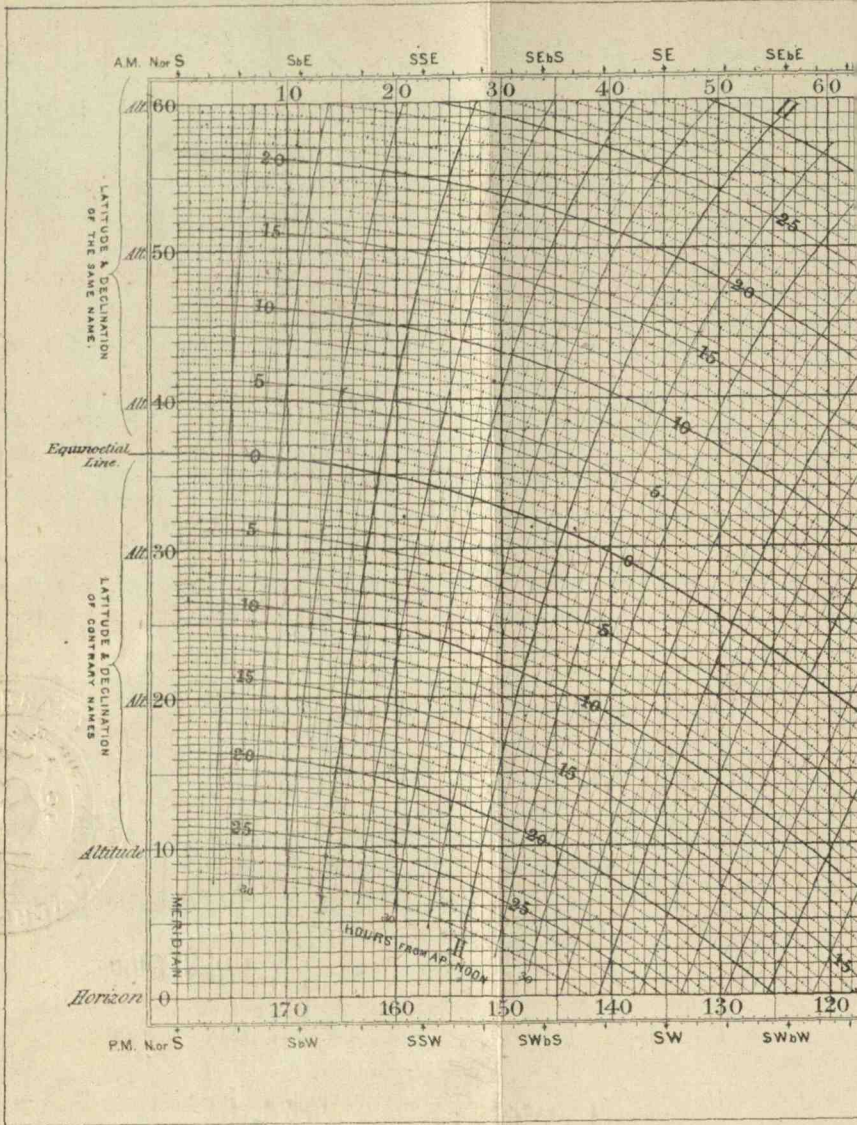


AZIMUTH, ALTITUDE & T

