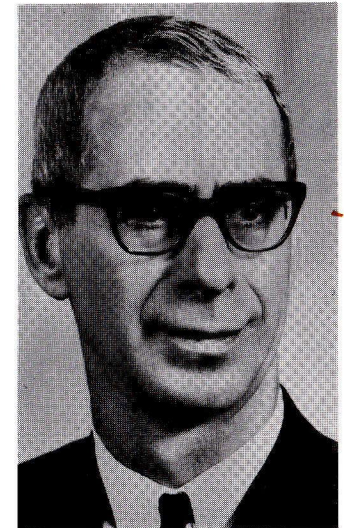


CNAV
QUEST
AGOR 172
DEFENCE RESEARCH VESSEL

DEPARTMENT OF NATIONAL DEFENCE

L. J. L'HEUREUX,
Chairman, Defence Research Board



With the commissioning of CNAV QUEST for Atlantic Ocean operations, Canada's defence scientists are now equipped to advance their acoustics and associated research aboard a ship specifically and uniquely designed to probe and clarify many of the mysteries presented by that vast and ever-changing ocean.

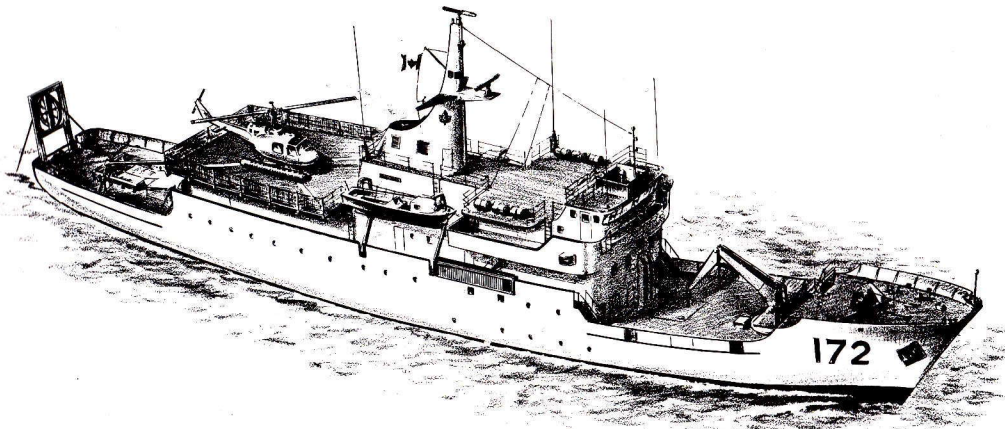
The 252-foot vessel, which displaces 2,200 tons, has been designed primarily for anti-submarine warfare research but it will also contribute significantly to filling gaps in scientific knowledge about the oceans.

Among the many features of this new Defence Research Board facility are unprecedented design techniques and carefully chosen onboard fittings which can be combined to make the QUEST a truly "quiet" ship — an urgent necessity for the complex acoustics and related research that will constitute the ship's primary function. An unusual and varied array of winches and associated gear, capable of handling very heavy research equipment, will increase immeasurably the long-term usefulness of the QUEST for at-sea research.

While neither Canada nor Britain in the past has named warships QUEST, scientists at the Defence Research Establishment Atlantic who suggested the name feel it is particularly appropriate in view of her research mission — in parallel with the objectives of the ship of the same name that bore the famed Sir Ernest Shackleton on his last expedition to the Antarctic.

On behalf of the Defence Research Board, I extend to the officers and crew of CNAV QUEST, and to all the scientists who will sail aboard her, my best wishes for many years of productive and happy operations.

L. J. L'Heureux
Chairman
DEFENCE RESEARCH BOARD



THE SHIP

The new ship, designated AGOR 172, is the second to be built for the Defence Research Board and will be employed by the Defence Research Establishment Atlantic located at Dartmouth, Nova Scotia.

The ship was constructed by Burrard Dry Dock Company Limited, North Vancouver, B.C., and the main propulsion machinery was applied by Canadian General Electric Company Limited, Peterborough, Ontario. The Electric Boat Division of General Dynamics Corporation, Groton, Connecticut, U.S.A., was the acoustic consultant for the Department of National Defence.

General characteristics of the ship are:

Length overall	252'-10"
Beam	42'- 0"
Mean draught	15'- 6"
Displacement	2,200 tons
Total shaft horsepower	2,900
Speed	15 knots

The hull configuration chosen was designed to provide the high degree of seakeeping ability demanded by oceanographic and related research, and economical speed. The anti-roll stabilization system installed will reduce the ship's roll providing a steady platform which in turn will increase research time at sea.

Twin screws and a retractable type bow thruster will make possible maximum manoeuvrability and the ship is designed for navigation in ice, a condition encountered frequently in the North Atlantic Ocean.

