

## About the Institute

The Institute of Ocean Sciences, Patricia Bay, is the newest of three federal government institutions devoted to the study of Canada's lakes and rivers, coastlines and oceans. It houses hydrographers and marine scientists whose common interest is a continuing study of British Columbia coastal waters, the North Pacific Ocean, the Canadian Arctic and navigable fresh waters east to the Manitoba border.

The multi-level building is situated on 36 acres of land sloping to the shores of Saanich Inlet at Patricia Bay, 30 kilometres north of Victoria, B.C. The main building provides a library, auditorium, computing centre and administrative offices as well as offices and laboratories for hydrographers and scientists. Precision machine shops, electronic laboratories and a water tunnel provide further support for research programs and hydrographic surveys.

This building complex brings together groups from several federal government agencies previously located in Victoria and Vancouver. The main components are Ocean and Aquatic Sciences of the Department of Fisheries and Oceans, and the Pacific Geoscience Centre of the Department of Energy, Mines and Resources.

## Programs

The Institute serves as home base for hydrographers and scientists whose field work takes them to inlets and estuaries of the British Columbia coast, out over the continental shelf and slope to the North Pacific, and to Arctic seas, fjords and islands.

Institute personnel also participate in far-ranging international experiments investigating ocean pollution, ocean circulation and the ways in which the oceans affect the world's weather and climate.



### INSTITUTE OF OCEAN SCIENCES PATRICIA BAY

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# INSTITUTE OF OCEAN SCIENCES PATRICIA BAY



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Canada  
Institute of Ocean Sciences, Patricia Bay

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## Hydrography

The Canadian Hydrographic Service has been responsible for charting Canadian waters since it was formed in 1907, replacing British Admiralty surveyors. Its prime objective is to provide accurate navigational information, published in the form of charts, tide tables and sailing directions, for shipping companies, pilots, commercial fishermen, harbor engineers and recreational boaters. Pertinent information is also provided for other federal government services, engineering and consulting firms, research scientists, environmental groups and the public.

New techniques for taking depth soundings and other measurements have replaced the leadline and sextant of earlier times. Electronic instruments and computers enable hydrographers to collect and process the vast amounts of information needed for thorough mapping of the oceans much more quickly and accurately than in the past.

A section of this Division is responsible for much of the design, installation and maintenance of instruments, including positioning and communication systems.

## Oceanography

Chemists, physicists and biologists work together on programs designed to study complex ocean systems. Their objectives are:

- to provide information about the marine environment and its resources
- to assess the impact of man's activities on the oceans
- to assess and predict the effect of the oceans on human activities.

Gathering this information over large areas of ocean and coastline requires a number of research platforms including Institute ships, Coast Guard weatherships, aircraft and buoys. Launches equipped with oceanographic instruments and computers are used for inshore work. A caravan of tracked vehicles has been designed by Institute staff for arctic programs. Portable, contaminant-free laboratories are used for chemical analysis on board ships. Temporary field stations include small boats in the Fraser River and camps on Arctic islands.

From these platforms oceanographers measure and record waves, currents, circulation patterns, chemical components, nutrients, plankton growth and productivity, the interaction between air and sea, temperature and salinity variations and other facets of the ocean. Some measurements are processed at sea by small computers. More detailed processing and analysis is carried out later at the Institute. In addition, hundreds of water samples are brought back by chemists and biologists for analysis in Institute laboratories.

Two sections of the Physics Division give added support to coastal, offshore and arctic oceanographers and to hydrographers. One uses satellite and aerial techniques to gather and assess information which supplements data obtained from the sea surface. The other constructs mathematical computer models to predict circulation and tidal levels under given conditions. These models can be used, for example, for rapid prediction of the movement of spilled oil.

## Pacific Geoscience Centre

The upper wing of the Institute houses the Marine Geology Section of the Geological Survey of Canada (Pacific Region) and the Victoria Geophysical Observatory of the Earth Physics Branch, Department of Energy, Mines and Resources.

Programs include marine geological studies of the coastal regions, the continental slope and shelf, and deep ocean sediments. Marine and land geophysical measurements are made to determine the thickness and composition of the sediments, bedrock and deep layers of the earth's crust.

Information from these measurements is used to locate and map undersea resources, to study geological processes, such as erosion, landslides and earthquakes, and to investigate properties of the deep interior of the earth. Potential sources of geothermal energy are also investigated.

Scientists at the Centre also measure changes in the earth's magnetic field. This information is used to produce geomagnetic charts important to navigators and surveyors for accurate correction of compass bearings.

