BOOKS IN REVIEW

OPTIQUE APPLIQUÉE ET PHOTOGRAPHIE (*)
(APPLIED OPTICS AND PHOTOGRAPHY)

by Ingénieur en Chef Géographe Jean CRUSET
Head of Research and Construction Section of the French
National Geographical Institute

1 vol., pp. 442; 21 × 27 cm; 340 figs., 6 col. pl. — Pr. : 5 840 French francs
Institut Géographique National, 107, rue de La Boëtie, Paris

In volume XXXV, No. 2 of the *International Hydrographic Review* an analysis was given of the course in optics taught at the training school (*Ecole d'Application*) of the French Hydrographic Office by *Ingénieur en Chef Géographe* Cruset and published by the Hydrographic Office.

The same author has now published a new work in the technical series of the National Geographical Institute (*Collection des Publications techniques de l'Institut Géographique National*), entitled *Optique appliquée et photographie*, and which of course contains a number of questions discussed in the course given at the Hydrographic Office. The later textbook is more complete, however, particularly as regards the applications of physical optics in the laboratory and in industry, various monographs on long-range observation instruments, magnifying glasses and microscopes, and more especially the science and technique of photography, which are insufficiently taught in the majority of countries. It is not, strictly speaking, a course or a treatise. A large amount of space is devoted to problems of metrology.

The basic scheme of the book is patterned on the succession of such well-known elements as source, light rays, optical media, instruments, and receptors. The other elements of the chain are discussed with reference to the two basic receptors, i.e. the human eye and the sensitized photographic surface. Thus aberrations, particularly chromatism of magnitude and distortion (a knowledge of which is highly important in photogrammetry) are treated by considering mainly the position, in relation to optics, of the retina or sensitized photographic surface. Distortion then appears as chiefly due to the spherical aberration of the centre of the pupils, whereas chromatism of magnitude, produced by the chromatism of position of the pupil centres, appears as a chromatic variation of distortion. The influence of diaphragming in the ideal instrument as well as the actual instrument plays a leading part in the treatment of the various questions discussed in this work. The study of the *quality* of the visual image, and that of the photographic image, emphasizes the considerable number of parameters involved, and cautions against the inadequacy of the rather arbitrary notion of resolving power.

(*) This work received an award from the Academy of Sciences on 15 December 1958.

The book is divided into six parts, outlined as follows :

I. *Physical optics.* Properties of sources of light rays, transparent media and receptors. Materials used in optics. Applications of physical optics to metrology and instrumental research laboratories.

II. *The ideal instrument.* Theory, diaphragming, photometry.

III. *The actual instrument.* Chromatism and achromatism, geometrical aberrations, diffraction, notions on computation of optical combinations. (Note : The purpose here is not the training of optical engineers, but to render geographers, geometers, and users in general better fitted to understand an instrument's potentialities and to discuss, as required, their particular problems with the makers).

IV. *Physiological optics.* Dioptrics of the eye, monocular vision (visual acuity, colour vision, thresholds of perception, Stiles-Crawford effects, role of monocular vision in relief perception), binocular vision (perception, estimation and reconstitution of relief).

V. *Optics of visual instruments.* Characteristics (role of pupils, magnification, brightness on axis and off axis, influence of Stiles effect, limit of resolution in photopic and scotopic vision, field); parts (objectives, eyepieces, rectifying and deviation systems, micrometers, night lighting); examples (Galilean telescope, telemeters, internal focussing telescope). Emphasis is laid on the optics of long-range observation instruments, but the general characteristics of magnifying glasses and microscopes are also discussed.

VI. *Photography.* The photographic objective (properties, controls, various combinations); the camera (the principal items are the study and calibration of shutters and the description of a few very special instruments); the practical study of gelatin and silver halide emulsions on a transparent base (general structure, manufacture and processing of emulsions, speed and chromatic sensitiveness, quality of negative image, properties of base); theory of latent image, development and chromatic sensitizing; various photographic effects; theoretical and practical determination of time of exposure; photographic paper; brief comments on various reproduction processes; principle of colour photography.

This textbook is the result of the long experience acquired by the author in the optical laboratories of the National Geographical Institute, where he and his assistants did a great deal of original research; as President of the Photography Committee of the International Society of Photogrammetry; as president or as a member of various national or international standardizing organizations; and as a professor of specialized subjects at the *Ecole Nationale des Sciences Géographiques,* the *Ecole d'Application* of the French Navy Hydrographic Office and the third division of the Paris Faculty of Sciences.

REMOUS D'UN OUVRAGE DANS UNE MER A MARÉE (EDDIES CAUSED BY A STRUCTURE IN A TIDAL SEA)

by L. VANTROYS, Ingénieur hydrographe en chef (C.R.)

