Owing to refraction, at the moment of true amplitude the Sun's centre appears to be elevated about 33′ above the horizon. In tropic latitudes the difference between the true and apparent amplitudes is negligible, since the Sun rises and sets nearly perpendicular to the horizon. In the higher latitudes, however, the difference may amount to as much as 3°, and for this reason it is probably better under these circumstances to use timed observations, only, for compass checks. In the case of the Moon the position is reversed. As a consequence of the Moon's large parallax that body is actually not visible at the moment of its true amplitude, its upper limb being then about 1′ below the horizon. Its availability for amplitude purposes is therefore restricted to latitudes within about 30° of its declination, when it will rise and set near the perpendicular.

TABLES 29 and 30—pp. 246-319, **A, B, and C Tables.**

A = Cot. H.A. Tan. Lat.   B = Cosec. H.A. Tan. Dec.   C = Cot. Az. Sec. Lat.

The ABC Tables provide one of the quickest and most convenient means of finding the azimuth; and also provide, with equal facility, great-circle courses and the " Longitude Correction ".

Table 29 contains the values designated "A" and " B," corresponding to the arguments H.A. and Lat., and H.A. and Dec. respectively; which values, when combined according to their appropriate signs, form "C", which is, in fact, the " Longitude Correction," and which, by means of Table C (Table 30), produces azimuths and great-circle courses. Table C is indexed for the arguments Azimuth and Latitude. When in search of azimuth the table is entered with latitude and value C (not value C and latitude). The eye is run horizontally across the pages opposite the latitude until value C is picked up, when the azimuth will be found at the head of the page.

Examples:

Time Azimuth.

H.A. 84°   Lat. 6°30′S. Dec. 1°18′N.

H.A. 84° { Lat. 6°30′S., A = .012 +
           Dec. 1 18N., B = .023 +

C = .035 +

Then in Table C, with Lat. $6\frac{1}{2}$°, Az. = 272°

Note.—Except when value C is small (less than .2) two decimal places are sufficient.

Time Azimuth.

H.A. 235°   Lat. 71°20′N. Dec. 62°10′N

H.A. 235° { Lat. 71°20′N., A = 2.07 –
            Dec. 62 10N., B = 2.31 –

C = 4.38 –

Then in Table C, with Lat. 71°20′, Az. = 035°

For Great-Circle Courses—

D. Long. = Hour angle.
" From " Lat. = Latitude.
" To " Lat. = Declination.

Example of Great-Circle Course :—

From Lat. 58° 10′N. Long. 5° 20′W.
To Lat. 20° 05′N. Long. 61° 35′W.

56° 15′W D. Long.

With H.A. $56\frac{1}{4}$° { Lat. 58° 10′N., A = 1.09 +
Dec. 20° 05′N., B = .44 –

C = .65 +

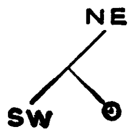
Then in Table C, with Lat. 58°, Az. = 251° = Course required.

When D. Long. is E. it would be proper to subtract it from 360° in order to make the precepts at the head of Table C yield correct advice for naming the course. This, however, need not be done if it is remembered to name the course as for " Body RISING ": which, as the course will be easterly, should present no difficulty.

Longitude Correction—

" C " (the combination of the values A and B) is the error of longitude corresponding to an error of one minute in the latitude. It must, of course, be multiplied by the total error of latitude to obtain the total error of longitude.

To determine which way to apply the correction. The position-line runs at right-angles to the bearing of the body observed. Draw a short line to represent the bearing of the body, according to quadrant, and across the appropriate end of this line draw a second line to indicate the position-line. Thus, supposing the body bore S.E., then by sketch it is obvious that the position-line runs N.E. and S.W.—which means that the further the observer is to the North, the further he will be to the East, or the further to the South the further to the West.

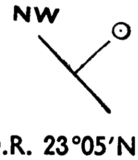


Example:

At 07.12 L.A.T., Lat. D.R. 22° 12′N. Long. obs. 37° 42′W. Sun in N.E. quadt. Dec. 18° 55′N
Now, L.A.T. 07.12 = H.A. 4h. 48m.