The seismograph station serves as a collecting point which receives and displays information about earth tremors telemetered from a number of detectors in the region.

## Program application

Institute programs are designed to provide information needed for effective coastal zone and fisheries management and for the protection and enhancement of the marine environment. Questions being asked include:

- how can we achieve the best balance between conflicting demands imposed on B.C. coastal waters by increased marine traffic, commercial and sport fisheries and industrial and residential growth?
- what impact does oil drilling, and possible undersea blowouts, have on the marine and coastal environment?
- how does the Pacific Ocean affect the weather over North America and Europe?

## International Research

Co-operation with university scientists, other Canadian institutions and other countries enables Institute scientists to make valuable contributions to the solution of international or global problems too large to be undertaken by one institution or any single country.

## The Ships

The Institute operates several major vessels, including the 64-metre Parizeau and the 40-metre Vector. Parizeau, used by hydrographers and scientists for both Pacific and Arctic cruises, has covered a wide expanse of ocean from Tokyo and Hawaii to the Beaufort Sea. The smaller Vector is used by Institute and university scientists for shorter cruises in coastal waters. In addition the Institute operates the Richardson, used for hydrographic and oceanographic programs, the hydrographic survey vessel Revisor and a fleet of 30 survey launches.

The Institute's two-man submersible, Pisces IV, has carried out oceanographic studies to depths of 800 metres in the Pacific and the Arctic. The MV Pandora II is on long-term charter to the Institute as mothership to the small submersible, and as a research ship.

The jetty extending into Patricia Bay provides 650m of docking space for ships and a small boat basin for the launches. Ship repair and maintenance is carried out in nearby workshops completed in 1976.

1. Chemist lowers 'Blumer' sampling bottle during environmental study of the Beaufort Sea. The water will be analysed for hydrocarbon content.

2. Scientist measures energy expended by small aquatic animals for respiration. This information contributes towards measurement of energy flow through communities in the ecosystem and leads eventually to prediction of fish yields, both in nature and in sea farming.

3. Foyer of cafeteria serves as a meeting place for discussion of scientific paper - or for a quick game of chess during lunch hour.

4. Acoustic current meter is checked in the laboratory before being deployed at sea. The instrument can be lowered from a ship to measure the direction and speed of ocean currents, or, with internal self-recording equipment, can be fixed in remote locations to operate automatically for days or months as required.

5. Two-man deep-diving research submersible Pisces IV being launched from stern of mothership Pandora II. Stabilizing fins, left, were designed especially for Institute programs.

6. Oceanographic technician checking water sampling bottles on one of the Canadian weather-ships which take meteorological and oceanographic observations at Ocean Weather Station P 850 nautical miles west of Vancouver Island.

