THE INTERNATIONAL HYDROGRAPHIC REVIEW

Vol. XXXII N° 2

(N° 58 OF THE SERIES)

PUBLISHED BY

THE

INTERNATIONAL HYDROGRAPHIC BUREAU

Quai des Etats-Unis - Monte-Carlo

MONACO

PRINCIPALITY

NOVEMBER 1955

IMPRIMERIE MEYERBEER
21, RUE MEYERBEER
NICE

575 - XI - 1955

Price : See latest Price List

INTERNATIONAL HYDROGRAPHIC REVIEW, **Vol. XXXII, N° 2**
REVUE HYDROGRAPHIQUE INTERNATIONALE, **Vol. XXXII, N° 2**

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THE
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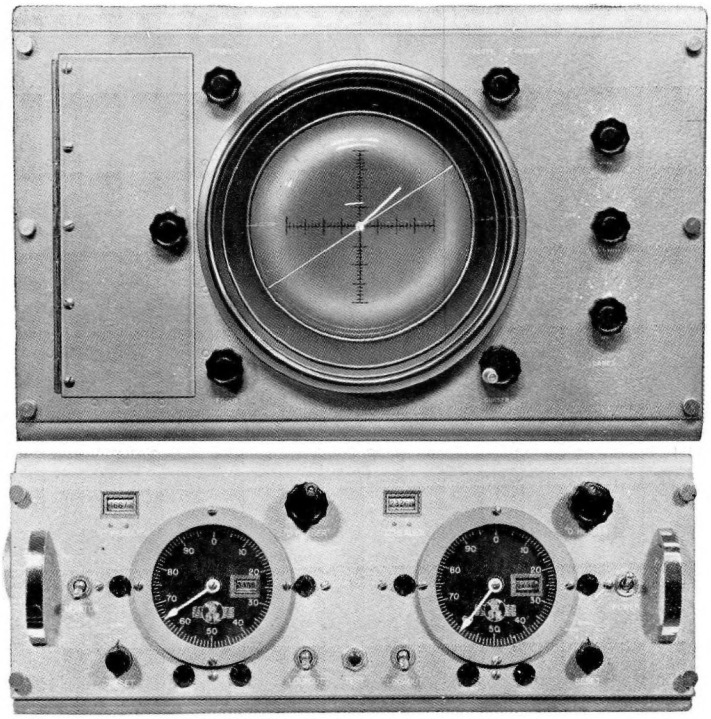
LORAC

RADIOLOCATION SYSTEM



LORAC Position Indicator Unit and Zero Header Display Unit.

A unique type of position display unit called the Zero Header has been developed for use with LORAC Radiolocation and Navigation equipment.

The LORAC System, comprised of three land-based transmitter stations, establishes a standing wave pattern over several thousand square miles, and is presently being used throughout the world in connection with hydrographic and geophysical surveys.

This new Zero Header supplements the LORAC shipboard Position Indicator Receiver equipment, and presents a direct display of range and bearing data in the form of a line on an oscilloscope. This line provides visually continuous data on the ships position when moving from point to point along the LORAC preplotted course.

LORAC equipment is offered for sale or lease with the services of technicians. For complete information write :

