or greater rates the increase in carbon dioxide in the earth's atmosphere will make the weather noticeably warmer in twenty years and will change the climate of the earth in a century. He said it will melt snow and ice at the poles and cause ocean levels to rise ten feet, flooding coastal cities.

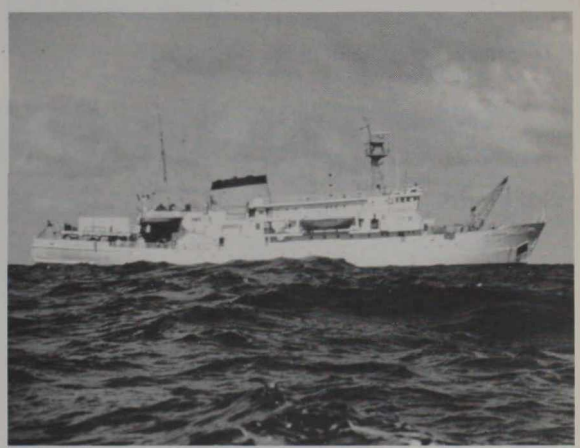
The *Hudson*: Pingoes, Chimneys and Benthic Storms

In 1970, the Institute's flagship CSS *Hudson* became the first ship to circumnavigate the Americas, sailing 58,000 miles, from Halifax, N.S., to Antarctica, to Vancouver, through the Beaufort Sea and Baffin Bay, around Newfoundland and back to Halifax.

In the Beaufort it discovered submerged pingoes, cones of antediluvian ice coated with frozen muck, sticking up like dirty spearheads, some within forty feet of the surface. They could pierce and rip the bottom of a ship the way a knife can gut a fish.



The Batfish.



CSS Hudson.

Two years ago the *Hudson* completed its detailed survey of the pingoes, providing navigators with their precise locations and making it safe to bring out Arctic gas and oil in deep-draft ships.

Last year the *Hudson* worked in the Norwegian Sea monitoring the movement of heavy, cool, saline waters as they sank to the ocean's floor and interacted with the warmer waters. The project was part of an international survey, and while the *Hudson* was doing its work the U.S. drilling ship *Glomar Challenger* was winding up a three-year effort in the Pacific where it drilled 4,429 feet down below the bottom floor.

The project—which involved ships in the Atlantic, Pacific and Indian Oceans, the Scripps Institution of Oceanography and scientists from a number of universities—has enormously expanded man's knowledge of the way oceans behave. The most significant finding was that a volume of water equal to the water in all the