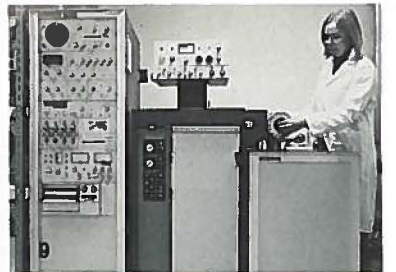
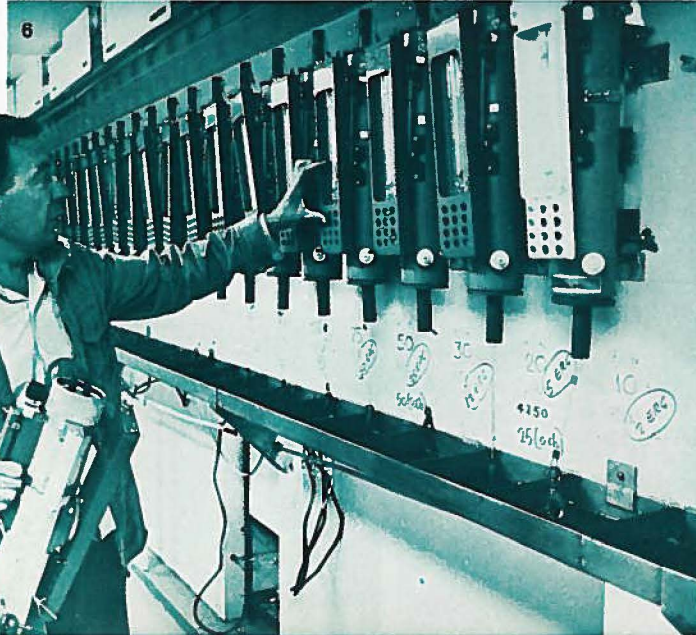
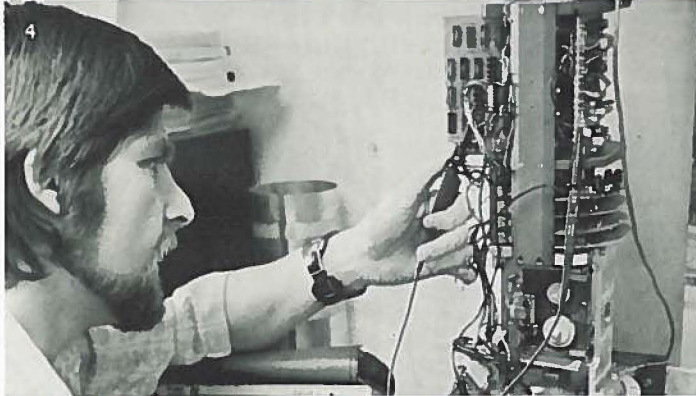
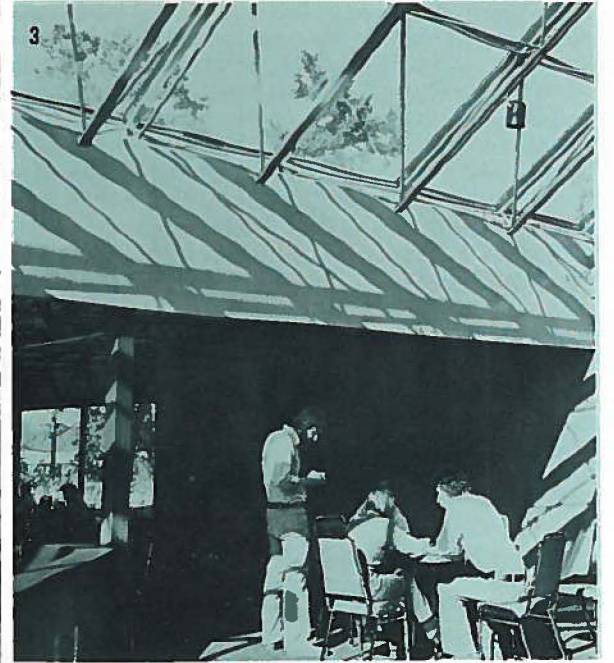
7. Draughtsmen preparing the master plates from which navigational charts will be produced. Meticulous care with a great many details is essential since the safety of ships and crews may depend on the accuracy of the chart.

8. Stocks of navigational charts are 'corrected' by hand to show new or relocated lights, marker buoys and other information of importance to mariners. Updated information is included in subsequent editions of the charts.