The propulsion machinery consists of a diesel electric system with two main diesel generators. In addition, a gas turbine driven generator will provide propulsion during quiet operations and extended periods of slow running. The propulsion motors can be controlled from the bridge, the aft control position and the propulsion control flat in the machinery spaces.

Safety features include a CO₂ smothering system in the machinery spaces and a sea water spray system in the magazine. The latter is provided for the storage of the explosive charges employed in acoustics research.

The ship is specifically designed to handle bulky scientific equipment over the stern to depths of 15,000 feet. A heavy equipment winch, fitted in the compartment below the quarter deck, helps to serve this requirement. In addition, an oceanographic winch is fitted in the wet laboratory on the port side.

The ship's research program requires the reduction of structureborne and airborne noise to the minimum. Special arrangements for mounting machinery, piping and trunking, and the provision of acoustical bulkheads have been included and serve to attain minimal noise requirements. Extreme care was exercised also in the detailed design and construction of the ship to minimize noise and vibration so that the ship-radiated noise level will be the lowest possible within the limits of existing technology.

Accommodation for the officers, the crew and the scientists are of a very high standard and an air conditioning system will make possible uninterrupted operations in tropical waters.

SCIENTIFIC FACILITIES

Laboratories

Scientific facilities in QUEST are concentrated primarily on two deck levels.

The main deck provides a large open working area aft for the major facilities required to lower heavy equipment into the sea. Forward of the superstructure is a small well deck fitted with a heavy articulated crane, and a cargo hatch to the hold below. These deck areas serve adjacent laboratories housing measurement and recording equipment.

The larger space adjoining the quarter deck consists of three rooms — a large instrumentation laboratory, an explosive assembly work shop, and a plotting room.

The main instrumentation space is the Dry Laboratory with an area of 850 square feet. Every effort has been made to provide flexibility and rapid changeover from one series of experiments to another. Furniture is modular to facilitate limited rearrangement and a large number of standardized mounting positions permit shock-mounted racks of equipment to be moved easily from place to place or to be removed to the jetty through the decks above.

A small Plotting Room adjacent to the Dry Laboratory provides a communications centre and houses displays connected to the ship's radars, echo sounders, and navigational instruments.

other examples of the lengths to which silencing has been carried is the steering gear's hydraulic system of advanced design which employs components particularly selected for silent operation. In addition, large areas of the ship's hull are coated with thick sound-deadening tiles to reduce the vibration of plates and frames.

Varied Winching Facilities

CNAV QUEST is fitted with a wide range of winches which provide versatility in matching wire size, length and speed in accordance with the needs of specific operations. The largest is the 370 h.p. heavy equipment winch located below the quarterdeck which will hold 15,000 ft. of 1½ inch diameter electrically-cored cable. It will haul at a speed of 350 ft. per minute.

This is a highly specialized winch based on a slightly smaller version designed by DREA and used successfully for many years in CNAV FORT FRANCES. It consists of a capstan which gradually relieves the tension of up to 25 tons in the wire as it passes several times around two specially-grooved drums. Finally, the wire is taken off at a nominal tension, about a ton, to a storage spool. There it can be stored layer upon layer without very heavy crushing forces building up on the electrical cores of the inner layers of wire. The control of driving torques on the capstan drums and storage spool must be very precise indeed so that the proper tension relationships are maintained during all phases of start-up, inching, high-speed raising and lowering, deceleration and braking.

The electrical power generated when lowering heavy loads at high speeds is dissipated in large water-cooled electric heating elements. This is an essential feature as the ship's service generator supplying the winch could not absorb the large reverse power. The control position for this winch is on O1 deck, two decks above, in the after part of the superstructure. Here the operator has an excellent view of equipment entering the water over the stern. The winch was designed and built by John T. Hepburn Limited of Toronto, who subcontracted the hydraulic and electronic systems to the Denison Division of Abex Corporation, Columbus, Ohio.

Medium-sized and small high-speed winches for oceanographic work are located on O1 deck in the Wet Laboratory and forward under the fo'c'sle is a deep anchoring winch capable of holding 14,000 feet of ¾ inch diameter wire rope and hauling it and a 500 lb. anchor at 600 ft. per minute.

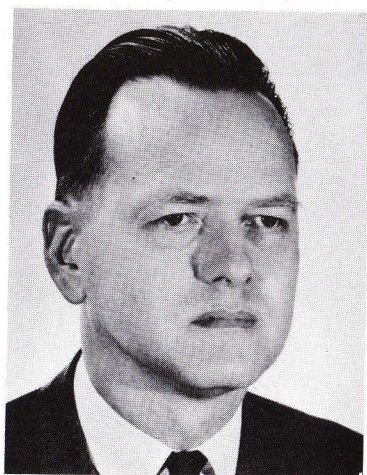
Equipment can be lowered over the side from a 5-ton articulated crane forward, and from a 1-ton crane aft with a long extensible boom.