Seismograph Service Corporation

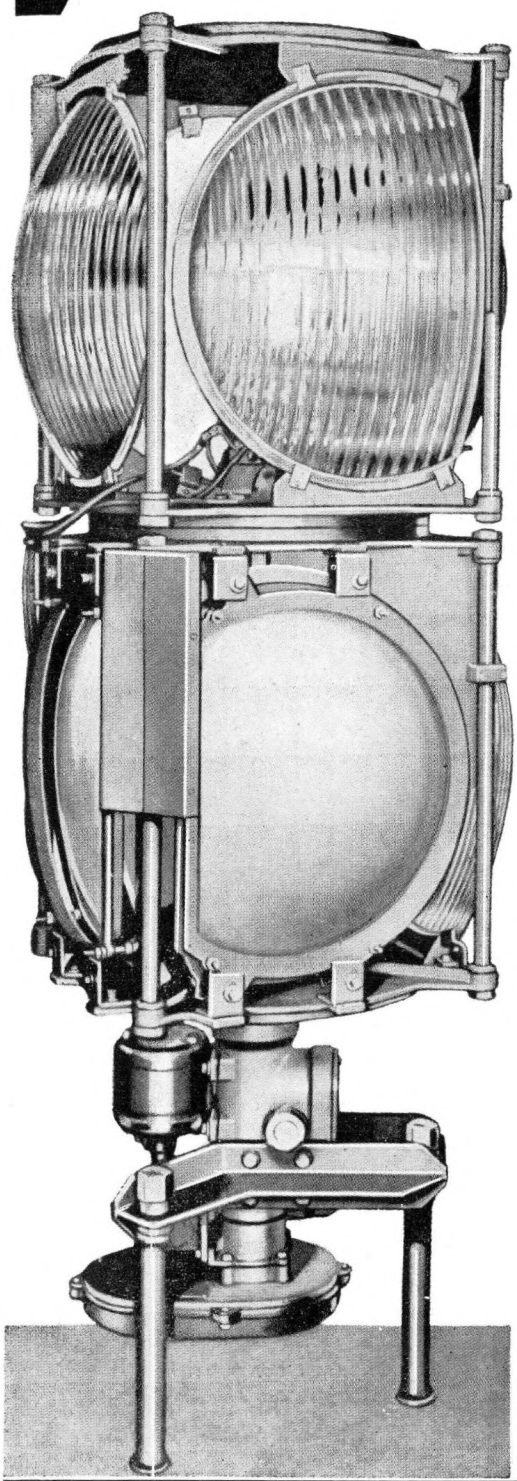
Seismic Surveys — Gravity Surveys — Pilot Surveys — Lorac

TULSA, OKLAHOMA, U. S. A.

You can convert any lighthouse to an automati

CROUS

Rotating Ligh



Many lighthouses are located in exposed and hazardous locations. The lighthouse keeper at these stations is not only exposed to the dangers of violent weather but may be unable to maintain contact with the mainland for days, or even weeks at a time.

Crouse-Hinds Type LHB Rotating Lighthouse Beacon is designed to operate unattended at such locations. An automatic lamp changer enables it to operate for at least a month without servicing. This allows the lighthouse keeper to live in safety and comfort on the mainland.

This new beacon is constructed in two decks each of which contains two 24" parabolic mirrors, mounted at 90 degrees to each other so their focal points coincide and a single lamp will produce two beams 90 degrees apart. These two decks are adjustable with respect to each other and rotate together. Lenses are mounted in front of each mirror designed to produce horizontal beam spreads of 6 degrees, 18 degrees, or 36 degrees as desired. The speed of rotation can be 1, 2, 3, 4 1/2, 6 or 12 r. p. m. according to the type of gears installed in the mechanism. The beacons can be arranged for either A. C. or D. C. current and utilize two 1000-watt lamps. There is an automatic lamp changer for each optical system and the lamps which are rated at 500 hours life are automatically replaced when they burn out.

Type LHB is also more efficient than older beacons, giving much higher candlepower from

◀ For conversion

Crouse-Hinds Type LHB Fixed Mount Lighthouse Beacon for use in existing lighthouses.