With H.A. 4h. 48m. and { Lat. 22° 12′N., Dec. 18° 55′N., } A = .13 +, B = .36 –

Therefore, Long. Corr. (C) = .23 –



At noon, when the above sight brought forward gave Lat. D.R. 23°05′N. Long. obs. 37°13′W., the latitude was found by meridian altitude to be 23°13′N. Then since the D.R. latitude, with which the sight was worked, is 8M. in error, it is obvious that the observed longitude must also be in error. The true latitude being more northerly, the sketch indicates that the true longitude will be further to the West—by the amount $8 \times .23 = 1'.84$.

Long. obs. (for D.R. Lat.)	- -	37° 13′ W.
Corr.	- -	1.8 W.
Long. obs. (for True Lat.),	- -	37° 14.8 W.

The correct noon position is therefore Lat. 23° 13′N. Long. 37° 14′.8W.

Note—Two decimal places are always sufficient for the Longitude Correction, for which purpose the sign of C is immaterial.

TABLE 31—pp. 321-325. **Vertical Sextant Angles.** $\frac{\text{Height}}{\text{Dist.}} = \text{Tan. Angle}$.
The table is for plane right-angled triangles only, which means that the point at sea-level vertically below the object observed must be within the observers' horizon (as defined by Table 44). The angle to be observed is that which subtends the crest of the object and its sea-level base point. Consequently, when a long fore-shore intervenes, guesswork has to be resorted to and the result should be accepted with caution.

The datum level for heights on British charts is High Water Ordinary Spring Tides. When the range of tide bears a considerable proportion to the height of the object (which may be the case with a sea-rock lighthouse) too small a distance may result. For lights the height given on the charts is that of the focal plane; but here also observations of the summit of the 'house give distances on the safe side—EXCEPT WHEN PASSING INSIDE A SUNKEN DANGER.

The space at the head of the table will be found convenient for pencilling in the heights of frequently used lighthouses, etc.

TABLE 37—p. 344. **Co-logarithms of Steaming Time.** The co-log. of a number is the arithmetical complement of the log. of that number. Thus, co-log. 15 = log. 1 – log. 15 = 0.00000 – 1.17609 = 8.82391. By the use of co-logs. we may effect division by adding, which, since the co-log. can be read from the tables at sight, is useful. To read co-log. from tables, proceed from **left to right**, subtracting each digit from 9 until the last, which is taken from 10.

The precept for using the table of co-logs. on p. 344 is given at the foot of the table. Where it is considered permissible to decide upon the steaming

Table 29

A

4 hrs.