Massive research gear used with the heavy equipment winch is handled over the stern using specialized hydraulically-operated launching gear. The usual anchoring windlass and mooring capstans are provided. An interesting feature of some of the winches is the LeBus automatic level-wind which has proven highly successful in other DREA ships in providing very even lays of wire on the drum at high speeds without the use of lead screws.





Dr. J. G. RETALLACK,
Director General,
Defence Research Establishment Atlantic



R. A. KENDALL,
DRB Project Engineer

DEFENCE RESEARCH ESTABLISHMENT

Atlantic, Dartmouth, N.S.

The Defence Research Establishment Atlantic (DREA) which specializes in research for maritime defence, is located in Dartmouth, N.S., across the harbour from the Canadian Forces Base in Halifax. It had its beginning in World War II as the Naval Research Establishment and during the post war years, made significant contributions in the development of variable depth sonar and techniques for preventing underwater corrosion of ships' hulls.

DREA's interests now lie in three areas — research associated with the acoustic detection and tracking of submarines, the hydro-dynamics of underwater equipment such as hydrofoils and streamlined bodies, and assisting the maritime component of the Canadian Armed Forces directly by the application of relevant science to its needs. Other DRB establishments, with anti-submarine warfare interests, will be employing the ship's facilities from time to time.

A major part of DREA's program is the measurement of those physical properties of the Atlantic Ocean which affect acoustic detection of submarines. These measurements help DREA to determine where the sound transmitted by a sonar goes and why; to develop techniques for directing sound to a special target location; to determine the source and quality of unwanted sounds and to devise ways of preventing their interference. Outstanding results in measurements of reverberation from the surface and from biological scatterers in the volume of the ocean have given DREA an international reputation.

Two research ships, one being replaced by CNAV QUEST this summer, are operated for DREA by Maritime Command of the Canadian Armed Forces. They are fitted with DREA-designed equipment to make acoustic observations from near the surface to depths of more than 10,000 feet. Hydrophones and sound-making projectors, designed and built at DREA; are tested at an acoustics barge in Bedford Basin where Armed Forces sonic devices for ships and aircraft are also calibrated.

Research aimed at the development of ocean-going hydrofoil craft began at DREA in 1951. Proposals based on this research led to the construction of the Canadian Forces prototype fast hydrofoil escort, FHE-400. DREA has continued to assist with trials of this craft both in model and in full scale form.

The largest of DREA's three experimental hydrofoil craft has now been fitted for high speed underwater towing. With this facility, members of the hydrodynamics team are studying bodies and cable fairing with the application to high speed underwater towing of sonar bodies. This research applies also to helicopter-towed acoustic survey devices of other government departments.

Through a Dockyard Laboratory Section and an Anti-Submarine Warfare Service Projects Unit, scientific support for the Armed Forces on a day-to-day and short term basis complements the establishment's longer term research projects.





LCDR J. FAWLEY,
Principal Naval Overseer, West Coast



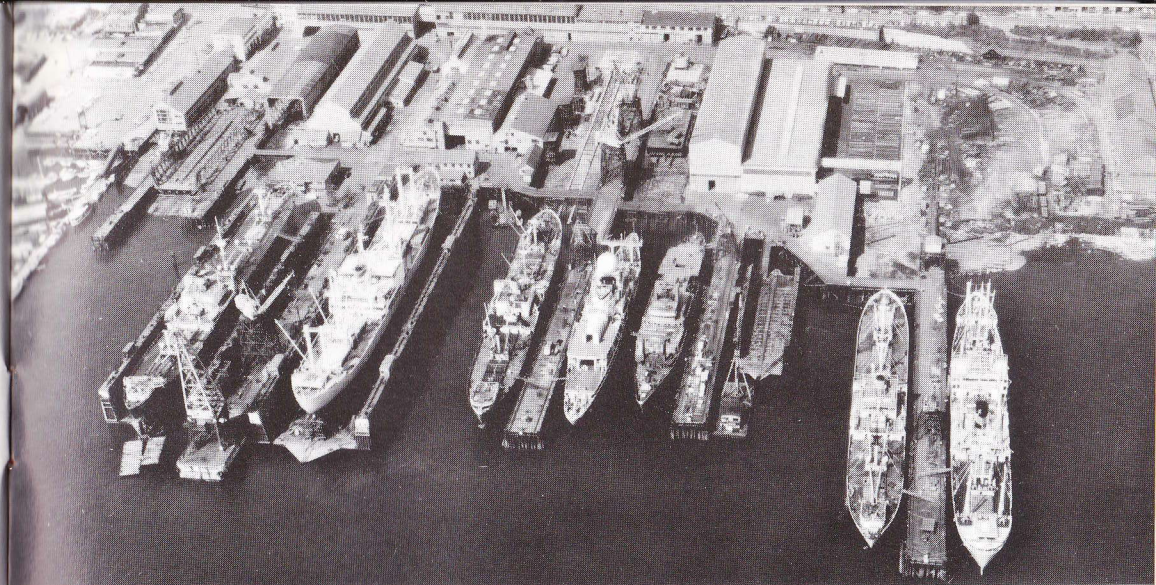
LCDR N. F. HELLYER,
Assistant Principal Naval Overseer, West Coast