unattended light station with

-HINDS

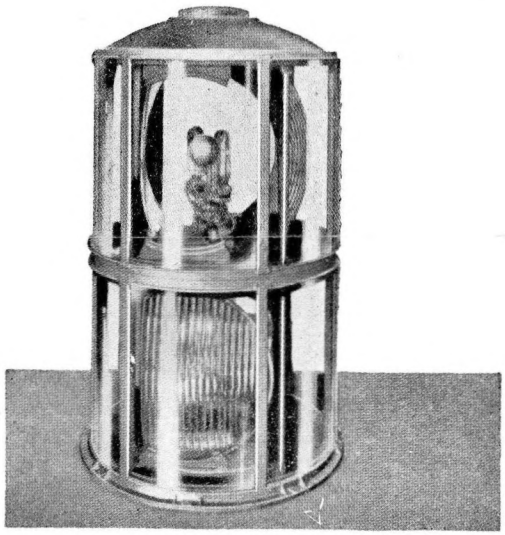
ouse Beacon

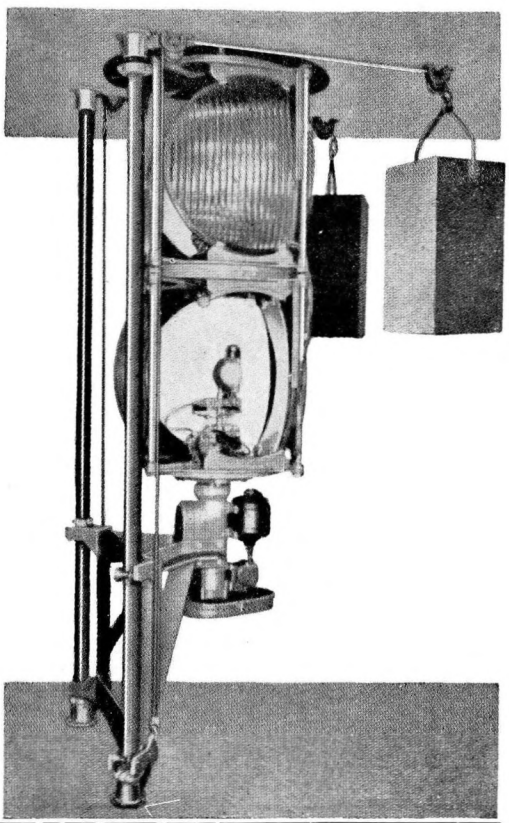
the same wattage. For lighthouses already in operation, the Fixed Mount Lighthouse Beacon, shown at the left, is installed in the existing structure. It is rated at 1,000,000 candle power and will give the lighthouse greater range as well as unattended operation.

For lighthouses where new structures are erected, the Lowering Mount Lighthouse Beacon, shown at the right, is installed. The lantern shown in the upper photo is placed on top of the structure. For inspection or service, the entire optical system is dropped through the floor to the room below by means of a counterweighted elevator mechanism. The service man is never exposed to the elements while checking the equipment.

Type LHB Lighthouse Beacon is built to Crouse-Hinds high standard of quality... from the finest material, with painstaking care, by skilled craftsmen. Due to the use of standardized mechanical and electrical parts and modern manufacturing techniques, its price is only a fraction of the cost of other types of lighthouse beacons.

Write for additional information on this outstanding development in the field of nautical signaling.





CROUSE-HINDS COMPANY

Syracuse 1, N. Y., U.S.A.

Cable address, « CROHINDS »

For new construction ➤

Crouse-Hinds Type LHB Lowering Mount Lighthouse Beacon. Upper photo shows the beacon raised into the outside lantern. Lower photo shows the beacon lowered into the room below for servicing.

Photograph by Courtesy Trans-Arabian Pipeline Co.

Oil terminal at Sidon, Lebanon

All hydrographic survey work in connection with this Mediterranean outlet for oil from the fields of Saudi Arabia was carried out by Kelvin Hughes on behalf of the Trans-Arabian Pipeline Company. Hydrographic surveys of every description are undertaken by Kelvin Hughes. Their specialist Surveyors, using the most modern equipment, are available for surveys anywhere in the world.

KELVIN HUGHES

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DEEP-SEA RESEARCH

Published by Pergamon Press, Ltd, 4 Fitzroy Square. London, W. 1.

The Journal *Deep-Sea Research* stresses the processes important to the deep-sea bottom and the organisms dwelling there. An understanding of these may depend on papers only indirectly related to the deep-sea bottom. The editors, therefore, do not discourage the submission of papers on quite diverse subjects.

The Journal is published as a quarterly. The following list of contents of Volume II No. 1 may give an idea of the scope of the Journal:

FRED. B. PHLEGER. — *Scripps Institution of Oceanography.*

Foraminifera and deep-sea research.

CLAUDE E. ZOBELL. — *Scripps Institution of Oceanography.*

Some effects of high hydrostatic pressure on apparatus observed on the Danish Galathea Deep-Sea expedition.

