



HYDROGRAPHIC BIBLIOGRAPHY.

I. — EXTRACTS AND REVIEWS.

TABLES POUR OBSERVATIONS A L'ASTROLABE A PRISME

TABLES FOR OBSERVATIONS WITH THE PRISMATIC ASTROLABE

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in 16 mo — 102 pages

Extract from the Preface of the *Zi-ka-wei Observatory Year-Book*

One objection which is sometimes made to the use of the prismatic astrolabe, is the length of the calculation both before and after the observations; before, to enable the astrolabe to be pointed in the correct azimuth at the required time; afterwards, to work out the observations.

In view of the International Revision of Longitudes, these genuine difficulties had to be faced, and tables had to be compiled to prepare for the observations, *i. e.*, to set the apparatus at the correct angle, and to make up for the insufficiency of diagrams.

Before observing a star of declination δ and right ascension a , with the astrolabe, it is necessary to know the azimuth Z and the time of observation, the latter being equal to $a \pm P$. (P is the interval between the passage of a star at the astrolabe and at the meridian).

Therefore, it is essential to know the elements Z and P , in order to prepare the necessary *book of angles* for pointing the apparatus.

There is a diagram, published by the FRENCH HYDROGRAPHIC OFFICE, which gives the values of P and Z corresponding to the latitude φ and declination δ .

Another diagram had to be specially constructed for Circum-meridians ($Z < 20^\circ$) and was ingeniously carried out by PERRET on the principle of aligned points. This diagram gives Z but it is still necessary to calculate P .

The two diagrams mentioned above are very useful, but are insufficient if an accurate determination of the two elements P and Z is required.

Moreover, they are graduated in polar distances and colatitudes (the ephemerides give the declinations) which is inconvenient.

A complete table appeared desirable in order to avoid errors, and to fill up omissions.

The Manual rightly says, that to make practical tables "a small volume" must be compiled.

But, if our tables are confined to latitudes between $+45^\circ$ and 0° , a single sheet for each degree will suffice to assure a good interpolation. This would be much more convenient, as one extra note-book on a journey is a negligible matter.

The direct construction of these tables would have been very laborious; as a matter of fact, this is already nearly completed. All that is required is to utilise the publications of the AMERICAN HYDROGRAPHIC OFFICE.

Our tables give the hour angle P and the azimuth Z of the star for latitudes between 0° and 45° , corresponding to each degree of declination δ , and for circum-meridians to each $10'$ of declination.

CONSTRUCTION OF THE TABLE.

Publications *HO* N° 103 and *HO* N° 204 of the AMERICAN HYDROGRAPHIC OFFICE, (Washington, 1923 and 1925) the perfect typographic execution of which is worthy of praise, were used as basis.

These tables solve the position triangle (triangle *PZA*) giving the hour angle *P* and the azimuth *Z* for each degree of altitude, declination and latitude.

The latitude varies from -60° to $+60^\circ$.

There is an omission in the *HO* N° 203 and 204 of the declinations 32° , 33° , 40° , 41° , 42° , 43° , 44° , 46° , 47° , 54° , and those above 63° ; the stars corresponding to these declinations not being "Navigator's stars"

In the present work, the figures suitable to the astrolabe (altitude = 60°) have been taken from publications 203 and 204.

It is obviously a very simple matter to take out the elements *P* and *Z* corresponding to any other altitude, if another equal altitude instrument is used.

The difficulty occasioned by the omissions of declination mentioned above, has been overcome by interchanging the elements, entering, for example, the American table with a latitude of 60° , or a latitude equal to the omitted declination; or by changing the elements *P* and *Z*.

Finally, when the quantity *P* had to be calculated, it was done by means of BOWDITCH'S *Useful Tables* (U. S. HYDROGRAPHIC OFFICE, Washington, 1920) from the formula

$$\text{hav. } N = \text{hav} (\delta - \varphi) + \cos \lambda \cos \delta \text{ hav. } P.$$

N = 30° being the zenith distance relative to the Astrolabe, φ the latitude, δ the declination; and *hav* *P* signifying $\sin^2 \frac{1}{2}P$.