THE OVERSEERS

The task of overseeing the construction and fitting out of CNAV QUEST during the past many months has been that of a staff of career specialist officers and technicians of the Canadian Armed Forces as well as senior civilian technical officers who comprise the staff of the Principal Naval Overseer West Coast.

The Naval Overseers are the vital link between the design authorities and support agencies at Canadian Forces Headquarters and the shipbuilder. Their role is to assist the shipbuilder by resolving design and construction problems at the site; interpreting drawings; documenting technical data and providing equipment and stores. Throughout the construction of the ship, they carry out a progressive inspection program for the laying of the keel, through the fitting out of the propulsion machinery and the maze of electrical cables and control equipment, on up to the final trials in conjunction with handing over the ship to the Captain and his crew.

The Principal Overseer West Coast has maintained an office in Vancouver since 1951 either as the principal shipbuilding inspection activity in B.C., or as a branch of the Victoria office. The present Acting Principal Naval Overseer for the West Coast is Lieutenant Commander J. Fawley, DC, whose office is located in the yard of Burrard Dry Dock Company Limited.



THE BUILDERS

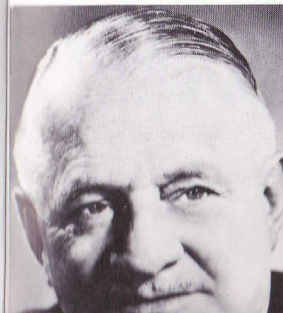
The acceptance of CNAV QUEST is another milestone in the proud history of Burrard Dry Dock Company Limited.

Founded in 1895 and established on its present site in 1906, the company has been closely connected with the development of western Canada and the port of Vancouver. Starting with the construction of small wooden fishing vessels, hundreds of new ships have left its yards in peace and war, ranging from stately sailing ships to large cargo vessels and naval ships of many types.

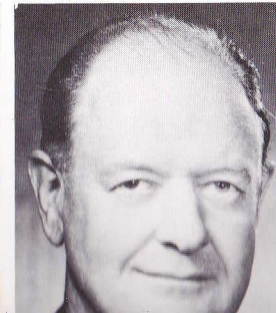
A member of the Burrard-Yarrows Group, Burrard Dry Dock in North Vancouver and Yarrows Limited in Victoria, maintain the largest integrated shipbuilding and ship repairing organization on Canada's west coast. In addition, its industrial divisions produce a variety of engineering products for industries of the western provinces.

CNAV QUEST is the most modern and sophisticated member of a growing fleet of auxiliary general oceanographic research vessels built in various maritime countries to extend our knowledge of the potential of the seas. The complexity and standard of outfit used in her construction is a tribute to the ability of the company's craftsmen and engineers.

THE HONOURABLE C. WALLACE,
President



J. W. HUDSON
Executive Vice-President



D. E. WALLACE,
General Manager



E. J. JONES,
Yard Manager





F. S. WILLIAMS,
Chief Engineer



CAPTAIN J. C. BENNETT



ALLAN EDWARDS,
Supervisor of Auxiliary Vessels,
Halifax

NEWEST ADDITION TO AUXILIARY FLEET

The Canadian Naval Auxiliary Vessel QUEST, one of the most modern ships of its type in the western world, is the largest and newest member of a proud team which carries out a wide variety of maritime tasks. The Canadian auxiliary ships conduct these missions in harbours and in open waters which support, but are not the responsibility of warships.

The QUEST replaces the ageing ex-RCN Algerine minesweeper NEW LISKEARD. During her 25 years of service with the Canadian Navy and in support of the Defence Research Establishment Atlantic, the NEW LISKEARD has established an enviable operational record both as a warship and also as a vessel modified for shallow and deep water defence research.

The new vessel will be commanded by Captain J. C. Bennett. The Chief Engineer will be F. S. Williams and the supporting crew of deck and engineering personnel will total 35.

Allan Edwards, Supervisor of Auxiliary Vessels, Halifax, who is responsible for the east coast auxiliary fleet, has accumulated 41 years of experience in the merchant and government marine service. Many of the 300 officers and men under his supervision began their sailing during the 1920's.

The future operation and programming of CNAV QUEST will become the responsibility of the Commander, HMC Dockyard, and of DREA, Halifax.