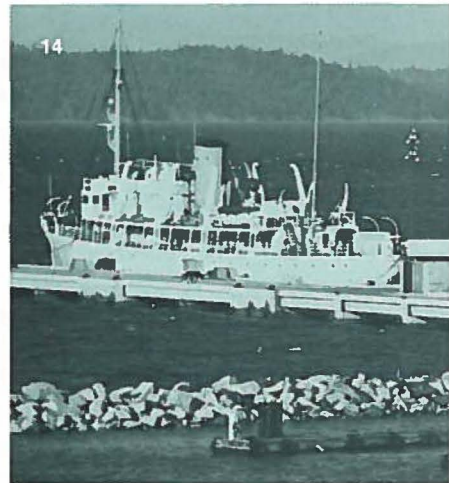
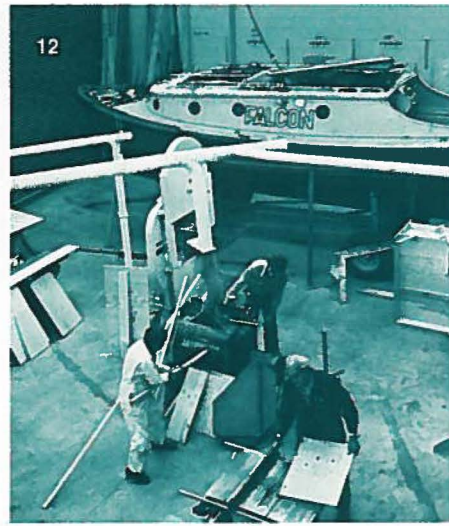
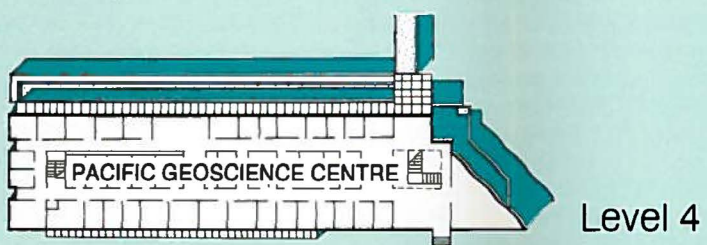
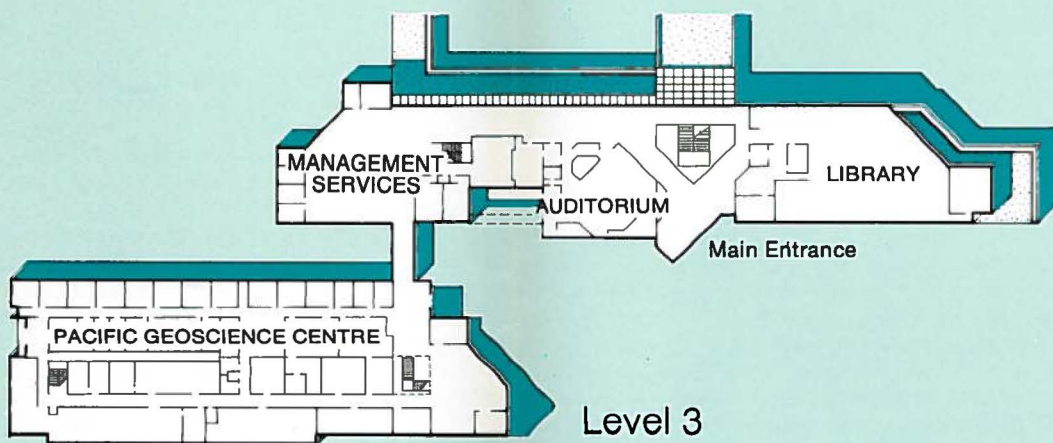
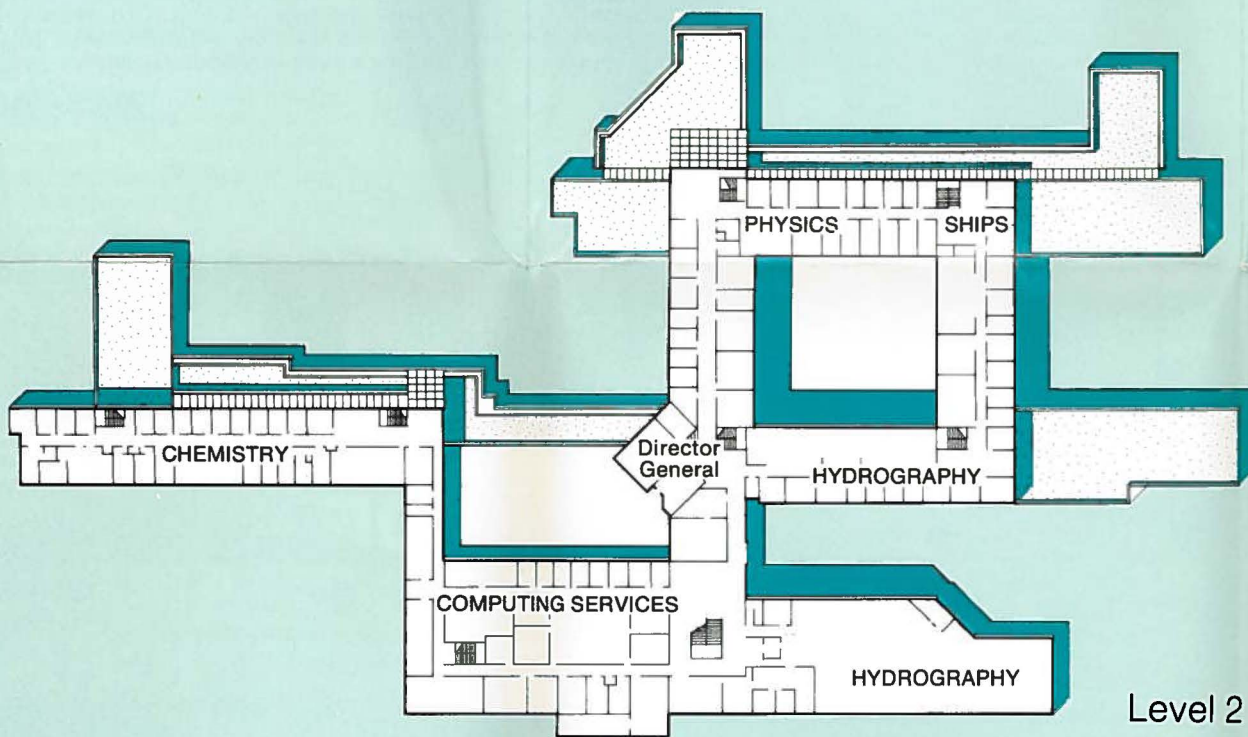
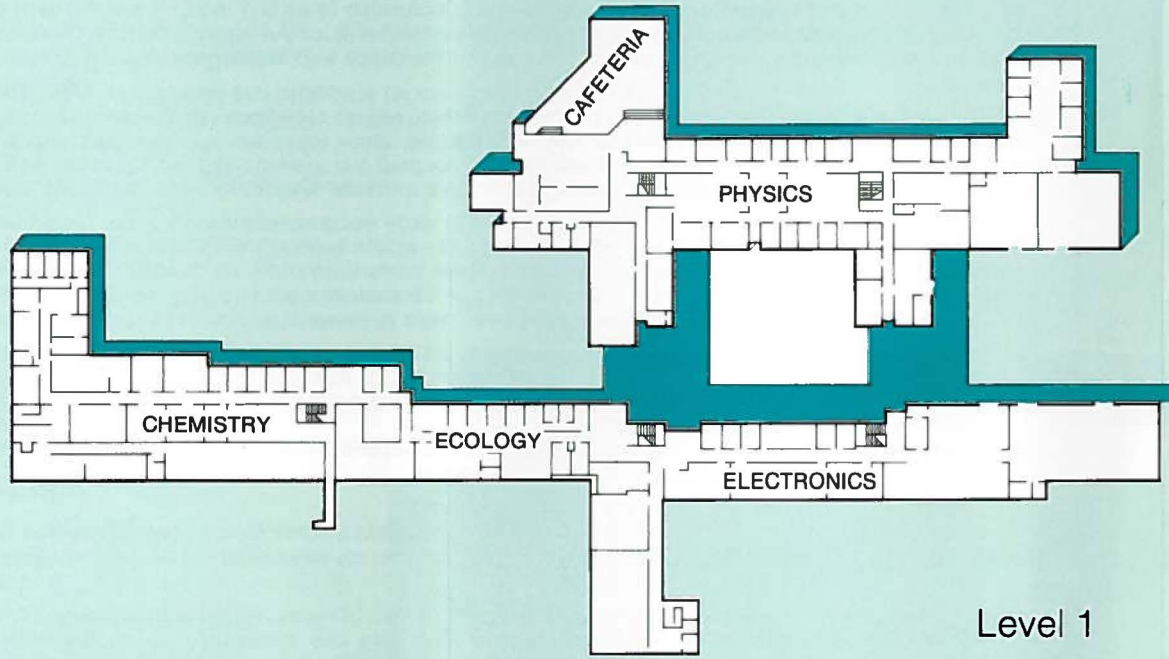
9. A Finnigan gas chromatograph/mass spectrometer system is used for detection and identification of hydrocarbon compounds in sea water samples.