The 900 values for the circum-meridians were calculated in two days and in series; which shows the very practical character of the *Useful Tables*.

An appendix gives a rapid method of calculating a table of hour angles to 0.01 s. for any given latitude.

HYDROGRAPHIC MANUAL

by J. H. HAWLEY, HYDROGRAPHIC AND GEODETIC ENGINEER U. S. COAST AND GEODETIC SURVEY

in 8 vo — 170 pages — 44 illustr.

Special Publication N° 143 of the U. S. Coast and Geodetic Survey

United States Government Printing Office, Washington, 1928

Price : 45 cents.

This manual is issued for the purpose of giving the general requirements of the UNITED STATES COAST AND GEODETIC SURVEY for the execution of hydrographic surveys and to describe the equipment and methods used for hydrographic work, that is to say, to secure information concerning coastal waters for the compilation of nautical charts and coast pilots or for the correction of existing charts and pilots.

The most important of these operations are as follows :

- a) Depth measurements, the determination of the nature of the bottom and the collation of data required for oceanographic research.
- b) Determination, by reference to control stations, of the position of each sounding, of rocks, reefs, wreckage, aids to navigation, etc., that may be charted for the guidance of navigators.
- c) Recording and plotting all data in order to provide permanent records that will show clearly all the information obtained by the survey and serve as a basis for chart construction and coast-pilot compilation.

The COAST AND GEODETIC SURVEY has also issued several publications covering special hydrographic operations (for example, tidal and current investigations).

Such operations are covered in this manual by a general description and reference to the publication in which complete details will be found.

In Part I of the manual are given the *general requirements for hydrographic work* prescribed by the Director of the COAST AND GEODETIC SURVEY to govern the execution of all hydrographic surveys. They are supplemented by special instructions covering the specific requirements for each operation contemplated.

All this first part, printed in small characters, is in the nature of general instructions, condensed in 179 paragraphs, among which the following may be cited:

Establishment of Control Stations - Scales - Projections - Depth limits for indirect methods - Use of pressure tubes - Tube corrections - Use of fathometer - Temperature and salinity observations - Velocity of sound - Verification of fathometer soundings - Records - Systems of sounding lines - Spacing of lines - Inshore limit of work - Sounding speed - Sounding interval - Fathometer (red light method) sounding interval - Supervision by chief of party - Correction to sounding apparatus - Selection of soundings - Depth unit for plotting - Plotting depth curves - Landmarks for charts - Progress sketches - Information for Sailing Directions - Approval of records.

The second part of the manual is devoted to the description of the equipment and methods used for hydrographic work.

The first chapter gives a description of the survey vessels and launches.

The chapters following relate to preliminary work: reconnaissance, preparation of the minutes, erection of land signals, construction of floating signals. (The use of floating signals is described in detail in chapter 5).

Chapter 4 is devoted to the equipment and methods for measuring depths: hand-lead sounding - lead-line sounding with machine - trolley sounding - ship sounding machines (*L* electric type, *SL* steam type, and the deep sea machine with a capacity of 6000 fathoms of piano wire) - launch sounding machines - registering sheaves - COAST AND GEODETIC SURVEY sounding tube with electric measuring device - echo sounding - the manual gives a complete description of the fathometer, its electrical connections, and procedure for operating.

This chapter also gives instructions for measuring oceanographic data, such as: temperature and *salinity* at the surface and at any desired depths, taking bottom specimens and water samples.

