DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, DIRECTOR

GEOGRAPHIC

TABLES AND FORMULAS

COMPILED BY

SAMUEL S. GANNETT

WASHINGTON
GOVERNMENT PRINTING OFFICE
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RULES FOR SOLUTION OF RIGHT-ANGLED TRIANGLES.

The "parts" of the figures are—

H=hypothenuse,
P=perpendicular,
B=base,

and the six circular functions of the angle α at the base of the triangle.

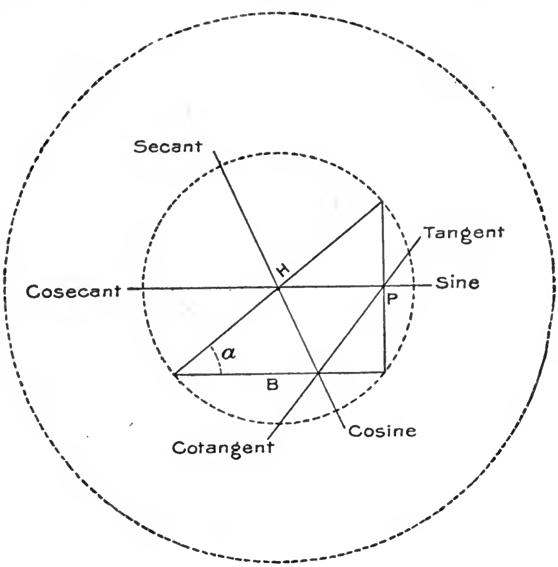


Fig. 1.—Solution of right-angled triangles.

Rule I. The product of two opposite parts $= 1$, $\therefore$ either is the reciprocal of the other.

Example: Tan $\alpha \times \cot \alpha = 1$, $\tan \alpha = \frac{1}{\cot \alpha}$.

Rule II. Each part=adjacent part divided by the following part, $\therefore$ each part=the product of the adjacent parts.

Example: Sin $\alpha = \frac{\cos \alpha}{\cot \alpha}$, $\sin \alpha = \frac{P}{H}$, $B = H \times \cos \alpha$.

REDUCTION TO CENTER.

In fig. 2 let

P=place of instrument;
C=center of station;
Q=measured angle at P between two objects, A and B;
y=angle at P between C and the left-hand object, B;
r=distance CP;
C′=unknown and required angle at C;
D=distance AC;
(r and D must be reduced to same unit, usually meters.)
G=distance BC;
A=angle at A between P and C;
B=angle at B between P and C.

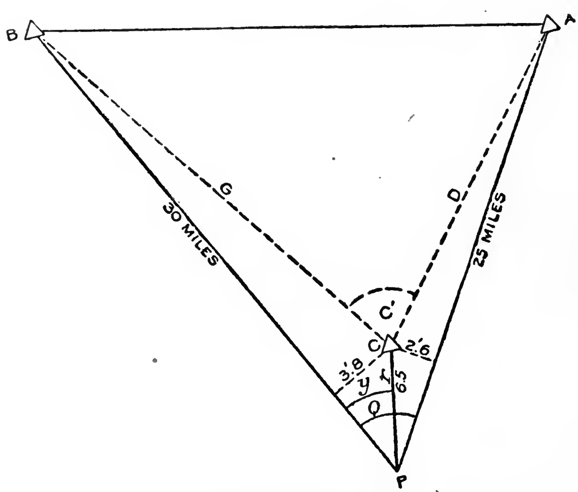


FIG. 2.—Reduction to center.

Then, from the relation between the parts of the triangle,

$$G : r :: \sin y : \sin B;$$

hence

$$\sin B = \frac{r \sin y}{G}.$$

As the angles at A and B are very small, their sines may be regarded as equal to A sin 1″ and B sin 1″, respectively; hence

$$B = (\text{in seconds}) \frac{r \sin y}{G \sin 1''}$$

and

$$C' = Q + \frac{r \sin (Q \pm y)}{D \sin 1''} - \frac{r \sin y}{G \sin 1''}.$$

In the use of this formula, proper attention should be paid to the signs of sin $(Q+y)$ and sin y; for the first term will be positive only when $(Q+y)$ is less than 180° (the reverse with sin y); D being the distance of the right-hand object, the graduation of the instrument running from left to right.

r being relatively small, the lengths of D and G are approximately computed with the angle Q.

The following quantities must be known in addition to the measured angles in order to find the correction for reducing to center:

1. The angle measured at the instrument, P, between the center of the signal or station, C, and the first-observed station to the right of it, A.

2. The distance from the center of the instrument to the center of the station $= r$.

3. The approximate distances, D, G, etc., from the station occupied to the stations observed. The latter may be computed from the uncorrected angles.

Example: Reduction to center from P to C.

Constants: a. c. log sin 1″	=5. 31443
log feet to log meters	=9. 48402
log constant (for any station)	4. 79845
r=6.5 feet: log	=0. 81291
log constant for this station	5. 61136

	Angle Q—Y (CPA) 23° 40′	Angle Y (BPC) 37°14′ or 322° 46′
log sin angle	9. 6036	9. 7818
a. c. log distance	5. 3954	5. 3162
log r + constant	5. 6114	5. 6114
log correction	0. 6104	0. 7094
correction to direction	4″. 08	5″. 12

correction to angle B P A=4″.08 +5″.12=9″.20.

GRAPHIC REDUCTION TO CENTER.

Approximate closure errors of triangles may be tested in the field before distances have been computed by scaling from the plot the distances between stations in miles and the perpendicular distance in feet from signal to line joining instrument and distant station.

Then, since 1 foot at a distance of 40 miles subtends an angle of 1″ (nearly),

$$\frac{\text{length of perpendicular in feet} \times 40}{\text{number of miles}} = \text{correction in seconds.}$$

Example: Station P. Correction for swing on line B P, 30 miles in length from instrument to signal

$$= \frac{3.8 \text{ feet} \times 40}{30} = 5''.1,$$

correction for swing on line A P, 25 miles in length,

$$= \frac{2.6 \text{ feet} \times 40}{25} = 4''.2,$$

and correction to angle B P A = Q to reduce from instrument to signal = 5.1″ + 4.2″ = 9.3″, agreeing closely with the exact computation.

APPROXIMATE SPHERICAL EXCESS IN SECONDS.

This may be obtained by dividing the area of the triangle in square miles by 75.5.

SOLUTION OF TRIANGLES.

Given two sides and included angle, to solve the triangle:

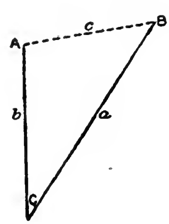


FIG. 3.—Solution of triangles; two sides and included angle given.

Let x be an auxiliary angle; then

$$\tan x = \frac{a}{b}, \text{ or } \log \tan x = \log a - \log b;$$

$$\tan \tfrac{1}{2}(A-B) = \tan (x-45^\circ) \tan \tfrac{1}{2}(A+B);$$
$$\tfrac{1}{2}(A+B) + \tfrac{1}{2}(A-B) = A;$$
$$\tfrac{1}{2}(A+B) - \tfrac{1}{2}(A-B) = B;$$

from which remaining parts can be computed.

Example:

Given log a=4.3666779	Given C (spherical angle) 21° 14′ 54″.10
Given log b=4.2050498	Given ⅓ sph. exc. — .10
(1) tan x=0.1616281	C (plane angle)= 21 14 54 .00 (2)
x=55° 25′ 25″.41	180
−45	180°−C=A+B=158 45 06 .00 (3)
(5) Log tan (x−45°)=10° 25′ 25″.41=9.2647291	½ (A+B)= 79° 22′ 33″.00 (4)
(6) Log tan 79 22 33 .00=0.7268100	
(7) 9.9915391=tan ½ (A−B)	= 44 26 30 .90
	sum=A=123° 49′ 03″.90 (8)
	difference=B= 34 56 02 .10 (9)

(10)

Check.		
A=123° 49′ 03″.90		log a =4.3666779
	a. c.	log sin A=0.0804971
B= 34 56 02 .10		log sin B=9.7578749
C= 21 14 54 .00		log sin C=9.5592012
Sum=180 00 00 .00		log c =4.0063762
		log b =4.2050499

THREE-POINT PROBLEM.

If three points, forming a triangle of which the sides and angles are known or can be computed, be visible from a fourth point, P, it is required to determine the position of P.

Set up the theodolite at P and measure the two angles subtended by any two of the given sides.

This problem is of use in cases where, the regular triangulation having been completed, additional points are required for the topographic survey, or are needed for special service. The angles should be carefully measured, and in the computations the logarithms should be carried to seven places of decimals.

Three cases of its application are given, as in others, such as when P falls upon one or another of the sides of the known triangle, or on the prolongation of either, the case resolves itself into the solution of a simple triangle with one side and the angles given; or the problem is indeterminate, as when P is situated on the circumference of the circle passing through the three known points—a contingency which rarely occurs.

Example for each of the three cases.

Given the side	$a = 11204.5$	Angle observed	A P C = P′
Given the side	$b = 7289.0$	Angle observed	A P B = P″
Given the side	$c = 6273.8$	To find	A B P = x
Given the angle	A = 111° 10′ 54″	To find	A C P = y

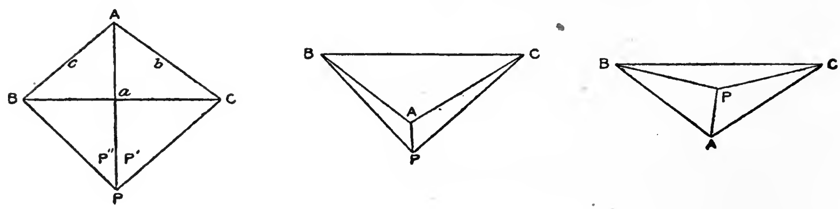


FIG. 4.—Three-point problem; computation.

P′	50° 06′ 12″	P′	49° 47′ 20″	P′	104° 00′ 00″
P″	43° 50′ 38″	P″	44° 09′ 30″	P″	100° 20′ 00″
S	$180° - \frac{1}{2}(A+P'+P'')$	S	$\frac{1}{2}(A-P'-P'')$	S	$180° - \frac{1}{2}(A+P'+P'')$
S	77° 26′ 08″	S	8° 37′ 02″	S	22° 14′ 33″

$$\tan Z = \frac{c \sin P'}{b \sin P''} \qquad \varepsilon = \tfrac{1}{2}(x-y) \qquad \tan \varepsilon = \cot(Z+45°) \tan S$$

$x = S + \varepsilon$ $\quad y = S - \varepsilon$, but if tan ε be negative, then $x = S - \varepsilon$, $\quad y = S + \varepsilon$

Computation.

log c	3.7975307	log c	3.7975397	log c	3.7975307
log sin P′	9.8849100	log sin P′	9.8839061	log sin P′	9.9869041
colog b	6.1373320	colog b	6.1373320	colog b	6.1373320
colog sin P″	0.1594574	colog sin P″	0.1569894	colog sin P″	0.0071016
log tan Z	9.9792301	log tan Z	9.9747583	log tan Z	9.9288684
Z	43° 37′ 49″.6	Z	43° 20′ 09″.2	Z	40° 19′ 43″.3
log cot (Z+45°)	8.3785397	log cot (Z+45°)	8.4631818	log cot (Z+45°)	8.9122794
log tan S	0.6519386	log tan S	9.1805366	log tan S	9.6116787
log tan ε	9.0304783	log tan ε	7.6437184	log tan ε	8.5239581
ε	6° 07′ 21″.7	ε	0° 15′ 08″.1	ε	1° 54′ 50″.04
S	77° 26′ 08″.0	S	8° 37′ 02″.0	S	22° 14′ 33″.00
x	83° 33′ 29″.7	x	8° 52′ 10″.1	x	24° 09′ 23″.00
y	71° 18′ 46″.3	y	8° 21′ 53″.9	y	20° 19′ 43″.00
Hence,		Hence,		Hence,	
P A B	52° 35′ 52″.3	P A B	126° 58′ 19″.9	P A B	55° 30′ 37″.00
P A C	58° 35′ 01″.7	P A C	121° 50′ 46″.1	P A C	55° 40′ 17″.00

As all the angles and a side in each triangle are now known, the other sides, or the distances from P to the three given points, can be readily computed.

	m		m		m
P B	7194.87	P B	7194.94	P B	5256.29
P A	8999.89	P A	1388.54	P A	2609.75
P C	8107.98	P C	8107.91	P C	6203.63
P A	8999.89	P A	1388.54	P A	2609.75

The results are verified when both triangles give the same value for the line P A.

GRAPHIC SOLUTION OF THE THREE-POINT PROBLEM.

1. When new point is within the triangle formed by the three points, point sought is within the triangle of error.

2. When new point is on or near the circle passing through the other points, *the location is uncertain.*

3. When new point is within either of the three shaded segments of the circle (see diagram below), orient on middle point; then the line from middle point lies between true point and point of intersection of lines from other two points.

4. When new point is without the circle, orient on most distant point; then the point sought is always on the same side of the line from most distant point as the point of intersection of the other two lines.

NOTE.—Since a location can be made from any three points, whether correctly plotted or not, therefore always check such locations by means of a fourth point if possible.

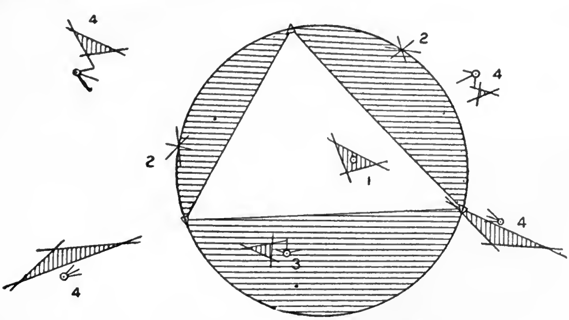
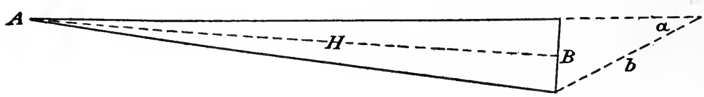


FIG. 5.—Three-point problem; graphic solution.

MICROMETER ALIDADES—DETERMINATION OF CONSTANT AND VALUE OF DIVISION.

R', R'' = readings of micrometer screw.
$R = R' - R''$ = difference of readings.
d = value in seconds of arc of 1 division of micrometer head.
A = angle subtended by targets in seconds of arc.
C = micrometer constant or ratio.
H = distance to targets, supposed at right angles to line of sight.
B = length of base, or distance between targets.



(1) $$d = \frac{B}{HR \sin. 1''}$$

(2) $$C = \frac{1}{d \sin. 1''} = \frac{HR}{B}$$

EXAMPLE.

Readings taken on two targets 21.25 feet apart at right angles to the line of sight and at a measured horizontal distance of 2859.5 feet from the point of observation.

R′	R″	R
550.0	−88.0	= 462.0
540.5	−76.5	= 464.0
etc.	etc.	etc.
		462.075 mean of 20 readings.

Computation of d by formula (1):

B = 21.25 ft	log.	1.32736
H = 2859.5 ft	colog.	6.54371
sin 1″	colog.	5.31443
R = 462.075 ft.	colog.	7.33528
d = 3″.317	log.	0.52078

Computation of C by formula (2):

B = 21.25 ft	colog.	8.67264
H = 2859.5 ft	log.	3.45629
R = 462.075 ft	log.	2.66472
C = 62180	log.	4.79365

For computing distances use this formula:

$$(3)\quad H=\frac{BC}{R}$$

When the base is not at right angles to the line of sight as at b, or at the same elevation as the point of observation, the factors sin a and cos V must be introduced, a being the angle between the base and line of sight and V the vertical angle at A.

The full formula for distances then becomes—

$$(4)\quad H=\frac{bC \sin a \cos V}{R}$$

The plotted position of the base b should be prolonged on the field sheet in order to permit the measurement of the angle a with a large paper or other protractor, with greater accuracy.

METHOD OF FIXING A MERIDIAN AT ANY TIME BY HOUR ANGLE.

[Extracted from United States Land Survey Manual.]

The annexed diagram (fig. 6) will show in their proper relation the various aspects of Polaris in its daily apparent motion around the north-polar point.

This must be carefully studied, as the illustration of Table 1, for finding at any hour the hour angle and azimuth of Polaris, and the resulting meridian, at times when more direct methods are not available.

Hour angle of Polaris.—In fig. 6 the full vertical line represents a portion of the meridian passing through the zenith Z (the point directly overhead), and intersecting the northern horizon at the north point N, from which, for surveying purposes, the azimuths of Polaris

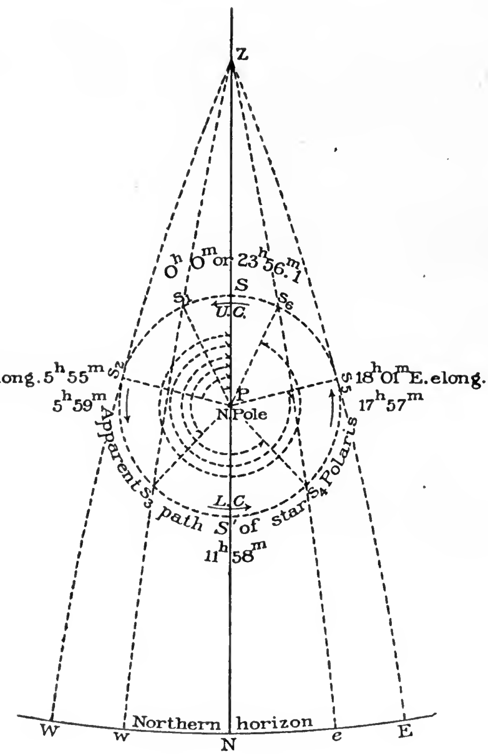


FIG. 6.—Aspects of Polaris.

are reckoned east or west. The meridian is pointed out by the plumb line when it is in the same plane with the eye of the observer and Polaris on the meridian, and a visual representation is also seen in the vertical wire of the transit, when it covers the star on the meridian.

When Polaris crosses the meridian it is said to culminate; above the pole (at S), the passage is called the upper culmination, in contradistinction to the lower culmination (at S′).

In the diagram—which the surveyor may better understand by holding it up perpendicular to the line of sight when he looks toward the pole—Polaris is supposed to be on the meridian, where it will be about noon on April 10 of each year. The star appears to revolve around the pole, in the direction of the arrows, once in every $23^h\ 56^m.1$ of mean solar time; it consequently comes to and crosses the meridian, or culminates, nearly four minutes earlier each successive day. The apparent motion of the star being uniform, one quarter of the circle will (omitting fractions) be described in $5^h\ 59^m$, one half in $11^h\ 58^m$, and three quarters in $17^h\ 57^m$. For the positions s_1, s_2, s_3, etc., the angles SPs_1, SPs_2, SPs_3, etc., are called hour angles of Polaris, for the instant the star is at s_1, s_2, or s_3, etc., and they are measured by the arcs Ss_1, Ss_2, Ss_3, etc., expressed (in these instructions) in mean solar (common clock) time, and are always counted from the upper meridian (at S), to the west, around the circle from $0^h\ 0^m$ to $23^h\ 56^m.1$, and may have any value between the limits named. The hour angles, measured by the arcs Ss_1, Ss_2, Ss_3, Ss_4, Ss_5, and Ss_6, are approximately $1^h\ 8^m$, $5^h\ 55^m$, $9^h\ 4^m$, $14^h\ 52^m$, $18^h\ 01^m$, and $22^h\ 48^m$, respectively; their extent is also indicated graphically by broken fractional circles about the pole.

Suppose the star observed at the point S_3; the time it was at S (the time of upper culmination), taken from the time of observation, will leave the arc Ss_3, or the hour angle at the instant of observation; similar relations will obtain when the star is observed in any other position; therefore, in general:

Subtract the time of upper culmination from the correct local mean time of observation; the remainder will be the hour angle of Polaris expressed in time, or the "argument for Table 3."

The observation may be made at any instant when Polaris is visible, the exact time being carefully noted.

TABLES.

TABLE 1.—*Local mean (astronomical) time of the culminations and elongations of Polaris in the year 1902.*

[From Magnetic Declination Tables, U. S. Coast and Geodetic Survey. Computed for latitude 40° north and longitude 90° or 6^h west of Greenwich.]

Date.	East elongation.		Upper culmination.		West elongation.		Lower culmination.	
1902	h	m	h	m	h	m	h	m
January 1	0	45.8	6	40.6	12	35.3	18	38.7
January 15	23	46.6	5	45.3	11	40.0	17	43.4
February 1	22	39.5	4	38.2	10	32.9	16	36.3
February 15	21	44.2	3	42.9	9	37.7	15	41.0
March 1	20	49.0	2	47.7	8	42.4	14	45.8
March 15	19	54.0	1	52.7	7	47.3	13	50.7
April 1	18	47.0	0	45.6	6	40.3	12	43.7
April 15	17	52.0	23	46.7	5	45.3	11	48.6
May 1	16	49.1	22	43.8	4	42.5	10	45.7
May 15	15	54.2	21	48.9	3	47.6	9	50.8
June 1	14	47.5	20	42.3	2	40.9	8	44.2
June 15	13	52.6	19	47.4	1	46.0	7	49.3
July 1	12	50.0	18	44.8	0	43.4	6	46.7
July 15	11	55.1	17	49.9	23	44.6	5	51.8
August 1	10	48.6	16	43.4	22	38.0	4	45.3
August 15	9	53.7	15	48.5	21	43.1	3	50.4
September 1	8	47.1	14	41.9	20	36.5	2	43.8
September 15	7	52.2	13	47.0	19	41.6	1	48.9
October 1	6	49.3	12	44.1	18	38.7	0	46.0
October 15	5	54.3	11	49.1	17	43.7	23	47.2
November 1	4	47.5	10	42.3	16	36.9	22	40.4
November 15	3	52.3	9	47.1	15	41.8	21	45.2
December 1	2	49.3	8	44.1	14	38.8	20	42.2
December 15	1	54.0	7	48.8	13	43.6	19	46.9

A. *To refer the above tabular quantities to years subsequent to 1902:*

For year 1903	add	1.4	minutes.	
1904	add	2.8	"	up to March 1
	subtract	1.1	"	on and after March 1
1905	add	0.2	"	
1906	"	1.5	"	
1907	"	2.9	"	
1908	"	4.2	"	up to March 1
		0.3	"	on and after March 1
1909	"	1.7	"	
1910	"	3.0	"	
1911	"	4.4	"	

B. *To refer to any calendar day other than the first and fifteenth of each month:* SUBTRACT the quantities below from the tabular quantity for the PRECEDING DATE.

Day of month.		Minutes.	Number of days elapsed.
2 or	16	3.9	1
3	17	7.9	2
4	18	11.8	3
5	19	15.8	4
6	20	19.7	5
7	21	23.6	6
8	22	27.6	7
9	23	31.5	8
10	24	35.5	9
11	25	39.4	10
12	26	43.3	11
13	27	47.3	12
14	28	51.2	13
	29	55.2	14
	30	59.1	15
	31	63.0	16

C. *To refer the table to standard time and to the civil or common method of reckoning:*

([a]) ADD to the tabular quantities four minutes for every degree of longitude the place is west of the standard meridian, and SUBTRACT when the place is east of the standard meridian.

([b]) The astronomical day begins twelve hours after the civil day, i. e., begins at noon on the civil day of the same date, and is reckoned from 0 to 24 hours. Consequently an astronomical time less than twelve hours refers to the same civil day, whereas an astronomical time greater than twelve hours refers to the morning of the next civil day.

It will be noticed that for the tabular year two eastern elongations occur on January 12 and two western elongations on July 12. There are also two upper culminations on April 12 and two lower culminations on October 12. The lower culmination either follows or precedes the upper culmination by $11^h\ 58^m.1$.

D. *To refer to any other than the tabular latitude between the limits of 25° and 50° north:* ADD to the time of west elongation $0^m.13$ for every degree south of 40°, and SUBTRACT from the time of west elongation $0^m.18$ for every degree north of 40°. Reverse these operations for correcting times of east elongation.

E. *To refer to any other than the tabular longitude:* ADD $0^m.16$ for each 15° east of the ninetieth meridian, and SUBTRACT $0^m.16$ for each 15° west of the ninetieth meridian.

A few examples will illustrate the use of table 1.

1. Required the time of upper culmination of Polaris for a station in longitude 90° west, for March 3, 1904.

	h.	m.
Astron. time, U. C. of Polaris, 1904, March 1	2	46.6
Reduction for two days, $7^m.9$ (B) (subtract)		7.9
Local mean time U. C. of Polaris, 1904, March 3	2	38.7

The required time may also be obtained by using the table in the opposite direction, i. e., by taking the time for March 15, and adding the reduction as follows:

	h.	m.
Astron. time U. C. of Polaris, 1904, March 15	1	51.6
Reduction for twelve days, add		47.3
Local mean time U. C. of Polaris, 1904, March 3	2	38.9

In this case the two results are practically identical. If the computation is made both ways, the results will check each other. B has been inserted to save the surveyor the little trouble of making the multiplications; thus, for the above example, in the table under B, opposite the third or seventeenth day of the month in the left hand column, will be found the correction $7^m.9$.

Computing from a preceding date, for days between April 11 and 15 of any year, the reduction in B will be greater than the tabulated time of culmination, in which case $23^h\ 56^m.1$ will be added, to make the subtraction possible.

2. Required, for a station in longitude 90° west, the time of U. C. of Polaris for April 14, 1906:

	h.	m.
Astron. time, U. C. of Polaris, 1906, April 1	0	47.1
Add	23	56.1
Sum	24	43.2
Reduction to April 14, subtract		51.2
Local mean time U. C. of Polaris, April 14	23	52.0

Working from a following date, for days between 9th and 15th of April, the sum will exceed $23^h\ 56^m.1$, and when this occurs subtract $23^h\ 56^m.1$ from the sum, and the remainder will be the required time.

3. Required, for a station in longitude 90° west, the time of U. C. of Polaris for April 10, 1904.

	h.	m.
Astron. time, U. C. of Polaris, 1904, April 15	23	45.6
Reduction for five days, add		19.7
Sum	24	05.3
Subtract	23	56.1
Local mean time, U. C. of Polaris, 1904, April 10	0	09.2

For further application of table 1 see pp. 24 and 25.

Table 2.—*Azimuth of Polaris when at elongation for any year between 1902 and 1910.*

Latitude.	1902.0	1903.0	1904.0	1905.0	1906.0	1907.0	1908.0	1909.0	1910.0
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
25°	1 20.5	1 20.1	1 19.8	1 19.4	1 19.1	1 18.7	1 18.4	1 18.1	1 17.7
26	21.1	20.8	20.5	20.1	19.8	19.4	19.1	18.7	18.4
27	21.9	21.5	21.2	20.8	20.5	20.1	19.8	19.4	19.1
28	22.6	22.2	21.9	21.6	21.3	20.9	20.5	20.1	19.8
29	23.4	23.0	22.7	22.4	22.1	21.7	21.3	20.9	20.5
30	24.2	23.9	23.5	23.1	22.8	22.4	22.1	21.7	21.3
31	25.1	24.7	24.4	24.0	23.6	23.2	22.9	22.5	22.2
32	26.0	25.6	25.3	24.9	24.5	24.1	23.8	23.4	23.1
33	27.0	26.6	26.2	25.9	25.5	25.1	24.7	24.3	24.0
34	28.0	27.6	27.2	26.9	26.5	26.1	25.7	25.3	25.0
35	29.0	28.7	28.3	27.9	27.5	27.1	26.8	26.4	26.0
36	30.1	29.8	29.4	29.0	28.6	28.2	27.9	27.5	27.1
37	31.3	30.9	30.5	30.1	29.7	29.3	29.0	28.6	28.2
38	32.6	32.2	31.8	31.4	31.0	30.6	30.2	29.8	29.4
39	33.9	33.5	33.1	32.7	32.3	31.8	31.4	31.0	30.6
40	35.2	34.8	34.4	34.0	33.6	38.2	32.8	32.4	32.0
41	36.7	36.2	35.8	35.4	35.0	34.6	34.2	33.8	33.4
42	38.2	37.7	37.3	36.9	36.5	36.0	35.6	35.2	34.8
43	39.8	39.3	38.9	38.5	38.1	37.6	37.2	36.8	36.3
44	41.4	41.0	40.5	40.1	39.7	39.2	38.8	38.4	37.9
45	43.2	42.7	42.3	41.8	41.4	40.9	40.5	40.1	39.6
46	45.0	44.6	44.2	43.7	43.2	42.7	42.3	41.9	41.4
47	46.9	46.5	46.0	45.6	45.1	44.6	44.2	43.7	43.3
48	49.0	48.6	48.1	47.7	47.2	46.7	46.3	45.8	45.3
49	51.2	50.7	50.2	49.8	49.3	48.8	48.4	47.9	47.4
50	1 53.5	1 53.0	1 52.5	1 52.0	1 51.5	1 51.0	1 50.6	1 50.1	1 49.6

The above table was computed with mean declination of Polaris for each year. A more accurate result will be had by applying to the tabular values the following correction, which depends on the difference of the mean and the apparent place of the star. The deduced azimuth will in general be correct within 0′.3.

For middle of—	Correction.	For middle of—	Correction.
	′		′
January	−0.4	July	+0.3
February	−0.3	August	+0.1
March	−0.2	September	−0.1
April	0.0	October	−0.3
May	+0.2	November	−0.6
June	+0.3	December	−0.8

TABLE 3.—*Azimuths of Polaris*

[From U. S. Land Survey Manual. The hour angles are expressed in *mean solar* time. The occurrence

STAR AND AZIMUTH.

W. of N. when hour angle is *less* than $11^h\ 58^m$.
E. of N. when hour angle is *greater* than $11^h\ 58^m$.

Time argument, the star's hour angle (or $23^h\ 56^m.1$ *minus* the star's hour angle), for the year—

POLARIS *above* THE POLE.

To determine the true meridian, the azimuth will be laid off to the *east* when the hour angle is *less* than $11^h\ 58^m$, and to the *west* when *greater* than $11^h\ 58^m$.

Azimuths for latitude—

Hours.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°
h.	m.	m.	m.	m.	m.	m.	m.	m.	′	′	′	′	′	′	′	′	′	′	′
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	5	5	5	5	5	5	5	2	2	2	2	2	2	2	2	2	2.	2.
	9.	9.	9.	9.	9.	10	10	10	3.	3.	3.	4	4	4	4	4.	4.	4.	5
	14.	14.	14.	14.	14.	14.	14.	15	5.	5.	5.	5.	6	6	6	6.	6.	7	7
	19	19	19	19.	19.	19.	19.	19.	7	7	7.	7.	8	8	8.	8.	9	9	9.
	24	24	24	24	24.	24.	24.	24.	9	9	9	9.	9.	10	10.	10.	11	11.	12
	28.	29	29	29	29	29.	29.	29.	10.	11	11	11.	11.	12	12.	13	13.	14	14.
	33.	33.	34	34	34	34.	34.	34.	12.	12.	13	13	13.	14	14.	15	15.	16	17
	38.	38.	38.	39	39	39	39.	39.	14	14.	14.	15	15.	16	16.	17	18	18.	19
	43	43.	43.	44	44	44	44.	44.	16	16	16.	17.	17.	18	18.	19.	20	21	21.
	48	48	48.	48.	49	49	49.	49.	17.	18	18.	19	19.	20	20.	21.	22.	23	24
	53	53	53.	53.	54	54	54.	54.	19.	20	20.	21	21.	22	22.	23.	24.	25.	26.
	58	58	58.	58.	59	59	59.	0	21.	21.	22	22.	23.	24	25	26	27	28	29
1	3	3	3.	3.	4	4.	4.	5	23	23.	24	24.	25	26	27	28	29	30	31.
	7.	8	8.	8.	9	9.	9.	10	25	25.	26	26.	27	28	29	30	31.	32.	34
	13	13	13.	14	14	14.	15	15	27	27	27.	28.	29	30	31	32	33.	35	36.
	18	18	18.	19	19.	19.	20	20.	28.	29	29.	30	31	32	33	34.	36	37.	39
	23	23.	23.	24	24.	25	25.	26	30.	31	31.	32	33	34	35	36.	38	39.	41.
	28	28.	29	29.	29.	30	30.	31	32	32.	33	34	35	36	37	38.	40	42	43.
	33.	33.	34	34.	35	35.	36	36.	33.	34.	35	36	37	38	39.	41	42.	44	46
	38.	39	39.	40	40.	41	41.	42	35.	36	37	38	39	40	41.	43	44.	46.	48.
	44	44.	45	45.	46	46.	47	47.	37	38	38.	39.	40.	42	43.	45	46.	48.	50.
	49	50	50.	51	51.	52	52.	53	39	39.	40.	41.	42.	44	45.	47	49	51	53
	54.	55	55.	56.	57	57.	58	58.	40.	41.	42.	43.	44.	46	47.	49	51	53	55
2	0	0.	1.	2	2.	3	4	4.	42.	43	44	45.	46.	48	49.	51.	53.	55.	57.
	6	6.	7	7.	8.	9	9.	10.	44	45	46	47	48.	50	51.	53.	55.	57.	60
	11.	12	12.	13.	14	15	15.	16.	46	47	48	49	50.	52	53.	55.	57.	60	62.
	17	18	18.	19.	20	21	21.	22.	47.	48.	49.	51	52.	54	56	57.	60	62	64.
	23	24	24.	25.	26	27	28	28.	49.	50.	51.	53	54.	56	58	60	62	64.	67
	29	30	30.	31.	32.	33	34	35	51	52	53.	55	56.	58	60	62	64.	66.	69.
	35	36	37	38	38.	39.	40.	41.	53	54	55.	56.	58.	60	62	64	66.	69	72
	41.	42.	43.	44.	45	46	47	48	54.	56	57	58.	60	62	64	66	68.	71.	74.
	48	49	50	51	52	53	54	55	56.	57.	59	60.	62	64	66	68.	71	73.	76.
	54.	55.	56.	57.	58.	59.	1	2	58	59.	61	62.	64	66	68	70.	73.	76	79
3	1.	2.	3.	4.	6	7	8	9	60	61.	63	64.	66	68	70	72.	75	78	81.
	8.	10	11	12	13	14.	15.	17	61.	63	64.	66	68	70	72	74.	77.	80.	84
	16	17	18.	19.	21	22	23.	25	63.	65	66.	68	70	72	74.	77	79.	82.	86
	23.	25	26	27.	29	30.	31.	33	65	66.	68.	70	72	74	76.	79	82	85	88.
	31.	33	34.	35.	37	38.	40.	42	67	68.	70	72	74	76	78.	81	84	87	91
	39.	41	43	44.	46	47.	49.	51	69	70.	72	74	76	78	80.	83	86	89.	93.
	48.	50	52	53.	55	57	59	0.	70.	72	74	75.	77.	80	82.	85.	88.	91.	95.
	58	59.	1.	3.	5.	7.	9.	11.	72.	74	76	77.	79.	82	84.	87.	90.	94	98
4	8	10	12.	14.	16.	19	21	23.	74	76	77.	79.	81.	84	86.	89.	92.	96	100.
	19.	22	24	26.	29	32	34.	37.	76	77.	79.	81.	83.	86	88.	91.	95	98.	103
	32	34.	37.	40.	43.	46.	50	53.	77.	79.	81.	83.	85.	88	90.	94	97	101	105
	46.	50	53.	57.	2	6.	11	16.	79.	81.	83	85	87.	90	93	96	99.	103	107.
5	5	10	16	23.	32	42.			81	83	85	87	89.	92	95	98	101.	105.	110
	40.								83	85	87	89	91.	94	97	100	103.	107.	112

for the use of surveyors.

of a period after minutes of time or of an hour angle indicates that its value is 0^{m}.5 greater than printed.]

Star and Azimuth. W. of N. when hour angle is *less* than 11^{h} 58^{m}. E. of N. when hour angle is *greater* than 11^{h} 58^{m}. Time argument, the star's hour angle (or 23^{h} 56^{m}.1 *minus* the star's hour angle), for the year—									Polaris *below* the Pole. To determine the true meridian, the azimuth will be laid off to the *east* when the hour angle is *less* than 11^{h} 58^{m}, and to the *west* when *greater* than 11^{h} 58^{m}. Azimuths for latitude—										
Hours.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	° 30	° 32	° 34	° 36	° 38	° 40	° 42	° 44	° 46	° 48	° 50
h.	m.								′	′	′	′	′	′	′	′	′	′	′
6	9.	m.	m.	m.	m.	m.			83	85	87	89	91.	94	97	100	103.	107.	112
	45	40.	34	27	18	8	m.	m.	81.	83	85	87	89.	92	95	98	101.	105.	109.
7	4	0.	56.	52.	48.	44	39	34	79.	81.	83	85	87.	90	93	96	99.	103	107
	18.	16	13	10	7	4	0.	57	78	79.	81.	83.	85.	88	90.	93.	97	100.	104.
	31.	29	26.	24	21.	19	16	13	76	77.	79.	81.	83.	86	88.	91.	95	98.	102
	42.	40.	38.	36.	34.	32	29.	27	74.	76	77.	79.	81.	84	86.	89.	92.	96	100
	53	51.	49.	47.	45.	43.	41.	39.	72.	74	76	77.	79.	82	84.	87.	90.	94	97.
8	2.	1	59.	57.	56	54	52.	50.	71	72.	74	76	77.	80	82.	85.	88.	91.	95
	11.	10	8.	7	5.	4	2.	1	69	70.	72	74	75.	78	80.	83	86	89	92.
	20	18.	17.	16	14.	13	11.	10	67.	68.	70.	72	74	76	78.	81	84	87	90
	28	27	25.	24.	23	21.	20.	19	65.	67	68.	70	72	74	76.	79	81.	84.	88
	36	35	33.	32.	31	30	28.	27.	64	65	66.	68	70	72	74.	77	79.	82.	85.
	43.	42.	41.	40	39	38	36.	35.	62	63.	64.	66.	68	70	72	74.	77.	80	83
	50.	49.	48.	47.	46.	45.	44.	43	60.	61.	63	64.	66	68	70	72.	75	78	80.
	57.	56.	55.	54.	53.	52.	51.	50.	58.	59.	61	62.	64	66	68	70.	73	75.	78
9	4.	3.	2.	1.	1	0	59	58	57	58	59	60.	62.	64	66	68	70.	73	76
	11	10.	9.	8.	7.	6.	5.	5	55	56	57.	59	60.	62	64	66	68.	71	73.
	17.	17	16	15	14.	13.	12	11.	53.	54.	55.	57	58.	60	62	64	66	68.	71
	24	23	22.	21.	20.	20	19	18	51.	52.	53.	55	56.	58	60	62	64	66.	68.
	30	29.	28.	28	27	26.	25.	24.	49.	50.	52	53	54.	56	58	59.	62	64	66.
	36	35.	35	34	33.	32.	32	31	48	49	50	51	52.	54	55.	57.	59.	61.	64
	42	41.	41	40	39.	38.	38	37.	46	47	48	49.	50.	52	53.	55.	57.	59.	61.
	48	47.	47	46	45.	45	44	43.	44.	45.	46.	47.	48.	50	51.	53.	55	57	59
	54	53	52.	52	51.	51	50	49.	42.	43.	44.	45.	46.	48	49.	51	53	55	57
	59.	59	58.	57.	57	56.	56	55.	41	41.	42.	43.	44.	46	47.	49	50.	52.	54.
10	5	4.	4	3.	3	2.	2	1.	39	40	40.	41.	43	44	45.	47	48.	50	52
	10.	10	9.	9	8.	8	7.	7	37.	38	39	40	41	42	43.	45	46.	48	49
	16	15.	15	14.	14	13.	13	12.	35.	36	37	38	39	40	41	42.	44	45.	47.
	21.	21	20.	20	19.	19.	19	18.	34	34.	35	36	37	38	39	40.	42	43.	45
	27	26.	26	25.	25	25	24.	24	32	32.	33.	34	35	36	37	38.	39.	41	42.
	32	32	31.	31	30.	30	30	29.	30	31	31.	32	33	34	35	36	37.	39	40
	37.	37	36.	36.	36	35.	35	35	28.	29	29.	30.	31	32	33	34	35.	36.	38
	42.	42.	42	41.	41.	41	40.	40	26.	27	28	28.	29	30	31	32	33	34	35.
	48	47.	47.	47	46.	46.	46	45.	25	25.	26	26.	27	28	29	30	31	32	33
	53	52.	52.	52	52	51.	51	51	23	23.	24	24.	25.	26	27	27.	28.	29.	31
	58	58	57.	57.	57	57	56.	56	21.	22	22	22.	23	24	25	25.	26.	27.	28.
11	3	3	2.	2.	2	2	1.	1.	19.	20	20.	21	21.	22	22.	23.	24	25	26
	8.	8	8	7.	7	7	7	6.	18	18	18.	19	19.	20	20.	21.	22	23	23.
	13.	13	13	12.	12.	12.	12	12	16	16.	16.	17	17.	18	18.	19	20	20.	21.
	18.	18	18	18	17.	17.	17.	17	14	14.	15	15	15.	16	16.	17	17.	18	19
	23.	23	23	23	22.	22.	22.	22	12.	12.	13	13.	13.	14	14.	15	15.	16	16.
	28.	28.	28	28	28	27.	27.	27.	10.	11	11	11.	11.	12	12.	12.	13	13.	14
	33.	33	33	33	33	33	32.	32.	9	9	9	9.	9.	10	10.	10.	11	11.	12
	38.	38	38	38	38	38	38	37.	7	7	7.	7.	8	8	8	8.	9	9	9.
	43.	43	43	43	43	43	43	43	5.	5.	5.	5.	6	6	6	6.	6.	7	7
	48	48	48	48	48	48	48	48	3.	3.	3.	4	4	4	4	4	4.	4.	4.
	53	53	53	53	53	53	53	53	2	2	2	2	2	2	2	2	2	2.	2.
	58	58	58	58	58	58	58	58	0	0	0	0	0	0	0	0	0	0	0

Table 3 gives for various hour angles, expressed in mean solar time and for even degrees of latitude from 30 to 50 degrees, the azimuths of Polaris for eight years, computed for average values of the north polar distance of the star, the arguments being the hour angle (or 23^h $56^m.1$ minus the hour angle when the latter exceeds 11^h 58^m), which is termed the time argument,[a] and the latitude of the place of observation. The table is so extended that azimuths may be taken out by inspection and all interpolation avoided, except such as can be performed mentally.

The hours of the "time arguments" are placed in the columns headed "hours," on the left of each page. The minutes of the time arguments will be found in the columns marked "m," under the years for which they are computed, and they are included between the same heavy zigzag lines which inclose the hours to which they belong.

The time arguments are given to the nearest half minute; the occurrence of a period after the minutes of any one of them indicates that its value is $0^m.5$ greater than printed, the table being so arranged to economize space.

The table will be used as follows: Find the *hours* of the time argument in the left-hand column of either page; then, between the heavy lines which inclose the hours, find the *minutes* in the column marked at the top with the current year. On the same horizontal line with the *minutes* the azimuth will be found under the given latitude, which is marked at the top of the right-hand half of each page. Thus, for 1904, time argument 0^h 43^m, latitude 36°, find 0^h on left-hand page, and under 1904 find 43^m on tenth line from the top, and on same line with the minutes, under latitude 36°, is the azimuth 0° 17′. For 1908, time argument 9^h $33\frac{1}{2}^m$, latitude 48°, the azimuth is 1° 1½′, found on the twenty-first line from the top of right-hand page.

If the exact time argument is not found in the table, the azimuth should be proportioned to the difference between the given and tabular values of said argument.

The table has been arranged to give the azimuths by simple inspection. No written arithmetical work is required, all being performed mentally. It will always be sufficient to take the nearest whole degree of latitude and use it as above directed, except for a few values near the top of either page where the difference of azimuths for 2° difference of latitude amounts to four or five minutes of arc.

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[a] The vertical diameter SS′, fig. 6, divides the apparent path of Polaris into two equal parts, and for the star at any point s_6 on the east side is a corresponding point s_1 on the west side of the meridian, for which azimuth Nw is equal to the azimuth N*e*. The arc, Ss_1 $S's_6$, taken from the entire circle (or 23^h $56^m.1$), leaves the arc Ss_6, and its equal Ss_1, expressed in time, may be used to find, from table 3, the azimuth Nw, which is equal to N*e*.

The hour angles entered in table 3 include only those of the west half of the circle ending at S, and when an hour angle greater than 11^h 58^m results from observation it will be subtracted from 23^h $56^m.1$, and the remainder will be used as the "time argument" for the table. The surveyor should not confound these two quantities. The hour angle itself always decides the direction of the azimuth and defines the place of the star with reference to the pole and meridian, as noted at top of table 3. See examples.

The attention of the observer is directed to the fact that he should always use one day of twenty-four hours as the unit when he subtracts the time of culmination from the time of observation. In any case when the time of upper culmination, taken from table 1, for the given date would be numerically greater than the astronomical time of observation, the former time will be taken out for a date one day earlier than the date of observation. The surveyor will decide when such condition exists by comparing the time given in the table with his astronomical time of observation. (See Example 4 and explanations in footnotes, page 24.)

The watch time to be used when making observations on Polaris at all times except elongation should be as accurate as can be obtained. Looking at table 3 near top of page 20, the surveyor will observe that for a difference of four minutes in the time argument there is a change of about two minutes in azimuth; consequently, to obtain the azimuth to the nearest whole minute of arc, the local mean time, upon which all depends, should be known within two minutes. When the observer uses standard railroad time he will correct the same for the difference of longitude between his station and the standard meridian for which the time is given at the rate of four minutes of time for each degree of the difference in arc. Thus, if the difference in longitude is 6° 45′, the equivalent in time will be twenty-seven minutes. The difference of longitude may be taken from a good map. The correction will be subtracted from the standard railroad time of observation when the surveyor's station is west, or added when east of the standard meridian, as the case may require, to obtain local time. It is immaterial where the surveyor obtains the standard time provided he gets it right, a result which will be gained most easily by a direct personal comparison at a telegraph office.

If the direction of the meridian is known with an error not greater than one-fourth of a degree, the local time can be obtained to the nearest minute by observing the sun's transit by the following method, suggested by Mr. H. L. Baldwin, jr.

The transit being in meridian and carefully leveled, place the telescope so that it will point toward the sun at the time the latter comes to the meridian and allow the magnified image of the sun to fall upon a notebook or sheet of white paper about 1 foot distant from eyepiece. The telescope should be slightly out of focus (lengthened) to get best results, the best focal position to be determined by trial. When the vertical cross wire bisects the sun's image, note the time by watch. This will be the time of apparent noon. To get time of mean noon, correct the noted time by adding or subtracting the equation of time, taken from the Nautical Almanac "to reduce apparent noon to mean noon," or get this from any almanac giving "sun fast" or "sun slow" time.

Example.

	h.	m.	s.
June 20, 1903.			
Watch time of sun's transit	11	50	25
Equation of time		+1	04
Local mean noon	11	51	29
Or watch slow		8	31

The error of observation should not exceed two or three seconds and the error resulting from incorrect meridian will be approximately four seconds for each 1′ error in meridian.

Applications of Tables 1 and 3.

1. Required the hour angle and azimuth of Polaris, for a station in latitude 46° N., longitude 90° W., at $8^h\ 24^m$ p. m., November 7, 1910.

	h.	m.		h.	m.
Astronomical time of observation, 1910, November 7				8	24.0
Equivalent to time of November 6				32	24.0
Astron. time, U. C. Polaris, November 1 (table 1)	10	45.3			
Reduction to November 6[a] (B), subtract		[b]19.7			
Astron. time, U. C. Polaris, November 6	10	25.6	subtract	[c]10	25.6
Hour angle of Polaris, at observation				21	58.4
Subtract from				[d]23	56.1
Time argument for table 3				1	57.7
Azimuth of Polaris, at observation				0°	51′ E.

2. Required the hour angle and azimuth of Polaris, for a station in latitude 41° 12′ N., longitude 94° W., at $6^h\ 16^m$ a. m., November 19, 1904.

	h.	m.		h.	m.
Astronominal time of observation, 1904, November 18				18	16.0
Astron. time, U. C. Polaris, November 15 (table 1)	9	47.1			
Reduction to November 18, subtract		11.8			
Astron. time, U. C. Polaris, November 18	9	35.3	subtract	9	35.3
Hour angle of Polaris, at observation, and time argument for table 3				[e]8	40.7
Azimuth of Polaris, at observation (table 3), 72′ or				[f]1°	12′ W.

The following four examples illustrate any difficulties in the use of tables 1 and 3:

---

[a] By reference to the above table, the surveyor will observe that the times, between November 1 and 15, are greater than $8^h\ 24^m$; consequently, the culmination for one day earlier, November 6, will be used.

[b] From table 1, opposite sixth day of month.

[c] To subtract, take one day from November 7, and add its equivalent, 24^h, to $8^h\ 24^m$, making, November 6, $32^h\ 24^m$ (which is the time expressed by November 7, $8^h\ 24^m$); then subtract in the usual manner.

[d] See last clause of footnote, page 22.

[e] In case the hour angle comes out greater than $11^h\ 58^m$, subtract it from $23^h\ 56^m.1$; see example 4, above.

[f] The hour angle being less than $11^h\ 58^m$, the azimuth is west; see precepts, top of table 3.

EVENING OBSERVATIONS.

1. February 20, 1904, at $7^{h}\ 42^{m}.5$ p. m., local mean time, Polaris is observed at a station in southern California, latitude 36°, longitude 117°.

	h.	m.	h.	m.
Time of observation			7	42.5
From table 1, U. C. Polaris, February 15	3	45.7		
Reduction to February 20		19.7		
			3	26.0
Time elapsed since preceding culmination			4	16.5

From table 3 corresponding azimuth is 80′.5=1° 20′.5.

2. May 9, 1904, at $8^{h}\ 56^{m}.4$ p. m., local mean time, Polaris is observed at a station in northeastern Minnesota, latitude 48°, longitude 90°. The nearest culmination is that of May 8.

	h.	m.	h.	m.
Time of observation May 9, 1904, $8^{h}\ 56^{m}.4$, or May 8			32	56.4
From table 1, U. C., May 1, 1904	22	42.7		
Reduction to May 8		27.6		
			22	15.1
Time elapsed since preceding culmination			10	41.3

From table 3, corresponding azimuth is 34′.

MORNING OBSERVATIONS.

3. May 10, 1904, at $5^{h}\ 13^{m}$ a. m., local mean time, or May 9, $17^{h}\ 13^{m}$, astronomical time, Polaris is observed at a station in northeastern Minnesota, latitude 48°, longitude 90°.

	h.	m.	h.	m.
Time of observation, May 9, 1904			17	13.0
From table 1, U. C., May 1	22	42.7		
Reduction to May 9		31.5		
			22	11.2
Time to elapse to next following culmination			4	58.2

From table 3 corresponding azimuth is 104′.3=1° 44′.3

4. February 21, 1904, at $5^{h}\ 10^{m}$ a. m., local mean time, Polaris is observed at a station in southern California, latitude 36°, longitude 117°. The nearest culmination is on February 21.

	h.	m.	h.	m.	h.	m.
Time of observation, February 20					17	10.0
From table 1, U. C., February 15	3	45.7				
Reduction to February 20		19.7				
	3	26.0+	23	56.1=	27	22.1
Time to elapse to next following culmination					10	12.1

From table 3, corresponding azimuth is 39′.3.

TABLE 4.—AZIMUTH AND APPARENT ALTITUDE OF POLARIS AT DIFFERENT HOUR ANGLES.

[From U. S. Coast and Geodetic Survey Report for 1895.]

The accompanying tables are intended for field use, to facilitate placing an instrument in the meridian. They are also suitable for determining the approximate latitude or meridian. They contain the azimuth of Polaris at intervals of fifteen minutes in hour angle for each degree of north latitude from 30° to 60°, and the apparent altitude at the same intervals and for each fifth degree of latitude.[a] The tables are computed for the declination of Polaris 88° 46′, but the rate of change in both azimuth and altitude is given with the argument 1′ increase in declination.[b] The tables are intended to be used in connection with the American Ephemeris, where are given the apparent right ascension and declination of Polaris for each day in the year. The approximate local time will in general be known with sufficient accuracy from standard time and the approximate longitude of the place. The following example explains the use of the tables and the derivation of the hour angle of Polaris:

Position, latitude 36° 20′ N., longitude $5^h\ 20^m\ 30^s$ W. of Greenwich.

	h.	m.	s.
Time of observation, July 10, 1895, standard (75th mer.) mean time	8	52	40 p. m.
Reduction to local time	—	20	30
Local mean time	8	32	10
Reduction to sidereal time (Table III, Amer. Ephem.)	+	1	24
Sidereal time mean noon, Greenwich, July 10, 1895	7	12	38
Correction for longitude, $5^h\ 20^m\ 30^s$ (Table III, Amer. Ephem.)	+	0	53
Local sidereal time	15	47	05
Apparent right ascension of Polaris, July 10, 1895	1	20	18
Hour angle before upper culmination	9	33	13

[a] The tables were computed with the following formulas:

$$\tan a = \frac{\sin t}{\cos \varphi \tan \delta - \sin \varphi \cos t},$$

$$\sin h = \sin \varphi \sin \delta + \cos \varphi \cos \delta \cos t,$$

$$\sin a_e = \frac{\cos \delta}{\cos \varphi},$$

$$\cos t_e = \cot \delta \tan \varphi;$$

where a = azimuth from true north,
t = hour angle,
φ = latitude,
δ = declination,
h = true altitude,
a_e = azimuth at elongation,
t_e = hour angle at elongation.

[b] As the corrections are given with proper sign for increase in declination over 88° 46′, they are to be applied with reversed sign while the declination is less than 88° 46′, as it will be until near the close of the century.

	°	′	″
Declination of table	88	46	
Apparent declination, July 10, 1895	88	44	47
Increase in declination		— 1	13=—1′·2

	°	′	″		°	′
Values from tables (interpolated) azimuth	0	54	12,	apparent altitude	35	21.8
Correction for—1′.2 increase in declination			+52			—1.0
	0	55	04		35	20.8
	East of north					

It is to be remembered that Polaris is east of the meridian for twelve hours before upper culmination, and west of the meridian for twelve hours after. By setting the instrument at the apparent altitude and sweeping near the meridian Polaris can ordinarily be found and the instrument placed in the meridian some time before dark. With transit instruments not provided with horizontal arc, the value of the azimuth adjusting screw may be readily determined and used.

Without the American Ephemeris these tables may be conveniently used for obtaining the approximate meridian or latitude, in connection with Bulletin 14, United States Coast and Geodetic Survey,[a] where are given the approximate mean times of culminations of Polaris, and the mean declinations for various epochs.

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[a] Approximate Times of Culminations and Elongations and of the Azimuths at Elongation of Polaris for the Years between 1889 and 1910.

The mean places of Polaris are given as follows:

	α			δ		
	h.	m.	s.	°	′	″
1895	1	20	30.08	88	44	52.68
1900	1	22	33.76	88	46	26.66
1905	1	24	42.48	88	48	00.31
1910	1	26	56.58	88	49	33.61

TABLE 4.—*Azimuth and apparent altitude*

Hour angle before or after upper culmination.	Azimuth of Polaris computed for declination 88° 46′.					
	Latitude 30°.	Latitude 31°.	Latitude 32°.	Latitude 33°.	Latitude 34°.	Latitude 35°.
h. m.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
0 15	0 05 40	0 05 43	0 05 47	0 05 51	0 05 55	0 06 00
0 30	0 11 18	0 11 25	0 11 33	0 11 41	0 11 49	0 11 58
0 45	0 16 53	0 17 04	0 17 15	0 17 27	0 17 40	0 17 53
1 00	0 22 23	0 22 38	0 22 53	0 23 09	0 23 26	0 23 44
1 15	0 27 48	0 28 06	0 28 25	0 28 45	0 29 06	0 29 28
1 30	0 33 05	0 33 26	0 33 49	0 34 13	0 34 38	0 35 04
1 45	0 38 13	0 38 38	0 39 04	0 39 32	0 40 00	0 40 30
2 00	0 43 12	0 43 40	0 44 09	0 44 40	0 45 12	0 45 46
2 15	0 47 58	0 48 29	0 49 02	0 49 36	0 50 12	0 50 50
2 30	0 52 32	0 53 06	0 53 42	0 54 19	0 54 59	0 55 40
2 45	0 56 52	0 57 29	0 58 07	0 58 48	0 59 30	1 00 15
3 00	1 00 58	1 01 37	1 02 18	1 03 01	1 03 46	1 04 34
3 15	1 04 47	1 05 28	1 06 12	1 06 58	1 07 46	1 08 36
3 30	1 08 19	1 09 02	1 09 48	1 10 36	1 11 27	1 12 20
3 45	1 11 33	1 12 18	1 13 06	1 13 56	1 14 49	1 15 45
4 00	1 14 28	1 15 15	1 16 05	1 16 57	1 17 52	1 18 50
4 15	1 17 04	1 17 52	1 18 44	1 19 37	1 20 34	1 21 34
4 30	1 19 19	1 20 09	1 21 02	1 21 57	1 22 55	1 23 57
4 45	1 21 14	1 22 05	1 22 59	1 23 55	1 24 55	1 25 57
5 00	1 22 48	1 23 40	1 24 35	1 25 32	1 26 32	1 27 36
5 15	1 24 00	1 24 53	1 25 48	1 26 46	1 27 47	1 28 51
5 30	1 24 51	1 25 44	1 26 40	1 27 38	1 28 39	1 29 44
5 45	1 25 20	1 26 13	1 27 09	1 28 07	1 29 09	1 30 14
6 00	1 25 27	1 26 19	1 27 15	1 28 14	1 29 15	1 30 20
6 15	1 25 12	1 26 04	1 26 59	1 27 57	1 28 59	1 30 03
6 30	1 24 34	1 25 27	1 26 21	1 27 19	1 28 19	1 29 23
6 45	1 23 36	1 24 27	1 25 21	1 26 18	1 27 17	1 28 20
7 00	1 22 16	1 23 06	1 23 59	1 24 55	1 25 53	1 26 55
7 15	1 20 35	1 21 25	1 22 16	1 23 10	1 24 08	1 25 08
7 30	1 18 34	1 19 22	1 20 12	1 21 05	1 22 00	1 22 59
7 45	1 16 13	1 16 59	1 17 48	1 18 39	1 19 33	1 20 29
8 00	1 13 33	1 14 17	1 15 04	1 15 53	1 16 45	1 17 39
8 15	1 10 34	1 11 16	1 12 01	1 12 48	1 13 37	1 14 29
8 30	1 07 17	1 07 57	1 08 40	1 09 25	1 10 12	1 11 01
8 45	1 03 43	1 04 22	1 05 02	1 05 44	1 06 29	1 07 15
9 00	0 59 54	1 00 30	1 01 07	1 01 47	1 02 29	1 03 12
9 15	0 55 49	0 56 23	0 56 58	0 57 34	0 58 13	0 58 54
9 30	0 51 31	0 52 01	0 52 34	0 53 08	0 53 43	0 54 21
9 45	0 46 59	0 47 27	0 47 57	0 48 28	0 49 00	0 49 34
10 00	0 42 16	0 42 42	0 43 08	0 43 36	0 44 05	0 44 35
10 15	0 37 23	0 37 45	0 38 08	0 38 33	0 38 59	0 39 26
10 30	0 32 20	0 32 39	0 32 59	0 33 20	0 33 43	0 34 06
10 45	0 27 09	0 27 25	0 27 42	0 28 00	0 28 18	0 28 38
11 00	0 21 51	0 22 04	0 22 18	0 22 32	0 22 47	0 23 03
11 15	0 16 28	0 16 38	0 16 48	0 16 59	0 17 10	0 17 22
11 30	0 11 01	0 11 08	0 11 14	0 11 22	0 11 29	0 11 37
11 45	0 05 31	0 05 34	0 05 38	0 05 42	0 05 45	0 05 49
Elongation:						
Azimuth ...	1 25 27	1 26 20	1 27 16	1 28 14	1 29 16	1 30 20
	h. m. s.	*h. m. s.*	*h. m. s.*	*h. m. s.*	*h. m. s.*	*h. m. s.*
Hour angle.	5 57 09	5 57 02	5 56 55	5 56 48	5 56 40	5 56 33

of Polaris at different hour angles.