If entered with H.A. at **top,** Sign **+**
" " " " **foot,** " **−**

LAT.	HOUR ANGLE or DIFF. LONG.																LAT.
	00m	04m	08m	12m	16m	20m	24m	28m	32m	36m	40m	44m	48m	52m	56m	60m	
	60° 300	61° 299	62° 298	63° 297	64° 296	65° 295	66° 294	67° 293	68° 292	69° 291	70° 290	71° 289	72° 288	73° 287	74° 286	75° 285	
0°	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	0°
1	.010	.010	.009	.009	.009	.008	.008	.007	.007	.007	.006	.006	.006	.005	.005	.005	1
2	.020	.019	.019	.018	.017	.016	.016	.015	.014	.013	.013	.012	.011	.011	.010	.009	2
3	.030	.029	.028	.027	.026	.024	.023	.022	.021	.020	.019	.018	.017	.016	.015	.014	3
4	.040	.039	.037	.036	.034	.033	.031	.030	.028	.027	.026	.024	.023	.021	.020	.019	4
5	.051	.048	.047	.045	.043	.041	.039	.037	.035	.034	.032	.030	.028	.027	.025	.023	5
6	.061	.058	.056	.054	.051	.049	.047	.045	.043	.040	.038	.036	.034	.032	.030	.028	6
7	.071	.068	.065	.063	.060	.057	.055	.052	.050	.047	.045	.042	.040	.038	.035	.033	7
8	.081	.078	.075	.072	.069	.066	.063	.060	.057	.054	.051	.048	.046	.043	.040	.038	8
9	.091	.088	.084	.081	.077	.074	.071	.067	.064	.061	.058	.055	.051	.048	.045	.042	9
10	.102	.098	.094	.090	.086	.082	.079	.075	.071	.068	.064	.061	.057	.054	.051	.047	10
11	.112	.108	.103	.099	.095	.091	.087	.083	.079	.075	.071	.067	.063	.059	.056	.052	11
12	.123	.118	.113	.108	.104	.099	.095	.090	.086	.082	.077	.073	.069	.065	.061	.057	12
13	.133	.128	.123	.118	.113	.108	.103	.098	.093	.089	.084	.079	.075	.071	.066	.062	13
14	.144	.138	.133	.127	.122	.116	.111	.106	.101	.096	.091	.086	.081	.076	.071	.067	14
15	.155	.149	.142	.137	.131	.125	.119	.114	.108	.103	.098	.092	.087	.082	.077	.072	15
16	.166	.159	.152	.146	.140	.134	.128	.122	.116	.110	.104	.099	.093	.088	.082	.077	16
17	.177	.169	.163	.156	.149	.143	.136	.130	.124	.117	.111	.105	.099	.093	.088	.082	17
18	.188	.180	.173	.166	.158	.152	.145	.138	.131	.125	.118	.112	.106	.099	.093	.087	18
19	.199	.191	.183	.175	.168	.161	.153	.146	.139	.132	.125	.119	.112	.105	.099	.092	19
20	.210	.202	.194	.185	.178	.170	.162	.154	.147	.140	.132	.125	.118	.111	.104	.098	20
21	.222	.213	.204	.196	.187	.179	.171	.163	.155	.147	.140	.132	.125	.117	.110	.103	21
22	.233	.224	.215	.206	.197	.188	.180	.171	.163	.155	.147	.139	.131	.124	.116	.108	22
23	.245	.235	.226	.216	.207	.198	.189	.180	.171	.163	.154	.146	.138	.130	.122	.114	23
24	.257	.247	.237	.227	.217	.208	.198	.189	.180	.171	.162	.153	.145	.136	.128	.119	24
25	.269	.258	.248	.238	.227	.217	.208	.198	.188	.179	.170	.161	.152	.143	.134	.125	25
26	.282	.270	.259	.249	.238	.227	.217	.207	.197	.187	.178	.168	.158	.149	.140	.131	26
27	.294	.282	.271	.260	.249	.238	.227	.216	.206	.196	.185	.175	.166	.156	.146	.137	27
28	.307	.295	.283	.271	.259	.248	.237	.226	.215	.204	.194	.183	.173	.163	.152	.142	28
29	.320	.307	.295	.282	.270	.258	.247	.235	.224	.213	.202	.191	.180	.169	.159	.149	29
