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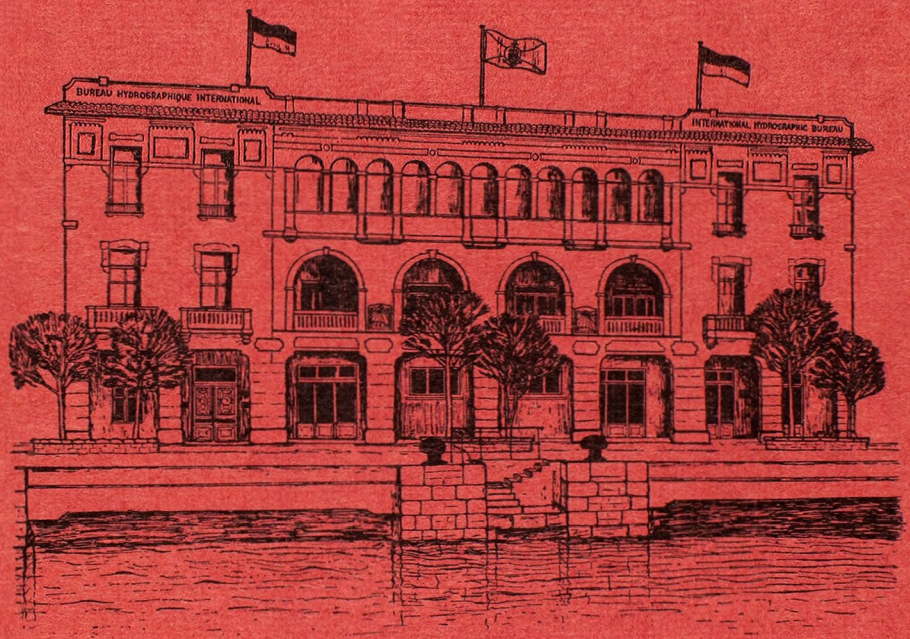
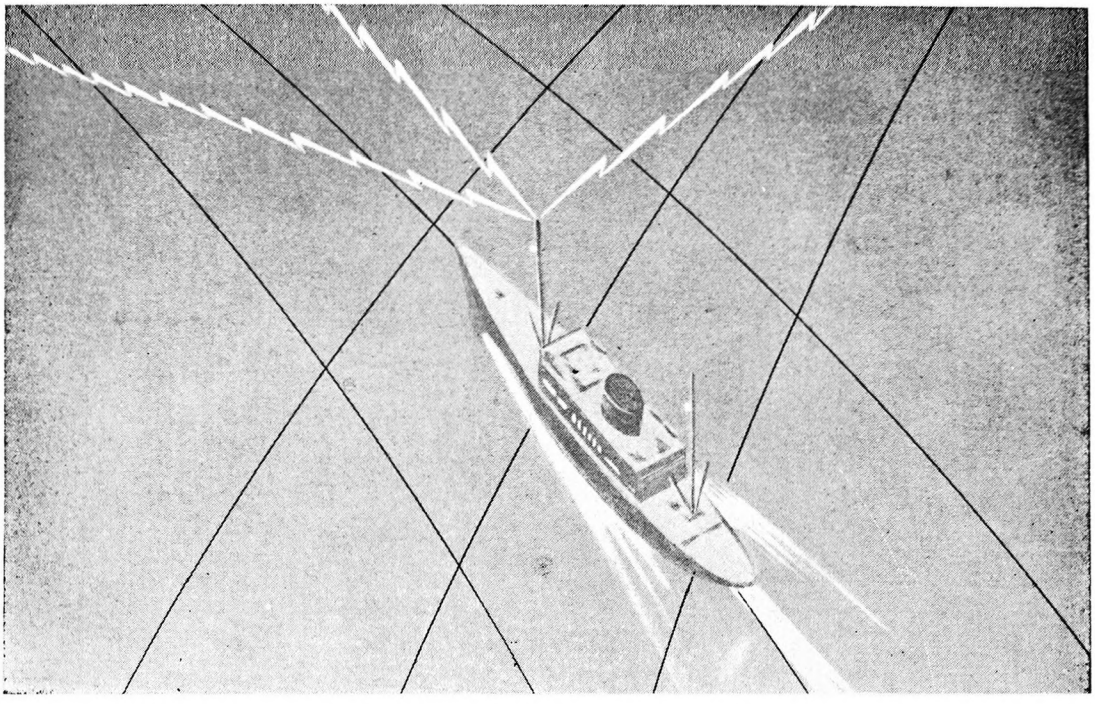