K. F. BOWDEN. — *National Institute of Oceanography, Wormley.*

The direct measurements of subsurface currents in the oceans.

ROBERT B. FISHER. — *Scripps Institution of Oceanography.*

On sounding of trenches.

DAYTON E. CARRITT. — *Chesapeake Bay Institute.*

Atmospheric pressure changes and gas solubility.

RPB. MONTGOMERY AND WARREN S. WOOSTER. — *Brown University.*

Thermostatic anomaly and the analysis of serial oceanographic data.

PAUL FERRIS SMITH. — *Woods Hole Oceanographic Institution.*

Further measurements of the sound scattering properties of several marine organisms.

G. P. D. HALL. — *British Admiralty Hydrographic Department.*

Survey of newly discovered feature (Genista Bank) off the Arabian Coast.

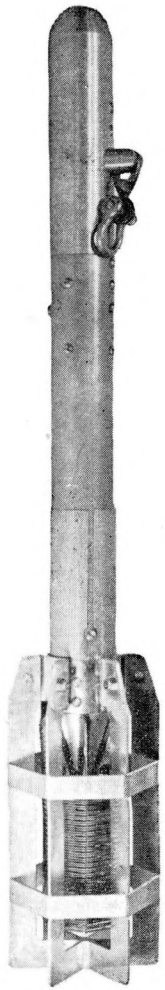
ANTON FR. BRUUN. — *Copenhagen.*

An Oceanographic organisation for the Indo-Pacific region.

ANTON FR. BRUUN. — *Copenhagen.*

Oceanography at the 8th Pacific Science Congress.

To enable individual subscribers using the Journal for their own private use to subscribe to it, a reduced subscription fee of £ 3.10.0 ($9.80) has been introduced as from January 1955. It is hoped that research workers will make use of this reduction and subscribe. The subscription for libraries, research departments, government offices, industrial firms, etc. is £ 4.10.0 ($12.60) per volume consisting of four numbers.



Wallace and Tiernan
Thermarine Recorder

USE THIS WALLACE and TIERNAN

Thermarine Recorder

to measure and record water temperature vs depth.

THERMARINE RECORDER
(Bathythermograph)

	MODEL N°		
	FA-190011	FA-190021	FA-190031
Depth range *	0 to 200 ft.	0 to 450 ft.	0 to 900 ft.
Accuracy	2 ft.	4.5 ft.	9 ft.
Temperature range *	+ 30° to + 90° F.	+ 30° to + 90° F.	+ 30° to + 90° F.
Accuracy	± 0.1° F.	± 0.1° F.	± 0.1° F.
Maximum allowable depth	225 ft.	562.5 ft.	1125 ft.
Length	31"	31"	31"
Diameter: Nose	2 1/8"	2 1/8"	2 1/8"
— Tail	5"	5"	5"
Weight (pounds)	21 3/4 lb.	21 3/4 lb.	22 lb.
Shipping weight (pounds)	75 lb.	75 lb.	75 lb.

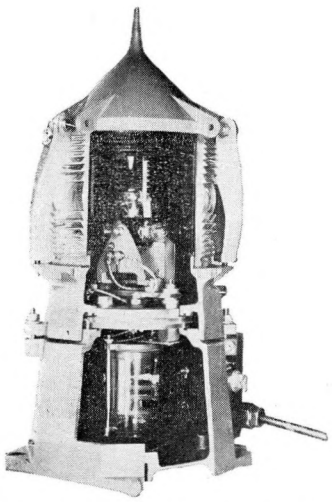
ACCESSORIES:

200 smoked glass slides. — Two individually calibrated grids and holders. — Two grid viewers. — Two pts. slide lacquer. — One pt. lacquer thinner. — One slide forceps. — One thermometer. — One nose casting.

* Temperature and depth may be calibrated in °C and meters, if desired.

The accessories listed above are the same for models FA-190011, FA-190021 and FA-190031, with the exception that a deep diving rig is included with model FA-190031.

WALLACE & TIERNAN Incorporated
Belleville 9, New Jersey (U. S. A.)