30	.333	.320	.307	.294	.282	.269	.257	.245	.233	.222	.210	.199	.188	.177	.166	.155	30
31	.347	.333	.319	.306	.293	.280	.268	.255	.243	.231	.219	.207	.195	.184	.172	.161	31
32	.361	.346	.332	.318	.305	.291	.278	.265	.252	.240	.227	.215	.203	.191	.179	.167	32
33	.375	.360	.345	.331	.317	.303	.289	.276	.262	.249	.236	.224	.211	.199	.186	.174	33
34	.389	.374	.359	.344	.329	.315	.300	.286	.273	.259	.246	.232	.219	.206	.193	.181	34
35	.404	.388	.372	.357	.342	.327	.312	.297	.283	.269	.255	.241	.228	.214	.201	.188	35
36	.419	.403	.386	.370	.354	.339	.323	.308	.294	.279	.264	.250	.236	.222	.208	.195	36
37	.435	.418	.401	.384	.368	.351	.336	.320	.304	.289	.274	.259	.245	.230	.216	.202	37
38	.451	.433	.415	.398	.381	.364	.348	.332	.316	.300	.284	.269	.254	.239	.224	.209	38
39	.468	.449	.431	.413	.395	.378	.361	.344	.327	.311	.295	.279	.263	.248	.232	.217	39
40	.484	.465	.446	.428	.409	.391	.374	.356	.339	.322	.305	.289	.273	.257	.241	.225	40
41	.502	.482	.462	.443	.424	.405	.387	.369	.351	.334	.316	.299	.282	.266	.249	.233	41
42	.520	.499	.479	.459	.439	.420	.401	.382	.364	.346	.328	.310	.293	.275	.258	.241	42
43	.538	.517	.496	.475	.455	.435	.415	.396	.377	.358	.339	.321	.303	.285	.267	.250	43
44	.558	.535	.513	.492	.471	.450	.430	.410	.390	.371	.351	.333	.314	.295	.277	.259	44
45	.577	.554	.532	.510	.488	.466	.445	.424	.404	.384	.364	.344	.325	.306	.287	.268	45
46	.598	.574	.551	.528	.505	.483	.461	.440	.418	.398	.377	.357	.336	.317	.297	.277	46
47	.619	.594	.570	.546	.523	.500	.477	.455	.433	.412	.390	.369	.348	.328	.307	.287	47
48	.641	.616	.591	.566	.542	.518	.494	.471	.449	.426	.404	.382	.361	.340	.318	.298	48
49	.664	.638	.612	.586	.561	.536	.512	.488	.465	.442	.419	.396	.374	.352	.330	.308	49
50	.688	.661	.634	.607	.581	.556	.531	.506	.481	.457	.434	.410	.387	.364	.342	.319	50
51	.713	.685	.657	.629	.602	.576	.550	.524	.499	.474	.449	.425	.401	.378	.354	.331	51
52	.739	.709	.681	.652	.624	.597	.570	.543	.517	.491	.466	.441	.416	.391	.367	.343	52
53	.766	.736	.706	.676	.647	.619	.591	.563	.536	.509	.483	.457	.431	.406	.381	.356	53
54	.795	.763	.732	.701	.671	.642	.613	.584	.556	.528	.501	.474	.447	.421	.395	.369	54
55	.825	.792	.759	.728	.697	.666	.636	.606	.577	.548	.520	.492	.464	.437	.410	.383	55
56	.856	.822	.788	.755	.723	.691	.660	.629	.599	.569	.540	.510	.482	.453	.425	.397	56
57	.889	.854	.819	.785	.751	.718	.686	.654	.622	.591	.560	.530	.500	.471	.442	.413	57
58	.924	.887	.851	.815	.781	.746	.713	.679	.647	.614	.582	.551	.520	.489	.459	.429	58
59	.961	.923	.885	.848	.812	.776	.741	.706	.672	.639	.606	.573	.541	.509	.477	.446	59
60	1.00	.960	.921	.883	.845	.808	.771	.735	.700	.665	.630	.596	.563	.530	.497	.464	60
LAT.	120° 240	119° 241	118° 242	117° 243	116° 244	115° 245	114° 246	113° 247	112° 248	111° 249	110° 250	109° 251	108° 252	107° 253	106° 254	105° 255	LAT.

