TABLE 8. — REFRACTION

To be subtracted from sextant altitude

R_0	Height above sea level in thousands of feet											
	0	5	10	15	20	25	30	35	40	45	50	55
	Sextant Altitude											
′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	90	90	90	90	90	90	90	90	90	90	90	90
1	63	59	55	51	46	41	36	31	26	20	17	13
2	33	29	26	22	19	16	14	11	9	7	6	4
3	21	19	16	14	12	10	8	7	5	4	2 40	1 40
4	16	14	12	10	8	7	6	5	3 10	2 20	1 30	0 40
5	12	11	9	8	7	5	4 00	3 10	2 10	1 30	0 39	+ 0 05
6	10	9	7	5 50	4 50	3 50	3 10	2 20	1 30	0 49	+ 0 11	– 0 19
7	8 10	6 50	5 50	4 50	4 00	3 00	2 20	1 50	1 10	0 24	– 0 11	– 0 38
8	6 50	5 50	5 00	4 00	3 10	2 30	1 50	1 20	0 38	+ 0 04	– 0 28	– 0 54
9	6 00	5 10	4 10	3 20	2 40	2 00	1 30	1 00	0 19	– 0 13	– 0 42	– 1 08
10	5 20	4 30	3 40	2 50	2 10	1 40	1 10	0 35	+ 0 03	– 0 27	– 0 53	– 1 18
12	4 30	3 40	2 50	2 20	1 40	1 10	0 37	+ 0 11	– 0 16	– 0 43	– 1 08	– 1 31
14	3 30	2 50	2 10	1 40	1 10	0 34	+ 0 09	– 0 14	– 0 37	– 1 00	– 1 23	– 1 44
16	2 50	2 10	1 40	1 10	0 37	+ 0 10	– 0 13	– 0 34	– 0 53	– 1 14	– 1 35	– 1 56
18	2 20	1 40	1 20	0 43	+ 0 15	– 0 08	– 0 31	– 0 52	– 1 08	– 1 27	– 1 46	– 2 05
20	1 50	1 20	0 49	+ 0 23	– 0 02	– 0 26	– 0 46	– 1 06	– 1 22	– 1 39	– 1 57	– 2 14
25	1 12	0 44	+ 0 19	– 0 06	– 0 28	– 0 48	– 1 09	– 1 27	– 1 42	– 1 58	– 2 14	– 2 30
30	0 34	+ 0 10	– 0 13	– 0 36	– 0 55	– 1 14	– 1 32	– 1 51	– 2 06	– 2 21	– 2 34	– 2 49
35	+ 0 06	– 0 16	– 0 37	– 0 59	– 1 17	– 1 33	– 1 51	– 2 07	– 2 23	– 2 37	– 2 51	– 3 04
40	– 0 18	– 0 37	– 0 58	– 1 16	– 1 34	– 1 49	– 2 06	– 2 22	– 2 35	– 2 49	– 3 03	– 3 16
45		– 0 53	– 1 14	– 1 31	– 1 47	– 2 03	– 2 18	– 2 33	– 2 47	– 2 59	– 3 13	– 3 25
50		– 1 10	– 1 28	– 1 44	– 1 59	– 2 15	– 2 28	– 2 43	– 2 56	– 3 08	– 3 22	– 3 33
55			– 1 40	– 1 53	– 2 09	– 2 24	– 2 38	– 2 52	– 3 04	– 3 17	– 3 29	– 3 41
60				– 2 03	– 2 18	– 2 33	– 2 46	– 3 01	– 3 12	– 3 25	– 3 37	– 3 48
							– 2 53	– 3 07	– 3 19	– 3 31	– 3 42	– 3 53

f	Height above sea level in thousands of feet											
	0	5	10	15	20	25	30	35	40	45	50	55
	Temperature in degrees Celsius (centigrade)											
0.9	+ 47	+ 36	+ 27	+ 18	+ 10	+ 3	– 5	– 13	For these heights no temperature correction is necessary: use $R = R_0$			
1.0	+ 26	+ 16	+ 6	– 4	– 13	– 22	– 31	– 40				
1.1	+ 5	– 5	– 15	– 25	– 36	– 46	– 57	– 68				
1.2	– 16	– 25	– 36	– 46	– 58	– 71	– 83	– 95				
	– 37	– 45	– 56	– 67	– 81	– 95						

R_0	$R = R_0 \times f$			
	f			
	0.9	1.0	1.1	1.2
′	R			
	′	′	′	′
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	4
4	4	4	4	5
5	5	5	5	6
6	5	6	7	7
7	6	7	8	8
8	7	8	9	10
9	8	9	10	11
10	9	10	11	12
12	11	12	13	14
14	13	14	15	17
16	14	16	18	19
18	16	18	20	22
20	18	20	22	24
25	22	25	28	30
30	27	30	33	36
35	31	35	38	42
40	36	40	44	48
45	40	45	50	54
50	45	50	55	60
55	49	55	60	66
60	54	60	66	72
	0.9	1.0	1.1	1.2
	f			
f	Refraction $R = R_0 \times f$ When R_0 is less than 10′ or the height is more than 35, 000 ft.: use $R = R_0$			
0.9				
1.0				
1.1				
1.2				

Choose the column appropriate to height, in units of 1,000 feet, and find the range of altitude in which the sextant altitude lies; thus find R_0. This is the refraction corresponding to the sextant altitude unless conditions are extreme. In that case find f from the lower table corresponding to the range of temperature for the appropriate height, and use the table on the right to find R. Example: at a height of 30,000 feet and temperature (–) 60° C, a celestial body is observed at altitude (–) 2° 36′. R_0 is 50′, f is 1.1 and R is 55′. Subtracting this from the sextant altitude gives (–) 3° 31′.

TABLE 9. — CORIOLIS (*Z*) CORRECTION

Ground speed knots	Latitude										Ground speed knots
	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	
	′	′	′	′	′	′	′	′	′	′	
50	0	0	0	1	1	1	1	1	1	1	**50**
100	0	0	1	1	2	2	2	2	3	3	**100**
150	0	1	1	2	3	3	3	4	4	4	**150**
200	0	1	2	3	3	4	5	5	5	5	**200**
250	0	1	2	3	4	5	6	6	6	7	**250**
300	0	1	3	4	5	6	7	7	8	8	**300**
350	0	2	3	5	6	7	8	9	9	9	**350**
400	0	2	4	5	7	8	9	10	10	10	**400**
450	0	2	4	6	8	9	10	11	12	12	**450**
500	0	2	4	7	8	10	11	12	13	13	**500**
550	0	3	5	7	9	11	12	14	14	14	**550**
600	0	3	5	8	10	12	14	15	16	16	**600**
650	0	3	6	9	11	13	15	16	17	17	**650**
700	0	3	6	9	12	14	16	17	18	18	**700**
750	0	3	7	10	13	15	17	18	19	20	**750**
800	0	4	7	10	13	16	18	20	21	21	**800**
850	0	4	8	11	14	17	19	21	22	22	**850**
900	0	4	8	12	15	18	20	22	23	24	**900**

To be applied by moving the position line a distance *Z* to starboard (right) of the track in northern latitudes and to port (left) in southern latitudes.

STANDARD DOME REFRACTION

To be *subtracted* from observed altitude when using sextant suspension in a perspex dome.

Alt. °	Refn. ′	Alt. °	Refn. ′
10	8	50	4
20	7	60	4
30	6	70	3
40	5	80	3

This table must not be used if a calibration table is fitted to the dome, or if a flat glass plate is provided, or for non-standard domes.

BUBBLE SEXTANT ERROR

Sextant No.

Alt. °	Corr. ′