150 pages; 15.5 × 23.5 cm. Extract from « Annales Hydrographiques », Service Hydrographique de la Marine, Paris, 1958

This is the text of a doctor's thesis presented before the Paris Faculty of Sciences. It discusses disturbances produced in the tide by a structure, i.e. breakwater, channel, tidal-power plant, etc., in the sea. *Ingénieur Hydrographe*

en Chef Vautroys, who was the Head of the Tidal Utilization Research Service of the state-operated *Electricité de France,* was particularly qualified for the theoretical study of this exceptionally difficult problem. He has endeavoured to arrive at numerical conclusions for possible use in an actual project. These are only partial conclusions obtained by simplifying or ignoring certain factors. But the methods used can be applied to other projects and numerical values be obtained for effects applicable to numerous variants of tidal-power plant projects. At the present stage of development, this thesis has the merit of supplying rough solutions to problems that have yet hardly been touched upon.

COURS DE PRATIQUE DES MARÉES (COURSE IN TIDAL PRACTICE)

by Ingénieur Hydrographe Général A. GOUGENHEIM
Professor at the French Hydrographic Office Training School

(1958-59 edition)
200 pages; figures; 28 × 24 cm
Service Hydrographique de la Marine, Paris

As part of the series of courses given at the Training School (*Ecole d'Application*), the French Hydrographic Office has issued a new edition of its manual on tidal practice, intended for first division students and drawn up by the French Hydrographer, *Ingénieur Hydrographe Général* Gougenheim.

The new edition is principally devoted to the study of tidal phenomena at any point ashore. After a rapid examination of observation methods, the author discusses the factors causing the tide, and methods followed for its analysis and prediction.

A certain number of practical hydrographic questions are considered, including the usual tidal problems raised in hydrographic surveying and in nautical chart production.

GEODESIA E HIDROGRAFIA (GEODESY AND HYDROGRAPHY)

by Hydrographic Engineer Lt. Cdr. Vicente GANDARIAS AMILLATEGUI

8°; 335 pages; 207 figures and tables
Published by : Editorial Dossat S.A., Plaza de Santa Ana, 9, Madrid

Works of reference in Spanish on the science of geodesy, and in particular hydrography, are not as complete and comprehensive as they might be, considering the importance of the subject. Except for a few out-dated works, which contain no account of the recent progress made in these sciences, there are not enough well-documented text books to allow a student to learn about these sciences or resolve problems concerning them.

One of the principal reasons explaining this anomaly unquestionably is that

in comparison with other branches of knowledge such as medicine, civil engineering, architecture, etc., too few people have specialized in these sciences; this is because specialists are obliged to study unremittingly their development and application, which leaves them no time to set down in writing their exhaustive knowledge of the subject.

However, recently some progress has been made, as shown by the publication of the book *Geodesy and Hydrography* by Captain D. Rafael Ravina Poggio, in use at the Naval Military College; it is certain that this trend will continue, and that both a scholarly and practical bibliography of considerable worth will result.

Capitan de Corbeta (I. H.) D. Vicente Gandarias Amillategui, who is Chief of the Geodetic Subsection at the Spanish Navy Hydrographic Institute, has included in *Geodesia e Hidrografia* all the information a naval officer needs to carry out a hydrographic survey.

This book, which was declared to be of general interest to the Navy, describes fully and in simple, practical terms, the requisite technics for undertaking a geodetic, hydrographic or topographical survey. In addition, the theoretical study of the various subjects applicable to the actual surveying is kept to the minimum required for a full understanding of the book and to maintain its practical features.

The first section of the book, entitled Geodesy, deals with the following questions :

1) Shape of the earth, geoid, ellipsoid, radii of curvature, longitude of parallel and meridian arcs, geographical coordinates of ellipsoid and geoid, geodetic lines
2) Geodetic triangulation, Legendre's theorem, calculation of triangles, closing errors, eccentric stations, convergence of meridians, computation and transformation of geographic positions, and converse problem
3) Geodetic and topographical bases, invar tape, enlargement of bases, adjustment of quadrilaterals and polygons
4) Altimetry, refraction and refraction coefficient, absolute and reciprocal zenith distances, determination of altitudes
5) Geodetic astronomy, prismatic astrolabe, azimuths of the sun and Polaris, deviation of the vertical
6) Terrestrial magnetism, measurements of magnetic declination on land and at sea.

The second section of the book, entitled Hydrography, deals with the following questions :

1) Projections, construction of Mercator chart
2) General description of a hydrographic survey
3) Signals and levels
4) Instruments and methods of measurement
5) Levelling
6) Measurements by tachymetry and secondary triangulations
7) Tides
8) Sounding operations
9) Running surveys and sailing directions
10) Outline of a hydrographic survey
11) Cartographic drawing and reproduction.