Table 29 **B**

4 hrs.

Lat. and Dec. SAME name, Sign −

Lat. and Dec. CONTRARY names, Sign +

HOUR ANGLE or DIFF. LONG.

DEC.	00m	04m	08m	12m	16m	20m	24m	28m	32m	36m	40m	44m	48m	52m	56m	60m	DEC.
	60° 300	61° 299	62° 298	63° 297	64° 296	65° 295	66° 294	67° 293	68° 292	69° 291	70° 290	71° 289	72° 288	73° 287	74° 286	75° 285	
0°	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	0°
1	.020	.020	.020	.020	.019	.019	.019	.019	.019	.019	.019	.018	.018	.018	.018	.018	1
2	.040	.040	.040	.039	.039	.039	.038	.038	.038	.037	.037	.037	.037	.037	.036	.036	2
3	.061	.060	.059	.059	.058	.058	.057	.057	.057	.056	.056	.055	.055	.055	.055	.054	3
4	.081	.080	.079	.078	.078	.077	.077	.076	.075	.075	.074	.074	.074	.073	.073	.072	4
5	.101	.100	.099	.098	.097	.097	.096	.095	.094	.094	.093	.093	.092	.091	.091	.091	5
6	.121	.120	.119	.118	.117	.116	.115	.114	.113	.113	.112	.111	.111	.110	.109	.109	6
7	.142	.140	.139	.138	.137	.135	.134	.133	.132	.132	.131	.130	.129	.128	.128	.127	7
8	.162	.161	.159	.158	.156	.155	.154	.153	.152	.151	.150	.149	.148	.147	.146	.145	8
9	.183	.181	.179	.178	.176	.175	.173	.172	.171	.170	.169	.168	.167	.166	.165	.164	9
10	.204	.202	.200	.198	.196	.195	.193	.192	.190	.189	.188	.186	.185	.184	.183	.183	10
11	.224	.222	.220	.218	.216	.214	.213	.211	.210	.208	.207	.206	.204	.203	.202	.201	11
12	.245	.243	.241	.239	.236	.235	.233	.231	.229	.228	.226	.225	.223	.222	.221	.220	12
13	.267	.264	.261	.259	.257	.255	.253	.251	.249	.247	.246	.244	.243	.241	.240	.239	13
14	.288	.285	.282	.280	.277	.275	.273	.271	.269	.267	.265	.264	.262	.261	.259	.258	14
15	.309	.306	.303	.301	.298	.296	.293	.291	.289	.287	.285	.283	.282	.280	.279	.277	15
16	.331	.328	.325	.322	.319	.316	.314	.312	.309	.307	.305	.303	.302	.300	.298	.297	16
17	.353	.350	.346	.343	.340	.337	.335	.332	.330	.327	.325	.323	.321	.320	.318	.317	17
18	.375	.371	.368	.365	.362	.359	.356	.353	.350	.348	.346	.344	.342	.340	.338	.336	18
19	.398	.394	.390	.386	.383	.380	.377	.374	.371	.369	.366	.364	.362	.360	.358	.356	19
20	.420	.416	.412	.408	.405	.402	.398	.395	.393	.390	.387	.385	.383	.381	.379	.377	20
21	.443	.439	.435	.431	.427	.424	.420	.417	.414	.411	.408	.406	.404	.401	.399	.397	21
22	.467	.462	.458	.453	.450	.446	.442	.439	.436	.433	.430	.427	.425	.422	.420	.418	22
23	.490	.485	.481	.476	.472	.468	.465	.461	.458	.455	.452	.449	.446	.444	.442	.439	23
24	.514	.509	.504	.500	.495	.491	.487	.484	.480	.477	.474	.471	.468	.466	.463	.461	24
25	.538	.533	.528	.523	.519	.515	.510	.507	.503	.499	.496	.493	.490	.488	.485	.483	25
26	.563	.558	.552	.547	.543	.538	.534	.530	.526	.522	.519	.516	.513	.510	.507	.505	26
27	.588	.583	.577	.572	.567	.562	.558	.554	.550	.546	.542	.539	.536	.533	.530	.527	27
28	.614	.608	.602	.597	.592	.587	.582	.578	.573	.570	.566	.562	.559	.556	.553	.550	28
29	.640	.634	.628	.622	.617	.612	.607	.602	.598	.594	.590	.586	.583	.580	.577	.574	29
30	.667	.660	.654	.648	.642	.637	.632	.627	.623	.618	.614	.611	.607	.604	.601	.598	30
31	.694	.687	.681	.674	.669	.663	.658	.653	.648	.644	.639	.635	.632	.628	.625	.622	31
