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RESEARCH VESSEL *VARUNA*

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THE Indo-Norwegian Project had already, at an early stage, taken up the idea of including marine research work as part of the Project activities, in close co-operation with Indian scientific institutions and scientists.

In December 1957 one of the fishing schooners of Indo-Norwegian Project M. O. *KRISTENSEN* was converted to a fishing-*cum*-research vessel. This vessel was later replaced by another fishing vessel, I. N. P. *KALAVA*.

During the period of 1958-59-60 a number of cruises were conducted to areas off the Malabar coast including Laccadives. The fishing-*cum*-research vessel was operated by the Central Marine Research Institute, Mandapam, partly assisted by a Norwegian Research Adviser.

The need for a suitable research vessel was soon found essential, and the Board of Indo-Norwegian Project decided to construct an ocean going research vessel for the operating disposal of Central Marine Fisheries Research Institute.

R. V. *VARUNA* is designed by Naval Architect Erling Sivertsen, Directorate of Fisheries, Bergen, Norway and built by Ankerloekken Verft, Floroe, Norway.

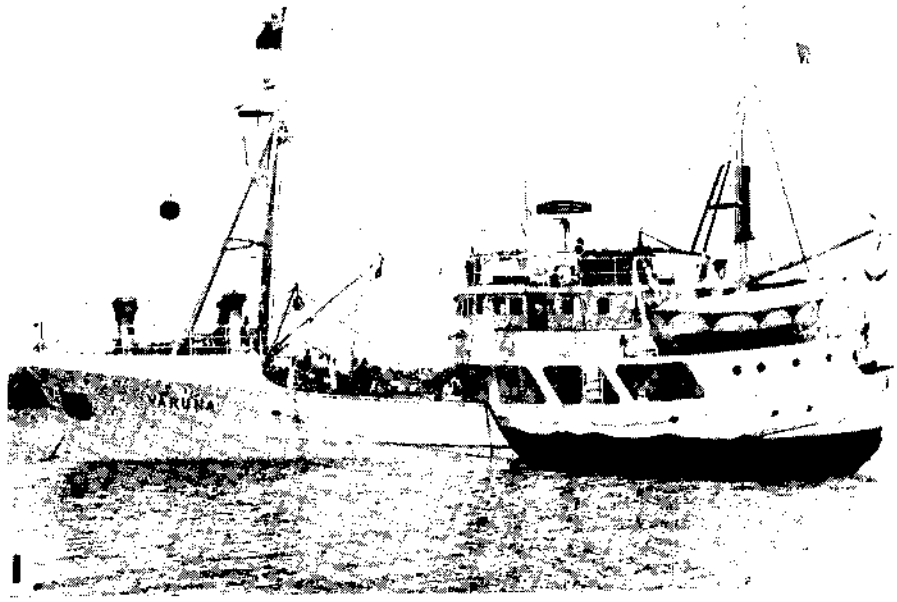
The research vessel was launched in September 1961 and bound for India in the beginning of October same year. After a total crossing time of 38 days she arrived in India on 19th November 1961.

R. V. *VARUNA* has an overall length of 27.98 meters with a moulded breadth of 6.70 meters and depth of 3.38 m. The hull is made of steel shell-plate and casing and wheel house of aluminium, deck and inside outfit is made of hard-wood.

R. V. *VARUNA* is powered by a 4 AC Wichmann diesel which develop 400 HP at 350 rpm. and which gives her a running speed of 1o knots. Auxiliary machinery includes two 52 HP Volvo Penta diesel connected to two 220 AC generators, each of 20 kilowatts. The Lemkuhl refrigerating machinery supplies two deep freezing holds (—32°C) and one cold storage (+5°C). She has also got a Nirex evaporater which is capable of supplying one ton of fresh water every 24 hours.

She has one controllable pitch propeller. Propeller and engine are controlled from the wheel house. Fuel oil capacity is 35.50 tons which gives her a maximum endurance at sea of approximately 30 days. She is fitted with hydraulic steering equipment, electric log, radio direction finder and Decca D. 404 radar.

The radio telephone is a 100 W. transmitter with 12 frequencies and approximate range of 500 miles. The equipment also includes 3 Simrad echo sounders and



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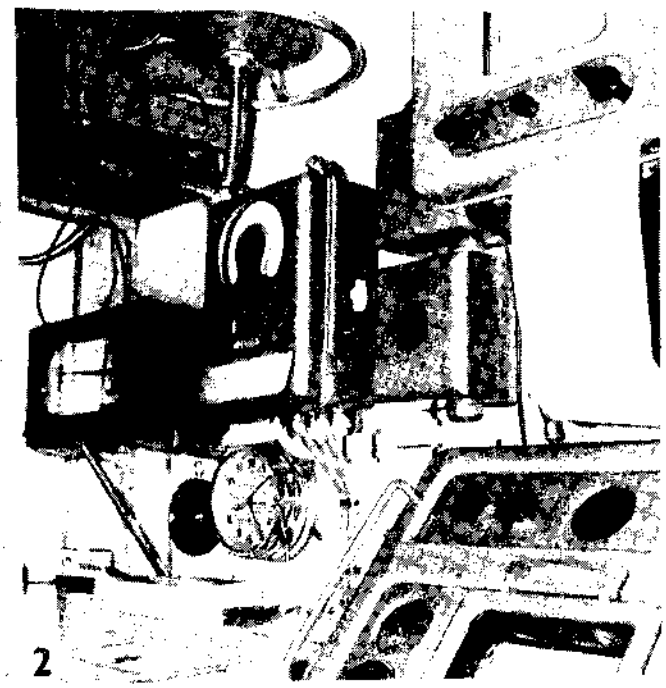