Azimuth of Polaris computed for declination 88° 46′.					Correction for 1′ increase in declination of Polaris.		Hour angle before or after upper culmination.
Latitude 36°.	Latitude 37°.	Latitude 38°.	Latitude 39°.	Latitude 40°.	Latitude 30°.	Latitude 40°.	
° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″	h. m.
0 06 05	0 06 10	0 06 15	0 06 20	0 06 26	− 5	− 5	0 15
0 12 08	0 12 18	0 12 28	0 12 39	0 12 50	− 9	−10	0 30
0 18 07	0 18 22	0 18 38	0 18 54	0 19 11	−14	−16	0 45
0 24 02	0 24 22	0 24 43	0 25 04	0 25 27	−18	−21	1 00
0 29 51	0 30 15	0 30 41	0 31 08	0 31 36	−23	−26	1 15
0 35 31	0 36 00	0 36 31	0 37 02	0 37 36	−27	−31	1 30
0 41 02	0 41 35	0 42 11	0 42 47	0 43 26	−31	−36	1 45
0 46 22	0 47 00	0 47 39	0 48 21	0 49 04	−35	−40	2 00
0 51 29	0 52 11	0 52 55	0 53 41	0 54 29	−39	−45	2 15
0 56 23	0 57 09	0 57 57	0 58 47	0 59 40	−43	−49	2 30
1 01 02	1 01 51	1 02 43	1 03 37	1 04 34	−46	−53	2 45
1 05 24	1 06 17	1 07 12	1 08 10	1 09 12	−50	−57	3 00
1 09 29	1 10 25	1 11 24	1 12 25	1 13 30	−53	−60	3 15
1 13 16	1 14 14	1 15 16	1 16 21	1 17 29	−56	−63	3 30
1 16 43	1 17 44	1 18 49	1 19 57	1 21 08	−58	−66	3 45
1 19 50	1 20 54	1 22 01	1 23 11	1 24 25	−61	−69	4 00
1 22 36	1 23 42	1 24 51	1 26 03	1 27 20	−63	−72	4 15
1 25 01	1 26 08	1 27 19	1 28 33	1 29 52	−64	−74	4 30
1 27 03	1 28 12	1 29 24	1 30 40	1 32 00	−66	−75	4 45
1 28 42	1 29 52	1 31 06	1 32 23	1 33 44	−68	−76	5 00
1 29 59	1 31 09	1 32 24	1 33 42	1 35 04	−69	−77	5 15
1 30 52	1 32 03	1 33 18	1 34 37	1 35 59	−69	−78	5 30
1 31 21	1 32 33	1 33 48	1 35 07	1 36 30	−70	−78	5 45
1 31 27	1 32 39	1 33 54	1 35 13	1 36 35	−70	−78	6 00
1 31 10	1 32 21	1 33 36	1 34 54	1 36 16	−69	−78	6 15
1 30 30	1 31 40	1 32 54	1 34 11	1 35 32	−68	−77	6 30
1 29 26	1 30 35	1 31 48	1 33 04	1 34 24	−67	−76	6 45
1 27 59	1 29 07	1 30 18	1 31 33	1 32 52	−66	−75	7 00
1 26 11	1 27 17	1 28 26	1 29 39	1 30 56	−65	−73	7 15
1 24 00	1 25 04	1 26 12	1 27 23	1 28 38	−64	−72	7 30
1 21 28	1 22 30	1 23 36	1 24 45	1 25 57	−62	−69	7 45
1 18 36	1 19 36	1 20 39	1 21 45	1 22 54	−60	−66	8 00
1 15 24	1 16 21	1 17 22	1 18 25	1 19 31	−57	−64	8 15
1 11 53	1 12 48	1 13 45	1 14 45	1 15 48	−54	−61	8 30
1 08 04	1 08 56	1 09 50	1 10 47	1 11 47	−51	−58	8 45
1 03 58	1 04 47	1 05 38	1 06 31	1 07 27	−48	−54	9 00
0 59 37	1 00 22	1 01 09	1 01 59	1 02 51	−45	−50	9 15
0 55 00	0 55 42	0 56 25	0 57 11	0 57 59	−42	−46	9 30
0 50 10	0 50 48	0 51 27	0 52 09	0 52 53	−38	−42	9 45
0 45 08	0 45 42	0 46 17	0 46 54	0 47 34	−34	−38	10 00
0 39 54	0 40 24	0 40 55	0 41 28	0 42 03	−30	−34	10 15
0 34 30	0 34 57	0 35 24	0 35 52	0 36 22	−26	−29	10 30
0 28 59	0 29 20	0 29 43	0 30 07	0 30 32	−22	−24	10 45
0 23 19	0 23 37	0 23 55	0 24 14	0 24 35	−18	−20	11 00
0 17 35	0 17 48	0 18 02	0 18 16	0 18 31	−13	−15	11 15
0 11 46	0 11 54	0 12 04	0 12 13	0 12 23	− 9	−10	11 30
0 05 53	0 05 58	0 06 02	0 06 07	0 06 12	− 4	− 5	11 45
1 31 28	1 32 40	1 33 55	1 35 14	1 36 36	−69	−78	
h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	s.	s.	
5 56 25	5 56 17	5 56 09	5 56 00	5 55 52	+ 2	+ 3	

TABLE 4.—*Azimuth and apparent altitude*

Hour angle before or after upper culmination.	Azimuth of Polaris computed for declination 88° 46′.					
	Latitude 40°.	Latitude 41°.	Latitude 42°.	Latitude 43°.	Latitude 44°.	Latitude 45°.
h. m.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
0 15	0 06 26	0 06 32	0 06 39	0 06 45	0 06 52	0 07 00
0 30	0 12 50	0 13 03	0 13 15	0 13 29	0 13 43	0 13 58
0 45	0 19 11	0 19 30	0 19 48	0 20 08	0 20 29	0 20 52
1 00	0 25 27	0 25 51	0 26 16	0 26 43	0 27 10	0 27 40
1 15	0 31 36	0 32 05	0 32 36	0 33 09	0 33 44	0 34 21
1 30	0 37 36	0 38 11	0 38 48	0 39 27	0 40 09	0 40 52
1 45	0 43 26	0 44 07	0 44 50	0 45 35	0 46 22	0 47 12
2 00	0 49 04	0 49 50	0 50 39	0 51 29	0 52 23	0 53 19
2 15	0 54 29	0 55 20	0 56 14	0 57 10	0 58 10	0 59 12
2 30	0 59 40	1 00 35	1 01 34	1 02 36	1 03 41	1 04 49
2 45	1 04 34	1 05 34	1 06 38	1 07 44	1 08 54	1 10 08
3 00	1 09 12	1 10 16	1 11 24	1 12 35	1 13 50	1 15 09
3 15	1 13 30	1 14 38	1 15 50	1 17 06	1 18 25	1 19 49
3 30	1 17 29	1 18 41	1 19 57	1 21 16	1 22 39	1 24 08
3 45	1 21 08	1 22 23	1 23 42	1 25 04	1 26 32	1 28 04
4 00	1 24 25	1 25 43	1 27 05	1 28 31	1 30 01	1 31 37
4 15	1 27 20	1 28 40	1 30 04	1 31 33	1 33 07	1 34 45
4 30	1 29 52	1 31 14	1 32 41	1 34 12	1 35 48	1 37 29
4 45	1 32 00	1 33 24	1 34 53	1 36 25	1 38 04	1 39 47
5 00	1 33 44	1 35 10	1 36 40	1 38 14	1 39 54	1 41 38
5 15	1 35 04	1 36 30	1 38 02	1 39 37	1 41 18	1 43 04
5 30	1 35 59	1 37 26	1 38 58	1 40 34	1 42 16	1 44 02
5 45	1 36 30	1 37 57	1 39 29	1 41 05	1 42 47	1 44 34
6 00	1 36 35	1 38 02	1 39 34	1 41 10	1 42 51	1 44 38
6 15	1 36 16	1 37 43	1 39 14	1 40 49	1 42 30	1 44 16
6 30	1 35 32	1 36 58	1 38 28	1 40 03	1 41 42	1 43 27
6 45	1 34 24	1 35 48	1 37 17	1 38 50	1 40 28	1 42 12
7 00	1 32 52	1 34 15	1 35 42	1 37 13	1 38 49	1 40 31
7 15	1 30 56	1 32 17	1 33 42	1 35 11	1 36 45	1 38 24
7 30	1 28 38	1 29 56	1 31 19	1 32 46	1 34 17	1 35 53
7 45	1 25 57	1 27 13	1 28 33	1 29 56	1 31 25	1 32 58
8 00	1 22 54	1 24 07	1 25 24	1 26 45	1 28 10	1 29 40
8 15	1 19 31	1 20 41	1 21 55	1 23 12	1 24 33	1 25 59
8 30	1 15 48	1 16 55	1 18 05	1 19 18	1 20 35	1 21 57
8 45	1 11 47	1 12 49	1 13 55	1 15 05	1 16 18	1 17 35
9 00	1 07 27	1 08 26	1 09 28	1 10 33	1 11 41	1 12 54
9 15	1 02 51	1 03 45	1 04 43	1 05 43	1 06 47	1 07 54
9 30	0 57 59	0 58 49	0 59 42	1 00 38	1 01 37	1 02 38
9 45	0 52 53	0 53 39	0 54 27	0 55 18	0 56 11	0 57 07
10 00	0 47 34	0 48 15	0 48 58	0 49 44	0 50 32	0 51 22
10 15	0 42 03	0 42 39	0 43 18	0 43 58	0 44 40	0 45 25
10 30	0 36 22	0 36 53	0 37 26	0 38 01	0 38 38	0 39 16
10 45	0 30 32	0 30 58	0 31 26	0 31 55	0 32 26	0 32 58
11 00	0 24 35	0 24 56	0 25 18	0 25 42	0 26 06	0 26 32
11 15	0 18 31	0 18 47	0 19 04	0 19 22	0 19 40	0 20 00
11 30	0 12 23	0 12 34	0 12 45	0 12 57	0 13 09	0 13 23
11 45	0 06 12	0 06 18	0 06 23	0 06 29	0 06 36	0 06 42
Elongation:						
Azimuth . . .	1 36 36	1 38 03	1 39 35	1 41 11	1 42 53	1 44 40
	h. m. s.	*h. m. s.*	*h. m. s.*	*h. m. s.*	*h. m. s.*	*h. m. s.*
Hour angle.	5 55 52	5 55 43	5 55 34	5 55 24	5 55 14	5 55 04

of Polaris at different hour angles—Continued.

Azimuth of Polaris computed for declination 88° 46′.					Correction for 1′ increase in declination of Polaris.		Hour angle before or after upper culmination.
Latitude 46°.	Latitude 47°.	Latitude 48°.	Latitude 49°.	Latitude 50°.	Latitude 40°.	Latitude 50°.	
° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″	h. m.
0 07 08	0 07 16	0 07 25	0 07 34	0 07 44	− 5	− 6	0 15
0 14 13	0 14 30	0 14 48	0 15 06	0 15 25	−10	−13	0 30
0 21 15	0 21 40	0 22 06	0 22 33	0 23 02	−16	−19	0 45
0 28 11	0 28 44	0 29 18	0 29 55	0 30 33	−21	−25	1 00
0 34 59	0 35 40	0 36 23	0 37 08	0 37 56	−26	−32	1 15
0 41 38	0 42 26	0 43 17	0 44 11	0 45 08	−31	−38	1 30
0 48 05	0 49 01	0 49 59	0 51 02	0 52 07	−36	−43	1 45
0 54 19	0 55 22	0 56 28	0 57 38	0 58 52	−40	−49	2 00
1 00 18	1 01 28	1 02 41	1 03 59	1 05 21	−45	−54	2 15
1 06 01	1 07 17	1 08 38	1 10 03	1 11 32	−49	−59	2 30
1 11 26	1 12 48	1 14 15	1 15 47	1 17 24	−53	−64	2 45
1 16 32	1 18 00	1 19 33	1 21 11	1 22 54	−57	−68	3 00
1 21 17	1 22 50	1 24 29	1 26 13	1 28 02	−60	−72	3 15
1 25 40	1 27 18	1 29 02	1 30 51	1 32 46	−63	−76	3 30
1 29 41	1 31 23	1 33 11	1 35 05	1 37 06	−66	−80	3 45
1 33 17	1 35 03	1 36 55	1 38 54	1 40 59	−69	−83	4 00
1 36 29	1 38 18	1 40 14	1 42 16	1 44 25	−72	−86	4 15
1 39 15	1 41 08	1 43 06	1 45 11	1 47 24	−74	−88	4 30
1 41 35	1 43 30	1 45 31	1 47 39	1 49 54	−75	−90	4 45
1 43 29	1 45 25	1 47 28	1 49 38	1 51 55	−76	−91	5 00
1 44 55	1 46 53	1 48 57	1 51 08	1 53 27	−77	−92	5 15
1 45 54	1 47 53	1 49 58	1 52 10	1 54 30	−78	−93	5 30
1 46 26	1 48 25	1 50 30	1 52 43	1 55 03	−78	−94	5 45
1 46 31	1 48 29	1 50 34	1 52 46	1 55 06	−78	−93	6 00
1 46 08	1 48 05	1 50 10	1 52 21	1 54 40	−78	−93	6 15
1 45 18	1 47 14	1 49 17	1 51 27	1 53 44	−77	−92	6 30
1 44 01	1 45 56	1 47 56	1 50 04	1 52 20	−76	−91	6 45
1 42 18	1 44 10	1 46 09	1 48 14	1 50 27	−75	−89	7 00
1 40 09	1 41 59	1 43 54	1 45 57	1 48 06	−73	−87	7 15
1 37 35	1 39 21	1 41 14	1 43 13	1 45 19	−72	−85	7 30
1 34 36	1 36 19	1 38 08	1 40 03	1 42 05	−69	−82	7 45
1 31 14	1 32 53	1 34 38	1 36 29	1 38 26	−66	−79	8 00
1 27 29	1 29 04	1 30 44	1 32 30	1 34 22	−64	−76	8 15
1 23 23	1 24 53	1 26 28	1 28 09	1 29 55	−61	−72	8 30
1 18 56	1 20 21	1 21 51	1 23 26	1 25 07	−58	−68	8 45
1 14 10	1 15 30	1 16 54	1 18 23	1 19 57	−54	−64	9 00
1 09 05	1 10 19	1 11 38	1 13 01	1 14 28	−50	−59	9 15
1 03 44	1 04 52	1 06 04	1 07 21	1 08 41	−46	−55	9 30
0 58 07	0 59 09	1 00 15	1 01 24	1 02 38	−42	−50	9 45
0 52 16	0 53 12	0 54 11	0 55 13	0 56 19	−38	−45	10 00
0 46 12	0 47 01	0 47 53	0 48 49	0 49 47	−34	−40	10 15
0 39 57	0 40 40	0 41 25	0 42 12	0 43 02	−29	−34	10 30
0 33 32	0 34 08	0 34 46	0 35 26	0 36 08	−24	−29	10 45
0 27 00	0 27 28	0 27 59	0 28 31	0 29 05	−20	−23	11 00
0 20 20	0 20 42	0 21 05	0 21 29	0 21 55	−15	−18	11 15
0 13 36	0 13 51	0 14 06	0 14 22	0 14 39	−10	−12	11 30
0 06 49	0 06 56	0 07 04	0 07 12	0 07 21	− 5	− 6	11 45
1 46 32	1 48 31	1 50 36	1 52 48	1 55 08	−78	−93	
h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	s.	s.	
5 54 53	5 54 42	5 54 31	5 54 20	5 54 07	+ 3	+ 5	

TABLE 4.—*Azimuth and apparent altitude*

Hour angle before or after upper culmination.	Azimuth of Polaris computed for declination 88° 46′.					
	Latitude 50°.	Latitude 51°.	Latitude 52°.	Latitude 53°.	Latitude 54°.	Latitude 55°.
h. m.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
0 15	0 07 44	0 07 54	0 08 05	0 08 17	0 08 29	0 08 42
0 30	0 15 25	0 15 46	0 16 08	0 16 31	0 16 56	0 17 22
0 45	0 23 02	0 23 33	0 24 06	0 24 41	0 25 18	0 25 57
1 00	0 30 33	0 31 14	0 31 58	0 32 44	0 33 33	0 34 25
1 15	0 37 56	0 38 47	0 39 40	0 40 38	0 41 38	0 42 43
1 30	0 45 08	0 46 08	0 47 12	0 48 20	0 49 32	0 50 49
1 45	0 52 07	0 53 17	0 54 31	0 55 49	0 57 12	0 58 41
2 00	0 58 52	1 00 11	1 01 34	1 03 03	1 04 37	1 06 16
2 15	1 05 21	1 06 48	1 08 21	1 09 59	1 11 43	1 13 33
2 30	1 11 32	1 13 08	1 14 48	1 16 35	1 18 29	1 20 30
2 45	1 17 24	1 19 07	1 20 55	1 22 51	1 24 54	1 27 04
3 00	1 22 54	1 24 44	1 26 41	1 28 44	1 30 55	1 33 15
3 15	1 28 02	1 29 59	1 32 02	1 34 13	1 36 32	1 39 00
3 30	1 32 46	1 34 49	1 36 58	1 39 16	1 41 42	1 44 18
3 45	1 37 06	1 39 14	1 41 29	1 43 52	1 46 25	1 49 07
4 00	1 40 59	1 43 12	1 45 32	1 48 01	1 50 39	1 53 27
4 15	1 44 25	1 46 42	1 49 07	1 51 40	1 54 23	1 57 16
4 30	1 47 24	1 49 44	1 52 13	1 54 50	1 57 37	2 00 35
4 45	1 49 54	1 52 17	1 54 49	1 57 29	2 00 20	2 03 21
5 00	1 51 55	1 54 21	1 56 54	1 59 37	2 02 31	2 05 35
5 15	1 53 27	1 55 54	1 58 29	2 01 15	2 04 10	2 07 16
5 30	1 54 30	1 56 58	1 59 34	2 02 20	2 05 16	2 08 23
5 45	1 55 03	1 57 31	2 00 08	2 02 53	2 05 50	2 08 58
6 00	1 55 06	1 57 34	2 00 10	2 02 56	2 05 52	2 08 58
6 15	1 54 40	1 57 06	1 59 41	2 02 26	2 05 21	2 08 26
6 30	1 53 44	1 56 09	1 58 43	2 01 25	2 04 18	2 07 22
6 45	1 52 20	1 54 42	1 57 14	1 59 54	2 02 44	2 05 45
7 00	1 50 27	1 52 47	1 55 15	1 57 52	2 00 39	2 03 36
7 15	1 48 06	1 50 23	1 52 48	1 55 21	1 58 04	2 00 57
7 30	1 45 19	1 47 32	1 49 52	1 52 21	1 54 59	1 57 47
7 45	1 42 05	1 44 13	1 46 29	1 48 53	1 51 26	1 54 08
8 00	1 38 26	1 40 29	1 42 40	1 44 58	1 47 25	1 50 01
8 15	1 34 22	1 36 20	1 38 25	1 40 38	1 42 58	1 45 27
8 30	1 29 55	1 31 48	1 33 47	1 35 52	1 38 06	1 40 28
8 45	1 25 07	1 26 53	1 28 45	1 30 44	1 32 50	1 35 04
9 00	1 19 57	1 21 37	1 23 22	1 25 13	1 27 11	1 29 17
9 15	1 14 28	1 16 01	1 17 38	1 19 22	1 21 12	1 23 08
9 30	1 08 41	1 10 06	1 11 36	1 13 12	1 14 53	1 16 40
9 45	1 02 38	1 03 55	1 05 17	1 06 44	1 08 16	1 09 53
10 00	0 56 19	0 57 28	0 58 42	1 00 00	1 01 23	1 02 50
10 15	0 49 47	0 50 48	0 51 53	0 53 02	0 54 15	0 55 32
10 30	0 43 02	0 43 56	0 44 52	0 45 51	0 46 54	0 48 01
10 45	0 36 08	0 36 52	0 37 39	0 38 29	0 39 22	0 40 18
11 00	0 29 05	0 29 41	0 30 18	0 30 58	0 31 41	0 32 26
11 15	0 21 55	0 22 22	0 22 50	0 23 20	0 23 52	0 24 26
11 30	0 14 39	0 14 57	0 15 16	0 15 37	0 15 58	0 16 21
11 45	0 07 21	0 07 30	0 07 39	0 07 49	0 08 00	0 08 11
Elongation:						
Azimuth...	1 55 08	1 57 36	2 00 13	2 02 59	2 05 55	2 09 02
	h. m. s.	*h. m. s.*	*h. m. s.*	*h. m. s.*	*h. m. s.*	*h. m. s.*
Hour angle.	5 54 07	5 53 54	5 53 41	5 53 27	5 53 12	5 52 57

of Polaris at different hour angles—Continued.

Azimuth of Polaris computed for declination 88° 46′.					Correction for 1′ increase in declination of Polaris.		Hour angle before or after upper culmination.
Latitude 56°.	Latitude 57°.	Latitude 58°.	Latitude 59°.	Latitude 60°.	Latitude 50°.	Latitude 60°.	
° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″	h. m.
0 08 56	0 09 12	0 09 28	0 09 45	0 10 03	— 6	— 8	0 15
0 17 50	0 18 20	0 18 53	0 19 27	0 20 04	—13	— 17	0 30
0 26 39	0 27 24	0 28 12	0 29 03	0 29 58	—19	— 25	0 45
0 35 21	0 36 20	0 37 23	0 38 31	0 39 44	—25	— 33	1 00
0 43 52	0 45 06	0 46 24	0 47 48	0 49 19	—32	— 41	1 15
0 52 11	0 53 39	0 55 12	0 56 52	0 58 40	—38	— 49	1 30
1 00 16	1 01 56	1 03 44	1 05 40	1 07 44	—43	— 57	1 45
1 08 03	1 09 57	1 11 58	1 14 08	1 16 28	—49	— 64	2 00
1 15 31	1 17 37	1 19 52	1 22 16	1 24 51	—54	— 71	2 15
1 22 39	1 24 56	1 27 24	1 30 01	1 32 50	—59	— 78	2 30
1 29 23	1 31 52	1 34 31	1 37 21	1 40 23	—64	— 84	2 45
1 35 43	1 38 22	1 41 12	1 44 13	1 47 28	—68	— 89	3 00
1 41 37	1 44 25	1 47 25	1 50 37	1 54 03	—72	— 94	3 15
1 47 03	1 50 00	1 53 08	1 56 30	2 00 07	—76	— 99	3 30
1 52 00	1 55 04	1 58 21	2 01 51	2 05 37	—80	—104	3 45
1 56 26	1 59 37	2 03 01	2 06 40	2 10 34	—83	—108	4 00
2 00 21	2 03 38	2 07 09	2 10 54	2 14 55	—86	—111	4 15
2 03 44	2 07 06	2 10 42	2 14 32	2 18 39	—88	—114	4 30
2 06 34	2 10 00	2 13 40	2 17 35	2 21 47	—90	—116	4 45
2 08 51	2 12 20	2 16 03	2 20 02	2 24 17	—91	—118	5 00
2 10 34	2 14 05	2 17 50	2 21 51	2 26 09	—92	—119	5 15
2 11 42	2 15 14	2 19 01	2 23 04	2 27 23	—93	—120	5 30
2 12 17	2 15 50	2 19 36	2 23 39	2 27 58	—94	—120	5 45
2 12 17	2 15 49	2 19 35	2 23 37	2 27 56	—93	—120	6 00
2 11 44	2 15 14	2 18 59	2 22 59	2 27 15	—93	—119	6 15
2 10 37	2 14 05	2 17 47	2 21 44	2 25 57	—92	—118	6 30
2 08 57	2 12 21	2 16 00	2 19 53	2 24 03	—91	—116	6 45
2 06 44	2 10 05	2 13 39	2 17 27	2 21 32	—89	—114	7 00
2 04 00	2 07 16	2 10 45	2 14 27	2 18 26	—87	—111	7 15
2 00 45	2 03 55	2 07 18	2 10 54	2 14 46	—85	—108	7 30
1 57 00	2 00 04	2 03 20	2 06 49	2 10 32	—82	—104	7 45
1 52 47	1 55 43	1 58 52	2 02 12	2 05 47	—79	—100	8 00
1 48 06	1 50 54	1 53 54	1 57 06	2 00 32	—76	— 96	8 15
1 42 58	1 45 39	1 48 30	1 51 32	1 54 47	—72	— 91	8 30
1 37 26	1 39 57	1 42 39	1 45 31	1 48 35	—68	— 86	8 45
1 31 30	1 33 51	1 36 23	1 39 05	1 41 57	—64	— 80	9 00
1 25 12	1 27 24	1 29 44	1 32 14	1 34 55	—59	— 75	9 15
1 18 34	1 20 36	1 22 45	1 25 03	1 27 30	—55	— 69	9 30
1 11 37	1 13 28	1 15 25	1 17 31	1 19 45	—50	— 63	9 45
1 04 23	1 06 03	1 07 48	1 09 41	1 11 41	—45	— 56	10 00
0 56 54	0 58 22	0 59 55	1 01 34	1 03 20	—40	— 50	10 15
0 49 12	0 50 27	0 51 48	0 53 14	0 54 45	—34	— 43	10 30
0 41 18	0 42 21	0 43 28	0 44 40	0 45 57	—29	— 36	10 45
0 33 14	0 34 05	0 34 59	0 35 57	0 36 59	—23	— 29	11 00
0 25 02	0 25 41	0 26 21	0 27 05	0 27 51	—18	— 22	11 15
0 16 45	0 17 10	0 17 38	0 18 07	0 18 38	—12	— 14	11 30
0 08 23	0 08 36	0 08 50	0 09 04	0 09 20	— 6	— 7	11 45
2 12 21	2 15 54	2 19 40	2 23 43	2 28 02	—93	—120	
h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	s.	s.	
5 52 41	5 52 24	5 52 06	5 51 47	5 51 27	+ 5	+ 7	

TABLE 4.—*Azimuth and apparent altitude of Polaris at different hour angles*—Continued.

Hour angle before or after upper culmination.	Apparent altitude of Polaris, computed for declination 88° 46′ and mean refraction.							Correction for 1′ increase in declination of Polaris.	Hour angle before or after upper culmination.
	Latitude 30°.	Latitude 35°.	Latitude 40°.	Latitude 45°.	Latitude 50°.	Latitude 55°.	Latitude 60°.		
h. m.	° ′	° ′	° ′	° ′	° ′	° ′	° ′	′	*h. m.*
0 00	31 15.6	36 15.3	41 15.1	46 14.9	51 14.8	56 14.6	61 14.5	−1.0	0 00
0 15	31 15.4	36 15.2	41 14.9	46 14.8	51 14.6	56 14.4	61 14.3	−1.0	0 15
0 30	31 14.9	36 14.7	41 14.5	46 14.3	51 14.2	56 14.0	61 13.8	−1.0	0 30
0 45	31 14.2	36 13.9	41 13.7	46 13.5	51 13.3	56 13.2	61 13.0	−1.0	0 45
1 00	31 13.0	35 12.8	41 12.5	46 12.3	51 12.2	56 12.0	61 11.9	−1.0	1 00
1 15	31 11.6	36 11.3	41 11.1	46 10.9	51 10.8	56 10.6	61 10.4	−0.9	1 15
1 30	31 09.9	36 09.6	41 09.4	46 09.2	51 09.0	56 08.8	61 08.6	−0.9	1 30
1 45	31 07.9	36 07.6	41 07.3	46 07.2	51 07.0	56 06.8	61 06.6	−0.9	1 45
2 00	31 05.6	36 05.3	41 05.0	46 04.8	51 04.6	56 04.4	61 04.2	−0.8	2 00
2 15	31 03.0	36 02.7	41 02.4	46 02.2	51 02.0	56 01.8	61 01.6	−0.8	2 15
2 30	31 00.1	35 59.8	40 59.5	45 59.3	50 59.1	55 58.9	60 58.7	−0.8	2 30
2 45	30 57.0	35 56.7	40 56.5	45 56.2	50 56.0	55 55.8	60 55.5	−0.7	2 45
3 00	30 53.7	35 53.4	40 53.1	45 52.9	50 52.6	55 52.3	60 52.1	−0.7	3 00
3 15	30 50.1	35 49.8	40 49.5	45 49.2	50 49.0	55 48.8	60 48.5	−0.6	3 15
3 30	30 46.4	35 46.0	40 45.7	45 45.5	50 45.2	55 45.0	60 44.7	−0.6	3 30
3 45	30 42.4	35 42.1	40 41.8	45 41.5	50 41.3	55 41.0	60 40.7	−0.5	3 45
4 00	30 38.3	35 38.0	40 37.6	45 37.4	50 37.1	55 36.8	60 36.5	−0.5	4 00
4 15	30 34.0	35 33.6	40 33.3	45 33.0	50 32.8	55 32.5	60 32.1	−0.4	4 15
4 30	30 29.6	35 29.2	40 28.9	45 28.5	50 28.3	55 28.0	60 27.6	−0.4	4 30
4 45	30 25.0	35 24.6	40 24.3	45 24.0	50 23.7	55 23.4	60 23.0	−0.3	4 45
5 00	30 20.4	35 20.0	40 19.7	45 19.4	50 19.1	55 18.8	60 18.4	−0.2	5 00
5 15	30 15.6	35 15.3	40 14.9	45 14.6	50 14.3	55 14.0	60 13.6	−0.2	5 15
5 30	30 10.8	35 10.4	40 10.1	45 09.9	50 09.6	55 09.2	60 08.8	−0.1	5 30
5 45	30 06.0	35 05.6	40 05.3	45 05.0	50 04.7	55 04.4	60 04.0	0.0	5 45
6 00	30 01.2	35 00.8	40 00.5	45 00.2	49 59.9	54 59.5	59 59.1	0.0	6 00
6 15	29 56.4	34 56.0	39 55.6	44 55.3	49 55.0	54 54.7	59 54.3	+0.1	6 15
6 30	29 51.6	34 51.2	39 50.8	44 50.5	49 50.2	54 49.9	59 49.6	+0.1	6 30
6 45	29 46.8	34 46.4	39 46.0	44 45.7	49 45.5	54 45.1	59 44.8	+0.2	6 45
7 00	39 42.1	34 41.7	39 41.4	44 41.1	49 40.8	54 40.4	59 40.1	+0.3	7 00
7 15	29 37.5	34 37.1	39 36.8	44 36.4	49 36.2	54 35.8	59 35.4	+0.4	7 15
7 30	29 33.0	34 32.6	39 32.3	44 32.0	49 31.7	54 31.4	59 31.0	+0.4	7 30
7 45	29 28.6	34 28.2	39 27.9	44 27.6	49 27.3	54 27.0	59 26.7	+0.5	7 45
8 00	29 24.4	34 24.0	39 23.7	44 23.4	49 23.1	54 22.8	59 22.5	+0.5	8 00
8 15	29 20.3	34 19.9	39 19.6	44 19.3	49 19.0	54 18.8	59 18.4	+0.6	8 15
8 30	29 16.4	34 16.0	39 15.7	44 15.4	49 15.2	54 14.9	59 14.6	+0.6	8 30
8 45	29 12.7	34 12.3	39 12.0	44 11.7	49 11.5	54 11.2	59 11.0	+0.7	8 45
9 00	29 09.2	34 08.8	39 08.5	44 08.3	49 08.1	54 07.9	59 07.6	+0.7	9 00
9 15	29 05.9	34 05.5	39 05.3	44 05.0	49 04.8	54 04.5	59 04.3	+0.8	9 15
9 30	29 02.8	34 02.5	39 02.2	44 02.0	49 01.8	54 01.5	59 01.3	+0.8	9 30
9 45	29 00.0	33 59.7	38 59.4	43 59.2	48 59.0	53 58.8	58 58.6	+0.8	9 45
10 00	28 57.5	33 57.2	38 56.9	43 56.7	48 56.6	53 56.4	58 56.1	+0.9	10 00
10 15	28 55.3	33 55.0	38 54.7	43 54.5	48 54.3	53 54.1	58 53.9	+0.9	10 15
10 30	28 53.3	33 53.0	38 52.8	43 52.5	48 52.4	53 52.1	58 52.0	+0.9	10 30
10 45	28 51.6	33 51.3	38 51.1	43 50.8	48 50.7	53 50.5	58 50.3	+0.9	10 45
11 00	28 50.2	33 49.9	38 49.7	43 49.5	48 49.4	53 49.1	58 49.0	+1.0	11 00
11 15	28 49.2	33 48.9	38 48.6	43 48.4	48 48.2	53 48.0	58 47.9	+1.0	11 15
11 30	28 48.4	33 48.1	38 47.8	43 47.6	48 47.5	53 47.2	58 47.1	+1.0	11 30
11 45	28 47.9	33 47.6	38 47.4	43 47.1	48 47.0	53 46.8	58 46.7	+1.0	11 45
12 00	28 47.7	33 47.4	38 47.2	43 47.0	48 46.8	53 46.7	58 46.6	+1.0	12 00

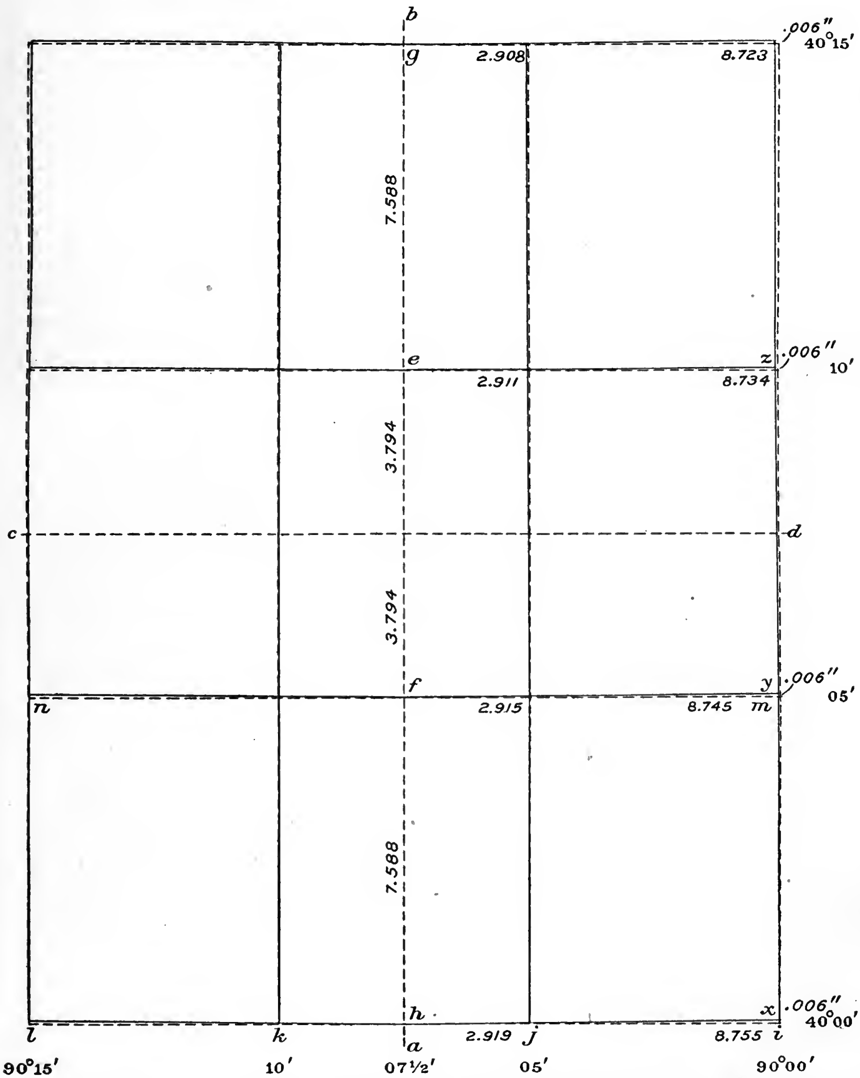

FIG. 7.—Construction of polyconic projection. 15′ of latitude and longitude; scale 1:48000. Construction lines (to be drawn in pencil) dotted; final projection lines full.

EXAMPLE OF USE OF PROJECTION TABLES.

Let it be required to construct a projection for the area between parallels of 40° 00′ and 40° 15′ and meridians 90° 00′ and 90° 15′ on a scale of 1:48000 (4,000 feet=1 inch). For this scale it is customary to show meridians or parallels at intervals of 5 minutes, though any other desired interval may be adopted.

Through the center of the paper (see diagram, fig. 7) draw two fine pencil lines *a-b* and *c-d* exactly perpendicular to each other. The vertical line will be the meridian of 90° 07′ 30″ and the intersection of the horizontal line with the vertical line will be a point on the parallel of 40° 07′ 30″. From the column headed "Meridional distance" Table 9, page 82, opposite 40° in column "Latitude of parallel," take the value of a latitude interval of 5′, which is 7.588 inches; lay off half of this interval or 3.794 inches, on the central meridian above and below the horizontal line; these distances will give points e and f, on the parallels of 40° 10′ and 40° 05′, respectively. The distance, 7.588 inches, laid off above and below the latter points will give points g and h for latitudes 40° 15′ and 40° 00′. Through each of these points draw a line parallel to the horizontal line and perpendicular to the vertical line first drawn.

In a similar manner lay off points on the east and west lines through latitude points 40° (h), and 40° 15′ (g), by measuring from the meridian east and west distances obtained from the columns headed "Abscissas of developed parallel" in Table 9, page 82, for the appropriate latitude and for the longitude intervals of 2½′ and 7½′. Thus, for 40°, the tabular value for 2½′ is 2.919 inches, for 5′ it is 5.837 inches, and for 7½′ it is 8.755 inches. The points so found (i, j, k, l) will be on the meridians of 90° 00′, 90° 05′, 90° 10′, and 90° 15′. Find similar points for latitude 40° 15′, and join corresponding points with light pencil lines. In order to find points on these meridians where each parallel of latitude crosses, take from the columns headed "Ordinates of developed parallel" in Table 9, on the same page, opposite the given latitude 40°, the distance for the "Longitude interval" 2½′ and 7½′ (the value of 2½′ for the 1:48000 scale is inappreciable, being less than 0.001 inch); lay these distances off northward along the meridian from the horizontal lines, giving points x, y, z, etc., on the desired parallels, and through these points draw curved lines concave toward the north. After testing the accuracy of the plotting by comparing the length of the diagonals $f\text{-}i=f\text{-}l$, $h\text{-}m=h\text{-}n$, etc., the projection may be inked in.

In a similar manner projections may be constructed for other scales or areas. Table 7, for the scale of 1:63360 (1 mile to 1 inch), may be used for any even fraction or multiple of a mile. The distance between parallels being found from column "Meridional distance;" distances not given may be found by simple proportion except for "ordinates of developed parallel," which increase as the square of the distance from the central meridian. For scales of any number of thousands of feet to 1 inch, use suitable fractions of the distance given for scale 1:12000 (1,000 feet to 1 inch) in Table 10.

For maps of large areas Table 5 gives the actual or full scale distances in meters. These may be divided by the proper scale ratio and the distances so found platted with a metric scale or reduced to feet by the table on page 268; the X values are the distances from the central horizontal line measured to the north or south, and the corresponding Y values give the offsets northward to points on the curved parallels. The distances measured east and west from the central meridian are those in the part of Table 5 entitled "Arcs of the parallel" (p. 39), each to be taken for the proper latitude. For projections of large extent the meridians differ sensibly from straight lines and they as well as the parallels must be drawn as curves.

TABLE 5.—*For projection of maps of large areas.*

[The ratio of the yard to the meter as stated by Clarke, namely, 1 meter = 1.093623 yards = 39.370432 inches, is that used in the table.]

LENGTHS OF DEGREES OF THE MERIDIAN.

Latitude.	Meters. [a]	Statute miles.	Latitude.	Meters. [a]	Statute miles.
°			°		
0	110,567.2	68.704	45	111,130.9	69.054
1	110,567.6	68.704	46	111,150.6	69.066
2	110,568.6	68.705	47	111,170.4	69.079
3	110,570.3	68.706	48	111,190.1	69.091
4	110,572.7	68.708	49	111,209.7	69.103
5	110,575.8	68.710	50	111,229.3	69.115
6	110,579.5	68.712	51	111,248.7	69.127
7	110,583.9	68.715	52	111,268.0	69.139
8	110,589.0	68.718	53	111,287.1	69.151
9	110,594.7	68.721	54	111,306.0	69.163
10	110,601.1	68.725	55	111,324.8	69.175
11	110,608.1	68.730	56	111,343.3	69.186
12	110,615.8	68.734	57	111,361.5	69.197
13	110,624.1	68.739	58	111,379.5	69.209
14	110,633.0	68.744	59	111,397.2	69.220
15	110,642.5	68.751	60	111,414.5	69.230
16	110,652.6	68.757	61	111,431.5	69.241
17	110,663.3	68.764	62	111,448.2	69.251
18	110,674.5	68.771	63	111,464.4	69.261
19	110,686.3	68.778	64	111,480.3	69.271
20	110,698.7	68.786	65	111,495.7	69.281
21	110,711.6	68.794	66	111,510.7	69.290
22	110,725.0	68.802	67	111,525.3	69.299
23	110,738.8	68.811	68	111,539.3	69.308
24	110,753.2	68.820	69	111,552.9	69.316
25	110,768.0	68.829	70	111,565.9	69.324
26	110,783.3	68.839	71	111,578.4	69.332
27	110,799.0	68.848	72	111,590.4	69.340
28	110,815.1	68.858	73	111,601.8	69.347
29	110,831.6	68.869	74	111,612.7	69.354
30	110,848.5	68.879	75	111,622.9	69.360
31	110,865.7	68.890	76	111,632.6	69.366
32	110,883.2	68.901	77	111,641.6	69.372
33	110,901.1	68.912	78	111,650.0	69.377
34	110,919.2	68.923	79	111,657.8	69.382
35	110,937.6	68.935	80	111,664.9	69.386
36	110,956.2	68.946	81	111,671.4	69.390
37	110,975.1	68.958	82	111,677.2	69.394
38	110,994.1	68.969	83	111,682.4	69.397
39	111,013.3	68.981	84	111,686.9	69.400
40	111,032.7	68.993	85	111,690.7	69.402
41	111,052.2	69.006	86	111,693.8	69.404
42	111,071.7	69.018	87	111,696.2	69.405
43	111,091.4	69.030	88	111,697.9	69.407
44	111,111.1	69.042	89	111,699.0	69.407
45	111,130.9	69.054	90	111,699.3	69.407

[a] These quantities express the number of meters and statute miles contained within an arc of which the degree of latitude named is the middle; thus, the quantity 111,032.7, opposite latitude 40°, is the number of meters between latitude 39° 30′ and latitude 40° 30′.

TABLE 5.—*For projection of maps of large areas*—Continued.

[Extracted from Appendix No. 6, U. S. Coast and Geodetic Survey Report for 1884.]

LENGTHS OF DEGREES OF THE PARALLEL.

Latitude.	Meters.	Statute miles.	Latitude.	Meters.	Statute miles.
°			°		
0	111,321	69.172	45	78,849	48.995
1	111,304	69.162	46	77,466	48.136
2	111,253	69.130	47	76,058	47.261
3	111,169	69.078	48	74,628	46.372
4	111,051	69.005	49	73,174	45.469
5	110,900	68.911	50	71,698	44.552
6	110,715	68.795	51	70,200	43.621
7	110,497	68.660	52	68,680	42.676
8	110,245	68.504	53	67,140	41.719
9	109,959	68.326	54	65,578	40.749
10	109,641	68.129	55	63,996	39.766
11	109,289	67.910	56	62,395	38.771
12	108,904	67.670	57	60,774	37.764
13	108,486	67.410	58	59,135	36.745
14	108,036	67.131	59	57,478	35.716
15	107,553	66.830	60	55,802	34.674
16	107,036	66.510	61	54,110	33.623
17	106,487	66.169	62	52,400	32.560
18	105,906	65.808	63	50,675	31.488
19	105,294	65.427	64	48,934	30.406
20	104,649	65.026	65	47,177	29.315
21	103,972	64.606	66	45,407	28.215
22	103,264	64.166	67	43,622	27.106
23	102,524	63.706	68	41,823	25.988
24	101,754	63.228	69	40,012	24.862
25	100,952	62.729	70	38,188	23.729
26	100,119	62.212	71	36,353	22.589
27	99,257	61.676	72	34,506	21.441
28	98,364	61.122	73	32,648	20.287
29	97,441	60.548	74	30,781	19.127
30	96,488	59.956	75	28,903	17.960
31	95,506	59.345	76	27,017	16.788
32	94,495	58.716	77	25,123	15.611
33	93,455	58.071	78	23,220	14.428
34	92,387	57.407	79	21,311	13.242
35	91,290	56.725	80	19,394	12.051
36	90,166	56.027	81	17,472	10.857
37	89,014	55.311	82	15,545	9.659
38	87,835	54.579	83	13,612	8.458
39	86,629	53.829	84	11,675	7.255
40	85,396	53.063	85	9,735	6.049
41	84,137	52.281	86	7,792	4.842
42	82,853	51.483	87	5,846	3.632
43	81,543	50.669	88	3,898	2.422
44	80,208	49.840	89	1,949	1.211
45	78,849	48.995	90	0	0.000

TABLE 5.—*For projection of maps of large areas*—Continued.

[Extracted from Appendix No. 6, U. S. Coast and Geodetic Survey Report for 1884.]

ARCS OF THE PARALLEL IN METERS.

Latitude.	Value of 1′.	Latitude.	Value of 1′.	Latitude.	Value of 1′.
° ′		° ′		° ′	
24 00	1695.9	33 00	1557.6	42 00	1380.9
10	1693.7	10	1554.7	10	1377.3
20	1691.5	20	1551.7	20	1373.7
30	1689.3	30	1548.7	30	1370.0
40	1687.0	40	1545.8	40	1366.4
50	1684.8	50	1542.8	50	1362.7
25 00	1682.5	34 00	1539.8	43 00	1359.1
10	1680.3	10	1536.8	10	1355.4
20	1678.0	20	1533.7	20	1351.7
30	1675.7	30	1530.7	30	1348.0
40	1673.3	40	1527.6	40	1344.3
50	1671.0	50	1524.6	50	1340.5
26 00	1668.7	35 00	1521.5	44 00	1336.8
10	1666.3	10	1518.4	10	1333.1
20	1663.9	20	1515.3	20	1329.3
30	1661.5	30	1512.2	30	1325.5
40	1659.1	40	1509.1	40	1321.7
50	1656.7	50	1505.9	50	1318.0
27 00	1654.3	36 00	1502.8	45 00	1314.2
10	1651.8	10	1499.6	10	1310.3
20	1649.4	20	1496.4	20	1306.5
30	1646.9	30	1493.2	30	1302.7
40	1644.4	40	1490.0	40	1298.8
50	1641.9	50	1486.8	50	1295.0
28 00	1639.4	37 00	1483.6	46 00	1291.0
10	1636.9	10	1480.3	10	1287.2
20	1634.3	20	1477.1	20	1283.3
30	1631.8	30	1473.8	30	1279.4
40	1629.2	40	1470.5	40	1275.5
50	1626.6	50	1467.2	50	1271.6
29 00	1624.0	38 00	1463.9	47 00	1267.6
10	1621.4	10	1460.6	10	1263.7
20	1618.8	20	1457.3	20	1259.7
30	1616.1	30	1453.9	30	1255.8
40	1613.5	40	1450.6	40	1251.8
50	1610.8	50	1447.2	50	1247.8
30 00	1608.1	39 00	1443.8	48 00	1243.8
10	1605.4	10	1440.4	10	1239.8
20	1602.7	20	1437.0	20	1235.8
30	1600.0	30	1433.6	30	1231.7
40	1597.3	40	1430.2	40	1227.7
50	1594.5	50	1426.7	50	1223.6
31 00	1591.8	40 00	1423.3	49 00	1219.6
10	1589.0	10	1419.8	10	1215.5
20	1586.2	20	1416.3	20	1211.4
30	1583.4	30	1412.8	30	1207.3
40	1580.6	40	1409.3	40	1203.2
50	1577.8	50	1405.8	50	1199.1
32 00	1574.9	41 00	1402.3	50 00	1195.0
10	1572.1	10	1398.8	10	1190.8
20	1569.2	20	1395.2	20	1186.7
30	1566.3	30	1391.6	30	1182.5
40	1563.4	40	1388.1	40	1178.4
50	1560.5	50	1384.5	50	1174.2

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.

Latitude 24°.			Latitude 25°.			Latitude 26°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	101,753	361	1 00	100,951	372	1 00	100,118	383
2 00	203,500	1,445	2 00	201,896	1,489	2 00	200,231	1,532
3 00	305,237	3,250	3 00	302,831	3,351	3 00	300,332	3,447
4 00	406,959	5,778	4 00	403,749	5,957	4 00	400,416	6,128
5 00	508,660	9,028	5 00	504,645	9,307	5 00	500,476	9,574
6 00	610,336	13,001	6 00	605,514	13,401	6 00	600,506	13,786
7 00	711,981	17,695	7 00	706,349	18,239	7 00	700,501	18,763
8 00	813,590	23,109	8 00	807,146	23,821	8 00	800,456	24,505
9 00	915,159	29,245	9 00	907,899	30,146	9 00	900,364	31,011
10 00	1,016,681	36,102	10 00	1,008,603	37,215	10 00	1,000,218	38,282
11 00	1,118,152	43,679	11 00	1,109,252	45,026	11 00	1,100,015	46,316
12 00	1,219,566	51,977	12 00	1,209,841	53,578	12 00	1,199,747	55,114
13 00	1,320,919	60,994	13 00	1,310,364	62,873	13 00	1,299,409	64,675
14 00	1,422,205	70,731	14 00	1,410,815	72,909	14 00	1,398,994	74,998
15 00	1,523,420	81,186	15 00	1,511,190	83,685	15 00	1,498,498	86,082
16 00	1,624,558	92,360	16 00	1,611,483	95,202	16 00	1,597,914	97,928
17 00	1,725,614	104,251	17 00	1,711,688	107,458	17 00	1,697,237	110,534
18 00	1,826,583	116,859	18 00	1,811,800	120,453	18 00	1,796,460	123,899
19 00	1,927,460	130,184	19 00	1,911,813	134,186	19 00	1,895,578	138,023
20 00	2,028,240	144,225	20 00	2,011,722	148,656	20 00	1,994,585	152,905
21 00	2,128,918	158,981	21 00	2,111,522	163,862	21 00	2,093,475	168,544
22 00	2,229,488	174,451	22 00	2,211,207	179,805	22 00	2,192,243	184,939
23 00	2,329,946	190,634	23 00	2,310,771	196,482	23 00	2,290,882	202,089
24 00	2,430,287	207,530	24 00	2,410,210	213,894	24 00	2,389,387	219,993
25 00	2,530,505	225,138	25 00	2,509,518	232,038	25 00	2,487,753	238,650
26 00	2,630,596	243,458	26 00	2,608,689	250,914	26 00	2,585,973	258,061
27 00	2,730,554	262,487	27 00	2,707,718	270,521	27 00	2,684,042	278,222
28 00	2,830,374	282,225	28 00	2,806,600	290,859	28 00	2,781,953	299,132
29 00	2,930,052	302,671	29 00	2,905,329	311,925	29 00	2,879,702	320,788
30 00	3,029,582	323,825	30 00	3,003,900	333,718	30 00	2,977,281	343,197

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.								
Latitude 27°.			Latitude 28°.			Latitude 29°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	99,256	393	1 00	98,363	403	1 00	97,439	412
2 00	198,505	1,573	2 00	196,719	1,612	2 00	194,872	1,649
3 00	297,742	3,539	3 00	295,062	3,627	3 00	292,291	3,710
4 00	396,960	6,291	4 00	393,385	6,447	4 00	389,689	6,595
5 00	496,154	9,829	5 00	491,682	10,073	5 00	487,059	10,305
6 00	595,316	14,154	6 00	589,945	14,505	6 00	584,394	14,838
7 00	694,440	19,264	7 00	688,168	19,741	7 00	681,687	20,194
8 00	793,522	25,159	8 00	786,347	25,782	8 00	778,931	26,374
9 00	892,554	31,839	9 00	884,472	32,627	9 00	876,120	33,376
10 00	991,529	39,303	10 00	982,537	40,276	10 00	973,246	41,199
11 00	1,090,442	47,551	11 00	1,080,537	48,728	11 00	1,070,302	49,845
12 00	1,189,287	56,583	12 00	1,178,464	57,983	12 00	1,167,282	59,313
13 00	1,288,057	66,398	13 00	1,276,312	68,040	13 00	1,264,178	69,601
14 00	1,386,746	76,995	14 00	1,374,075	78,899	14 00	1,360,983	80,706
15 00	1,485,348	88,374	15 00	1,471,745	90,558	15 00	1,457,691	92,631
16 00	1,583,857	100,534	16 00	1,569,315	103,017	16 00	1,554,295	105,375
17 00	1,682,267	113,474	17 00	1,666,781	116,275	17 00	1,650,787	118,935
18 00	1,780,570	127,193	18 00	1,764,135	130,331	18 00	1,747,161	133,311
19 00	1,878,762	141,690	19 00	1,861,371	145,185	19 00	1,843,410	148,502
20 00	1,976,836	156,966	20 00	1,958,481	160,835	20 00	1,939,527	164,506
21 00	2,074,786	173,018	21 00	2,055,460	177,280	21 00	2,035,505	181,324
22 00	2,172,606	189,845	22 00	2,152,302	194,518	22 00	2,131,338	198,953
23 00	2,270,289	207,447	23 00	2,248,998	212,550	23 00	2,227,020	217,392
24 00	2,367,830	225,823	24 00	2,345,544	231,374	24 00	2,322,539	236,640
25 00	2,465,222	244,970	25 00	2,441,932	250,988	25 00	2,417,893	256,695
26 00	2,562,459	264,889	26 00	2,538,156	271,391	26 00	2,513,074	277,558
27 00	2,659,535	285,577	27 00	2,634,210	292,582	27 00	2,608,075	299,224
28 00	2,756,445	307,035	28 00	2,730,087	314,559	28 00	2,702,890	321,694
29 00	2,853,181	329,259	29 00	2,825,779	337,321	29 00	2,797,511	344,964
30 00	2,949,739	352,249	30 00	2,921,284	360,866	30 00	2,891,931	369,036

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.								
Latitude 30°.			Latitude 31°.			Latitude 32°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	96,487	421	1 00	95,505	429	1 00	94,494	437
2 00	192,967	1,684	2 00	191,002	1,717	2 00	188,980	1,748
3 00	289,432	3,789	3 00	286,484	3,863	3 00	283,449	3,933
4 00	385,875	6,735	4 00	381,943	6,867	4 00	377,894	6,991
5 00	482,288	10,523	5 00	477,371	10,729	5 00	472,307	10,922
6 00	578,665	15,153	6 00	572,760	15,450	6 00	566,680	15,727
7 00	674,998	20,623	7 00	668,103	21,027	7 00	661,004	21,404
8 00	771,279	26,934	8 00	763,392	27,461	8 00	755,272	27,954
9 00	867,502	34,084	9 00	858,619	34,751	9 00	849,475	35,375
10 00	963,658	42,074	10 00	953,777	42,897	10 00	943,605	43,667
11 00	1,059,741	50,903	11 00	1,048,858	51,898	11 00	1,037,655	52,829
12 00	1,155,744	60,570	12 00	1,143,854	61,753	12 00	1,131,616	62,861
13 00	1,251,658	71,074	13 00	1,238,758	72,462	13 00	1,225,480	73,761
14 00	1,347,477	82,415	14 00	1,333,561	84,024	14 00	1,319,239	85,529
15 00	1,443,193	94,591	15 00	1,428,257	96,437	15 00	1,412,885	98,164
16 00	1,538,800	107,603	16 00	1,522,837	109,701	16 00	1,506,411	111,664
17 00	1,634,290	121,449	17 00	1,617,294	123,815	17 00	1,599,808	126,029
18 00	1,729,654	136,127	18 00	1,711,621	138,777	18 00	1,693,067	141,256
19 00	1,824,887	151,637	19 00	1,805,810	154,586	19 00	1,786,182	157,346
20 00	1,919,982	167,977	20 00	1,899,852	171,241	20 00	1,879,144	174,296
21 00	2,014,930	185,147	21 00	1,993,740	188,741	21 00	1,971,946	192,105
22 00	2,109,725	203,143	22 00	2,087,468	207,085	22 00	2,064,579	210,772
23 00	2,204,359	221,966	23 00	2,181,027	226,270	23 00	2,157,035	230,295
24 00	2,298,825	241,616	24 00	2,274,411	246,295	24 00	2,249,305	250,672
25 00	2,393,116	262,089	25 00	2,367,610	267,159	25 00	2,341,385	271,901
26 00	2,487,224	283,383	26 00	2,460,618	288,860	26 00	2,433,264	293,981
27 00	2,581,144	305,498	27 00	2,553,427	311,396	27 00	2,524,935	316,910
28 00	2,674,867	328,432	28 00	2,646,029	334,765	28 00	2,616,390	340,686
29 00	2,768,385	352,183	29 00	2,738,418	358,966	29 00	2,707,621	365,307
30 00	2,861,694	376,749	30 00	2,830,585	383,997	30 00	2,798,621	390,770

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.

Latitude 33°.			Latitude 34°.			Latitude 35°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	93,454	444	1 00	92,385	451	1 00	91,289	457
2 00	186,899	1,777	2 00	184,762	1,803	2 00	182,568	1,828
3 00	280,328	3,997	3 00	277,121	4,057	3 00	273,830	4,112
4 00	373,731	7,106	4 00	369,454	7,212	4 00	365,064	7,310
5 00	467,100	11,102	5 00	461,751	11,268	5 00	456,261	11,421
6 00	560,428	15,986	6 00	554,004	16,225	6 00	547,412	16,445
7 00	653,704	21,757	7 00	646,205	22,082	7 00	638,509	22,381
8 00	746,922	28,414	8 00	738,344	28,839	8 00	729,542	29,229
9 00	840,072	35,957	9 00	830,413	36,494	9 00	820,501	36,987
10 00	933,146	44,385	10 00	922,403	45,048	10 00	911,379	45,656
11 00	1,026,136	53,697	11 00	1,014,305	54,499	11 00	1,002,165	55,234
12 00	1,119,033	63,893	12 00	1,106,110	64,846	12 00	1,092,850	65,721
13 00	1,211,829	74,971	13 00	1,197,809	76,089	13 00	1,183,426	77,115
14 00	1,304,515	86,931	14 00	1,289,395	88,227	14 00	1,273,884	89,415
15 00	1,397,083	99,771	15 00	1,380,858	101,258	15 00	1,364,214	102,619
16 00	1,489,526	113,491	16 00	1,472,190	115,180	16 00	1,454,407	116,728
17 00	1,581,834	128,089	17 00	1,563,381	129,993	17 00	1,544,454	131,738
18 00	1,673,998	143,564	18 00	1,654,423	145,696	18 00	1,634,347	147,650
19 00	1,766,011	159,914	19 00	1,745,308	162,287	19 00	1,724,076	164,460
20 00	1,857,866	177,138	20 00	1,836,026	179,763	20 00	1,813,632	182,168
21 00	1,949,553	195,234	21 00	1,926,569	198,124	21 00	1,903,006	200,772
22 00	2,041,062	214,201	22 00	2,016,929	217,368	22 00	1,992,190	220,268
23 00	2,132,387	234,037	23 00	2,107,097	237,493	23 00	2,081,174	240,657
24 00	2,223,521	254,740	24 00	2,197,065	258,497	24 00	2,169,949	261,936
25 00	2,314,453	276,309	25 00	2,286,823	230,378	25 00	2,258,507	284,102
26 00	2,405,175	298,741	26 00	2,376,363	303,134	26 00	2,346,838	307,154
27 00	2,495,680	322,034	27 00	2,465,677	326,763	27 00	2,434,934	331,089
28 00	2,585,961	346,187	28 00	2,554,756	351,262	28 00	2,522,787	355,905
29 00	2,676,007	371,197	29 00	2,643,591	376,629	29 00	2,610,386	381,598
30 00	2,765,812	397,061	30 00	2,732,175	402,863	30 00	2,697,724	408,168

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y meters.								
Latitude 36°.			Latitude 37°.			Latitude 38°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	90,164	462	1 00	89,012	467	1 00	87,833	472
2 00	180,319	1,850	2 00	178,015	1,870	2 00	175,656	1,888
3 00	270,455	4,162	3 00	266,997	4,207	3 00	263,458	4,247
4 00	360,562	7,399	4 00	355,951	7,479	4 00	351,230	7,549
5 00	450,631	11,560	5 00	444,865	11,685	5 00	438,962	11,795
6 00	540,653	16,645	6 00	533,730	16,824	6 00	526,643	16,983
7 00	630,618	22,652	7 00	622,536	22,896	7 00	614,263	23,112
8 00	720,517	29,583	8 00	711,273	29,901	8 00	701,812	30,183
9 00	810,340	37,435	9 00	799,932	37,838	9 00	789,280	38,195
10 00	900,078	46,209	10 00	888,503	46,706	10 00	876,657	47,145
11 00	989,720	55,903	11 00	976,975	56,503	11 00	963,933	57,034
12 00	1,079,259	66,515	12 00	1,065,340	67,229	12 00	1,051,098	67,860
13 00	1,168,684	78,046	13 00	1,153,587	78,882	13 00	1,138,141	79,622
14 00	1,257,987	90,494	14 00	1,241,707	91,462	14 00	1,225,053	92,319
15 00	1,347,156	103,856	15 00	1,329,690	104,967	15 00	1,311,823	105,949
16 00	1,436,184	118,133	16 00	1,417,526	119,395	16 00	1,398,441	120,511
17 00	1,525,061	133,323	17 00	1,505,206	134,745	17 00	1,484,899	136,002
18 00	1,613,777	149,423	18 00	1,592,721	151,015	18 00	1,571,185	152,421
19 00	1,702,324	166,433	19 00	1,680,059	168,203	19 00	1,657,289	169,767
20 00	1,790,691	184,350	20 00	1,767,211	186,307	20 00	1,743,202	188,037
21 00	1,878,870	203,173	21 00	1,854,169	205,326	21 00	1,828,914	207,229
22 00	1,966,851	222,899	22 00	1,940,922	225,258	22 00	1,914,415	227,341
23 00	2,054,625	243,527	23 00	2,027,462	246,099	23 00	1,999,694	248,370
24 00	2,142,183	265,055	24 00	2,113,777	267,849	24 00	2,084,743	270,315
25 00	2,229,516	287,479	25 00	2,199,860	290,503	25 00	2,169,551	293,172
26 00	2,316,613	310,798	26 00	2,285,699	314,061	26 00	2,254,109	316,939
27 00	2,403,467	335,009	27 00	2,371,287	338,519	27 00	2,338,406	341,613
28 00	2,490,068	360,111	28 00	2,456,612	363,874	28 00	2,422,433	367,192
29 00	2,576,407	386,099	29 00	2,541,667	390,125	29 00	2,506,181	393,672
30 00	2,662,475	412,971	30 00	2,626,441	417,267	30 00	2,589,639	421,050

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.								
Latitude 39°.			Latitude 40°.			Latitude 41°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	86,627	476	1 00	85,394	479	1 00	84,136	482
2 00	173,243	1,903	2 00	170,778	1,916	2 00	168,260	1,927
3 00	259,859	4,281	3 00	256,140	4,311	3 00	252,363	4,335
4 00	346,403	7,611	4 00	341,470	7,663	4 00	336,432	7,706
5 00	432,925	11,891	5 00	426,757	11,972	5 00	420,457	12,039
6 00	519,396	17,121	6 00	511,990	17,238	6 00	504,428	17,335
7 00	605,803	23,300	7 00	597,158	23,460	7 00	588,332	23,591
8 00	692,138	30,428	8 00	682,252	30,637	8 00	672,159	30,807
9 00	778,388	38,504	9 00	767,260	38,768	9 00	755,897	38,983
10 00	864,545	47,527	10 00	852,171	47,852	10 00	839,537	48,118
11 00	950,598	57,496	11 00	936,975	57,888	11 00	923,067	58,209
12 00	1,036,536	68,409	12 00	1,021,661	68,875	12 00	1,006,475	69,256
13 00	1,122,349	80,266	13 00	1,106,218	80,811	13 00	1,089,752	81,258
14 00	1,208,027	93,064	14 00	1,190,636	93,695	14 00	1,172,886	94,212
15 00	1,293,559	106,802	15 00	1,274,904	107,525	15 00	1,255,866	108,117
16 00	1,378,934	121,479	16 00	1,359,012	122,300	16 00	1,338,681	122,971
17 00	1,464,144	137,093	17 00	1,442,949	138,017	17 00	1,421,321	138,773
18 00	1,549,177	153,642	18 00	1,526,704	154,675	18 00	1,503,775	155,520
19 00	1,634,023	171,124	19 00	1,610,267	172,272	19 00	1,586,031	173,210
20 00	1,718,671	189,537	20 00	1,693,628	190,805	20 00	1,668,079	191,841
21 00	1,803,113	208,878	21 00	1,776,775	210,272	21 00	1,749,909	211,409
22 00	1,887,337	229,146	22 00	1,859,698	230,671	22 00	1,831,509	231,914
23 00	1,971,333	250,337	23 00	1,942,387	251,998	23 00	1,912,869	253,352
24 00	2,055,091	272,450	24 00	2,024,833	274,252	24 00	1,993,978	275,719
25 00	2,138,602	295,481	25 00	2,107,023	297,430	25 00	2,074,826	299,014
26 00	2,221,854	319,429	26 00	2,188,948	321,528	26 00	2,155,402	323,233
27 00	2,304,838	344,289	27 00	2,270,597	346,543	27 00	2,235,695	348,374
28 00	2,387,545	370,059	28 00	2,351,961	372,473	28 00	2,315,695	374,432
29 00	2,469,963	396,736	29 00	2,433,029	399,314	29 00	2,395,392	401,404
30 00	2,552,084	424,317	30 00	2,513,790	427,063	30 00	2,474,774	429,287

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.								
Latitude 42°.			Latitude 43°.			Latitude 44°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	82,851	484	1 00	81,541	485	1 00	80,206	486
2 00	165,691	1,935	2 00	163,071	1,941	2 00	160,401	1,945
3 00	248,508	4,354	3 00	244,578	4,367	3 00	240,572	4,375
4 00	331,292	7,739	4 00	326,050	7,763	4 00	320,708	7,778
5 00	414,030	12,092	5 00	407,476	12,129	5 00	400,797	12,152
6 00	496,712	17,410	6 00	488,844	17,464	6 00	480,827	17,496
7 00	579,325	23,693	7 00	570,143	23,766	7 00	560,786	23,811
8 00	661,861	30,941	8 00	651,361	31,036	8 00	640,662	31,094
9 00	744,305	39,152	9 00	732,486	39,272	9 00	720,445	39,345
10 00	826,648	48,325	10 00	813,508	48,474	10 00	800,122	48,563
11 00	908,879	58,459	11 00	894,415	58,639	11 00	879,681	58,746
12 00	990,985	69,553	12 00	975,195	69,766	12 00	959,110	69,893
13 00	1,072,956	81,605	13 00	1,055,837	81,854	13 00	1,038,399	82,002
14 00	1,154,781	94,614	14 00	1,136,329	94,901	14 00	1,117,535	95,072
15 00	1,236,449	108,577	15 00	1,216,661	108,905	15 00	1,196,507	109,100
16 00	1,317,948	123,493	16 00	1,296,820	123,864	16 00	1,275,303	124,084
17 00	1,399,267	139,360	17 00	1,376,795	139,777	17 00	1,353,911	140,023
18 00	1,480,395	156,175	18 00	1,456,575	156,640	18 00	1,432,320	156,913
19 00	1,561,321	173,937	19 00	1,536,148	174,451	19 00	1,510,519	174,753
20 00	1,642,035	192,642	20 00	1,615,505	193,209	20 00	1,588,496	193,540
21 00	1,722,524	212,289	21 00	1,694,632	212,909	21 00	1,666,240	213,270
22 00	1,802,779	232,874	22 00	1,773,519	233,551	22 00	1,743,738	233,942
23 00	1,882,788	254,396	23 00	1,852,155	255,129	23 00	1,820,980	255,552
24 00	1,962,540	276,850	24 00	1,930,528	277,642	24 00	1,897,955	278,096
25 00	2,042,024	300,234	25 00	2,008,628	301,087	25 00	1,974,650	301,572
26 00	2,121,230	324,544	26 00	2,086,443	325,459	26 00	2,051,055	325,977
27 00	2,200,146	349,778	27 00	2,163,963	350,750	27 00	2,127,159	351,306
28 00	2,278,762	375,932	28 00	2,241,176	376,974	28 00	2,202,950	377,555
29 00	2,357,067	403,002	29 00	2,318,071	404,109	29 00	2,278,417	404,722
30 00	2,435,052	430,985	30 00	2,394,639	432,157	30 00	2,353,550	432,801

Table 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.								
Latitude 45°.			Latitude 46°.			Latitude 47°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	78,847	486	1 00	77,464	486	1 00	76,056	485
2 00	157,682	1,946	2 00	154,915	1,945	2 00	152,100	1,942
3 00	236,493	4,378	3 00	232,342	4,376	3 00	228,119	4,368
4 00	315,269	7,783	4 00	309,732	7,779	4 00	304,101	7,765
5 00	393,996	12,160	5 00	387,074	12,153	5 00	380,034	12,131
6 00	472,663	17,508	6 00	464,354	17,498	6 00	455,904	17,467
7 00	551,258	23,826	7 00	541,562	23,813	7 00	531,700	23,770
8 00	629,769	31,114	8 00	618,684	31,096	8 00	607,410	31,040
9 00	708,184	39,370	9 00	695,708	39,347	9 00	683,020	39,276
10 00	786,492	48,594	10 00	772,623	48,565	10 00	758,520	48,477
11 00	864,679	58,782	11 00	849,416	58,747	11 00	833,895	58,640
12 00	942,735	69,936	12 00	926,075	69,893	12 00	909,135	69,765
13 00	1,020,647	82,051	13 00	1,002,588	82,000	13 00	984,227	81,849
14 00	1,098,404	95,127	14 00	1,078,943	95,067	14 00	1,059,158	94,890
15 00	1,175,994	109,162	15 00	1,155,128	109,091	15 00	1,133,917	108,887
16 00	1,253,404	124,153	15 00	1,231,131	124,071	16 00	1,208,491	123,837
17 00	1,330,624	140,099	17 00	1,306,940	140,003	17 00	1,282,868	139,738
18 00	1,407,640	156,996	18 00	1,382,543	156,887	18 00	1,357,036	156,587
19 00	1,484,443	174,842	19 00	1,457,928	174,718	19 00	1,430,984	174,381
20 00	1,561,019	193,635	20 00	1,533,083	193,494	20 00	1,504,697	193,118
21 00	1,637,358	213,371	21 00	1,607,997	213,212	21 00	1,578,166	212,793
22 00	1,713,447	234,048	22 00	1,682,657	233,869	22 00	1,651,377	233,405
23 00	1,789,276	255,663	23 00	1,757,052	255,462	23 00	1,724,320	254,950
24 00	1,864,831	278,211	24 00	1,831,170	277,987	24 00	1,796,982	277,425
25 00	1,940,103	301,690	25 00	1,904,999	301,441	25 00	1,869,351	300,824
26 00	2,015,079	326,097	26 00	1,978,528	325,820	26 00	1,941,415	325,146
27 00	2,089,749	351,427	27 00	2,051,745	351,120	27 00	2,013,163	350,386
28 00	2,164,100	377,676	28 00	2,124,639	377,337	28 00	2,084,583	376,539
29 00	2,238,121	404,841	29 00	2,197,197	404,468	29 00	2,155,663	403,602
30 00	2,311,802	432,918	30 00	2,269,410	432,507	30 00	2,226,392	431,569

TABLE 5.—*For projections of maps of large areas*—Continued.

