THE INTERNATIONAL HYDROGRAPHIC REVIEW



Vol. XXXV

Nº 1

(Nº 63 OF THE SERIES)

PUBLISHED BY

THE

INTERNATIONAL HYDROGRAPHIC BUREAU Quai des Etats-Unis - Monte-Carlo

MONACO

PRINCIPALITY

605

MAY 1958

IMPRIMERIE MEVERBER 21, RUE MEVERBER NICE

575 - V - 1958

Price : See latest Price List

INTERNATIONAL HYDROGRAPHIC REVIEW, Vol. XXXV, Nº 1 REVUE HYDROGRAPHIQUE INTERNATIONALE, Vol. XXXV, Nº 1

Received the above Publication

Reçu la publication ci-dessus

Name (
Address (or office stamp) Adresse (ou cachet du Bureau)	
Date	
No. of copies Nombre d'exemplaires	English text Texte anglais French text Texte français

N. B. — Only one receipt should be completed and returned to the <u>International</u> Hydrographic Bureau.

N.B. — Un seul reçu doit être complété et retourné au Bureau Hydrographique International. IMPRIMÉ

PRINTED MATTER



BUREAU HYDROGRAPHIQUE INTERNATIONAL

Quai des Etats-Unis MONTE - CARLO

Principauté de MONACO (Europe)



RADIO AIDS MARITIME NAVIGATION AND HYDROGRAPHY TO (INTERNATIONAL HYDROGRAPHIC BUREAU SPECIAL PUBLICATION No 39)

This publication contains the latest theoretical and practical information available regarding radio aids currently used for position-fixing in both maritime navigation and hydrography. The summary of chapters is as follows:

CHAPTER I. — Spectrum and Propagation of Radio Waves. 1) Frequency Spectrum of Electromagnetic and Radio Waves - 2) Propagation of Radio Waves.

CHAPTER II. — Radio Systems Used in Maritime Navigation. 1) Radio Direction-Finding - 2) Loran - 3) Decca - 4) Consol.

CHAPTER III. — Radio Systems Used in Hydrographic Surveying.

- 1) Decca in Hydrographic Surveying 2) Shoran 3) Electronic Position Indicator (EPI) -4) Shoran and EPI in Offshore Hydrographic Surveying 5) Raydist 6) Lorac 7) Rana -
- 8) Computation and Plotting of Hyperbolic Lattices on Survey Plotting Sheets.

CHAPTER IV. — Radar Technique.

1) Radar Technique in Navigation - 2) Use of Marine Radar in Surveying.

- CHAPTER V. Radio Systems in Geodetic Surveying.
 - 1) Outline of Present Situation 2' Operational Reports.

CHAPTER VI. — Reports on Use of Radio Systems in Hydrography. 1) Decca - 2) Shoran - 3) EPI - 4) Raydist - 5) Lorac - 6) Rana.

The publication has been prepared in the two official languages of the I. H. B.: English and French. Both editions, which appeared in 1956, contain approximately 450 pages, and 223 figures including 50 full-page illustrations.

The price per volume in either edition has been set at 8 U.S. Dollars. Conditions of sale are as follows: Owing to fluctuations of exchange, the price is given in U.S. Dollars. Packing and carriage expenses are extra.

A reduction of 30 % on the price is allowed to Government Offices and Naval and Mercantile Marine Officers of States-Members of the Bureau if the order is sent direct to the Bureau and not through a bookseller.

A reduction of 30 % on the price is allowed to any bookseller.

SURVEY DEPTH RECORDER





For Economical, Extremely Precise UNDERWATER SURVEY

The Edo Survey Depth Recorder, Model 255, was developed at the request of experts in the field of hydrographic survey. It is the finest equipment on the market for measuring the depth of water for survey purposes and for presenting in permanent form an accurate and legible record of the water's depth.

Accurate to within one-half of one per cent, the Survey Depth Recorder is designed in all respects to satisfy the most stringent requirements of cartographers, oceanographers, dredgers and all others concerned with the exact depth of the water in channels, harbors, inland or coastal waters.

The equipment is readily installed to operate aboard survey vessels of all types... traveling at any speed up to 15 knots... in any water depth from three feet to 250 fathoms... whether fresh, brackish or salt. Its light weight permits permanent or temporary installation on large or small survey craft.