INTERNATIONAL HYDROGRAPHIC BUREAU
MONACO

Vol. XLVI, N° 1
(No 84 OF THE SERIES)

JANUARY 1969



INTERNATIONAL HYDROGRAPHIC BUREAU SPECIAL PUBLICATION 39

2nd edition, 1965

RADIO AIDS

TO MARITIME NAVIGATION AND HYDROGRAPHY

Special Publication No. 39 of the International Hydrographic Bureau entitled **Radio Aids to Maritime Navigation and Hydrography** deals with the principles and gives a general description of radioelectric systems and instruments used in navigation and hydrographic surveying. The 2nd edition, 1965, of this work is a complete revision and recast of the 1st edition issued in 1956, with new additions. It includes the total number of Supplementary Papers which have already been published, and contains the following chapters and sections :

CHAPTER II. — Radio Systems used in Maritime Navigation :

1. Radio Direction-finding; 2. Loran; 3. Decca; 4. Consol; 5. Radar.

CHAPTER III. — Radio Systems used in Hydrographic Surveying :

1. Decca; 2. Shoran; 3. Electronic Position Indicator (E.P.I.); 4. Shoran and E.P.I. in Offshore Hydrographic Surveying; 5. Raydist; 6. Lorac; 7. Rana; 8. Hi-Fix; 9. Hydrodist; 10. Microwave Position-Fixing System (M. P. F. S.); 11. Derveaux; 12. Toran.

CHAPTER IV. — Computation and Plotting of Hyperbolic Lattices :

1. General; 2. Methods of the Danish Hydrographic Office; 3. Methods of the French Hydrographic Office; 4. Method of the U. S. Naval Oceanographic Office; 5. Method of the Swedish Hydrographic Department; 6. Methods of the Netherlands Hydrographic Office; 7. Methods of the British Naval Hydrographic Office.

CHAPTER V. — Electromagnetic Systems in Geodetic Surveying :

1. General Aspects and Use of Radio Positioning Systems; 2. Aga Geodimeter; 3. Tellurometer; 4. Micro-Dist (Electrotape).

This work, in loose-leaf form, thus permitting subsequent additions, is on sale at $ 15.00. It includes about 550 pages and 270 figures.

It will continue to be brought up to date in the future by the publication of Supplementary Papers, whose issue will be announced in both the **International Hydrographic Review** and the **International Hydrographic Bulletin.**

SUPPLEMENTARY PAPERS TO SP 39

The 10 Supplementary Papers already published are the following :

PAPER 1 : Tellurometer and Micro-Dist (44 pages), price $ 1.00.

PAPER 2 : Raydist, Hydrodist, M.P.F.S. (Microwave Position-fixing System) and Derveaux (72 pages), price $ 2.00.

PAPER 3 : Decca in Hydrographic Surveys. Lorac, Rana and Hi-Fix (88 pages), price $ 2.50.

PAPER 4 : Decca in Navigation (32 pages), price $ 1.00.

PAPER 5 : Loran (56 pages), price $ 2.00.

PAPER 6 : AGA Geodimeter (23 pages), price $ 0.70.

PAPER 7 : Shoran and EPI (46 pages), price $ 1.20.

PAPER 8 : Radio Direction - Finding, Consol, Radar (46 pages), price $ 1.20.