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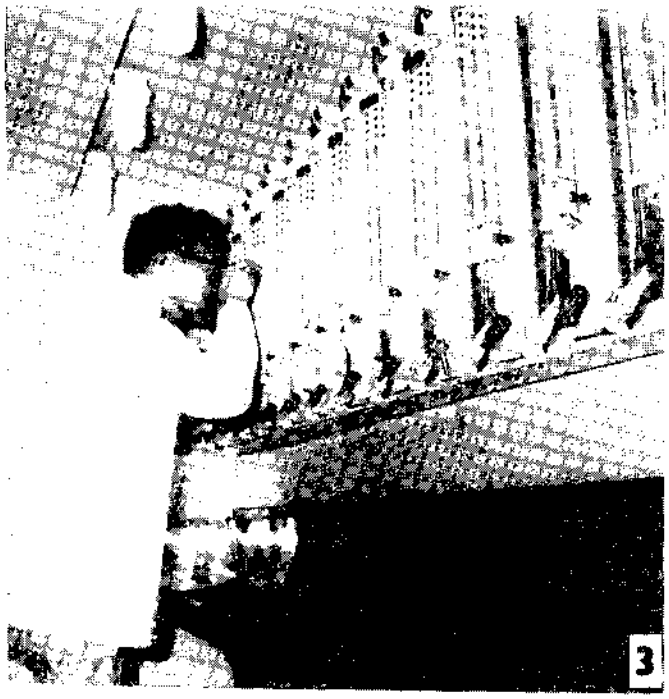
Fig. 1. The Research Vessel *VARUNA*, a general view.
Fig. 2. The Echo Sounder and other depth recording instruments in the laboratory.



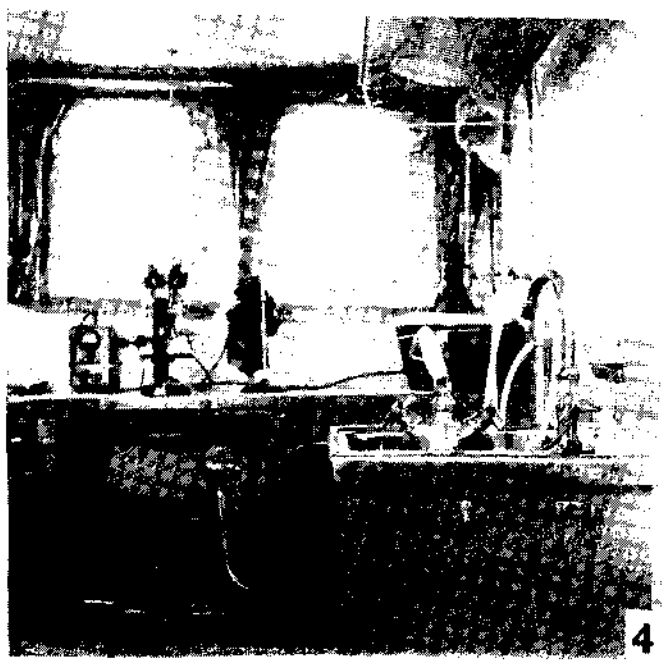


Fig. 3. The hydrographic laboratory on board R.V *VARUNA* when the series of reversing water bottles are in view.

Fig. 4. Part of the biological laboratory on board.

one Simrad sonar (asdic). One echo sounder has a range of 200 meters, one ' white-line ' echo sounder with a range of 1250 meters and one deep echo sounder with the range of approx. 12000 meters. The horizontal range of the sonar is 1500 meters. For all instruments the transducing ping is variable.

She has a hydraulic 2 drums trawl winch, containing altogether 1400 fathoms of $1\frac{3}{4}''$ trawl wire, besides 2 hydraulic hydrographic winches one containing 4000 meters 4 mm steel wire and the other 2000 meters of the same. She is equipped with a Puretic power block and one long line self-winder.

R. V. *VARUNA* has got accommodation for a crew of 17, including 4 scientists, a cabin for the skipper on the bridge, 4 single berth cabins, 2 two berth cabins and one 8 berth cabin forward under the whaleback.

Three different laboratories are available in the ship. 2 analytic laboratories and one sampling laboratory. One small room under the whaleback is provided for fish processing. All laboratories are provided with electric energy, hot and cold water and one laboratory also with sea water. Among the scientific equipment could be mentioned 15 Nansen reversing bottles, 2 bathythermographs, one binocular, one pH-meter, one electro-photometer, one centrifuge, one vacuum pump, sediment silts etc.

One stainless steel sea water tank is placed on deck for fish tagging experiments. She is also equipped with plankton sampling devices, bottom grab, sea surface thermograph and various instruments for meteorological observations.

The vessel is provided with rolling keels and is able to withstand most severe weather conditions.

Since R. V. *VARUNA* arrived in India she has covered a distance of more than 25000 nautical miles, all along the west coast to some 30-40 nautical miles off the continental shelf including the vicinity of the Laccadive Islands, Maldives and equatorial region.

It is hoped that R.V. *VARUNA* will make a significant contribution to the Indian Ocean Expedition, which is going to be launched within this year, with the main emphasis on fishery investigations.