COORDINATES OF CURVATURE.

Natural scale.—Values of X and Y in meters.

Latitude 48°.			Latitude 49°.			Latitude 50°.		
Longitude.	X	Y	Longitude.	X	Y	Longitude.	X	Y
° ′			° ′			° ′		
1 00	74,626	484	1 00	73,172	482	1 00	71,696	479
2 00	149,239	1,936	2 00	146,331	1,928	2 00	143,379	1,917
3 00	223,827	4,355	3 00	219,465	4,337	3 00	215,037	4,313
4 00	298,377	7,742	4 00	292,561	7,709	4 00	286,656	7,667
5 00	372,877	12,095	5 00	365,606	12,044	5 00	358,224	11,978
6 00	447,314	17,414	6 00	438,588	17,340	6 00	429,727	17,246
7 00	521,677	23,698	7 00	511,493	23,598	7 00	501,154	23,469
8 00	595,951	30,946	8 00	584,310	30,815	8 00	572,492	30,646
9 00	670,125	39,157	9 00	657,026	38,991	9 00	643,727	38,777
10 00	744,186	48,329	10 00	729,627	48,123	10 00	714,847	47,859
11 00	818,123	58,461	11 00	802,102	58,212	11 00	785,839	57,891
12 00	891,921	69,552	12 00	874,438	69,254	12 00	856,691	68,872
13 00	965,570	81,598	13 00	946,622	81,248	13 00	927,389	80,798
14 00	1,039,056	94,598	14 00	1,018,642	94,191	14 00	997,922	93,669
15 00	1,112,367	108,551	15 00	1,090,485	108,082	15 00	1,068,277	107,482
16 00	1,185,491	123,453	16 00	1,162,138	122,918	16 00	1,138,440	122,234
17 00	1,258,416	139,302	17 00	1,233,591	138,697	17 00	1,208,400	137,923
18 00	1,331,129	156,096	18 00	1,304,829	155,416	18 00	1,278,144	154,546
19 00	1,403,618	173,832	19 00	1,375,840	173,071	19 00	1,347,660	172,099
20 00	1,475,871	192,506	20 00	1,446,613	191,660	20 00	1,416,934	190,581
21 00	1,547,876	212,116	21 00	1,517,135	211,180	21 00	1,485,956	209,987
22 00	1,619,620	232,658	22 00	1,587,394	231,627	22 00	1,554,711	230,314
23 00	1,691,091	254,128	23 00	1,657,378	252,998	23 00	1,623,189	251,559
24 00	1,762,279	276,524	24 00	1,727,073	275,288	24 00	1,691,377	273,717
25 00	1,833,170	299,842	25 00	1,796,470	298,495	25 00	1,759,262	296,785
26 00	1,903,752	324,077	26 00	1,865,554	322,614	26 00	1,826,833	320,758
27 00	1,974,015	349,225	27 00	1,934,315	347,640	27 00	1,894,077	345,633
28 00	2,043,945	375,283	28 00	2,002,740	373,570	28 00	1,960,983	371,404
29 00	2,113,531	402,245	29 00	2,070,817	400,399	29 00	2,027,538	398,068
30 00	2,182,762	430,107	30 00	2,138,536	428,123	30 00	2,093,731	425,619

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$).*

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel.					
		5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
0 00	....	2.922	5.844	8.765	11.687	14.609	17.531
10	5.804	2.922	5.843	8.765	11.687	14.608	17.530
20	11.608	2.922	5.843	8.765	11.686	14.608	17.530
30	17.412	2.922	5.843	8.765	11.686	14.608	17.530
40	23.216	2.922	5.843	8.764	11.686	14.608	17.529
50	29.020	2.921	5.843	8.764	11.686	14.607	17.528
1 00	....	2.921	5.843	8.764	11.685	14.606	17.528
10	5.840	2.921	5.842	8.763	11.684	14.606	17.527
20	11.608	2.921	5.842	8.763	11.684	14.604	17.525
30	17.412	2.921	5.841	8.762	11.683	14.604	17.524
40	23.216	2.920	5.841	8.761	11.682	14.602	17.522
50	29.020	2.920	5.840	8.761	11.681	14.601	17.521
2 00	....	2.920	5.840	8.760	11.680	14.600	17.520
10	5.804	2.920	5.839	8.759	11.678	14.598	17.518
20	11.608	2.919	5.839	8.758	11.677	14.596	17.516
30	17.412	2.919	5.838	8.757	11.676	14.594	17.513
40	23.216	2.918	5.837	8.756	11.674	14.592	17.511
50	29.020	2.918	5.836	8.755	11.673	14.591	17.509
3 00	....	2.918	5.836	8.753	11.671	14.589	17.507
10	5.804	2.917	5.835	8.752	11.669	14.586	17.504
20	11.608	2.917	5.834	8.750	11.667	14.584	17.501
30	17.413	2.916	5.832	8.749	11.665	14.581	17.497
40	23.217	2.916	5.831	8.747	11.663	14.578	17.494
50	29.021	2.915	5.830	8.746	11.661	14.576	17.491
4 00	....	2.915	5.829	8.744	11.659	14.574	17.488
10	5.804	2.914	5.828	8.742	11.656	14.570	17.484
20	11.609	2.913	5.827	8.740	11.654	14.567	17.480
30	17.413	2.913	5.825	8.738	11.651	14.564	17.476
40	23.217	2.912	5.824	8.736	11.648	14.560	17.473
50	29.022	2.911	5.823	8.734	11.646	14.557	17.468
5 00	....	2.911	5.822	8.732	11.643	14.554	17.465
10	5.804	2.910	5.820	8.730	11.640	14.550	17.459
20	11.609	2.909	5.818	8.727	11.636	14.546	17.455
30	17.414	2.908	5.817	8.725	11.633	14.542	17.450
40	23.218	2.908	5.815	8.722	11.630	14.538	17.445
50	29.022	2.907	5.813	8.720	11.627	14.534	17.440
6 00	....	2.906	5.812	8.718	11.624	14.530	17.435
10	5.805	2.905	5.810	8.715	11.620	14.524	17.429
20	11.609	2.904	5.808	8.712	11.616	14.520	17.424
30	17.414	2.903	5.806	8.709	11.612	14.515	17.418
40	23.219	2.902	5.804	8.706	11.608	14.510	17.413
50	29.024	2.901	5.802	8.703	11.604	14.506	17.407
7 00	....	2.900	5.800	8.701	11.601	14.501	17.401
10	5.805	2.899	5.798	8.697	11.596	14.496	17.395
20	11.610	2.898	5.796	8.694	11.592	14.490	17.387
30	17.415	2.897	5.794	8.690	11.587	14.484	17 381
40	23.220	2.896	5.791	8.687	11.583	14.478	17.374
50	29.025	2.895	5.789	8.684	11.578	14.473	17.368
8 00	....	2.894	5.787	8.680	11.574	14.468	17.361

Ordinates of developed parallel.		
Longitude interval.	0°	1°
′	*Inches.*	*Inches.*
5	0.000	0.000
10	.000	.000
15	.000	.000
20	.000	.001
25	.000	.001
30	.000	.001
	2°	3°
5	0.000	0.000
10	.000	.000
15	.001	.001
20	.001	.002
25	.002	.003
30	.003	.004
	4°	5°
5	0.000	0.000
10	.001	.001
15	.001	.002
20	.002	.003
25	.004	.005
30	.005	.007
	6°	7°
5	0.000	0.000
10	.001	.001
15	.002	.002
20	.004	.004
25	.006	.006
30	.008	.009
	8°	
5	0.000	
10	.001	
15	.003	
20	.005	
25	.007	
30	.010	

TABLE 6.—*Coordinates for projection of maps* (*scale* $\frac{1}{125000}$)—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
8 00	....	2.894	5.787	8.680	11.574	14.468	17.361
10	5.805	2.892	5.784	8.677	11.569	14.461	17.353
20	11.610	2.891	5.782	8.673	11.564	14.455	17.346
30	17.416	2.890	5.779	8.669	11.559	14.448	17.338
40	23.221	2.888	5.777	8.666	11.554	14.442	17.331
50	29.026	2.887	5.775	8.662	11.549	14.436	17.324
9 00	....	2.886	5.772	8.658	11.544	14.430	17.317
10	5.806	2.885	5.769	8.654	11.539	14.424	17.308
20	11.611	2.883	5.767	8.650	11.533	14.416	17.300
30	17.417	2.882	5.764	8.646	11.528	14.410	17.291
40	23.222	2.881	5.761	8.642	11.522	14.402	17.283
50	29.028	2.879	5.758	8.637	11.516	14.396	17.275
10 00	....	2.878	5.755	8.633	11.511	14.388	17.266
10	5.806	2.876	5.752	8.628	11.504	14.380	17.257
20	11.612	2.875	5.749	8.624	11.498	14.373	17.248
30	17.417	2.873	5.746	8.619	11.492	14.366	17.239
40	23.223	2.872	5.743	8.614	11.486	14.358	17.229
50	29.029	2.870	5.740	8.610	11.480	14.350	17.220
11 00	....	2.869	5.737	8.606	11.474	14.342	17.211
10	5.806	2.867	5.734	8.601	11.468	14.334	17.201
20	11.612	2.865	5.730	8.596	11.461	14.326	17.191
30	17.419	2.864	5.727	8.590	11.454	14.318	17.181
40	23.225	2.862	5.724	8.585	11.447	14.309	17.171
50	29.031	2.860	5.720	8.580	11.440	14.300	17.161
12 00	....	2.858	5.717	8.575	11.434	14.292	17.150
10	5.807	2.857	5.713	8.570	11.426	14.282	17.139
20	11.613	2.855	5.709	8.564	11.419	14.274	17.128
30	17.420	2.853	5.706	8.559	11.412	14.264	17.117
40	23.226	2.851	5.702	8.553	11.404	14.256	17.107
50	29.033	2.849	5.698	8.548	11.397	14.246	17.095
13 00	....	2.847	5.695	8.542	11.390	14.237	17.084
10	5.807	2.846	5.691	8.536	11.382	14.228	17.073
20	11.614	2.844	5.687	8.530	11.374	14.218	17.061
30	17.421	2.842	5.683	8.524	11.366	14.208	17.049
40	23.228	2.840	5.679	8.519	11.358	14.198	17.038
50	29.035	2.838	5.675	8.513	11.350	14.188	17.026
14 00	....	2.836	5.671	8.507	11.342	14.178	17.014
10	5.808	2.834	5.667	8.500	11.334	14.168	17.001
20	11.615	2.831	5.663	8.494	11.326	14.157	16.988
30	17.422	2.829	5.658	8.488	11.317	14.146	16.975
40	23.230	2.827	5.654	8.481	11.308	14.136	16.963
50	29.038	2.825	5.650	8.475	11.300	14.125	16.950
15 00	....	2.823	5.646	8.469	11.292	14.114	16.937
10	5.808	2.821	5.641	8.462	11.282	14.103	16.924
20	11.616	2.818	5.637	8.455	11.274	14.092	16.910
30	17.424	2.816	5.632	8.448	11.264	14,080	16.897
40	23.232	2.814	5.628	8.441	11.255	14.069	16.883
50	29.040	2.812	5.623	8.435	11.246	14.058	16.870
16 00	....	2.809	5.619	8.428	11.237	14.046	16.856

Ordinates of developed parallel.

Longitude interval.	8°	9°
′	*Inches.*	*Inches.*
5	0.000	0.000
10	.001	.001
15	.003	.003
20	.005	.005
25	.007	.008
30	.010	.012
	10°	**11°**
5	0.000	0.000
10	.001	.002
15	.003	.004
20	.006	.006
25	.009	.010
30	.013	.014
	12°	**13°**
5	0.000	0.000
10	.002	.002
15	.004	.004
20	.007	.007
25	.011	.012
30	.016	.017
	14°	**15°**
5	0.000	0.001
10	.002	.002
25	.004	.005
20	.008	.009
25	.012	.013
30	.018	.019
	16°	
5	0.001	
10	.002	
15	.005	
20	.009	
25	.014	
30	.020	

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
16	00	....	2.809	5.619	8.428	11.237	14.046	16.856
	10	5.809	2.807	5.614	8.421	11.228	14.034	16.841
	20	11.617	2.804	5.609	8.414	11.218	14.022	16.827
	30	17.426	2.802	5.604	8.406	11.208	14.010	16.813
	40	23.234	2.800	5.599	8.399	11.199	13.998	16.798
	50	29.043	2.797	5.595	8.392	11.189	13.986	16.784
17	00	....	2.795	5.590	8.385	11.180	13.974	16.769
	10	5.809	2.792	5.585	8.377	11.170	13.962	16.754
	20	11.618	2.790	5.580	8.369	11.159	13.949	16.739
	30	17.427	2.787	5.575	8.362	11.149	13.936	16.724
	40	23.236	2.785	5.570	8.354	11.139	13.924	16.709
	50	29.046	2.782	5.564	8.347	11.129	13.911	16.693
18	00	....	2.780	5.559	8.339	11.119	13.898	16.678
	10	5.810	2.777	5.554	8.331	11.108	13.885	16.662
	20	11.619	2.774	5.549	8.323	11.097	13.872	16.646
	30	17.429	2.772	5.543	8.315	11.087	13.859	16.630
	40	23.239	2.769	5.538	8.307	11.076	13.845	16.614
	50	29.049	2.766	5.533	8.299	11.065	13.832	16.598
19	00	....	2.764	5.527	8.291	11.054	13.818	16.582
	10	5.810	2.761	5.522	8.282	11.043	13.804	16.565
	20	11.621	2.758	5.516	8.274	11.032	13.790	16.548
	30	17.431	2.755	5.510	8.266	11.021	13.776	16.531
	40	23.242	2.752	5.505	8.257	11.009	13.762	16.514
	50	29.052	2.750	5.499	8.249	10.998	13.748	16.497
20	00	....	2.747	5.493	8.240	10.987	13.734	16.480
	10	5.811	2.743	5.487	8.231	10.975	13.719	16.462
	20	11.622	2.741	5.482	8.222	10.963	13.704	16.445
	30	17.433	2.738	5.476	8.213	10.951	13.689	16.427
	40	23.244	2.735	5.470	8.204	10.939	13.674	16.409
	50	29.055	2.732	5.464	8.196	10.928	13.660	16.391
21	00	....	2.729	5.458	8.187	10.916	13.645	16.373
	10	5.812	2.726	5.452	8.177	10.903	13.629	16.355
	20	11.623	2.723	5.445	8.168	10.891	13.614	16.336
	30	17.435	2.720	5.439	8.159	10.878	13.598	16.318
	40	23.247	2.717	5.433	8.150	10.866	13.583	16.300
	50	29.058	2.714	5.427	8.141	10.854	13.568	16.281
22	00	....	2.710	5.421	8.131	10.842	13.552	16.262
	10	5.812	2.707	5.414	8.122	10.829	13.536	16.243
	20	11.625	2.704	5.408	8.112	10.816	13.520	16.223
	30	17.437	2.701	5.401	8.102	10.802	13.503	16.204
	40	23.250	2.697	5.395	8.092	10.790	13.487	16.184
	50	29.062	2.694	5.388	8.083	10.777	13.471	16.165
23	00	....	2.691	5.382	8.073	10.764	13.455	16.145
	10	5.813	2.688	5.375	8.063	10.750	13.438	16.125
	20	11.626	2.684	5.368	8.053	10.737	13.421	16.105
	30	17.439	2.681	5.362	8.042	10.723	13.404	16.085
	40	23.252	2.677	5.355	8.032	10.710	13.387	16.064
	50	29.066	2.674	5.348	8.022	10.696	13.371	16.045
24	00	....	2.671	5.341	8.012	10.683	13.354	16.024

Ordinates of developed parallel. Longitude interval.	16°	17°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.002	.002
15	.005	.005
20	.009	.010
25	.014	.015
30	.020	.021
	18°	19°
5	0.001	0.001
10	.002	.003
15	.006	.006
20	.010	.010
25	.016	.016
30	.022	.024
	20°	21°
5	0.001	0.001
10	.003	.003
15	.006	.006
20	.011	.011
25	.017	.018
30	.025	026
	22°	23°
5	0.001	0.001
10	.003	.003
15	.007	.007
20	.012	.012
25	.018	.019
30	.027	.028
	24°	
5	0.001	
10	.003	
15	.007	
20	.013	
25	.020	
30	.028	

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
24	00	....	2.671	5.341	8.012	10.683	13.354	16.024
	10	5.814	2.667	5.334	8.002	10.669	13.336	16.003
	20	11.628	2.664	5.327	7.991	10.655	13.319	15.982
	30	17.442	2.660	5.320	7.981	10.641	13.301	15.961
	40	23.256	2.657	5.313	7.970	10.627	13.284	15.940
	50	29.069	2.653	5.306	7.960	10.613	13.266	15.919
25	00	....	2.650	5.299	7.949	10.599	13.249	15.898
	10	5.815	2.646	5.292	7.938	10.584	13.231	15.877
	20	11.629	2.642	5.285	7.927	10.570	13.212	15.854
	30	17.444	2.639	5.278	7.916	10.555	13.194	15.833
	40	23.259	2.635	5.270	7.905	10.540	13.176	15.811
	50	29.074	2.631	5.263	7.894	10.526	13.157	15.788
26	00	....	2.628	5.256	7.883	10.511	13.139	15.767
	10	5.816	2.624	5.248	7.872	10.496	13.120	15.744
	20	11.631	2.620	5.240	7.861	10.481	13.101	15.721
	30	17.446	2.616	5.233	7.849	10.466	13.082	15.698
	40	23.262	2.613	5.225	7.838	10.451	13.063	15.676
	50	29.077	2.609	5 218	7.827	10.436	13.045	15.654
27	00	....	2.605	5.210	7.816	10.421	13.026	15.631
	10	5.816	2.601	5.203	7.804	10.405	13.006	15.608
	20	11.633	2.597	5.195	7.792	10.390	12.987	15.584
	30	17.449	2.593	5.187	7.780	10.374	12.967	15.560
	40	23.265	2.589	5.179	7.768	10.358	12.947	15.537
	50	29.082	2.586	5.171	7.757	10.342	12.928	15.514
28	00	....	2.582	5.163	7.745	10.327	12.909	15.490
	10	5.817	2.578	5.155	7.733	10.311	12.889	15.466
	20	11.634	2.574	5.147	7.721	10.294	12.868	15.442
	30	17.451	2.570	5.139	7.709	10.278	12.848	15.418
	40	23.268	2.566	5.131	7.697	10.262	12.828	15.394
	50	29.086	2.562	5.123	7.685	10.246	12.808	15.369
29	00	....	2.558	5.115	7.673	10.230	12.788	15.345
	10	5.818	2.553	5.107	7.660	10.213	12.767	15.320
	20	11.636	2.549	5.098	7.648	10.197	12.746	15.295
	30	17.454	2.545	5.090	7.635	10.180	12.725	15.270
	40	23.272	2.541	5.082	7.622	10.163	12.704	15.245
	50	29.090	2.537	5.073	7.610	10.146	12.683	15.220
30	00	....	2.533	5.065	7.598	10.130	12.662	15.195
	10	5.819	2.528	5.056	7.585	10.113	12.641	15.169
	20	11.638	2.524	5.048	7.572	10.096	12.620	15.143
	30	17.457	2.520	5.039	7.559	10.078	12.598	15.118
	40	23.276	2.515	5.031	7.546	10.061	12.577	15.092
	50	29.094	2.511	5.022	7.533	10.044	12.555	15.066
31	00	....	2.507	5.014	7.520	10.027	12.534	15.040
	10	5.820	2.502	5.005	7.507	10.009	12.512	15.014
	20	11.640	2.498	4.996	7.494	9.992	12.490	14.987
	30	17.460	2.493	4.987	7.480	9.974	12.467	14.960
	40	23.280	2.489	4.978	7.467	9.956	12.445	14.934
	50	29.100	2.485	4.969	7.454	9.938	12.423	14.908
32	00	....	2.480	4.960	7.441	9.921	12.401	14.881

Ordinates of developed parallel.		
Longitude interval.	24°	25°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.003	.003
15	.007	.007
20	.013	.013
25	.020	.020
30	.028	.029
	26°	27°
5	0.001	0.001
10	.003	.003
15	.008	.008
20	.013	.014
25	.021	.022
30	.030	.031
	28°	29°
5	0.001	0.001
10	.004	.004
15	.008	.008
20	.014	.014
25	.022	.023
30	.032	.032
	30°	31°
5	0.001	0.001
10	.004	.004
15	.008	.008
20	.015	.015
25	.023	.023
30	.033	.034
	32°	
5	0.001	
10	.004	
15	.009	
20	.015	
25	.024	
30	.034	

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
32	00	....	2.480	4.960	7.441	9.921	12.401	14.881
	10	5.821	2.476	4.951	7.427	9.903	12.379	14.854
	20	11.642	2.471	4.942	7.413	9.884	12.355	14.827
	30	17.462	2.467	4.933	7.400	9.866	12.333	14.800
	40	23.283	2.462	4.924	7.386	9.848	12.310	14.772
	50	29.104	2.458	4.915	7.373	9.830	12.288	14.745
33	00	....	2.453	4.906	7.359	9.812	12.265	14.717
	10	5.822	2.448	4.896	7.345	9.793	12.241	14.689
	20	11.643	2.444	4.887	7.331	9.774	12.218	14.661
	30	17.465	2.439	4.878	7.316	9.755	12.194	14.633
	40	23.287	2.434	4.868	7.302	9.736	12.171	14.605
	50	29.109	2.429	4.859	7.288	9.718	12.147	14.576
34	00	....	2.425	4.850	7.274	9.699	12.124	14.549
	10	5.823	2.420	4.840	7.260	9.680	12.100	14.520
	20	11.645	2.415	4.830	7.246	9.661	12.076	14.491
	30	17.468	2.410	4.821	7.231	9.642	12.052	14.462
	40	23.291	2.406	4.811	7.217	9.622	12.028	14.434
	50	29.113	2.401	4.802	7.203	9.604	12.004	14.405
35	00	....	2.396	4.792	7.188	9.584	11.980	14.376
	10	5.824	2.391	4.782	7.174	9.565	11.956	14.347
	20	11.647	2.386	4.773	7.159	9.545	11.932	14.318
	30	17.471	2.381	4.763	7.144	9.526	11.907	14.288
	40	23.294	2.377	4.753	7.130	9.506	11.883	14.259
	50	29.118	2.372	4.743	7.115	9.486	11.858	14.230
36	00	....	2.367	4.733	7.099	9.466	11.833	14.200
	10	5.824	2.362	4.723	7.085	9.446	11.808	14.170
	20	11.649	2.357	4.713	7.070	9.426	11.783	14.139
	30	17.473	2.351	4.703	7.055	9.406	11.757	14.109
	40	23.297	2.346	4.693	7.039	9.386	11.732	14.078
	50	29.122	2.341	4.683	7.024	9.366	11.707	14.048
37	00	....	2.336	4.673	7.009	9.345	11.682	14.018
	10	5.826	2.331	4.662	6.994	9.325	11.656	13.987
	20	11.651	2.326	4.652	6.978	9.304	11.630	13.956
	30	17.477	2.321	4.642	6.963	9.284	11.605	13.925
	40	23.302	2.316	4.631	6.947	9.263	11.579	13.894
	50	29.128	2.311	4.621	6.932	9.242	11.553	13.864
38	00	....	2.305	4.611	6.916	9.222	11.527	13.832
	10	5.827	2.300	4.600	6.900	9.200	11.501	13.801
	20	11.653	2.295	4.590	6.884	9.179	11.474	13.769
	30	17.480	2.290	4.579	6.869	9.158	11.448	13.737
	40	23.306	2.284	4.568	6.853	9.137	11.421	13.705
	50	29.133	2.279	4.558	6.837	9.116	11.395	13.673
39	00	....	2.274	4.548	6.821	9.095	11.369	13.642
	10	5.828	2.268	4.537	6.805	9.073	11.342	13.610
	20	11.655	2.263	4.526	6.789	9.052	11.315	13.577
	30	17.483	2.258	4.515	6.773	9.030	11.288	13.545
	40	23.310	2.252	4.504	6.756	9.008	11.261	13.513
	50	29.138	2.247	4.493	6.740	8.987	11.234	13.480
40	00	....	2.241	4.483	6.724	8.965	11.207	13.448

Ordinates of developed parallel.

Longitude interval.	32°	33°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.004	.004
15	.009	.009
20	.015	.016
25	.024	.024
30	.034	.035
	34°	**35°**
5	0.001	0.001
10	.004	.004
15	.009	.009
20	.016	.016
25	.025	.025
30	.036	.036
	36°	**37°**
5	0.001	0.001
10	.004	.004
15	.009	.009
20	.013	.016
25	.025	.026
30	.036	.037
	38°	**39°**
5	0.001	0.001
10	.004	.004
15	.009	.009
20	.017	.017
25	.026	.026
30	.037	.037
	40°	
5	0.001	
10	.004	
15	.009	
20	.017	
25	.026	
30	.038	

TABLE 6.—*Coordinates for projection of maps* (*scale* $\frac{1}{125000}$)—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel.					
		5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
40 00	....	2.241	4.483	6.724	8.965	11.207	13.448
10	5.829	2.236	4.472	6.707	8.943	11.179	13.415
20	11.657	2.230	4.461	6.691	8.921	11.152	13.382
30	17.486	2.225	4.450	6.674	8.899	11.124	13.349
40	23.314	2.219	4.439	6.658	8.877	11.097	13.316
50	29.143	2.214	4.428	6.641	8.855	11.069	13.283
41 00	....	2.208	4.417	6.625	8.834	11.042	13.250
10	5.830	2.203	4.406	6.608	8.811	11.014	13.217
20	11.659	2.197	4.394	6.591	8.788	10.985	13.183
30	17.489	2.192	4.383	6.575	8.766	10.958	13.149
40	23.319	2.186	4.372	6.558	8.744	10.929	13.115
50	29.149	2.180	4.360	6.541	8.721	10.901	13.081
42 00	....	2.175	4.349	6.524	8.698	10.873	13.048
10	5.831	2.169	4.338	6.507	8.676	10.844	13.013
20	11.661	2.163	4.326	6.490	8.653	10.816	12.979
30	17.492	2.157	4.315	6.472	8.630	10.787	12.945
40	23.323	2.152	4.303	6.455	8.607	10.759	12.910
50	29.154	2.146	4.292	6.438	8.584	10.730	12.876
43 00	....	2.140	4.281	6.421	8.561	10.702	12.842
10	5.832	2.135	4.269	6.403	8.538	10.672	12.807
20	11.663	2.129	4.257	6.386	8.514	10.643	12.772
30	17.495	2.123	4.246	6.368	8.491	10.614	12.737
40	23.327	2.117	4.234	6.351	8.468	10.585	12.701
50	29.159	2.111	4.222	6.333	8.444	10.556	12.667
44 00	....	2.105	4.210	6.316	8.421	10.526	12.631
10	5.833	2.099	4.199	3.298	8.397	10.496	12.596
20	11.666	2.093	4.187	6.280	8.373	10.467	12.560
30	17.498	2.087	4.175	6.262	8.350	10.437	12.524
40	23.331	2.081	4.163	6.244	8.326	10.407	12.489
50	29.164	2.076	4.151	6.227	8.302	10.378	12.453
45 00	....	2.070	4.139	6.209	8.278	10.348	12.417
10	5.834	2.064	4.127	6.191	8.254	10.317	12.381
20	11.668	2.057	4.115	6.172	8.230	10.288	12.345
30	17.501	2.051	4.103	6.154	8.206	10.257	12.308
40	23.335	2.045	4.091	6.136	8.181	10.226	12.272
50	29.169	2.039	4.079	6.118	8.157	10.197	12.236
46 00	....	2.033	4.067	6.100	8.133	10.166	12.199
10	5.835	2.027	4.054	6.081	8.108	10.136	12.163
20	11.670	2.021	4.042	6.063	8.084	10.104	12.125
30	17.504	2.015	4.030	6.044	8.059	10.074	12.089
40	23.339	2.009	4.017	6.026	8.034	10.043	12.052
50	29.174	2.003	4.005	6.008	8.010	10.013	12.015
47 00	....	1.996	3.992	5.989	7.985	9.981	11.978
10	5.836	1.990	3.980	5.970	7.960	9.951	11.941
20	11.672	1.984	3.968	5.951	7.935	9.919	11.903
30	17.508	1.978	3.955	5.933	7.910	9.888	11.866
40	23.344	1.971	3.943	5.914	7.885	9.857	11.828
50	29.180	1.965	3.930	5.895	7.860	9.826	11.791
48 00	....	1.959	3.917	5.876	7.835	9.794	11.752

Ordinates of developed parallel.		
Longitude interval.	40°	41°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.004	.004
15	.009	.009
20	.017	.017
25	.026	.026
30	.038	.038
	42°	43°
5	0.001	0.001
10	.004	.004
15	.010	.010
20	.017	.017
25	.026	.027
30	.038	.038
	44°	45°
5	0.001	0.001
10	.004	.004
15	.010	.010
20	.017	.017
25	.027	.027
30	.038	.038
	46°	47°
5	0.001	0.001
10	.004	.004
15	.010	.010
20	.017	.017
25	.027	.027
30	.038	.038
	48°	
5	0.001	
10	.004	
15	.010	
20	.017	
25	.026	
30	.038	

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
48	00	....	1.959	3.917	5.876	7.835	9.794	11.752
	10	5.837	1.952	3.905	5.857	7.810	9.762	11.714
	20	11.674	1.946	3.892	5.838	7.784	9.730	11.677
	30	17.511	1.940	3.879	5.819	7.759	9.699	11.638
	40	23.348	1.933	3.867	5.800	7.733	9.667	11.600
	50	29.185	1.927	3.854	5.781	7.708	9.635	11.562
49	00	....	1.921	3.841	5.762	7.682	9.603	11.523
	10	5.838	1.914	3.828	5.743	7.657	9.571	11.485
	20	11.676	1.908	3.815	5.723	7.631	9.539	11.446
	30	17.514	1.901	3.803	5.704	7.605	9.507	11.408
	40	23.352	1.895	3.790	5.684	7.579	9.474	11.369
	50	29.190	1.888	3.777	5.665	7.553	9.442	11.330
50	00	....	1.882	3.764	5.646	7.527	9.409	11.291
	10	5.839	1.875	3.750	5.626	7.501	9.376	11.251
	20	11.678	1.869	3.737	5.606	7.475	9.344	11.212
	30	17.517	1.862	3.724	5.587	7.449	9.311	11.173
	40	23.356	1.856	3.711	5.567	7.422	9.278	11.134
	50	29.194	1.849	3.698	5.547	7.396	9.245	11.094
51	00	....	1.842	3.685	5.528	7.370	9.212	11.055
	10	5.840	1.836	3.672	5.507	7.343	9.179	11.015
	20	11.680	1.829	3.658	5.488	7.317	9.146	10.975
	30	17.520	1.823	3.645	5.468	7.290	9.113	10.936
	40	23.360	1.816	3.632	5.448	7.264	9.080	10.895
	50	29.200	1.809	3.618	5.428	7.237	9.046	10.855
52	00	....	1.803	3.605	5.408	7.210	9.013	10.816
	10	5.841	1.796	3.592	5.388	7.184	8.980	10.775
	20	11.682	1.789	3.578	5.367	7.156	8.946	10.734
	30	17.523	1.782	3.565	5.347	7.130	8.912	10.694
	40	23.364	1.776	3.551	5.327	7,103	8.878	10.654
	50	29.204	1.769	3.538	5.307	7.076	8.844	10.613
53	00	....	1.762	3.524	5.287	7.049	8.811	10.573
	10	5.842	1.755	3.511	5.266	7.022	8.777	10.532
	20	11.684	1.748	3.497	5.246	6.994	8.742	10.491
	30	17.526	1.742	3.483	5.225	6.967	8.708	10.450
	40	23.368	1.735	3.470	5.205	6.940	8.674	10.409
	50	29.210	1.728	3.456	5.184	6.912	8.640	10.368
54	00	....	1.721	3.442	5.164	6.885	8.606	10.327
	10	5.843	1.714	3.429	5.143	6.857	8.572	10.286
	20	11.686	1.707	3.415	5.122	6.830	8.537	10.244
	30	17.529	1.700	3.401	5.101	6.802	8.502	10.202
	40	23.372	1.694	3.387	5.080	6.774	8.468	10.161
	50	29.214	1.687	3.373	5.060	6.746	8.433	10.120
55	00	....	1.680	3.359	5.039	6.719	8.398	10.078
	10	5.844	1.673	3.345	5.018	6.691	8.364	10.036
	20	11.688	1.666	3.331	4.997	6.663	8.328	9.994
	30	17.532	1.659	3.317	4.976	6.635	8.294	9.952
	40	23.376	1.652	3.303	4.955	6.607	8.258	9.910
	50	29.220	1.645	3.289	4.934	6.579	8.224	9.868
56	00	....	1.638	3.275	4.913	6.551	8.188	9.826

Ordinates of developed parallel.

Longitude interval.	48°	49°	50°	51°	52°	53°	54°	55°	56°
′	*Inches.*	*Inches.*							
5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
10	.004	.004	.004	.004	.004	.004	.004	.004	.004
15	.010	.010	.009	.009	.009	.009	.009	.009	.009
20	.017	.017	.017	.017	.017	.016	.016	.016	.016
25	.026	.026	.026	.026	.026	.026	.025	.025	.025
30	.038	.038	.038	.037	.037	.037	.036	.036	.036

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*.—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
56 00	....	1.638	3.275	4.913	6.551	8.188	9.826
10	5.845	1.631	3.261	4.892	6.522	8.153	9.784
20	11.690	1.624	3.247	4.870	6.494	8.118	9.741
30	17.535	1.616	3.233	4.849	6.466	8.082	9.698
40	23.380	1.609	3.219	4.828	6.437	8.046	9.656
50	29.224	1.602	3.204	4.807	6.409	8.011	9.613
57 00	....	1.595	3.190	4.785	6.380	7.976	9.571
10	5.846	1.588	3.176	4.764	6.352	7.940	9.527
20	11.692	1.581	3.162	4.742	6.323	7.904	9.485
30	17.537	1.574	3.147	4.721	6.294	7.868	9.442
40	23.383	1.566	3.133	4.699	6.266	7.832	9.398
50	29.229	1.559	3.119	4.678	6.237	7.796	9.356
58 00	....	1.552	3.104	4.656	6.208	7.760	9.313
10	5.847	1.545	3.090	4.634	6.179	7.724	9.269
20	11.694	1.538	3.075	4.613	6.150	7.688	9.226
30	17.540	1.530	3.061	4.591	6.122	7.652	9.182
40	23.387	1.523	3.046	4.569	6.092	7.616	9.139
50	29.234	1.516	3.032	4.547	6.063	7.579	9.095
59 00	....	1.509	3.017	4.526	6.034	7.543	9.052
10	5.848	1.501	3.003	4.504	6.005	7.506	9.008
20	11.695	1.494	2.988	4.482	5.976	7.470	8.963
30	17.543	1.487	2.973	4.460	5.946	7.433	8.920
40	23.391	1.479	2.959	4.438	5.917	7.396	8.876
50	29.238	1.472	2.944	4.416	5.888	7.360	8.831
60 00	....	1.465	2.929	4.394	5.858	7.323	8.788
10	5.849	1.457	2.914	4.372	5.829	7.286	8.743
20	11.697	1.450	2.900	4.349	5.799	7.249	8.699
30	17.546	1.442	2.885	4.327	5.770	7.212	8.654
40	23.394	1.435	2.870	4.305	5.740	7.175	8.610
50	29.243	1.428	2.855	4.283	5.710	7.138	8.566
61 00	....	1.320	2.840	4.261	5.681	7.101	8.521
10	5.850	1.313	2.825	4.238	5.651	7.064	8.476
20	11.699	1.405	2.810	4.216	5.621	7.026	8.431
30	17.549	1.398	2.795	4.193	5.591	6.988	8.386
40	23.398	1.390	2.781	4.171	5.561	6.952	8.342
50	29.248	1.383	2.766	4.148	5.531	6.914	8.297
62 00	....	1.375	2.751	4.126	5.501	6.877	8.252
10	5.850	1.368	2.736	4.103	5.471	6.839	8.207
20	11.701	1.360	2.720	4.081	5.441	6.801	8.161
30	17.551	1.353	2.705	4.058	5.410	6.763	8.116
40	23.402	1.345	2.690	4.035	5.380	6.726	8.071
50	29.252	1.338	2.675	4.013	5.350	6.688	8.026
63 00	....	1.330	2.660	3.990	5.320	6.650	7.980
10	5.851	1.322	2.645	3.967	5.290	6.612	7.934
20	11.702	1.315	2.630	3.944	5.259	6.574	7.889
30	17.554	1.307	2.614	3.921	5.228	6.536	7.843
40	23.405	1.300	2.599	3.899	5.198	6.498	7.797
50	29.256	1.292	2.584	3.876	5.168	6.460	7.751
64 00	....	1.284	2.569	3.853	5.137	6.422	7.706

Ordinates of developed parallel.

Longitude interval.	56°	57°	58°	59°	60°	61°	62°	63°	64°
′	*Inches.*	*Inches.*							
5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
10	.004	.004	.004	.004	.004	.004	.004	.003	[illegible]
15	.009	.009	.009	.008	.008	.008	.008	.008	.008
20	.016	.016	.015	.015	.015	.014	.014	.014	.013
25	.025	.024	.024	.024	.023	.023	.022	.022	.021
30	.036	.035	.034	.034	.033	.033	.032	.031	.030

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
64 00	....	1.284	2.569	3.853	5.137	6.422	7.706
10	5.852	1.277	2.553	3.830	5.106	6.383	7.660
20	11.704	1.269	2.538	3.807	5.076	6.345	7.614
30	17.556	1.261	2.523	3.784	5.045	6.307	7.568
40	23.408	1.254	2.507	3.761	5.014	6.268	7.522
50	29.260	1.246	2.492	3.738	4.984	6.230	7.476
65 00	....	1.238	2.477	3.715	4.953	6.192	7.430
10	5.853	1.231	2.461	3.692	4.922	6.153	7.384
20	11.706	1.223	2.446	3.668	4.891	6.114	7.337
30	17.558	1.215	2.430	3.645	4.860	6.075	7.290
40	23.411	1.207	2.415	3.622	4.829	6.037	7.244
50	29.264	1.200	2.399	3.599	4.798	5.998	7.198
66 00	....	1.192	2.384	3.575	4.767	5.959	7.151
10	5.854	1.184	2.368	3.552	4.736	5.920	7.104
20	11.707	1.176	2.352	3.529	4.705	5.881	7.057
30	17.561	1.168	2.337	3.505	4.673	5.842	7.010
40	23.414	1.161	2.321	3.482	4.642	5.803	6.963
50	29.268	1.153	2.305	3.458	4.611	5.764	6.916
67 00	....	1.145	2.290	3.435	4.580	5.725	6.869
10	5.854	1.137	2.274	3.411	4.548	5.685	6.822
20	11.709	1.129	2.258	3.388	4.517	5.646	6.775
30	17.563	1.121	2.243	3.364	4.485	5.607	6.728
40	23.418	1.113	2.227	3.340	4.454	5.567	6.680
50	29.272	1.106	2.211	3.317	4.422	5.528	6.634
68 00	....	1.098	2.195	3.293	4.391	5.489	6.586
10	5.855	1.090	2.180	3.269	4.359	5.449	6.539
20	11.710	1.082	2.164	3.246	4.328	5.410	6.491
30	17.565	1.074	2.148	3.222	4.296	5.370	6.443
40	23.420	1.066	2.132	3.198	4.264	5.330	6.396
50	29.276	1.058	2.116	3.174	4.232	5.291	6.349
69 00	....	1.050	2.100	3.151	4.201	5.251	6.301
10	5.856	1.042	2.084	3.127	4.169	5.211	6.253
20	11.712	1.034	2.068	3.103	4.137	5.171	6.205
30	17.567	1.026	2.052	3.079	4.105	5.131	6.157
40	23.423	1.018	2.037	3.055	4.073	5.092	6.110
50	29.279	1.010	2.021	3.031	4.041	5.052	6.062
70 00	....	1.002	2.005	3.007	4.009	5.012	6.014
10	5.856	.994	1.989	2.983	3.977	4.972	5.966
20	11.713	.986	1.972	2.959	3.945	4.931	5.917
30	17.570	.978	1.956	2.935	3.913	4.891	5.869
40	23.426	.970	1.940	2.911	3.881	4.851	5.821
50	29.282	.962	1.924	2.886	3.848	4.811	5.773
71 00	....	.954	1.908	2.862	3.816	4.771	5.725
10	5.857	.946	1.892	2.838	3.784	4.730	5.676
20	11.714	.938	1.876	2.814	3.752	4.690	5.628
30	17.572	.930	1.860	2.790	3.720	4.650	5.579
40	23.429	.922	1.844	2.765	3.687	4.609	5.531
50	29.286	.914	1.828	2.741	3.655	4.569	5.483
72 00	....	.906	1.811	2.717	3.623	4.529	5.434

Ordinates of developed parallel. Longitude interval.		
	64°	65°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.003	.003
15	.008	.007
20	.013	.013
25	.021	.020
30	.030	.029
	66°	67°
5	0.001	0.001
10	.003	.003
15	.007	.007
20	.013	.012
25	.020	.019
30	.029	.028
	68°	69°
5	0.001	0.001
10	.003	.003
15	.007	.006
20	.012	.011
25	.019	.018
30	.027	.026
	70°	71°
5	0.001	0.001
10	.003	.003
15	.006	.006
20	.011	.010
25	.017	.016
30	.024	.024
	72°	
5	0.001	
10	.003	
15	.006	
20	.010	
25	.016	
30	.023	

TABLE 6.—*Coordinates for projection of maps (scale $\frac{1}{125000}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
72 00	....	.906	1.811	2.717	3.623	4.529	5.434
10	5.858	.898	1.795	2.693	3.590	4.488	5.386
20	11.716	.889	1.779	2.668	3.558	4.447	5.336
30	17.573	.881	1.763	2.644	3.525	4.407	5.288
40	23.431	.873	1.746	2.620	3.493	4.366	5.239
50	29.289	.865	1.730	2.595	3.460	4.325	5.190
73 00	....	.857	1.714	2.571	3.428	4.285	5.141
10	5.858	.849	1.697	2.546	3.395	4.244	5.092
20	11.717	.841	1.681	2.522	3.362	4.203	5.044
30	17.575	.832	1.665	2.497	3.330	4.162	4.994
40	23.434	.824	1.648	2.473	3.297	4.121	4.945
50	29.292	.816	1.632	2.448	3.264	4.081	4.897
74 00	....	.808	1.616	2.424	3.232	4.040	4.847
10	5.859	.800	1.599	2.399	3.199	3.999	4.798
20	11.718	.791	1.583	2.374	3.160	3.957	4.748
30	17.577	.783	1.566	2.350	3.133	3.916	4.699
40	23.436	.775	1.550	2.325	3.100	3.875	4.650
50	29.295	.767	1.534	2.300	3.067	3.834	4.601
75 00	....	.759	1.517	2.276	3.034	3.793	4.552
10	5.860	.750	1.501	2.251	3.002	3.752	4.502
20	11.719	.742	1.484	2.226	2.968	3.711	4.453
30	17.578	.734	1.468	2.201	2.935	3.669	4.403
40	23.438	.726	1.451	2.177	2.902	3.628	4.354
50	29.298	.717	1.435	2.152	2.870	3.587	4.304
76 00	....	.709	1.418	2.127	2.836	3.546	4.255
10	5.860	.701	1.402	2.102	2.803	3.504	4.205
20	11.720	.692	1.385	2.078	2.770	3.463	4.155
30	17.580	.684	1.368	2.053	2.737	3.421	4.105
40	23.440	.676	1.352	2.028	2.704	3.380	4.056
50	29.300	.668	1.335	2.003	2.671	3.339	4.006
77 00	....	.659	1.319	1.978	2.638	3.297	3.956
10	5.860	.651	1.302	1.953	2.604	3.256	3.907
20	11.721	.643	1.285	1.928	2.571	3.214	3.856
30	17.582	.634	1.269	1.903	2.538	3.172	3.806
40	23.442	.626	1.252	1.878	2.504	3.131	3.757
50	29.302	.618	1.235	1.853	2.471	3.089	3.706
78 00	....	.609	1.219	1.828	2.438	3.047	3.656
10	5.861	.601	1.202	1.803	2.404	3.005	3.606
20	11.722	.593	1.185	1.778	2.371	2.964	3.556
30	17.583	.584	1.169	1.753	2.338	2.922	3.506
40	23.444	.576	1.152	1.728	2.304	2.880	3.456
50	29.304	.568	1.135	1.703	2.270	2.838	3.406
79 00	....	.559	1.119	1.678	2.237	2.797	3.356
10	5.861	.551	1.102	1.653	2.204	2.755	3.305
20	11.723	.542	1.085	1.628	2.170	2.713	3.255
30	17.584	.534	1.068	1.602	2.136	2.671	3.205
40	23.445	.526	1.052	1.577	2.103	2.629	3.155
50	29.306	.517	1.035	1.552	2.070	2.587	3.104
80 00	....	.509	1.018	1.527	2.036	2.545	3.054

Ordinates of developed parallel. Longitude interval.	72°	73°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.003	.002
15	.006	.005
20	.010	.010
25	.016	.015
30	.023	.021
	74°	75°
5	0.001	0.001
10	.002	.002
15	.005	.005
20	.009	.009
25	.014	.013
30	.020	.019
	76°	77°
5	0.001	0.000
10	.002	.002
15	.005	.004
20	.008	.007
25	.013	.012
30	.018	.017
	78°	79°
5	0.000	0.000
10	.002	.002
15	.004	.004
20	.007	.006
25	.011	.010
30	.016	.014

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$).*

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel.					
		5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
0 00	....	5.764	11.529	17.293	23.058	28.822	34.586
10	11.451	5.764	11.528	17.293	23.057	28.821	34.585
20	22.901	5.764	11.528	17.292	23.056	28.821	34.585
30	34.352	5.764	11.528	17.292	23.056	28.820	34.583
40	45.803	5.764	11.528	17.291	23.055	28.819	34.583
50	57.254	5.764	11.527	17.291	23.054	28.818	34.582
1 00	68.704	5.764	11.527	17.291	23.054	28.818	34.581
10	11.451	5.763	11.526	17.289	23.052	28.816	34.579
20	22.901	5.763	11.525	17.288	23.050	28.813	34.576
30	34.352	5.762	11.524	17.287	23.049	28.811	34.573
40	45.803	5.762	11.524	17.285	23.047	28.809	34.571
50	57.254	5.761	11.523	17.284	23.045	28.807	34.568
2 00	68.704	5.761	11.522	17.283	23.044	28.805	34.565
10	11.451	5.760	11.520	17.281	23.041	28.801	34.561
20	22.902	5.759	11.519	17.278	23.038	28.797	34.556
30	34.353	5.759	11.517	17.276	23.035	28.794	34.552
40	45.804	5.758	11.516	17.274	23.032	28.790	34.548
50	57.254	5.757	11.514	17.272	23.029	28.786	34.543
3 00	68.705	5.756	11.513	17.270	23.026	28.783	34.539
10	11.451	5.756	11.511	17.267	23.022	28.778	34.533
20	22.902	5.754	11.509	17.264	23.018	28.773	34.527
30	34.353	5.753	11.507	17.260	23.014	28.767	34.520
40	45.804	5.752	11.505	17.257	23.010	28.762	34.514
50	57.255	5.751	11.503	17.254	23.006	28.757	34.508
4 00	68.706	5.750	11.501	17.251	23.002	28.752	34.502
10	11.451	5.749	11.498	17.247	22.996	28.746	34.495
20	22.903	5.748	11.496	17.243	22.991	28.739	34.487
30	34.354	5.746	11.493	17.240	22.986	28.733	34.479
40	45.805	5.745	11.490	17.236	22.981	28.726	34.471
50	57.256	5.744	11.488	17.232	22.976	28.720	34.463
5 00	68.708	5.743	11.485	17.228	22.970	28.713	34.456
10	11.452	5.741	11.482	17.223	22.964	28.705	34.446
20	22.903	5.739	11.479	17.218	22.958	28.697	34.436
30	34.855	5.738	11.476	17.213	22.951	28.689	34.427
40	45.806	5.736	11.472	17.209	22.945	28.681	34.417
50	57.258	5.735	11.469	17.204	22.938	28.673	34.408
6 00	68.710	5.733	11.466	17.199	22.932	28.665	34.398
10	11.452	5.731	11.462	17.193	22.924	28.656	34.387
20	22.904	5.729	11.458	17.188	22.917	28.646	34.375
30	34.356	5.727	11.455	17.182	22.910	28.637	34.364
40	45.808	5.726	11.451	17.177	22.902	28.628	34.353
50	57.260	5.724	11.447	17.171	22.894	28.618	34.342
7 00	68.712	5.722	11.443	17.165	22.887	28.609	34.330

Ordinates of developed parallel.		
Longitude interval.	0°	1°
′	*Inch.*	*Inch.*
5	0.000	0.000
10	.000	.000
15	.000	.001
20	.000	.001
25	.000	.002
30	.000	.003
	2°	3°
5	0.000	0.000
10	.001	.001
15	.001	.002
20	.002	.003
25	.004	.005
30	.005	.008
	4°	5°
5	0.000	0.000
10	.001	.001
15	.003	.003
20	.005	.006
25	.007	.009
30	.011	.013
	6°	7°
5	0.000	0.000
10	.002	.002
15	.004	.005
20	.007	.008
25	.011	.013
30	.016	.018

TABLE 7.—*Coordinates for projection of maps* (*scale* $\frac{1}{63360}$)—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
7	00	68.712	5.722	11.443	17.165	22.887	28.609	34.330
	10	11.452	5.720	11.439	17.159	22.878	28.598	34.317
	20	22.905	5.717	11.435	17.152	22.869	28.587	34.304
	30	34.358	5.715	11.430	17.146	22.861	28.576	34.291
	40	45.810	5.713	11.426	17.139	22.852	28.565	34.278
	50	57.262	5.711	11.422	17.132	22.843	28.554	34.265
8	00	68.715	5.709	11.417	17.126	22.834	28.543	34.252
	10	11.453	5.706	11.412	17.119	22.825	28.531	34.237
	20	22.906	5.704	11.407	17.111	22.815	28.519	34.222
	30	34.359	5.701	11.403	17.104	22.805	28.507	34.208
	40	45.812	5.699	11.398	17.096	22.795	28.494	34.193
	50	57.265	5.696	11.393	17.089	22.786	28.482	34.178
9	00	68.718	5.694	11.388	17.082	22.776	28.470	34.163
	10	11.454	5.691	11.382	17.073	22.764	28.456	34.147
	20	22.907	5.688	11.377	17.065	22.754	28.442	34.130
	30	33.361	5.686	11.371	17.057	22.742	28.428	34.114
	40	45.814	5.683	11.366	17.049	22.732	28.415	34.097
	50	57.268	5.680	11.360	17.040	22.720	28.401	34.081
10	00	68.722	5.677	11.355	17.032	22.710	28.387	34.064
	10	11.454	5.674	11.349	17.023	22.698	28.372	34.046
	20	22.909	5.671	11.343	17.014	22.685	28.357	34.028
	30	34.263	5.668	11.337	17.005	22.673	28.342	34.010
	40	45.817	5.665	11.331	16.996	22.661	28.327	33.992
	50	57.272	5.662	11.324	16.987	22.649	28.311	33.973
11	00	68.726	5.659	11.318	16.978	22.637	28.296	33.955
	10	11.455	5.656	11.312	16.968	22.624	28.280	33.935
	20	22.910	5.652	11.305	16.958	22.610	28.263	33.915
	30	34.365	5.649	11.298	16.948	22.597	28.246	33.895
	40	45.820	5.646	11.292	16.938	22.584	28.230	33.875
	50	57.275	5.642	11.285	16.928	22.570	28.213	33.855
12	00	68.730	5.639	11.278	16.918	22.557	28.196	33.835
	10	11.456	5.636	11.271	16.907	22.542	28.178	33.814
	20	22.912	5.632	11.264	16.896	22.528	28.160	33.792
	30	34.367	5.628	11.257	16.885	22.514	28.142	33.770
	40	45.823	5.625	11.250	16.874	22.499	28.124	33.749
	50	57.279	5.621	11.242	16.864	22.485	28.106	33.727
13	00	68.735	5.618	11.235	16.853	22.470	28.088	33.706
	10	11.457	5.614	11.227	16.841	22.455	28.069	33.682
	20	22.913	5.610	11.220	16.829	22.439	28.049	33.659
	30	34.370	5.606	11.212	16.818	22.424	28.030	33.635
	40	45.827	5.602	11.204	16.806	22.408	28.010	33.612
	50	57.284	5.598	11.196	16.794	22.392	27.991	33.589
14	00	68.740	5.594	11.188	16.783	22.377	27.971	33.565

Ordinates of developed parallel.		
Longitude interval.	7°	8°
′	*Inch.*	*Inch.*
5	0.000	0.001
10	.002	.002
15	005	.005
20	.008	.009
25	.013	.014
30	.018	.021
	9°	10°
5	0.001	0.001
10	.003	.003
15	.006	.006
20	.010	.011
25	.016	.018
30	.023	.026
	11°	12°
5	0.001	0.001
10	.003	.003
15	.007	.008
20	.013	.014
25	.020	.021
30	.028	.031
	13°	14°
5	0.001	0.001
10	.004	.004
15	.008	.009
20	.015	.016
25	.023	.025
30	.033	.035

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
14 00	68.740	5.594	11.188	16.783	22.377	27.971	33.565
10	11.458	5.590	11.180	16.770	22.360	27.950	33.540
20	22.915	5.586	11.172	16.758	22.344	27.930	33.515
30	34.373	5.582	11.163	16.745	22.327	27.909	33.490
40	45.830	5.578	11.155	16.733	22.310	27.888	33.465
50	57.288	5.573	11.147	16.720	22.294	27.867	33.440
15 00	68.746	5.569	11.138	16.708	22.277	27.846	33.415
10	11.459	5.565	11.130	16.694	22.259	27.824	33.389
20	22.917	5.560	11.121	16.681	22.241	27.802	33.362
30	34.376	5.556	11.112	16.667	22.223	27.779	33.335
40	45.834	5.551	11.103	16.654	22.206	27.757	33.308
50	57.293	5.547	11.094	16.641	22.188	27.735	33.282
16 00	68.752	5.542	11.085	16.628	22.170	27.713	33.255
10	11.460	5.538	11.076	16.613	22.151	27.689	33.227
20	22.919	5.533	11.066	16.599	22.132	27.665	33.198
30	34.379	5.528	11.057	16.585	22.113	27.642	33.170
40	45.838	5.524	11.047	16.571	22.094	27.618	33.142
50	57.298	5.519	11.038	16.556	22.075	27.594	33.113
17 00	68.758	5.514	11.028	16.542	22.056	27.571	33.085
10	11.461	5.509	11.018	16.527	22.036	27.546	33.055
20	22.921	5.504	11.008	16.512	22.016	27.521	33.025
30	34.382	5.499	10.998	16.497	21.996	27.495	32.994
40	45.843	5.494	10.988	16.482	21.976	27.470	32.964
50	57.304	5.489	10.978	16.467	21.956	27.445	32.934
18 00	68.764	5.484	10.968	16.452	21.936	27.420	32.904
10	11.462	5.479	10.957	16.436	21.915	27.394	32.872
20	22.924	5.473	10.947	16.420	21.894	27.367	32.840
30	34.386	5.468	10.936	16.404	21.872	27.341	32.809
40	45.848	5.463	10.926	16.389	21.852	27.315	32.777
50	57.310	5.458	10.915	16.373	21.830	27.288	32.746
19 00	68.771	5.452	10.905	16.357	21.809	27.262	32.714
10	11.463	5.447	10.893	16.340	21.787	27.234	32.680
20	22.926	5.441	10.882	16.324	21.765	27.206	32.647
30	34.390	5.436	10.871	16.307	21.742	27.178	32.614
40	45.853	5.430	10.860	16.290	21.720	27.150	32.580
50	57.316	5.424	10.849	16.274	21.698	27.123	32.547
20 00	68.779	5.419	10.838	16.257	21.676	27.095	32.513
10	11.464	5.413	10.826	16.239	21.652	27.065	32.478
20	22.929	5.407	10.814	16.222	21.629	27.036	32.443
30	34.394	5.401	10.803	16.204	21.605	27.007	32.408
40	45.858	5.396	10.791	16.187	21.582	26.978	32.373
50	57.322	5.390	10.779	16.169	21.558	26.948	32.338
21 00	68.787	5.384	10.768	16.151	21.535	26.919	32.303

Ordinates of developed parallel. Longitude interval.		
	14°	15°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.004	.004
15	.009	.009
20	.016	.017
25	.025	.026
30	.035	.038
	16°	17°
5	0.001	0.001
10	.004	.005
15	.010	.011
20	.018	.019
25	.028	.029
30	.040	.042
	18°	19°
5	0.001	0.001
10	.005	.005
15	.011	.012
20	.020	.021
25	.031	.032
30	.044	.046
	20°	21°
5	0.001	0.001
10	.005	.006
15	.012	.013
20	.022	.022
25	.034	.035
30	.049	.051

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
21	00	68.787	5.384	10.768	16.151	21.535	26.919	32.303
	10	11.466	5.378	10.755	16.133	21.511	26.889	32.266
	20	22.932	5.372	10.743	16.115	21.486	26.858	32.230
	30	34.397	5.366	10.731	16.097	21.462	26.828	32.193
	40	45.863	5.359	10.719	16.078	21.438	26.797	32.156
	50	57.329	5.353	10.707	16.060	21.413	26.767	32.120
22	00	68.795	5.347	10.694	16.042	21.389	26.736	32.083
	10	11.467	5.341	10.682	16.022	21.363	26.704	32.045
	20	22.934	5.334	10.669	16.003	21.338	26.672	32.006
	30	34.401	5.328	10.656	15.984	21.312	26.641	31.969
	40	45.868	5.322	10.643	15.965	21.287	26.609	31.930
	50	57.336	5.315	10.631	15.946	21.261	26.577	31.892
23	00	68.803	5.309	10.618	15.927	21.236	26.545	31.853
	10	11.469	5.302	10.604	15.907	21.209	26.511	31.813
	20	22.937	5.296	10.591	15.887	21.182	26.478	31.774
	30	34.406	5.289	10.578	15.867	21.156	26.445	31.733
	40	45.874	5.282	10.565	15.847	21.129	26.412	31.694
	50	57.343	5.276	10.551	15.827	21.102	26.378	31.654
24	00	68.812	5.269	10.538	15.807	21.076	26.345	31.614
	10	11.470	5.263	10.526	15.789	21.052	26.315	31.577
	20	22.940	5.256	10.512	15.767	21.023	26.279	31.535
	30	34.410	5.249	10.498	15.746	20.995	26.244	31.493
	40	45.880	5.242	10.483	15.725	20.967	26.209	31.450
	50	57.350	5.235	10.469	15.704	20.938	26.173	31.408
25	00	68.821	5.227	10.455	15.682	20.910	26.137	31.365
	10	11.472	5.220	10.441	15.661	20.881	26.101	31.322
	20	22.943	5.213	10.426	15.639	20.852	26.065	31.279
	30	34.415	5.206	10.412	15.618	20.824	26.029	31.235
	40	45.886	5.199	10.397	15.596	20.795	25.993	31.192
	50	57.358	5.191	10.383	15.575	20.766	25.958	31.149
26	00	68.830	5.184	10.369	15.553	20.737	25.922	31.106
	10	11.473	5.177	10.354	15.531	20.708	25.884	31.061
	20	22.946	5.169	10.339	15.508	20.678	25.847	31.017
	30	34.419	5.162	10.324	15.486	20.648	25.810	30.972
	40	45.892	5.154	10.309	15.463	20.618	25.772	30.927
	50	57.365	5.147	10.294	15.441	20.588	25.735	30.882
27	00	68.838	5.140	10.279	15.419	20.558	25.698	30.838
	10	11.475	5.132	10.264	15.396	20.528	25.659	30.791
	20	22.950	5.124	10.248	15.373	20.497	25.621	30.745
	30	34.424	5.116	10.233	15.349	20.466	25.582	30.699
	40	45.899	5.109	10.218	15.326	20.435	25.544	30.653
	50	57.374	5.101	10.202	15.303	20.404	25.505	30.607
28	00	68.849	5.093	10.187	15.280	20.374	25.467	30.560

Ordinates of developed parallel.

Longitude interval.	21°	22°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.006	.006
15	.013	.013
20	.022	.023
25	.035	.036
30	.051	.052
	23°	**24°**
5	0.001	0.002
10	.006	.006
15	.014	.014
20	.024	.025
25	.038	.039
30	.054	.056
	25°	**26°**
5	0.002	0.002
10	.006	.007
15	.014	.015
20	.026	.026
25	.040	.041
30	.058	.059
	27°	**28°**
5	0.002	0.002
10	.007	.007
15	.015	.016
20	.027	.028
25	.042	.043
30	.061	.063

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
28	00	68.849	5.093	10.187	15.280	20.374	25.467	30.560
	10	11.476	5.085	10.171	15.256	20.342	25.427	30.513
	20	22.953	5.077	10.155	15.232	20.310	25.387	30.465
	30	34.430	5.069	10.139	15.208	20.278	25.347	30.417
	40	45.906	5.061	10.123	15.185	20.246	25.308	30.369
	50	57.383	5.054	10.107	15.161	20.214	25.268	30.321
29	00	68.859	5.046	10.091	15.137	20.182	25.228	30.274
	10	11.478	5.037	10.075	15.112	20.150	25.187	30.224
	20	22.957	5.029	10.058	15.087	20.117	25.146	30.175
	30	34.435	5.021	10.042	15.063	20.084	25.105	30.126
	40	45.913	5.013	10.025	15.038	20.051	25.064	30.076
	50	57.391	5.004	10.009	15.013	20.018	25.022	30.027
30	00	68.870	4.996	9.993	14.989	19.985	24.981	29.978
	10	11.480	4.988	9.976	14.963	19.951	24.939	29.927
	20	22.960	4.979	9.959	14.938	19.917	24.896	29.876
	30	34.440	4.971	9.942	14.912	19.883	24.854	29.825
	40	45.920	4.962	9.925	14.887	19.849	24.812	29.774
	50	57.400	4.954	9.908	14.862	19.815	24.769	29.723
31	00	68.880	4.945	9.891	14.836	19.782	24.727	29.672
	10	11.482	4.937	9.873	14.810	19.747	24.683	29.620
	20	22.964	4.928	9.856	14.784	19.712	24.640	29.568
	30	34.446	4.919	9.838	14.758	19.677	24.596	29.515
	40	45.927	4.910	9.821	14.731	19.642	24.552	29.463
	50	57.409	4.902	9.804	14.705	19.607	24.509	29.411
32	00	68.891	4.893	9.786	14.679	19.572	24.465	29.358
	10	11.484	4.884	9.768	14.652	19.536	24.420	29.305
	20	22.967	4.875	9.750	14.625	19.500	24.376	29.251
	30	34.451	4.866	0.732	14.598	19.465	24.331	29.197
	40	45.934	4.857	9.714	14.572	19.429	24.286	29.143
	50	57.418	4.848	9.696	14.545	19.393	24.241	29.089
33	00	68.902	4.839	9.679	14.518	19.357	24.196	29.036
	10	11.485	4.830	9.660	14.490	19.320	24.150	28.980
	20	22.971	4.821	9.642	14.462	19.283	24.104	28.925
	30	34.456	4.812	9.623	14.435	19.246	24.058	28.870
	40	45.942	4.802	9.605	14.407	19.210	24.012	28.814
	50	57.427	4.793	9.586	14.379	19.173	23.966	28.759
34	00	68.913	4.784	9.568	14.352	19.136	23.920	28.704
	10	11.487	4.774	9.549	14.323	19.098	23.872	28.647
	20	22.975	4.765	9.530	14.295	19.060	23.825	28.590
	30	34.462	4.755	9.511	14.267	19.022	23.778	28.533
	40	45.949	4.746	9.492	14.238	18.984	23.730	28.476
	50	57.437	4.737	9.473	14.210	18.946	23.683	28.420
35	00	68.924	4.727	9.454	14.181	18.908	23.636	28.363

Ordinates of developed parallel.