Precise Measurement in 8 Ranges

Edo Model 255 is easily adjustable for transducer draft or sound velocity and records in eight ranges :

0	то	10	reet	or	Tathoms	
60	to	130	feet	or	fathoms	
120	to	190	feet	or	fathoms	
180	to	250	feet	or	fathoms	

Notes can easily be made on chart through large hinged window or positions marked automatically with marker button. One roll of paper operates 10 hours continuously on « foot » scale; 20 hours on « fathom » scale. Equipment is housed in rugged cast aluminum case. Send for brochure today.





Makers of Scientific Surveying and Photographic Instruments

ĩ

PHOTOGRAMMETRIC

EQUIPMENT DESIGNED FOR THE STUDY OF THE SEA SURFACE

-

148

140

Aerial Photogrammetric cameras

1st 2nd 3rd class plotting instruments Galileo-Santoni patents (Stereocartograph Galileo-Santoni mod. IV - Stereosimplex mod. II and mod. III. Cartographic Stereomicrometer)

Photogrammetric equipments for special works

High accuracy topographic instruments.

OFFIGINE GALILEO - 44 VIA GARLO BINI - FIRENZE (ITALY)

LORAC HAS LOCATED MORE SURVEYING POINTS* THAN ALL OTHER SYSTEMS COMBINED



To date Lorac has positioned 1,750,000 geophysical stations in the Gulf of Mexico.

For several years Lorac has been standard equipment on the survey ships of the Hydrographic Office of the United States Navy.



LORAC ACTRAC UNIT FOR THE CON-TINUOUS PLOTTING OF POSITION.

Lorac networks serve the precise positioning requirements of the missile test center at Cape Canaveral, Florida.

FOR INFORMATION ON THE USE OF LORAC ON LAND, OVER WATER, OR IN THE AIR CONTACT ...



SEISMIC - GRAVITY AND MAGNETIC SURVEYS - LORAC - CONTINUOUS VELOCITY LOGGING Seismograph Service Corporation 6200 East 41st Street • TULSA, OKLAHOMA • Riverside 3-1381

"Accurate to One Foot In a Mile"

RAYDIST

Radio Location Systems

for precise HYDROGRAPHIC SURVEYING MAPPING AND CHARTING HARBOR AND CHANNEL CONTROL GEOPHYSICAL EXPLORATION AIR AND WATER CURRENT RESEARCH VELOCITY AND WATER SPEED MEASUREMENTS NAVIGATION AND POSITIONING TRACKING ENGINEERS AND TECHNICIANS AVAILABLE FOR OPERATIONS OR TRAINING

> Developed and Manufactured Sold or Leased

> > By

HASTINGS-RAYDIST, INCORPORATED

Hampton, Virginia (U.S.A.)



PORT OF BENGHAZI - LIBYA

All hydrographic survey work in connection with the re-design and improvement of Benghazi Harbour was carried out by Kelvin Hughes on behalf of the Consulting Engineers: Sir William Halcrow & Partners, acting for the Libyan Public Development and Stabilisation Agency. 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

CONTRACT SURVEY SECTION

KELVIN & HUGHES (MARINE) LIMITED - 99 FENCHURCH STREET - LONDON - E.C. 3 TGA KHM 65

FRENCH INSTITUTE OF NAVIGATION

13, Rue de l'Université — PARIS (7^e)

Publishes a Technical Review on Maritime and Aerial Navigation entitled :

NAVIGATION

which is issued quarterly



Membership. — Applications should be addressed to the Secretary-General. They are decided by the Council. Membership in the French Institute of Navigation automatically ensures regular delivery of the Review.

Dues. — Annual rates are as follows :

-	Active M	ember			2.200 fr.
-	Associate	Member	(resident	abroad)	2.500 fr.

Payment. — Preferably by transfer or payment to the Association's Postal Order Account : I.F.N. 1581-32 Paris.

Bank cheques are accepted, payable in Paris in French francs.