PAPER 9 : Introduction, Wave Propagation, Geodetic Use of Radio Positioning Systems (35 pages), price $ 1.00.

PAPER 10 : Toran, Computation and Plotting of Hyperbolic Lattices (88 pages), price $ 2.50.

A Special Supplementary Paper containing the Preface, the Table of Contents and the General Index has been issued (23 pages), price : $ 0.50.

Finally, a loose-leaf cover for filing the various Supplementary Papers making up the 2nd edition of the SP 39, is available at the price of $ 1.50.

SUPPLEMENTS TO THE INTERNATIONAL HYDROGRAPHIC REVIEW

The purpose of these Supplements is to complete the basic work that SP 39 represents, by publishing articles, some of which give the practical points of view or the conclusions of the users of electromagnetic instruments and systems, and the others may be technical and scientific notes in connection with the theoretical subjects dealt with in SP 39. Other articles are either outlines of systems, whose development is contemplated or the improvement of those already existing.

A bibliography is also included in these Supplements.

The Supplements already published are :

VOLUME 1, October 1960 (148 pages), price $ 5.00.
VOLUME 2, October 1961 (158 pages), price $ 5.00.
VOLUME 3, October 1962 (101 pages), price $ 3.00.
VOLUME 4, December 1963 (128 pages), price $ 4.00.
VOLUME 5, April 1964 (108 pages), price $ 3.00.
VOLUME 6, September 1965 (122 pages), price $ 4.00.
VOLUME 7, June 1967 (65 pages), price $ 2.00.

Later Volumes will be announced in the **International Hydrographic Review** and the **International Hydrographic Bulletin.**

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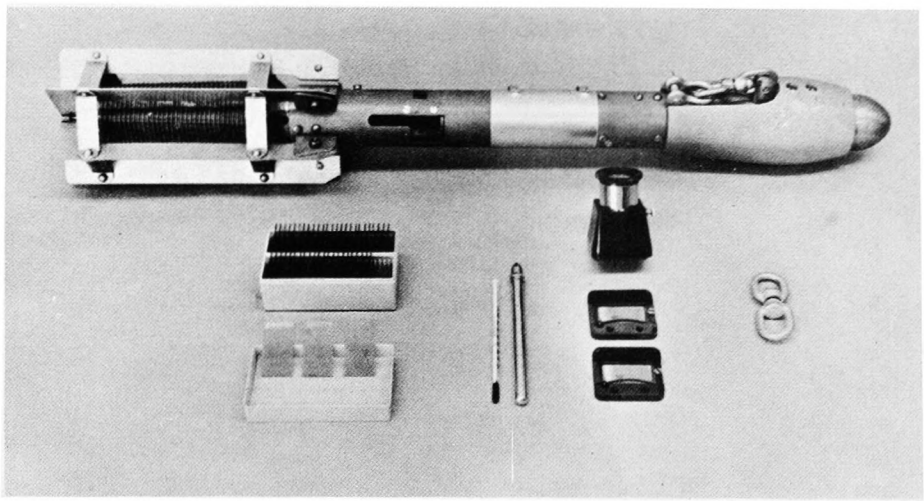
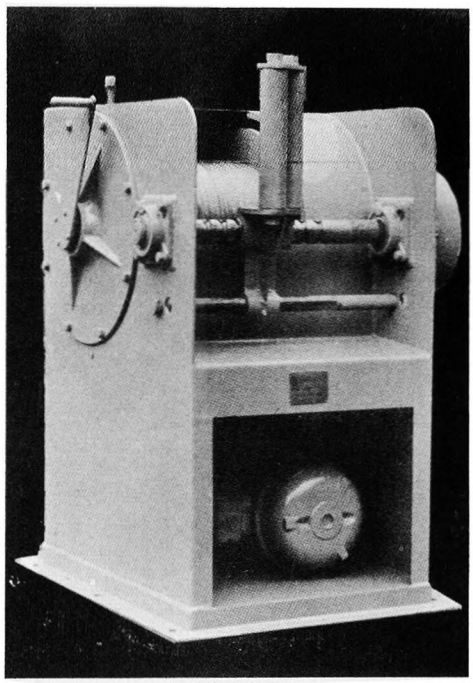