Longitude interval.	28°	29°	30°	31°	32°	33°	34°	35°
′	Inches.	Inches.						
5	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
10	.007	.007	.007	.007	.007	.008	.008	.008
15	.016	.016	.016	.017	.017	.017	.017	.018
20	.028	.028	.029	.030	.030	.031	.031	.031
25	.043	.044	.045	.046	.047	.048	.049	.049
30	.063	.064	.065	.067	.068	.069	.070	.071

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
35	00	68.924	4.727	9.454	14.181	18.908	23.636	28.363
	10	11.489	4.717	9.435	14.152	18.870	23.587	28.305
	20	22.978	4.708	9.415	14.123	18.831	23.539	28.246
	30	34.468	4.698	9.396	14.094	18.792	23.490	28.188
	40	45.957	4.688	9.377	14.065	18.753	23.442	28.130
	50	57.446	4.679	9.357	14.036	18.714	23.393	28.072
36	00	68.935	4.669	9.338	14.007	18.676	23.345	28.014
	10	11.491	4.659	9.318	13.977	18.636	23.295	27.954
	20	22.983	4.649	9.298	13.947	18.596	23.245	27.894
	30	34.474	4.639	9.278	13.917	18.556	23.195	27.835
	40	45.965	4.629	9.258	13.887	18.517	23.146	27.775
	50	57.457	4.619	9.238	13.858	18.477	23.096	27.715
37	00	68.948	4.609	9.219	13.828	18.437	23.046	27.656
	10	11.493	4.599	9.198	13.797	18.396	22.995	27.594
	20	22.986	4.589	9.178	13.767	18.356	22.944	27.533
	30	34.480	4.579	9.157	13.736	18.315	22.894	27.472
	40	45.973	4.568	9.137	13.706	18.274	22.843	27.411
	50	57.466	4.558	9.117	13.675	18.234	22.792	27.350
38	00	68.959	4.548	9.096	13.645	18.193	22.741	27.289
	10	11.495	4.538	9.076	13.613	18.151	22.689	27.227
	20	22.990	4.527	9.055	13.582	18.109	22.637	27.164
	30	34.485	4.517	9.034	13.551	18.068	22.585	27.102
	40	45.980	4.506	9.013	13.520	18.026	22.533	27.039
	50	57.475	4.496	8.992	13.488	17.984	22.481	26.977
39	00	68.970	4.486	8.971	13.457	17.943	22.429	26.914
	10	11.497	4.475	8.950	13.425	17.900	22.375	26.851
	20	22.994	4.464	8.929	13.393	17.858	22.322	26.787
	30	34.491	4.454	8.908	13.361	17.815	22.269	26.723
	40	45.988	4.443	8.886	13.330	17.773	22.216	26.659
	50	57.485	4.433	8.865	13.298	17.730	22.163	26.595
40	00	68.982	4.422	8.844	13.266	17.688	22.110	26.532
	10	11.499	4.411	8.822	13.233	17.644	22.055	26.466
	20	22.998	4.400	8.800	13.201	17.601	22.001	26.401
	30	34.497	4.389	8.779	13.168	17.557	21.947	26.336
	40	45.996	4.378	8.757	13.135	17.514	21.892	26.271
	50	57.495	4.368	8.735	13.103	17.470	21.838	26.206
41	00	68.994	4.357	8.713	13.070	17.427	21.784	26.140
	10	11.501	4.346	8.691	13.037	17.383	21.728	26.074
	20	23.002	4.335	8.669	13.004	17.338	21.673	26.007
	30	34.503	4.324	8.647	12.971	17.294	21.618	25.941
	40	46.004	4.312	8.625	12.937	17.250	21.562	25.875
	50	57.506	4.301	8.603	12.904	17.205	21.507	25.808
42	00	69.007	4.290	8.581	12.871	17.161	21.451	25.742

Ordinates of developed parallel.

Longitude interval.	35°	36°
′	*Inches.*	*Inches.*
5	0.002	0.002
10	.008	.008
15	.018	.018
20	.031	.032
25	.049	.050
30	.071	.072
	37°	**38°**
5	0.002	0.002
10	.008	.008
15	.018	.018
20	.032	.033
25	.050	.051
30	.073	.073
	39°	**40°**
5	0.002	0.002
10	.008	.008
15	.018	.019
20	.033	.033
25	.051	.052
30	.074	.074
	41°	**42°**
5	0.002	0.002
10	.008	.008
15	.019	.019
20	.033	.033
25	.052	.052
30	.075	.075

Table 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
42	00	69.007	4.290	8.581	12.871	17.161	21.451	25.742
	10	11.503	4.279	8.558	12.837	17.116	21.395	25.674
	20	23.006	4.268	8.535	12.803	17.071	21.338	25.606
	30	34.510	4.256	8.513	12.769	17.025	21.282	25.538
	40	46.013	4.245	8.490	12.735	16.980	21.225	25.470
	50	57.516	4.234	8.467	12.701	16.935	21.169	25.402
43	00	69.019	4.222	8.445	12.667	16.890	21.112	25.334
	10	11.505	4.211	8.422	12.633	16.844	21.054	25.265
	20	23.010	4.199	8.399	12.598	16.798	20.997	25.196
	30	34.515	4.188	8.376	12.564	16.751	20.939	25.127
	40	46.020	4.176	8.353	12.529	16.705	20.882	25.058
	50	57.525	4.165	8.330	12.494	16.659	20.824	24.989
44	00	69.030	4.153	8.307	12.460	16.613	20.767	24.920
	10	11.507	4.142	8.283	12.425	16.566	20.708	24.849
	20	23.014	4.130	8.260	12.390	16.519	20.649	24.779
	30	34.522	4.118	8.236	12.354	16.473	20.591	24.709
	40	46.029	4.106	8.213	12.319	16.426	20.532	24.638
	50	57.536	4.095	8.189	12.284	16.379	20.473	24.568
45	00	69.043	4.083	8.166	12.249	16.332	20.415	24.498
	10	11.509	4.071	8.142	12.213	16.284	20.355	24.426
	20	23.018	4.059	8.118	12.177	16.236	20.295	24.354
	30	34.528	4.047	8.094	12.141	16.188	20.236	24.283
	40	46.037	4.035	8.070	12.105	16.141	20.176	24.211
	50	57.546	4.023	8.046	12.070	16.093	20.116	24.139
46	00	69.055	4.011	8.023	12.034	16.045	20.056	24.068
	10	11.511	3.999	7.998	11.997	15.997	19.996	23.995
	20	23.023	3.987	7.974	11.961	15.948	19.935	23.922
	30	34.534	3.975	7.950	11.925	15.899	19.874	23.849
	40	46.045	3.963	7.925	11.888	15.851	19.813	23.776
	50	57.557	3.951	7.901	11.852	15.802	19.753	23.703
47	00	69.068	3.938	7.877	11.815	15.754	19.692	23.630
	10	11.513	3.926	7.852	11.778	15.704	19.630	23.556
	20	23.027	3.914	7.827	11.741	15.655	19.569	23.482
	30	34.540	3.901	7.803	11.704	15.606	19.507	23.408
	40	46.053	3.889	7.778	11.667	15.556	19.445	23.334
	50	57.567	3.877	7.753	11.630	15.507	19.383	23.260
48	00	69.080	3.864	7.729	11.593	15.457	19.322	23.186
	10	11.516	3.852	7.704	11.555	15.407	19.259	23.111
	20	23.031	3.839	7.679	11.518	15.357	19.196	23.035
	30	34.546	3.827	7.653	11.480	15.307	19.134	22.960
	40	46.062	3.814	7.628	11.442	15.257	19.071	22.885
	50	57.577	3.802	7.603	11.405	15.206	19.008	22.810
49	00	69.093	3.789	7.578	11.367	15.156	18.945	22.734

Ordinates of developed parallel.

Longitude interval.	42°	43°	44°	45°	46°	47°	48°	49°
′	*Inches.*	*Inches.*						
5	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
10	.008	.008	.008	.008	.008	.008	.008	.008
15	.019	.019	.019	.019	.019	.019	.019	.019
20	.033	.033	.034	.034	.034	.034	.033	.033
25	.052	.052	.052	.053	.053	.052	.052	.052
30	.075	.075	.075	.076	.076	.075	.075	.075

TABLE 7.—*Coordinates for projection of maps* (*scale* $\frac{1}{63360}$)—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
49	00	69.093	3.789	7.578	11.367	15.156	18.945	22.734
	10	11.517	3.776	7.553	11.329	15.105	18.882	22.658
	20	23.035	3.764	7.527	11.291	15.054	18.818	22.581
	30	34.552	3.751	7.502	11.253	15.003	18.754	22.505
	40	46.070	3.738	7.476	11.214	14.952	18.690	22.429
	50	57.587	3.725	7.451	11.176	14.901	18.627	22.352
50	00	69.105	3.713	7.425	11.138	14.850	18.563	22.276
	10	11.520	3.700	7.399	11.099	14.799	18.499	22.198
	20	23.039	3.687	7.374	11.060	14.747	18.434	22.121
	30	34.558	3.674	7.348	11.021	14.695	18.369	22.043
	40	46.078	3.661	7.322	10.983	14.644	18.305	21.965
	50	57.598	3.648	7.296	10.944	14.592	18.240	21.888
51	00	69.117	3.635	7.270	10.905	14.540	18.176	21.811
	10	11.521	3.622	7.244	10.866	14.488	18.110	21.732
	20	23.043	3.609	7.218	10.827	14.436	18.045	21.653
	30	34.564	3.596	7.191	10.787	14.383	17.979	21.574
	40	46.086	3.583	7.165	10.748	14.330	17.913	21.496
	50	57.607	3.570	7.139	10.709	14.278	17.848	21.417
52	00	69.128	3.556	7.113	10.669	14.226	17.782	21.338
	10	11.523	3.543	7.086	10.629	14.172	17.716	21.259
	20	23.047	3.530	7.060	10.589	14.119	17.649	21.179
	30	34.570	3.516	7.033	10.550	14.066	17.583	21.099
	40	46.094	3.503	7.006	10.510	14.013	17.516	21.019
	50	57.617	3.490	6.980	10.470	13.960	17.450	20.939
53	00	69.140	3.477	6.953	10.430	13.906	17.383	20.860
	10	11.525	3.463	6.926	10.389	13.852	17.316	20.779
	20	23.051	3.450	6.899	10.349	13.798	17.248	20.698
	30	34.576	3.436	6.872	10.309	13.745	17.181	20.617
	40	46.102	3.423	6.845	10.268	13.691	17.114	20.536
	50	57.627	3.409	6.818	10.228	13.637	17.046	20.455
54	00	69.152	3.396	6.791	10.187	13.583	16.979	20.374
	10	11.527	3.382	6.764	10.146	13.528	16.910	20.292
	20	23.055	3.368	6.737	10.105	13.474	16.842	20.210
	30	34.582	3.355	6.709	10.064	13.419	16.774	20.128
	40	46.109	3.341	6.682	10.023	13.364	16.706	20.047
	50	57.636	3.327	6.655	9.982	13.310	16.637	19.964
55	00	69.164	3.314	6.628	9.941	13.255	16.569	19.883
	10	11.529	3.300	6.600	9.900	13.200	16.500	19.800
	20	23.059	3.286	6.572	9.859	13.145	16.431	19.717
	30	34.588	3.272	6.545	9.817	13.089	16.362	19.634
	40	46.117	3.258	6.517	9.776	13.034	16.293	19.551
	50	57.646	3.245	6.489	9.734	12.979	16.224	19.468
56	00	69.176	3.231	6.462	9.693	12.924	16.155	19.385

Ordinates of developed parallel.

Longitude interval.	49°	50°
′	*Inches.*	*Inches.*
5	0.002	0.002
10	.008	.008
15	.019	.019
20	.033	.033
25	.052	.052
30	.075	.075
	51°	**52°**
5	0.002	0.002
10	.008	.008
15	.019	.018
20	.033	.033
25	.051	.051
30	.074	.073
	53°	**54°**
5	0.002	0.002
10	.008	.008
15	.018	.018
20	.032	.032
25	.050	.050
30	.073	.072
	55°	**56°**
5	0.002	0.002
10	.008	.008
15	.018	.018
20	.032	.031
25	.049	.049
30	.071	.070

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
56	00	69.176	3.231	6.462	9.693	12.924	16.155	19.385
	10	11.531	3.217	6.434	9.651	12.868	16.085	19.301
	20	23.063	3.203	6.406	9.609	12.812	16.015	19.217
	30	34.594	3.189	6.378	9.567	12.756	15.945	19.134
	40	46.125	3.175	6.350	9.525	12.700	15.875	19.050
	50	57.656	3.161	6.322	9.483	12.644	15.805	18.966
57	00	69.188	3.147	6.294	9.441	12.588	15.735	18.882
	10	11.533	3.133	6.266	9.398	12.531	15.664	18.797
	20	23.066	3.119	6.237	9.356	12.475	15.594	18.712
	30	34.599	3.104	6.209	9.314	12.418	15.523	18.627
	40	46.132	3.090	6.181	9.271	12.362	15.452	18.542
	50	57.666	3.076	6.152	9.229	12.305	15.381	18.457
58	00	69.199	3.062	6.124	9.186	12.248	15.311	18.373
	10	11.535	3.048	6.096	9.143	12.191	15.239	18.287
	20	23.070	3.034	6.067	9.101	12.134	15.168	18.201
	30	34.605	3.019	6.038	9.058	12.077	15.096	18.115
	40	46.140	3.005	6.010	9.015	12.020	15.025	18.029
	50	57.675	2.991	5.981	8.972	11.962	14.953	17.944
59	00	69.210	2.976	5.953	8.929	11.905	14.882	17.858
	10	11.537	2.962	5.924	8.885	11.847	14.809	17.771
	20	23.074	2.947	5.895	8.842	11.790	14.737	17.684
	30	34.610	2.933	5.866	8.799	11.732	14.665	17.597
	40	46.147	2.918	5.837	8.755	11.674	14.592	17.510
	50	57.684	2.904	5.808	8.712	11.616	14.520	17.424
60	00	69.221	2.890	5.779	8.669	11.558	14.448	17.337
	10	11.539	2.875	5.750	8.625	11.500	14.375	17.249
	20	23.077	2.860	5.721	8.581	11.441	14.302	17.162
	30	34.616	2.846	5.691	8.537	11.383	14.229	17.074
	40	46.154	2.831	5.662	8.493	11.324	14.156	16.987
	50	57.693	2.816	5.633	8.450	11.266	14.083	16.899
61	00	69.232	2.802	5.604	8.406	11.208	14.010	16.811
	10	11.540	2.787	5.574	8.361	11.148	13.936	16.723
	20	23.081	2.772	5.545	8.317	11.090	13.862	16.634
	30	34.621	2.758	5.115	8.273	11.030	13.788	16.546
	40	46.162	2.743	5.486	8.229	10.972	13.715	16.457
	50	57.702	2.728	5.456	8.184	10.912	13.641	16.369
62	00	69.242	2.713	5.427	8.140	10.854	13.567	16.280
	10	11.542	2.699	5.397	8.096	10.794	13.493	16.191
	20	23.084	2.684	5.367	8.051	10.734	13.418	16.102
	30	34.626	2.669	5.337	8.006	10.675	13.344	16.012
	40	46.168	2.654	5.308	7.961	10.615	13.269	15.923
	50	57.710	2.639	5.278	7.917	10.556	13.195	15.833
63	00	69.253	2.624	5.248	7.872	10.496	13.120	15.744

Ordinates of developed parallel.

Longitude interval.	56°	57°	58°	59°	60°	61°	62°	63°
′	*Inches.*	*Inches.*						
5	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
10	.008	.008	.008	.007	.007	.007	.007	.007
15	.018	.017	.017	.017	.016	.016	.016	.015
20	.031	.031	.030	.030	.029	.029	.028	.027
25	.049	.048	.047	.046	.045	.045	.044	.043
30	.070	.069	.068	.067	.065	.064	.063	.061

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
63	00	69.253	2.624	5.248	7.872	10.496	13.120	15.744
	10	11.544	2.609	5.218	7.827	10.436	13.045	15.654
	20	23.087	2.594	5.188	7.782	10.376	12.970	15.564
	30	34.631	2.579	5.158	7.737	10.316	12.895	15.473
	40	46.175	2.564	5.128	7.692	10.256	12.820	15.383
	50	57.718	2.549	5.098	7.647	10.196	12.745	15.293
64	00	69.262	2.534	5.068	7.602	10.136	12.670	15.203
	10	11.545	2.519	5.037	7.556	10.075	12.594	15.112
	20	23.091	2.504	5.007	7.511	10.014	12.518	15.022
	30	34.636	2.488	4.977	7.465	9.954	12.442	14.930
	40	46.182	2.473	4.947	7.420	9.893	12.367	14.840
	50	57.727	2.458	4.916	7.374	9.832	12.291	14.749
65	00	69.272	2.443	4.886	7.329	9.772	12.215	14.658
	10	11.547	2.428	4.855	7.283	9.711	12.139	14.566
	20	23.094	2.412	4.825	7.237	9.650	12.062	14.474
	30	34.641	2.397	4.794	7.191	9.588	11.986	14.383
	40	46.188	2.382	4.764	7.145	9.527	11.909	14.291
	50	57.735	2.366	4.733	7.100	9.466	11.833	14.199
66	00	69.282	2.351	4.702	7.054	9.405	11.756	14.107
	10	11.548	2.336	4.672	7.007	9.343	11.679	14.015
	20	23.097	2.320	4.641	6.961	9.282	11.602	13.922
	30	34.646	2.305	4.610	6.915	9.220	11.525	13.830
	40	46.194	2.290	4.579	6.869	9.158	11.448	13.738
	50	57.742	2.274	4.548	6.823	9.097	11.371	13.645
67	00	69.291	2.259	4.518	6.776	9.035	11.294	13.553
	10	11.550	2.243	4.487	6.730	8.973	11.217	13.460
	20	23.100	2.228	4.455	6.683	8.911	11.139	13.366
	30	34.650	2.212	4.424	6.637	8.849	11.061	13.273
	40	46.200	2.197	4.393	6.590	8.787	10.984	13.180
	50	57.750	2.181	4.362	6.543	8.724	10.906	13.087
68	00	69.300	2.166	4.331	6.497	8.662	10.828	12.994
	10	11.552	2.150	4.300	6.450	8.600	10.750	12.900
	20	23.103	2.134	4.269	6.403	8.538	10.672	12.806
	30	34.654	2.119	4.237	6.356	8.475	10.594	12.712
	40	46.206	2.103	4.206	6.309	8.412	10.516	12.619
	50	57.758	2.088	4.175	6.263	8.350	10.438	12.525
69	00	69.309	2.072	4.144	6.216	8.288	10.360	12.431
	10	11.553	2.056	4.112	6.169	8.225	10.281	12.337
	20	23.106	2.040	4.081	6.121	8.162	10.202	12.242
	30	34.659	2.025	4.049	6.074	8.099	10.124	12.148
	40	46.212	2.009	4.018	6.027	8.036	10.045	12.054
	50	57.764	1.993	3.986	5.980	7.973	9.966	11.959
70	00	69.317	1.977	3.955	5.932	7.910	9.888	11.865

Ordinates of developed parallel.		
Longitude interval.	63°	64°
′	*Inches.*	*Inches.*
5	0.002	0.002
10	.007	.007
15	.015	.015
20	.027	.026
25	.043	.041
30	.061	.060
	65°	66°
5	0.002	0.002
10	.006	.006
15	.014	.014
20	.026	.025
25	.040	.039
30	.058	.056
	67°	68°
5	0.001	0.001
10	.006	.006
15	.014	.013
20	.024	.023
25	.038	.036
30	.054	.053
	69°	70°
5	0.001	0.001
10	.006	.005
15	.013	.012
20	.022	.022
25	.035	.034
30	.051	.049

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
70	00	69.317	1.977	3.955	5.932	7.910	9.888	11.865
	10	11.554	1.962	3.923	5.885	7.846	9.808	11.770
	20	23.109	1.946	3.892	5.837	7.783	9.729	11.675
	30	34.663	1.930	3.860	5.790	7.720	9.650	11.579
	40	46.217	1.914	3.828	5.742	7.656	9.571	11.485
	50	57.772	1.898	3.796	5.695	7.593	9.491	11.389
71	00	69.326	1.882	3.765	5.647	7.530	9.412	11.294
	10	11.556	1.866	3.733	5.600	7.466	9.333	11.199
	20	23.111	1.850	3.701	5.552	7.402	9.253	11.103
	30	34.667	1.835	3.669	5.504	7.338	9.173	11.008
	40	46.222	1.819	3.637	5.456	7.275	9.094	10.912
	50	57.778	1.803	3.605	5.408	7.211	9.014	10.816
72	00	69.334	1.787	3.574	5.360	7.147	8.934	10.721
	10	11.557	1.771	3.542	5.312	7.083	8.854	10.625
	20	23.114	1.755	3.509	5.264	7.019	8.774	10.528
	30	34.670	1.739	3.477	5.216	6.955	8.694	10.432
	40	46.227	1.723	3.445	5.168	6.891	8.614	10.336
	50	57.784	1.707	3.413	5.120	6.826	8.533	10.240
73	00	69.341	1.691	3.381	5.072	6.762	8.453	10.144
	10	11.558	1.674	3.349	5.024	6.698	8.373	10.047
	20	23.116	1.658	3.317	4.975	6.634	8.292	9.950
	30	34.674	1.642	3.284	4.927	6.569	8.211	9.853
	40	46.232	1.626	3.252	4.878	6.504	8.131	9.757
	50	57.790	1.610	3.220	4.830	6.440	8.050	9.660
74	00	69.348	1.594	3.188	4.782	6.376	7.970	9.563
	10	11.559	1.578	3.155	4.733	6.311	7.889	9.466
	20	23.118	1.562	3.123	4.685	6.246	7.808	9.369
	30	34.677	1.545	3.091	4.636	6.181	7.727	9.272
	40	46.236	1.529	3.058	4.587	6.116	7.645	9.175
	50	57.796	1.513	3.026	4.539	6.052	7.565	9.077
75	00	69.355	1.497	2.993	4.490	5.987	7.484	8.980
	10	11.560	1.480	2.961	4.441	5.922	7.402	8.882
	20	23.120	1.464	2.928	4.392	5.856	7.321	8.785
	30	34.681	1.448	2.896	4.344	5.792	7.240	8.687
	40	46.241	1.432	2.863	4.295	5.726	7.158	8.590
	50	57.801	1.415	2.831	4.246	5.661	7.077	8.492
76	00	69.361	1.399	2.798	4.197	5.596	6.995	8.394
	10	11.561	1.383	2.765	4.148	5.530	6.913	8.296
	20	23.122	1.366	2.733	4.099	5.465	6.832	8.198
	30	34.683	1.350	2.700	4.050	5.400	6.750	8.099
	40	46.244	1.334	2.667	4.001	5.334	6.668	8.002
	50	57.806	1.317	2.634	3.952	5.269	6.586	7.903
77	00	69.367	1.301	2.602	3.903	5.204	6.505	7.805

Ordinates of developed parallel.

Longitude interval.	70°	71°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.005	.005
15	.012	.012
20	.022	.021
25	.034	.032
30	.049	.047
	72°	**73°**
5	0.001	0.001
10	.005	.005
15	.011	.011
20	.020	.019
25	.031	.029
30	.044	.042
	74°	**75°**
5	0.001	0.001
10	.004	.004
15	.010	.009
20	.018	.017
25	.028	.026
30	.040	.038
	76°	**77°**
5	0.001	0.001
10	.004	.004
15	.009	.008
20	.016	.015
25	.025	.023
30	.036	.033

TABLE 7.—*Coordinates for projection of maps (scale $\frac{1}{63360}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 5′ longitude.	10′ longitude.	15′ longitude.	20′ longitude.	25′ longitude.	30′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
77 00	69.367	1.301	2.602	3.903	5.204	6.505	7.805
10	11.562	1.284	2.569	3.854	5.138	6.423	7.707
20	23.124	1.268	2.536	3.804	5.072	6.341	7.609
30	34.686	1.252	2.503	3.755	5.006	6.258	7.510
40	46.248	1.235	2.470	3.706	4.941	6.176	7.411
50	57.810	1.219	2.438	3.656	4.875	6.094	7.313
78 00	69.373	1.202	2.405	3.607	4.810	6.012	7.214
10	11.563	1.186	2.372	3.558	4.744	5.930	7.115
20	23.126	1.169	2.339	3.508	4.678	5.847	7.016
30	34.689	1.153	2.306	3.459	4.612	5.765	6.918
40	46.252	1.136	2.273	3.410	4.546	5.683	6.819
50	57.814	1.120	2.240	3.360	4.480	5.600	6.720
79 00	69.377	1.104	2.207	3.311	4.414	5.518	6.621
10	11.564	1.087	2.174	3.261	4.348	5.435	6.522
20	23.127	1.070	2.141	3.211	4.282	5.352	6.422
30	34.691	1.054	2.108	3.162	4.216	5.270	6.323
40	46.255	1.037	2.075	3.112	4.150	5.187	6.224
50	57.818	1.021	2.042	3.062	4.083	5.104	6.125
80 00	69.382	1.004	2.009	3.013	4.017	5.022	6.026

Ordinates of developed parallel. Longitude interval.	77°	78°
′	*Inches.*	*Inches.*
5	0.001	0.001
10	.004	.003
15	.008	.008
20	.015	.014
25	.023	.021
30	.033	.031
	79°	80°
5	0.001	0.001
10	.003	.003
15	.007	.006
20	.013	.011
25	.020	.018
30	.028	.026

TABLE 8.—*Coordinates for projection of maps (scale $\frac{1}{62500}$).*

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 2½′ longitude.	5′ longitude.	7½′ longitude.	10′ longitude.	12½′ longitude.	15′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
25	00	....	2.650	5.299	7.949	10.599	13.248	15.898
	05	5.815	2.648	5.296	7.944	10.591	13.239	15.887
	10	11.629	2.646	5.292	7.938	10.584	13.230	15.876
	15	17.444	2.644	5.288	7.933	10.577	13.221	15.865
	20	23.259	2.642	5.285	7.927	10.569	13.212	15.854
	25	29.074	2.641	5.281	7.922	10.562	13.203	15.843
	30	34.888	2.639	5.277	7.916	10.555	13.194	15.832
	35	....	2.637	5.274	7.911	10.548	13.184	15.821
	40	....	2.635	5.270	7.905	10.540	13.175	15.810
	45	....	2.633	5.266	7.900	10.533	13.166	15.799
	50	....	2.631	5.263	7.894	10.526	13.157	15.788
	55	....	2.630	5.259	7.889	10.518	13.148	15.777
26	00	....	2.628	5.256	7.883	10.511	13.139	15.766
	05	5.816	2.626	5.252	7.878	10.504	13.129	15.755
	10	11.631	2.624	5.248	7.872	10.496	13.120	15.744
	15	17.447	2.622	5.244	7.866	10.489	13.111	15.733
	20	23.262	2.620	5.241	7.861	10.481	13.101	15.721
	25	29.078	2.618	5.237	7.855	10.473	13.092	15.710
	30	34.893	2.617	5.233	7.849	10.466	13.082	15.699
	35	....	2.615	5.229	7.844	10.458	13.073	15.688
	40	....	2.613	5.225	7.838	10.451	13.064	15.676
	45	....	2.611	5.222	7.833	10.443	13.054	15.665
	50	....	2.609	5.218	7.827	10.436	13.045	15.654
	55	....	2.607	5.214	7.821	10.428	13.035	15.642
27	00	....	2.605	5.210	7.816	10.421	13.026	15.631
	05	5.816	2.603	5.207	7.810	10.413	13.016	15.620
	10	11.633	2.601	5.203	7.804	10.405	13.006	15.608
	15	17.449	2.599	5.199	7.798	10.397	12.997	15.596
	20	23.265	2.597	5.195	7.792	10.389	12.987	15.584
	25	29.082	2.595	5.191	7.786	10.382	12.977	15.572
	30	34.898	2.593	5.187	7.780	10.374	12.967	15.561
	35	....	2.591	5.183	7.774	10.366	12.957	15.549
	40	....	2.590	5.179	7.769	10.358	12.948	15.537
	45	....	2.588	5.175	7.763	10.350	12.938	15.525
	50	....	2.586	5.171	7.757	10.342	12.928	15.514
	55	....	2.584	5.167	7.751	10.335	12.918	15.502
28	00	....	2.582	5.163	7.745	10.327	12.908	15.490
	05	5.817	2.580	5.159	7.739	10.319	12.898	15.478
	10	11.634	2.578	5.155	7.733	10.311	12.888	15.466
	15	17.451	2.576	5.151	7.727	10.303	12.878	15.454
	20	23.268	2.574	5.147	7.721	10.294	12.868	15.442
	25	29.085	2.572	5.143	7.715	10.286	12.858	15.430
	30	34.903	2.570	5.139	7.709	10.278	12.848	15.418
	35	....	2.568	5.135	7.703	10.270	12.838	15.405
	40	....	2.566	5.131	7.697	10.262	12.828	15.393
	45	....	2.564	5.127	7.691	10.254	12.818	15.381
	50	....	2.562	5.123	7.685	10.246	12.808	15.369
	55	....	2.560	5.119	7.679	10.238	12.798	15.357
29	00	....	2.558	5.115	7.673	10.230	12.788	15.345

Ordinates of developed parallel.

Longitude interval.	25°	26°
′	*Inches.*	*Inches.*
2½	0.000	0.000
5	.002	.002
7½	.004	.004
10	.007	.007
12½	.010	.010
15	.015	.015

Longitude interval.	27°
′	*Inches.*
2½	0.000
5	.002
7½	.004
10	.007
12½	.011
15	.015

Longitude interval.	27°	28°
′	*Inches.*	*Inches.*
2½	0.000	0.000
5	.002	.002
7½	.004	.004
10	.007	.007
12½	.011	.011
15	.015	.016

Longitude interval.	29°
′	*Inches.*
2½	0.000
5	.002
7½	.004
10	.007
12½	.011
15	.016

TABLE 8.—*Coordinates for projection of maps (scale $\frac{1}{62500}$)*—Continued.

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			2½′ longitude.	5′ longitude.	7½′ longitude.	10′ longitude.	12½′ longitude.	15′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
29	00	....	2.558	5.115	7.673	10.230	12.788	15.345
	05	5.818	2.555	5.111	7.666	10.222	12.777	15.333
	10	11.636	2.553	5.107	7.660	10.213	12.767	15.320
	15	17.454	2.551	5.103	7.654	10.205	12.756	15.308
	20	23.272	2.549	5.098	7.648	10.197	12.746	15.295
	25	29.090	2.547	5.094	7.641	10.188	12.735	15.283
	30	34.908	2.545	5.090	7.635	10.180	12.725	15.270
	35	....	2.543	5.086	7.629	10.172	12.715	15.258
	40	....	2.541	5.082	7.623	10.164	12.704	15.245
	45	....	2.539	5.078	7.616	10.155	12.694	15.233
	50	....	2.537	5.073	7.610	10.147	12.684	15.220
	55	....	2.535	5.069	7.604	10.138	12.673	15.208
30	00	....	2.533	5.065	7.598	10.130	12.663	15.195
	05	5.819	2.530	5.061	7.591	10.122	12.652	15.182
	10	11.638	2.528	5.057	7.585	10.113	12.641	15.169
	15	17.457	2.526	5.052	7.578	10.104	12.630	15.157
	20	23.276	2.524	5.048	7.572	10.096	12.620	15.144
	25	29.095	2.522	5.044	7.565	10.087	12.609	15.131
	30	34.913	2.520	5.039	7.559	10.079	12.598	15.118
	35	....	2.518	5.035	7.552	10.070	12.587	15.105
	40	....	2.515	5.031	7.546	10.061	12.577	15.092
	45	....	2.513	5.026	7.540	10.053	12.566	15.079
	50	....	2.511	5.022	7.533	10.044	12.555	15.066
	55	....	2.509	5.018	7.527	10.036	12.544	15.053
31	00	....	2.507	5.014	7.520	10.027	12.534	15.040
	05	5.820	2.505	5.009	7.514	10.018	12.523	15.027
	10	11.640	2.502	5.005	7.507	10.009	12.512	15.014
	15	17.460	2.500	5.000	7.500	10.000	12.500	15.000
	20	23.280	2.498	4.996	7.494	9.992	12.489	14.987
	25	29.100	2.496	4.991	7.487	9.983	12.478	14.974
	30	34.919	2.494	4.987	7.480	9.974	12.467	14.961
	35	....	2.491	4.983	7.474	9.965	12.456	14.948
	40	....	2.489	4.978	7.467	9.956	12.445	14.934
	45	....	2.487	4.974	7.460	9.947	12.434	14.921
	50	....	2.485	4.969	7.454	9.938	12.423	14.908
	55	....	2.482	4.965	7.447	9.930	12.412	14.894
32	00	....	2.480	4.960	7.441	9.921	12.401	14.881
	05	5.821	2.478	4.956	7.434	9.912	12.390	14.868
	10	11.642	2.476	4.951	7.427	9.903	12.378	14.854
	15	17.462	2.473	4.947	7.420	9.894	12.367	14.840
	20	23.283	2.471	4.942	7.413	9.884	12.356	14.827
	25	29.104	2.469	4.938	7.407	9.875	12.344	14.813
	30	34.925	2.467	4.933	7.400	9.866	12.333	14.800
	35	....	2.464	4.929	7.393	9.857	12.322	14.786
	40	....	2.462	4.924	7.386	9.848	12.310	14.772
	45	....	2.460	4.920	7.379	9.839	12.299	14.759
	50	....	2.458	4.915	7.372	9.831	12.287	14.745
	55	....	2.455	4.910	7.366	9.821	12.276	14.731
33	00	....	2.453	4.906	7.359	9.812	12.265	14.718

Ordinates of developed parallel.

Longitude interval.	29°	30°
′	*Inches.*	*Inches.*
2½	0.000	0.000
5	.002	.002
7½	.004	.004
10	.007	.007
12½	.011	.012
15	.016	.017
	31°	
2½	0.000	
5	.002	
7½	.004	
10	.008	
12½	.012	
15	.017	

Longitude interval.	31°	32°
′	*Inches.*	*Inches.*
2½	0.000	0.000
5	.002	.002
7½	.004	.004
10	.008	.008
12½	.012	.012
15	.017	.017
	33°	
2½	0.000	
5	.002	
7½	.004	
10	.008	
12½	.012	
15	.017	

TABLE 8.—*Coordinates for projection of maps (scale $\frac{1}{62500}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 2½′ longitude.	5′ longitude.	7½′ longitude.	10′ longitude.	12½′ longitude.	15′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
33	00	....	2.453	4.906	7.359	9.812	12.265	14.718
	05	5.822	2.451	4.901	7.352	9.802	12.253	14.704
	10	11.643	2.448	4.897	7.345	9.793	12.241	14.690
	15	17.465	2.446	4.892	7.338	9.784	12.230	14.676
	20	23.287	2.444	4.887	7.331	9.774	12.218	14.662
	25	29.109	2.441	4.882	7.324	9.765	12.206	14.648
	30	34.930	2.439	4.878	7.317	9.756	12.195	14.633
	35	....	2.437	4.873	7.310	9.746	12.183	14.619
	40	....	2.434	4.868	7.303	9.737	12.171	14.605
	45	....	2.432	4.864	7.296	9.728	12.160	14.591
	50	....	2.430	4.859	7.289	9.718	12.148	14.577
	55	....	2.427	4.854	7.282	9.709	12.136	14.563
34	00	....	2.425	4.850	7.275	9.700	12.124	14.549
	05	5.823	2.423	4.845	7.267	9.690	12.112	14.535
	10	11.645	2.420	4.840	7.260	9.680	12.100	14.520
	15	17.468	2.418	4.835	7.253	9.671	12.088	14.506
	20	23.291	2.415	4.831	7.246	9.661	12.076	14.492
	25	29.113	2.413	4.826	7.239	9.652	12.064	14.477
	30	34.936	2.411	4.821	7.231	9.642	12.052	14.463
	35	....	2.408	4.816	7.224	9.632	12.040	14.448
	40	....	2.406	4.811	7.217	9.623	12.028	14.434
	45	....	2.403	4.807	7.210	9.613	12.016	14.420
	50	....	2.401	4.802	7.203	9.604	12.004	14.405
	55	....	2.399	4.797	7.195	9.594	11.992	14.391
35	00	....	2.396	4.792	7.188	9.584	11.980	14.376
	05	5.824	2.394	4.787	7.181	9.574	11.968	14.362
	10	11.647	2.391	4.782	7.174	9.565	11.956	14.347
	15	17.471	2.389	4.777	7.166	9.555	11.944	14.332
	20	23.294	2.386	4.773	7.159	9.545	11.931	14.318
	25	29.118	2.384	4.768	7.151	9.535	11.919	14.303
	30	34.942	2.381	4.763	7.144	9.525	11.907	14.288
	35	....	2.379	4.758	7.137	9.516	11.895	14.273
	40	....	2.376	4.753	7.129	9.506	11.882	14.259
	45	....	2.374	4.748	7.122	9.496	11.870	14.244
	50	....	2.372	4.743	7.115	9.486	11.858	14.229
	55	....	2.369	4.738	7.107	9.476	11.845	14.214
36	00	....	2.367	4.733	7.100	9.466	11.833	14.200
	05	5.824	2.364	4.728	7.092	9.456	11.820	14.185
	10	11.649	2.362	4.723	7.085	9.446	11.808	14.169
	15	17.473	2.359	4.718	7.077	9.436	11.795	14.154
	20	23.297	2.357	4.713	7.070	9.426	11.783	14.139
	25	29.122	2.354	4.708	7.062	9.416	11.770	14.124
	30	34.946	2.352	4.703	7.055	9.406	11.758	14.109
	35	....	2.349	4.698	7.047	9.396	11.745	14.094
	40	....	2.346	4.693	7.039	9.386	11.732	14.079
	45	....	2.344	4.688	7.032	9.376	11.720	14.064
	50	....	2.341	4.683	7.024	9.366	11.707	14.048
	55	....	2.339	4.678	7.017	9.356	11.694	14.033
37	00	....	2.336	4.673	7.009	9.345	11.682	14.018

Ordinates of developed parallel.

Longitude interval.	33°	34°
′	*Inches.*	*Inches.*
2½	0.000	0.000
5	.002	.002
7½	.004	.004
10	.008	.008
12½	.012	.012
15	.017	.018

	35°
′	*Inches.*
2½	0.000
5	.002
7½	.004
10	.008
12½	.012
15	.018

Longitude interval.	35°	36°
′	*Inches.*	*Inches*
2½	0.000	0.001
5	.002	.002
7½	.004	.005
10	.008	.008
12½	.012	.013
15	.018	.018

	37°
′	*Inches.*
2½	0.001
5	.002
7½	.005
10	.008
12½	.013
15	.018

TABLE 8.—*Coordinates for projection of maps* (*scale* $\frac{1}{62500}$)—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel. 2½′ longitude.	5′ longitude.	7½′ longitude.	10′ longitude.	12½′ longitude.	15′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
37	00	....	2.336	4.673	7.009	9.345	11.682	14.018
	05	5.826	2.334	4.667	7.001	9.335	11.669	14.003
	10	11.651	2.331	4.662	6.994	9.325	11.656	13.987
	15	17.477	2.329	4.657	6.986	9.314	11.643	13.972
	20	23.302	2.326	4.652	6.978	9.304	11.630	13.956
	25	29.128	2.323	4.647	6.970	9.294	11.617	13.941
	30	34.954	2.321	4.642	6.963	9.283	11.604	13.925
	35	....	2.318	4.637	6.955	9.273	11.591	13.910
	40	....	2.316	4.631	6.947	9.263	11.578	13.894
	45	....	2.313	4.626	6.939	9.253	11.566	13.879
	50	....	2.311	4.621	6.932	9.242	11.553	13.863
	55	....	2.308	4.616	6.924	9.232	11.540	13.848
38	00	....	2.305	4.611	6.916	9.222	11.527	13.832
	05	5.827	2.303	4.606	6.908	9.211	11.514	13.817
	10	11.653	2.300	4.600	6.900	9.201	11.501	13.801
	15	17.480	2.298	4.595	6.892	9.190	11.488	13.785
	20	23.306	2.295	4.590	6.885	9.179	11.474	13.769
	25	29.133	2.292	4.584	6.877	9.169	11.461	13.753
	30	34.960	2.290	4.579	6.869	9.158	11.448	13.737
	35	....	2.287	4.574	6.861	9.148	11.435	13.722
	40	....	2.284	4.569	6.853	9.137	11.422	13.706
	45	....	2.382	4.563	6.845	9.127	11.408	13.690
	50	....	2.279	4.558	6.837	9.116	11.395	13.674
	55	....	2.276	4.553	6.829	9.106	11.382	13.658
39	00	....	2.274	4.547	6.821	9.095	11.369	13.642
	05	5.828	2.271	4.542	6.813	9.084	11.355	13.626
	10	11.655	2.268	4.537	6.805	9.073	11.342	13.610
	15	17.483	2.266	4.531	6.797	9.063	11.328	13.594
	20	23.310	2.263	4.526	6.789	9.052	11.315	13.578
	25	29.138	2.260	4.521	6.781	9.041	11.301	13.562
	30	34.966	2.258	4.515	6.773	9.030	11.288	13.545
	35	....	2.255	4.510	6.765	9.020	11.274	13.529
	40	....	2.252	4.504	6.757	9.009	11.261	13.513
	45	....	2.250	4.499	6.748	8.998	11.247	13.497
	50	....	2.247	4.494	6.740	8.987	11.234	13.481
	55	....	2.244	4.488	6.732	8.976	11.221	13.465
40	00	....	2.241	4.483	6.724	8.966	11.207	13.448
	05	5.829	2.239	4.477	6.716	8.955	11.193	13.432
	10	11.657	2.236	4.472	6.708	8.944	11.180	13.415
	15	17.486	2.233	4.466	6.699	8.933	11.166	13.399
	20	23.314	2.230	4.461	6.691	8.922	11.152	13.382
	25	29.143	2.228	4.455	6.683	8.911	11.138	13.366
	30	34.972	2.225	4.450	6.675	8.899	11.124	13.349
	35	....	2.222	4.444	6.666	8.888	11.111	13.333
	40	....	2.219	4.439	6.658	8.877	11.097	13.316
	45	....	2.217	4.433	6.650	8.866	11.083	13.300
	50	....	2.214	4.428	6.642	8.855	11.069	13.283
	55	....	2.211	4.422	6.633	8.844	11.056	13.267
41	00	....	2.208	4.417	6.625	8.833	11.042	13.250

Ordinates of developed parallel.

Longitude interval.	37°	38°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.008	.008
12½	.013	.013
15	.018	.019

	39°
′	*Inches.*
2½	0.001
5	.002
7½	.005
10	.008
12½	.013
15	.019

Longitude interval.	39°	40°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.008	.008
12½	.013	.013
15	.019	.019

	41°
′	*Inches.*
2½	0.001
5	.002
7½	.005
10	.008
12½	.013
15	.019

TABLE 8.—*Coordinates for projection of maps (scale $\frac{1}{62500}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.		Meridional distances from even degree parallels.	Abscissas of developed parallel.					
			2½′ longitude.	5′ longitude.	7½′ longitude.	10′ longitude.	12½′ longitude.	15′ longitude.
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
41	00	....	2.208	4.417	6.625	8.833	11.042	13.250
	05	5.830	2.206	4.411	6.617	8.822	11.028	13.233
	10	11.659	2.203	4.406	6.608	8.811	11.014	13.216
	15	17.489	2.200	4.400	6.600	8.800	11.000	13.200
	20	23.319	2.197	4.394	6.591	8.789	10.986	13.183
	25	29.149	2.194	4.389	6.583	8.777	10.972	13.166
	30	34.978	2.192	4.383	6.575	8.766	10.958	13.149
	35	....	2.189	4.377	6.566	8.755	10.944	13.132
	40	....	2.186	4.372	6.558	8.744	10.930	13.115
	45	....	2.183	4.366	6.549	8.732	10.916	13.099
	50	....	2.180	4.361	6.541	8.721	10.902	13.082
	55	....	2.178	4.355	6.533	8.710	10.888	13.065
42	00	....	2.175	4.349	6.524	8.699	10.873	13.048
	05	5.831	2.172	4.344	6.515	8.687	10.859	13.031
	10	11.661	2.169	4.338	6.507	8.676	10.845	13.014
	15	17.492	2.166	4.332	6.498	8.664	10.830	12.996
	20	23.323	2.163	4.326	6.490	8.653	10.816	12.979
	25	29.154	2.160	4.321	6.481	8.641	10.802	12.962
	30	34.984	2.158	4.315	6.472	8.630	10.787	12.945
	35	....	2.155	4.309	6.464	8.618	10.773	12.928
	40	....	2.152	4.304	6.455	8.607	10.759	12.910
	45	....	2.149	4.298	6.447	8.596	10.744	12.893
	50	....	2.146	4.292	6.438	8.584	10.730	12.876
	55	....	2.143	4.286	6.429	8.573	10.716	12.859
43	00	....	2.140	4.281	6.421	8.561	10.701	12.842
	05	5.832	2.137	4.275	6.412	8.550	10.687	12.824
	10	11.663	2.134	4.269	6.403	8.538	10.672	12.807
	15	17.495	2.132	4.263	6.395	8.526	10.658	12.789
	20	23.327	2.129	4.257	6.386	8.514	10.643	12.772
	25	29.159	2.126	4.251	6.377	8.503	10.628	12.754
	30	34.990	2.123	4.246	6.368	8.491	10.614	12.736
	35	....	2.120	4.240	6.359	8.479	10.599	12.719
	40	....	2.117	4.234	6.351	8.468	10.585	12.701
	45	....	2.114	4.228	6.342	8.456	10.570	12.684
	50	....	2.111	4.222	6.333	8.444	10.555	12.666
	55	....	2.108	4.216	6.324	8.432	10.541	12.649
44	00	....	2.105	4.210	6.316	8.421	10.526	12.631
	05	5.833	2.102	4.205	6.307	8.409	10.511	12.613
	10	11.666	2.099	4.199	6.298	8.397	10.496	12.596
	15	17.498	2.096	4.193	6.289	8.385	10.482	12.578
	20	23.331	2.093	4.187	6.280	8.373	10.467	12.560
	25	29.164	2.090	4.181	6.271	8.361	10.452	12.542
	30	34.997	2.087	4.175	6.262	8.350	10.437	12.524
	35	....	2.084	4.169	6.253	8.338	10.422	12.506
	40	....	2.081	4.163	6.244	8.326	10.407	12.489
	45	....	2.078	4.157	6.235	8.314	10.392	12.471
	50	....	2.076	4.151	6.227	8.302	10.377	12.453
	55	....	2.073	4.145	6.218	8.290	10.363	12.435
45	00	....	2.070	4.139	6.209	8.278	10.348	12.417

Ordinates of developed parallel.		
Longitude interval.	41°	42°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.008	.008
12½	.013	.013
15	.019	.019
	43°	
′	*Inches.*	
2½	0.001	
5	.002	
7½	.005	
10	.008	
12½	.013	
15	.019	
Longitude interval.	43°	44°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.008	.009
12½	.013	.013
15	.019	.019
	45°	
′	*Inches.*	
2½	0.001	
5	.002	
7½	.005	
10	.009	
12½	.013	
15	.019	

TABLE 8.—*Coordinates for projection of maps (scale $\frac{1}{62500}$)*—Continued.

[From Smithsonian Geographical Tables.]

Latitude of parallel.	Meridional distances from even degree parallels.	Abscissas of developed parallel. 2½′ longitude.	5′ longitude.	7½′ longitude.	10′ longitude.	12½′ longitude.	15′ longitude.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
45 00	....	2.070	4.139	6.209	8.278	10.348	12.417
05	5.834	2.067	4.133	6.200	8.266	10.333	12.399
10	11.668	2.064	4.127	6.191	8.254	10.318	12.381
15	17.501	2.061	4.121	6.181	8.242	10.302	12.363
20	23.335	2.058	4.115	6.172	8.230	10.287	12.345
25	29.169	2.054	4.109	6.163	8.218	10.272	12.327
30	35.003	2.051	4.103	6.154	8.206	10.257	12.308
35	....	2.048	4.097	6.145	8.194	10.242	12.290
40	....	2.045	4.091	6.136	8.181	10.227	12.272
45	....	2.042	4.085	6.127	8.169	10.212	12.254
50	....	2.039	4.079	6.118	8.157	10.197	12.236
55	....	2.036	4.073	6.109	8.145	10.182	12.218
46 00	....	2.033	4.067	6.100	8.133	10.166	12.200
05	5.835	2.030	4.060	6.091	8.121	10.151	12.181
10	11.670	2.027	4.054	6.081	8.108	10.136	12.163
15	17.504	2.024	4.048	6.072	8.096	10.120	12.144
20	23.339	2.021	4.042	6.063	8.084	10.105	12.126
25	29.174	2.018	4.036	6.054	8.072	10.090	12.107
30	35.009	2.015	4.030	6.044	8.059	10.074	12.089
35	....	2.012	4.023	6.035	8.047	10.059	12.070
40	....	2.009	4.017	6.026	8.035	10.043	12.052
45	....	2.006	4.011	6.017	8.022	10.028	12.033
50	....	2.003	4.005	6.008	8.010	10.013	12.015
55	....	1.999	3.999	5.998	7.998	9.997	11.996
47 00	....	1.996	3.993	5.989	7.985	9.982	11.978
05	5.836	1.993	3.986	5.980	7.973	9.966	11.959
10	11.672	1.990	3.980	5.970	7.960	9.950	11.940
15	17.508	1.987	3.974	5.961	7.948	9.935	11.922
20	23.344	1.984	3.968	5.951	7.935	9.919	11.903
25	29.180	1.981	3.961	5.942	7.923	9.903	11.884
30	35.015	1.977	3.955	5.933	7.910	9.888	11.865
35	....	1.974	3.949	5.923	7.898	9.872	11.846
40	....	1.971	3.943	5.914	7.885	9.856	11.828
45	....	1.968	3.936	5.904	7.872	9.841	11.809
50	....	1.965	3.930	5.895	7.860	9.825	11.790
55	....	1.962	3.924	5.886	7.848	9.809	11.771
48 00	....	1.959	3.917	5.876	7.835	9.794	11.752
05	5.837	1.956	3.911	5.867	7.822	9.778	11.733
10	11.674	1.952	3.905	5.857	7.810	9.763	11.714
15	17.511	1.949	3.898	5.848	7.797	9.746	11.695
20	23.348	1.946	3.892	5.838	7.784	9.730	11.676
25	29.185	1.943	3.886	5.829	7.771	9.714	11.657
30	35.021	1.940	3.879	5.819	7.759	9.698	11.638
35	....	1.937	3.873	5.810	7.746	9.683	11 619
40	....	1.933	3.867	5.800	7.733	9.667	11.600
45	....	1.930	3.860	5.790	7.721	9.651	11.581
50	....	1.927	3.854	5.781	7.708	9.635	11.562
55	....	1.924	3.848	5.771	7.695	9.619	11.543
49 00	....	1.921	3.841	5.762	7.682	9.603	11.524
05	5.838	1.917	3.835	5.752	7.670	9.587	11.504
10	11.676	1.914	3.828	5.742	7.657	9.571	11.485
15	17.514	1.911	3.822	5.733	7.644	9.555	11.466
20	23.352	1.908	3.815	5.723	7.631	9.538	11.446
25	29.190	1.905	3.809	5.713	7.618	9.522	11.427
30	35.027	1.901	3.802	5.704	7.605	9.506	11.407
35	....	1.898	3.796	5.694	7.592	9.490	11.388
40	....	1.895	3.790	5.684	7.579	9.474	11.369
45	....	1.892	3.783	5.675	7.566	9.458	11.349
50	....	1.888	3.777	5.665	7.553	9.442	11.330
55	....	1.885	3.770	5.655	7.540	9.426	11.311
50 00	....	1.882	3.764	5.646	7.528	9.409	11.291

Ordinates of developed parallel.

Longitude interval.	45°	46°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.009	.009
12½	.013	.013
15	.019	.019
	47°	
′	*Inches.*	
2½	0.001	
5	.002	
7½	.005	
10	.008	
12½	.013	
15	.019	

Longitude interval.	47°	48°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.008	.008
12½	.013	.013
15	.019	.019
	49°	
′	*Inches.*	
2½	0.001	
5	.002	
7½	.005	
10	.008	
12½	.013	
15	.019	
	49°	50°
′	*Inches.*	*Inches.*
2½	0.001	0.001
5	.002	.002
7½	.005	.005
10	.008	.008
12½	.013	.013
15	.019	.019

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$).*[a]

[Prepared by S. S. Gannett.]

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 2½′	5′	7½′	10′	15′
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
25 00	3.450	6.900	10.350	13.800	20.700
05	.448	.895	.343	.790	.685
07½	.446	.893	.339	.786	.678
10	.445	.890	.336	.781	.671
15	.443	.886	.329	.772	.657
20	3.441	6.881	10.322	13.772	20.643
22½	.440	.879	.318	.758	.636
25	.438	.876	.314	.753	.629
30	.436	.872	.307	.744	.615
35	3.434	6.867	10.300	13.734	20.601
37½	.433	.865	.297	.730	.594
40	.431	.862	.293	.725	.587
45	.429	.858	.286	.715	.573
50	3.426	6.852	10.279	13.705	20.558
52½	.425	.850	.276	.700	.551
55	.424	.848	.272	.696	.544
60	.422	.843	.264	.686	.529
26 00	3.422	6.843	10.264	13.686	20.529
05	.419	.838	.257	.677	.514
07½	.418	.836	.253	.672	.506
10	.417	.833	.250	.666	.499
15	.414	.828	.243	.657	.485
20	3.412	6.824	10.236	13.647	20.471
22½	.410	.821	.232	.642	.464
25	.409	.819	.238	.638	.457
30	.407	.814	.221	.628	.442
35	3.405	6.809	10.214	13.618	20.427
37½	.403	.806	.210	.612	.419
40	.402	.804	.206	.608	.412
45	.400	.799	.198	.598	.397
50	3.397	6.794	10.191	13.588	20.382
52½	.396	.792	.188	.583	.375
55	.394	.789	.184	.578	.367
60	.392	.784	.176	.569	.353
27 00	3.392	6.784	10.177	13.569	20.353
05	.390	.779	.169	.559	.338
07½	.388	.777	.165	.554	.330
10	.387	.774	.161	.548	.322
15	.385	.769	.153	.538	.307
20	3.382	6.764	10.146	13.528	20.292
22½	.380	.761	.142	.523	.284
25	.379	.759	.138	.518	.277
30	.377	.754	.131	.508	.262
35	3.374	6.749	10.124	13.498	20.247
37½	.373	.746	.120	.492	.239
40	.371	.743	.116	.487	.231
45	.369	.738	.108	.477	.215
50	3.367	6.733	10.100	13.467	20.200
52½	.365	.730	.095	.461	.191
55	.364	.728	.092	.456	.184
60	.361	.723	.084	.446	.169

Ordinates of developed parallel (latitude 25°).

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.008
15	.019

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.514
2	3.028
3	4.542
4	6.057
5	7.571
6	9.085
7	10.599
8	12.114
9	13.628
10	15.142

Ordinates of developed parallel (latitude 26°).

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.009
15	.020

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.515
2	3.029
3	4.544
4	6.058
5	7.573
6	9.087
7	10.602
8	12.115
9	13.631
10	15.145

Ordinates of developed parallel (latitude 27°).

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.009
15	.020

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.515
2	3.029
3	4.544
4	6.058
5	7.574
6	9.087
7	10.603
8	12.117
9	13.632
10	15.147

[a] This table can be used for even multiples or divisions of the $\frac{1}{48000}$ scale, as indicated in the two following cases. Scale $\frac{1}{24000}$: For a given latitude the meridional distance for a certain latitude interval and the abscissas and ordinates for a certain longitude interval are double the values given in the table. Scale $\frac{1}{96000}$: For a given latitude the meridional distance for a certain latitude interval and the abscissas and ordinates for a certain longitude interval are half the values given in the table.

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$)*—Continued.

Latitude of parallel.		Abscissas of developed parallel. Longitude interval.				
		2½′	5′	7½′	10′	15′
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
28	00	3.361	6.723	10.084	13.446	20.169
	05	.359	.718	.077	.436	.154
	07½	.357	.715	.072	.430	.145
	10	.356	.713	.069	.425	.138
	15	.354	.708	.061	.415	.123
	20	3.352	6.703	10.054	13.405	20.108
	22½	.350	.700	.050	.400	.100
	25	.349	.698	.046	.395	.092
	30	.346	.692	.038	.384	.076
	35	3.343	6.687	10.030	13.373	20.060
	37½	.342	.684	.026	.368	.052
	40	.340	.681	.022	.363	.044
	45	.338	.676	.014	.352	.028
	50	3.336	6.671	10.006	13.342	20.013
	52½	.334	.668	.002	.336	.005
	55	.333	.666	9.998	.331	19.997
	60	.330	.660	.990	.320	.981
29	00	3.330	6.660	9.990	13.320	19.980
	05½	.328	.655	.982	.310	.964
	07	.326	.652	.978	.304	.956
	10	.325	.649	.974	.299	.948
	15	.322	.644	.966	.288	.932
	20	3.319	6.638	9.958	13.277	19.915
	22½	.318	.636	.954	.271	.907
	25	.317	.633	.950	.266	.899
	30	.314	.628	.942	.255	.883
	35	3.311	6.622	9.934	13.245	19.867
	37½	.310	.620	.930	.239	.859
	40	.309	.617	.925	.234	.850
	45	.305	.611	.916	.222	.833
	50	3.303	6.605	9.908	13.211	19 816
	52½	.302	.603	.904	.206	.808
	55	.300	.600	.900	.200	.800
	60	.298	.595	.892	.190	.785
30	00	3.298	6.595	9.892	13.190	19.785
	05	.295	.590	.884	.179	.768
	07½	.294	.587	.880	.173	.760
	10	.292	.584	.876	.168	.751
	15	.289	.578	.867	.156	.734
	20	3.286	6.572	9.858	13.145	19.717
	22½	.285	.570	.855	.140	.710
	25	.284	.567	.850	.134	.701
	30	.281	.562	.842	.123	.685
	35	3.278	6.556	9.824	13.112	19.668
	37½	.277	.553	.830	.106	.659
	40	.275	.550	.826	.101	.651
	45	.273	.545	.818	.090	.635
	50	3.270	6.540	9.810	13.080	19.619
	52½	.268	.537	.805	.074	.611
	55	.267	.534	.801	.068	.602
	60	.264	.528	.792	.056	.584

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.009
15	.021

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.515
2	3.030
3	4.545
4	6.060
5	7.575
6	9.090
7	10.605
8	12.120
9	13.635
10	15.150

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.009
15	.021

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.515
2	3.030
3	4.545
4	6.060
5	7.575
6	9.090
7	10.605
8	12.122
9	13.637
10	15.152

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.009
15	.021

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.515
2	3.030
3	4.545
4	6.061
5	7.576
6	9.092
7	10.608
8	12.123
9	13.638
10	15.154

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{45000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel.				
	Longitude interval.				
	2½′	5′	7½′	10′	15′
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
31 00	3.264	6.528	9.792	13.056	19.584
05	.261	.522	.783	.044	.567
07½	.259	.519	.779	.039	.558
10	.258	.517	.775	.033	.550
15	.256	.511	.766	.022	.533
20	3.253	6.505	9.757	13.010	19.515
22½	.251	.502	.753	.004	.506
25	.250	.499	.749	12.999	.498
30	.247	.494	.741	.988	.481
35	3.244	6.488	9.732	12.976	19.464
37½	.243	.485	.728	.970	.455
40	.241	.482	.723	.964	.447
45	.239	.477	.715	.953	.430
50	3.236	6.471	9.707	12.942	19.413
52½	.234	.468	.702	.936	.404
55	.233	.465	.697	.930	.395
60	.230	.459	.688	.918	.377
32 00	3.230	6.459	9.688	12.918	19.377
05	.227	.453	.680	.906	.359
07½	.225	.450	.675	.900	.350
10	.223	.447	.670	.894	.341
15	.220	.441	.661	.882	.323
20	3.218	6.435	9.652	12.870	19.305
22½	.216	.432	.648	.864	.296
25	.214	.429	.644	.858	.287
30	.212	.423	.635	.846	.269
35	3.208	6.417	9.625	12.834	19.251
37½	.207	.414	.621	.828	.242
40	.205	.411	.617	.822	.233
45	.202	.405	.608	.811	.216
50	3.200	6.400	9.600	12.799	19.199
52½	.198	.396	.595	.793	.189
55	.197	.393	.590	.787	.180
60	.194	.387	.581	.775	.162
33 00	3.194	6.387	9.581	12.775	19.162
05	.191	.382	.572	.763	.145
07½	.190	.379	.568	.757	.136
10	.188	.376	.563	.751	.127
15	.185	.370	.554	.739	.109
20	3.182	6.364	9.545	12.727	19.090
22½	.180	.360	.540	.720	.080
25	.178	.357	.536	.714	.071
30	.176	.351	.527	.702	.053
35	3.172	6.345	9.517	12.690	19.035
37½	.171	.342	.513	.684	.026
40	.169	.339	.508	.678	.017
45	.166	.333	.499	.665	18.998
50	3.163	6.327	9.490	12.653	18.980
52½	.162	.324	.485	.647	.971
55	.160	.320	.481	.641	.961
60	.157	.314	.472	.629	.943

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
5	0.002
7½	.005
10	.010
15	.022

Latitude. interval.	Meridional distance.
′	*Inches.*
1	1.515
2	3.031
3	4.545
4	6.062
5	7.578
6	9.093
7	10.609
8	12.124
9	13.640
10	15.156

Longitude. interval.	Inch.
′	
5	0.002
7½	.006
10	.010
15	.022

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.516
2	3.032
3	4.547
4	6.063
5	7.579
6	9.095
7	10.611
8	12.127
9	13.643
10	15.159

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.010
15	.023

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.516
2	3.032
3	4.548
4	6.065
5	7.580
6	9.097
7	10.613
8	12.129
9	13.645
10	15.161

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$)*—Continued.