32	.722	.714	.708	.701	.695	.689	.684	.679	.674	.669	.665	.661	.657	.653	.650	.647	32
33	.750	.743	.735	.729	.723	.717	.711	.705	.700	.696	.691	.687	.683	.679	.676	.672	33
34	.779	.771	.764	.757	.750	.744	.738	.733	.727	.722	.718	.713	.709	.705	.702	.698	34
35	.809	.801	.793	.786	.779	.773	.766	.761	.755	.750	.745	.741	.736	.732	.728	.725	35
36	.839	.831	.823	.815	.808	.802	.795	.789	.784	.778	.773	.768	.764	.760	.756	.752	36
37	.870	.862	.853	.846	.838	.831	.825	.819	.813	.807	.802	.797	.792	.788	.784	.780	37
38	.902	.893	.885	.877	.869	.862	.855	.849	.843	.837	.831	.826	.821	.817	.813	.809	38
39	.935	.926	.917	.909	.901	.893	.886	.880	.873	.867	.862	.856	.851	.847	.842	.838	39
40	.969	.959	.950	.942	.934	.926	.919	.912	.905	.899	.893	.887	.882	.877	.873	.869	40
41	1.00	.994	.985	.976	.967	.959	.952	.944	.938	.931	.925	.919	.914	.909	.904	.900	41
42	1.04	1.03	1.02	1.01	1.00	.993	.986	.978	.971	.964	.958	.952	.947	.942	.937	.932	42
43	1.08	1.07	1.06	1.05	1.04	1.03	1.02	1.01	1.01	.999	.992	.986	.981	.975	.970	.965	43
44	1.12	1.10	1.09	1.08	1.07	1.07	1.06	1.05	1.04	1.03	1.03	1.02	1.02	1.01	1.00	1.00	44
45	1.15	1.14	1.13	1.12	1.11	1.10	1.09	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	45
46	1.20	1.18	1.17	1.16	1.15	1.14	1.13	1.12	1.12	1.11	1.10	1.10	1.09	1.08	1.08	1.07	46
47	1.24	1.23	1.21	1.20	1.19	1.18	1.17	1.16	1.16	1.15	1.14	1.13	1.13	1.12	1.12	1.11	47
48	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.17	1.16	1.16	1.15	48
49	1.33	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.22	1.21	1.20	1.20	1.19	49
50	1.38	1.36	1.35	1.34	1.33	1.31	1.30	1.29	1.29	1.28	1.27	1.26	1.25	1.25	1.24	1.23	50
51	1.43	1.41	1.40	1.39	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.31	1.30	1.29	1.28	1.28	51
52	1.48	1.46	1.45	1.44	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.33	52
53	1.53	1.52	1.50	1.49	1.48	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.40	1.39	1.38	1.37	53
54	1.59	1.57	1.56	1.54	1.53	1.52	1.51	1.50	1.48	1.47	1.46	1.46	1.45	1.44	1.43	1.42	54
55	1.65	1.63	1.62	1.60	1.59	1.58	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.49	1.48	55
56	1.71	1.70	1.68	1.66	1.65	1.64	1.62	1.61	1.60	1.59	1.58	1.57	1.56	1.55	1.54	1.53	56
57	1.78	1.76	1.74	1.73	1.71	1.70	1.69	1.67	1.66	1.65	1.64	1.63	1.62	1.61	1.60	1.59	57
58	1.85	1.83	1.81	1.80	1.78	1.77	1.75	1.74	1.73	1.71	1.70	1.69	1.68	1.67	1.66	1.66	58
59	1.92	1.90	1.88	1.87	1.85	1.84	1.82	1.81	1.79	1.78	1.77	1.76	1.75	1.74	1.73	1.72	59
60	2.00	1.98	1.96	1.94	1.93	1.91	1.90	1.88	1.87	1.86	1.84	1.83	1.82	1.81	1.80	1.79	60
61	2.08	2.06	2.04	2.02	2.01	1.99	1.97	1.96	1.95	1.93	1.92	1.91	1.90	1.89	1.88	1.87	61
62	2.17	2.15	2.13	2.11	2.09	2.08	2.06	2.04	2.03	2.01	2.00	1.99	1.98	1.97	1.96	1.95	62
63	2.27	2.24	2.22	2.20	2.18	2.17	2.15	2.13	2.12	2.10	2.09	2.08	2.06	2.05	2.04	2.03	63
DEC.	120° 240	119° 241	118° 242	117° 243	116° 244	115° 245	114° 246	113° 247	112° 248	111° 249	110° 250	109° 251	108° 252	107° 253	106° 254	105° 255	DEC.