BATHYTHERMOGRAPH (BT)

The illustration shows the improved model BT, complete with its accessories, which comes packed in a strong, shock-proof carrying case. All improvements have been field tested and accepted by the U.S. Navy, as well as other oceanographic research groups. The BT operates at various depths, down to 900 feet (275 meters) and may be towed at ship speeds up to 20 knots. When in service, the BT stylus makes a trace on a glass slide which indicates the measured temperatures and depths during the towing cycle. Sensitivity and accuracy are guaranteed; the device will operate without hysterisis.



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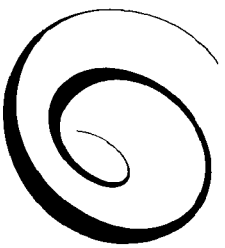

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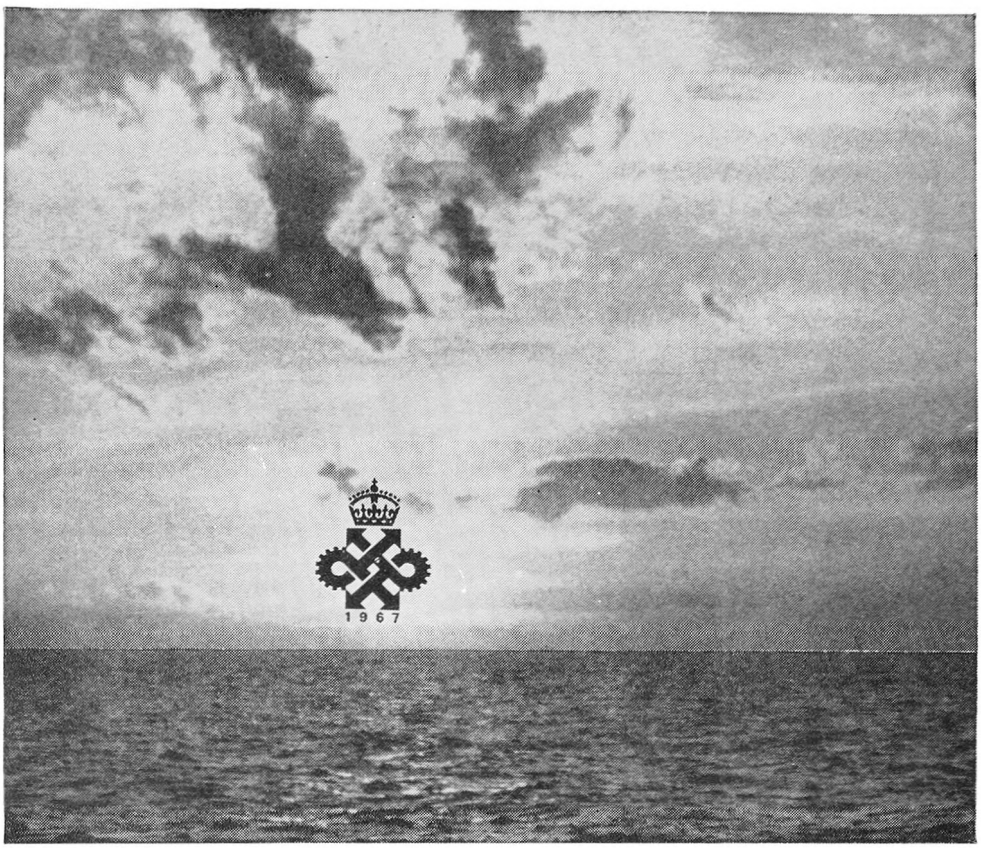