Latitude of parallel.		Abscissas of developed parallel. Longitude interval.				
		2½′	5′	7½′	10′	15′
°	′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
34	00	3.157	6.314	9.472	12.629	18.943
	05	.154	.309	.462	.617	.925
	07½	.152	.305	.457	.610	.915
	10	.151	.302	.453	.604	.906
	15	.148	.296	.444	.592	.888
	20	3.145	6.290	9.434	12.579	18.869
	22½	.143	.286	.430	.572	.859
	25	.142	.283	.425	.567	.850
	30	.139	.277	.416	.554	.831
	35	3.135	6.271	9.406	12.542	18.813
	37½	.134	.268	.402	.535	.803
	40	.132	.264	.396	.529	.793
	45	.129	.258	.387	.517	.775
	50	3.126	6.252	9.378	12.504	18.756
	52½	.124	.249	.374	.498	.747
	55	.123	.246	.369	.492	.738
	60	.120	.240	.360	.479	.719
35	00	3.120	6.240	9.360	12.479	18.719
	05	.117	.233	.350	.466	.699
	07½	.115	.230	.345	.460	.690
	10	.114	.227	.340	.454	.681
	15	.110	.220	.330	.441	.661
	20	3.107	6.214	9.321	12.428	18.642
	22½	.105	.211	.317	.422	.633
	25	.104	.208	.312	.415	.623
	30	.100	.201	.302	.402	.604
	35	3.097	6.195	9.292	12.390	18.585
	37½	.096	.192	.288	.384	.576
	40	.094	.188	.283	.377	.565
	45	.091	.182	.273	.364	.546
	50	3.088	6.176	9.263	12.351	18.527
	52½	.086	.172	.258	.345	.517
	55	.084	.169	.254	.338	.508
	60	.082	.163	.244	.326	.489
36	00	3.082	6.163	9.244	12.326	18.489
	05	.078	.156	.234	.313	.469
	07½	.076	.153	230	.306	.459
	10	.075	.150	.225	.300	.450
	15	.072	.144	.215	.287	.431
	20	3.068	6.137	9.205	12.274	18.411
	22½	.067	.134	.200	.268	.401
	25	.065	.130	.195	.260	.390
	30	.062	.124	.185	.247	.371
	35	3.058	6.117	9.176	12.234	18.351
	37	.057	.114	.171	.228	.342
	40	.055	.110	.166	.221	.332
	45	.052	.104	.156	.208	.312
	50	3.048	6.097	9.146	12.194	18.292
	52	.047	.094	.141	.188	.282
	55	.045	.091	.136	.182	.272
	60	.042	.084	.126	.169	.253

Ordinates of developed parallel.	
Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.010
15	.023
Latitude interval.	**Meridional distance.**
′	*Inches.*
1	1.516
2	3.032
3	4.548
4	6.065
5	7.581
6	9.096
7	10.613
8	12.130
9	13.646
10	15.162
Longitude interval.	**Inch.**
′	
5	0.003
7½	.006
10	.010
15	.023
Latitude interval.	**Meridional distance.**
′	*Inches.*
1	1.516
2	3.033
3	4.549
4	6.067
5	7.583
6	9.100
7	10.616
8	12.133
9	13.648
10	15.164
Longitude interval.	**Inch.**
′	
5	0.003
7½	.006
10	.010
15	.024
Latitude interval.	**Meridional distance.**
′	*Inches.*
1	1.517
2	3.034
3	4.551
4	6.067
5	7.584
6	9.102
7	10.619
8	12.135
9	13.652
10	15.169

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 2½′	5′	7½′	10′	15′
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
37 00	3.042	6.084	9.126	12.169	18.253
05	.038	.077	.116	.155	.232
07½	.037	.074	.111	.148	.222
10	.035	.070	.106	.141	.212
15	.032	.064	.096	.128	.192
20	3.028	6.057	9.086	12.114	18.172
22½	.027	.053	.081	.107	.162
25	.024	.049	.076	.101	.152
30	.022	.044	.066	.088	.132
35	3.019	6.037	9.056	12.074	18.112
37½	.017	.034	.051	.068	.102
40	.015	.030	.045	.061	.091
45	.012	.024	.035	.048	.071
50	3.009	6.017	9.025	12.034	18.050
52½	.006	.013	.020	.027	.040
55	.005	.010	.015	.020	.030
60	.001	.003	.004	.006	.009
38 00	3.001	6.003	9.004	12.006	18.009
05	2.998	5.996	8.994	11.993	17.989
07½	.997	.993	.989	.986	.979
10	.995	.990	.984	.980	.969
15	.991	.983	.974	.966	.949
20	2.988	5.976	8.964	11.952	17.929
22½	.987	.973	.959	.946	.919
25	.984	.969	.954	.939	.908
30	.981	.962	.944	.925	.887
35	2.978	5.955	8.933	11.911	17.867
37½	.976	.952	.927	.904	.856
40	.974	.949	.923	.898	.846
45	.971	.942	.913	.884	.826
50	2.968	5.935	8.902	11.870	17.805
52½	.966	.932	.897	.863	.795
55	.964	.928	.892	.856	.784
60	.960	.921	.882	.842	.763
39 00	2.960	5.921	8.882	11.842	17.763
05	.957	.914	.871	.828	.742
07½	.955	.910	.865	.821	.731
10	.954	.907	.860	.814	.721
15	.950	.900	.850	.800	.700
20	2.946	5.893	8.840	11.786	17.679
22½	.945	.890	.835	.779	.669
25	.943	.886	.829	.772	.658
30	.940	.879	.819	.758	.637
35	2.936	5.872	8.808	11.744	17.616
37½	.934	.868	.802	.737	.605
40	.933	.865	.798	.730	.595
45	.929	.858	.787	.716	.574
50	2.926	5.851	8.777	11.702	17.553
52½	.924	.848	.772	.695	.543
55	.922	.844	.766	.688	.532
60	.919	.837	.755	.674	.511

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.010
15	.024

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.517
2	3.034
3	4.551
4	6.068
5	7.585
6	9.102
7	10.619
8	12.136
9	13.653
10	15.170

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.010
15	.024

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.517
2	3.034
3	4.551
4	6.069
5	7.586
6	9.103
7	10.620
8	12.138
9	13.655
10	15.172

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.024

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.517
2	3.035
3	4.552
4	6.070
5	7.587
6	9.105
7	10.622
8	12.140
9	13.658
10	15.175

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$)*—Continued.

Latitude of parallel.		Abscissas of developed parallel. Longitude interval. 2½′	5′	7½′	10′	15′
°	′					
40	00	2.919	5.837	8.755	11.674	17.511
	05	.915	.830	.745	.660	.490
	07½	.913	.826	.740	.653	.479
	10	.912	.823	.734	.646	.469
	15	.908	.816	.723	.631	.447
	20	2.904	5.808	8.712	11.616	17.424
	22½	.902	.804	.706	.609	.413
	25	.900	.801	.702	.602	.403
	30	.897	.794	.691	.588	.382
	35	2.894	5.787	8.680	11.574	17.361
	37½	.892	.784	.675	.567	.351
	40	.890	.780	.679	.560	.340
	45	.886	.772	.659	.545	.317
	50	2.883	5.765	8.648	11.530	17.295
	52½	.881	.762	.642	.523	.285
	55	.879	.758	.636	.516	.273
	60	.875	.750	.625	.501	.251
41	00	2.875	5.750	8.625	11.501	17.251
	05	.872	.743	.614	.486	.229
	07½	.870	.740	.609	.479	.219
	10	.868	.736	.604	.472	.208
	15	.864	.729	.594	.458	.187
	20	2.861	5.722	8.582	11.443	17.165
	22½	.859	.718	.577	.436	.154
	25	.857	.714	.572	.428	.143
	30	.854	.707	.561	.414	.121
	35	2.850	5.700	8.550	11.399	17.099
	37½	.848	.696	.544	.392	.088
	40	.846	.692	.539	.385	.077
	45	.843	.685	.528	.370	.055
	50	2.839	5.678	8.517	11.355	17.033
	52½	.837	.674	.510	.347	.021
	55	.835	.670	.505	.340	.011
	60	.831	.663	.494	.326	16.989
42	00	2.831	5.663	8.494	11.326	16.989
	05	.827	.655	.483	.311	.966
	07½	.826	.652	.478	.304	.956
	10	.824	.648	.472	.296	.944
	15	.820	.641	.462	.282	.923
	20	2.817	5.634	8.450	11.267	16.901
	22½	.815	.630	.444	.259	.889
	25	.813	.626	.439	.252	.878
	30	.809	.618	.428	.237	.855
	35	2.805	5.611	8.417	11.222	16.833
	37½	.804	.608	.412	.215	.823
	40	.802	.604	.406	.208	.812
	45	.798	.597	.395	.192	.790
	50	2.794	5.589	8.384	11.178	16.767
	52½	.793	.585	.378	.170	.755
	55	.791	.582	.372	.163	.745
	60	.787	.574	.361	.148	.722

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.024

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.518
2	3.035
3	4.557
4	6.070
5	7.588
6	9.106
7	10.624
8	12.143
9	13.660
10	15.178

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.025

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.518
2	3.036
3	4.554
4	6.072
5	7.590
6	9.108
7	10.626
8	12.145
9	13.663
10	15.181

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.025

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.518
2	3.036
3	4.554
4	6.073
5	7.591
6	9.109
7	10.627
8	12.147
9	13.666
10	15.184

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval.					Ordinates of developed parallel.	
	2½′	5′	7½′	10′	15′	Longitude interval.	Inch.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	′	
43 00	2.787	5.574	8.361	11.148	16.722	5	0.003
05	.783	.566	.349	.132	.698	7½	.006
07½	.781	.562	.343	.124	.686	10	.011
10	.779	.558	.338	.117	.675	15	.025
15	.776	.551	.326	.102	.653		
20	2.772	5.543	8.314	11.086	16.629	Latitude interval.	Meridional distance.
22½	.770	.539	.308	.078	.617		
25	.768	.535	.303	.070	.606	′	*Inches.*
30	.764	.528	.292	.055	.583	1	1.519
						2	3.038
						3	4.557
35	2.760	5.520	8.280	11.040	16.560	4	6.075
37½	.758	.516	.274	.032	.548	5	7.594
40	.756	.512	.268	.025	.537	6	9.113
45	.752	.505	.257	.010	.515	7	10.631
						8	12.149
50	2.749	5.498	8.246	10.995	16.493	9	13.668
52½	.747	.494	.240	.987	.481	10	15.187
55	.745	.490	.235	.980	.470		
60	.741	.482	.223	.964	.446	Longitude interval.	Inch.
						′	
44 00	2.741	5.482	8.223	10.964	16.446		
05	.737	.474	.212	.949	.423	5	0.003
07½	.735	.470	.206	.941	.411	7½	.006
10	.733	.467	.200	.934	.400	10	.011
15	.730	.459	.188	.918	.377	15	.025
20	2.726	5.451	8.177	10.902	16.354	Latitude interval.	Meridional distance.
22½	.723	.447	.171	.894	.341		
25	.722	.444	.166	.887	.331		
30	.718	.436	.154	.872	.308	′	*Inches.*
						1	1.519
						2	3.038
35	2.714	5.428	8.142	10.856	16.284	3	4.557
37½	.712	.424	.136	.848	.272	4	6.076
40	.710	.420	.130	.840	.261	5	7.595
45	.706	.413	.119	.825	.238	6	9.114
						7	10.633
50	2.702	5.405	8.108	10.810	16.215	8	12.152
52½	.700	.401	.102	.802	.203	9	13.671
55	.698	.397	.096	.794	.192	10	15.190
60	.695	.390	.084	.779	.169		
						Longitude interval.	Inch.
45 00	2.695	5.390	8.084	10.779	16.169		
05	.691	.382	.073	.764	.146	′	
07½	.689	.378	.067	.756	.134	5	0.003
10	.687	.374	.061	.748	.122	7½	.006
15	.683	.366	.049	.732	.098	10	.011
						15	.025
20	2.679	5.358	8.038	10.717	16.075		
22½	.677	.354	.032	.708	.063	Latitude interval.	Meridional distance.
25	.675	.350	.026	.701	.051		
30	.671	.342	.014	.685	.027	′	*Inches.*
35	2.667	5.334	8.002	10.669	16.003	1	1.519
37½	.665	.330	7.996	.661	15.991	2	3.038
40	.663	.326	.990	.653	.980	3	4.557
45	.660	.319	.978	.638	.957	4	6.077
						5	7.596
						6	9.115
50	2.655	5.311	7.966	10.622	15.933	7	10.635
52½	.654	.307	.960	.614	.921	8	12.154
55	.652	.303	.954	.606	.909	9	13.673
60	.648	.295	.942	.590	.885	10	15.192

TABLE 9.—*Coordinates for projection of maps (scale $\frac{1}{48000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel.				
	Longitude interval.				
	2½′	5′	7½′	10′	15′
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
46 00	2.648	5.295	7.942	10.590	15.885
05	.644	.287	.930	.574	.861
07½	.640	.281	.922	.562	.844
10	.639	.279	.918	.558	.837
15	.635	.271	.906	.542	.813
20	2.631	5.263	7.894	10.526	15.789
22½	.630	.259	.888	.518	.777
25	.627	.255	.882	.510	.765
30	.623	.247	.870	.494	.741
35	2.619	5.239	7.858	10.478	15.717
37½	.617	.235	.852	.470	.705
40	.615	.230	.846	.461	.692
45	.611	.223	.834	.445	.667
50	2.607	5.214	7.822	10.429	15.643
52½	.605	.210	.816	.421	.631
55	.603	.206	.810	.413	.619
60	.599	.198	.798	.397	.595
47 00	2.599	5.198	7.798	10.397	15.595
05	.595	.190	.786	.381	.571
07½	.593	.186	.780	.373	.559
10	.591	.182	.774	.365	.547
15	.587	.174	.761	.348	.522
20	2.583	5.166	7.749	10.332	15.498
22	.581	.162	.743	.324	.486
25	.579	.158	.737	.316	.474
30	.575	.150	.724	.299	.449
35	2.570	5.141	7.712	10.282	15.423
37½	.568	.137	.706	.274	.411
40	.567	.133	.700	.266	.399
45	.563	.125	.688	.250	.375
50	2.559	5.117	7.676	10.234	15.351
52½	.557	.113	.670	.226	.339
55	.555	.109	.663	.218	.326
60	.550	.100	.650	.201	.307
48 00	2.550	5.100	7.650	10.201	15.301
05	.546	.092	.638	.185	.277
07½	.544	.088	.632	.177	.265
10	.542	.084	.626	.168	.252
15	.538	.076	.614	.152	.228
20	2.534	5.068	7.602	10.136	15.204
22½	.532	.064	.596	.128	.192
25	.530	.060	.590	.119	.179
30	.526	.051	.577	.102	.154
35	2.522	5.043	7.564	10.086	15.129
37½	.520	.039	.558	.078	.116
40	.517	.034	.552	.069	.103
45	.513	.026	.539	.052	.078
50	2.509	5.018	7.527	10.036	15.054
52½	.507	.014	.521	.028	.042
55	.505	.010	.515	.020	.030
60	.501	.002	.502	.003	.005

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.025

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.520
2	3.039
3	4.559
4	6.078
5	7.598
6	9.117
7	10.637
8	12.157
9	13.677
10	15.196

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.025

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.520
2	3.039
3	4.559
4	6.079
5	7.599
6	9.119
7	10.638
8	12.158
9	13.678
10	15.197

Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.025

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.520
2	3.040
3	4.560
4	6.080
5	7.600
6	9.120
7	10.640
8	12.160
9	13.680
10	15.200

TABLE 9.—*Coordinates for projection of maps (scale* $\frac{1}{48000}$)—Continued.

Latitude of parallel.	Abscissas of developed parallel.				
	Longitude interval.				
	2½′	5′	7½′	10′	15′
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
49 00	2.501	5.002	7.502	10.003	15.005
05	2.496	4.993	.490	9.986	14.980
07½	.494	.989	.484	.978	.967
10	.492	.985	.477	.970	.955
15	.488	.976	.464	.952	.929
20	2.484	4.968	7.452	9.936	14.904
22½	.482	.964	.446	.928	.892
25	.480	.960	.440	.920	.880
30	.476	.952	.428	.903	.855
35	2.472	4.943	7.415	9.886	14.829
37½	.470	.939	.408	.878	.816
40	.467	.934	.402	.869	.803
45	.463	.926	.389	.852	.778
50	2.459	4.918	7.377	9.836	14.754
52½	.457	.914	.371	.828	.742
55	.455	.910	.364	.819	.729
60	.450	.901	.352	.802	.703

Ordinates of developed parallel.	
Longitude interval.	Inch.
′	
5	0.003
7½	.006
10	.011
15	.025

Latitude interval.	Meridional distance.
′	*Inches.*
1	1.520
2	3.040
3	4.560
4	6.081
5	7.601
6	9.121
7	10.641
8	12.162
9	13.682
10	15.202

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$).*

[Prepared by S. S. Gannett and George T. Hawkins.]

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
25 00	5.520	11.040	16.560	22.080	27.600
05	.516	.032	.549	.065	.581
07½	.515	.029	.544	.057	.572
10	.512	.025	.538	.050	.562
15	.509	.018	.528	.035	.544
20	5.505	11.010	16.515	22.020	27.525
22½	.503	.006	.509	.012	.516
25	.501	.002	.503	.005	.506
30	.497	10.995	.492	21.990	.487
35	5.494	10.988	16.480	21.975	27.468
37½	.492	.984	.476	.968	.459
40	.490	.980	.470	.960	.449
45	.486	.972	.458	.945	.430
50	5.482	10.965	16.448	21.930	27.411
52½	.480	.961	.441	.921	.401
55	.478	.957	.435	.915	.392
60	.475	.950	.424	.900	.373
26 00	5.475	10.950	16.424	21.900	27.373
05	.470	.942	.412	.882	.353
07½	.469	.937	.406	.875	.343
10	.467	.933	.400	.867	.333
15	.463	.925	.389	.852	.314
20	5.459	10.918	16.377	21.835	27.294
22½	.457	.914	.371	.828	.284
25	.455	.910	.365	.820	.275
30	.451	.902	.353	.805	.255
35	5.447	10.894	16.341	21.789	27.235
37½	.445	.890	.335	.780	.225
40	.443	.887	.330	.773	.216
45	.439	.878	.318	.758	.196
50	5.435	10.870	16.306	21.741	27.176
52½	.433	.866	.298	.732	.167
55	.431	.863	.294	.725	.157
60	.428	.855	.282	.710	.138
27 00	5.428	10.855	16.283	21.710	27.138
05	.422	.848	.270	.695	.118
07½	.421	.843	.264	.686	.108
10	.420	.839	.258	.678	.097
15	.415	.831	.247	.662	.077
20	5.410	10.822	16.233	21.645	27.056
22½	.409	.818	.227	.636	.046
25	.407	.815	.220	.628	.035
30	.403	.805	.210	.612	.015
35	5.399	10.798	16.198	21.595	26.995
37½	.397	.794	.191	.588	.984
40	.395	.790	.185	.580	.974
45	.391	.782	.172	.562	.953
50	5.387	10.774	16.160	21.548	26.933
52½	.384	.768	.154	.538	.922
55	.382	.765	.148	.530	.912
60	.378	.758	.135	.515	.892

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.009

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.057
2	12.114
3	18.171
4	24.228
5	30.285

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.009

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.058
2	12.115
3	18.173
4	24.231
5	30.289

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.058
2	12.117
3	18.175
4	24.235
5	30.292

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
28 00	5.378	10.758	16.135	21.515	26.892
05	.374	.749	.122	.498	.871
07½	.372	.745	.116	.488	.861
10	.370	.740	.110	.480	.850
15	.366	.732	.098	.465	.830
20	5.362	10.724	16.085	21.448	26.810
22½	.360	.720	.078	.439	.799
25	.358	.715	.072	.430	.789
30	.354	.708	.060	.415	.768
35	5.349	10.698	16.048	21.398	26.746
37½	.347	.694	.041	.388	.735
40	.345	.690	.035	.380	.725
45	.341	.682	.022	.362	.703
50	5.336	10.673	16.010	21.348	26.683
52½	.334	.668	.004	.339	.672
55	.332	.665	15.998	.330	.662
60	.328	.657	.985	.312	.640
29 00	5.328	10.657	15.985	21.312	26.640
05	.324	.648	.971	.295	.619
07½	.322	.643	.965	.287	.608
10	.320	.640	.958	.278	.598
15	.315	.630	.945	.260	.575
20	5.310	10.621	15.932	21.242	26.553
22½	.308	.617	.925	.234	.542
25	.306	.612	.920	.225	.532
30	.302	.605	.907	.209	.511
35	5.298	10.596	15.894	21.192	26.490
37½	.295	.591	.886	.183	.478
40	.294	.587	.880	.174	.468
45	.289	.578	.867	.156	.445
50	5.284	10.569	15.853	21.137	26.422
52½	.282	.565	.847	.130	.412
55	.280	.560	.841	.121	.401
60	.275	.552	.828	.104	.380
30 00	5.275	10.552	15.828	21.104	26.380
05	.272	.543	.815	.086	.358
07½	.269	.538	.808	.077	.346
10	.267	.534	.801	.068	.335
15	.262	.525	.787	.050	.312
20	5.258	10.516	15.774	21.032	26.290
22½	.256	.512	.768	.024	.280
25	.254	.507	.760	.014	.268
30	.249	.499	.748	20.998	.247
35	5.245	10.490	15.735	20.980	26.225
37½	.243	.485	.728	.971	.213
40	.240	.480	.721	.961	.202
45	.236	.472	.708	.944	.180
50	5.232	10.463	15.695	20.927	26.159
52½	.229	.459	.688	.918	.147
55	.227	.454	.681	.908	.135
60	.222	.445	.667	.890	.112

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.060
2	12.120
3	18.178
4	24.238
5	30.298

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.060
2	12.121
3	18.182
4	24.242
5	30.302

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.061
2	12.122
3	18.183
4	24.245
5	30.305

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
31 00	5.222	10.445	15.667	20 890	26.112
05	.218	.435	.654	.872	.089
07½	.216	.432	.647	.863	.079
10	.213	.426	.640	.853	.066
15	.209	.417	.626	.834	.043
20	5.204	10.408	15.613	20.817	26.021
22½	.202	.404	.605	.807	.009
25	.200	.400	.598	.798	25.998
30	.195	.390	.585	.780	.975
35	5.190	10.381	15.571	20.762	25.952
37½	.188	.376	.565	.753	.941
40	.186	.372	.557	.743	.929
45	.181	.362	.544	.725	.906
50	5.177	10.353	15.530	20.706	25.883
52½	.174	.348	.523	.697	.871
55	.172	.344	.516	.688	.860
60	.167	.334	.502	.669	.836
32 00	5.167	10.334	15.502	20.669	25.836
05	.162	.325	.487	.650	.812
07½	.160	.320	.480	.640	.800
10	.158	.315	.473	.630	.788
15	.153	.305	.458	.611	.764
20	5.148	10.296	15.444	20.592	25.740
22½	.146	.291	.437	.582	.728
25	.143	.286	.430	.573	.716
30	.139	.277	.416	.554	.693
35	5.134	10.268	15.401	20.535	25.669
37½	.131	.263	.394	.526	.659
40	.129	.258	.387	.516	.645
45	.124	.249	.373	.498	.622
50	5.120	10.239	15.359	20.478	25.598
52½	.117	.234	.352	.469	.586
55	.115	.229	.344	.459	.574
60	.110	.220	.330	.440	.550
33 00	5.110	10.220	15.330	20.440	25.550
05	.105	.210	.316	.421	.526
07½	.103	.206	.308	.411	.514
10	.100	.201	.301	.402	.502
15	.096	.191	.287	.382	.478
20	5.091	10.182	15.272	20.363	25.454
22½	.088	.176	.264	.352	.440
25	.086	.171	.257	.342	.428
30	.081	.162	.242	.323	.404
35	5.076	10.152	15.228	20.304	25.380
37½	.074	.147	.220	.294	.368
40	.071	.143	.213	.285	.356
45	.066	.132	.199	.265	.331
50	5.061	10.123	15.184	20.246	25.307
52½	.059	.118	.177	.236	.295
55	.056	.113	.169	.226	.282
60	.052	.103	.155	.206	.258

Ordinates of developed parallel. Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.006
5	.010
Latitude interval.	**Meridional distance.**
′	*Inches.*
1	6.062
2	12.124
3	18.187
4	24.249
5	30.311
Longitude interval.	**Inch.**
′	
1	.000
2	.002
3	.003
4	.007
5	.010
Latitude interval.	**Meridional distance.**
′	*Inches.*
1	6.063
2	12.127
3	18.190
4	24.254
5	30.317
Longitude interval.	**Inch.**
′	
1	.000
2	.002
3	.003
4	.007
5	.010
Latitude interval.	**Meridional distance.**
′	*Inches.*
1	6.065
2	12.129
3	18.193
4	24.258
5	30.322

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{120000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval.				
	1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
34 00	5.052	10.103	15.155	20.206	25.258
05	.047	.093	.140	.186	.233
07½	.044	.089	.132	.176	.220
10	.042	.083	.125	.166	.208
15	.037	.073	.110	.146	.183
20	5.032	10.063	15.095	20.126	25.158
22½	.029	.058	.087	.116	.145
25	.027	.053	.080	.106	.133
30	.022	.043	.065	.086	.108
35	5.017	10.033	15.050	20.066	25.083
37½	.014	.028	.042	.056	.070
40	.012	.023	.035	.046	.058
45	.007	.013	.020	.026	.033
50	5.002	10.003	15.005	20.006	25.008
52½	4.999	9.998	14.997	19.996	24.995
55	.997	.993	.990	.986	.983
60	.992	.983	.975	.966	.958
35 00	4.992	9.983	14.975	19.966	24.958
05	.987	.973	.960	.947	.933
07½	.984	.968	.952	.936	.920
10	.982	.963	.945	.926	.908
15	.976	.953	.929	.906	.882
20	4.971	9.942	14.913	19.885	24.856
22½	.969	.937	.906	.874	.843
25	.966	.932	.898	.864	.830
30	.961	.922	.883	.844	.805
35	4.956	9.912	14.868	19.824	24.780
37½	.953	.907	.860	.814	.767
40	.951	.902	.853	.805	.754
45	.946	.891	.837	.783	.728
50	4.940	9.881	14.821	19.762	24.702
52½	.938	.876	.814	.752	.690
55	.935	.871	.806	.742	.677
60	.930	.861	.791	.722	.652
36 00	4.930	9.861	14.791	19.722	24.652
05	.925	.850	.776	.701	.626
07½	.923	.845	.768	.690	.613
10	.920	.840	.760	.680	.600
15	.915	.830	.745	.660	.574
20	4.910	9.819	14.719	19.638	24.548
22½	.907	.814	.721	.628	.535
25	.904	.808	.712	.617	.521
30	.899	.798	.697	.596	.495
35	4.894	9.787	14.681	19.574	24.468
37½	.891	.782	.673	.564	.455
40	.888	.777	.665	.554	.442
45	.883	.766	.649	.532	.415
50	4.878	9.756	14.633	19.512	24.389
52½	.875	.750	.626	.501	.376
55	.873	.745	.618	.490	.363
60	.868	.735	.603	.470	.338

Ordinates of developed parallel.	
Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.007
5	.010
Latitude interval.	Meridional distance.
′	*Inches.*
1	6.065
2	12.130
3	18.198
4	24.262
5	30.328
Longitude interval.	Inch.
′	
1	.000
2	.002
3	.003
4	.007
5	.010
Latitude interval.	Meridional distance.
′	*Inches.*
1	6.067
2	12.133
3	18.200
4	24.266
5	30.333
Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010
Latitude interval.	Meridional distance.
′	*Inches.*
1	6.067
2	12.135
3	18.202
4	24.269
5	30.336

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{120000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
37 00	4.868	9.735	14.603	19.470	24.338
05	.862	.724	.586	.448	.310
07½	.859	.718	.578	.437	.296
10	.856	.713	.569	.426	.282
15	.851	.702	.553	.404	.255
20	4.846	9.691	14.537	19.382	24.228
22½	.843	.686	.529	.372	.215
25	.840	.680	.521	.362	.202
30	.835	.670	.505	.340	.175
35	4.830	9.659	14.489	19.318	24.148
37½	.827	.654	.481	.308	.135
40	.824	.649	.473	.298	.122
45	.819	.638	.457	.276	.095
50	4.814	9.627	14.441	19.254	24.068
52½	.811	.622	.432	.243	.054
55	.808	.616	.424	.232	.040
60	.802	.605	.407	.209	.012
38 00	4.802	9.605	14.407	19.209	24.012
05	.797	.594	.391	.188	23.985
07½	.794	.589	.383	.178	.972
10	.792	.584	.375	.167	.959
15	.786	.573	.359	.146	.932
20	4.781	9.562	14.343	19.124	23.905
22½	.778	.556	.335	.113	.891
25	.776	.551	.326	.102	.878
30	.770	.540	.310	.080	.850
35	4.764	9.529	14.293	19.058	23.822
37½	.762	.524	.285	.047	.809
40	.759	.518	.277	.036	.795
45	.754	.507	.261	.015	.768
50	4.748	9.496	14.244	18.993	23.740
52½	.745	.490	.236	.981	.726
55	.742	.485	.227	.970	.712
60	.737	.474	.211	.948	.685
39 00	4.737	9.474	14.211	18.948	23.685
05	.731	.463	.194	.926	.657
07½	.728	.457	.185	.914	.642
10	.726	.451	.177	.902	.628
15	.720	.440	.160	.880	.600
20	4.714	9.429	14.143	18.858	23.572
22½	.712	.423	.135	.846	.558
25	.709	.417	.126	.835	.544
30	.703	.407	.119	.813	.516
35	4.698	9.395	14.093	18.790	23.488
37½	.695	.389	.084	.779	.474
40	.692	.384	.076	.768	.460
45	.686	.373	.059	.746	.432
50	4.681	9.362	14.042	18.723	23.404
52½	.678	.356	.034	.712	.390
55	.675	.350	.025	.700	.375
60	.669	.339	.008	.678	.347

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.068
2	12.136
3	18.205
4	24.273
5	30.341

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.069
2	12.138
3	18.207
4	24.277
5	30.345

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.070
2	12.140
3	18.210
4	24.281
5	30.351

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
40 00	4.669	9.339	14.008	18.678	23.347
05	.664	.328	13.991	.655	.319
07½	.661	.322	.983	.644	.305
10	.658	.316	.975	.632	.291
15	.652	.305	.957	.610	.262
20	4.647	9.293	13.940	18.586	23.233
22½	.644	.288	.931	.575	.219
25	.641	.282	.923	.564	.205
30	.635	.271	.906	.542	.177
35	4.630	9.259	13.889	18.518	23.148
37½	.627	.253	.880	.507	.134
40	.624	.248	.871	.495	.119
45	.618	.236	.854	.472	.090
50	4.612	9.224	13.837	18.449	23.061
52½	.609	.219	.828	.438	.047
55	.606	.213	.819	.426	.032
60	.600	.201	.801	.402	.002
41 00	4.600	9.201	13.801	18.402	23.002
05	.595	.189	.784	.378	22.973
07½	.592	.183	.775	.368	.958
10	.589	.178	.766	.355	.944
15	.583	.166	.749	.332	.915
20	4.577	9.154	13.732	18.309	22.886
22½	.574	.149	.723	.298	.872
25	.571	.143	.714	.286	.857
30	.566	.131	.697	.262	.828
35	4.560	9.119	13.679	18.239	22.798
37½	.557	.114	.670	.227	.784
40	.554	.108	.661	.215	.769
45	.548	.096	.644	.192	.740
50	4.542	9.084	13.626	18.168	22.710
52½	.539	.078	.617	.156	.695
55	.536	.072	.608	.145	.681
42 00	4.530	9.060	13.591	18.122	22.652
05	.524	.049	.572	.098	.622
07½	.521	.043	.564	.086	.607
10	.518	.037	.555	.073	.592
15	.513	.025	.537	.050	.563
20	4.507	9.013	13.520	18.027	22.533
22½	.504	.007	.511	.014	.518
25	.501	.002	.502	.003	.504
30	.495	.990	.484	17.979	.474
35	4.489	8.978	13.467	17.956	22.445
37½	.486	.972	.458	.944	.430
40	.483	.966	.449	.932	.415
45	.477	.954	.431	.908	.385
50	4.471	8.942	13.413	17.884	22.355
52½	.468	.936	.404	.872	.340
55	.465	.930	.395	.860	.325
60	.459	.918	.377	.836	.295

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.072
2	12.143
3	18.215
4	24.286
5	30.358

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.072
2	12.145
3	18.218
4	24.290
5	30.362

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.073
2	12.148
3	18.220
4	24.294
5	30.367

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval.				
	1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
43 00	4.459	8.918	13.377	17.836	22.295
05	.453	.906	.359	.812	.265
07½	.450	.899	.349	.799	.249
10	.447	.894	.340	.787	.234
15	.441	.882	.322	.762	.203
20	4.434	8.869	13.303	17.738	22.172
22½	.431	.863	.294	.726	.157
25	.428	.856	.285	.713	.141
30	.422	.844	.266	.688	.110
35	4.416	8.832	13.248	17.664	22.080
37½	.413	.826	.239	.652	.065
40	.410	.820	.230	.640	.050
45	.404	.808	.212	.616	.020
50	4.398	8.796	13.194	17.592	21.990
52½	.395	.789	.184	.579	.974
55	.392	.784	.175	.567	.959
60	.386	.772	.157	.543	.929
44 00	4.386	8.772	13.157	17.543	21.929
05	.380	.759	.139	.518	.898
07½	.376	.753	.129	.506	.882
10	.373	.747	.120	.494	.867
15	.367	.734	.102	.469	.836
20	4.361	8.722	13.083	17.444	21.805
22½	.358	.716	.074	.431	.789
25	.355	.709	.064	.419	.774
30	.349	.697	.046	.394	.743
35	4.342	8.685	13.027	17.370	21.712
37½	.339	.678	.018	.357	.696
40	.336	.672	.009	.345	.681
45	.330	.660	12.990	.320	.650
50	4.324	8.648	12.971	17.295	21.619
52½	.321	.642	.963	.283	.604
55	.318	.635	.953	.270	.588
60	.312	.623	.935	.246	.558
45 00	4.312	8.623	12.935	17.246	21.558
05	.305	.610	.916	.221	.527
07½	.302	.604	.906	.208	.511
10	.299	.598	.897	.196	.495
15	.293	.586	.878	.171	.464
20	4.287	8.573	12.860	17.146	21.433
22½	.283	.567	.849	.134	.417
25	.280	.560	.841	.121	.401
30	.274	.548	.822	.096	.370
35	4.268	8.535	12.803	17.070	21.338
37½	.264	.529	.793	.058	.322
40	.261	.522	.784	.045	.306
45	.255	.510	.765	.020	.275
50	4.249	8.497	12.746	16.995	21.243
52½	.246	.491	.737	.982	.228
55	.242	.485	.727	.970	.212
60	.236	.472	.707	.944	.180

Ordinates of developed parallel.

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.075
2	12.149
3	18.223
4	24.298
5	30.372

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.076
2	12.152
3	18.228
4	24.304
5	30.380

Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.077
2	12.154
3	18.231
4	24.308
5	30.385

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel.					Ordinates of developed parallel.	
	Longitude interval.					Longitude interval.	Inch.
	1′.	2′.	3′.	4′.	5′.		
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	′	
46 00	4.236	8.472	12.707	16.944	21.179	1	.000
05	.229	.459	.688	.918	.147	2	.002
07½	.226	.452	.679	.905	.131	3	.005
10	.223	.446	.669	.892	.115	4	.007
15	.216	.433	.649	.867	.082	5	.010
20	4.210	8.420	12.630	16.840	21.051	Latitude interval.	Meridional distance.
22½	.207	.414	.621	.828	.035		
25	.204	.408	.611	.815	.019		
30	.198	.395	.593	.790	20.988	′	*Inches.*
						1	6.078
35	4.191	8.382	12.573	16.764	20.955	2	12.157
37½	.188	.376	.564	.752	.939	3	18.235
40	.184	.369	.553	.738	.922	4	24.313
45	.178	.356	.534	.712	.890	5	30.391
50	4.172	8.343	12.515	16.687	20.858	Longitude interval.	Inch.
52½	.168	.337	.505	.674	.842		
55	.165	.330	.496	.661	.826		
60	.159	.318	.476	.635	.794		
47 00	4.159	8.318	12.476	16.635	20.794	′	
05	.152	.305	.457	.610	.762	1	.000
07½	.149	.299	.448	.597	.746	2	.002
10	.146	.292	.438	.584	.730	3	.005
15	.139	.279	.418	.558	.697	4	.007
						5	.010
20	4.133	8.266	12.398	16.531	20.664	Latitude interval.	Meridional distance.
22½	.130	.259	.389	.518	.648		
25	.126	.252	.378	.505	.631		
30	.120	.239	.359	.478	.598	′	*Inches.*
						1	6.078
35	4.113	8.226	12.339	16.452	20.565	2	12.157
37½	.110	.220	.329	.439	.549	3	18.235
40	.106	.213	.319	.426	.532	4	24.315
45	.100	.200	.300	.400	.500	5	30.392
50	4.094	8.187	12.281	16.375	20.468	Longitude interval.	Inch.
52½	.090	.180	.271	.361	.451		
55	.089	.174	.261	.348	.435		
60	.080	.161	.241	.322	.402		
48 00	4.080	8.160	12.241	16.321	20.401	′	
05	.074	.148	.222	.296	.370	1	.000
07½	.071	.142	.212	.284	.354	2	.002
10	.067	.135	.202	.270	.337	3	.005
15	.061	.122	.182	.244	.304	4	.007
						5	.010
20	4.054	8.108	12.162	16.217	20.271	Latitude interval.	Meridional distance.
22½	.051	.102	.153	.204	.255		
25	.048	.095	.143	.190	.238		
30	.041	.082	.123	.164	.205		
						′	*Inches.*
						1	6.080
35	4.034	8.069	12.103	16.138	20.172	2	12.160
37½	.031	.062	.093	.124	.155	3	18.240
40	.028	.055	.083	.110	.138	4	24.320
45	.021	.042	.063	.084	.105	5	30.400
50	4.014	8.029	12.043	16.058	20.072		
52½	.011	.022	.034	.045	.056		
55	.008	.016	.024	.031	.039		
60	.001	.002	.003	.004	.006		

TABLE 10.—*Coordinates for the projection of maps (scale $\frac{1}{12000}$)*—Continued.

Latitude of parallel.	Abscissas of developed parallel. Longitude interval. 1′.	2′.	3′.	4′.	5′.
° ′	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
49 00	4.001	8.002	12.003	16.004	20.006
05	3.995	7.989	11.984	15.978	19.973
07½	.991	.982	.974	.965	.956
10	.988	.976	.964	.952	.939
15	.981	.962	.943	.924	.905
20	3.974	7.949	11.923	15.898	19.872
22½	.971	.942	.914	.885	.856
25	.968	.936	.904	.872	.840
30	.961	.922	.883	.844	.805
35	3.954	7.908	11.863	15.817	19.771
37½	.951	.902	.853	.804	.755
40	.948	.895	.843	.790	.738
45	.941	.882	.823	.764	.705
50	3.934	7.869	11.803	15.738	19.672
52½	.931	.862	.793	.724	.655
55	.928	.855	.783	.710	.638
60	.921	.842	.762	.683	.604

Ordinates of developed parallel. Longitude interval.	Inch.
′	
1	.000
2	.002
3	.005
4	.007
5	.010

Latitude interval.	Meridional distance.
′	*Inches.*
1	6.081
2	12.162
3	18.243
4	24.324
5	30.405

TABLE 11.—*Areas of quadrilaterals of earth's surface of 1° extent in latitude and longitude.*

From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
0 00	4,752.33	22 00	4,414.67	44 00	3,440.98
0 30	4,752.16	22 30	4,399.30	44 30	3,412.26
1 00	4,751.63	23 00	4,383.60	45 00	3,383.27
1 30	4,750.75	23 30	4,367.57	45 30	3,354.01
2 00	4,749.52	24 00	4,351.21	46 00	3,324.49
2 30	4,747.93	24 30	4,334.52	46 30	3,294.71
3 00	4,746.00	25 00	4,317.51	47 00	3,264.68
3 30	4,743.71	25 30	4,300.17	47 30	3,234.39
4 00	4,741.07	26 00	4,282.50	48 00	3,203.84
4 30	4,738.08	26 30	4,264.51	48 30	3,173.04
5 00	4,734.74	27 00	4,246.20	49 00	3,141.99
5 30	4,731.04	27 30	4,227.56	49 30	3,110.69
6 00	4,727.00	28 00	4,208.61	50 00	3,079.15
6 30	4,722.61	28 30	4,189.33	50 30	3,047.37
7 00	4,717.86	29 00	4,169.74	51 00	3,015.34
7 30	4,712.76	29 30	4,149.83	51 30	2,983.08
8 00	4,707.32	30 00	4,129.60	52 00	2,950.58
8 30	4,701.52	30 30	4,109.06	52 30	2,917.85
9 00	4,695.38	31 00	4,088.21	53 00	2,884.88
9 30	4,688.89	31 30	4,067.05	53 30	2,851.68
10 00	4,682.05	32 00	4,045.57	54 00	2,818.27
10 30	4,674.86	32 30	4,023.79	54 30	2,784.62
11 00	4,667.32	33 00	4,001.69	55 00	2,750.76
11 30	4,659.43	33 30	3,979.30	55 30	2,716.67
12 00	4,651.20	34 00	3,956.59	56 00	2.682.37
12 30	4,642.63	34 30	3,933.59	56 30	2,647.85
13 00	4,633.71	35 00	3,910.28	57 00	2,613.13
13 30	4,624.44	35 30	3,886.67	57 30	2,578.19
14 00	4,614.82	36 00	3,862.76	58 00	2,543.05
14 30	4,604.87	36 30	3,838.56	58 30	2,507.70
15 00	4,594.57	37 00	3,814.06	59 00	2,472.16
15 30	4,583.92	37 30	3,789.26	59 30	2,436.42
16 00	4,572.94	38 00	3,764.18	60 00	2,400.48
16 30	4,561.61	38 30	3,738.80	60 30	2,364.34
17 00	4,549.94	39 00	3,713.14	61 00	2,328.02
17 30	4,537.93	39 30	3,687.18	61 30	2,291.51
18 00	4,525.59	40 00	3,660.95	62 00	2,254.82
18 30	4,512.90	40 30	3,634.42	62 30	2,217.94
19 00	4,499.87	41 00	3,607.62	63 00	2,180.89
19 30	4,486.51	41 30	3,580.54	63 30	2,143.66
20 00	4,472.81	42 00	3,553.17	64 00	2,106.26
20 30	4,458.78	42 30	3,525.54	64 30	2,068.68
21 00	4,444.41	43 00	3,497.62	65 00	2,030.94
21 30	4,429.71	43 30	3,469.44	65 30	1,993.04

TABLE 11.—*Areas of quadrilaterals of earth's surface of 1° extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
66 00	1,954.97	76 00	1,164.49	86 00	336.02
66 30	1,916.75	76 30	1,123.75	86 30	294.08
67 00	1,878.37	77 00	1,082.91	87 00	252.11
67 30	1,839.84	77 30	1,041.99	87 30	210.12
68 00	1,801.16	78 00	1,000.99	88 00	168.12
68 30	1,762.33	78 30	959.90	88 30	126.10
69 00	1,723.36	79 00	918.73	89 00	84.07
69 30	1,684.24	79 30	877.49	89 30	42.04
70 00	1,645.00	80 00	836.18	90 00	00.00
70 30	1,605.62	80 30	794.79		
71 00	1,566.10	81 00	753.34		
71 30	1,526.46	81 30	711.83		
72 00	1,486.70	82 00	670.27		
72 30	1,446.81	82 30	628.64		
73 00	1,406.81	83 00	586.97		
73 30	1,366.69	83 30	545.24		
74 00	1,326.46	84 00	503.47		
74 30	1,286.12	84 30	461.66		
75 00	1,245.68	85 00	419.81		
75 30	1,205.13	85 30	377.93		

TABLE 12.—*Areas of quadrilaterals of earth's surface of 30′ extent in latitude and longitude.*

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
0 00	1,188.10	11 00	1,166.84	22 00	1,103.68
0 15	1,188.08	11 15	1,165.86	22 15	1,101.77
0 30	1,188.05	11 30	1,164.86	22 30	1,099.84
0 45	1,188.00	11 45	1,163.85	22 45	1,097.88
1 00	1,187.92	12 00	1,162.81	23 00	1,095.91
1 15	1,187.82	12 15	1,161.75	23 15	1,093.92
1 30	1,187.70	12 30	1,160.67	23 30	1,091.90
1 45	1,187.56	12 45	1,159.56	23 45	1,089.87
2 00	1,187.39	13 00	1,158.44	24 00	1,087.81
2 15	1,187.20	13 15	1,157.29	24 15	1,085.74
2 30	1,186.99	13 30	1,156.12	24 30	1,083.64
2 45	1,186.76	13 45	1,154.93	24 45	1,081.52
3 00	1,186.51	14 00	1,153.72	25 00	1,079.39
3 15	1,186.24	14 15	1,152.48	25 15	1,077.23
3 30	1,185.95	14 30	1,151.23	25 30	1,075.05
3 45	1,185.62	14 45	1,149.95	25 45	1,072.85
4 00	1,185.28	15 00	1,148.65	26 00	1,070.64
4 15	1,184.92	15 15	1,147.33	26 15	1,068.40
4 30	1,184.53	15 30	1,145.99	26 30	1,066.14
4 45	1,184.13	15 45	1,144.63	26 45	1,063.86
5 00	1,183.70	16 00	1,143.25	27 00	1,061.56
5 15	1,183.24	16 15	1,141.84	27 15	1,059.24
5 30	1,182.77	16 30	1,140.41	27 30	1,056.90
5 45	1,182.28	16 45	1,138.96	27 45	1,054.54
6 00	1,181.76	17 00	1,137.50	28 00	1,052.16
6 15	1,181.22	17 15	1,136.00	28 15	1,049.76
6 30	1,180.66	17 30	1,134.49	28 30	1,047.34
6 45	1,180.08	17 45	1,132.96	28 45	1,044.90
7 00	1,179.48	18 00	1,131.41	29 00	1,042.44
7 15	1,178.85	18 15	1,129.83	29 15	1,039.97
7 30	1,178.20	18 30	1,128.24	29 30	1,037.47
7 45	1,177.53	18 45	1,126.62	29 45	1,034.95
8 00	1,176.84	19 00	1,124.98	30 00	1,032.41
8 15	1,176.13	19 15	1,123.32	30 15	1,029.85
8 30	1,175.39	19 30	1,121.64	30 30	1,027.27
8 45	1,174.63	19 45	1,119.93	30 45	1,024.68
9 00	1,173.86	20 00	1,118.21	31 00	1,022.06
9 15	1,173.06	20 15	1,116.47	31 15	1,019.43
9 30	1,172.23	20 30	1,114.71	31 30	1,016.77
9 45	1,171.39	20 45	1,112.92	31 45	1,014.10
10 00	1,170.52	21 00	1,111.11	32 00	1,011.40
10 15	1,169.63	21 15	1,109.28	32 15	1,008.69
10 30	1,168.73	21 30	1,107.44	32 30	1,005.96
10 45	1,167.80	21 45	1,105.57	32 45	1,003.20

TABLE 12.—*Areas of quadrilaterals of earth's surface of 30′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
33 00	1,000.43	44 00	860.25	55 00	687.70
33 15	997.64	44 15	856.67	55 15	683.44
33 30	994.83	44 30	853.07	55 30	679.17
33 45	992.00	44 45	849.46	55 45	674.89
34 00	989.16	45 00	845.82	56 00	670.60
34 15	986.29	45 15	842.18	56 15	666.29
34 30	983.41	45 30	838.51	56 30	661.97
34 45	980.50	45 45	834.83	56 45	657.64
35 00	977.58	46 00	831.13	57 00	653.29
35 15	974.64	46 15	827.42	57 15	648.93
35 30	971.68	46 30	823.68	57 30	644.55
35 45	968.70	46 45	819.94	57 45	640.17
36 00	965.70	47 00	816.18	58 00	635.77
36 15	962.68	47 15	812.40	58 15	631.36
36 30	959.65	47 30	808.60	58 30	626.93
36 45	956.60	47 45	804.79	58 45	622.49
37 00	953.52	48 00	800.97	59 00	618.05
37 15	950.43	48 15	797.13	59 15	613.59
37 30	947.32	48 30	793.27	59 30	609.11
37 45	944.21	48 45	789.39	59 45	604.62
38 00	941.05	49 00	785.50	60 00	600.13
38 15	937.88	49 15	781.60	60 15	595.62
38 30	934.71	49 30	777.68	60 30	591.09
38 45	931.51	49 45	773.74	60 45	586.56
39 00	928.29	50 00	769.79	61 00	582.01
39 15	925.06	50 15	765.83	61 15	577.45
39 30	921.80	50 30	761.85	61 30	572.88
39 45	918.53	50 45	757.85	61 45	568.30
40 00	915.25	51 00	753.84	62 00	563.71
40 15	911.94	51 15	749.82	62 15	559.11
40 30	908.61	51 30	745.78	62 30	554.49
40 45	905.27	51 45	741.72	62 45	549.86
41 00	901.91	52 00	737.65	63 00	545.23
41 15	898.54	52 15	733.57	63 15	540.58
41 30	895.14	52 30	729.47	63 30	535.92
41 45	891.73	52 45	725.36	63 45	531.25
42 00	888.30	53 00	721.23	64 00	526.57
42 15	884.85	53 15	717.08	64 15	521.88
42 30	881.39	53 30	712.93	64 30	517.17
42 45	877.91	53 45	708.76	64 45	512.46
43 00	874.41	54 00	704.57	65 00	507.74
43 15	870.90	54 15	700.38	65 15	503.01
43 30	867.37	54 30	696.16	65 30	498.26
43 45	863.82	54 45	691.94	65 45	493.51

TABLE 12.—*Areas of quadrilaterals of earth's surface of 30′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
66 00	488.75	74 00	331.62	82 00	167.57
66 15	483.97	74 15	326.58	82 15	162.37
66 30	479.19	74 30	321.53	82 30	157.16
66 45	474.40	74 45	316.48	82 45	151.95
67 00	469.60	75 00	311.42	83 00	146.74
67 15	464.78	75 15	306.36	83 15	141.53
67 30	459.96	75 30	301.28	83 30	136.31
67 45	455.13	75 45	296.21	83 45	131.09
68 00	450.29	76 00	291.12	84 00	125.87
68 15	445.45	76 15	286.04	84 15	120.64
68 30	440.59	76 30	280.94	84 30	115.42
68 45	435.72	76 45	275.84	84 45	110.18
69 00	430.84	77 00	270.73	85 00	104.95
69 15	425.96	77 15	265.62	85 15	99.72
69 30	421.06	77 30	260.50	85 30	94.48
69 45	416.16	77 45	255.38	85 45	89.25
70 00	411.25	78 00	250.25	86 00	84.01
70 15	406.34	78 15	245.12	86 15	78.76
70 30	401.41	78 30	239.98	86 30	73.52
70 45	396.47	78 45	234.83	86 45	68.27
71 00	391.53	79 00	229.68	87 00	63.03
71 15	386.58	79 15	224.53	87 15	57.78
71 30	381.62	79 30	219.37	87 30	52.53
71 45	376.65	79 45	214.21	87 45	47.28
72 00	371.68	80 00	209.05	88 00	42.03
72 15	366.70	80 15	203.88	88 15	36.78
72 30	361.71	80 30	198.70	88 30	31.53
72 45	356.71	80 45	193.52	88 45	26.27
73 00	351.71	81 00	188.34	89 00	21.02
73 15	346.69	81 15	183.15	89 15	15.76
73 30	341.68	81 30	177.96	89 30	10.51
73 45	336.65	81 45	172.77	89 45	5.26

TABLE 13.—*Areas of quadrilaterals of earth's surface of 15′ extent in latitude and longitude.*

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′ ″		° ′ ″		° ′ ″	
0 07 30	297.02	5 37 30	295.63	11 07 30	291.59
0 15 00	297.02	5 45 00	295.57	11 15 00	291.47
0 22 30	297.02	5 52 30	295.51	11 22 30	291.34
0 30 00	297.01	6 00 00	295.44	11 30 00	291.22
0 37 30	297.01	6 07 30	295.37	11 37 30	291.09
0 45 00	297.00	6 15 00	295.31	11 45 00	290.96
0 52 30	296.99	6 22 30	295.24	11 52 30	290.83
1 00 00	296.98	6 30 00	295.17	12 00 00	290.70
1 07 30	296.97	6 37 30	295.09	12 07 30	290.57
1 15 00	296.96	6 45 00	295.02	12 15 00	290.44
1 22 30	296.94	6 52 30	294.95	12 22 30	290.30
1 30 00	296.93	7 00 00	294.87	12 30 00	290.17
1 37 30	296.91	7 07 30	294.79	12 37 30	290.03
1 45 00	296.89	7 15 00	294.71	12 45 00	289.89
1 52 30	296.87	7 22 30	294.63	12 52 30	289.75
2 00 00	296.85	7 30 00	294.55	13 00 00	289.61
2 07 30	296.82	7 37 30	294.47	13 07 30	289.47
2 15 00	296.80	7 45 00	294.39	13 15 00	289.33
2 22 30	296.77	7 52 30	294.30	13 22 30	289.18
2 30 00	296.75	8 00 00	294.21	13 30 00	289.03
2 37 30	296.72	8 07 30	294.12	13 37 30	288.88
2 45 00	296.69	8 15 00	294.03	13 45 00	288.73
2 52 30	296.66	8 22 30	293.94	13 52 30	288.58
3 00 00	296.63	8 30 00	293.85	14 00 00	288.43
3 07 30	296.60	8 37 30	293.75	14 07 30	288.28
3 15 00	296.56	8 45 00	293.66	14 15 00	288.12
3 22 30	296.53	8 52 30	293.56	14 22 30	287.96
3 30 00	296.49	9 00 00	293.47	14 30 00	287.81
3 37 30	296.45	9 07 30	293.37	14 37 30	287.65
3 45 00	296.41	9 15 00	293.27	14 45 00	287.49
3 52 30	296.36	9 22 30	293.16	14 52 30	287.33
4 00 00	296.32	9 30 00	293.06	15 00 00	287.17
4 07 30	296.28	9 37 30	292.95	15 07 30	287.00
4 15 00	296.23	9 45 00	292.85	15 15 00	286.83
4 22 30	296.18	9 52 30	292.74	15 22 30	286.67
4 30 00	296.13	10 00 00	292.63	15 30 00	286.50
4 37 30	296.08	10 07 30	292.52	15 37 30	286.33
4 45 00	296.03	10 15 00	292.41	15 45 00	286.16
4 52 30	295.98	10 22 30	292.30	15 52 30	285.99
5 00 00	295.93	10 30 00	292.19	16 00 00	285.82
5 07 30	295.87	10 37 30	292.07	16 07 30	285.64
5 15 00	295.81	10 45 00	291.95	16 15 00	285.46
5 22 30	295.75	10 52 30	291.83	16 22 30	285.28
5 30 00	295.69	11 00 00	291.71	16 30 00	285.10

TABLE 13.—*Areas of quadrilaterals of earth's surface of 15′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′ ″		° ′ ″		° ′ ″	
16 37 30	284.92	22 07 30	275.68	27 37 30	263.93
16 45 00	284.74	22 15 00	275.44	27 45 00	263.64
16 52 30	284.56	22 22 30	275.20	27 52 30	263.34
17 00 00	284.38	22 30 00	274.96	28 00 00	263.04
17 07 30	284.19	22 37 30	274.72	28 07 30	262.74
17 15 00	284.00	22 45 00	274.47	28 15 00	262.44
17 22 30	283.81	22 52 30	274.22	28 22 30	262.14
17 30 00	283.62	23 00 00	273.98	28 30 00	261.84
17 37 30	283.43	23 07 30	273.73	28 37 30	261.53
17 45 00	283.24	23 15 00	273.48	28 45 00	261.23
17 52 30	283.05	23 22 30	273.23	28 52 30	260.92
18 00 00	282.86	23 30 00	272.98	29 00 00	260.61
18 07 30	282.66	23 37 30	272.72	29 07 30	260.30
18 15 00	282.46	23 45 00	272.47	29 15 00	259.99
18 22 30	282.26	23 52 30	272.21	29 22 30	259.68
18 30 00	282.06	24 00 00	271.95	29 30 00	259.37
18 37 30	281.86	24 07 30	371.69	29 37 30	259.05
18 45 00	281.66	24 15 00	271.44	29 45 00	258.74
18 52 30	281.45	24 22 30	271.17	29 52 30	258.42
19 00 00	281.25	24 30 00	270.91	30 00 00	258.10
19 07 30	281.04	24 37 30	270.65	30 07 30	257.78
19 15 00	280.83	24 45 00	270.38	30 15 00	257.46
19 22 30	280.62	24 52 30	270.11	30 22 30	357.14
19 30 00	280.41	25 00 00	269.85	30 30 00	256.82
19 37 30	280.20	25 07 30	269.58	30 37 30	256.49
19 45 00	279.99	25 15 00	269.31	30 45 00	256.17
19 52 30	279.77	25 22 30	269.04	30 52 30	255.84
20 00 00	279.55	25 30 00	268.76	31 00 00	255.52
20 07 30	279.34	25 37 30	268.49	31 07 30	255.19
20 15 00	279.12	25 45 00	268.21	31 15 00	254.86
20 22 30	278.90	25 52 30	267.94	31 22 30	254.53
20 30 00	278.68	26 00 00	267.66	31 30 00	254.19
20 37 30	278.46	26 07 30	267.38	31 37 30	253.86
20 45 00	278.23	26 15 00	267.10	31 45 00	253.53
20 52 30	278.00	26 22 30	266.82	31 52 30	253.19
21 00 00	277.78	26 30 00	266.54	32 00 00	252.85
21 07 30	277.55	26 37 30	266.25	32 07 30	252.51
21 15 00	277.32	26 45 00	265.97	32 15 00	252.17
21 22 30	277.09	26 52 30	265.68	32 22 30	251.83
21 30 00	276.86	27 00 00	265.39	32 30 00	251.49
21 37 30	276.63	27 07 30	265.10	32 37 30	251.15
21 45 00	276.39	27 15 00	264.81	32 45 00	250.80
21 52 30	276.16	27 22 30	264.52	32 52 30	250.45
22 00 00	275.92	27 30 00	264.23	33 00 00	250.11

TABLE 13.—*Areas of quadrilaterals of earth's surface of 15′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′ ″		° ′ ″		° ′ ″	
33 07 30	249.76	38 37 30	233.28	44 07 30	214.61
33 15 00	249.41	38 45 00	232.88	44 15 00	214.17
33 22 30	249.06	38 52 30	232.48	44 22 30	213.72
33 30 00	248.71	39 00 00	232.07	44 30 00	213.27
33 37 30	248.36	39 07 30	231.67	44 37 30	212.82
33 45 00	248.00	39 15 00	231.27	44 45 00	212.37
33 52 30	247.65	39 22 30	230.86	44 52 30	211.91
34 00 00	247.29	39 30 00	230.45	45 00 00	211.46
34 07 30	246.93	39 37 30	230.04	45 07 30	211.00
34 15 00	246.57	39 45 00	229.63	45 15 00	210.55
34 22 30	246.21	39 52 30	229.22	45 22 30	210.09
34 30 00	245.85	40 00 00	228.81	45 30 00	209.63
34 37 30	245.49	40 07 30	228.40	45 37 30	209.17
34 45 00	245.13	40 15 00	227.99	45 45 00	208.71
34 52 30	244.76	40 22 30	227.57	45 52 30	208.25
35 00 00	244.40	40 30 00	227.15	46 00 00	207.78
35 07 30	244.03	40 37 30	226.73	46 07 30	207.32
35 15 00	243.66	40 45 00	226.32	46 15 00	206.86
35 22 30	243.29	40 52 30	225.90	46 22 30	206.39
35 30 00	242.92	41 00 00	225.48	46 30 00	205.92
35 37 30	242.55	41 07 30	225.06	46 37 30	205.45
35 45 00	242.18	41 15 00	224.64	46 45 00	204.99
35 52 30	241.80	41 22 30	224.21	46 52 30	204.52
36 00 00	241.43	41 30 00	223.79	47 00 00	204.05
36 07 30	241.05	41 37 30	223.36	47 07 30	203.57
36 15 00	240.67	41 45 00	222.93	47 15 00	203.10
36 22 30	240.29	41 52 30	222.50	47 22 30	202.63
36 30 00	239.91	42 00 00	222.08	47 30 00	202.15
36 37 30	239.53	42 07 30	221.65	47 37 30	201.67
36 45 00	239.15	42 15 00	221.21	47 45 00	201.20
36 52 30	238.77	42 22 30	220.78	47 52 30	200.72
37 00 00	238.38	42 30 00	220.35	48 00 00	200.24
37 07 30	237.99	42 37 30	219.91	48 07 30	199.76
37 15 00	237.61	42 45 00	219.48	48 15 00	199.28
37 22 30	237.22	42 52 30	219.04	48 22 30	198.80
37 30 00	236.83	43 00 00	218.60	48 30 00	198.32
37 37 30	236.44	43 07 30	218.16	48 37 30	197.83
37 45 00	236.05	43 15 00	217.73	48 45 00	197.35
37 52 30	235.66	43 22 30	217.28	48 52 30	196.86
38 00 00	235.26	43 30 00	216.84	49 00 00	196.38
38 07 30	234.87	43 37 30	216.40	49 07 30	195.89
38 15 00	234.47	43 45 00	215.96	49 15 00	195.40
38 22 30	234.07	43 52 30	215.51	49 22 30	194.91
38 30 00	233.68	44 00 00	215.06	49 30 00	194.42

TABLE 13.—*Areas of quadrilaterals of earth's surface of 15′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′ ″		° ′ ″		° ′ ″	
49 37 30	193.93	55 07 30	171.39	60 37 30	147.21
49 45 00	193.44	55 15 00	170.86	60 45 00	146.64
49 52 30	192.94	55 22 30	170.33	60 52 30	146.07
50 00 00	192.45	55 30 00	169.79	61 00 00	145.50
50 07 30	191.95	55 37 30	169.26	61 07 30	144.93
50 15 00	191.46	55 45 00	168.72	61 15 00	144.36
50 22 30	190.96	55 52 30	168.19	61 22 30	143.79
50 30 00	190.46	56 00 00	167.65	61 30 00	143.22
50 37 30	189.96	56 07 30	167.11	61 37 30	142.65
50 45 00	189.46	56 15 00	166.57	61 45 00	142.08
50 52 30	188.96	56 22 30	166.03	61 52 30	141.50
51 00 00	188.46	56 30 00	165.49	62 00 00	140.93
51 07 30	187.96	56 37 30	164.95	62 07 30	140.35
51 15 00	187.46	56 45 00	164.41	62 15 00	139.78
51 22 30	186.95	56 52 30	163.87	62 22 30	139.20
51 30 00	186.45	57 00 00	163.32	62 30 00	138.62
51 37 30	185.94	57 07 30	162.78	62 37 30	138.04
51 45 00	185.43	57 15 00	162.23	62 45 00	137.47
51 52 30	184.92	57 22 30	161.68	62 52 30	136.89
52 00 00	184.41	57 30 00	161.14	63 00 00	136.31
52 07 30	183.90	57 37 30	160.59	63 07 30	135.73
52 15 00	183.39	57 45 00	160.04	63 15 00	135.15
52 22 30	182.88	57 52 30	159.49	63 22 30	134.56
52 30 00	182.37	58 00 00	158.94	63 30 00	133.98
52 37 30	181.85	58 07 30	158.39	63 37 30	133.40
52 45 00	181.34	58 15 00	157.84	63 45 00	132.81
52 52 30	180.82	58 22 30	157.29	63 52 30	132.23
53 00 00	180.31	58 30 00	156.73	64 00 00	131.64
53 07 30	179.79	58 37 30	156.18	64 07 30	131.06
53 15 00	179.27	58 45 00	155.62	64 15 00	130.47
53 22 30	178.75	58 52 30	155.07	64 22 30	129.88
53 30 00	178.23	59 00 00	154.51	64 30 00	129.29
53 37 30	177.71	59 07 30	153.96	64 37 30	128.70
53 45 00	177.19	59 15 00	153.40	64 45 00	128.12
53 52 30	176.67	59 22 30	152.84	64 52 30	127.53
54 00 00	176.14	59 30 00	152.28	65 00 00	126.94
54 07 30	175.62	59 37 30	151.72	65 07 30	126.34
54 15 00	175.10	59 45 00	151.16	65 15 00	125.75
54 22 30	174.57	59 52 30	150.60	65 22 30	125.16
54 30 00	174.04	60 00 00	150.03	65 30 00	124.57
54 37 30	173.51	60 07 30	149.47	65 37 30	123.97
54 45 00	172.99	60 15 00	148.91	65 45 00	123.38
54 52 30	172.46	60 22 30	148.34	65 52 30	122.78
55 00 00	171.93	60 30 00	147.77	66 00 00	122.19

TABLE 13.—*Areas of quadrilaterals of earth's surface of 15′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′ ″		° ′ ″		° ′ ″	
66 07 30	121.59	71 37 30	94.78	77 07 30	67.04
66 15 00	120.99	71 45 00	94.16	77 15 00	66.41
66 22 30	120.40	71 52 30	93.54	77 22 30	65.77
66 30 00	119.80	72 00 00	92.92	77 30 00	65.13
66 37 30	119.20	72 07 30	92.30	77 37 30	64.49
66 45 00	118.60	72 15 00	91.68	77 45 00	63.85
66 52 30	118.00	72 22 30	91.05	77 52 30	63.20
67 00 00	117.40	72 30 00	90.43	78 00 00	62.56
67 07 30	116.80	72 37 30	89.80	78 07 30	61.92
67 15 00	116.20	72 45 00	89.18	78 15 00	61.28
67 22 30	115.59	72 52 30	88.55	78 22 30	60.64
67 30 00	114.99	73 00 00	87.93	78 30 00	60.00
67 37 30	114.39	73 07 30	87.30	78 37 30	59.35
67 45 00	113.78	73 15 00	86.67	78 45 00	58.71
67 52 30	113.18	73 22 30	86.05	78 52 30	58.06
68 00 00	112.57	73 30 00	85.42	79 00 00	57.42
68 07 30	111.97	73 37 30	84.79	79 07 30	56.78
68 15 00	111.36	73 45 00	84.16	79 15 00	56.13
68 22 30	110.76	73 52 30	83.53	79 22 30	55.49
68 30 00	110.15	74 00 00	82.91	79 30 00	54.84
68 37 30	109.54	74 07 30	82.28	79 37 30	54.20
68 45 00	108.93	74 15 00	81.65	79 45 00	53.55
68 52 30	108.32	74 22 30	81.01	79 52 30	52.91
69 00 00	107.71	74 30 00	80.38	80 00 00	52.26
69 07 30	107.10	74 37 30	79.75	80 07 30	51.62
69 15 00	106.49	74 45 00	79.12	80 15 00	50.97
69 22 30	105.88	74 52 30	78.49	80 22 30	50.32
69 30 00	105.27	75 00 00	77.86	80 30 00	49.68
69 37 30	104.65	75 07 30	77.22	80 37 30	49.03
69 45 00	104.04	75 15 00	76.59	80 45 00	48.38
69 52 30	103.43	75 22 30	75.95	80 52 30	47.73
70 00 00	102.81	75 30 00	75.32	81 00 00	47.08
70 07 30	102.20	75 37 30	74.69	81 07 30	46.44
70 15 00	101.59	75 45 00	74.05	81 15 00	45.79
70 22 30	100.97	75 52 30	73.42	81 22 30	45.14
70 30 00	100.35	76 00 00	72.78	81 30 00	44.49
70 37 30	99.74	76 07 30	72.14	81 37 30	43.84
70 45 00	99.12	76 15 00	71.51	81 45 00	43.19
70 52 30	98.50	76 22 30	70.87	81 52 30	42.54
71 00 00	97.88	76 30 00	70.24	82 00 00	41.89
71 07 30	97.26	76 37 30	69.60	82 07 30	41.24
71 15 00	96.65	76 45 00	68.96	82 15 00	40.59
71 22 30	96.03	76 52 30	68.32	82 22 30	39.94
71 30 00	95.41	77 00 00	67.68	82 30 00	39.29