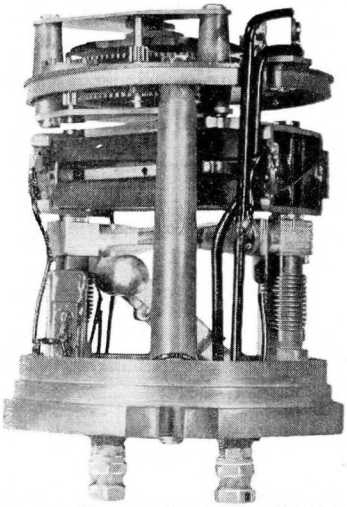
Wallace and Tiernan 200 mm. Lantern cut away to show lamp changer and flasher mechanism

ELECTRICITY POWERS THE MODERN AID TO NAVIGATION

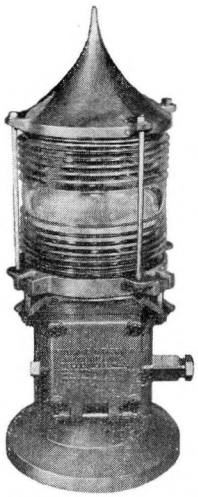
For Lighthouse or Buoy

Recognizing the responsibility imposed on marine lights and their accessories, Wallace and Tiernan has, over the years, developed a complete line of modern **electrically powered** aids to navigation meeting all the requirements of unfailing dependability, low initial cost, negligible maintenance and long unattended service periods.

Among the design features of Wallace and Tiernan Electric Marine Beacons which have led to their use by lighthouse authorities the world over are :—



Wallace and Tiernan Flasher mechanism



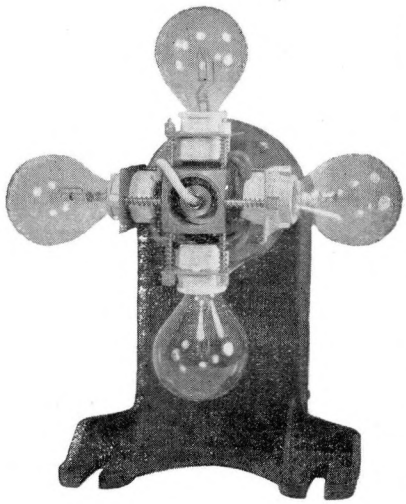
Wallace and Tiernan 150 mm. Lantern

- Electrically powered operation.
- Flasher Mechanisms suitable for any flashing characteristics and operating voltage.
- Automatic lamp changers.
- Corrosion resistant, watertight construction.
- Efficient candlepower output high visibility with low power consumption.
- Low initial cost.
- Continuous, unattended operation for long periods.

Wallace and Tiernan Specialists on aids to navigation will be glad to make recommendations on your problem without obligation—either on new installations or on the conversion of old gas or oil lights to modern electric operation. Such conversions, utilizing existing optics and structures, are both economical and pratical.

WALLACE & TIERNAN AIDS TO NAVIGATION INCLUDE :

- Lighthouse beacons and Lanterns from 90 mm. to 500 mm.
- Buoys and Structures.
- Flasher mechanisms.
- Automatic lamp changers.
- Range light lanterns.
- Fog signals.
- Batteries of all types.



Wallace and Tiernan Lamp changer, for electrifying large optics

WALLACE & TIERNAN INCORPORATED

Belleville 9, New Jersey

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THE
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FOREWORD

The International Hydrographic Review is dependent for its value and interest on original contributions from its readers, as well as on the re-publication, in English and French, of appropriate articles which have already appeared in other publications.

Articles on any branch of hydrographic surveying, navigation and allied subjects, such as radio and other aids to navigation, new instruments, hints to hydrographic surveyors, etc., as well as articles dealing with the history and organization of hydrographic offices with descriptions of surveying ships and boats and their equipment, are of great interest to all Hydrographic Offices.

The Directing Committee of the International Hydrographic Bureau will carefully consider all articles received for publication. Free reprints in English and/or French of original articles will be supplied to their authors on request made when sending manuscript.