Ľ. 0 to 900 ft. 9 ft. 1 30° to + 90° F 1 0.1° F. 125 ft. 200 smoked glass slides. — Two individually calibrated grids and holders. — Two grid viewers. — Two pts. slide lacquer. — One pt. lacquerthinner. — One slide forceps. — One thermometer. — One nose casting. FA-190032 USE THIS WALLACE and TIERNAN 2 1/8" 5" 22 lb. 75 lb. 31" to measure and record water temperature vs depth. * Temperature and depth may be calibrated in °C and meters, if desired. The accessories listed above are the same for models FA-190012, FA-190022 and A-190032, with the exception that a deep diving rig is included with model FA-190032. Ľ. 0 to 450 ft. 4.5 ft. + 30° to + 90° F ± 0.1° F. 562.5 ft. WALLACE & TIERNAN Incorporated Belleville 9, New Jersey (U.S.A.) 21 3/4 lb. 75 lb. NODEL Nº Thermarine Recorder FA-190022 2 1/8" 31" -12 THERMARINE RECORDER (Bathythermograph) ACCESSORIES : Ŀ. + 30° to + 90° F ± 0.1° F. 225 ft. 0 to 200 ft. 2 ft. 21 3/4 lb. 75 lb. FA-190012 2 1/8" 31" 5 Maximum allowable depth Accuracy Diameter: Nose Length Shipping weight (pounds) emperature range *. Weight (pounds) Depth range * Tail Accuracy Wallace and Tiernan Thermarine Recorder N



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 lighthouse use by authorities the world over are :-

- Electrically powered operation.
 - Flashe, 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

make recommendations on your problem without to 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 Lanfrom 90 mm. terns to 500 mm. **Buovs and Structures.** Flasher mechanisms.

Wallace and Tiernan

150 mm. Lantern

- . Automatic lamp changers. , Range light lanterns, . Fog signals,
- . Batteries of all types.





Wallace and Tiernan Flasher mechanism



Wallace and Tiernan Lamp ch for electrifying large optics changer,

Wallace and Tiernan 200 mm. Lantern cut away changer and





*Decca Chains are in current operation in every type of climate and terrain from Newfoundland to New Guinea.

THE DECCA Mobile Chains NAVIGATOR

for Survey and Exploration

THE DECCA NAVIGATOR COMPANY LIMITED, LONDON, ENGLAND

Unrivalled Observatory Honours

No ocean breezes blow in Switzerland and even from their mountain tops the

Swiss cannot glimpse the sea... Yet ever since the days of the Tsars, Queen Victoria and the first President Roosevelt, Switzerland has been a principal supplier to the world's fleets.

A single reason accounts for this astonishing paradox : the tenacity of a brand that stands unchallenged and unchallengeable — Ulysse Nardin, In Switzerland Ulysse Nardin alone make marine chronometers. This unique position is due to their universal reputation as makers of the world's finest marine chronometers —a reputation officially attested by 3884 Observatory Prizes.

Teday, Ulysse Nardin's production is no longer confined to the needs of navies—yeu, too, may enjoy the same high standard of precision with a watch that bears the name of Ulysse Nardin.

ULYSSENARDIN

For further information, please write to : ULYSSE NARDIN S.A., Manufacture de Montres et Chronomètres, Le Locle (Switzerland).



for PRECISE MEASUREMENT of DISTANCE



Manufactured in South Africa by TELLUROMETER (PTY.) LTD · P.O. BOX NO. 1177 CAPE TOWN

COOKE TROUGHTON & SIMMS LTD

are Agents for WESTERN EUROPE & DEPENDENT TERRITORIES and INDIA, PAKISTAN AND CEYLON

NEW METEOROLOGICAL INSTRUMENTS

designed and accepted by world-recognized Experts

RECORDING BALLOON THEODOLITE,

Georgi Model, complete with mechanical printer. High accuracy, compact and easy to handle; for land or ship use. The most versatile Theodolite manufactured.

CLOUD CEILING METERS, AUTOMATIC SCANNING AND RECORDING TYPE,

The most advanced design available. Uses impulsed light for accurately recording cloud heights at low or high altitudes.

RADIATION BALANCE METER,

Albrecht-Wagner type — either recording or indicating models available. Approved by International Radiation Commission.

PALINGRAPH,

A multi-probe recording device using the new sweep balance principle for high accuracy. Designed to withstand severe vibration or shock on ship or for field work. Will indicate up to 18 different points. May be used for recording temperature, pressure, voltage, etc.

PORTABLE HIGH PRESSURE HYDROGEN GENERATOR,

Georgi Model, designed for field work where bottled cylinders of hydrogen are not available. Used for balloon or Radio Sonde work.

AUTOMATIC POLLUTION METER, RECORDING TYPE,

Dr. Effenberger Model — used for sampling and trapping pollutants on a greased drum giving a visual indication of volume of pollutants during a fixed time cycle.

