LUCAS'S TABLES FOR FINDING THE LONGITUDE BY THE MERIDIAN ALTITUDE, AT SEA, WITHOUT THE AID OF A CHRONOMETER

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WILLIAM LUCAS

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LUCAS'S  TABLES

FOR

FINDING THE LONGITUDE

BY THE

MERIDIAN ALTITUDE,

AT SEA,

WITHOUT THE AID OF A CHRONOMETER;

INCLUDING

NEW AND CONCISE TABLES FOR WORKING THE SYSTEM,

TOGETHER WITH

A TABLE SHOWING THE DAILY VARIATION OF THE EQUATION OF TIME UNDER THE MERIDIAN OF GREENWICH.

BY WILLIAM LUCAS.

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PREFACE.

THE object of this work is to facilitate what navigators most desire, and to assist them in obtaining, within the shortest possible space of time, the necessary results required in conducting their ships. I have personally made it my study to secure this object when at sea, and experience has proved to me that the method I adopted, which is explained in this treatise, is such as I can with the greatest confidence recommend to others.

I propose means of finding the Longitude at sea by a Meridian Altitude, at noon, without the use of a chronometer. By the following method I can do this, in an inconceivably short space of time when compared with the ordinary method. I hereafter give as an illustration a few Examples of my mode, which Examples are novel to any in use.

I have established my system by test with that valuable invention, "Moore's Spherical or Great Circle Indicator," the inventor of which I sailed under many years ago. My plan is based on simple calculation, found to be correct by my own experience in the conduct of valuable ships and property at sea. Neither the method nor the Examples are recommended, as most works are, as theories. The method is founded on practice and developed by my own practical experience. Having submitted my system to the examination of the Marine Board in London, I decided on making a voyage as chief officer under the command of an experienced captain, so that I might give him the opportunity of investigating my plan, and herewith is annexed a certificate from him, which he personally ratified at the Mercantile Marine Board of London.

WILLIAM LUCAS.

Oct., 1864.

[COPY OF CERTIFICATE.]

"LONDON, *July* 27, 1864.

"This is to certify that William Lucas was mate of the barque 'Douglas,' under my command, in a voyage from Swansea to the West Indies, and back to London. I beg to recommend his method of finding Longitude by Meridian Altitude, having found it to correspond with my Chronometer.

(Signed) "JOSEPH S. SOPWITH,

"Master, barque 'Douglas.'"

ABBREVIATIONS.

Alt.	Altitude.
App.	Apparent.
App. T. S.	Apparent Time, Ship.
Equ. T.	Equation of Time.
Diff.	Difference.
Decl.	Declination.
Lat.	Latitude.
Long.	Longitude.
Merid.	Meridian.
M. T. S.	Mean Time, Ship.
M. T. G.	Mean Time, Greenwich.
P. D.	Polar Distance.
+	Add.
−	Subtract.
×	Multiply.
÷	Divide.
=	Equal to.

RULE AND EXAMPLES

FOR WORKING LUCAS'S SYSTEM.

RULE.

THE system set forth in the present work, is that of FINDING THE LONGITUDE BY THE MERIDIAN ALTITUDE, AT SEA, WITHOUT THE AID OF A CHRONOMETER. In order to do this, the following rule must be observed. First ascertain the Altitude, at noon, by means of the quadrant or sextant. Next ascertain mean time at Greenwich in this way:—Find the Altitude at Greenwich by working the Altitude back from the Latitude at Greenwich; and then take the Polar Distance at Greenwich and the Latitude at Greenwich, and with these three work as in the old form or system. Next find the Secant and Co-Secant, Co-Sine and Sine, as in the old system. Then take (when South 45°), half the Meridian Altitude at noon, and correct it by a correction which will be found in Example I. Then, with the Latitude and Polar Distance, Half Sum and Remainder, and work in the same way as in finding the mean time at Greenwich. This gives the apparent time at Ship; and applying the Equation as in the old system, brings it to mean time at ship. The difference between the mean time at ship and mean time at Greenwich is the Longitude, which is shown in the following Examples, as is also the mode of finding the corrections. There are two Examples, in which no correction is required, for finding the Longitude by the rising and setting of the sun. The mode of applying the Equation is also shown in these Examples.

EXAMPLES.

EXAMPLE I.

Proving that the Rule works for intermediate days.

BARBADOES, June 5th, 1864.

	°	′				
Noon's alt.	80	29				
Greenwich alt.	61	8				
	19	21	Diff. between Greenwich alt. and noon's alt., from which the correction is found, as laid down, thus:—			
Noon's alt.	80	29			°	′
					½)19	21
	½)61	08			¼) 9	10
	30	34			⅛) 4	55
Add	+ 2	25	Correction.		2	25 Correction.
Corrected alt.	32	59				
	13	5	Secant	0·114		
Polar Dis.	67	24	Co-Secant	0·347		
Sum	113	28				
Half Sum	56	44	Co-Sine	4·7392		
Remainder	23	45	Sine	4·6050		
	h.	m.	s.	9·3903		
	20	2	25			
Equation	—	1	12			
	20	1	13			
	24	00	00			
	3	58	47	59·42 Long. West.		