Chapter 5, entitled "Position Finding" relates to instruments and methods of fixing positions. The use of the protractor is described in detail as well as its testing and adjustment and mention is made of "Court's celluloid three-arm protractor". Various methods for fixing positions offshore are then described: by bearing of floating signals, precise dead reckoning (which depends on the accuracy of the log at the slow speed required for sounding), the radio acoustic method and, finally, astronomical observations of stars. This latter method is applicable to echo-sounding as soundings can be taken under way without reducing the speed of the ship. The manual points out that radiogoniometric bearings should be used for hydrography only when other means are impossible.

Chapter 6 concerns the recording and reduction of soundings.

Three examples are given for soundings taken with a Fathometer.

1) For soundings of 450 fathoms or less, taken with an instrument, the dial graduation of which corresponds to 240 revolutions per minute (*i.e.* corresponding to an assumed velocity of sound of 800 fathoms per second).

2) For soundings of 450 fathoms or less, taken with an instrument the dial graduation of which corresponds to 246 revolutions per minute (*i.e.* corresponding to an assumed velocity of sound of 820 fathoms per second).

3) For soundings over 450 fathoms.

In the first two cases, the soundings are corrected by means of a factor, taken from the tables in the appendix to the manual. These tables are entered with the temperature and salinity.

In the third case, the correction is made by means of a factor which is computed for each 200 fathom layer of depth, using the observed salinity and temperature.

Chapter 7, entitled "Hydrographic Surveying" relates to the division of work between the various units of the party. It describes an original method for reducing soundings, then passes on to the spacing of lines of soundings. Under the name "180 mirror" an instrument is described whereby a straight line between two objects ahead and astern of the observer may be followed.

It gives information on sounding speed and sounding intervals; on researches with reference to rocks, shoals and channels.

Chapter 8 concerns the plotting of provisional minutes, and drafting them in accordance with the symbols and notations used in hydrography. It gives instructions for the preparation of progress sketches, and indicates the regular terminology for submarine relief, and the rules for geographical names.

The last chapter is devoted to the compilation of Sailing Directions or Coast Pilots, which are published for the purpose of supplying all information that may be of use to the navigator not furnished on charts or in other readily available forms, and to verifying and completing these directions on the spot.

The appendix gives various tables, a summary of data to be forwarded to the head office, and a list of rubber stamps to be affixed to records for checking purposes.

The Manual states that a Special Publication of the COAST AND GEODETIC SURVEY, entitled "Radio Acoustic Position Finding" is in course of preparation.

TECHNISCHE NAVIGATION UND METEOROLOGIE TECHNICAL NAVIGATION AND METEOROLOGY

by H. MELDAU

in 8vo — 180 pages — 89 fig.

published by G. Winters, Bremen, 1927.

This supplement to the *Treatise on Navigation* by MELDAU deals with various modern appliances and methods of navigation and meteorology.

The first chapter is devoted to a detailed study of the gyroscopic compass. Although of an elementary character, reference is made to the method of precession of the compass and to its damping by means of a basin containing liquid. A detailed description is given of the Anschütz compass with three gyroscopes and of its complete installation on board with repeating compasses.

A description is also given of the new Anschütz spherical compass.

Chapter 2 contains a description of the Anschütz automatic steering apparatus and automatic track recorder, an apparatus which, although it does not record the track on the chart, gives nevertheless all the indications necessary to compute the dead reckoning position.

In Chapter 3 a brief description is given of modern sounding appliances: lead dropping sounders, the Langevin-Florisson, Marti, Behm, British Admiralty, Sonic Depth-Finder, Langevin-Chilowsky, Fathometer sound or echo sounders.

Chapter 4 deals with radiogoniometric apparatus, its installation on board, its adjustment and use in navigation in the form of orthodromic bearings.

Chapter 5, which embodies the second half of the work, is devoted to meteorology, atmosphere, atmospheric circulation, the technique of meteorological measurements and instruments, application to navigation, tropical storms.

An annexed plate gives photographs of clouds together with the meteorological symbols used on weather charts. This work also contains a graphic psychometric table by Dr. H. BOUGARDS and a diagram for converting the apparent direction of the wind to the true direction, on board ship.

