## TABLE 6. — 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 |

| $R_0$ | $R = R_0 \times f$ | | | |
|---|---|---|---|---|
| | 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 |

| 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 | | | | | | |

| f | Refraction $R = R_0 \times f$ |
|---|---|
| 0.9 | When $R_0$ is less than 10′ or the height is more than 35, 000 ft.: use $R = R_0$ |
| 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 7. — 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. ′ |
|---|---|