Table 30

C

(Longitude Correction)

		North Lat.	South Lat.
Body **RISING** (H.A. greater than 180°)	Sign **−**	Az. in **NE** Qdt.	**SE** Qdt.
	„ **+**	„ **SE** „	**NE** „
Body **SETTING** (H.A. less than 180°)	Sign **+**	Az. in **SW** Qdt.	**NW** Qdt.
	„ **−**	„ **NW** „	**SW** „

AZIMUTH or Course (according to Quadrant)

Qdt. 1st / 2nd / 3rd / 4th	75° / 105 / 255 / 285	75½° / 104½ / 255½ / 284½	76° / 104 / 256 / 284	76½° / 103½ / 256½ / 283½	77° / 103 / 257 / 283	77½° / 102½ / 257½ / 282½	78° / 102 / 258 / 282	78½° / 101½ / 258½ / 281½	79° / 101 / 259 / 281	79½° / 100½ / 259½ / 280½	80° / 100 / 260 / 280	80½° / 99½ / 260½ / 279½	81° / 99 / 261 / 279	81½° / 98½ / 261½ / 278½	82° / 98 / 262 / 278	82½° / 97½ / 262½ / 277½	Qdt. NE / SE / SW / NW
LAT.																	**LAT.**
0°	.268	.259	.249	.240	.231	.222	.213	.203	.194	.185	.176	.167	.158	.149	.141	.132	0°
1	.268	.259	.249	.240	.231	.222	.213	.203	.194	.185	.176	.167	.158	.149	.141	.132	1
2	.268	.259	.249	.240	.231	.222	.213	.204	.194	.185	.176	.167	.158	.150	.141	.132	2
3	.268	.259	.250	.240	.231	.222	.213	.204	.195	.186	.177	.168	.159	.150	.141	.132	3
4	.269	.259	.250	.241	.231	.222	.213	.204	.195	.186	.177	.168	.159	.150	.141	.132	4
5	.269	.260	.250	.241	.232	.223	.213	.204	.195	.186	.177	.168	.159	.150	.141	.132	5
6	.269	.260	.251	.241	.232	.223	.214	.205	.195	.186	.177	.168	.159	.150	.141	.132	6
7	.270	.261	.251	.242	.233	.223	.214	.205	.196	.187	.178	.169	.160	.151	.142	.133	7
8	.271	.261	.252	.242	.233	.224	.215	.205	.196	.187	.178	.169	.160	.151	.142	.133	8
9	.271	.262	.252	.243	.234	.224	.215	.206	.197	.188	.179	.169	.160	.151	.142	.133	9
10	.272	.263	.253	.244	.234	.225	.216	.207	.197	.188	.179	.170	.161	.152	.143	.134	10
11	.273	.263	.254	.245	.235	.226	.217	.207	.198	.189	.180	.170	.161	.152	.143	.134	11
12	.274	.264	.255	.245	.236	.227	.217	.208	.199	.189	.180	.171	.162	.153	.144	.135	12
13	.275	.265	.256	.246	.237	.228	.218	.209	.199	.190	.181	.172	.163	.153	.144	.135	13
14	.276	.267	.257	.247	.238	.228	.219	.210	.200	.191	.182	.172	.163	.154	.145	.136	14
15	.277	.268	.258	.249	.239	.230	.220	.211	.201	.192	.183	.173	.164	.155	.145	.136	15
16	.279	.269	.259	.250	.240	.231	.221	.212	.202	.193	.183	.174	.165	.155	.146	.137	16
17	.280	.270	.261	.251	.241	.232	.222	.213	.203	.194	.184	.175	.166	.156	.147	.138	17
18	.282	.272	.262	.252	.243	.233	.223	.214	.204	.195	.185	.176	.167	.157	.148	.138	18
19	.283	.274	.264	.254	.244	.234	.225	.215	.206	.196	.186	.177	.168	.158	.149	.139	19
20	.285	.275	.265	.255	.246	.236	.226	.217	.207	.197	.188	.178	.169	.159	.150	.140	20
21	.287	.277	.267	.257	.247	.237	.228	.218	.208	.199	.189	.179	.170	.160	.151	.141	21
22	.289	.279	.269	.259	.249	.239	.229	.219	.210	.200	.190	.180	.171	.161	.152	.142	22
23	.291	.281	.271	.261	.251	.241	.231	.221	.211	.201	.192	.182	.172	.162	.153	.143	23
24	.293	.283	.273	.263	.253	.243	.233	.223	.213	.203	.193	.183	.173	.164	.154	.144	24
25	.296	.285	.275	.265	.255	.245	.235	.224	.214	.204	.195	.185	.175	.165	.155	.145	25
26	.298	.288	.277	.267	.257	.247	.236	.226	.216	.206	.196	.186	.176	.166	.156	.146	26