VERHANDLUNGEN DER BALTISCHEN GEODATISCHEN KOMMISSION.
REPORT OF PROCEEDINGS OF THE BALTIC GEODETIC COMMISSION
HELSINGFORS 1924 — STOCKOLM 1926 — RIGA 1927.

by ILMARI BONSDORFF
in 8°, 150, 159 pp.
Kirjapaino-oy Sana Helsinki 1928.

This work contains the reports of various conferences held by the Baltic Geodetic Commission.

At the 1924 session, the German delegate, Professor KOHLSCHÜTTER forwarded a proposal to the Conference concerning the adjustment of the triangulation net for the Baltic Sea.

Professor KOHLSCHÜTTER's proposals for the adjustment of a triangulation net have been translated from the German into French by the INTERNATIONAL HYDROGRAPHIC BUREAU, which will forward this translation on request.

INSTRUCTIONS FOR TIDE OBSERVATIONS.

by G. T. RUDE, HYDROGRAPHIC AND GEODETIC ENGINEER

Special Publication N° 139, U. S. Coast and Geodetic Survey.
United States Government Printing Office, Washington, 1925.

Price: 20 cents.

The purpose of this publication is to summarize for field use the methods used by the COAST AND GEODETIC SURVEY in obtaining tide observations and in making the reductions of the tide records necessary for the establishment of planes of reference for reducing the soundings of a hydrographic survey. Since it is intended as a working manual, no theoretical discussions have been included, and the methods of computations and reductions have been limited to those necessary for field use.

The introductory chapter contains ordinary definitions relative to tides—with suggestions as to the selection of sites for tide stations under various conditions.

The chapters following are devoted to a detailed description of the material; tide staffs, non-registering gauges, standard automatic tide gauges and portable automatic tide gauges (previously described in *Special Publication N° 113* of the COAST SURVEY and reproduced by the INTERNATIONAL HYDROGRAPHIC BUREAU in the *Hydrographic Review*, Vol. III, N° 2, page 210).

Chapter 6 relates to Bench Marks, and the method of placing them near tide stations, and connecting them with the tide staffs.

The remaining chapters concern the tabulation of tide records, hourly heights and high and low waters; various planes of reference used for tides or soundings on the coasts of the UNITED STATES OF AMERICA; tide reducers for soundings.

The work concludes with special recommendations concerning the inspection of primary Tide Stations, i.e. those stations at which the tides are permanently observed and which are placed under the direct control of the COAST AND GEODETIC SURVEY.

**RESUMEN DE LOS TRABAJOS DE LA COMISIÓN HIDROGRÁFICA
DE ESPAÑA EN LA COSTA DE GALICIA EN LOS ANOS 1903 A 1918.**

SUMMARY OF WORK CARRIED OUT BY THE SPANISH HYDROGRAPHIC
COMMISSION ON THE COAST OF GALICIA FROM 1903 to 1918

in 8vo — 113 pages

published by the *Dirección General de Navegación del Ministerio de Marina,*
Printing-works " Ram ", Madrid, 1925

The Bureau has received from the SPANISH HYDROGRAPHIC OFFICE a volume entitled: *Resumen de los trabajos de la Comisión Hidrográfica de España en la Costa de Galicia en los Años 1903 a 1918.* This book describes the work of triangulation carried out on the coasts of Galicia and the methods of adjustment used; it gives the geographical positions of all the triangulation stations, and the azimuths and lengths of sides. It also deals with the numerous magnetic observations made and the results obtained from observations of the San-Fernando-Observatory up to the 1st of July, 1914, for declination and horizontal force and up to the 1st of July 1910 for inclination.

Details on tides and the establishment of charts are given. The latter are drawn on Mercator's projection, using Struve's ellipticity, $\frac{1}{\alpha} = 294.73$. Tables of meridional parts, corresponding to each minute of latitude, between the parallels of 41°44' and 44°20' are given to 6 decimal places.