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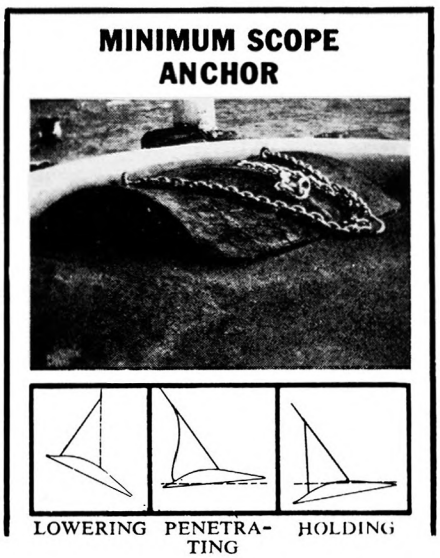

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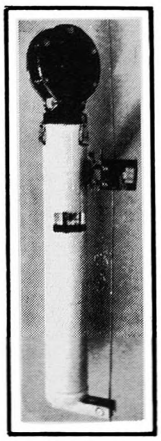

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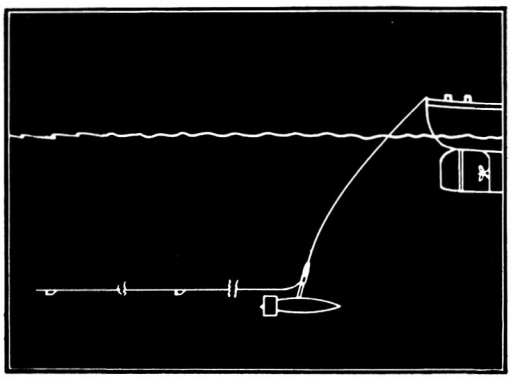
A proven self-powered, widely used signalling device which is attached to the end of the oceanographic wire and permits accurate location aboard ship regardless of water current structure or wire configuration. It is very useful for lowering instruments to or near the ocean bottom and may be used to position water bottles, bottom sampling equipment, deep-sea cameras, or other equipment we offer. The signal can be received on any 10 or 12 Kc ship sonar system. The pinger has a special casing to withstand pressures at any ocean depth.



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The GEK reliably measures surface water current velocities while being towed at speeds up to 12 knots. This system has been proven to provide accurate recording of water velocities down to 0.1 knot. The GEK includes a calibrated recorder with geomagnetic compensation features, highly stable electrodes with cable and a depressor.

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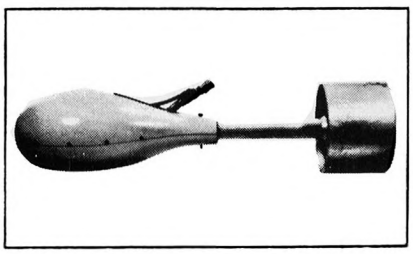
This enclosure of fiberglass construction is hydrodynamically designed for " quiet listening ". Transducers placed in the vehicle receive signals without interference from the ship's sound or motion, thereby permitting rapid and noise-free operation with increased sensitivity. It may be towed at speeds up to 20 knots at any depth, carrying a payload of 100 lbs (45 kg). Faired (low-drag) cable for rapid and noise free towing is available.



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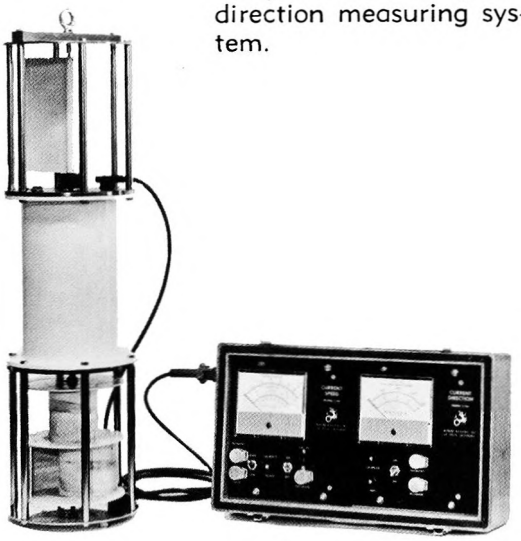
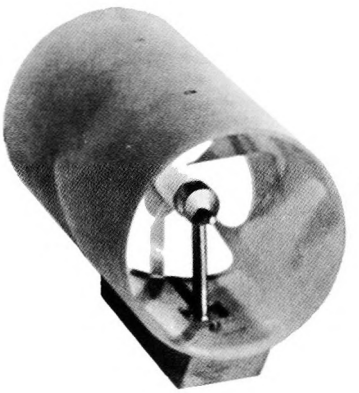
Q-15 incorporates a new design concept that screens out the turbulent water motion associated with wave action and provides accurate measurement of the remaining steady-state current velocity.