TABLE 13.—*Areas of quadrilaterals of earth's surface of 15′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′ ″		° ′ ″		° ′ ″	
82 37 30	38.64	85 07 30	25.58	87 37 30	12.48
82 45 00	37.99	85 15 00	24.93	87 45 00	11.82
82 52 30	37.34	85 22 30	24.27	87 52 30	11.16
83 00 00	36.69	85 30 00	23.62	88 00 00	10.51
83 07 30	36.03	85 37 30	22.97	88 07 30	9.85
83 15 00	35.38	85 45 00	22.31	88 15 00	9.20
83 22 30	34.73	85 52 30	21.66	88 22 30	8.54
83 30 00	34.08	86 00 00	21.00	88 30 00	7.88
83 37 30	33.42	86 07 30	20.35	88 37 30	7.22
83 45 00	32.77	86 15 00	19.69	88 45 00	6.57
83 52 30	32.12	86 22 30	19.04	88 52 30	5.91
84 00 00	31.47	86 30 00	18.38	89 00 00	5.26
84 07 30	30.81	86 37 30	17.72	89 07 30	4.60
84 15 00	30.16	86 45 00	17.07	89 15 00	3.94
84 22 30	29.51	86 52 30	16.41	89 22 30	3.28
84 30 00	28.86	87 00 00	15.76	89 30 00	2.63
84 37 30	28.20	87 07 30	15.10	89 37 30	1.97
84 45 00	27.54	87 15 00	14.44	89 45 00	1.31
84 52 30	26.89	87 22 30	13.79	89 52 30	0.66
85 00 00	26.24	87 30 00	13.13		

TABLE 14.—*Areas of quadrilaterals of earth's surface of 10′ extent in latitude and longitude.*

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
0 05	132.01	7 25	130.93	14 45	127.77
0 15	132.01	7 35	130.88	14 55	127.67
0 25	132.01	7 45	130.84	15 05	127.58
0 35	132.00	7 55	130.79	15 15	127.48
0 45	132.00	8 05	130.73	15 25	127.38
0 55	131.99	8 15	130.68	15 35	127.28
1 05	131.99	8 25	130.63	15 45	127.18
1 15	131.98	8 35	130.57	15 55	127.08
1 25	131.97	8 45	130.51	16 05	126.98
1 35	131.96	8 55	130.46	16 15	126.87
1 45	131.95	9 05	130.40	16 25	126.77
1 55	131.94	9 15	130.34	16 35	126.66
2 05	131.93	9 25	130.28	16 45	126.55
2 15	131.91	9 35	130.22	16 55	126.44
2 25	131.90	9 45	130.15	17 05	126.33
2 35	131.88	9 55	130.09	17 15	126.22
2 45	131.86	10 05	130.02	17 25	126.11
2 55	131.84	10 15	129.96	17 35	126.00
3 05	131.82	10 25	129.89	17 45	125.88
3 15	131.80	10 35	129.82	17 55	125.77
3 25	131.78	10 45	129.76	18 05	125.65
3 35	131.76	10 55	129.68	18 15	125.54
3 45	131.74	11 05	129.61	18 25	125.42
3 55	131.71	11 15	129.54	18 35	125.30
4 05	131.68	11 25	129.47	18 45	125.18
4 15	131.66	11 35	129.39	18 55	125.06
4 25	131.63	11 45	129.32	19 05	124.94
4 35	131.60	11 55	129.24	19 15	124.81
4 45	131.57	12 05	129.16	19 25	124.69
4 55	131.54	12 15	129.08	19 35	124.56
5 05	131.50	12 25	129.00	19 45	124.44
5 15	131.47	12 35	128.92	19 55	124.31
5 25	131.44	12 45	128.84	20 05	124.18
5 35	131.40	12 55	128.76	20 15	124.05
5 45	131.36	13 05	128.67	20 25	123.92
5 55	131.33	13 15	128.59	20 35	123.79
6 05	131.29	13 25	128.50	20 45	123.66
6 15	131.25	13 35	128.41	20 55	123.52
6 25	131.21	13 45	128.33	21 05	123.39
6 35	131.16	13 55	128.24	21 15	123.25
6 45	131.12	14 05	128.14	21 25	123.12
6 55	131.07	14 15	128.05	21 35	122.98
7 05	131.03	14 25	127.96	21 45	122.84
7 15	130.98	14 35	127.87	21 55	122.70

TABLE 14.—*Areas of quadrilaterals of earth's surface of 10′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
22 05	122.56	29 25	115.37	36 45	106.29
22 15	122.42	29 35	115.18	36 55	106.06
22 25	122.28	29 45	114.99	37 05	105.83
22 35	122.13	29 55	114.81	37 15	105.60
22 45	121.99	30 05	114.62	37 25	105.37
22 55	121.84	30 15	114.43	37 35	105.14
23 05	121.69	30 25	114.24	37 45	104.91
23 15	121.55	30 35	114.04	37 55	104.68
23 25	121.40	30 45	113.85	38 05	104.44
23 35	121.25	30 55	113.66	38 15	104.21
23 45	121.10	31 05	113.47	38 25	103.97
23 55	120.94	31 15	113.27	38 35	103.74
24 05	120.79	31 25	113.07	38 45	103.50
24 15	120.64	31 35	112.88	38 55	103.26
24 25	120.48	31 45	112.68	39 05	103.02
24 35	120.33	31 55	112.48	39 15	102.78
24 45	120.17	32 05	112.28	39 25	102.54
24 55	120.01	32 15	112.08	39 35	102.30
25 05	119.85	32 25	111.87	39 45	102.06
25 15	119.69	32 35	111.67	39 55	101.82
25 25	119.53	32 45	111.47	40 05	101.57
25 35	119.37	32 55	111.26	40 15	101.33
25 45	119.21	33 05	111.06	40 25	101.08
25 55	119.04	33 15	110.85	40 35	100.83
26 05	118.87	33 25	110.64	40 45	100.59
26 15	118.71	33 35	110.43	40 55	100.34
26 25	118.54	33 45	110.22	41 05	100.09
26 35	118.37	33 55	110.01	41 15	99.84
26 45	118.21	34 05	109.80	41 25	99.59
26 55	118.04	34 15	109.59	41 35	99.33
27 05	117.87	34 25	109.37	41 45	99.08
27 15	117.69	34 35	109.16	41 55	98.83
27 25	117.52	34 45	108.94	42 05	98.57
27 35	117.35	34 55	108.73	42 15	98.32
27 45	117.17	35 05	108.51	42 25	98.06
27 55	116.99	35 15	108.29	42 35	97.80
28 05	116.82	35 25	108.07	42 45	97.55
28 15	116.64	35 35	107.85	42 55	97.29
28 25	116.46	35 45	107.63	43 05	97.03
28 35	116.28	35 55	107.41	43 15	96.77
28 45	116.10	36 05	107.19	43 25	96.50
28 55	115.92	36 15	106.96	43 35	96.24
29 05	115.73	36 25	106.74	43 45	95.98
29 15	115.55	36 35	106.51	43 55	95.71

TABLE 14.—*Areas of quadrilaterals of earth's surface of 10′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
44 05	95.45	50 45	84.21	57 25	71.78
44 15	95.19	50 55	83.91	57 35	71.46
44 25	94.92	51 05	83.61	57 45	71.13
44 35	94.65	51 15	83.31	57 55	70.80
44 45	94.38	51 25	83.01	58 05	70.48
44 55	94.11	51 35	82.71	58 15	70.15
45 05	93.84	51 45	82.41	58 25	69.82
45 15	93.58	51 55	82.11	58 35	69.49
45 25	93.30	52 05	81.81	58 45	69.17
45 35	93.03	52 15	81.51	58 55	68.84
45 45	92.76	52 25	81.20	59 05	68.51
45 55	92.48	52 35	80.90	59 15	68.18
46 05	92.21	52 45	80.60	59 25	67.84
46 15	91.94	52 55	80.29	59 35	67.51
46 25	91.66	53 05	79.98	59 45	67.18
46 35	91.38	53 15	79.68	59 55	66.85
46 45	91.10	53 25	79.37	60 05	66.51
46 55	90.82	53 35	79.06	60 15	66.18
47 05	90.55	53 45	78.75	60 25	65.84
47 15	90.27	53 55	78.44	60 35	65.51
47 25	89.99	54 05	78.13	60 45	65.17
47 35	89.70	54 15	77.82	60 55	64.84
47 45	89.42	54 25	77.51	61 05	64.50
47 55	89.14	54 35	77.19	61 15	64.16
48 05	88.85	54 45	76.88	61 25	63.82
48 15	88.57	54 55	76.57	61 35	63.48
48 25	88.28	55 05	76.25	61 45	63.14
48 35	88.00	55 15	75.94	61 55	62.80
48 45	87.71	55 25	75.62	62 05	62.46
48 55	87.42	55 35	75.30	62 15	62.12
49 05	87.13	55 45	74.99	62 25	61.78
49 15	86.84	55 55	74.67	62 35	61.44
49 25	86.55	56 05	74.35	62 45	61.10
49 35	86.26	56 15	74.03	62 55	60.75
49 45	85.97	56 25	73.71	63 05	60.41
49 55	85.68	56 35	73.39	63 15	60.06
50 05	85.39	56 45	73.07	63 25	59.72
50 15	85.09	56 55	72.75	63 35	59.37
50 25	84.80	57 05	72.43	63 45	59.03
50 35	84.50	57 15	72.10	63 55	58.68

TABLE 14.—*Areas of quadrilaterals of earth's surface of 10′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
64 05	58.33	70 45	44.05	77 25	29.13
64 15	57.99	70 55	43.69	77 35	28.76
64 25	57.64	71 05	43.32	77 45	28.37
64 35	57.29	71 15	42.95	77 55	27.99
64 45	56.94	71 25	42.58	78 05	27.62
64 55	56.59	71 35	42.22	78 15	27.24
65 05	56.24	71 45	41.85	78 25	26.85
65 15	55.89	71 55	41.48	78 35	26.47
65 25	55.54	72 05	41.11	78 45	26.09
65 35	55.19	72 15	40.74	78 55	25.71
65 45	54.83	72 25	40.37	79 05	25.33
65 55	54.48	72 35	40.00	79 15	24.95
66 05	54.13	72 45	39.63	79 25	24.57
66 15	53.78	72 55	39.26	79 35	24.18
66 25	53.42	73 05	38.89	79 45	23.80
66 35	53.06	73 15	38.52	79 55	23.42
66 45	52.71	73 25	38.15	80 05	23.04
66 55	52.35	73 35	37.78	80 15	22.65
67 05	52.00	73 45	37.41	80 25	22.27
67 15	51.64	73 55	37.03	80 35	21.89
67 25	51.28	74 05	36.66	80 45	21.50
67 35	50.93	74 15	36.29	80 55	21.12
67 45	50.57	74 25	35.91	81 05	20.73
67 55	50.21	74 35	35.54	81 15	20.35
68 05	49.85	74 45	35.17	81 25	19.97
68 15	49.49	74 55	34.79	81 35	19.58
68 25	49.13	75 05	34.42	81 45	19.20
68 35	48.77	75 15	34.04	81 55	18.81
68 45	48.41	75 25	33.66	82 05	18.43
68 55	48.05	75 35	33.29	82 15	18.04
69 05	47.69	75 45	32.91	82 25	17.65
69 15	47.33	75 55	32.53	82 35	17.27
69 25	46.97	76 05	32.16	82 45	16.88
69 35	46.60	76 15	31.78	82 55	16.50
69 45	46.24	76 25	31.40	83 05	16.11
69 55	45.88	76 35	31.03	83 15	15.73
70 05	45.51	76 45	30.65	83 25	15.34
70 15	45.15	76 55	30.27	83 35	14.95
70 25	44.78	77 05	29.89	83 45	14.57
70 35	44.42	77 15	29.51	83 55	14.18

TABLE 14.—*Areas of quadrilaterals of earth's surface of 10′ extent in latitude and longitude*—Continued.

[From Smithsonian Geographical Tables.]

Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.	Middle latitude of quadrilateral.	Area in square miles.
° ′		° ′		° ′	
84 05	13.79	86 05	9.14	88 05	4.47
84 15	13.40	86 15	8.75	88 15	4.09
84 25	13.02	86 25	8.36	88 25	3.70
84 35	12.63	86 35	7.97	88 35	3.31
84 45	12.24	86 45	7.59	88 45	2.92
84 55	11.86	86 55	7.20	88 55	2.53
85 05	11.47	87 05	6.81	89 05	2.14
85 15	11.08	87 15	6.42	89 15	1.75
85 25	10.69	87 25	6.03	89 25	1.36
85 35	10.30	87 35	5.64	89 35	0.97
85 45	9.92	87 45	5.25	89 45	0.58
85 55	9.53	87 55	4.86	89 55	0.19

TABLE 15.—*For conversion of arc into time.*

°	h. m.	°	h. m.	°	h. m.	°	h. m.	°	h. m.	°	h. m.	′	m. s.	″	s.
0	0 0	**60**	4 0	**120**	8 0	**180**	12 0	**240**	16 0	**300**	20 0	**0**	0 0	**0**	0.000
1	0 4	61	4 4	121	8 4	181	12 4	241	16 4	301	20 4	1	0 4	1	0.067
2	0 8	62	4 8	122	8 8	182	12 8	242	16 8	302	20 8	2	0 8	2	0.133
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12	3	0 12	3	0.200
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16	4	0 16	4	0.267
5	0 20	**65**	4 20	**125**	8 20	**185**	12 20	**245**	16 20	**305**	20 20	**5**	0 20	**5**	0.333
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24	6	0 24	6	0.400
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28	7	0 28	7	0.467
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32	8	0 32	8	0.533
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36	9	0 36	9	0.600
10	0 40	**70**	4 40	**130**	8 40	**190**	12 40	**250**	16 40	**310**	20 40	**10**	0 40	**10**	0.667
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44	11	0 44	11	0.733
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48	12	0 48	12	0.800
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52	13	0 52	13	0.867
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56	14	0 56	14	0.933
15	1 0	**75**	5 0	**135**	9 0	**195**	13 0	**255**	17 0	**315**	21 0	**15**	1 0	**15**	1.000
16	1 4	76	5 4	136	9 4	196	13 4	256	17 4	316	21 4	16	1 4	16	1.067
17	1 8	77	5 8	137	9 8	197	13 8	257	17 8	317	21 8	17	1 8	17	1.133
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12	18	1 12	18	1.200
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16	19	1 16	19	1.267
20	1 20	**80**	5 20	**140**	9 20	**200**	13 20	**260**	17 20	**320**	21 20	**20**	1 20	**20**	1.333
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24	21	1 24	21	1.400
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28	22	1 28	22	1.467
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32	23	1 32	23	1.533
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36	24	1 36	24	1.600
25	1 40	**85**	5 40	**145**	9 40	**205**	13 40	**265**	17 40	**325**	21 40	**25**	1 40	**25**	1.667
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44	26	1 44	26	1.733
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48	27	1 48	27	1.800
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52	28	1 52	28	1.867
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56	29	1 56	29	1.933
30	2 0	**90**	6 0	**150**	10 0	**210**	14 0	**270**	18 0	**330**	22 0	**30**	2 0	**30**	2.000
31	2 4	91	6 4	151	10 4	211	14 4	271	18 4	331	22 4	31	2 4	31	2.067
32	2 8	92	6 8	152	10 8	212	14 8	272	18 8	332	22 8	32	2 8	32	2.133
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12	33	2 12	33	2 200
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16	34	2 16	34	2.267
35	2 20	**95**	6 20	**155**	10 20	**215**	14 20	**275**	18 20	**335**	22 20	**35**	2 20	**35**	2.333
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24	36	2 24	36	2.400
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28	37	2 28	37	2.467
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32	38	2 32	38	2.533
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36	39	2 36	39	2.600
40	2 40	**100**	6 40	**160**	10 40	**220**	14 40	**280**	18 40	**340**	22 40	**40**	2 40	**40**	2.667
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44	41	2 44	41	2.733
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48	42	2 48	42	2.800
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52	43	2 52	43	2.867
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56	44	2 56	44	2.933
45	3 0	**105**	7 0	**165**	11 0	**225**	15 0	**285**	19 0	**345**	23 0	**45**	3 0	**45**	3.000
46	3 4	106	7 4	166	11 4	226	15 4	286	19 4	346	23 4	46	3 4	46	3.067
47	3 8	107	7 8	167	11 8	227	15 8	287	19 8	347	23 8	47	3 8	47	3.133
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12	48	3 12	48	3.200
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16	49	3 16	49	3.267
50	3 20	**110**	7 20	**170**	11 20	**230**	15 20	**290**	19 20	**350**	23 20	**50**	3 20	**50**	3.333
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24	51	3 24	51	3.400
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28	52	3 28	52	3.467
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32	53	3 32	53	3.533
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36	54	3 36	54	3.600
55	3 40	**115**	7 40	**175**	11 40	**235**	15 40	**295**	19 40	**355**	23 40	**55**	3 40	**55**	3.667
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44	56	3 44	56	3.733
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48	57	3 48	57	3.800
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52	58	3 52	58	3.867
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56	59	3 56	59	3.933
60	4 0	**120**	8 0	**180**	12 0	**240**	16 0	**300**	20 0	**360**	24 0	**60**	4 0	**60**	4.000

TABLE 16.—*For conversion of time into arc.*

Hours of time into arc.

Time.	Arc.	Time.	Arc.	Time.	Arc.	Time.	Arc.	Time.	Arc.	Time.	Arc.
hrs.	°	*hrs.*	°	*hrs.*	°	*hrs.*	°	*hrs.*	°	*hrs.*	°
1	15	**5**	75	**9**	135	**13**	195	**17**	255	**21**	315
2	30	**6**	90	**10**	150	**14**	210	**18**	270	**22**	330
3	45	**7**	105	**11**	165	**15**	225	**19**	285	**23**	345
4	60	**8**	120	**12**	180	**16**	240	**20**	300	**24**	360

Minutes of time into arc.						Seconds of time into arc.					
m.	° ′	m.	° ′	m	° ′	s.	′ ″	s.	′ ″	s.	′ ″
1	0 15	**21**	5 15	**41**	10 15	**1**	0 15	**21**	5 15	**41**	10 15
2	0 30	22	5 30	42	10 30	2	0 30	22	5 30	42	10 30
3	0 45	23	5 45	43	10 45	3	0 45	23	5 45	43	10 45
4	1 0	24	6 0	44	11 0	4	1 0	24	6 0	44	11 0
5	1 15	**25**	6 15	**45**	11 15	**5**	1 15	**25**	6 15	**45**	11 15
6	1 30	26	6 30	46	11 30	6	1 30	26	6 30	46	11 30
7	1 45	27	6 45	47	11 45	7	1 45	27	6 45	47	11 45
8	2 0	28	7 0	48	12 0	8	2 0	28	7 0	48	12 0
9	2 15	29	7 15	49	12 15	9	2 15	29	7 15	49	12 15
10	2 30	**30**	7 30	**50**	12 30	**10**	2 30	**30**	7 30	**50**	12 30
11	2 45	31	7 45	51	12 45	11	2 45	31	7 45	51	12 45
12	3 0	32	8 0	52	13 0	12	3 0	32	8 0	52	13 0
13	3 15	33	8 15	53	13 15	13	3 15	33	8 15	53	13 15
14	3 30	34	8 30	54	13 30	14	3 30	34	8 30	54	13 30
15	3 45	**35**	8 45	**55**	13 45	**15**	3 45	**35**	8 45	**55**	13 45
16	4 0	36	9 0	56	14 0	16	4 0	36	9 0	56	14 0
17	4 15	37	9 15	57	14 15	17	4 15	37	9 15	57	14 15
18	4 30	38	9 30	58	14 30	18	4 30	38	9 30	58	14 30
19	4 45	39	9 45	59	14 45	19	4 45	39	9 45	59	14 45
20	5 0	**40**	10 0	**60**	15 0	**20**	5 0	**40**	10 0	**60**	15 0

Hundredths of a second of time into arc.

Hundredths of a second of time.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
s.	″	″	″	″	″	″	″	″	″	″
0.00	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35
.10	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85
.20	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35
.30	4.50	4.65	4.80	4.95	5.10	5.25	5.40	5.55	5.70	5.85
.40	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35
0.50	7.50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85
.60	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35
.70	10.50	10.65	10.80	10.95	11.10	11.25	11.40	11.55	11.70	11.85
.80	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35
.90	13.50	13.65	13.80	13.95	14.10	14.25	14.40	14.55	14.70	14.85

TABLE 17.—*For conversion of mean time into sidereal time.*

s	m 0			m 1			m 2			m 3								
	h	m	s	h	m	s	h	m	s	h	m	s	s	m	s	s	m	s
0	0	0	0	6	5	15	12	10	29	18	15	44	0.00	0	0	0.50	3	3
1	0	6	5	6	11	20	12	16	34	18	21	49	0.01	0	4	0.51	3	6
2	0	12	10	6	17	25	12	22	40	18	27	54	0.02	0	7	0.52	3	10
3	0	18	16	6	23	30	12	28	45	18	33	59	0.03	0	11	0.53	3	14
4	0	24	21	6	29	36	12	34	50	18	40	5	0.04	0	15	0.54	3	17
5	0	30	26	6	35	41	12	40	55	18	46	10	0.05	0	18	0.55	3	21
6	0	36	31	6	41	46	12	47	1	18	52	15	0.06	0	22	0.56	3	25
7	0	42	37	6	47	51	12	53	6	18	58	20	0.07	0	26	0.57	3	28
8	0	48	42	6	53	56	12	59	11	19	4	26	0.08	0	29	0.58	3	32
9	0	54	47	7	0	2	13	5	16	19	10	31	0.09	0	33	0.59	3	35
10	1	0	52	7	6	7	13	11	21	19	16	36	0.10	0	37	0.60	3	39
11	1	6	58	7	12	12	13	17	27	19	22	41	0.11	0	40	0.61	3	43
12	1	13	3	7	18	17	13	23	32	19	28	47	0.12	0	44	0.62	3	46
13	1	19	8	7	24	23	13	29	37	19	34	52	0.13	0	47	0.63	3	50
14	1	25	13	7	30	28	13	35	42	19	40	57	0.14	0	51	0.64	3	54
15	1	31	19	7	36	33	13	41	48	19	47	2	0.15	0	55	0.65	3	57
16	1	37	24	7	42	38	13	47	53	19	53	7	0.16	0	58	0.66	4	1
17	1	43	29	7	48	44	13	53	58	19	59	13	0.17	1	2	0.67	4	5
18	1	49	34	7	54	49	14	0	3	20	5	18	0.18	1	6	0.68	4	8
19	1	55	40	8	0	54	14	6	9	20	11	23	0.19	1	9	0.69	4	12
20	2	1	45	8	6	59	14	12	14	20	17	28	0.20	1	13	0.70	4	16
21	2	7	50	8	13	5	14	18	19	20	23	34	0.21	1	17	0.71	4	19
22	2	13	55	8	19	10	14	24	24	20	29	39	0.22	1	20	0.72	4	23
23	2	20	1	8	25	15	14	30	30	20	35	44	0.23	1	24	0.73	4	27
24	2	26	6	8	31	20	14	36	35	20	41	49	0.24	1	28	0.74	4	30
25	2	32	11	8	37	26	14	42	40	20	47	55	0.25	1	31	0.75	4	34
26	2	38	16	8	43	31	14	48	45	20	54	0	0.26	1	35	0.76	4	38
27	2	44	22	8	49	36	14	54	51	21	0	5	0.27	1	39	0.77	4	41
28	2	50	27	8	55	41	15	0	56	21	6	10	0.28	1	42	0.78	4	45
29	2	56	32	9	1	47	15	7	1	21	12	16	0.29	1	46	0.79	4	49
30	3	2	37	9	7	52	15	13	6	21	18	21	0.30	1	50	0.80	4	52
31	3	8	43	9	13	57	15	19	12	21	24	26	0.31	1	53	0.81	4	56
32	3	14	48	9	20	2	15	25	17	21	30	31	0.32	1	57	0.82	4	59
33	3	20	53	9	26	8	15	31	22	21	36	37	0.33	2	1	0.83	5	3
34	3	26	58	9	32	13	15	37	27	21	42	42	0.34	2	4	0.84	5	7
35	3	33	3	9	38	18	15	43	33	21	48	47	0.35	2	8	0.85	5	10
36	3	39	9	9	44	23	15	49	38	21	54	52	0.36	2	11	0.86	5	14
37	3	45	14	9	50	28	15	55	43	22	0	58	0.37	2	15	0.87	5	18
38	3	51	19	9	56	34	16	1	48	22	7	3	0.38	2	19	0.88	5	21
39	3	57	24	10	2	39	16	7	54	22	13	8	0.39	2	22	0.89	5	25
40	4	3	30	10	8	44	16	13	59	22	19	13	0.40	2	26	0.90	5	29
41	4	9	35	10	14	49	16	20	4	22	25	19	0.41	2	30	0.91	5	32
42	4	15	40	10	20	55	16	26	9	22	31	24	0.42	2	33	0.92	5	36
43	4	21	45	10	27	0	16	32	14	22	37	29	0.43	2	37	0.93	5	40
44	4	27	51	10	33	5	16	38	20	22	43	34	0.44	2	41	0.94	5	43
45	4	33	56	10	39	10	16	44	25	22	49	39	0.45	2	44	0.95	5	47
46	4	40	1	10	45	16	16	50	30	22	55	45	0.46	2	48	0.96	5	51
47	4	46	6	10	51	21	16	56	35	23	1	50	0.47	2	52	0.97	5	54
48	4	52	12	10	57	26	17	2	41	23	7	55	0.48	2	55	0.98	5	58
49	4	58	17	11	3	31	17	8	46	23	14	0	0.49	2	59	0.99	6	2
50	5	4	22	11	9	37	17	14	51	23	20	6	0.50	3	3	1.00	6	5
51	5	10	27	11	15	42	17	20	56	23	26	11						
52	5	16	33	11	21	47	17	27	2	23	32	16						
53	5	22	38	11	27	52	17	33	7	23	38	21						
54	5	28	43	11	33	58	17	39	12	23	44	27						
55	5	34	48	11	40	3	17	45	17	23	50	32						
56	5	40	54	11	46	8	17	51	23	23	56	37						
57	5	46	59	11	52	13	17	57	28	24	2	42						
58	5	53	4	11	58	19	18	3	33	24	8	48						
59	5	59	9	12	4	24	18	9	38	24	14	53						
60	6	5	15	12	10	29	18	15	44	24	20	58						

Example: Let the given mean time be $14^h\ 57^m\ 32^s.56$.

The table gives

first for	$14^h\ 54^m\ 51^s$	$2^m\ 27^s$
then for	$2\ \ 41.56$	0.44
		$2\ \ 27.44$

The sum $14^h\ 57^m\ 32^s.56 + 2^m\ 27^s.44 = 15^h\ 0^m\ 0^s$ is the required sidereal time.

TABLE 18.—*For conversion of sidereal time into mean time.*

s	m 0 (h m s)	m 1 (h m s)	m 2 (h m s)	m 3 (h m s)	s	m s	s	m s
0	0 0 0	6 6 15	12 12 29	18 18 44	0.00	0 0	0.50	3 3
1	0 6 6	6 12 21	12 18 35	18 24 50	0.01	0 4	0.51	3 7
2	0 12 12	6 18 27	12 24 42	18 30 56	0.02	0 7	0.52	3 10
3	0 18 19	6 24 33	12 30 48	18 37 2	0.03	0 11	0.53	3 14
4	0 24 25	6 30 40	12 36 54	18 43 9	0.04	0 15	0.54	3 18
5	0 30 31	6 36 46	12 43 0	18 49 15	0.05	0 18	0.55	3 21
6	0 36 37	6 42 52	12 49 7	18 55 21	0.06	0 22	0.56	3 25
7	0 42 44	6 48 58	12 55 13	19 1 27	0.07	0 26	0.57	3 29
8	0 48 50	6 55 4	13 1 19	19 7 34	0.08	0 29	0.58	3 32
9	0 54 56	7 1 11	13 7 25	19 13 40	0.09	0 33	0.59	3 36
10	1 1 2	7 7 17	13 13 31	19 19 46	0.10	0 37	0.60	3 40
11	1 7 9	7 13 23	13 19 38	19 25 52	0.11	0 40	0.61	3 43
12	1 13 15	7 19 29	13 25 44	19 31 59	0.12	0 44	0.62	3 47
13	1 19 21	7 25 36	13 31 50	19 38 5	0.13	0 48	0.63	3 51
14	1 25 27	7 31 42	13 37 56	19 44 11	0.14	0 51	0.64	3 54
15	1 31 34	7 37 48	13 44 3	19 50 17	0.15	0 55	0.65	3 58
16	1 37 40	7 43 54	13 50 9	19 56 23	0.16	0 59	0.66	4 2
17	1 43 46	7 50 1	13 56 15	20 2 30	0.17	1 2	0.67	4 5
18	1 49 52	7 56 7	14 2 21	20 8 36	0.18	1 6	0.68	4 9
19	1 55 59	8 2 13	14 8 28	20 14 42	0.19	1 10	0.69	4 13
20	2 2 5	8 8 19	14 14 34	20 20 48	0.20	1 13	0.70	4 16
21	2 8 11	8 14 26	14 20 40	20 26 55	0.21	1 17	0.71	4 20
22	2 14 17	8 20 32	14 26 46	20 33 1	0.22	1 21	0.72	4 24
23	2 20 24	8 26 38	14 32 53	20 39 7	0.23	1 24	0.73	4 27
24	2 26 30	8 32 44	14 38 59	20 45 13	0.24	1 28	0.74	4 31
25	2 32 36	8 38 51	14 45 5	20 51 20	0.25	1 32	0.75	4 35
26	2 38 42	8 44 57	14 51 11	20 57 26	0.26	1 35	0.76	4 38
27	2 44 49	8 51 3	14 57 18	21 3 32	0.27	1 39	0.77	4 42
28	2 50 55	8 57 9	15 3 24	21 9 38	0.28	1 43	0.78	4 46
29	2 57 1	9 3 16	15 9 30	21 15 45	0.29	1 46	0.79	4 49
30	3 3 7	9 9 22	15 15 36	21 21 51	0.30	1 50	0.80	4 53
31	3 9 14	9 15 28	15 21 43	21 27 57	0.31	1 54	0.81	4 57
32	3 15 20	9 21 34	15 27 49	21 34 3	0.32	1 57	0.82	5 0
33	3 21 26	9 27 41	15 33 55	21 40 10	0.33	2 1	0.83	5 4
34	3 27 32	9 33 47	15 40 1	21 46 16	0.34	2 5	0.84	5 8
35	3 33 38	9 39 53	15 46 8	21 52 22	0.35	2 8	0.85	5 11
36	3 39 45	9 45 59	15 52 14	21 58 28	0.36	2 12	0.86	5 15
37	3 45 51	9 52 5	15 58 20	22 4 35	0.37	2 16	0.87	5 19
38	3 51 57	9 58 12	16 4 26	22 10 41	0.38	2 19	0.88	5 22
39	3 58 3	10 4 18	16 10 33	22 16 47	0.39	2 23	0.89	5 26
40	4 4 10	10 10 24	16 16 39	22 22 53	0.40	2 26	0.90	5 30
41	4 10 16	10 16 30	16 22 45	22 29 0	0.41	2 30	0.91	5 33
42	4 16 22	10 22 37	16 28 51	22 35 6	0.42	2 34	0.92	5 37
43	4 22 28	10 28 43	16 34 57	22 41 12	0.43	2 37	0.93	5 41
44	4 28 35	10 34 49	16 41 4	22 47 18	0.44	2 41	0.94	5 44
45	4 34 41	10 40 55	16 47 10	22 53 24	0.45	2 45	0.95	5 48
46	4 40 47	10 47 2	16 53 16	22 59 31	0.46	2 48	0.96	5 52
47	4 46 53	10 53 8	16 59 22	23 5 37	0.47	2 52	0.97	5 55
48	4 53 0	10 59 14	17 5 29	23 11 43	0.48	2 56	0.98	5 59
49	4 59 6	11 5 20	17 11 35	23 17 49	0.49	2 59	0.99	6 3
50	5 5 12	11 11 27	17 17 41	23 23 56	0.50	3 3	1.00	6 6
51	5 11 18	11 17 33	17 23 47	23 30 2				
52	5 17 25	11 23 39	17 29 54	23 36 8				
53	5 23 31	11 29 45	17 36 0	23 42 14				
54	5 29 37	11 35 52	17 42 6	23 48 21				
55	5 35 43	11 41 58	17 48 12	23 54 27				
56	5 41 50	11 48 4	17 54 19	24 0 33				
57	5 47 56	11 54 10	18 0 25	24 6 39				
58	5 54 2	12 0 17	18 6 31	24 12 46				
59	6 0 8	12 6 23	18 12 37	24 18 52				
60	6 6 15	12 12 29	18 18 44	24 24 58				

Example: Given $15^h\,0^m\,0^s$.
The table gives
first for $14^h\,57^m\,18^s$ $\quad 2^m\,27^s$
then for $\quad 2\;\;42 \quad\quad 0.44$

$15\;\;0\;\;0 \quad\quad 2\;\;27.44$

The difference
$15^h 0^m 0^s - 2^m 27^s.44 = 14^h\,57^m\,32^s.56$
is the required mean time.

TABLE 19.—*For interconversion of feet and decimals of a mile.*

Feet.	Miles.	Feet.	Miles.	Feet.	Miles.	Feet.	Miles.
53	.01	1373	.26	2693	.51	4013	.76
106	.02	1426	.27	2746	.52	4066	.77
158	.03	1478	.28	2798	.53	4118	.78
211	.04	1531	.29	2851	.54	4171	.79
264	.05	1584	.30	2904	.55	4224	.80
317	.06	1637	.31	2957	.56	4277	.81
370	.07	1690	.32	3010	.57	4330	.82
422	.08	1742	.33	3062	.58	4382	.83
475	.09	1795	.34	3115	.59	4435	.84
528	.10	1848	.35	3168	.60	4488	.85
581	.11	1901	.36	3221	.61	4541	.86
634	.12	1954	.37	3274	.62	4594	.87
686	.13	2006	.38	3326	.63	4646	.88
739	.14	2059	.39	3379	.64	4699	.89
792	.15	2112	.40	3432	.65	4752	.90
845	.16	2165	.41	3485	.66	4805	.91
898	.17	2218	.42	3538	.67	4858	.92
950	.18	2270	.43	3590	.68	4910	.93
1003	.19	2323	.44	3643	.69	4963	.94
1056	.20	2376	.45	3696	.70	5016	.95
1109	.21	2429	.46	3749	.71	5069	.96
1162	.22	2482	.47	3802	.72	5122	.97
1214	.23	2534	.48	3854	.73	5174	.98
1267	.24	2587	.49	3907	.74	5227	.99
1320	.25	2640	.50	3960	.75	5280	1.00

TABLE 20.—*Converting wheel revolutions into hundredths of a mile.*

[Prepared by J. H. Jennings.]

[Scale divisions outside; revolutions inside.]

CIRCUMFERENCE OF WHEEL, 9.5 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	6	11	17	22	28	33	39	44	50	56
10	61	67	72	78	83	89	94	100	105	111
20	117	122	128	133	139	144	150	155	161	167
30	172	178	183	189	194	200	205	211	216	222
40	228	233	239	244	250	255	261	266	272	278
50	283	289	294	300	305	311	316	322	328	333
60	339	344	350	355	361	366	372	378	383	389
70	394	400	405	411	416	422	428	433	439	444
80	450	455	461	466	472	478	483	489	494	500
90	506	511	516	522	528	533	539	544	550	555

CIRCUMFERENCE OF WHEEL, 9.6 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	11	16	22	27	33	38	44	50	55
10	60	66	72	77	82	88	93	99	105	110
20	116	121	126	132	137	143	148	154	159	165
30	171	177	182	188	193	199	204	209	215	220
40	225	231	236	242	247	253	258	264	270	275
50	281	286	292	297	303	308	314	319	325	330
60	336	341	347	352	358	363	369	374	380	385
70	391	396	402	407	413	418	424	429	435	440
80	446	451	457	462	468	473	479	484	490	495
90	501	506	512	517	523	528	534	539	544	550

CIRCUMFERENCE OF WHEEL, 9.7 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	11	16	22	27	33	38	44	49	54
10	60	65	71	76	81	87	92	98	103	109
20	114	120	125	131	136	142	147	152	158	163
30	169	174	179	185	190	196	201	206	212	218
40	223	228	234	239	245	250	256	261	267	272
50	277	283	288	294	299	305	310	316	321	326
60	331	337	342	348	353	359	364	370	376	381
70	386	392	397	403	408	414	419	424	429	435
80	441	446	451	457	462	468	473	479	484	490
90	495	500	506	511	517	522	528	533	539	544

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 9.8 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	11	16	22	27	32	38	43	49	54
10	59	65	70	75	81	86	91	97	102	108
20	113	119	124	129	135	140	145	151	156	162
30	167	172	178	183	189	194	199	205	211	216
40	221	226	231	237	242	248	253	259	265	270
50	275	280	286	291	296	302	307	313	318	324
60	329	334	339	345	350	356	361	366	372	377
70	383	388	394	400	405	410	415	421	426	431
80	437	442	447	453	458	464	469	474	480	485
90	490	496	501	506	512	517	522	528	533	539

CIRCUMFERENCE OF WHEEL, 9.9 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	11	16	21	27	32	37	43	48	53
10	59	64	69	75	80	85	91	96	101	107
20	112	117	122	128	133	138	144	149	155	160
30	165	170	176	181	186	192	197	203	208	213
40	219	224	229	235	240	245	251	256	261	267
50	272	277	282	288	293	298	304	309	314	320
60	325	330	336	341	346	352	357	362	368	373
70	378	384	389	394	400	405	410	416	421	426
80	432	437	442	448	453	458	464	469	474	480
90	485	490	496	501	506	512	517	522	528	533

CIRCUMFERENCE OF WHEEL, 10 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	11	16	21	26	32	37	42	48	53
10	58	63	69	75	80	85	90	96	101	106
20	111	116	121	127	132	137	143	148	153	158
30	164	169	174	180	185	190	195	201	206	211
40	217	222	227	232	238	243	248	253	259	264
50	269	275	280	285	290	296	301	306	311	317
60	322	327	333	338	343	349	354	359	364	370
70	375	380	385	391	396	401	406	412	417	422
80	428	433	438	444	449	454	459	465	470	475
90	481	486	491	496	502	507	512	517	523	528

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 10.1 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	16	21	26	31	36	41	47	52
10	58	63	68	73	79	84	89	94	100	105
20	110	115	121	126	131	136	142	147	152	157
30	162	167	173	178	183	188	193	199	204	209
40	214	220	226	231	236	241	247	252	257	262
50	267	272	277	282	288	293	298	303	308	314
60	319	324	329	334	340	345	350	355	361	366
70	371	376	381	386	392	397	402	408	413	418
80	424	429	434	439	445	450	455	460	466	471
90	476	481	486	492	497	502	507	513	518	523

CIRCUMFERENCE OF WHEEL, 10.2 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	16	21	26	31	36	41	47	52
10	57	62	67	73	78	83	88	93	98	104
20	109	114	119	124	130	135	140	145	150	155
30	161	166	171	176	181	186	191	197	202	207
40	212	218	224	229	234	239	244	249	254	259
50	264	269	275	280	285	290	295	300	306	311
60	316	321	326	332	337	342	347	352	357	363
70	368	373	378	383	388	394	399	404	409	414
80	419	425	430	435	440	446	451	456	461	466
90	471	476	481	487	492	497	503	508	513	518

CIRCUMFERENCE OF WHEEL, 10.3 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	26	31	36	41	46	51
10	56	62	67	72	77	82	87	92	97	103
20	108	113	118	123	128	133	138	144	149	154
30	159	164	169	174	180	185	190	195	200	204
40	209	214	219	224	230	235	240	245	250	256
50	262	267	272	277	282	287	292	297	303	308
60	313	318	323	328	333	338	344	349	354	359
70	364	369	374	380	385	390	395	400	405	410
80	416	421	426	431	436	441	446	451	457	462
90	467	472	477	482	487	492	498	503	508	513

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 10.4 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	25	30	36	41	46	51
10	56	61	66	71	76	81	86	91	97	102
20	107	112	117	122	127	132	137	142	147	152
30	157	163	168	173	178	183	188	193	198	203
40	208	213	218	223	228	233	238	244	249	254
50	259	264	269	274	279	284	289	295	300	305
60	310	315	320	325	330	335	340	345	350	356
70	361	366	371	376	381	386	391	396	401	406
80	411	416	421	426	432	437	442	447	452	457
90	462	467	472	478	483	488	493	498	503	508

CIRCUMFERENCE OF WHEEL, 10.5 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	25	30	35	40	45	50
10	55	60	65	70	75	80	85	90	95	101
20	106	111	116	121	126	131	136	141	146	151
30	156	161	166	171	176	181	186	191	196	201
40	206	211	216	221	226	231	236	241	246	251
50	257	262	267	272	277	282	287	292	297	302
60	307	312	317	322	327	332	337	342	347	352
70	357	362	367	372	377	382	387	392	397	402
80	407	412	417	422	428	433	438	443	448	453
90	458	463	468	473	478	483	488	493	498	503

CIRCUMFERENCE OF WHEEL, 10.6 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	25	30	35	40	45	50
10	55	60	65	70	75	80	85	90	95	100
20	105	110	115	120	125	130	135	140	144	149
30	154	159	164	169	174	179	184	189	194	199
40	204	209	214	219	224	229	234	239	244	249
50	254	259	264	269	274	279	284	289	294	299
60	304	309	314	319	324	329	334	339	344	349
70	354	359	364	369	374	379	384	389	393	398
80	403	408	413	418	423	428	433	438	443	448
90	453	458	463	468	473	478	483	488	493	498

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 10.7 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	25	30	35	40	44	49
10	54	59	64	69	74	79	84	89	94	99
20	104	109	114	119	123	128	133	138	143	148
30	153	158	163	168	173	178	183	188	193	198
40	203	207	212	217	222	227	232	237	242	247
50	252	257	262	267	272	277	282	287	291	296
60	301	306	311	316	321	326	331	336	341	346
70	351	356	361	366	371	375	380	385	390	395
80	400	405	410	415	420	425	430	435	440	445
90	450	454	459	464	469	474	479	484	489	494

CIRCUMFERENCE OF WHEEL, 10.8 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	20	24	29	34	39	44	49
10	54	59	64	68	73	78	83	88	93	98
20	103	108	113	118	122	127	132	137	142	147
30	152	156	161	166	171	176	181	186	191	196
40	200	205	210	215	220	225	230	235	240	244
50	249	254	259	264	269	274	279	283	288	293
60	298	303	308	313	318	323	328	332	337	341
70	346	351	356	361	366	371	376	381	386	391
80	396	401	406	411	416	421	425	430	435	440
90	445	450	455	460	464	469	474	479	484	489

CIRCUMFERENCE OF WHEEL, 10.9 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	15	19	24	29	34	39	44	48
10	53	58	63	68	73	78	82	87	92	97
20	102	107	111	116	121	126	131	136	141	145
30	150	155	160	165	170	175	179	184	189	193
40	197	202	207	212	217	222	227	232	237	242
50	247	252	257	261	266	271	276	281	286	290
60	295	300	305	310	315	319	324	329	334	339
70	344	349	353	358	363	368	373	378	383	387
80	392	397	402	407	411	416	421	426	431	436
90	440	445	450	455	460	465	469	474	479	484

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 11.0 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	14	19	24	29	33	38	43	48
10	53	57	62	67	72	76	81	86	91	96
20	101	106	110	115	119	124	129	134	139	144
30	149	154	158	163	168	173	178	182	187	192
40	197	202	206	211	216	221	225	230	235	240
50	245	250	254	259	263	268	273	278	283	288
60	293	298	302	307	312	317	321	326	331	336
70	341	346	350	355	360	365	369	374	379	384
80	389	394	398	403	408	413	417	422	427	432
90	437	442	446	451	456	461	465	470	475	480

CIRCUMFERENCE OF WHEEL, 11.1 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	10	14	19	24	29	33	38	43	48
10	52	57	62	66	71	76	81	85	90	95
20	100	104	109	114	119	124	129	133	138	143
30	147	152	157	161	166	171	176	180	185	190
40	195	200	205	209	214	219	224	229	233	238
50	243	248	252	257	262	267	271	276	281	286
60	290	295	300	305	309	314	319	324	328	333
70	338	343	347	352	357	362	367	371	376	381
80	386	390	395	400	405	409	414	419	424	428
90	433	438	443	447	452	457	462	466	471	476

CIRCUMFERENCE OF WHEEL, 11.2 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	9	14	19	24	28	33	38	42	47
10	52	57	62	66	71	76	80	84	89	94
20	99	104	108	113	117	122	127	132	137	141
30	146	151	155	160	165	169	174	179	184	188
40	193	198	203	207	212	217	222	226	231	236
50	240	245	250	255	259	264	269	274	278	283
60	287	292	297	302	307	312	316	321	326	330
70	334	339	344	348	353	358	363	367	372	377
80	382	386	391	396	400	405	410	415	419	424
90	429	434	438	443	447	452	456	461	466	471

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 11.3 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	9	14	19	23	28	33	37	42	47
10	51	56	61	65	70	74	79	83	88	93
20	98	103	108	112	117	122	126	131	135	140
30	145	150	154	159	164	168	173	178	183	187
40	191	196	200	205	210	215	220	224	229	234
50	238	243	248	252	257	261	266	271	276	280
60	285	290	294	299	304	308	313	318	322	327
70	332	336	341	346	350	355	360	364	370	374
80	378	383	387	392	397	402	406	411	416	420
90	425	430	434	439	444	448	453	458	462	467

CIRCUMFERENCE OF WHEEL, 11.4 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	9	14	18	23	28	32	37	42	46
10	50	56	60	65	69	74	79	83	88	93
20	97	102	107	111	116	120	125	129	134	139
30	143	148	152	157	162	167	171	176	180	185
40	190	195	199	204	208	213	217	222	227	231
50	236	241	245	250	255	259	264	269	273	278
60	282	287	291	296	301	306	310	315	319	324
70	329	333	338	343	347	352	357	361	366	370
80	375	380	384	389	394	398	403	407	412	417
90	421	426	431	435	440	445	449	454	458	463

CIRCUMFERENCE OF WHEEL, 11.5 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	9	14	18	23	28	32	37	41	46
10	50	55	59	63	68	72	77	82	87	92
20	96	101	105	110	114	119	124	128	133	138
30	142	147	151	156	161	165	170	174	179	184
40	188	193	197	202	207	211	216	220	225	229
50	234	239	243	248	252	257	262	266	271	275
60	280	285	289	294	298	303	308	312	317	321
70	326	331	335	340	344	349	353	358	363	367
80	372	377	381	386	390	395	399	404	409	413
90	418	422	427	432	436	441	445	450	454	459

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 11.6 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	9	14	18	23	27	32	36	41	46
10	50	55	59	64	68	73	77	82	87	91
20	96	100	104	109	114	118	123	127	132	136
30	141	146	150	155	159	164	168	173	178	182
40	187	191	196	200	205	209	214	218	223	227
50	232	237	241	246	250	255	259	264	269	273
60	278	282	287	291	296	300	305	309	314	318
70	323	328	332	337	341	346	350	355	360	364
80	369	373	378	382	387	391	396	400	405	410
90	414	419	423	428	432	437	441	446	450	455

CIRCUMFERENCE OF WHEEL, 11.7 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	5	9	13	18	23	27	32	36	41	45
10	50	54	59	63	68	72	77	81	86	90
20	95	99	104	108	113	117	122	126	131	135
30	140	144	149	153	158	162	167	171	176	180
40	185	189	194	198	203	207	212	217	221	225
50	230	235	239	244	248	253	257	262	266	271
60	275	280	284	289	293	298	302	307	311	316
70	320	325	329	334	338	343	347	352	356	361
80	365	370	374	379	383	388	392	397	401	406
90	410	415	419	424	428	433	437	442	446	451

CIRCUMFERENCE OF WHEEL, 11.8 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	4	9	13	18	22	27	32	36	40	45
10	49	53	58	62	67	72	76	80	85	89
20	94	98	103	107	112	116	121	125	130	134
30	139	143	148	152	157	161	165	170	174	179
40	183	187	192	197	201	206	210	215	219	223
50	228	232	237	241	246	250	255	259	264	268
60	273	277	282	286	291	295	300	304	309	313
70	317	321	326	330	335	339	344	348	353	358
80	362	367	372	376	380	385	389	393	398	402
90	407	411	416	420	425	429	434	438	443	447

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 11.9 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	4	9	13	18	22	27	31	35	40	44
10	49	53	58	62	67	71	76	80	84	89
20	93	98	102	107	111	115	120	124	129	133
30	138	142	146	151	155	160	164	169	173	178
40	182	187	191	195	200	204	209	213	218	222
50	226	231	235	240	244	249	253	258	262	266
60	271	275	280	284	289	293	298	302	306	311
70	315	320	324	329	333	338	342	346	350	355
80	360	364	369	373	377	382	386	391	395	399
90	404	409	413	417	422	426	431	435	440	444

CIRCUMFERENCE OF WHEEL, 12 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	4	9	13	18	22	26	31	35	40	44
10	48	53	57	62	66	70	75	79	84	88
20	91	96	100	104	109	113	118	122	128	132
30	136	141	145	150	154	158	163	168	172	176
40	180	185	189	194	198	202	207	211	216	220
50	224	229	233	238	242	246	251	255	260	264
60	268	273	277	281	286	290	295	299	304	308
70	312	317	321	326	330	334	339	343	348	352
80	356	361	365	370	374	378	383	388	392	396
90	400	405	409	414	418	422	427	431	436	440

CIRCUMFERENCE OF WHEEL, 12.1 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	4	9	13	17	22	26	31	35	39	44
10	48	53	57	61	66	70	75	79	83	87
20	91	96	100	105	109	113	118	122	126	131
30	135	139	144	148	153	157	161	165	170	174
40	178	183	187	192	196	201	205	209	214	218
50	222	227	231	235	240	244	249	253	257	262
60	266	270	275	279	283	288	292	296	301	305
70	310	314	318	323	327	331	336	340	344	349
80	353	358	362	366	370	375	379	384	388	392
90	397	401	405	410	414	419	423	427	432	436

TABLE 20.—*Converting wheel revolutions into hundredths of a mile*—Continued.

CIRCUMFERENCE OF WHEEL, 12.2 FEET.

0	1	2	3	4	5	6	7	8	9	10
0	4	9	13	17	22	26	30	35	39	43
10	48	52	56	61	65	69	74	78	82	87
20	91	95	100	104	108	113	117	121	126	130
30	134	138	143	147	151	156	160	165	169	173
40	178	182	186	191	195	199	204	208	212	216
50	221	225	230	234	238	243	247	251	256	260
60	264	268	273	277	281	286	290	294	299	303
70	307	312	316	320	325	329	333	338	342	346
80	351	356	359	364	368	372	377	381	385	390
90	395	399	404	408	412	417	421	425	429	433

After measuring wheel use nearest tenth for size of wheel.

TABLE 21.—*Five-place logarithms of natural numbers.*

[Fractional change in a number corresponding to a change in its logarithm.]

Computed from the formula,

$$\frac{\Delta N}{N} = \frac{\Delta \log N}{\mu},$$

μ=modulus of common logarithms = 0.43429448.

For $\Delta \log N$ = 1 unit in	$\frac{\Delta N}{N}$	For $\Delta \log N$ = 4 units in	$\frac{\Delta N}{N}$ (in round numbers)
Fourth place	$\frac{1}{4343}$	Fourth place	$\frac{1}{1000}$
Fifth place	$\frac{1}{43429}$	Fifth place	$\frac{1}{10000}$
Sixth place	$\frac{1}{434294}$	Sixth place	$\frac{1}{100000}$
Seventh place	$\frac{1}{4342945}$	Seventh place	$\frac{1}{1000000}$

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
0		00 000	30 103	47 712	60 206	69 897	77 815	84 510	90 309	95 424
1	00 000	04 139	07 918	11 394	14 613	17 609	20 412	23 045	25 527	27 875
2	30 103	32 222	34 242	36 173	38 021	39 794	41 497	43 136	44 716	46 240
3	47 712	49 136	50 515	51 851	53 148	54 407	55 630	56 820	57 978	59 106
4	60 206	61 278	62 325	63 347	64 345	65 321	66 276	67 210	68 124	69 020
5	69 897	70 757	71 600	72 428	73 239	74 036	74 819	75 587	76 343	77 085
6	77 815	78 533	79 239	79 934	80 618	81 291	81 954	82 607	83 251	83 885
7	84 510	85 126	85 733	86 332	86 923	87 506	88 081	88 649	89 209	89 763
8	90 309	90 849	91 381	91 908	92 428	92 942	93 450	93 952	94 448	94 939
9	95 424	95 904	96 379	96 848	97 313	97 772	98 227	98 677	99 123	99 564
10	00 000	00 432	00 860	01 284	01 703	02 119	02 531	02 938	03 342	03 743
11	04 139	04 532	04 922	05 308	05 690	06 070	06 446	06 819	07 188	07 555
12	07 918	08 279	08 636	08 991	09 342	09 691	10 037	10 380	10 721	11 059
13	11 394	11 727	12 057	12 385	12 710	13 033	13 354	13 672	13 988	14 301
14	14 613	14 922	15 229	15 534	15 836	16 137	16 435	16 732	17 026	17 319
15	17 609	17 898	18 184	18 469	18 752	19 033	19 312	19 590	19 866	20 140
16	20 412	20 683	20 952	21 219	21 484	21 748	22 011	22 272	22 531	22 789
17	23 045	23 300	23 553	23 805	24 055	24 304	24 551	24 797	25 042	25 285
18	25 527	25 768	26 007	26 245	26 482	26 717	26 951	27 184	27 416	27 646
19	27 875	28 103	28 330	28 556	28 780	29 003	29 226	29 447	29 667	29 885
20	30 103	30 320	30 535	30 750	30 963	31 175	31 387	31 597	31 806	32 015
21	32 222	32 428	32 634	32 838	33 041	33 244	33 445	33 646	33 846	34 044
22	34 242	34 439	34 635	34 830	35 025	35 218	35 411	35 603	35 793	35 984
23	36 173	36 361	36 549	36 736	36 922	37 107	37 291	37 475	37 658	37 840
24	38 021	38 202	38 382	38 561	38 739	38 917	39 094	39 270	39 445	39 620
25	39 794	39 967	40 140	40 312	40 483	40 654	40 824	40 993	41 162	41 330
26	41 497	41 664	41 830	41 996	42 160	42 325	42 488	42 651	42 813	42 975
27	43 136	43 297	43 457	43 616	43 775	43 933	44 091	44 248	44 404	44 560
28	44 716	44 871	45 025	45 179	45 332	45 484	45 637	45 788	45 939	46 090
29	46 240	46 389	46 538	46 687	46 835	46 982	47 129	47 276	47 422	47 567
30	47 712	47 857	48 001	48 144	48 287	48 430	48 572	48 714	48 855	48 996
31	49 136	49 276	49 415	49 554	49 693	49 831	49 969	50 106	50 243	50 379
32	50 515	50 651	50 786	50 920	51 055	51 188	51 322	51 455	51 587	51 720
33	51 851	51 983	52 114	52 244	52 375	52 504	52 634	52 763	52 892	53 020
34	53 148	53 275	53 403	53 529	53 656	53 782	53 908	54 033	54 158	54 283
35	54 407	54 531	54 654	54 777	54 900	55 023	55 145	55 267	55 388	55 509
36	55 630	55 751	55 871	55 991	56 110	56 229	56 348	56 467	56 585	56 703
37	56 820	56 937	57 054	57 171	57 287	57 403	57 519	57 634	57 749	57 864
38	57 978	58 092	58 206	58 320	58 433	58 546	58 659	58 771	58 883	58 995
39	59 106	59 218	59 329	59 439	59 550	59 660	59 770	59 879	59 988	60 097
40	60 206	60 314	60 423	60 531	60 638	60 746	60 853	60 959	61 066	61 172
41	61 278	61 384	61 490	61 595	61 700	61 805	61 909	62 014	62 118	62 221
42	62 325	62 428	62 531	62 634	62 737	62 839	62 941	63 043	63 144	63 246
43	63 347	63 448	63 548	63 649	63 749	63 849	63 949	64 048	64 147	64 246
44	64 345	64 444	64 542	64 640	64 738	64 836	64 933	65 031	65 128	65 225
45	65 321	65 418	65 514	65 610	65 706	65 801	65 896	65 992	66 087	66 181
46	66 276	66 370	66 464	66 558	66 652	66 745	66 839	66 932	67 025	67 117
47	67 210	67 302	67 394	67 486	67 578	67 669	67 761	67 852	67 943	68 034
48	68 124	68 215	68 305	68 395	68 485	68 574	68 664	68 753	68 842	68 931
49	69 020	69 108	69 197	69 285	69 373	69 461	69 548	69 636	69 723	69 810
50	69 897	69 984	70 070	70 157	70 243	70 329	70 415	70 501	70 586	70 672
N.	L. 0	1	2	3	4	5	6	7	8	9

0° 1′ = 60″	S. 4. 68 557	T. 4. 68 557	0° 5′ = 300″	S. 4. 68 557	T. 4. 68 558
0 2 = 120	4. 68 557	4. 68 557	0 6 = 360	4. 68 557	4. 68 558
0 3 = 180	4. 68 557	4. 68 557	0 7 = 420	4. 68 557	4. 68 558
0 4 = 240	4. 68 557	4. 68 558	0 8 = 480	4. 68 557	4. 68 558

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
50	69 897	69 984	70 070	70 157	70 243	70 329	70 415	70 501	70 586	70 672
51	70 757	70 842	70 927	71 012	71 096	71 181	71 265	71 349	71 433	71 517
52	71 600	71 684	71 767	71 850	71 933	72 016	72 099	72 181	72 263	72 346
53	72 428	72 509	72 591	72 673	72 754	72 835	72 916	72 997	73 078	73 159
54	73 239	73 320	73 400	73 480	73 560	73 640	73 719	73 799	73 878	73 957
55	74 036	74 115	74 194	74 273	74 351	74 429	74 507	74 586	74 663	74 741
56	74 819	74 896	74 974	75 051	75 128	75 205	75 282	75 358	75 435	75 511
57	75 587	75 664	75 740	75 815	75 891	75 967	76 042	76 118	76 193	76 268
58	76 343	76 418	76 492	76 567	76 641	76 716	76 790	76 864	76 938	77 012
59	77 085	77 159	77 232	77 305	77 379	77 452	77 525	77 597	77 670	77 743
60	77 815	77 887	77 960	78 032	78 104	78 176	78 247	78 319	78 390	78 462
61	78 533	78 604	78 675	78 746	78 817	78 888	78 958	79 029	79 099	79 169
62	79 239	79 309	79 379	79 449	79 518	79 588	79 657	79 727	79 796	79 865
63	79 934	80 003	80 072	80 140	80 209	80 277	80 346	80 414	80 482	80 550
64	80 618	80 686	80 754	80 821	80 889	80 956	81 023	81 090	81 158	81 224
65	81 291	81 358	81 425	81 491	81 558	81 624	81 690	81 757	81 823	81 889
66	81 954	82 020	82 086	82 151	82 217	82 282	82 347	82 413	82 478	82 543
67	82 607	82 672	82 737	82 802	82 866	82 930	82 995	83 059	83 123	83 187
68	83 251	83 315	83 378	83 442	83 506	83 569	83 632	83 696	83 759	83 822
69	83 885	83 948	84 011	84 073	84 136	84 198	84 261	84 323	84 386	84 448
70	84 510	84 572	84 634	84 696	84 757	84 819	84 880	84 942	85 003	85 065
71	85 126	85 187	85 248	85 309	85 370	85 431	85 491	85 552	85 612	85 673
72	85 733	85 794	85 854	85 914	85 974	86 034	86 094	86 153	86 213	86 273
73	86 332	86 392	86 451	86 510	86 570	86 629	86 688	86 747	86 806	86 864
74	86 923	86 982	87 040	87 099	87 157	87 216	87 274	87 332	87 390	87 448
75	87 506	87 564	87 622	87 679	87 737	87 795	87 852	87 910	87 967	88 024
76	88 081	88 138	88 195	88 252	88 309	88 366	88 423	88 480	88 536	88 593
77	88 649	88 705	88 762	88 818	88 874	88 930	88 986	89 042	89 098	89 154
78	89 209	89 265	89 321	89 376	89 432	89 487	89 542	89 597	89 653	89 708
79	89 763	89 818	89 873	89 927	89 982	90 037	90 091	90 146	90 200	90 255
80	90 309	90 363	90 417	90 472	90 526	90 580	90 634	90 687	90 741	90 795
81	90 849	90 902	90 956	91 009	91 062	91 116	91 169	91 222	91 275	91 328
82	91 381	91 434	91 487	91 540	91 593	91 645	91 698	91 751	91 803	91 855
83	91 908	91 960	92 012	92 065	92 117	92 169	92 221	92 273	92 324	92 376
84	92 428	92 480	92 531	92 583	92 634	92 686	92 737	92 788	92 840	92 891
85	92 942	92 993	93 044	93 095	93 146	93 197	93 247	93 298	93 349	93 399
86	93 450	93 500	93 551	93 601	93 651	93 702	93 752	93 802	93 852	93 902
87	93 952	94 002	94 052	94 101	94 151	94 201	94 250	94 300	94 349	94 399
88	94 448	94 498	94 547	94 596	94 645	94 694	94 743	94 792	94 841	94 890
89	94 939	94 988	95 036	95 085	95 134	95 182	95 231	95 279	95 328	95 376
90	95 424	95 472	95 521	95 569	95 617	95 665	95 713	95 761	95 809	95 856
91	95 904	95 952	95 999	96 047	96 095	96 142	96 190	96 237	96 284	96 332
92	96 379	96 426	96 473	96 520	96 567	96 614	96 661	96 708	96 755	96 802
93	96 848	96 895	96 942	96 988	97 035	97 081	97 128	97 174	97 220	97 267
94	97 313	97 359	97 405	97 451	97 497	97 543	97 589	97 635	97 681	97 727
95	97 772	97 818	97 864	97 909	97 955	98 000	98 046	98 091	98 137	98 182
96	98 227	98 272	98 318	98 363	98 408	98 453	98 498	98 543	98 588	98 632
97	98 677	98 722	98 767	98 811	98 856	98 900	98 945	98 989	99 034	99 078
98	99 123	99 167	99 211	99 255	99 300	99 344	99 388	99 432	99 476	99 520
99	99 564	99 607	99 651	99 695	99 739	99 782	99 826	99 870	99 913	99 957
100	00 000	00 043	00 087	00 130	00 173	00 217	00 260	00 303	00 346	00 389
N.	L. 0	1	2	3	4	5	6	7	8	9

0° 9′ = 540″	S. 4. 68 557	T. 4. 68 558	0° 13′ = 780″	S. 4. 68 557	T. 4. 68 558
0 10 = 600	4. 68 557	4. 68 558	0 14 = 840	4. 68 557	4. 68 558
0 11 = 660	4. 68 557	4. 68 558	0 15 = 900	4. 68 557	4. 68 558
0 12 = 720	4. 68 557	4. 68 558	0 16 = 960	4. 68 557	4. 68 558