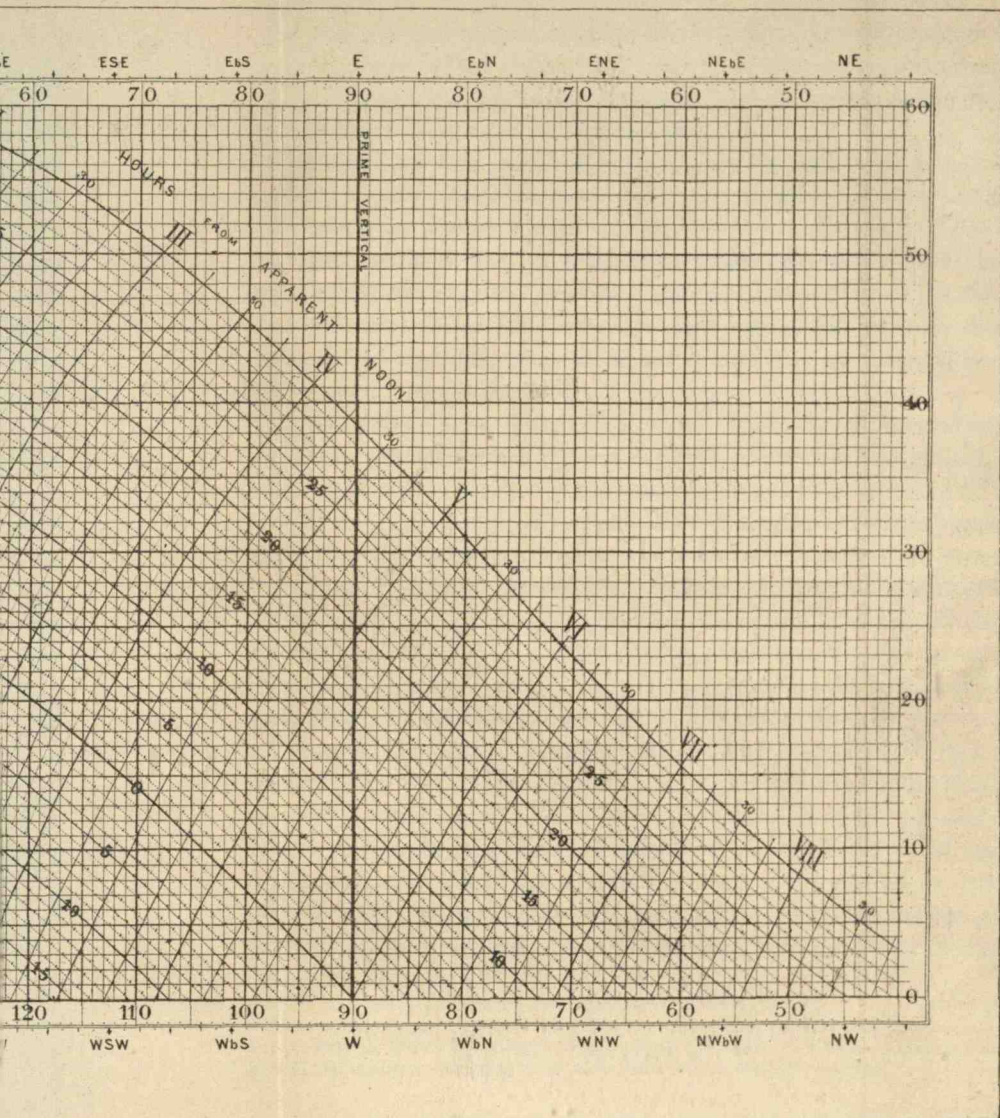
PLATE III.