Articles should be typewritten if possible in duplicate and adressed to

The Secretary-General

INTERNATIONAL HYDROGRAPHIC BUREAU
Quai des Etats-Unis,
MONTE-CARLO.
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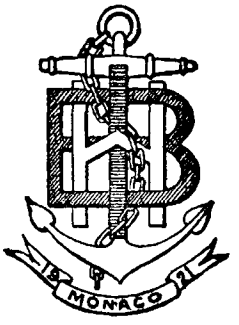
and should reach the Bureau not later than 31st January or 31st July for the May and November numbers respectively.

The Directing Committee are not responsible for statements made or opinions expressed in articles or papers published in this Review when written by authors who are not members of the Directing Committee or of the Staff of the International Hydrographic Bureau.

THE INTERNATIONAL HYDROGRAPHIC REVIEW

Vol. XXXII



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PUBLISHED BY

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INTERNATIONAL HYDROGRAPHIC BUREAU

Quai des Etats-Unis - Monte-Carlo

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NOVEMBER 1955

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ERRATA

International Hydrographic Review

Volume XXXI, N° 1, May 1954

THE ANALYSIS OF TIDAL OBSERVATIONS FOR 29 DAYS

The following corrections to his article « The Analysis of Tidal Observations for 29 days » which appeared in the *International Hydrographic Review*, Vol. XXXI, No. 1, May 1954, have been received from Dr Doodson :

Page 70 - Table III

	Cpo	Dpo
Amend Xpo, Ypo	1, 0 ...	0, 1
to read Xpo, Ypo	1, 1 ...	—1, 1

Amend Interpretation : Cpo = Xpo
to read Interpretation : Cpo = Xpo + Ypo

Page 71 - Table IV

under Combinations for 10^6 R sin r

	Mm	Msf
Amend Xoa	1175	— 145
ob	5	1127
to read Xoa	—1175	+ 145
ob	— 5	—1127

Page 72 - Table V

under N_2, MN_4, $2MN_6$
Amend w for angle = 190° given as —0.2
to read —2.2

under same heading
Amend : Angle is (3V for M_2) minus (3V for N_2)
to read : Angle is (3V for M_2) minus (2V for N_2)

Page 80 - Table 4

Amend R sin r for Mm and Msf = —0.158
—0.027 respectively
to read = +0.158
+0.027

Page 81 - Table 5

Left hand column : insert Δ between u and w in each of the three sections.

Under Mm and Msf

Amend r = 268°.7 and 333°.0 respectively
to read r = 91°.5 and 27°.0
Similarly amend g = 169°.6 and 326°.1 respectively
to read g = 352°.4 and 20°.1

ERRATA

International Hydrographic Review

Volume XXXI, N° 2, November 1954

USE OF RAYDIST SYSTEM IN PORTUGUESE GUINEA SURVEY

Page 16 - line 11, should read:
...from A and B as θ_A and θ_B, we know... etc.

Page 16 - line 7 from bottom, should read:

$$\theta_{BZ} = \theta_B - \frac{2\pi\ (f+\Delta f)}{c}(r_4) - \varphi(r_4)$$

Page 17 - third line, should read:

$$\alpha_Y = \theta_B - \theta_A - \frac{2\pi\ (f+\Delta f)}{c}(r_4) + \ldots \text{ etc.}$$

Page 17 - line 7, should read:

$$\psi = \alpha_Y - \alpha_X = \theta_B - \theta_A - \frac{2\pi\ (f+\Delta f)}{c}(r_4) + \frac{2\pi f}{c}(r_3) + \varphi(r_3) - \varphi(r_4)\ldots \text{ etc.}$$

Page 17 - line 9 from bottom, should read;
...while r_1, r_2 and r_5 are variable;

ERRATA

International Hydrographic Review

Volume XXXII, N° 1, May 1955, page 175.

SURVEY OF A NEWLY DISCOVERED FEATURE (GENISTA BANK) OFF THE ARABIAN COAST

Paragraph beginning 12th line from the bottom should read as follows:

« The 40-fathom depth reported by H.M.S. Genista is virtually disproved, « and it seems probable that the echoes obtained on that occasion resulted from fish, « eddies, or other aqueous phenomena, a number of false echoes also being observed « and remarked on by H.M.S. Owen. »