OZONE RADIO SONDE,

New instrumentation developed by the Max Planck Institute for stratosphere use in measuring ozone. These instruments are now being distributed world-wide as part of the I.G.Y. program.



All the above instruments are unconditionally guaranteed as to workmanship and quality. They are now used throughout Europe, Africa, and North America by private and government agencies, including NATO and U.S. Military Forces. These new instruments are superior to any existing equipment and yet will be found to be lower priced than obsolete competitive instruments. Literature available upon request.

KAHL SCIENTIFICINSTRUMENT CORP.el cajon (san diego)134 West 26 St.— california—New York 1, N.Y.

THE

INTERNATIONAL HYDROGRAPHIC REVIEW

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. They have decided that an honorarium of 15 gold francs per page of 600 words will be made to the authors of all original articles accepted. In addition, the Bureau will, upon request, supply each author free of charge with a total of 50 reprints of his article in one of the two official languages of the Bureau (or with 25 in English and 25 in French).

Articles should be typewritten if possible in duplicate and addressed to

The President of the Directing Committee of the

INTERNATIONAL HYDROGRAPHIC BUREAU

Quai des Etats-Unis,

MONTE-CARLO.

(Principality of Monaco)

and should reach the Bureau not later than 31st January or 31st July for the May and November numbers respectively. However, in order to achieve a well-balanced distribution of subject matter in the various issues of the « Review » (see Index of Authors and Articles), the Directing Committee reserve the right to print the articles submitted to them at whatever time appears most suitable.

> 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. XXXV

Nº 1

(Nº 63 OF THE SERIES)

PUBLISHED BY

THE

INTERNATIONAL HYDROGRAPHIC BUREAU Quai des Etats-Unis - Monte-Carlo

MONACO

PRINCIPALITY



MAY 1958

IMPRIMERIE MEYERBEER 21, Rue Meyerbeer - NICE

INTERNATIONAL HYDROGRAPHIC BUREAU

LIST OF STATES WHICH ARE MEMBERS OF THE BUREAU

ARGENTINA BRAZIL BRITISH COMMONWEALTH UNITED KINGDOM AUSTRALIA NEW-ZEALAND BURMA CANADA CHILE **CHINA** CUBA DENMARK DOMINICAN REPUBLIC EGYPT FINLAND FRANCE GERMANY GREECE **GUATEMALA** ICELAND

INDIA INDONESIA ITALY JAPAN KOREA MONACO **NETHERLANDS** NORWAY PAKISTAN PHILIPPINES POLAND PORTUGAL SPAIN SWEDEN THAILAND TURKEY UNION OF SOUTH AFRICA UNITED STATES OF AMERICA URUGUAY YUGOSLAVIA

DIRECTING COMMITTEE

President : Rear-Admiral R. W. KNOX, USC & GS (retired). Directors : Contrammiraglio A. VIGLIERI, Italian Navy. Ingénieur Hydrographe Général L. DAMIANI, Marine Française.

Secretary-General : vacant.

TABLE OF CONTENTS

Advertisements.

Pages

New Brazilian Survey Vessels	9
Sesquicentennial of the U.S. Coast and Geodetic Survey	11
II. Control for Photogrammetric Mapping (Ch. THEURER)	11
III. Aerotriangulation Adjustment (G. C. TEWINKEL)	15
IV. « Leapfrog » Barometric Leveling (H. R. CRAVAT)	22
V. Plastic Scribing (J. J. STREIFLER)	25
VI. Low-water Photography in Cobscook Bay, Maine (B. G. JONES)	31
Use of the Decca Navigator Survey System in New Guinea for Hydrography and as a Geodetic Framework (J. Th. VERSTELLE)	35
Standard Sheets of Hyperbolic Patterns for Survey Use (J. Th. VERSTELLE)	81
Automatic Computation of Hyperbolic Lattices (L. NVSTEDT)	101
Note on Methods of Determining Monthly and Annual Values of Mean Water Level (J. R. ROSSITER)	105
Seasonal Variations in Mean Level of Argentine Sea (M. A. BALAY)	117
Pamplona Searidge 1779-1957 (G. F. JORDAN)	147
French Translation of Nomenclature of Ocean Bottom Features	159
Manuale del Radarista (G. MONTEFINALE)	163
International Hydrographic Bibliography	167