The **Q-9** system combines the Savonius rotor with a direction sensor and readout to provide a complete current speed-direction measuring system.





The **Q-8** is a small, portable and economical current measuring system for linear measurement of current speeds to 15 knots. This meter is relatively insensitive to vertical motion caused by heaving of the ship.

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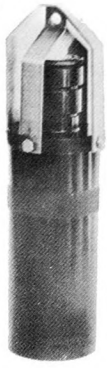
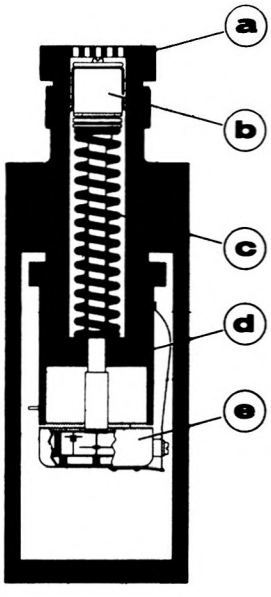
Model T-Ic

Bathykymograph

T-Ic is a simple self-contained mechanical device which senses and plots water depth as a function of time. This model requires no external electrical power, providing a unit that is inexpensive and virtually trouble-free.



The principal parts of the instrument are (a) the cylindrical pressure case, (b) a watertight piston on which the external water pressure acts, (c) a linear spring which opposes the water pressure, (d) a fixed interior cylinder around which a piece of standard-size, wax - coated chart paper is clamped, and (e) a manually-wound clock-type drive mechanism which is attached to the piston shaft and on which is mounted a stylus.



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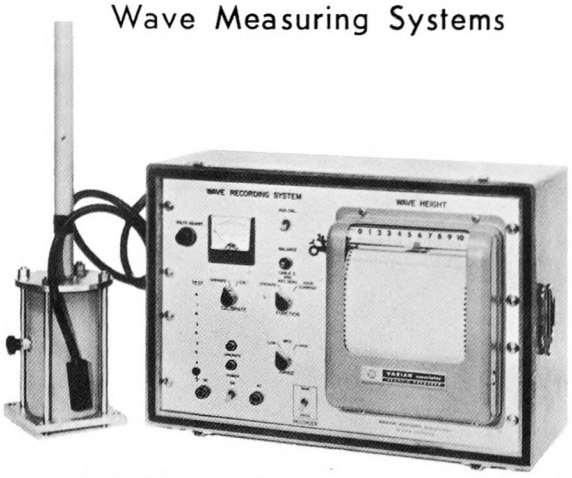
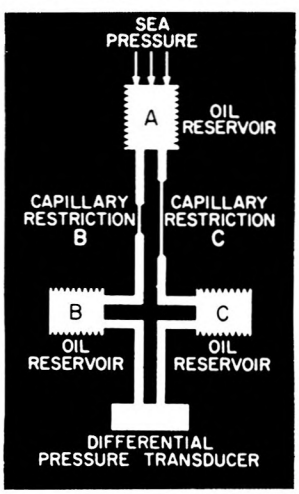
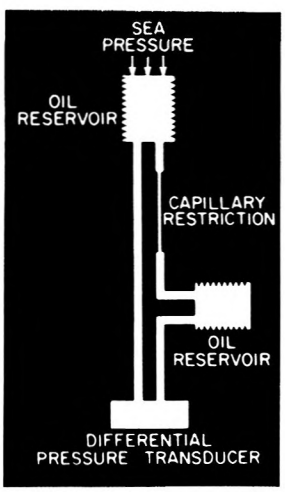