In order to carry out the practical aspect of the book, a series of examples is given to explain and amplify the various questions dealt with and to facilitate their direct application.

At the end of the book a series of tables needed for all kinds of surveys is added.

THE FLOORS OF THE OCEANS. — I. THE NORTH ATLANTIC (LES FONDS DES OCÉANS. — 1. L'ATLANTIQUE NORD)

by Bruce C. HEEZEN, Marie THARP and Maurice EWING

122 pages; 49 figures; 30 plates; 1 chart 136.5 × 67.8 cm
The Geological Society of America, 419, West 117 Street, New York 27, N.Y.

In this work the authors, who are eminent scientists of the *Lamont Geological Observatory* of the United States of America, describe their aims, and the methods they have employed in producing Sheet 1 of the physiography of the Atlantic Ocean. This sheet, which covers the Northern Atlantic Ocean between the latitudes 17° and 50° N, is the first of a series which will comprise 5 sheets to scale 1/5 000 000 and one sheet to scale 1/11 000 000. In addition diagrams of certain areas will be made to scale 1/2 000 000 where sounding profiles are particularly dense.

The authors were inspired by the physiographic portrayal of continental land areas completed by A. K. Lobeck and Erwin Raisz. The published sheet is based on continuous echo-sounding traverses made by research vessels. The relief shown on the profiles has been sketched in according to the Lobeck technique. Between the sounding profiles the relief is speculative, based on the general trends given by the profiles.

The ocean surface is divided into three major physiographic regions, which are in turn subdivided into several physiographic relief zones. Each relief zone is described briefly and illustrated by profiles and photographs of echo-sounding records.

The authors underline that boundaries of physiographic relief zones, defined solely by the topography of the ocean floor, agree closely with variations in the structure of the earth's crust as determined by seismic-refraction measurements, and with anomalies of gravity and magnetism. Further, these boundaries agree with the distribution patterns of bottom sediments. The authors conclude that physiographic zones are thus really morpho-tectonic zones, which will allow them to determine the geology of large areas in the oceans where no geophysical work has ever taken place, and to draw up in this way a tectonic map of the Atlantic.

MORSKOI ATLAS (MARINE ATLAS)

Responsible Editor of the Board of Editors
ISAKOV, I. V., Professor, Admiral of the Fleet v/o

Volume I : 52 × 40 cm; 83 plates with a separate alphabetical index (35 × 26 cm) of 541 pages (1950-1952)

Volume II : 52 × 40 cm; 76 plates with an alphabetical index (1953)
Publication of Head of Staff of Naval Forces
Ministry of Defense of the U.S.S.R.

The International Hydrographic Bureau has received Volumes I and II of the Morskoi Atlas (Marine Atlas) published by the Head of Staff of Naval Forces, Ministry of Defense of the U.S.S.R., as a gift from the Hydrographic Office of the U.S.S.R. Navy.

The Morskoi Atlas is published in accordance with the terms of a decree issued by the Council of Ministers of the U.S.S.R. dated 31 May, 1947.

The first volume, published in 1950, gives a general geographic and navigational outline of the seas, oceans, certain individual marine areas, and the principal ports of the world. The volume contains 83 coloured plates; an index-chart at the beginning of the volume enables the reader to refer readily to a chart covering a given region. Further, each plate is preceded by and index-chart indicating larger-scale plates also covering the area. The scale of the charts varies from 1/50 000 000 for the planisphere to 1/100 000 for the detailed charts. The bathymetry, as shown by soundings, depth contours and blue tints, is very legible; the planimetry and hypsometry are very finely drawn. The only difficulty in using the Atlas arises from the fact that Cyrillic characters are used for the toponymy throughout.

Volume I is accompanied by a separate alphabetical index published in 1952 and consisting of 541 pages.

Volume II concerns the physical geography of the oceans of the world. It contains 76 plates, and is divided into 4 sections. Section one : Chief Cruises and Nautical Expeditions (plates 1 to 6) illustrates the history of geographical discovery and research in the seas and oceans. Section two : Oceanography (plates 7 to 40) describes the hydrologic regime, currents, tides, the structure of the ocean floor, and certain problems of marine biology. Section three : Climates (plates 41 to 69) shows ocean climates, and their principal characteristics throughout the world. Section four relates to terrestrial magnetism, cartography and astronomy (plates 70 to 76).

The members of the editorial board of this important publication belong to naval academies, the Hydrographic Department of the Navy, institutes of the Academy of Sciences, the Institute of Oceanology, the Geographical Institute, the Marine-Hydrophysical Institute, the Institute of Oceanography and many other scientific organizations.