10. 'Arctic Research Units' have been designed by the Institute for oceanographic research in the Arctic from the sea-ice surface. Two tracked vehicles provide laboratory space and living quarters for scientific party for many days away from base camp. Instrument sled (centre) is positioned over a hole drilled through the ice for lowering instruments.

11. The research ship Vector was designed primarily for biological research but is also used for current surveys and physical and chemical oceanography in coastal waters. She is used extensively by Canadian west coast universities as well as by the Institute and other government agencies.



# INSTITUTE OF OCEAN SCIENCES





**12.** Launch repair facility in the Institute depot area. High speed launches operating from a mother ship or from a shore base carry out hydrographic surveys and oceanographic work in coastal areas. Modern fibreglass and some older wooden launches, as shown here, are all maintained and repaired in Institute shops.

**13.** Twenty-metre vessel Richardson is used for survey and research in inshore waters.

**14.** Foreshore area, showing equipment assembly area and boat launching ramp, small boat basin and main jetty with survey vessel Wm. J. Stewart at her berth.

**15.** Pandora II and the hydrographic survey vessel Wm. J. Stewart at the jetty, seen from shore in front of the Institute.

**16.** Hydrographic launch returns to small boat basin after survey in Saanich Inlet

**17.** The Parizeau, built in 1967, is used for hydrographic surveys and oceanographic research. She carries 13 scientists and a crew of 35.