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
100	00	000	043	087	130	173	217	260	303	346	389
101		432	475	518	561	604	647	689	732	775	817
102		860	903	945	988	*030	*072	*115	*157	*199	*242
103	01	284	326	368	410	452	494	536	578	620	662
104		703	745	787	828	870	912	953	995	*036	*078
105	02	119	160	202	243	284	325	366	407	449	490
106		531	572	612	653	694	735	776	816	857	898
107		938	979	*019	*060	*100	*141	*181	*222	*262	*302
108	03	342	383	423	463	503	543	583	623	663	703
109		743	782	822	862	902	941	981	*021	*060	*100
110	04	139	179	218	258	297	336	376	415	454	493
111		532	571	610	650	689	727	766	805	844	883
112		922	961	999	*038	*077	*115	*154	*192	*231	*269
113	05	308	346	385	423	461	500	538	576	614	652
114		690	729	767	805	843	881	918	956	994	*032
115	06	070	108	145	183	221	258	296	333	371	408
116		446	483	521	558	595	633	670	707	744	781
117		819	856	893	930	967	*004	*041	*078	*115	*151
118	07	188	225	262	298	335	372	408	445	482	518
119		555	591	628	664	700	737	773	809	846	882
120		918	954	990	*027	*063	*099	*135	*171	*207	*243
121	08	279	314	350	386	422	458	493	529	565	600
122		636	672	707	743	778	814	849	884	920	955
123		991	*026	*061	*096	*132	*167	*202	*237	*272	*307
124	09	342	377	412	447	482	517	552	587	621	656
125		691	726	760	795	830	864	899	934	968	*003
126	10	037	072	106	140	175	209	243	278	312	346
127		380	415	449	483	517	551	585	619	653	687
128		721	755	789	823	857	890	924	958	992	*025
129	11	059	093	126	160	193	227	261	294	327	361
130		394	428	461	494	528	561	594	628	661	694
131		727	760	793	826	860	893	926	959	992	*024
132	12	057	090	123	156	189	222	254	287	320	352
133		385	418	450	483	516	548	581	613	646	678
134		710	743	775	808	840	872	905	937	969	*001
135	13	033	066	098	130	162	194	226	258	290	322
136		354	386	418	450	481	513	545	577	609	640
137		672	704	735	767	799	830	862	893	925	956
138		988	*019	*051	*082	*114	*145	*176	*208	*239	*270
139	14	301	333	364	395	426	457	489	520	551	582
140		613	644	675	706	737	768	799	829	860	891
141		922	953	983	*014	*045	*076	*106	*137	*168	*198
142	15	229	259	290	320	351	381	412	442	473	503
143		534	564	594	625	655	685	715	746	776	806
144		836	866	897	927	957	987	*017	*047	*077	*107
145	16	137	167	197	227	256	286	316	346	376	406
146		435	465	495	524	554	584	613	643	673	702
147		732	761	791	820	850	879	909	938	967	997
148	17	026	056	085	114	143	173	202	231	260	289
149		319	348	377	406	435	464	493	522	551	580
150		609	638	667	696	725	754	782	811	840	869
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	44	**43**	**42**
1	4,4	4,3	4,2
2	8,8	8,6	8,4
3	13,2	12,9	12,6
4	17,6	17,2	16,8
5	22,0	21,5	21,0
6	26,4	25,8	25,2
7	30,8	30,1	29,4
8	35,2	34,4	33,6
9	39,6	38,7	37,8

	41	**40**	**39**
1	4,1	4,0	3,9
2	8,2	8,0	7,8
3	12,3	12,0	11,7
4	16,4	16,0	15,6
5	20,5	20,0	19,5
6	24,6	24,0	23,4
7	28,7	28,0	27,3
8	32,8	32,0	31,2
9	36,9	36,0	35,1

	38	**37**	**36**
1	3,8	3,7	3,6
2	7,6	7,4	7,2
3	11,4	11,1	10,8
4	15,2	14,8	14,4
5	19,0	18,5	18,0
6	22,8	22,2	21,6
7	26,6	25,9	25,2
8	30,4	29,6	28,8
9	34,2	33,3	32,4

	35	**34**	**33**
1	3,5	3,4	3,3
2	7,0	6,8	6,6
3	10,5	10,2	9,9
4	14,0	13,6	13,2
5	17,5	17,0	16,5
6	21,0	20,4	19,8
7	24,5	23,8	23,1
8	28,0	27,2	26,4
9	31,5	30,6	29,7

	32	**31**	**30**
1	3,2	3,1	3,0
2	6,4	6,2	6,0
3	9,6	9,3	9,0
4	12,8	12,4	12,0
5	16,0	15,5	15,0
6	19,2	18,6	18,0
7	22,4	21,7	21,0
8	25,6	24,8	24,0
9	28,8	27,9	27,0

		S.	T.			S.	T.
0° 16′	= 960″	S. 4. 68 557	T. 4. 68 558	0° 21′	= 1260″	S. 4. 68 557	T. 4. 68 558
0 17	= 1020	4. 68 557	4. 68 558	0 22	= 1320	4. 68 557	4. 68 558
0 18	= 1080	4. 68 557	4. 68 558	0 23	= 1380	4. 68 557	4. 68 558
0 19	= 1140	4. 68 557	4. 68 558	0 24	= 1440	4. 68 557	4. 68 558
0 20	= 1200	4. 68 557	4. 68 558	0 25	= 1500	4. 68 557	4. 68 558

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TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
150	17	609	638	667	696	725	754	782	811	840	869
151		898	926	955	984	*013	*041	*070	*099	*127	*156
152	18	184	213	241	270	298	327	355	384	412	441
153		469	498	526	554	583	611	639	667	696	724
154		752	780	808	837	865	893	921	949	977	*005
155	19	033	061	089	117	145	173	201	229	257	285
156		312	340	368	396	424	451	479	507	535	562
157		590	618	645	673	700	728	756	783	811	838
158		866	893	921	948	976	*003	*030	*058	*085	*112
159	20	140	167	194	222	249	276	303	330	358	385
160		412	439	466	493	520	548	575	602	629	656
161		683	710	737	763	790	817	844	871	898	925
162		952	978	*005	*032	*059	*085	*112	*139	*165	*192
163	21	219	245	272	299	325	352	378	405	431	458
164		484	511	537	564	590	617	643	669	696	722
165		748	775	801	827	854	880	906	932	958	985
166	22	011	037	063	089	115	141	167	194	220	246
167		272	298	324	350	376	401	427	453	479	505
168		531	557	583	608	634	660	686	712	737	763
169		789	814	840	866	891	917	943	968	994	*019
170	23	045	070	096	121	147	172	198	223	249	274
171		300	325	350	376	401	426	452	477	502	528
172		553	578	603	629	654	679	704	729	754	779
173		805	830	855	880	905	930	955	980	*005	*030
174	24	055	080	105	130	155	180	204	229	254	279
175		304	329	353	378	403	428	452	477	502	527
176		551	576	601	625	650	674	699	724	748	773
177		797	822	846	871	895	920	944	969	993	*018
178	25	042	066	091	115	139	164	188	212	237	261
179		285	310	334	358	382	406	431	455	479	503
180		527	551	575	600	624	648	672	696	720	744
181		768	792	816	840	864	888	912	935	959	983
182	26	007	031	055	079	102	126	150	174	198	221
183		245	269	293	316	340	364	387	411	435	458
184		482	505	529	553	576	600	623	647	670	694
185		717	741	764	788	811	834	858	881	905	928
186		951	975	998	*021	*045	*068	*091	*114	*138	*161
187	27	184	207	231	254	277	300	323	346	370	393
188		416	439	462	485	508	531	554	577	600	623
189		646	669	692	715	738	761	784	807	830	852
190		875	898	921	944	967	989	*012	*035	*058	*081
191	28	103	126	149	171	194	217	240	262	285	307
192		330	353	375	398	421	443	466	488	511	533
193		556	578	601	623	646	668	691	713	735	758
194		780	803	825	847	870	892	914	937	959	981
195	29	003	026	048	070	092	115	137	159	181	203
196		226	248	270	292	314	336	358	380	403	425
197		447	469	491	513	535	557	579	601	623	645
198		667	688	710	732	754	776	798	820	842	863
199		885	907	929	951	973	994	*016	*038	*060	*081
200	30	103	125	146	168	190	211	233	255	276	298
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	29	28
1	2,9	2,8
2	5,8	5,6
3	8,7	8,4
4	11,6	11,2
5	14,5	14,0
6	17,4	16,8
7	20,3	19,6
8	23,2	22,4
9	26,1	25,2

	27	26
1	2,7	2,6
2	5,4	5,2
3	8,1	7,8
4	10,8	10,4
5	13,5	13,0
6	16,2	15,6
7	18,9	18,2
8	21,6	20,8
9	24,3	23,4

	25
1	2,5
2	5,0
3	7,5
4	10,0
5	12,5
6	15,0
7	17,5
8	20,0
9	22,5

	24	23
1	2,4	2,3
2	4,8	4,6
3	7,2	6,9
4	9,6	9,2
5	12,0	11,5
6	14,4	13,8
7	16,8	16,1
8	19,2	18,4
9	21,6	20,7

	22	21
1	2,2	2,1
2	4,4	4,2
3	6,6	6,3
4	8,8	8,4
5	11,0	10,5
6	13,2	12,6
7	15,4	14,7
8	17,6	16,8
9	19,8	18,9

P. P.

		S.	T.			S.	T.
0° 25′	= 1500″	4. 68 557	4. 68 558	0° 30′	= 1800″	4. 68 557	4. 68 559
0 26	= 1560	4. 68 557	4. 68 558	0 31	= 1860	4. 68 557	4. 68 559
0 27	= 1620	4. 68 557	4. 68 558	0 32	= 1920	4. 68 557	4. 68 559
0 28	= 1680	4. 68 557	4. 68 558	0 33	= 1980	4. 68 557	4. 68 559
0 29	= 1740	4. 68 557	4. 68 558	0 34	= 2040	4. 68 557	4. 68 559

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
200	30	103	125	146	168	190	211	233	255	276	298
201		320	341	363	384	406	428	449	471	492	514
202		535	557	578	600	621	643	664	685	707	728
203		750	771	792	814	835	856	878	899	920	942
204		963	984	*006	*027	*048	*069	*091	*112	*133	*154
205	31	175	197	218	239	260	281	302	323	345	366
206		387	408	429	450	471	492	513	534	555	576
207		597	618	639	660	681	702	723	744	765	785
208		806	827	848	869	890	911	931	952	973	994
209	32	015	035	056	077	098	118	139	160	181	201
210		222	243	263	284	305	325	346	366	387	408
211		428	449	469	490	510	531	552	572	593	613
212		634	654	675	695	715	736	756	777	797	818
213		838	858	879	899	919	940	960	980	*001	*021
214	33	041	062	082	102	122	143	163	183	203	224
215		244	264	284	304	325	345	365	385	405	425
216		445	465	486	506	526	546	566	586	606	626
217		646	666	686	706	726	746	766	786	806	826
218		846	866	885	905	925	945	965	985	*005	*025
219	34	044	064	084	104	124	143	163	183	203	223
220		242	262	282	301	321	341	361	380	400	420
221		439	459	479	498	518	537	557	577	596	616
222		635	655	674	694	713	733	753	772	792	811
223		830	850	869	889	908	928	947	967	986	*005
224	35	025	044	064	083	102	122	141	160	180	199
225		218	238	257	276	295	315	334	353	372	392
226		411	430	449	468	488	507	526	545	564	583
227		603	622	641	660	679	698	717	736	755	774
228		793	813	832	851	870	889	908	927	946	965
229		984	*003	*021	*040	*059	*078	*097	*116	*135	*154
230	36	173	192	211	229	248	267	286	305	324	342
231		361	380	399	418	436	455	474	493	511	530
232		549	568	586	605	624	642	661	680	698	717
233		736	754	773	791	810	829	847	866	884	903
234		922	940	959	977	996	*014	*033	*051	*070	*088
235	37	107	125	144	162	181	199	218	236	254	273
236		291	310	328	346	365	383	401	420	438	457
237		475	493	511	530	548	566	585	603	621	639
238		658	676	694	712	731	749	767	785	803	822
239		840	858	876	894	912	931	949	967	985	*003
240	38	021	039	057	075	093	112	130	148	166	184
241		202	220	238	256	274	292	310	328	346	364
242		382	399	417	435	453	471	489	507	525	543
243		561	578	596	614	632	650	668	686	703	721
244		739	757	775	792	810	828	846	863	881	899
245		917	934	952	970	987	*005	*023	*041	*058	*076
246	39	094	111	129	146	164	182	199	217	235	252
247		270	287	305	322	340	358	375	393	410	428
248		445	463	480	498	515	533	550	568	585	602
249		620	637	655	672	690	707	724	742	759	777
250		794	811	829	846	863	881	898	915	933	950
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	22	21
1	2,2	2,1
2	4,4	4,2
3	6,6	6,3
4	8,8	8,4
5	11,0	10,5
6	13,2	12,6
7	15,4	14,7
8	17,6	16,8
9	19,8	18,9

	20
1	2,0
2	4,0
3	6,0
4	8,0
5	10,0
6	12,0
7	14,0
8	16,0
9	18,0

	19
1	1,9
2	3,8
3	5,7
4	7,6
5	9,5
6	11,4
7	13,3
8	15,2
9	17,1

	18
1	1,8
2	3,6
3	5,4
4	7,2
5	9,0
6	10,8
7	12,6
8	14,4
9	16,2

	17
1	1,7
2	3,4
3	5,1
4	6,8
5	8,5
6	10,2
7	11,9
8	13,6
9	15,3

0° 33′ = 1980″	S. 4. 68 557	T. 4. 68 559	0° 38′ = 2280″	S. 4. 68 557	T. 4. 68 559
0 34 = 2040	4. 68 557	4. 68 559	0 39 = 2340	4. 68 557	4. 68 559
0 35 = 2100	4. 68 557	4. 68 559	0 40 = 2400	4. 68 557	4. 68 559
0 36 = 2160	4. 68 557	4. 68 559	0 41 = 2460	4. 68 556	4. 68 560
0 37 = 2220	4. 68 557	4. 68 559	0 42 = 2520	4. 68 556	4. 68 560

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
250	39 794	811	829	846	863	881	898	915	933	950
251	967	985	*002	*019	*037	*054	*071	*088	*106	*123
252	40 140	157	175	192	209	226	243	261	278	295
253	312	329	346	364	381	398	415	432	449	466
254	483	500	518	535	552	569	586	603	620	637
255	654	671	688	705	722	739	756	773	790	807
256	824	841	858	875	892	909	926	943	960	976
257	993	*010	*027	*044	*061	*078	*095	*111	*128	*145
258	41 162	179	196	212	229	246	263	280	296	313
259	330	347	363	380	397	414	430	447	464	481
260	497	514	531	547	564	581	597	614	631	647
261	664	681	697	714	731	747	764	780	797	814
262	830	847	863	880	896	913	929	946	963	979
263	996	*012	*029	*045	*062	*078	*095	*111	*127	*144
264	42 160	177	193	210	226	243	259	275	292	308
265	325	341	357	374	390	406	423	439	455	472
266	488	504	521	537	553	570	586	602	619	635
267	651	667	684	700	716	732	749	765	781	797
268	813	830	846	862	878	894	911	927	943	959
269	975	991	*008	*024	*040	*056	*072	*088	*104	*120
270	43 136	152	169	185	201	217	233	249	265	281
271	297	313	329	345	361	377	393	409	425	441
272	457	473	489	505	521	537	553	569	584	600
273	616	632	648	664	680	696	712	727	743	759
274	775	791	807	823	838	854	870	886	902	917
275	933	949	965	981	996	*012	*028	*044	*059	*075
276	44 091	107	122	138	154	170	185	201	217	232
277	248	264	279	295	311	326	342	358	373	389
278	404	420	436	451	467	483	498	514	529	545
279	560	576	592	607	623	638	654	669	685	700
280	716	731	747	762	778	793	809	824	840	855
281	871	886	902	917	932	948	963	979	994	*010
282	45 025	040	056	071	086	102	117	133	148	163
283	179	194	209	225	240	255	271	286	301	317
284	332	347	362	378	393	408	423	439	454	469
285	484	500	515	530	545	561	576	591	606	621
286	637	652	667	682	697	712	728	743	758	773
287	788	803	818	834	849	864	879	894	909	924
288	939	954	969	984	*000	*015	*030	*045	*060	*075
289	46 090	105	120	135	150	165	180	195	210	225
290	240	255	270	285	300	315	330	345	359	374
291	389	404	419	434	449	464	479	494	509	523
292	538	553	568	583	598	613	627	642	657	672
293	687	702	716	731	746	761	776	790	805	820
294	835	850	864	879	894	909	923	938	953	967
295	982	997	*012	*026	*041	*056	*070	*085	*100	*114
296	47 129	144	159	173	188	202	217	232	246	261
297	276	290	305	319	334	349	363	378	392	407
298	422	436	451	465	480	494	509	524	538	553
299	567	582	596	611	625	640	654	669	683	698
300	712	727	741	756	770	784	799	813	828	842
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	18	17	16	15	14
1	1,8	1,7	1,6	1,5	1,4
2	3,6	3,4	3,2	3,0	2,8
3	5,4	5,1	4,8	4,5	4,2
4	7,2	6,8	6,4	6,0	5,6
5	9,0	8,5	8,0	7,5	7,0
6	10,8	10,2	9,6	9,0	8,4
7	12,6	11,9	11,2	10,5	9,8
8	14,4	13,6	12,8	12,0	11,2
9	16,2	15,3	14,4	13,5	12,6

0° 41′ = 2460″	S. 4. 68 556	T. 4. 68 560	0° 46′ = 2760″	S. 4. 68 556	T. 4. 68 560
0 42 = 2520	4. 68 556	4. 68 560	0 47 = 2820	4. 68 556	4. 68 560
0 43 = 2580	4. 68 556	4. 68 560	0 48 = 2880	4. 68 556	4. 68 560
0 44 = 2640	4. 68 556	4. 68 560	0 49 = 2940	4. 68 556	4. 68 560
0 45 = 2700	4. 68 556	4. 68 560	0 50 = 3000	4. 68 556	4. 68 561

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
300	47	712	727	741	756	770	784	799	813	828	842
301		857	871	885	900	914	929	943	958	972	986
302	48	001	015	029	044	058	073	087	101	116	130
303		144	159	173	187	202	216	230	244	259	273
304		287	302	316	330	344	359	373	387	401	416
305		430	444	458	473	487	501	515	530	544	558
306		572	586	601	615	629	643	657	671	686	700
307		714	728	742	756	770	785	799	813	827	841
308		855	869	883	897	911	926	940	954	968	982
309		996	*010	*024	*038	*052	*066	*080	*094	*108	*122
310	49	136	150	164	178	192	206	220	234	248	262
311		276	290	304	318	332	346	360	374	388	402
312		415	429	443	457	471	485	499	513	527	541
313		554	568	582	596	610	624	638	651	665	679
314		693	707	721	734	748	762	776	790	803	817
315		831	845	859	872	886	900	914	927	941	955
316		969	982	996	*010	*024	*037	*051	*065	*079	*092
317	50	106	120	133	147	161	174	188	202	215	229
318		243	256	270	284	297	311	325	338	352	365
319		379	393	406	420	433	447	461	474	488	501
320		515	529	542	556	569	583	596	610	623	637
321		651	664	678	691	705	718	732	745	759	772
322		786	799	813	826	840	853	866	880	893	907
323		920	934	947	961	974	987	*001	*014	*028	*041
324	51	055	068	081	095	108	121	135	148	162	175
325		188	202	215	228	242	255	268	282	295	308
326		322	335	348	362	375	388	402	415	428	441
327		455	468	481	495	508	521	534	548	561	574
328		587	601	614	627	640	654	667	680	693	706
329		720	733	746	759	772	786	799	812	825	838
330		851	865	878	891	904	917	930	943	957	970
331		983	996	*009	*022	*035	*048	*061	*075	*088	*101
332	52	114	127	140	153	166	179	192	205	218	231
333		244	257	270	284	297	310	323	336	349	362
334		375	388	401	414	427	440	453	466	479	492
335		504	517	530	543	556	569	582	595	608	621
336		634	647	660	673	686	699	711	724	737	750
337		763	776	789	802	815	827	840	853	866	879
338		892	905	917	930	943	956	969	982	994	*007
339	53	020	033	046	058	071	084	097	110	122	135
340		148	161	173	186	199	212	224	237	250	263
341		275	288	301	314	326	339	352	364	377	390
342		403	415	428	441	453	466	479	491	504	517
343		529	542	555	567	580	593	605	618	631	643
344		656	668	681	694	706	719	732	744	757	769
345		782	794	807	820	832	845	857	870	882	895
346		908	920	933	945	958	970	983	995	*008	*020
347	54	033	045	058	070	083	095	108	120	133	145
348		158	170	183	195	208	220	233	245	258	270
349		283	295	307	320	332	345	357	370	382	394
350		407	419	432	444	456	469	481	494	506	518
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	15
1	1,5
2	3,0
3	4,5
4	6,0
5	7,5
6	9,0
7	10,5
8	12,0
9	13,5

	14
1	1,4
1	2,8
3	4,2
4	5,6
5	7,0
6	8,4
7	9,8
8	11,2
9	12,6

	13
1	1,3
2	2,6
3	3,9
4	5,2
5	6,5
6	7,8
7	9,1
8	10,4
9	11,7

	12
1	1.2
2	2,4
3	3,6
4	4,8
5	6,0
6	7,2
7	8,4
8	9,6
9	10,8

0° 50′ = 3000″	S. 4. 68 556	T. 4. 68 561		0° 55′ = 3300″	S. 4. 68 556	T. 4. 68 561
0 51 = 3060	4. 68 556	4. 68 561		0 56 = 3360	4. 68 556	4. 38 561
0 52 = 3120	4. 68 556	4. 68 561		0 57 = 3420	4. 68 555	4. 68 561
0 53 = 3180	4. 68 556	4. 68 561		0 58 = 3480	4. 68 555	4. 68 562
0 54 = 3240	4. 68 556	4. 68 561		0 59 = 3540	4. 68 555	4. 68 562

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
350	54	407	419	432	444	456	469	481	494	506	518
351		531	543	555	568	580	593	605	617	630	642
352		654	667	679	691	704	716	728	741	753	765
353		777	790	802	814	827	839	851	864	876	888
354		900	913	925	937	949	962	974	986	998	*011
355	55	023	035	047	060	072	084	096	108	121	133
356		145	157	169	182	194	206	218	230	242	255
357		267	279	291	303	315	328	340	352	364	376
358		388	400	413	425	437	449	461	473	485	497
359		509	522	534	546	558	570	582	594	606	618
360		630	642	654	666	678	691	703	715	727	739
361		751	763	775	787	799	811	823	835	847	859
362		871	883	895	907	919	931	943	955	967	979
363		991	*003	*015	*027	*038	*050	*062	*074	*086	*098
364	56	110	122	134	146	158	170	182	194	205	217
365		229	241	253	265	277	289	301	312	324	336
366		348	360	372	384	396	407	419	431	443	455
367		467	478	490	502	514	526	538	549	561	573
368		585	597	608	620	632	644	656	667	679	691
369		703	714	726	738	750	761	773	785	797	808
370		820	832	844	855	867	879	891	902	914	926
371		937	949	961	972	984	996	*008	*019	*031	*043
372	57	054	066	078	089	101	113	124	136	148	159
373		171	183	194	206	217	229	241	252	264	276
374		287	299	310	322	334	345	357	368	380	392
375		403	415	426	438	449	461	473	484	496	507
376		519	530	542	553	565	576	588	600	611	623
377		634	646	657	669	680	692	703	715	726	738
378		749	761	772	784	795	807	818	830	841	852
379		864	875	887	898	910	921	933	944	955	967
380		978	990	*001	*013	*024	*035	*047	*058	*070	*081
381	58	092	104	115	127	138	149	161	172	184	195
382		206	218	229	240	252	263	274	286	297	309
383		320	331	343	354	365	377	388	399	410	422
384		433	444	456	467	478	490	501	512	524	535
385		546	557	569	580	591	602	614	625	636	647
386		659	670	681	692	704	715	726	737	749	760
387		771	782	794	805	816	827	838	850	861	872
388		883	894	906	917	928	939	950	961	973	984
389		995	*006	*017	*028	*040	*051	*062	*073	*084	*095
390	59	106	118	129	140	151	162	173	184	195	207
391		218	229	240	251	262	273	284	295	306	318
392		329	340	351	362	373	384	395	406	417	428
393		439	450	461	472	483	494	506	517	528	539
394		550	561	572	583	594	605	616	627	638	649
395		660	671	682	693	704	715	726	737	748	759
396		770	780	791	802	813	824	835	846	857	868
397		879	890	901	912	923	934	945	956	966	977
398		988	999	*010	*021	*032	*043	*054	*065	*076	*086
399	60	097	108	119	130	141	152	163	173	184	195
400		206	217	228	239	249	260	271	282	293	304
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	13	12	11	10
1	1,3	1,2	1,1	1,0
2	2,6	2,4	2,2	2,0
3	3,9	3,6	3,3	3,0
4	5,2	4,8	4,4	4,0
5	6,5	6,0	5,5	5,0
6	7,8	7,2	6,6	6,0
7	9,1	8,4	7,7	7,0
8	10,4	9,6	8,8	8,0
9	11,7	10,8	9,9	9,0

		S.	T.			S.	T.
0° 58′	= 3480″	4. 68 555	4. 68 562	1° 3′	= 3780″	4. 68 555	4. 68 562
0 59	= 3540	4. 68 555	4. 68 562	1 4	= 3840	4. 68 555	4. 68 563
1 0	= 3600	4. 68 555	4. 68 562	1 5	= 3900	4. 68 555	4. 68 563
1 1	= 3660	4. 68 555	4. 68 562	1 6	= 3960	4. 68 555	4. 68 563
1 2	= 3720	4. 68 555	4. 68 562	1 7	= 4020	4. 68 555	4. 68 563

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
400	60 206	217	228	239	249	260	271	282	293	304
401	314	325	336	347	358	369	379	390	401	412
402	423	433	444	455	466	477	487	498	509	520
403	531	541	552	563	574	584	595	606	617	627
404	638	649	660	670	681	692	703	713	724	735
405	746	756	767	778	788	799	810	821	831	842
406	853	863	874	885	895	906	917	927	938	949
407	959	970	981	991	*002	*013	*023	*034	*045	*055
408	61 066	077	087	098	109	119	130	140	151	162
409	172	183	194	204	215	225	236	247	257	268
410	278	289	300	310	321	331	342	352	363	374
411	384	395	405	416	426	437	448	458	469	479
412	490	500	511	521	532	542	553	563	574	584
413	595	606	616	627	637	648	658	669	679	690
414	700	711	721	731	742	752	763	773	784	794
415	805	815	826	836	847	857	868	878	888	899
416	909	920	930	941	951	962	972	982	993	*003
417	62 014	024	034	045	055	066	076	086	097	107
418	118	128	138	149	159	170	180	190	201	211
419	221	232	242	252	263	273	284	294	304	315
420	325	335	346	356	366	377	387	397	408	418
421	428	439	449	459	469	480	490	500	511	521
422	531	542	552	562	572	583	593	603	613	624
423	634	644	655	665	675	685	696	706	716	726
424	737	747	757	767	778	788	798	808	818	829
425	839	849	859	870	880	890	900	910	921	931
426	941	951	961	972	982	992	*002	*012	*022	*033
427	63 043	053	063	073	083	094	104	114	124	134
428	144	155	165	175	185	195	205	215	225	236
429	246	256	266	276	286	296	306	317	327	337
430	347	357	367	377	387	397	407	417	428	438
431	448	458	468	478	488	498	508	518	528	538
432	548	558	568	579	589	599	609	619	629	639
433	649	659	669	679	689	699	709	719	729	739
434	749	759	769	779	789	799	809	819	829	839
435	849	859	869	879	889	899	909	919	929	939
436	949	959	969	979	988	998	*008	*018	*028	*038
437	64 048	058	068	078	088	098	108	118	128	137
438	147	157	167	177	187	197	207	217	227	237
439	246	256	266	276	286	296	306	316	326	335
440	345	355	365	375	385	395	404	414	424	434
441	444	454	464	473	483	493	503	513	523	532
442	542	552	562	572	582	591	601	611	621	631
443	640	650	660	670	680	689	699	709	719	729
444	738	748	758	768	777	787	797	807	816	826
445	836	846	856	865	875	885	895	904	914	924
446	933	943	953	963	972	982	992	*002	*011	*021
447	65 031	040	050	060	070	079	089	099	108	118
448	128	137	147	157	167	176	186	196	205	215
449	225	234	244	254	263	273	283	292	302	312
450	321	331	341	350	360	369	379	389	398	408
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	11
1	1,1
2	2,2
3	3,3
4	4,4
5	5,5
6	6,6
7	7,7
8	8,8
9	9,9

	10
1	1,0
2	2,0
3	3,0
4	4,0
5	5,0
6	6,0
7	7,0
8	8,0
9	9,0

	9
1	0,9
2	1,8
3	2,7
4	3,6
5	4,5
6	5,4
7	6,3
8	7,2
9	8,1

	S.	T.		S.	T.
1° 6′ = 3960″	S. 4. 68 555	T. 4. 68 563	1° 11′ = 4260″	S. 4. 68 554	T. 4. 68 564
1 7 = 4020	4. 68 555	4. 68 563	1 12 = 4320	4. 68 554	4. 68 564
1 8 = 4080	4. 68 555	4. 68 563	1 13 = 4380	4. 68 554	4. 68 564
1 9 = 4140	4. 68 555	4. 68 563	1 14 = 4440	4. 68 554	4. 68 564
1 10 = 4200	4. 68 554	4. 68 563	1 15 = 4500	4. 68 554	4. 68 564

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
450	65	321	331	341	350	360	369	379	389	398	408
451		418	427	437	447	456	466	475	485	495	504
452		514	523	533	543	552	562	571	581	591	600
453		610	619	629	639	648	658	667	677	686	696
454		706	715	725	734	744	753	763	772	782	792
455		801	811	820	830	839	849	858	868	877	887
456		896	906	916	925	935	944	954	963	973	982
457		992	*001	*011	*020	*030	*039	*049	*058	*068	*077
458	66	087	096	106	115	124	134	143	153	162	172
459		181	191	200	210	219	229	238	247	257	266
460		276	285	295	304	314	323	332	342	351	361
461		370	380	389	398	408	417	427	436	445	455
462		464	474	483	492	502	511	521	530	539	549
463		558	567	577	586	596	605	614	624	633	642
464		652	661	671	680	689	699	708	717	727	736
465		745	755	764	773	783	792	801	811	820	829
466		839	848	857	867	876	885	894	904	913	922
467		932	941	950	960	969	978	987	997	*006	*015
468	67	025	034	043	052	062	071	080	089	099	108
469		117	127	136	145	154	164	173	182	191	201
470		210	219	228	237	247	256	265	274	284	293
471		302	311	321	330	339	348	357	367	376	385
472		394	403	413	422	431	440	449	459	468	477
473		486	495	504	514	523	532	541	550	560	569
474		578	587	596	605	614	624	633	642	651	660
475		669	679	688	697	706	715	724	733	742	752
476		761	770	779	788	797	806	815	825	834	843
477		852	861	870	879	888	897	906	916	925	934
478		943	952	961	970	979	988	997	*006	*015	*024
479	68	034	043	052	061	070	079	088	097	106	115
480		124	133	142	151	160	169	178	187	196	205
481		215	224	233	242	251	260	269	278	287	296
482		305	314	323	332	341	350	359	368	377	386
483		395	404	413	422	431	440	449	458	467	476
484		485	494	502	511	520	529	538	547	556	565
485		574	583	592	601	610	619	628	637	646	655
486		664	673	681	690	699	708	717	726	735	744
487		753	762	771	780	789	797	806	815	824	833
488		842	851	860	869	878	886	895	904	913	922
489		931	940	949	958	966	975	984	993	*002	*011
490	69	020	028	037	046	055	064	073	082	090	099
491		108	117	126	135	144	152	161	170	179	188
492		197	205	214	223	232	241	249	258	267	276
493		285	294	302	311	320	329	338	346	355	364
494		373	381	390	399	408	417	425	434	443	452
495		461	469	478	487	496	504	513	522	531	539
496		548	557	566	574	583	592	601	609	618	627
497		636	644	653	662	671	679	688	697	705	714
498		723	732	740	749	758	767	775	784	793	801
499		810	819	827	836	845	854	862	871	880	888
500		897	906	914	923	932	940	949	958	966	975
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	10	9	8
1	1,0	0,9	0,8
2	2,0	1,8	1,6
3	3,0	2,7	2,4
4	4,0	3,6	3,2
5	5,0	4,5	4,0
6	6,0	5,4	4,8
7	7,0	6,3	5,6
8	8,0	7,2	6,4
9	9,0	8,1	7,2

	S.	T.		S.	T.
1° 15′ = 4500″	4. 68 554	4. 68 564	1° 20′ = 4800″	4. 68 554	4. 68 565
1 16 = 4560	4. 68 554	4. 68 565	1 21 = 4860	4. 68 553	4. 68 566
1 17 = 4620	4. 68 554	4. 68 565	1 22 = 4920	4. 68 553	4. 68 566
1 18 = 4680	4. 68 554	4. 68 565	1 23 = 4980	4. 68 553	4. 68 566
1 19 = 4740	4. 68 554	4. 68 565	1 24 = 5040	4. 68 553	4. 68 566

Table 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
500	69	897	906	914	923	932	940	949	958	966	975
501		984	992	*001	*010	*018	*027	*036	*044	*053	*062
502	70	070	079	088	096	105	114	122	131	140	148
503		157	165	174	183	191	200	209	217	226	234
504		243	252	260	269	278	286	295	303	312	321
505		329	338	346	355	364	372	381	389	398	406
506		415	424	432	441	449	458	467	475	484	492
507		501	509	518	526	535	544	552	561	569	578
508		586	595	603	612	621	629	638	646	655	663
509		672	680	689	697	706	714	723	731	740	749
510		757	766	774	783	791	800	808	817	825	834
511		842	851	859	868	876	885	893	902	910	919
512		927	935	944	952	961	969	978	986	995	*003
513	71	012	020	029	037	046	054	063	071	079	088
514		096	105	113	122	130	139	147	155	164	172
515		181	189	198	206	214	223	231	240	248	257
516		265	273	282	290	299	307	315	324	332	341
517		349	357	366	374	383	391	399	408	416	425
518		433	441	450	458	466	475	483	492	500	508
519		517	525	533	542	550	559	567	575	584	592
520		600	609	617	625	634	642	650	659	667	675
521		684	692	700	709	717	725	734	742	750	759
522		767	775	784	792	800	809	817	825	834	842
523		850	858	867	875	883	892	900	908	917	925
524		933	941	950	958	966	975	983	991	999	*008
525	72	016	024	032	041	049	057	066	074	082	090
526		099	107	115	123	132	140	148	156	165	173
527		181	189	198	206	214	222	230	239	247	255
528		263	272	280	288	296	304	313	321	329	337
529		346	354	362	370	378	387	395	403	411	419
530		428	436	444	452	460	469	477	485	493	501
531		509	518	526	534	542	550	558	567	575	583
532		591	599	607	616	624	632	640	648	656	665
533		673	681	689	697	705	713	722	730	738	746
534		754	762	770	779	787	795	803	811	819	827
535		835	843	852	860	868	876	884	892	900	908
536		916	925	933	941	949	957	965	973	981	989
537		997	*006	*014	*022	*030	*038	*046	*054	*062	*070
538	73	078	086	094	102	111	119	127	135	143	151
539		159	167	175	183	191	199	207	215	223	231
540		239	247	255	263	272	280	288	296	304	312
541		320	328	336	344	352	360	368	376	384	392
542		400	408	416	424	432	440	448	456	464	472
543		480	488	496	504	512	520	528	536	544	552
544		560	568	576	584	592	600	608	616	624	632
545		640	648	656	664	672	679	687	695	703	711
546		719	727	735	743	751	759	767	775	783	791
547		799	807	815	823	830	838	846	854	862	870
548		878	886	894	902	910	918	926	933	941	949
549		957	965	973	981	989	997	*005	*013	*020	*028
550	74	036	044	052	060	068	076	084	092	099	107
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	9
1	0,9
2	1,8
3	2,7
4	3,6
5	4,5
6	5,4
7	6,3
8	7,2
9	8,1

	8
1	0,8
2	1,6
3	2,4
4	3,2
5	4,0
6	4,8
7	5,6
8	6,4
9	7,2

	7
1	0,7
2	1,4
3	2,1
4	2,8
5	3,5
6	4,2
7	4,9
8	5,6
9	6,3

1° 23′ = 4980″	S. 4. 68 553	T. 4. 68 566	1° 28′ = 5280″	S. 4. 68 553	T. 4. 68 567
1 24 = 5040	4. 68 553	4. 68 566	1 29 = 5340	4. 68 553	4. 68 567
1 25 = 5100	4. 68 553	4. 68 566	1 30 = 5400	4. 68 553	4. 68 567
1 26 = 5160	4. 68 553	4. 68 567	1 31 = 5460	4. 68 552	4. 68 568
1 27 = 5220	4. 68 553	4. 68 567	1 32 = 5520	4. 68 552	4. 68 568

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
550	74 036	044	052	060	068	076	084	092	099	107
551	115	123	131	139	147	155	162	170	178	186
552	194	202	210	218	225	233	241	249	257	265
553	273	280	288	296	304	312	320	327	335	343
554	351	359	367	374	382	390	398	406	414	421
555	429	437	445	453	461	468	476	484	492	500
556	507	515	523	531	539	547	554	562	570	578
557	586	593	601	609	617	624	632	640	648	656
558	663	671	679	687	695	702	710	718	726	733
559	741	749	757	764	772	780	788	796	803	811
560	819	827	834	842	850	858	865	873	881	889
561	896	904	912	920	927	935	943	950	958	966
562	974	981	989	997	*005	*012	*020	*028	*035	*043
563	75 051	059	066	074	082	089	097	105	113	120
564	128	136	143	151	159	166	174	182	189	197
565	205	213	220	228	236	243	251	259	266	274
566	282	289	297	305	312	320	328	335	343	351
567	358	366	374	381	389	397	404	412	420	427
568	435	442	450	458	465	473	481	488	496	504
569	511	519	526	534	542	549	557	565	572	580
570	587	595	603	610	618	626	633	641	648	656
571	664	671	679	686	694	702	709	717	724	732
572	740	747	755	762	770	778	785	793	800	808
573	815	823	831	838	846	853	861	868	876	884
574	891	899	906	914	921	929	937	944	952	959
575	967	974	982	989	997	*005	*012	*020	*027	*035
576	76 042	050	057	065	072	080	087	095	103	110
577	118	125	133	140	148	155	163	170	178	185
578	193	200	208	215	223	230	238	245	253	260
579	268	275	283	290	298	305	313	320	328	335
580	343	350	358	365	373	380	388	395	403	410
581	418	425	433	440	448	455	462	470	477	485
582	492	500	507	515	522	530	537	545	552	559
583	567	574	582	589	597	604	612	619	626	634
584	641	649	656	664	671	678	686	693	701	708
585	716	723	730	738	745	753	760	768	775	782
586	790	797	805	812	819	827	834	842	849	856
587	864	871	879	886	893	901	908	916	923	930
588	938	945	953	960	967	975	982	989	997	*004
589	77 012	019	026	034	041	048	056	063	070	078
590	085	093	100	107	115	122	129	137	144	151
591	159	166	173	181	188	195	203	210	217	225
592	232	240	247	254	262	269	276	283	291	298
593	305	313	320	327	335	342	349	357	364	371
594	379	386	393	401	408	415	422	430	437	444
595	452	459	466	474	481	488	495	503	510	517
596	525	532	539	546	554	561	568	576	583	590
597	597	605	612	619	627	634	641	648	656	663
598	670	677	685	692	699	706	714	721	728	735
599	743	750	757	764	772	779	786	793	801	808
600	815	822	830	837	844	851	859	866	873	880
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	8
1	0,8
2	1,6
3	2,4
4	3,2
5	4,0
6	4,8
7	5,6
8	6,4
9	7,2

	7
1	0,7
2	1,4
3	2,1
4	2,8
5	3,5
6	4,2
7	4,9
8	5,6
9	6,3

	S.	T.		S.	T.
1° 31′ = 5460″	4. 68 552	4. 68 568	1° 36′ = 5760″	4. 68 552	4. 68 569
1 32 = 5520	4. 68 552	4. 68 568	1 37 = 5820	4. 68 552	4. 68 569
1 33 = 5580	4. 68 552	4. 68 568	1 38 = 5880	4. 68 552	4. 68 569
1 34 = 5640	4. 68 552	4. 68 568	1 39 = 5940	4. 68 551	4. 68 569
1 35 = 5700	4. 68 552	4. 68 569	1 40 = 6000	4. 68 551	4. 68 570

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
600	77	815	822	830	837	844	851	859	866	873	880
601		887	895	902	909	916	924	931	938	945	952
602		960	967	974	981	988	996	*003	*010	*017	*025
603	78	032	039	046	053	061	068	075	082	089	097
604		104	111	118	125	132	140	147	154	161	168
605		176	183	190	197	204	211	219	226	233	240
606		247	254	262	269	276	283	290	297	305	312
607		319	326	333	340	347	355	362	369	376	383
608		390	398	405	412	419	426	433	440	447	455
609		462	469	476	483	490	497	504	512	519	526
610		533	540	547	554	561	569	576	583	590	597
611		604	611	618	625	633	640	647	654	661	668
612		675	682	689	696	704	711	718	725	732	739
613		746	753	760	767	774	781	789	796	803	810
614		817	824	831	838	845	852	859	866	873	880
615		888	895	902	909	916	923	930	937	944	951
616		958	965	972	979	986	993	*000	*007	*014	*021
617	79	029	036	043	050	057	064	071	078	085	092
618		099	106	113	120	127	134	141	148	155	162
619		169	176	183	190	197	204	211	218	225	232
620		239	246	253	260	267	274	281	288	295	302
621		309	316	323	330	337	344	351	358	365	372
622		379	386	393	400	407	414	421	428	435	442
623		449	456	463	470	477	484	491	498	505	511
624		518	525	532	539	546	553	560	567	574	581
625		588	595	602	609	616	623	630	637	644	650
626		657	664	671	678	685	692	699	706	713	720
627		727	734	741	748	754	761	768	775	782	789
628		796	803	810	817	824	831	837	844	851	858
629		865	872	879	886	893	900	906	913	920	927
630		934	941	948	955	962	969	975	982	989	996
631	80	003	010	017	024	030	037	044	051	058	065
632		072	079	085	092	099	106	113	120	127	134
633		140	147	154	161	168	175	182	188	195	202
634		209	216	223	229	236	243	250	257	264	271
635		277	284	291	298	305	312	318	325	332	339
636		346	353	359	366	373	380	387	393	400	407
637		414	421	428	434	441	448	455	462	468	475
638		482	489	496	502	509	516	523	530	536	543
639		550	557	564	570	577	584	591	598	604	611
640		618	625	632	638	645	652	659	665	672	679
641		686	693	699	706	713	720	726	733	740	747
642		754	760	767	774	781	787	794	801	808	814
643		821	828	835	841	848	855	862	868	875	882
644		889	895	902	909	916	922	929	936	943	949
645		956	963	969	976	983	990	996	*003	*010	*017
646	81	023	030	037	043	050	057	064	070	077	084
647		090	097	104	111	117	124	131	137	144	151
648		158	164	171	178	184	191	198	204	211	218
649		224	231	238	245	251	258	265	271	278	285
650		291	298	305	311	318	325	331	338	345	351
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	8	7	6
1	0,8	0,7	0,6
2	1,6	1,4	1,2
3	2,4	2,1	1,8
4	3,2	2,8	2,4
5	4,0	3,5	3,0
6	4,8	4,2	3,6
7	5,6	4,9	4,2
8	6,4	5,6	4,8
9	7,2	6,3	5,4

	S.	T.		S.	T.
1° 40′ = 6000″	4. 68 551	4. 68 570	1° 45′ = 6300″	4. 68 551	4. 68 571
1 41 = 6060	4. 68 551	4. 68 570	1 46 = 6360	4. 68 551	4. 68 571
1 42 = 6120	4. 68 551	4. 68 570	1 47 = 6420	4. 68 550	4. 68 572
1 43 = 6180	4. 68 551	4. 68 570	1 48 = 6480	4. 68 550	4. 68 572
1 44 = 6240	4. 68 551	4. 68 571	1 49 = 6540	4. 68 550	4. 68 572

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9
650	81	291	298	305	311	318	325	331	338	345	351
651		358	365	371	378	385	391	398	405	411	418
652		425	431	438	445	451	458	465	471	478	485
653		491	498	505	511	518	525	531	538	544	551
654		558	564	571	578	584	591	598	604	611	617
655		624	631	637	644	651	657	664	671	677	684
656		690	697	704	710	717	723	730	737	743	750
657		757	763	770	776	783	790	796	803	809	816
658		823	829	836	842	849	856	862	869	875	882
659		889	895	902	908	915	921	928	935	941	948
660		954	961	968	974	981	987	994	*000	*007	*014
661	82	020	027	033	040	046	053	060	066	073	079
662		086	092	099	105	112	119	125	132	138	145
663		151	158	164	171	178	184	191	197	204	210
664		217	223	230	236	243	249	256	263	269	276
665		282	289	295	302	308	315	321	328	334	341
666		347	354	360	367	373	380	387	393	400	406
667		413	419	426	432	439	445	452	458	465	471
668		478	484	491	497	504	510	517	523	530	536
669		543	549	556	562	569	575	582	588	595	601
670		607	614	620	627	633	640	646	653	659	666
671		672	679	685	692	698	705	711	718	724	730
672		737	743	750	756	763	769	776	782	789	795
673		802	808	814	821	827	834	840	847	853	860
674		866	872	879	885	892	898	905	911	918	924
675		930	937	943	950	956	963	969	975	982	988
676		995	*001	*008	*014	*020	*027	*033	*040	*046	*052
677	83	059	065	072	078	085	091	097	104	110	117
678		123	129	136	142	149	155	161	168	174	181
679		187	193	200	206	213	219	225	232	238	245
680		251	257	264	270	276	283	289	296	302	308
681		315	321	327	334	340	347	353	359	366	372
682		378	385	391	398	404	410	417	423	429	436
683		442	448	455	461	467	474	480	487	493	499
684		506	512	518	525	531	537	544	550	556	563
685		569	575	582	588	594	601	607	613	620	626
686		632	639	645	651	658	664	670	677	683	689
687		696	702	708	715	721	727	734	740	746	753
688		759	765	771	778	784	790	797	803	809	816
689		822	828	835	841	847	853	860	866	872	879
690		885	891	897	904	910	916	923	929	935	942
691		948	954	960	967	973	979	985	992	998	*004
692	84	011	017	023	029	036	042	048	055	061	067
693		073	080	086	092	098	105	111	117	123	130
694		136	142	148	155	161	167	173	180	186	192
695		198	205	211	217	223	230	236	242	248	255
696		261	267	273	280	286	292	298	305	311	317
697		323	330	336	342	348	354	361	367	373	379
698		386	392	398	404	410	417	423	429	435	442
699		448	454	460	466	473	479	485	491	497	504
700		510	516	522	528	535	541	547	553	559	566
N.	L.	0	1	2	3	4	5	6	7	8	9

P. P.

	7
1	0,7
2	1,4
3	2,1
4	2,8
5	3,5
6	4,2
7	4,9
8	5,6
9	6,3

	6
1	0,6
2	1,2
3	1,8
4	2,4
5	3,0
6	3,6
7	4,2
8	4,8
9	5,4

	S.	T.		S.	T.
1° 48′ = 6480″	4. 68 550	4. 68 572	1° 53′ = 6780″	4. 68 550	4. 68 573
1 49 = 6540	4. 68 550	4. 68 572	1 54 = 6840	4. 68 550	4. 68 573
1 50 = 6600	4. 68 550	4. 68 572	1 55 = 6900	4. 68 549	4. 68 574
1 51 = 6660	4. 68 550	4. 68 573	1 56 = 6960	4. 68 549	4. 68 574
1 52 = 6720	4. 68 550	4. 68 573	1 57 = 7020	4. 68 549	4. 68 574

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
700	84 510	516	522	528	535	541	547	553	559	566
701	572	578	584	590	597	603	609	615	621	628
702	634	640	646	652	658	665	671	677	683	689
703	696	702	708	714	720	726	733	739	745	751
704	757	763	770	776	782	788	794	800	807	813
705	819	825	831	837	844	850	856	862	868	874
706	880	887	893	899	905	911	917	924	930	936
707	942	948	954	960	967	973	979	985	991	997
708	85 003	009	016	022	028	034	040	046	052	058
709	065	071	077	083	089	095	101	107	114	120
710	126	132	138	144	150	156	163	169	175	181
711	187	193	199	205	211	217	224	230	236	242
712	248	254	260	266	272	278	285	291	297	303
713	309	315	321	327	333	339	345	352	358	364
714	370	376	382	388	394	400	406	412	418	425
715	431	437	443	449	455	461	467	473	479	485
716	491	497	503	509	516	522	528	534	540	546
717	552	558	564	570	576	582	588	594	600	606
718	612	618	625	631	637	643	649	655	661	667
719	673	679	685	691	697	703	709	715	721	727
720	733	739	745	751	757	763	769	775	781	788
721	794	800	806	812	818	824	830	836	842	848
722	854	860	866	872	878	884	890	896	902	908
723	914	920	926	932	938	944	950	956	962	968
724	974	980	986	992	998	*004	*010	*016	*022	*028
725	86 034	040	046	052	058	064	070	076	082	088
726	094	100	106	112	118	124	130	136	141	147
727	153	159	165	171	177	183	189	195	201	207
728	213	219	225	231	237	243	249	255	261	267
729	273	279	285	291	297	303	308	314	320	326
730	332	338	344	350	356	362	368	374	380	386
731	392	398	404	410	415	421	427	433	439	445
732	451	457	463	469	475	481	487	493	499	504
733	510	516	522	528	534	540	546	552	558	564
734	570	576	581	587	593	599	605	611	617	623
735	629	635	641	646	652	658	664	670	676	682
736	688	694	700	705	711	717	723	729	735	741
737	747	753	759	764	770	776	782	788	794	800
738	806	812	817	823	829	835	841	847	853	859
739	864	870	876	882	888	894	900	906	911	917
740	923	929	935	941	947	953	958	964	970	976
741	982	988	994	999	*005	*011	*017	*023	*029	*035
742	87 040	046	052	058	064	070	075	081	087	093
743	099	105	111	116	122	128	134	140	146	151
744	157	163	169	175	181	186	192	198	204	210
745	216	221	227	233	239	245	251	256	262	268
746	274	280	286	291	297	303	309	315	320	326
747	332	338	344	349	355	361	367	373	379	384
748	390	396	402	408	413	419	425	431	437	442
749	448	454	460	466	471	477	483	489	495	500
750	506	512	518	523	529	535	541	547	552	558
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	7	6	5
1	0,7	0,6	0,5
2	1,4	1,2	1,0
3	2,1	1,8	1,5
4	2,8	2,4	2,0
5	3,5	3,0	2,5
6	4,2	3,6	3,0
7	4,9	4,2	3,5
8	5,6	4,8	4,0
9	6,3	5,4	4,5

1° 56′ = 6960″	S. 4. 68 549	T. 4. 68 574	2° 1′ = 7260″	S. 4. 68 549	T. 4. 68 575
1 57 = 7020	4. 68 549	4. 68 574	2 2 = 7320	4. 68 548	4. 68 576
1 58 = 7080	4. 68 549	4. 68 575	2 3 = 7380	4. 68 548	4. 68 576
1 59 = 7140	4. 68 549	4. 68 575	2 4 = 7440	4. 68 548	4. 68 576
2 0 = 7200	4. 68 549	4. 68 575	2 5 = 7500	4. 68 548	4. 68 577

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
750	87 506	512	518	523	529	535	541	547	552	558
751	564	570	576	581	587	593	599	604	610	616
752	622	628	633	639	645	651	656	662	668	674
753	679	685	691	697	703	708	714	720	726	731
754	737	743	749	754	760	766	772	777	783	789
755	795	800	806	812	818	823	829	835	841	846
756	852	858	864	869	875	881	887	892	898	904
757	910	915	921	927	933	938	944	950	955	961
758	967	973	978	984	990	996	*001	*007	*013	*018
759	88 024	030	036	041	047	053	058	064	070	076
760	081	087	093	098	104	110	116	121	127	133
761	138	144	150	156	161	167	173	178	184	190
762	195	201	207	213	218	224	230	235	241	247
763	252	258	264	270	275	281	287	292	298	304
764	309	315	321	326	332	338	343	349	355	360
765	366	372	377	383	389	395	400	406	412	417
766	423	429	434	440	446	451	457	463	468	474
767	480	485	491	497	502	508	513	519	525	530
768	536	542	547	553	559	564	570	576	581	587
769	593	598	604	610	615	621	627	632	638	643
770	649	655	660	666	672	677	683	689	694	700
771	705	711	717	722	728	734	739	745	750	756
772	762	767	773	779	784	790	795	801	807	812
773	818	824	829	835	840	846	852	857	863	868
774	874	880	885	891	897	902	908	913	919	925
775	930	936	941	947	953	958	964	969	975	981
776	986	992	997	*003	*009	*014	*020	*025	*031	*037
777	89 042	048	053	059	064	070	076	081	087	092
778	098	104	109	115	120	126	131	137	143	148
779	154	159	165	170	176	182	187	193	198	204
780	209	215	221	226	232	237	243	248	254	260
781	265	271	276	282	287	293	298	304	310	315
782	321	326	332	337	343	348	354	360	365	371
783	376	382	387	393	398	404	409	415	421	426
784	432	437	443	448	454	459	465	470	476	481
785	487	492	498	504	509	515	520	526	531	537
786	542	548	553	559	564	570	575	581	586	592
787	597	603	609	614	620	625	631	636	642	647
788	653	658	664	669	675	680	686	691	697	702
789	708	713	719	724	730	735	741	746	752	757
790	763	768	774	779	785	790	796	801	807	812
791	818	823	829	834	840	845	851	856	862	867
792	873	878	883	889	894	900	905	911	916	922
793	927	933	938	944	949	955	960	966	971	977
794	982	988	993	998	*004	*009	*015	*020	*026	*031
795	90 037	042	048	053	059	064	069	075	080	086
796	091	097	102	108	113	119	124	129	135	140
797	146	151	157	162	168	173	179	184	189	195
798	200	206	211	217	222	227	233	238	244	249
799	255	260	266	271	276	282	287	293	298	304
800	309	314	320	325	331	336	342	347	352	358
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	6
1	0,6
2	1,2
3	1,8
4	2,4
5	3,0
6	3,6
7	4,2
8	4,8
9	5,4

	5
1	0,5
2	1,0
3	1,5
4	2,0
5	2,5
6	3,0
7	3,5
8	4,0
9	4,5

2° 5′ = 7500″	S. 4. 68 548	T. 4. 68 577	2° 10′ = 7800″	S. 4. 68 547	T. 4. 68 578
2 6 = 7560	4. 68 548	4. 68 577	2 11 = 7860	4. 68 547	4. 68 579
2 7 = 7620	4. 68 548	4. 68 577	2 12 = 7920	4. 68 547	4. 68 579
2 8 = 7680	4. 68 547	4. 68 578	2 13 = 7980	4. 68 547	4. 68 579
2 9 = 7740	4. 68 547	4. 68 578	2 14 = 8040	4. 68 546	4. 68 579

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
800	90 309	314	320	325	331	336	342	347	352	358
801	363	369	374	380	385	390	396	401	407	412
802	417	423	428	434	439	445	450	455	461	466
803	472	477	482	488	493	499	504	509	515	520
804	526	531	536	542	547	553	558	563	569	574
805	580	585	590	596	601	607	612	617	623	628
806	634	639	644	650	655	660	666	671	677	682
807	687	693	698	703	709	714	720	725	730	736
808	741	747	752	757	763	768	773	779	784	789
809	795	800	806	811	816	822	827	832	838	843
810	849	854	859	865	870	875	881	886	891	897
811	902	907	913	918	924	929	934	940	945	950
812	956	961	966	972	977	982	988	993	998	*004
813	91 009	014	020	025	030	036	041	046	052	057
814	062	068	073	078	084	089	094	100	105	110
815	116	121	126	132	137	142	148	153	158	164
816	169	174	180	185	190	196	201	206	212	217
817	222	228	233	238	243	249	254	259	265	270
818	275	281	286	291	297	302	307	312	318	323
819	328	334	339	344	350	355	360	365	371	376
820	381	387	392	397	403	408	413	418	424	429
821	434	440	445	450	455	461	466	471	477	482
822	487	492	498	503	508	514	519	524	529	535
823	540	545	551	556	561	566	572	577	582	587
824	593	598	603	609	614	619	624	630	635	640
825	645	651	656	661	666	672	677	682	687	693
826	698	703	709	714	719	724	730	735	740	745
827	751	756	761	766	772	777	782	787	793	798
828	803	808	814	819	824	829	834	840	845	850
829	855	861	866	871	876	882	887	892	897	903
830	908	913	918	924	929	934	939	944	950	955
831	960	965	971	976	981	986	991	997	*002	*007
832	92 012	018	023	028	033	038	044	049	054	059
833	065	070	075	080	085	091	096	101	106	111
834	117	122	127	132	137	143	148	153	158	163
835	169	174	179	184	189	195	200	205	210	215
836	221	226	231	236	241	247	252	257	262	267
837	273	278	283	288	293	298	304	309	314	319
838	324	330	335	340	345	350	355	361	366	371
839	376	381	387	392	397	402	407	412	418	423
840	428	433	438	443	449	454	459	464	469	474
841	480	485	490	495	500	505	511	516	521	526
842	531	536	542	547	552	557	562	567	572	578
843	583	588	593	598	603	609	614	619	624	629
844	634	639	645	650	655	660	665	670	675	681
845	686	691	696	701	706	711	716	722	727	732
846	737	742	747	752	758	763	768	773	778	783
847	788	793	799	804	809	814	819	824	829	834
848	840	845	850	855	860	865	870	875	881	886
849	891	896	901	906	911	916	921	927	932	937
850	942	947	952	957	962	967	973	978	983	988
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	6
1	0,6
2	1,2
3	1,8
4	2,4
5	3,0
6	3,6
7	4,2
8	4,8
9	5,4

	5
1	0,5
2	1,0
3	1,5
4	2,0
5	2,5
6	3,0
7	3,5
8	4,0
9	4,5

	S.	T.
2° 13′ = 7980″	S. 4. 68 547	T. 4. 68 579
2 14 = 8040	4. 68 546	4. 68 579
2 15 = 8100	4. 68 546	4. 68 580
2 16 = 8160	4. 68 546	4. 68 580
2 17 = 8220	4. 68 546	4. 68 580
2° 18′ = 8280″	S. 4. 68 546	T. 4. 68 581
2 19 = 8340	4. 68 546	4. 68 581
2 20 = 8400	4. 68 545	4. 68 582
2 21 = 8460	4. 68 545	4. 68 582
2 22 = 8520	4. 68 545	4. 68 582

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
850	92 942	947	952	957	962	967	973	978	983	988
851	993	998	*003	*008	*013	*018	*024	*029	*034	*039
852	93 044	049	054	059	064	069	075	080	085	090
853	095	100	105	110	115	120	125	131	136	141
854	146	151	156	161	166	171	176	181	186	192
855	197	202	207	212	217	222	227	232	237	242
856	247	252	258	263	268	273	278	283	288	293
857	298	303	308	313	318	323	328	334	339	344
858	349	354	359	364	369	374	379	384	389	394
859	399	404	409	414	420	425	430	435	440	445
860	450	455	460	465	470	475	480	485	490	495
861	500	505	510	515	520	526	531	536	541	546
862	551	556	561	566	571	576	581	586	591	596
863	601	606	611	616	621	626	631	636	641	646
864	651	656	661	666	671	676	682	687	692	697
865	702	707	712	717	722	727	732	737	742	747
866	752	757	762	767	772	777	782	787	792	797
867	802	807	812	817	822	827	832	837	842	847
868	852	857	862	867	872	877	882	887	892	897
869	902	907	912	917	922	927	932	937	942	947
870	952	957	962	967	972	977	982	987	992	997
871	94 002	007	012	017	022	027	032	037	042	047
872	052	057	062	067	072	077	082	086	091	096
873	101	106	111	116	121	126	131	136	141	146
874	151	156	161	166	171	176	181	186	191	196
875	201	206	211	216	221	226	231	236	240	245
876	250	255	260	265	270	275	280	285	290	295
877	300	305	310	315	320	325	330	335	340	345
878	349	354	359	364	369	374	379	384	389	394
879	399	404	409	414	419	424	429	433	438	443
880	448	453	458	463	468	473	478	483	488	493
881	498	503	507	512	517	522	527	532	537	542
882	547	552	557	562	567	571	576	581	586	591
883	596	601	606	611	616	621	626	630	635	640
884	645	650	655	660	665	670	675	680	685	689
885	694	699	704	709	714	719	724	729	734	738
886	743	748	753	758	763	768	773	778	783	787
887	792	797	802	807	812	817	822	827	832	836
888	841	846	851	856	861	866	871	876	880	885
889	890	895	900	905	910	915	919	924	929	934
890	939	944	949	954	959	963	968	973	978	983
891	988	993	998	*002	*007	*012	*017	*022	*027	*032
892	95 036	041	046	051	056	061	066	071	075	080
893	085	090	095	100	105	109	114	119	124	129
894	134	139	143	148	153	158	163	168	173	177
895	182	187	192	197	202	207	211	216	221	226
896	231	236	240	245	250	255	260	265	270	274
897	279	284	289	294	299	303	308	313	318	323
898	328	332	337	342	347	352	357	361	366	371
899	376	381	386	390	395	400	405	410	415	419
900	424	429	434	439	444	448	453	458	463	468
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	6	5	4
1	0,6	0,5	0,4
2	1,2	1,0	0,8
3	1,8	1,5	1,2
4	2,4	2,0	1,6
5	3,0	2,5	2,0
6	3,6	3,0	2,4
7	4,2	3,5	2,8
8	4,8	4,0	3,2
9	5,4	4,5	3,6

2° 21′ = 8460″	S. 4. 68 545	T. 4. 68 582	2° 26′ = 8760″	S. 4. 68 544	T 4. 68 584
2 22 = 8520	4. 68 545	4. 68 582	2 27 = 8820	4. 68 544	4. 68 584
2 23 = 8580	4. 68 545	4. 68 583	2 28 = 8880	4. 68 544	4. 68 584
2 24 = 8640	4. 68 545	4. 68 583	2 29 = 8940	4. 68 544	4. 68 585
2 25 = 8700	4. 68 545	4. 68 583	2 30 = 9000	4. 68 544	4. 68 585

TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L. 0	1	2	3	4	5	6	7	8	9
900	95 424	429	434	439	444	448	453	458	463	468
901	472	477	482	487	492	497	501	506	511	516
902	521	525	530	535	540	545	550	554	559	564
903	569	574	578	583	588	593	598	602	607	612
904	617	622	626	631	636	641	646	650	655	660
905	665	670	674	679	684	689	694	698	703	708
906	713	718	722	727	732	737	742	746	751	756
907	761	766	770	775	780	785	789	794	799	804
908	809	813	818	823	828	832	837	842	847	852
909	856	861	866	871	875	880	885	890	895	899
910	904	909	914	918	923	928	933	938	942	947
911	952	957	961	966	971	976	980	985	990	995
912	999	*004	*009	*014	*019	*023	*028	*033	*038	*042
913	96 047	052	057	061	066	071	076	080	085	090
914	095	099	104	109	114	118	123	128	133	137
915	142	147	152	156	161	166	171	175	180	185
916	190	194	199	204	209	213	218	223	227	232
917	237	242	246	251	256	261	265	270	275	280
918	284	289	294	298	303	308	313	317	322	327
919	332	336	341	346	350	355	360	365	369	374
920	379	384	388	393	398	402	407	412	417	421
921	426	431	435	440	445	450	454	459	464	468
922	473	478	483	487	492	497	501	506	511	515
923	520	525	530	534	539	544	548	553	558	562
924	567	572	577	581	586	591	595	600	605	609
925	614	619	624	628	633	638	642	647	652	656
926	661	666	670	675	680	685	689	694	699	703
927	708	713	717	722	727	731	736	741	745	750
928	755	759	764	769	774	778	783	788	792	797
929	802	806	811	816	820	825	830	834	839	844
930	848	853	858	862	867	872	876	881	886	890
931	895	900	904	909	914	918	923	928	932	937
932	942	946	951	956	960	965	970	974	979	984
933	988	993	997	*002	*007	*011	*016	*021	*025	*030
934	97 035	039	044	049	053	058	063	067	072	077
935	081	086	090	095	100	104	109	114	118	123
936	128	132	137	142	146	151	155	160	165	169
937	174	179	183	188	192	197	202	206	211	216
938	220	225	230	234	239	243	248	253	257	262
939	267	271	276	280	285	290	294	299	304	308
940	313	317	322	327	331	336	340	345	350	354
941	359	364	368	373	377	382	387	391	396	400
942	405	410	414	419	424	428	433	437	442	447
943	451	456	460	465	470	474	479	483	488	493
944	497	502	506	511	516	520	525	529	534	539
945	543	548	552	557	562	566	571	575	580	585
946	589	594	598	603	607	612	617	621	626	630
947	635	640	644	649	653	658	663	667	672	676
948	681	685	690	695	699	704	708	713	717	722
949	727	731	736	740	745	749	754	759	763	768
950	772	777	782	786	791	795	800	804	809	813
N.	L. 0	1	2	3	4	5	6	7	8	9

P. P.

	5
1	0,5
2	1,0
3	1,5
4	2,0
5	2,5
6	3,0
7	3,5
8	4,0
9	4,5

	4
1	0,4
2	0,8
3	1,2
4	1,6
5	2,0
6	2,4
7	2,8
8	3,2
9	3,6

	S.	T.		S.	T.
2° 30′ = 9000″	4. 68 544	4. 68 585	2° 35′ = 9300″	4. 68 543	4. 68 587
2 31 = 9060	4. 68 544	4. 68 585	2 36 = 9360	4. 68 543	4. 68 587
2 32 = 9120	4. 68 543	4. 68 586	2 37 = 9420	4. 68 542	4. 68 588
2 33 = 9180	4. 68 543	4. 68 586	2 38 = 9480	4. 68 542	4. 68 588
2 34 = 9240	4. 68 543	4. 68 587	2 39 = 9540	4. 68 542	4. 68 588

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TABLE 21.—*Five-place logarithms of natural numbers*—Continued.