The cartographic and drafting establishments of the Ministry of Defense, the General Directorate of Geodesy and Cartography of the Ministry of Internal Affairs, the Ministry of Finance, and the Ministry of Culture participated in the compilation and publication of these charts.

The organization of the work, scientific editing and revision of the charts was directed by the editorial board.

SUBSIDIOS PARA O ESTUDO DO REGIME HIDROGRAFICO DO PORTO DA BEIRA (MODIFICATION OF THE PHYSIOGRAPHY OF THE PORT OF BEIRA)

by J. A. BARAHONA FERNANDES

122 pages; 39 illustrations; 7 plates of survey plotting sheets and charts; 25 × 17 cm

Junta de Investigaçoes do Ultramar, Rua da Junqueira, 86, Lisboa, 1958

This book incorporates in one volume the various findings so far published concerning the physiography of the port and bar of Beira; it summarizes the studies made in 1956/1957 by the Hydrographic Mission of Mozambique in order to interpret the important alluvial phenomena of the region, and to help in setting the trend for future dredging and other improvements to the port.

After giving the history of the town of Beira and citing the hydrographic surveys made since 1885, the author describes the port and bar and lists the results obtained by the Hydrographic Mission concerning depths, tides and currents. Beach erosion, variations in depth in the port and the evolution of the bar are analysed by comparing the different hydrographic surveys.

The author recommends additional research with radioactive sand and scale-model tests, and submits conclusions regarding appropriate future dredging operations and quay construction.

The book demonstrates how useful hydrographic surveys can be both in chart construction and in carrying out improvements to harbours and their approaches.

THE POLAR REGIONS IN THEIR RELATION TO HUMAN AFFAIRS

by Laurence M. GOULD, President of Carleton College

54 pages; 20 illustrations; 4 maps
Bowman Memorial Lectures, The American Geographical Society
New York, 1958

The American Geographical Society of New York has included in the *Bowman Memorial Lectures* a lecture on the polar regions delivered before members and their guests on 30 January, 1958 by Dr. Laurence M. Gould, the eminent geologist, geographer, and explorer of the two polar regions in 1926 and in 1928/1930.

Dr. Laurence M. Gould, who during the International Geophysical Year was Chairman of the Antarctic Committee of the United States National Committee for the IGY, was particularly well qualified to give this lecture. The author begins by pointing out the essential differences between the north and south polar regions; then he studies each region separately with emphasis on human geography, and insisting on the strategic importance of these areas. The book contains many photographs and maps; one of the latter is a coloured bathymetric chart of the arctic basin, not included in the actual text but inset at the end of the book. Mention must also be made of an appendix setting out the various claims to sovereignty over parts of the Antarctic continent by different states.

ESTUDO DO SISTEMA TELLUROMETER

by JOAQUIM B.V. SOEIRO DE BRITO

144 pages; 38 illustrations; 25 × 17 cm
Ministerio do Ultramar (Junta de Investigaçoes do Ultramar),
Rua da Junqueira, 86, Lisboa, 1958

The *Junta de Investigaçoes do Ultramar* (Committee for Overseas Research) of the *Ministerio do Ultramar* (Ministry for Overseas Territories) of Portugal published in 1958 a study of the tellurometer system by Joaquim B.V. Soeiro de Brito which was numbered 45 in the collection *Estudos, Ensaios e Documentos* (Studies, Essays and Documents).

This paper, which is intended for users of the tellurometer, describes the theory of the apparatus so as to allow a better understanding of its use in practice as set out in the instructions manual.

In the first part of the study the author considers the most important factors concerned in the propagation of electro-magnetic waves, and in particular tropospheric propagation and the factors relating to the optical, or interference, zone which is the only one of interest in the use of the system. Propagation factors are grouped into two main classes : internal factors depending on the equipment used and external factors depending on the medium in which propagation occurs. Among the latter, the author gives particular emphasis to reflection, refraction and diffraction phenomena because of their great importance to complete understanding of the system. In an appendix to the first part some meteorological factors are pointed out which influence propagation.

The second part of the paper consists of the study of the theory of the system, and the corrections to be made to the instrument-measured distance to obtain the geodetic distance between stations. First of all the author establishes the fundamental relationships of frequency modulation, and studies the phenomena occurring in the simultaneous reception of two frequency-modulated waves, upon which technique the system is based. The results reached are then used in studying relations between the distance to be measured and the parameters indicated by the apparatus. Next he examines methods used to eliminate internal and external errors, and also for resolving the possible ambiguities of the system. Finally he analyses the applicable instrumental, propagation and geometrical corrections for obtaining the geodetic distance necessary for various calculations. An appendix to the second part sets forth the principles of the barometric determination of altitudes, as well as the present state of some of its techniques, as station elevation is an indispensable element for the use of the system.