The **Q-6** (shown with **A-2b** sensor) operates with either the A-la long-wave sensor or the **A-2b** sea-swell sensor. It contains a power supply for sensor excitation, a programmer for controlling recording speed, a strip chart recorder, and calibration circuitry. It is connected to the underwater sensor with a four-conductor sea cable.



The **A-la** sensor is the Frank Snodgrass Mark III. Both very fast pressure changes (i. e., sea-swell) and very slow pressure changes (i. e., tides) are removed by hydraulic filters.



The **A-2b** is the Frank Snodgrass Mark X design. Very slow pressure changes (such as tides) are removed by the hydraulic filter leaving a clear record of sea-swell.

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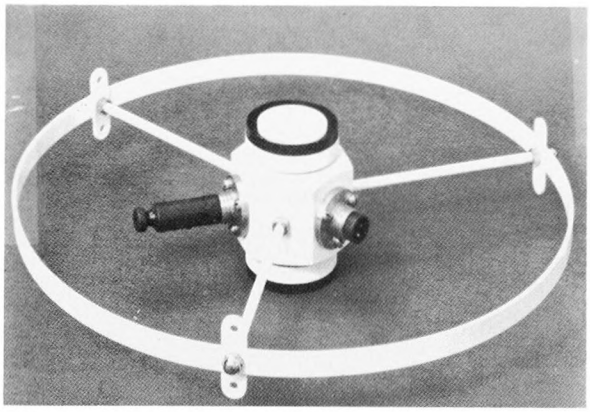
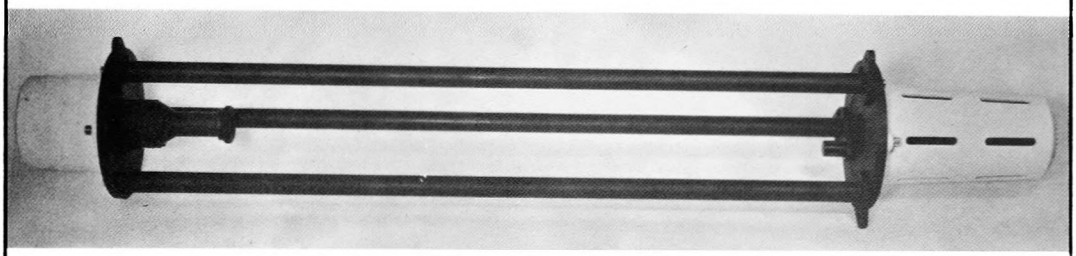
Hydro-optical Instruments



C-1a provides a means of measuring the ambient irradiance at any chosen depth in a body of water, and from the rate of decay of this parameter with depth, it is possible to obtain the diffuse attenuation coefficient K for the natural light field. Outputs of the underwater cell (left) and deck cell (right), are compared by the deck readout unit (not shown).



Model C-2a is a precise instrument for measuring the beam attenuation coefficient. The light source and two photovoltaic cells are contained in the underwater prove (photo above). The outputs from the two cells are compared by means of a null balancing system, and the final reading is the ratio of the output from the receiver to that from the reference cell.

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FOREWORD

The International Hydrographic Review is published in January and July of each year in both English and French editions. The Bureau welcomes articles on hydrographic, topographic and photogrammetric surveying, radio aids, navigation and allied subjects, new instruments and equipment, new hydrographic ships and boats as well as articles on the history and organization of hydrographic offices.

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January issue will close 1 August
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THE INTERNATIONAL HYDROGRAPHIC REVIEW

Vol. XLVI N° 1

(No. 84 OF THE SERIES)

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