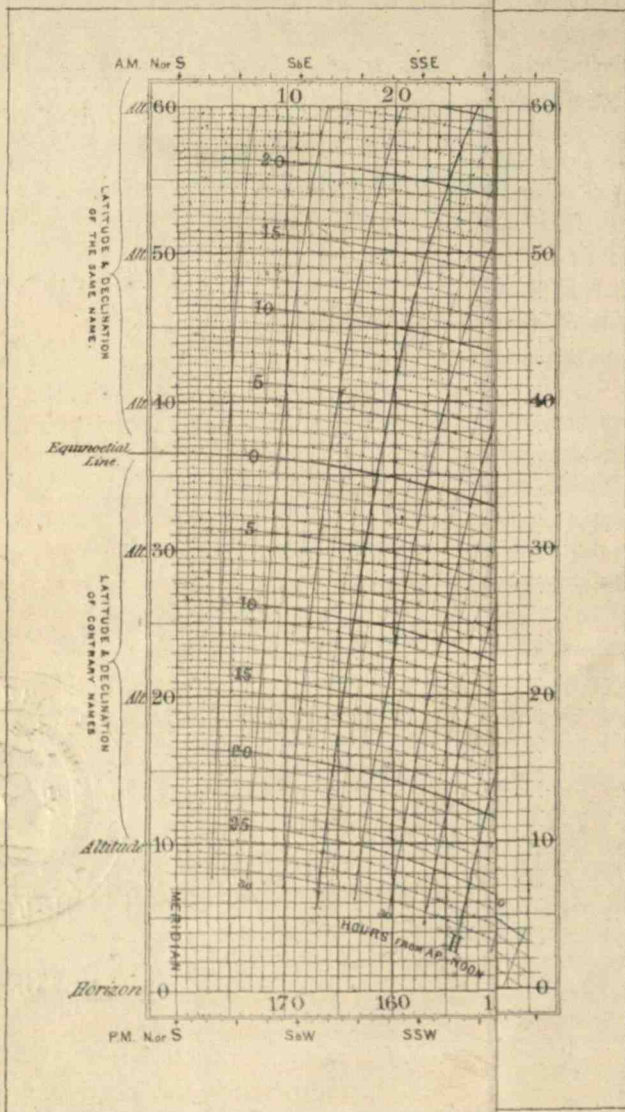
DESIGNED BY

& TIME TABLE FOR LATITUDE $53\frac{1}{2}$.

H. S. OF L & C. VOL. X.



BY W. W. RUNDELL, ESQ.



AZIMUTH CARD FOR THE LATITUDE OF LIVERPOOL.

By Mr. W. W. Rundell.

(READ 15TH JANUARY, 1857.)

The accompanying diagram for showing the true bearing of the sun at any minute of time, by mere inspection, is intended for the use of captains of ships, when approaching or leaving the port of Liverpool, and will enable them to ascertain, with great ease, if their compasses are correct, or, the amount of deviation for which allowance must be made if their compasses are in error.

DESCRIPTION OF THE DIAGRAM.

The horizontal lines numbered from 0 to 60 in the side margins show degrees of altitude from the horizon.

The vertical lines, numbered at the top and bottom of the diagram, indicate in degrees, *azimuths*, or angular distance from the meridian measured on the horizon,—the corresponding points of the compass are also shown; the morning points at the top, and the afternoon points at the bottom of the diagram.

The curved lines running from the meridian (marked S for south,) to the straight line at the bottom (marked horizon) represent the sun's path for each degree of north and south declination, every fifth degree being conspicuously numbered. These lines are divided to show hours and minutes of apparent time, reckoned from noon (*hour angles*); the hours being indicated by the usual Roman numerals, the quarter hours by dark lines, and the minutes by small dots, every fifth minute having a larger dot.

RULES FOR USE.

I. By a watch, set to apparent time, at place, find how many hours and minutes from noon (the nearest five minutes will suffice); observe where the line representing the *time from noon* meets the line of *declination* for the day of observation; the nearest vertical line to this point will show the sun's true bearing.

II. If altitude be used instead of time—observe where the line of altitude meets the line of declination; the nearest vertical line shows the sun's true bearing.

III. If the *magnetic bearing* of the sun be required, apply the variation to the true bearing. At Liverpool, for 1858, the variation is 23.50 W.

REMARKS.

It will be evident to the navigator that the diagram may also be used to find the true bearing of the moon, the planets, and many bright stars, in the same manner as for the sun; and thus the indications of the compass may be checked at night, when the heavenly bodies are visible, with nearly the same facility as by day.

The lines of declination have been carried to 30° above the equinoctial line, and to 28° below it, so as to include extreme declinations of the moon and planets, and the declinations of many bright stars.

EXAMPLES.

OBJECT.	ALTITUDE.	HOOR ANGLE, OR, TIME FROM NOON.	DECLINATION.	TRUE AZIMUTH.	MAGNETIC BEARING.
Sun.	..	3 h. 11 m. P.M.	23° S.	S. 43° W.	S. 67° W.
San.	..	11 h. 5 m. A.M. (or 0 h. 55 m.)	16° S.	S. 14° E.	S. 10° W.
Moon.	18° (P.M.)	..	28° N.	N. 67° W.	N. 43° W.
Venus.	15° (A.M.)	..	25° N.	N. 68° E.	E. 2° S.
Aldebaran.	..	5 h. 30 m. P.M.	16.13 N.	W. 4° N.	W. 28° N.

It should be observed that when *time* is used with this diagram to obtain the bearing of a heavenly body, a difference of one or two degrees in latitude will produce only a small error in the azimuth; the diagram will therefore be sufficiently correct for any part of the Irish Sea.

A gimballed *Dumb-Card*, with adjustable sight vanes, lubber line, &c., is strongly recommended for ascertaining the true direction of the ship's head, in connexion with this Azimuth Card, as much more convenient and accurate than the ordinary Azimuth Compass.