

These star lists are lists of stars for each degree of latitude from 60° North to 60° South with their approximate local sidereal times and azimuths of crossing the altitude of 60°, with magnitudes, names and approximate right ascensions, including all stars for which ten-day places are given for the year 1930 in the American *Ephemeris*, British *Nautical Almanac*, or the French *Connaissance des Temps*.

The objection may be raised that in the course of time the lists will become obsolete, owing to changes in the star places. While this is true enough the changes in the lists due to changes in declination are so slight that, except in extreme cases, twenty years will barely affect the list values of azimuth and local sidereal time (L.S.T.). In twenty years the average change due to change in right ascension (R.A.) will be about one minute of time. Since the tables are for "finding" purposes only, it would seem a simple matter to advance the given L.S.T. mentally by that amount.

The book also contains suggestions for the adjustment and use of REEVES' prism attachment for theodolites.

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## DIE ECHOLOTUNGEN DES "METEOR" (Text und Echolotprofile).

THE ECHO SOUNDINGS OF THE "METEOR" (TEXT AND PROFILES).

by

PROF. DR. HANS MAURER, 1933.

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The INTERNATIONAL HYDROGRAPHIC BUREAU has received the second volume of the scientific results of the *Meteor* expedition. It contains a description of the sounding material and the plotting of the soundings obtained during her 1925-27 cruise in the Atlantic Ocean.

The *Meteor* was provided with four systems of acoustic apparatus :

(i) The dropping lead or bomb (FREILOTT). (See *Hydrographic Review* No. 4, p. 177 and No. 9, p. 159) ;

(ii) The BEHMLOTT. (See *Hydrographic Review* No. 4, pp. 166-167) ;

(iii) The SIGNALOTT: (described under the name of ECHOLOTT in *Hydrographic Review* No. 9, pp. 161-163) ;

and (iv) The ATLASOTT: (See *Hydrographic Review* No. 9, pp. 153-159).

These sets are described in great detail; the last two were those generally used during the work.

The author discusses with the greatest competence the corrections to be applied to the crude soundings, to allow for the velocity of sound without introducing the slope, a knowledge of which seems to him to be too uncertain. The velocity of sound at each position and for every depth is studied with great care, and an interesting map (page 42) shows the lines of equal mean velocity between the surface and the bottom in the region where the work was undertaken. The results of this investigation differ but little from those given in the tables of velocity of sound published by the British Admiralty, as is shown by the comparison given in Table 10 on page 47.

To obtain an estimate as to the accuracy of acoustic methods, a comparison was made at a certain number of positions between the soundings obtained by sound, by line, and by the comparison of protected and unprotected thermometers; the latter question has already been dealt with by G. Wüster in Vol. IV of the same publication. (See also *Hydrographic Review* No. 20, pp. 28-49). This comparison leads to the conclusion that the accuracy of the three methods is approximately of the same order, and to empirical correction formulae for obtaining the most probable value of the depth according to the method or methods adopted.

Table 17 (p. 69) gives the greatest and least depths obtained during the cruise, the maximum attained being 8,264 m. (4,459 fms.) in the South Sandwich Deep.

Table 18 is a complete table of the soundings taken, both on the outward and homeward passages and on the 14 profiles made. Each depth is accompanied by the velocity of sound used in correcting it.

These final results of the soundings differ somewhat from those which are given in Volume I, where all the corrections and the discussion of the crude results were not so complete. The same applies to the list of soundings given in Vol. IV. These differences, which sometimes exceed 100 m. (54.7 fms.), are easily explained and show the inevitable uncertainty which must exist with regard to the true depth; they are none the less vexatious and troublesome in the volumes of a single publication when the enormous mass of this material has to be exploited.

Vol. II is completed by an appended volume containing the morphological profiles of all the *Meteor's* tracks; these extremely curious profiles show us the very uneven bottom of the ocean, often as much so as in the most confused mountain ranges, so that sometimes its representation by contour lines is almost impossible. Here is a new fact for geological theories and a very important one, which can only be verified and developed by a minute examination of comparatively restricted fields, where the greatest difficulty consists in obtaining a few datum positions well enough fixed to enable the soundings to be located with great accuracy.

P. V.

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## METHODEN ZUM STUDIUM DER MEERESSTRÖMUNGEN.

(METHODS OF STUDYING SEA CURRENTS).

by

HERMANN THORADE, Hamburg, 1933.

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This book, one of a series of manuals on biological methods of work, has an essentially practical object — to describe the various experimental methods of studying sea currents. This is one of the most important and most difficult parts of oceanographic science; it is of interest both to seamen and oceanographers and we owe the author a debt of thanks for collating, with a high degree of skill, the information to be found in the most recent works, which have been particularly numerous during the last twenty years and an excellent list of which is given at the end of the volume.

The work is divided into three parts. The first contains a description of the methods of observation: floats or drifting ships, investigation into the origin of the water from its physical or chemical properties, screw or paddle apparatus, and pendulum apparatus. The descriptions are very precise, and illustrated by numerous figures; (several of the more important of these appliances have been described in the *Hydrographic Review*). One chapter is devoted to obtaining a fixed position in deep water; information on this subject has already been presented to readers of the *Hydrographic Review* in the article in *Hydrographic Review* No. 17 compiled by the Commanding Officer of the *Meteor*.

The second part deals with the method of making use of the observations, an extremely delicate utilisation of data where the causes of error are often of the same order as the phenomenon to be found; the latter, in some regions, being almost as variable as the wind itself. Thus recourse has been had to a method of representation based on statistics and averages: (it is surprising not to find mention of MAURY's name). But the charts so produced are not too easy to interpret, and this has led to a representation — much more striking — by lines of currents and fields of currents. By this method an image is obtained into which the theoretical ideas of the author have of necessity entered in regard to the choice between the statistical results, but which is as clear, scientific and accurate as our still imperfect knowledge of the phenomenon permits. The authors of these charts generally use a special symbol to take the statistical figures into account by indicating the constancy of the current and present a bird's eye view which has the great advantage of being in agreement with the laws of hydrodynamics. (See *Hydrographic Review* No. 15, pp. 233 and 240).

The third part is a rapid study of the causes which produce currents. On this subject of dynamic oceanography we have already noted, in the 13th number of the *Hydrographic Review*, the important work by Prof. Dr. A. DEFANT which was published in 1929.