27	.302	.290	.280	.269	.259	.249	.239	.228	.218	.208	.198	.188	.178	.168	.158	.148	27
28	.303	.293	.282	.272	.261	.251	.241	.230	.220	.210	.200	.190	.179	.169	.159	.149	28
29	.306	.296	.285	.274	.264	.253	.243	.233	.222	.212	.202	.191	.181	.171	.161	.151	29
30	.309	.299	.288	.277	.267	.256	.245	.235	.224	.214	.204	.193	.183	.173	.162	.152	30
31	.313	.302	.291	.280	.269	.259	.248	.237	.227	.216	.206	.195	.185	.174	.164	.154	31
32	.316	.305	.294	.283	.272	.261	.251	.240	.229	.219	.208	.197	.187	.176	.166	.155	32
33	.319	.308	.297	.286	.275	.264	.253	.243	.232	.221	.210	.200	.189	.178	.168	.157	33
34	.323	.312	.301	.290	.278	.267	.256	.245	.234	.224	.213	.202	.191	.180	.170	.159	34
35	.327	.316	.304	.293	.282	.271	.259	.248	.237	.226	.215	.204	.193	.182	.172	.161	35
36	.331	.320	.308	.297	.285	.274	.263	.251	.240	.229	.218	.207	.196	.185	.174	.163	36
37	.336	.324	.312	.301	.289	.278	.266	.255	.243	.232	.221	.210	.198	.187	.176	.165	37
38	.340	.328	.316	.305	.293	.281	.270	.258	.247	.235	.224	.212	.201	.190	.178	.167	38
39	.345	.333	.321	.309	.297	.285	.274	.262	.250	.238	.227	.215	.204	.192	.181	.169	39
40	.350	.338	.325	.313	.301	.289	.277	.266	.254	.242	.230	.218	.207	.195	.183	.172	40
41	.355	.343	.330	.318	.306	.294	.282	.270	.258	.246	.234	.222	.210	.198	.186	.174	41
42	.361	.348	.336	.323	.311	.298	.286	.274	.262	.249	.237	.225	.213	.201	.189	.177	42
43	.366	.354	.341	.328	.316	.303	.291	.278	.266	.253	.241	.229	.217	.204	.192	.180	43
44	.372	.360	.347	.334	.321	.308	.295	.283	.270	.258	.245	.233	.220	.208	.195	.183	44
45	.379	.366	.353	.340	.326	.314	.301	.288	.275	.262	.249	.237	.224	.211	.199	.186	45
46	.386	.372	.359	.346	.332	.319	.306	.293	.280	.267	.254	.241	.228	.215	.202	.190	46
47	.393	.379	.366	.352	.339	.325	.312	.298	.285	.272	.259	.245	.232	.219	.206	.193	47
48	.400	.386	.373	.359	.345	.331	.318	.304	.290	.277	.264	.250	.237	.223	.210	.197	48
49	.408	.394	.380	.366	.352	.338	.324	.310	.296	.283	.269	.255	.241	.228	.214	.201	49
50	.417	.402	.388	.373	.359	.345	.331	.317	.302	.288	.274	.260	.246	.233	.219	.205	50
51	.426	.411	.396	.381	.367	.352	.338	.323	.309	.295	.280	.266	.252	.237	.223	.209	51
52	.435	.420	.405	.390	.375	.360	.345	.330	.316	.301	.286	.272	.257	.243	.228	.214	52
53	.445	.430	.414	.399	.384	.368	.353	.338	.323	.308	.293	.278	.263	.248	.234	.219	53
54	.456	.440	.424	.408	.393	.377	.362	.346	.331	.315	.300	.285	.269	.254	.239	.224	54
55	.467	.451	.435	.419	.403	.387	.371	.355	.339	.323	.307	.292	.276	.261	.245	.230	55
56	.479	.462	.446	.429	.413	.396	.380	.364	.348	.331	.315	.299	.283	.267	.251	.235	56
57	.492	.475	.458	.441	.424	.407	.390	.374	.357	.340	.324	.307	.291	.274	.258	.242	57
58	.506	.488	.471	.453	.436	.418	.401	.384	.367	.350	.333	.316	.299	.282	.265	.248	58
59	.520	.502	.484	.466	.448	.430	.413	.395	.377	.360	.342	.325	.308	.290	.273	.256	59
60	.536	.517	.499	.480	.462	.443	.425	.407	.389	.371	.353	.335	.317	.299	.281	.263	60

For quadrantal compass graduation readings the degrees are to be taken as for 1st Quadrant (0° to 90°). The azimuth is then named in accordance with the precepts above.