



THE DEVELOPMENT OF CELESTIAL NAVIGATION

Navigation can be traced to the Polynesians who realized that certain stars at their zenith passed over certain islands. This enabled them to navigate the Pacific latitudinally, aligning themselves with the appropriate star and moving either east or west.

Medieval Norse navigators valued the Pole Star for measuring latitudes since its altitude above the horizon was nearly constant. At times went on they also recognized that latitude could be found by measuring the altitude of the sun at its highest point, at noon. Still later, European mariners used the planets and stars, and devised almanacs to show the various positions of the celestial bodies at different times of the year. This provided a reliable guide for finding latitude.

Longitude, however, could not be accurately determined until the chronometer was developed in the mid eighteenth century, allowing proper timekeeping at sea. Chronometers became standard equipment for ships, and when the sextant replaced the astrolabe, the measurement of altitude became more precise. Yet, even with these improvements, celestial navigation still meant complicated, spherical trigonometric calculations.

Not until the development of the computer, just before World War II, could the thousands of values be pre-calculated and published in Sight Reduction Tables. Knowledge of simple arithmetic, now sufficient for the celestial navigator, with valid Almanacs and Sight Reduction Tables, the modern sailor can determine his position accurately and quickly and yet still feel a common bond with ancient mariner voyagers.

LAT	DECLINATION (15°-29°) SAME NAME AS LATITUDE														
	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°
0	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00
1	15.01	16.01	17.01	18.01	19.01	20.01	21.01	22.01	23.01	24.01	25.01	26.01	27.01	28.01	29.01
2	15.02	16.02	17.02	18.02	19.02	20.02	21.02	22.02	23.02	24.02	25.02	26.02	27.02	28.02	29.02
3	15.03	16.03	17.03	18.03	19.03	20.03	21.03	22.03	23.03	24.03	25.03	26.03	27.03	28.03	29.03
4	15.04	16.04	17.04	18.04	19.04	20.04	21.04	22.04	23.04	24.04	25.04	26.04	27.04	28.04	29.04
5	15.05	16.05	17.05	18.05	19.05	20.05	21.05	22.05	23.05	24.05	25.05	26.05	27.05	28.05	29.05
6	15.06	16.06	17.06	18.06	19.06	20.06	21.06	22.06	23.06	24.06	25.06	26.06	27.06	28.06	29.06
7	15.07	16.07	17.07	18.07	19.07	20.07	21.07	22.07	23.07	24.07	25.07	26.07	27.07	28.07	29.07
8	15.08	16.08	17.08	18.08	19.08	20.08	21.08	22.08	23.08	24.08	25.08	26.08	27.08	28.08	29.08
9	15.09	16.09	17.09	18.09	19.09	20.09	21.09	22.09	23.09	24.09	25.09	26.09	27.09	28.09	29.09
10	15.10	16.10	17.10	18.10	19.10	20.10	21.10	22.10	23.10	24.10	25.10	26.10	27.10	28.10	29.10
11	15.11	16.11	17.11	18.11	19.11	20.11	21.11	22.11	23.11	24.11	25.11	26.11	27.11	28.11	29.11
12	15.12	16.12	17.12	18.12	19.12	20.12	21.12	22.12	23.12	24.12	25.12	26.12	27.12	28.12	29.12
13	15.13	16.13	17.13	18.13	19.13	20.13	21.13	22.13	23.13	24.13	25.13	26.13	27.13	28.13	29.13
14	15.14	16.14	17.14	18.14	19.14	20.14	21.14	22.14	23.14	24.14	25.14	26.14	27.14	28.14	29.14
15	15.15	16.15	17.15	18.15	19.15	20.15	21.15	22.15	23.15	24.15	25.15	26.15	27.15	28.15	29.15
16	15.16	16.16	17.16	18.16	19.16	20.16	21.16	22.16	23.16	24.16	25.16	26.16	27.16	28.16	29.16
17	15.17	16.17	17.17	18.17	19.17	20.17	21.17	22.17	23.17	24.17	25.17	26.17	27.17	28.17	29.17
18	15.18	16.18	17.18	18.18	19.18	20.18	21.18	22.18	23.18	24.18	25.18	26.18	27.18	28.18	29.18
19	15.19	16.19	17.19	18.19	19.19	20.19	21.19	22.19	23.19	24.19	25.19	26.19	27.19	28.19	29.19
20	15.20	16.20	17.20	18.20	19.20	20.20	21.20	22.20	23.20	24.20	25.20	26.20	27.20	28.20	29.20
21	15.21	16.21	17.21	18.21	19.21	20.21	21.21	22.21	23.21	24.21	25.21	26.21	27.21	28.21	29.21
22	15.22	16.22	17.22	18.22	19.22	20.22	21.22	22.22	23.22	24.22	25.22	26.22	27.22	28.22	29.22
23	15.23	16.23	17.23	18.23	19.23	20.23	21.23	22.23	23.23	24.23	25.23	26.23	27.23	28.23	29.23
24	15.24	16.24	17.24	18.24	19.24	20.24	21.24	22.24	23.24	24.24	25.24	26.24	27.24	28.24	29.24
25	15.25	16.25	17.25	18.25	19.25	20.25	21.25	22.25	23.25	24.25	25.25	26.25	27.25	28.25	29.25
26	15.26	16.26	17.26	18.26	19.26	20.26	21.26	22.26	23.26	24.26	25.26	26.26	27.26	28.26	29.26
27	15.27	16.27	17.27	18.27	19.27	20.27	21.27	22.27	23.27	24.27	25.27	26.27	27.27	28.27	29.27
28	15.28	16.28	17.28	18.28	19.28	20.28	21.28	22.28	23.28	24.28	25.28	26.28	27.28	28.28	29.28
29	15.29	16.29	17.29	18.29	19.29	20.29	21.29	22.29	23.29	24.29	25.29	26.29	27.29	28.29	29.29
30	15.30	16.30	17.30	18.30	19.30	20.30	21.30	22.30	23.30	24.30	25.30	26.30	27.30	28.30	29.30

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