N.	L.	0	1	2	3	4	5	6	7	8	9	P. P.
950	97	772	777	782	786	791	795	800	804	809	813	
951		818	823	827	832	836	841	845	850	855	859	
952		864	868	873	877	882	886	891	896	900	905	
953		909	914	918	923	928	932	937	941	946	950	
954		955	959	964	968	973	978	982	987	991	996	
955	98	000	005	009	014	019	023	028	032	037	041	
956		046	050	055	059	064	068	073	078	082	087	
957		091	096	100	105	109	114	118	123	127	132	
958		137	141	146	150	155	159	164	168	173	177	
959		182	186	191	195	200	204	209	214	218	223	
960		227	232	236	241	245	250	254	259	263	268	
961		272	277	281	286	290	295	299	304	308	313	5
962		318	322	327	331	336	340	345	349	354	358	1 | 0,5
963		363	367	372	376	381	385	390	394	399	403	2 | 1,0
964		408	412	417	421	426	430	435	439	444	448	3 | 1,5
965		453	457	462	466	471	475	480	484	489	493	4 | 2,0
966		498	502	507	511	516	520	525	529	534	538	5 | 2,5
967		543	547	552	556	561	565	570	574	579	583	6 | 3,0
968		588	592	597	601	605	610	614	619	623	628	7 | 3,5
969		632	637	641	646	650	655	659	664	668	673	8 | 4,0
970		677	682	686	691	695	700	704	709	713	717	9 | 4,5
971		722	726	731	735	740	744	749	753	758	762	
972		767	771	776	780	784	789	793	798	802	807	
973		811	816	820	825	829	834	838	843	847	851	
974		856	860	865	869	874	878	883	887	892	896	
975		900	905	909	914	918	923	927	932	936	941	
976		945	949	954	958	963	967	972	976	981	985	
977		989	994	998	*003	*007	*012	*016	*021	*025	*029	
978	99	034	038	043	047	052	056	061	065	069	074	
979		078	083	087	092	096	100	105	109	114	118	
980		123	127	131	136	140	145	149	154	158	162	
981		167	171	176	180	185	189	193	198	202	207	4
982		211	216	220	224	229	233	238	242	247	251	1 | 0,4
983		255	260	264	269	273	277	282	286	291	295	2 | 0,8
984		300	304	308	313	317	322	326	330	335	339	3 | 1,2
985		344	348	352	357	361	366	370	374	379	383	4 | 1,6
986		388	392	396	401	405	410	414	419	423	427	5 | 2,0
987		432	436	441	445	449	454	458	463	467	471	6 | 2,4
988		476	480	484	489	493	498	502	506	511	515	7 | 2,8
989		520	524	528	533	537	542	546	550	555	559	8 | 3,2
990		564	568	572	577	581	585	590	594	599	603	9 | 3,6
991		607	612	616	621	625	629	634	638	642	647	
992		651	656	660	664	669	673	677	682	686	691	
993		695	699	704	708	712	717	721	726	730	734	
994		739	743	747	752	756	760	765	769	774	778	
995		782	787	791	795	800	804	808	813	817	822	
996		826	830	835	839	843	848	852	856	861	865	
997		870	874	878	883	887	891	896	900	904	909	
998		913	917	922	926	930	935	939	944	948	952	
999		957	961	965	970	974	978	983	987	991	996	
1000	00	000	004	009	013	017	022	026	030	035	039	
N.	L.	0	1	2	3	4	5	6	7	8	9	P. P.

2° 38′ = 9480″	S. 4. 68 542	T. 4. 68 588		2° 43′ = 9780″	S. 4. 68 541	T. 4. 68 590
2 39 = 9540	4. 68 542	4. 68 588		2 44 = 9840	4. 68 541	4. 68 590
2 40 = 9600	4. 68 542	4. 68 589		2 45 = 9900	4. 68 541	4. 68 591
2 41 = 9660	4. 68 542	4. 68 589		2 46 = 9960	4. 68 541	4. 68 591
2 42 = 9720	4. 68 541	4. 68 590		2 47 = 10020	4. 68 540	4. 68 592

Formula for using quantities S and T:

$$\log \sin a = \log a'' + S.$$
$$\log \tan a = \log a'' + T.$$
$$\log \cot a = \text{a. c. } \log a'' + \text{a. c. } \log T.$$

$$\log a'' = \log \sin a - S = \log \tan a - T.$$

$$\log \cos a = \log (90^\circ - a)'' + S.$$
$$\log \cot a = \log (90^\circ - a)'' + T.$$
$$\log \tan a = \text{a. c. } \log (90^\circ - a)'' + \text{a. c. } \log T.$$

$$\log (90^\circ - a)'' = \log \cos a - S = \log \cot a - T.$$

TABLE 22.—*Five-place logarithms of circular functions, expressed in arc and time.*

0h **0°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	′	m.	s.
0	0	**0**	—		—		—	0.00 000	**60**	60	0
	4	1	6.46 373		6.46 373		3.53 627	0.00 000	59		56
	8	2	6.76 476	30103	6.76 476	30103	3.23 524	0.00 000	58		52
	12	3	6.94 085	17609	6.94 085	17609	3.05 915	0.00 000	57		48
	16	4	7.06 579	12494	7.06 579	12494	2.93 421	0.00 000	56		44
0	20	5	7.16 270	9691	7.16 270	9691	2.83 730	0.00 000	55	59	40
	24	6	7.24 188	7918	7.24 188	7918	2.75 812	0.00 000	54		36
	28	7	7.30 882	6694	7.30 882	6694	2.69 118	0.00 000	53		32
	32	8	7.36 682	5800	7.36 682	5800	2.63 318	0.00 000	52		28
	36	9	7.41 797	5115	7.41 797	5115	2.58 203	0.00 000	51		24
0	40	**10**	7.46 373	4576	7.46 373	4576	2.53 627	0.00 000	**50**	59	20
	44	11	7.50 512	4139	7.50 512	4139	2.49 488	0.00 000	49		16
	48	12	7.54 291	3779	7.54 291	3779	2.45 709	0.00 000	48		12
	52	13	7.57 767	3476	7.57 767	3476	2.42 233	0.00 000	47		8
	56	14	7.60 985	3218	7.60 986	3219	2.39 014	0.00 000	46		4
1	0	15	7.63 982	2997	7.63 982	2996	2.36 018	0.00 000	45	59	0
	4	16	7.66 784	2802	7.66 785	2803	2.33 215	0.00 000	44		56
	8	17	7.69 417	2633	7.69 418	2633	2.30 582	9.99 999	43		52
	12	18	7.71 900	2483	7.71 900	2482	2.28 100	9.99 999	22		48
	16	19	7.74 248	2348	7.74 248	2348	2.25 752	9.99 999	41		44
1	20	**20**	7.76 475	2227	7.76 476	2228	2.23 524	9.99 999	**40**	58	40
	24	21	7.78 594	2119	7.78 595	2119	2.21 405	9.99 999	39		36
	28	22	7.80 615	2021	7.80 615	2020	2.19 385	9.99 999	38		32
	32	23	7.82 545	1930	7.82 546	1931	2.17 454	9.99 999	37		28
	36	24	7.84 393	1848	7.84 394	1848	2.15 606	9.99 999	36		24
1	40	25	7.86 166	1773	7.86 167	1773	2.13 833	9.99 999	35	58	20
	44	26	7.87 870	1704	7.87 871	1704	2.12 129	9.99 999	34		16
	48	27	7.89 509	1639	7.89 510	1639	2.10 490	9.99 999	33		12
	52	28	7.91 088	1579	7.91 089	1579	2.08 911	9.99 999	32		8
	56	29	7.92 612	1524	7.92 613	1524	2.07 387	9.99 998	31		4
2	0	**30**	7.94 084	1472	7.94 086	1473	2.05 914	9.99 998	**30**	58	0
	4	31	7.95 508	1424	7.95 510	1424	2.04 490	9.99 998	29		56
	8	32	7.96 887	1379	7.96 889	1379	2.03 111	9.99 998	28		52
	12	33	7.98 223	1336	7.98 225	1336	2.01 775	9.99 998	27		48
	16	34	7.99 520	1297	7.99 522	1297	2.00 478	9.99 998	26		44
2	20	35	8.00 779	1259	8.00 781	1259	1.99 219	9.99 998	25	57	40
	24	36	8.02 002	1223	8.02 004	1223	1.97 996	9.99 998	24		36
	28	37	8.03 192	1190	8.03 194	1190	1.96 806	9.99 997	23		32
	32	38	8.04 350	1158	8.04 353	1159	1.95 647	9.99 997	22		28
	36	39	8.05 478	1128	8.05 481	1128	1.94 519	9.99 997	21		24
2	40	**40**	8.06 578	1100	8.06 581	1100	1.93 419	9.99 997	**20**	57	20
	44	41	8.07 650	1072	8.07 653	1072	1.92 347	9.99 997	19		16
	48	42	8.08 696	1046	8.08 700	1047	1.91 300	9.99 997	18		12
	52	43	8.09 718	1022	8.09 722	1022	1.90 278	9.99 997	17		8
	56	44	8.10 717	999	8.10 720	998	1.89 280	9.99 996	16		4
3	0	45	8.11 693	976	8.11 696	976	1.88 304	9.99 996	15	57	0
	4	46	8.12 647	954	8.12 651	955	1.87 349	9.99 996	14		56
	8	47	8.13 581	934	8.13 585	934	1.86 415	9.99 996	13		52
	12	48	8.14 495	914	8.14 500	915	1.85 500	9.99 996	12		48
	16	49	8.15 391	896	8.15 395	895	1.84 605	9.99 996	11		44
3	20	**50**	8.16 268	877	8.16 273	878	1.83 727	9.99 995	**10**	56	40
	24	51	8.17 128	860	8.17 133	860	1.82 867	9.99 995	9		36
	28	52	8.17 971	843	8.17 976	843	1.82 024	9.99 995	8		32
	32	53	8.18 798	827	8.18 804	828	1.81 196	9.99 995	7		28
	36	54	8.19 610	812	8.19 616	812	1.80 384	9.99 995	6		24
3	40	55	8.20 407	797	8.20 413	797	1.79 587	9.99 994	5	56	20
	44	56	8.21 189	782	8.21 195	782	1.78 805	9.99 994	4		16
	48	57	8.21 958	769	8.21 964	769	1.78 036	9.99 994	3		12
	52	58	8.22 713	755	8.22 720	756	1.77 280	9.99 994	2		8
	56	59	8.23 456	743	8.23 462	742	1.76 538	9.99 994	1		4
4	0	**60**	8.24 186	730	8.24 192	730	1.75 808	9 99 993	**0**	56	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m.	s.

89° **5h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0h **1°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		m.	s.
4	0	**0**	8.24 186		8.24 192		1.75 808	9.99 993	**60**	56	0
	4	1	8.24 903	717	8.24 910	718	1.75 090	9.99 993	59		56
	8	2	8.25 609	706	8.25 616	706	1.74 384	9.99 993	58		52
	12	3	8.26 304	695	8.26 312	696	1.73 688	9.99 993	57		48
	16	4	8.26 988	684	8.26 996	684	1.73 004	9.99 992	56		44
4	20	5	8.27 661	673	8.27 669	673	1.72 331	9.99 992	55	55	40
	24	6	8.28 324	663	8.28 332	663	1.71 668	9.99 992	54		36
	28	7	8.28 977	653	8.28 986	654	1.71 014	9.99 992	53		32
	32	8	8.29 621	644	8.29 629	643	1.70 371	9.99 992	52		28
	36	9	8.30 255	634	8.30 263	634	1.69 737	9.99 991	51		24
4	40	**10**	8.30 879	624	8.30 888	625	1.69 112	9.99 991	**50**	55	20
	44	11	8.31 495	616	8.31 505	617	1.68 495	9.99 991	49		16
	48	12	8.32 103	608	8.32 112	607	1.67 888	9.99 990	48		12
	52	13	8.32 702	599	8.32 711	599	1.67 289	9.99 990	47		8
	56	14	8.33 292	590	8.33 302	591	1.66 698	9.99 990	46		4
5	0	15	8.33 875	583	8.33 886	584	1.66 114	9.99 990	45	55	0
	4	16	8.34 450	575	8.34 461	575	1.65 539	9.99 989	44		56
	8	17	8.35 018	568	8.35 029	568	1.64 971	9.99 989	43		52
	12	18	8.35 578	560	8.35 590	561	1.64 410	9.99 989	42		48
	16	19	8.36 131	553	8.36 143	553	1.63 857	9.99 989	41		44
5	20	**20**	8.36 678	547	8.36 689	546	1.63 311	9.99 988	**40**	54	40
	24	21	8.37 217	539	8.37 229	540	1.62 771	9.99 988	39		36
	28	22	8.37 750	533	8.37 762	533	1.62 238	9.99 988	38		32
	32	23	8.38 276	526	8.38 289	527	1.61 711	9.99 987	37		28
	36	24	8.38 796	520	8.38 809	520	1.61 191	9.99 987	36		24
5	40	25	8.39 310	514	8.39 323	514	1.60 677	9.99 987	35	54	20
	44	26	8.39 818	508	8.39 832	509	1.60 168	9.99 986	34		16
	48	27	8.40 320	502	8.40 334	502	1.59 666	9.99 986	33		12
	52	28	8.40 816	496	8.40 830	496	1.59 170	9.99 986	32		8
	56	29	8.41 307	491	8.41 321	491	1.58 679	9.99 985	31		4
6	0	**30**	8.41 792	485	8.41 807	486	1.58 193	9.99 985	**30**	54	0
	4	31	8.42 272	480	8.42 287	480	1.57 713	9.99 985	29		56
	8	32	8.42 746	474	8.42 762	475	1.57 238	9.99 984	28		52
	12	33	8.43 216	470	8.43 232	470	1.56 768	9.99 984	27		48
	16	34	8.43 680	464	8.43 696	464	1.56 304	9.99 984	26		44
6	20	35	8.44 139	459	8.44 156	460	1.55 844	9.99 983	25	53	40
	24	36	8.44 594	455	8.44 611	455	1.55 389	9.99 983	24		36
	28	37	8.45 044	450	8.45 061	450	1.54 939	9.99 983	23		32
	32	38	8.45 489	445	8.45 507	446	1.54 493	9.99 982	22		28
	36	39	8.45 930	441	8.45 948	441	1.54 052	9.99 982	21		24
6	40	**40**	8.46 366	436	8.46 385	437	1.53 615	9.99 982	**20**	53	20
	44	41	8.46 799	433	8.46 817	432	1.53 183	9.99 981	19		16
	48	42	8.47 226	427	8.47 245	428	1.52 755	9.99 981	18		12
	52	43	8.47 650	424	8.47 669	424	1.52 331	9.99 981	17		8
	56	44	8.48 069	419	8.48 089	420	1.51 911	9.99 980	16		4
7	0	45	8.48 485	416	8.48 505	416	1.51 495	9.99 980	15	53	0
	4	46	8.48 896	411	8.48 917	412	1.51 083	9.99 979	14		56
	8	47	8.49 304	408	8.49 325	408	1.50 675	9.99 979	13		52
	12	48	8.49 708	404	8.49 729	404	1.50 271	9.99 979	12		48
	16	49	8.50 108	400	8.50 130	401	1.49 870	9.99 978	11		44
7	20	**50**	8.50 504	396	8.50 527	397	1.49 473	9.99 978	**10**	52	40
	24	51	8.50 897	393	8.50 920	393	1.49 080	9.99 977	9		36
	28	52	8.51 287	390	8.51 310	390	1.48 690	9.99 977	8		32
	32	53	8.51 673	386	8.51 696	386	1.48 304	9.99 977	7		28
	36	54	8.52 055	382	8.52 079	383	1.47 921	9.99 976	6		24
7	40	55	8.52 434	379	8.52 459	380	1.47 541	9.99 976	5	52	20
	44	56	8.52 810	376	8.52 835	376	1.47 165	9.99 975	4		16
	48	57	8.53 183	373	8.53 208	373	1.46 792	9.99 975	3		12
	52	58	8.53 552	369	8.53 578	370	1.46 422	9.99 974	2		8
	56	59	8.53 919	367	8.53 945	367	1.46 055	9.99 974	1		4
8	0	**60**	8.54 282	363	8.54 308	363	1.45 692	9.99 974	**0**	52	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m.	s.

88° **5h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0h 2°

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		
8 0	0	8.54 282		8.54 308		1.45 692	9.99 974	60	52 0
4	1	8.54 642	360	8.54 669	361	1.45 331	9.99 973	59	56
8	2	8.54 999	357	8.55 027	358	1.44 973	9.99 973	58	52
12	3	8.55 354	355	8.55 382	355	1.44 618	9.99 972	57	48
16	4	8.55 705	351	8.55 734	352	1.44 266	9.99 972	56	44
8 20	5	8.56 054	349	8.56 083	349	1.43 917	9.99 971	55	51 40
24	6	8.56 400	346	8.56 429	346	1.43 571	9.99 971	54	36
28	7	8.56 743	343	8.56 773	344	1.43 227	9.99 970	53	32
32	8	8.57 084	341	8.57 114	341	1.42 886	9.99 970	52	28
36	9	8.57 421	337	8.57 452	338	1.42 548	9.99 969	51	24
8 40	10	8.57 757	336	8.57 788	336	1.42 212	9.99 969	50	51 20
44	11	8.58 089	332	8.58 121	333	1.41 879	9.99 968	49	16
48	12	8.58 419	330	8.58 451	330	1.41 549	9.99 968	48	12
52	13	8.58 747	328	8.58 779	328	1.41 221	9.99 967	47	8
56	14	8.59 072	325	8.59 105	326	1.40 895	9.99 967	46	4
9 0	15	8.59 395	323	8.59 428	323	1.40 572	9.99 967	45	51 0
4	16	8.59 715	320	8.59 749	321	1.40 251	9.99 966	44	56
8	17	8.60 033	318	8.60 068	319	1.39 932	9.99 966	43	52
12	18	8.60 349	316	8.60 384	316	1.39 616	9.99 965	42	48
16	19	8.60 662	313	8.60 698	314	1.39 302	9.99 964	41	44
9 20	20	8.60 973	311	8.61 009	311	1.38 991	9.99 964	40	50 40
24	21	8.61 282	309	8.61 319	310	1.38 681	9.99 963	39	36
28	22	8.61 589	307	8.61 626	307	1.38 374	9.99 963	38	32
32	23	8.61 894	305	8.61 931	305	1.38 069	9.99 962	37	28
36	24	8.62 196	302	8.62 234	303	1.37 766	9.99 962	36	24
9 40	25	8.62 497	301	8.62 535	301	1.37 465	9.99 961	35	50 20
44	26	8.62 795	298	8.62 834	299	1.37 166	9.99 961	34	16
48	27	8.63 091	296	8.63 131	297	1.36 869	9.99 960	33	12
52	28	8.63 385	294	8.63 426	295	1.36 574	9.99 960	32	8
56	29	8.63 678	293	8.63 718	292	1.36 282	9.99 959	31	4
10 0	30	8.63 968	290	8.64 009	291	1.35 991	9.99 959	30	50 0
4	31	8.64 256	288	8.64 298	289	1.35 702	9.99 958	29	56
8	32	8.64 543	287	8.64 585	287	1.35 415	9.99 958	28	52
12	33	8.64 827	284	8.64 870	285	1.35 130	9.99 957	27	48
16	34	8.65 110	283	8.65 154	284	1.34 846	9.99 956	26	44
10 20	35	8.65 391	281	8.65 435	281	1.34 565	9.99 956	25	49 40
24	36	8.65 670	279	8.65 715	280	1.34 285	9.99 955	24	36
28	37	8.65 947	277	8.65 993	278	1.34 007	9.99 955	23	32
32	38	8.66 223	276	8.66 269	276	1.33 731	9.99 954	22	28
36	39	8.66 497	274	8.66 543	274	1.33 457	9.99 954	21	24
10 40	40	8.66 769	272	8.66 816	273	1.33 184	9.99 953	20	49 20
44	41	8.67 039	270	8.67 087	271	1.32 913	9.99 952	19	16
48	42	8.67 308	269	8.67 356	269	1.32 644	9.99 952	18	12
52	43	8.67 575	267	8.67 624	268	1.32 376	9.99 951	17	8
56	44	8.67 841	266	8.67 890	266	1.32 110	9.99 951	16	4
11 0	45	8.68 104	263	8.68 154	264	1.31 846	9.99 950	15	49 0
4	46	8.68 367	263	8.68 417	263	1.31 583	9.99 949	14	56
8	47	8.68 627	260	8.68 678	261	1.31 322	9.99 949	13	52
12	48	8.68 886	259	8.68 938	260	1.31 062	9.99 948	12	48
16	49	8.69 144	258	8.69 196	258	1.30 804	9.99 948	11	44
11 20	50	8.69 400	256	8.69 453	257	1.30 547	9.99 947	10	48 40
24	51	8.69 654	254	8.69 708	255	1.30 292	9.99 946	9	36
28	52	8.69 907	253	8.69 962	254	1.30 038	9.99 946	8	32
32	53	8.70 159	252	8.70 214	252	1.29 786	9.99 945	7	28
36	54	8.70 409	250	8.70 465	251	1.29 535	9.99 944	6	24
11 40	55	8.70 658	249	8.70 714	249	1.29 286	9.99 944	5	48 20
44	56	8.70 905	247	8.70 962	248	1.29 038	9.99 943	4	16
48	57	8.71 151	246	8.71 208	246	1.28 792	9.99 942	3	12
52	58	8.71 395	244	8.71 453	245	1.28 547	9.99 942	2	8
56	59	8.71 638	243	8.71 697	244	1.28 303	9.99 941	1	4
12 0	60	8.71 880	242	8.71 940	243	1.28 060	9.99 940	0	48 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m. s.

87° 5h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0h **3°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		m.	s.
12	0	**0**	8.71 880		8.71 940		1.28 060	9.99 940	**60**	48	0
	4	1	8.72 120	240	8.72 181	241	1.27 819	9.99 940	59		56
	8	2	8.72 359	239	8.72 420	239	1.27 580	9.99 939	58		52
	12	3	8.72 597	238	8.72 659	239	1.27 341	9.99 938	57		48
	16	4	8.72 834	237	8.72 896	237	1.27 104	9.99 938	56		44
12	20	5	8.73 069	235	8.73 132	236	1.26 868	9.99 937	55	47	40
	24	6	8.73 303	234	8.73 366	234	1.26 634	9.99 936	54		36
	28	7	8.73 535	232	8.73 600	234	1.26 400	9.99 936	53		32
	32	8	8.73 767	232	8.73 832	232	1.26 168	9.99 935	52		28
	36	9	8.73 997	230	8.74 063	231	1.25 937	9.99 934	51		24
12	40	**10**	8.74 226	229	8.74 292	229	1.25 708	9.99 934	**50**	47	20
	44	11	8.74 454	228	8.74 521	229	1.25 479	9.99 933	49		16
	48	12	8.74 680	226	8.74 748	227	1.25 252	9.99 932	48		12
	52	13	8.74 906	226	8.74 974	226	1.25 026	9.99 932	47		8
	56	14	8.75 130	224	8.75 199	225	1.24 801	9.99 931	46		4
13	0	15	8.75 353	223	8.75 423	224	1.24 577	9.99 930	45	47	0
	4	16	8.75 575	222	8.75 645	222	1.24 355	9.99 929	44		56
	8	17	8.75 795	220	8.75 867	222	1.24 133	9.99 929	43		52
	12	18	8.76 015	220	8.76 087	220	1.23 913	9.99 928	42		48
	16	19	8.76 234	219	8.76 306	219	1.23 694	9.99 927	41		44
13	20	**20**	8.76 451	217	8.76 525	219	1.23 475	9.99 926	**40**	46	40
	24	21	8.76 667	216	8.76 742	217	1.23 258	9.99 926	39		36
	28	22	8.76 883	216	8.76 958	216	1.23 042	9.99 925	38		32
	32	23	8.77 097	214	8.77 173	215	1.22 827	9.99 924	37		28
	36	24	8.77 310	213	8.77 387	214	1.22 613	9.99 923	36		24
13	40	25	8.77 522	212	8.77 600	213	1.22 400	9.99 923	35	46	20
	44	26	8.77 733	211	8.77 811	211	1.22 189	9.99 922	34		16
	48	27	8.77 943	210	8.78 022	211	1.21 978	9.99 921	33		12
	52	28	8.78 152	209	8.78 232	210	1.21 768	9.99 920	32		8
	56	29	8.78 360	208	8.78 441	209	1.21 559	9.99 920	31		4
14	0	**30**	8.78 568	208	8.78 649	208	1.21 351	9.99 919	**30**	46	0
	4	31	8.78 774	206	8.78 855	206	1.21 145	9.99 918	29		56
	8	32	8.78 979	205	8.79 061	206	1.20 939	9.99 917	28		52
	12	33	8.79 183	204	8.79 266	205	1.20 734	9.99 917	27		48
	16	34	8.79 386	203	8.79 470	204	1.20 530	9.99 916	26		44
14	20	35	8.79 588	202	8.79 673	203	1.20 327	9.99 915	25	45	40
	24	36	8.79 789	201	8.79 875	202	1.20 125	9.99 914	24		36
	28	37	8.79 990	201	8.80 076	201	1.19 924	9.99 913	23		32
	32	38	8.80 189	199	8.80 277	201	1.19 723	9.99 913	22		28
	36	39	8.80 388	199	8.80 476	199	1.19 524	9.94 912	21		24
14	40	**40**	8.80 585	197	8.80 674	198	1.19 326	9.99 911	**20**	45	20
	44	41	8.80 782	197	8.80 872	198	1.19 128	9.99 910	19		16
	48	42	8.80 978	196	8.81 068	196	1.18 932	9.99 909	18		12
	52	43	8.81 173	195	8.81 264	196	1.18 736	9.99 909	17		8
	56	44	8.81 367	194	8.81 459	195	1.18 541	9.99 908	16		4
15	0	45	8.81 560	193	8.81 653	194	1.18 347	9.99 907	15	45	0
	4	46	8.81 752	192	8.81 846	193	1.18 154	9.99 906	14		56
	8	47	8.81 944	192	8.82 038	192	1.17 962	9.99 905	13		52
	12	48	8.82 134	190	8.82 230	192	1.17 770	9.99 904	12		48
	16	49	8.82 324	190	8.82 420	190	1.17 580	9.99 904	11		44
15	20	**50**	8.82 513	189	8.82 610	190	1.17 390	9.99 903	**10**	44	40
	24	51	8.82 701	188	8.82 799	189	1.17 201	9.99 902	9		36
	28	52	8.82 888	187	8.82 987	188	1.17 013	9.99 901	8		32
	32	53	8.83 075	187	8.83 175	188	1.16 825	9.99 900	7		28
	36	54	8.83 261	186	8.83 361	186	1.16 639	9.99 899	6		24
15	40	55	8.83 446	185	8.83 547	186	1.16 453	9.99 898	5	44	20
	44	56	8.83 630	184	8.83 732	185	1.16 268	9.99 898	4		16
	48	57	8.83 813	183	8.83 916	184	1.16 084	9.99 897	3		12
	52	58	8.83 996	183	8.84 100	184	1.15 900	9.99 896	2		8
	56	59	8.84 177	181	8.84 282	182	1.15 718	9.99 895	1		4
16	0	**60**	8.84 358	181	8.84 464	182	1.15 536	9.99 894	**0**	44	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m.	s.

86° **5h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0^h 4°

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	′	m. s.
16 0	**0**	8.84 358	181	8.84 464	182	1.15 536	9.99 894	**60**	44 0
4	1	8.84 539	179	8.84 646	180	1.15 354	9.99 893	59	56
8	2	8.84 718	179	8.84 826	180	1.15 174	9.99 892	58	52
12	3	8.84 897	178	8.85 006	179	1.14 994	9.99 891	57	48
16	4	8.85 075	177	8.85 185	178	1.14 815	9.99 891	56	44
16 20	5	8.85 252	177	8.85 363	177	1.14 637	9.99 890	55	43 40
24	6	8.85 429	176	8.85 540	177	1.14 460	9.99 889	54	36
28	7	8.85 605	175	8.85 717	176	1.14 283	9.99 888	53	32
32	8	8.85 780	175	8.85 893	176	1.14 107	9.99 887	52	28
36	9	8.85 955	173	8.86 069	174	1.13 931	9.99 886	51	24
16 40	**10**	8.86 128	173	8.86 243	174	1.13 757	9.99 885	**50**	43 20
44	11	8.86 301	173	8.86 417	174	1.13 583	9.99 884	49	16
48	12	8.86 474	171	8.86 591	172	1.13 409	9.99 883	48	12
52	13	8.86 645	171	8.86 763	172	1.13 237	9.99 882	47	8
56	14	8.86 816	171	8.86 935	171	1.13 065	9.99 881	46	4
17 0	15	8.86 987	169	8.87 106	171	1.12 894	9.99 880	45	43 0
4	16	8.87 156	169	8.87 277	170	1.12 723	9.99 879	44	56
8	17	8.87 325	169	8.87 447	169	1.12 553	9.99 879	43	52
12	18	8.87 494	167	8.87 616	169	1.12 384	9.99 878	42	48
16	19	8.87 661	168	8.87 785	168	1.12 215	9.99 877	41	44
17 20	**20**	8.87 829	166	8.87 953	167	1.12 047	9.99 876	**40**	42 40
24	21	8.87 995	166	8.88 120	167	1.11 880	9.99 875	39	36
28	22	8.88 161	165	8.88 287	166	1.11 713	9.99 874	38	32
32	23	8.88 326	164	8.88 453	165	1.11 547	9.99 873	37	28
36	24	8.88 490	164	8.88 618	165	1.11 382	9.99 872	36	24
17 40	25	8.88 654	163	8.88 783	165	1.11 217	9.99 871	35	42 20
44	26	8.88 817	163	8.88 948	163	1.11 052	9.99 870	34	16
48	27	8.88 980	162	8.89 111	163	1.10 889	9.99 869	33	12
52	28	8.89 142	162	8.89 274	163	1.10 726	9.99 868	32	8
56	29	8.89 304	160	8.89 437	161	1.10 563	9.99 867	31	4
18 0	**30**	8.89 464	161	8.89 598	162	1.10 402	9.99 866	**30**	42 0
4	31	8.89 625	159	8.89 760	160	1.10 240	9.99 865	29	56
8	32	8.89 784	159	8.89 920	160	1.10 080	9.99 864	28	52
12	33	8.89 943	159	8.90 080	160	1.09 920	9.99 863	27	48
16	34	8.90 102	158	8.90 240	159	1.09 760	9.99 862	26	44
18 20	35	8.90 260	157	8.90 399	158	1.09 601	9.99 861	25	41 40
24	36	8.90 417	157	8.90 557	158	1.09 443	9.99 860	24	36
28	37	8.90 574	156	8.90 715	157	1.09 285	9.99 859	23	32
32	38	8.90 730	155	8.90 872	157	1.09 128	9.99 858	22	28
36	39	8.90 885	155	8.91 029	156	1.08 971	9.99 857	21	24
18 40	**40**	8.91 040	155	8.91 185	155	1.08 815	9.99 856	**20**	41 20
44	41	8.91 195	154	8.91 340	155	1.08 660	9.99 855	19	16
48	42	8.91 349	153	8.91 495	155	1.08 505	9.99 854	18	12
52	43	8.91 502	153	8.91 650	153	1.08 350	9.99 853	17	8
56	44	8.91 655	152	8.91 803	154	1.08 197	9.99 852	16	4
19 0	45	8.91 807	152	8.91 957	153	1.08 043	9.99 851	15	41 0
4	46	8.91 959	151	8.92 110	152	1.07 890	9.99 850	14	56
8	47	8.92 110	151	8.92 262	152	1.07 738	9.99 848	13	52
12	48	8.92 261	150	8.92 414	151	1.07 586	9.99 847	12	48
16	49	8.92 411	150	8.92 565	151	1.07 435	9.99 846	11	44
19 20	**50**	8.92 561	149	8.92 716	150	1.07 284	9.99 845	**10**	40 40
24	51	8.92 710	149	8.92 866	150	1.07 134	9.99 844	9	36
28	52	8.92 859	148	8.93 016	149	1.06 984	9.99 843	8	32
32	53	8.93 007	147	8.93 165	148	1.06 835	9.99 842	7	28
36	54	8.93 154	147	8.93 313	149	1.06 687	9.99 841	6	24
19 40	55	8.93 301	147	8.93 462	147	1.06 538	9.99 840	5	40 20
44	56	8.93 448	146	8.93 609	147	1.06 391	9.99 839	4	16
48	57	8.93 594	146	8.93 756	147	1.06 244	9.99 838	3	12
52	58	8.93 740	145	8.93 903	146	1.06 097	9.99 837	2	8
56	59	8.93 885	145	8.94 049	146	1.05 951	9.99 836	1	4
20 0	**60**	8.94 030		8.94 195		1.05 805	9.99 834	**0**	40 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m. s.

85° 5^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0^h $5°$

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		m.	s.
20	0	**0**	8.94 030	144	8.94 195	145	1.05 805	9.99 834	**60**	40	0
	4	1	8.94 174	143	8.94 340	145	1.05 660	9.99 833	59		56
	8	2	8.94 317	144	8.94 485	145	1.05 515	9.99 832	58		52
	12	3	8.94 461	142	8.94 630	143	1.05 370	9.99 831	57		48
	16	4	8.94 603	143	8.94 773	144	1.05 227	9.99 830	56		44
20	20	5	8.94 746	141	8.94 917	143	1.05 083	9.99 829	55	39	40
	24	6	8.94 887	142	8.95 060	142	1.04 940	9.99 828	54		36
	28	7	8.95 029	141	8.95 202	142	1.04 798	9.99 827	53		32
	32	8	8.95 170	140	8.95 344	142	1.04 656	9.99 825	52		28
	36	9	8.95 310	140	8.95 486	141	1.04 514	9.99 824	51		24
20	40	**10**	8.95 450	139	8.95 627	140	1.04 373	9.99 823	**50**	39	20
	44	11	8.95 589	139	8.95 767	141	1.04 233	9.99 822	49		16
	48	12	8.95 728	139	8.95 908	139	1.04 092	9.99 821	48		12
	52	13	8.95 867	138	8.96 047	140	1.03 953	9.99 820	47		8
	56	14	8.96 005	138	8.96 187	138	1.03 813	9.99 819	46		4
21	0	15	8.96 143	137	8.96 325	139	1.03 675	9.99 817	45	39	0
	4	16	8.96 280	137	8.96 464	138	1.03 536	9.99 816	44		56
	8	17	8.96 417	136	8.96 602	137	1.03 398	9.99 815	43		52
	12	18	8.96 553	136	8.96 739	138	1.03 261	9.99 814	42		48
	16	19	8.96 689	136	8.96 877	136	1.03 123	9.99 813	41		44
21	20	**20**	8.96 825	135	8.97 013	137	1.02 987	9.99 812	**40**	38	40
	24	21	8.96 960	135	8.97 150	135	1.02 850	9.99 810	39		36
	28	22	8.97 095	134	8.97 285	136	1.02 715	9.99 809	38		32
	32	23	8.97 229	134	8.97 421	135	1.02 579	9.99 808	37		28
	36	24	8.97 363	133	8.97 556	135	1.02 444	9.99 807	36		24
21	40	25	8.97 496	133	8.97 691	134	1.02 309	9.99 806	35	38	20
	44	26	8.97 629	133	8.97 825	134	1.02 175	9.99 804	34		16
	48	27	8.97 762	132	8.97 959	133	1.02 041	9.99 803	33		12
	52	28	8.97 894	132	8.98 092	133	1.01 908	9.99 802	32		8
	56	29	8.98 026	131	8.98 225	133	1.01 775	9.99 801	31		4
22	0	**30**	8.98 157	131	8.98 358	132	1.01 642	9.99 800	**30**	38	0
	4	31	8.98 288	131	8.98 490	132	1.01 510	9.99 798	29		56
	8	32	8.98 419	130	8.98 622	131	1.01 378	9.99 797	28		52
	12	33	8.98 549	130	8.98 753	131	1.01 247	9.99 796	27		48
	16	34	8.98 679	129	8.98 884	131	1.01 116	9.99 795	26		44
22	20	35	8.98 808	129	8.99 015	130	1.00 985	9.99 793	25	37	40
	24	36	8.98 937	129	8.99 145	130	1.00 855	9.99 792	24		36
	28	37	8.99 066	128	8.99 275	130	1.00 725	9.99 791	23		32
	32	38	8.99 194	128	8.99 405	129	1.00 595	9.99 790	22		28
	36	39	8.99 322	128	8.99 534	128	1.00 466	9.99 788	21		24
22	40	**40**	8.99 450	127	8.99 662	129	1.00 338	9.99 787	**20**	37	20
	44	41	8.99 577	127	8.99 791	128	1.00 209	9.99 786	19		16
	48	42	8.99 704	126	8.99 919	127	1.00 081	9.99 785	18		12
	52	43	8.99 830	126	9.00 046	128	0.99 954	9.99 783	17		8
	56	44	8.99 956	126	9.00 174	127	0.99 826	9.99 782	16		4
23	0	45	9.00 082	125	9.00 301	126	0.99 699	9.99 781	15	37	0
	4	46	9.00 207	125	9.00 427	126	0.99 573	9.99 780	14		56
	8	47	9.00 332	124	9.00 553	126	0.99 447	9.99 778	13		52
	12	48	9.00 456	125	9.00 679	126	0.99 321	9.99 777	12		48
	16	49	9.00 581	123	9.00 805	125	0.99 195	9.99 776	11		44
23	20	**50**	9.00 704	124	9.00 930	125	0.99 070	9.99 775	**10**	36	40
	24	51	9.00 828	123	9.01 055	124	0.98 945	9.99 773	9		36
	28	52	9.00 951	123	9.01 179	124	0.98 821	9.99 772	8		32
	32	53	9.01 074	122	9.01 303	124	0.98 697	9.99 771	7		28
	36	54	9.01 196	122	9.01 427	123	0.98 573	9.99 769	6		24
23	40	55	9.01 318	122	9.01 550	123	0.98 450	9.99 768	5	36	20
	44	56	9.01 440	121	9.01 673	123	0.98 327	9.99 767	4		16
	48	57	9.01 561	121	9.01 796	122	0.98 204	9.99 765	3		12
	52	58	9.01 682	121	9.01 918	122	0.98 082	9.99 764	2		8
	56	59	9.01 803	120	9.02.040	122	0.97 960	9.99 763	1		4
24	0	**60**	9.01 923		9.02 162		0.97 838	9.99 761	**0**	36	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m.	s.

$84°$ **5^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0^h 6°

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		m. s.
24 0	**0**	9.01 923	120	9.02 162	121	0.97 838	9.99 761	**60**	36 0
4	1	9.02 043	120	9.02 283	121	0.97 717	9.99 760	59	56
8	2	9.02 163	120	9.02 404	121	0.97 596	9.99 759	58	52
12	3	9.02 283	119	9.02 525	120	0.97 475	9.99 757	57	48
16	4	9.02 402	118	9.02 645	121	0.97 355	9.99 756	56	44
24 20	5	9.02 520	119	9.02 766	119	0.97 234	9.99 755	55	35 40
24	6	9.02 639	118	9.02 885	120	0.97 115	9.99 753	54	36
28	7	9.02 757	117	9.03 005	119	0.96 995	9.99 752	53	32
32	8	9.02 874	118	9.03 124	118	0.96 876	9.99 751	52	28
36	9	9.02 992	117	9.03 242	119	0.96 758	9.99 749	51	24
24 40	**10**	9.03 109	117	9.03 361	118	0.96 639	9.99 748	**50**	35 20
44	11	9.03 226	116	9.03 479	118	0.96 521	9.99 747	49	16
48	12	9.03 342	116	9.03 597	117	0.96 403	9.99 745	48	12
52	13	9.03 458	116	9.03 714	118	0.96 286	9.99 744	47	8
56	14	9.03 574	116	9.03 832	116	0.96 168	9.99 742	46	4
25 0	15	9.03 690	115	9.03 948	117	0.96 052	9.99 741	45	35 0
4	16	9.03 805	115	9.04 065	116	0.95 935	9.99 740	44	56
8	17	9.03 920	114	9.04 181	116	0.95 819	9.99 738	43	52
12	18	9.04 034	115	9.04 297	116	0.95 703	9.99 737	42	48
16	19	9.04 149	113	9.04 413	115	0.95 587	9.99 736	41	44
25 20	**20**	9.04 262	114	9.04 528	115	0.95 472	9.99 734	**40**	34 40
24	21	9.04 376	114	9.04 643	115	0.95 357	9.99 733	39	36
28	22	9.04 490	113	9.04 758	115	0.95 242	9.99 731	38	32
32	23	9.04 603	112	9.04 873	114	0.95 127	9.99 730	37	28
36	24	9.04 715	113	9.04 987	114	0.95 013	9.99 728	36	24
25 40	25	9.04 828	112	9.05 101	113	0.94 899	9.99 727	35	34 20
44	26	9.04 940	112	9.05 214	114	0.94 786	9.99 726	34	16
48	27	9.05 052	112	9.05 328	113	0.94 672	9.99 724	33	12
52	28	9.05 164	111	9.05 441	112	0.94 559	9.99 723	32	8
56	29	9.05 275	111	9.05 553	113	0.94 447	9.99 721	31	4
26 0	**30**	9.05 386	111	9.05 666	112	0.94 334	9.99 720	**30**	34 0
4	31	9.05 497	110	9.05 778	112	0.94 222	9.99 718	29	56
8	32	9.05 607	110	9.05 890	112	0.94 110	9.99 717	28	52
12	33	9.05 717	110	9.06 002	111	0.93 998	9.99 716	27	48
16	34	9.05 827	110	9.06 113	111	0.93 887	9.99 714	26	44
26 20	35	9.05 937	109	9.06 224	111	0.93 776	9.99 713	25	33 40
24	36	9.06 046	109	9.06 335	110	0.93 665	9.99 711	24	36
28	37	9.06 155	109	9.06 445	111	0.93 555	9.99 710	23	32
32	38	9.06 264	108	9.06 556	110	0.93 444	9.99 708	22	28
36	39	9.06 372	109	9.06 666	109	0.93 334	9.99 707	21	24
26 40	**40**	9.06 481	108	9.06 775	110	0.93 225	9.99 705	**20**	33 20
44	41	9.06 589	107	9.06 885	109	0.93 115	9.99 704	19	16
48	42	9.06 696	108	9.06 994	109	0.93 006	9.99 702	18	12
52	43	9.06 804	107	9.07 103	108	0.92 897	9.99 701	17	8
56	44	9.06 911	107	9.07 211	109	0.92 789	9.99 699	16	4
27 0	45	9.07 018	106	9.07 320	108	0.92 680	9.99 698	15	33 0
4	46	9.07 124	107	9.07 428	108	0.92 572	9.99 696	14	56
8	47	9.07 231	106	9.07 536	107	0.92 464	9.99 695	13	52
12	48	9.07 337	105	9.07 643	108	0.92 357	9.99 693	12	48
16	49	9.07 442	106	9.07 751	107	0.92 249	9.99 692	11	44
27 20	**50**	9.07 548	105	9.07 858	106	0.92 142	9.99 690	**10**	32 40
24	51	9.07 653	105	9.07 964	107	0.92 036	9.99 689	9	36
28	52	9.07 758	105	9.08 071	106	0.91 929	9.99 687	8	32
32	53	9.07 863	105	9.08 177	106	0.91 823	9.99 686	7	28
36	54	9.07 968	104	9.08 283	106	0.91 717	9.99 684	6	24
27 40	55	9.08 072	104	9.08 389	106	0.91 611	9.99 683	5	32 20
44	56	9.08 176	104	9.08 495	105	0.91 505	9.99 681	4	16
48	57	9.08 280	103	9.08 600	105	0.91 400	9.99 680	3	12
52	58	9.08 383	103	9.08 705	105	0.91 295	9.99 678	2	8
56	59	9.08 486	103	9.08 810	104	0.91 190	9.99 677	1	4
28 0	**60**	9.08 589		9.08 914		0.91 086	9.99 675	**0**	32 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m. s.

83° 5^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0h **7°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		m. s.
28 0	**0**	9.08 589	103	9.08 914	105	0.91 086	9.99 675	**60**	32 0
4	1	9.08 692	103	9.09 019	104	0.90 981	9.99 674	59	56
8	2	9.08 795	102	9.09 123	104	0.90 877	9.99 672	58	52
12	3	9.08 897	102	9.09 227	103	0.90 773	9.99 670	57	48
16	4	9.08 999	102	9.09 330	104	0.90 670	9.99 669	56	44
28 20	5	9.09 101	101	9.09 434	103	0.90 566	9.99 667	55	31 40
24	6	9.09 202	102	9.09 537	103	0.90 463	9.99 666	54	36
28	7	9.09 304	101	9.09 640	102	0.90 360	9.99 664	53	32
32	8	9.09 405	101	9.09 742	103	0.90 258	9.99 663	52	28
36	9	9.09 506	100	9.09 845	102	0.90 155	9.99 661	51	24
28 40	**10**	9.09 606	101	9.09 947	102	0.90 053	9.99 659	**50**	31 20
44	11	9.09 707	100	9.10 049	101	0.89 951	9.99 658	59	16
48	12	9.09 807	100	9.10 150	102	0.89 850	9.99 656	48	12
52	13	9.09 907	99	9.10 252	101	0.89 748	9.99 655	47	8
56	14	9.10 006	100	9.10 353	101	0.89 647	9.99 653	46	4
29 0	15	9.10 106	99	9.10 454	101	0.89 546	9.99 651	45	31 0
4	16	9.10 205	99	9.10 555	101	0.89 445	9.99 650	44	56
8	17	9.10 304	98	9.10 656	100	0.89 344	9.99 648	43	52
12	18	9.10 402	99	9.10 756	100	0.89 244	9.99 647	42	48
16	19	9.10 501	98	9.10 856	100	0.89 144	9.99 645	41	44
29 20	**20**	9.10 599	98	9.10 956	100	0.89 044	9.99 643	**40**	30 40
24	21	9.10 697	98	9.11 056	99	0.88 944	9.99 642	39	36
28	22	9.10 795	98	9.11 155	99	0.88 845	9.99 640	38	32
32	23	9.10 893	97	9.11 254	99	0.88 746	9.99 638	37	28
36	24	9.10 990	97	9.11 353	99	0.88 647	9.99 637	36	24
29 40	25	9.11 087	97	9.11 452	99	0.88 548	9.99 635	35	30 20
44	26	9.11 184	97	9.11 551	98	0.88 449	9.99 633	34	16
48	27	9.11 281	96	9.11 649	98	0.88 351	9.99 632	33	12
52	28	9.11 377	97	9.11 747	98	0.88 253	9.99 630	32	8
56	29	9.11 474	96	9.11 845	98	0.88 155	9.99 629	31	4
30 0	**30**	9.11 570	96	9.11 943	97	0.88 057	9.99 627	**30**	30 0
4	31	9.11 666	95	9.12 040	98	0.87 960	9.99 625	29	56
8	32	9.11 761	96	9.12 138	97	0.87 862	9.99 624	28	52
12	33	9.11 857	95	9.12 235	97	0.87 765	9.99 622	27	48
16	34	9.11 952	95	9.12 332	96	0.87 668	9.99 620	26	44
30 20	35	9.12 047	95	9.12 428	97	0.87 572	9.99 618	25	29 40
24	36	9.12 142	94	9.12 525	96	0.87 475	9.99 617	24	36
28	37	9.12 236	95	9.12 621	96	0.87 379	9.99 615	23	32
32	38	9.12 331	94	9.12 717	96	0.87 283	9.99 613	22	28
36	39	9.12 425	94	9.12 813	96	0.87 187	9.99 612	21	24
30 40	**40**	9.12 519	93	9.12 909	95	0.87 091	9.99 610	**20**	29 20
44	41	9.12 612	94	9.13 004	95	0.86 996	9.99 608	19	16
48	42	9.12 706	93	9.13 099	95	0.86 901	9.99 607	18	12
52	43	9.12 799	93	9.13 194	95	0.86 806	9.99 605	17	8
56	44	9.12 892	93	9.13 289	95	0.86 711	9.99 603	16	4
31 0	45	9.12 985	93	9.13 384	94	0.86 616	9.99 601	15	29 0
4	46	9.13 078	93	9.13 478	95	0.86 522	9.99 600	14	56
8	47	9.13 171	92	9.13 573	94	0.86 427	9.99 598	13	52
12	48	9.13 263	92	9.13 667	94	0.86 333	9.99 596	12	48
16	49	9.13 355	92	9.13 761	93	0.86 239	9.99 595	11	44
31 20	**50**	9.13 447	92	9.13 854	94	0.86 146	9.99 593	**10**	28 40
24	51	9.13 539	91	9.13 948	93	0.86 052	9.99 591	9	36
28	52	9.13 630	92	9.14 041	93	0.85 959	9.99 589	8	32
32	53	9.13 722	91	9.14 134	93	0.85 866	9.99 588	7	28
36	54	9.13 813	91	9.14 227	93	0.85 773	9.99 586	6	24
31 40	55	9.13 904	90	9.14 320	92	0.85 680	9.99 584	5	28 20
44	56	9.13 994	91	9.14 412	92	0.85 588	9.99 582	4	16
48	57	9.14 085	90	9.14 504	93	0.85 496	9.99 581	3	12
52	58	9.14 175	91	9.14 597	91	0.85 403	9.99 579	2	8
56	59	9.14 266	90	9.14 688	92	0.85 312	9.99 577	1	4
32 0	**60**	9.14 356		9.14 780		0.85 220	9.99 575	**0**	28 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m. s.

82° **5h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0h **8°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	′	m.	s.
32	0	**0**	9.14 356	89	9.14 780	92	0.85 220	9.99 575	**60**	28	0
	4	1	9.14 445	90	9.14 872	91	0.85 128	9.99 574	59		56
	8	2	9.14 535	89	9.14 963	91	0.85 037	9.99 572	58		52
	12	3	9.14 624	90	9.15 054	91	0.84 946	9.99 570	57		48
	16	4	9.14 714	89	9.15 145	91	0.84 855	9.99 568	56		44
32	20	5	9.14 803	88	9.15 236	91	0.84 764	9.99 566	55	27	40
	24	6	9.14 891	89	9.15 327	90	0.84 673	9.99 565	54		36
	28	7	9.14 980	89	9.15 417	91	0.84 583	9.99 563	53		32
	32	8	9.15 069	88	9.15 508	90	0.84 492	9.99 561	52		28
	36	9	9.15 157	88	9.15 598	90	0.84 402	9.99 559	51		24
32	40	**10**	9.15 245	88	9.15 688	89	0.84 312	9.99 557	**50**	27	20
	44	11	9.15 333	88	9.15 777	90	0.84 223	9.99 556	49		16
	48	12	9.15 421	87	9.15 867	89	0.84 133	9.99 554	48		12
	52	13	9.15 508	88	9.15 956	90	0.84 044	9.99 552	47		8
	56	14	9.15 596	87	9.16 046	89	0.83 954	9.99 550	46		4
33	0	15	9.15 683	87	9.16 135	89	0.83 865	9.99 548	45	27	0
	4	16	9.15 770	87	9.16 224	88	0.83 776	9.99 546	44		56
	8	17	9.15 857	87	9.16 312	89	0.83 688	9.99 545	43		52
	12	18	9.15 944	86	9.16 401	88	0.83 599	9.99 543	42		48
	16	19	9.16 030	86	9.16 489	88	0.83 511	9.99 541	41		44
33	20	**20**	9.16 116	87	9.16 577	88	0.83 423	9.99 539	**40**	26	40
	24	21	9.16 203	86	9.16 665	88	0.83 335	9.99 537	39		36
	28	22	9.16 289	85	9.16 753	88	0.83 247	9.99 535	38		32
	32	23	9.16 374	86	9.16 841	87	0.83 159	9.99 533	37		28
	36	24	9.16 460	85	9.16 928	88	0.83 072	9.99 532	36		24
33	40	25	9.16 545	86	9.17 016	87	0.82 984	9.99 530	35	26	20
	44	26	9.16 631	85	9.17 103	87	0.82 897	9.99 528	34		16
	48	27	9.16 716	85	9.17 190	87	0.82 810	9.99 526	33		12
	52	28	9.16 801	85	9.17 277	86	0.82 723	9.99 524	32		8
	56	29	9.16 886	84	9.17 363	87	0.82 637	9.99 522	31		4
34	0	**30**	9.16 970	85	9.17 450	86	0.82 550	9.99 520	**30**	26	0
	4	31	9.17 055	84	9.17 536	86	0.82 464	9.99 518	29		56
	8	32	9.17 139	84	9.17 622	86	0.82 378	9.99 517	28		52
	12	33	9.17 223	84	9.17 708	86	0.82 292	9.99 515	27		48
	16	34	9.17 307	84	9.17 794	86	0.82 206	9.99 513	26		44
34	20	35	9.17 391	83	9.17 880	85	0.82 120	9.99 511	25	25	40
	24	36	9.17 474	84	9.17 965	86	0.82 035	9.99 509	24		36
	28	37	9.17 558	83	9.18 051	85	0.81 949	9.99 507	23		32
	32	38	9.17 641	83	9.18 136	85	0.81 864	9.99 505	22		28
	36	39	9.17 724	83	9.18 221	85	0.81 779	9.99 503	21		24
34	40	**40**	9.17 807	83	9.18 306	85	0.81 694	9.99 501	**20**	25	20
	44	41	9.17 890	83	9.18 391	84	0.81 609	9.99 499	19		16
	48	42	9.17 973	82	9.18 475	85	0.81 525	9.99 497	18		12
	52	43	9.18 055	82	9.18 560	84	0.81 440	9.99 495	17		8
	56	44	9.18 137	83	9.18 644	84	0.81 356	9.99 494	16		4
35	0	45	9.18 220	82	9.18 728	84	0.81 272	9.99 492	15	25	0
	4	46	9.18 302	81	9.18 812	84	0.81 188	9.99 490	14		56
	8	47	9.18 383	82	9.18 896	83	0.81 104	9.99 488	13		52
	12	48	9.18 465	82	9.18 979	84	0.81 021	9.99 486	12		48
	16	49	9.18 547	81	9.19 063	83	0.80 937	9.99 484	11		44
35	20	**50**	9.18 628	81	9.19 146	83	0.80 854	9.99 482	**10**	24	40
	24	51	9.18 709	81	9.19 229	83	0.80 771	9.99 480	9		36
	28	52	9.18 790	81	9.19 312	83	0.80 688	9.99 478	8		32
	32	53	9.18 871	81	9.19 395	83	0.80 605	9.99 476	7		28
	36	54	9.18 952	81	9.19 478	83	0.80 522	9.99 474	6		24
35	40	55	9.19 033	80	9.19 561	82	0.80 439	9.99 472	5	24	20
	44	56	9.19 113	80	9.19 643	82	0.80 357	9.99 470	4		16
	48	57	9.19 193	80	9.19 725	82	0.80 275	9.99 468	3		12
	52	58	9.19 273	80	9.19 807	82	0.80 193	9.99 466	2		8
	56	59	9.19 353	80	9.19 889	82	0.80 111	9.99 464	1		4
36	0	**60**	9.19 433		9.19 971		0.80 029	9.99 462	**0**	24	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m.	s.

81° **5h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0ʰ **9°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	′	m.	s.
36	0	**0**	9.19 433	80	9.19 971	82	0.80 029	9.99 462	**60**	24	0
	4	1	9.19 513	79	9.20 053	81	0.79 947	9.99 460	59		56
	8	2	9.19 592	80	9.20 134	82	0.79 866	9.99 458	58		52
	12	3	9.19 672	79	9.20 216	81	0.79 784	9.99 456	57		48
	16	4	9.19 751	79	9.20 297	81	0.79 703	9.99 454	56		44
36	20	5	9.19 830	79	9.20 378	81	0.79 622	9.99 452	55	23	40
	24	6	9.19 909	79	9.20 459	81	0.79 541	9.99 450	54		36
	28	7	9.19 988	79	9.20 540	81	0.79 460	9.99 448	53		32
	32	8	9.20 067	78	9.20 621	80	0.79 379	9.99 446	52		28
	36	9	9.20 145	78	9.20 701	81	0.79 299	9.99 444	51		24
36	40	**10**	9.20 223	79	9.20 782	80	0.79 218	9.99 442	**50**	23	20
	44	11	9.20 302	78	9.20 862	80	0.79 138	9.99 440	49		16
	48	12	9.20 380	78	9.20 942	80	0.79 058	9.99 438	48		12
	52	13	9.20 458	77	9.21 022	80	0.78 978	9.99 436	47		8
	56	14	9.20 535	78	9.21 102	80	0.78 898	9.99 434	46		4
37	0	15	9.20 613	78	9.21 182	79	0.78 818	9.99 432	45	23	0
	4	16	9.20 691	77	9.21 261	80	0.78 739	9.99 429	44		56
	8	17	9.20 768	77	9.21 341	79	0.78 659	9.99 427	43		52
	12	18	9.20 845	77	9.21 420	79	0.78 580	9.99 425	42		48
	16	19	9.20 922	77	9.21 499	79	0.78 501	9.99 423	41		44
37	20	**20**	9.20 999	77	9.21 578	79	0.78 422	9.99 421	**40**	22	40
	24	21	9.21 076	77	9.21 657	79	0.78 343	9.99 419	39		36
	28	22	9.21 153	76	9.21 736	78	0.78 264	9.99 417	38		32
	32	23	9.21 229	77	9.21 814	79	0.78 186	9.99 415	37		28
	36	24	9.21 306	76	9.21 893	78	0.78 107	9.99 413	36		24
37	40	25	9.21 382	76	9.21 971	78	0.78 029	9.99 411	35	22	20
	44	26	9.21 458	76	9.22 049	78	0.77 951	9.99 409	34		16
	48	27	9.21 534	76	9.22 127	78	0.77 873	9.99 407	33		12
	52	28	9.21 610	75	9.22 205	78	0.77 795	9.99 404	32		8
	56	29	9.21 685	76	9.22 283	78	0.77 717	9.99 402	31		4
38	0	**30**	9.21 761	75	9.22 361	77	0.77 639	9.99 400	**30**	22	0
	4	31	9.21 836	76	9.22 438	78	0.77 562	9.99 398	29		56
	8	32	9.21 912	75	9.22 516	77	0.77 484	9.99 396	28		52
	12	33	9.21 987	75	9.22 593	77	0.77 407	9.99 394	27		48
	16	34	9.22 062	75	9.22 670	77	0.77 330	9.99 392	26		44
38	20	35	9.22 137	74	9.22 747	77	0.77 253	9.99 390	25	21	40
	24	36	9.22 211	75	9.22 824	77	0.77 176	9.99 388	24		36
	28	37	9.22 286	75	9.22 901	76	0.77 099	9.99 385	23		32
	32	38	9.22 361	74	9.22 977	77	0.77 023	9.99 383	22		28
	36	39	9.22 435	74	9.23 054	76	0.76 946	9.99 381	21		24
38	40	**40**	9.22 509	74	9.23 130	76	0.76 870	9.99 379	**20**	21	20
	44	41	9.22 583	74	9.23 206	77	0.76 794	9.99 377	19		16
	48	42	9.22 657	74	9.23 283	76	0.76 717	9.99 375	18		12
	52	43	9.22 731	74	9.23 359	76	0.76 641	9.99 372	17		8
	56	44	9.22 805	73	9.23 435	75	0.76 565	9.99 370	16		4
39	0	45	9.22 878	74	9.23 510	76	0.76 490	9.99 368	15	21	0
	4	46	9.22 952	73	9.23 586	75	0.76 414	9.99 366	14		56
	8	47	9.23 025	73	9.23 661	76	0.76 339	9.99 364	13		52
	12	48	9.23 098	73	9.23 737	75	0.76 263	9.99 362	12		48
	16	49	9.23 171	73	9.23 812	75	0.76 188	9.99 359	11		44
39	20	**50**	9.23 244	73	9.23 887	75	0.76 113	9.99 357	**10**	20	40
	24	51	9.23 317	73	9.23 962	75	0.76 038	9.99 355	9		36
	28	52	9.23 390	72	9.24 037	75	0.75 963	9.99 353	8		32
	32	53	9.23 462	73	9.24 112	74	0.75 888	9.99 351	7		28
	36	54	9.23 535	72	9.24 186	[illegible]	0.75 814	9.99 348	6		24
39	40	55	9.23 607	72	9.24 261	74	0.75 739	9.99 346	5	20	20
	44	56	9.23 679	73	9.24 335	75	0.75 665	9.99 344	4		16
	48	57	9.23 752	71	9.24 410	74	0.75 590	9.99 342	3		12
	52	58	9.23 823	72	9.24 484	74	0.75 516	9.99 340	2		8
	56	59	9.23 895	72	9.24 558	74	0.75 442	9.99 337	1		4
40	0	**60**	9.23 967		9.24 632		0.75 368	9.99 335	**0**	20	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	m.	s.

80° **5ʰ**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0ʰ **10°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
40 0	**0**	9.23 967		9.24 632		0.75 368	9.99 335		**60**	20 0
4	1	9.24 039	72	9.24 706	74	0.75 294	9.99 333	2	59	56
8	2	9.24 110	71	9.24 779	73	0.75 221	9.99 331	2	58	52
12	3	9.24 181	71	9.24 853	74	0.75 147	9.99 328	3	57	48
16	4	9.24 253	72	9.24 926	73	0.75 074	9.99 326	2	56	44
			71		74			2		
40 20	5	9.24 324		9.25 000		0.75 000	9.99 324		55	19 40
24	6	9.24 395	71	9.25 073	73	0.74 927	9.99 322	2	54	36
28	7	9.24 466	71	7.25 146	73	0.74 854	9.99 319	3	53	32
32	8	9.24 536	70	9.25 219	73	0.74 781	9.99 317	2	52	28
36	9	9.24 607	71	9.25 292	73	0.74 708	9.99 315	2	51	24
			70		73			2		
40 40	**10**	9.24 677		9.25 365		0.74 635	9.99 313		**50**	19 20
44	11	9.24 748	71	9.25 437	72	0.74 563	9.99 310	3	49	16
48	12	9.24 818	70	9.25 510	73	0.74 490	9.99 308	2	48	12
52	13	9.24 888	70	9.25 582	72	0.74 418	9.99 306	2	47	8
56	14	9.24 958	70	9.25 655	73	0.74 345	9.99 304	2	46	4
			70		72			3		
41 0	15	9.25 028		9.25 727		0.74 273	9.99 301		45	19 0
4	16	9.25 098	70	9.25 799	72	0.74 201	9.99 299	2	44	56
8	17	9.25 168	70	9.25 871	72	0.74 129	9.99 297	2	43	52
12	18	9.25 237	69	9.25 943	72	0.74 057	9.99 294	3	42	48
16	19	9.25 307	70	9.26 015	72	0.73 985	9.99 292	2	41	44
			69		71			2		
41 20	**20**	9.25 376		9.26 086		0.73 914	9.99 290		**40**	18 40
24	21	9.25 445	69	9.26 158	72	0.73 842	9.99 288	2	39	36
28	22	9.25 514	69	9.26 229	71	0.73 771	9.99 285	3	38	32
32	23	9.25 583	69	9.26 301	72	0.73 699	9.99 283	2	37	28
36	24	9.25 652	69	9.26 372	71	0.73 628	9.99 281	2	36	24
			69		71			3		
41 40	25	9.25 721		9.26 443		0.73 557	9.99 278		35	18 20
44	26	9.25 790	69	9.26 514	71	0.73 486	9.99 276	2	34	16
48	27	9.25 858	68	9.26 585	71	0.73 415	9.99 274	2	33	12
52	28	9.25 927	69	9.26 655	70	0.73 345	9.99 271	3	32	8
56	29	9.25 995	68	9.26 726	71	0.73 274	9.99 269	2	31	4
			68		71			2		
42 0	**30**	9.26 063		9.26 797		0.73 203	9.99 267		**30**	18 0
4	31	9.26 131	68	9.26 867	70	0.73 133	9.99 264	3	29	56
8	32	9.26 199	68	9.26 937	70	0.73 063	9.99 262	2	28	52
12	33	9.26 267	68	9.27 008	71	0.72 992	9.99 260	2	27	48
16	34	9.26 335	68	9.27 078	70	0.72 922	9.99 257	3	26	44
			68		70			2		
42 20	35	9.26 403		9.27 148		0.72 852	9.99 255		25	17 40
24	36	9.26 470	67	9.27 218	70	0.72 782	9.99 252	3	24	36
28	37	9.26 538	68	9.27 288	70	0.72 712	9.99 250	2	23	32
32	38	9.26 605	67	9.27 357	69	0.72 643	9.99 248	2	22	28
36	39	9.26 672	67	9.27 427	70	0.72 573	9.99 245	3	21	24
			67		69			2		
42 40	**40**	9.26 739		9.27 496		0.72 504	9.99 243		**20**	17 20
44	41	9.26 806	67	9.27 566	70	0.72 434	9.99 241	2	19	16
48	42	9.26 873	67	9.27 635	69	0.72 365	9.99 238	3	18	12
52	43	9.26 940	67	9.27 704	69	0.72 296	9.99 236	2	17	8
56	44	9.27 007	67	9.27 773	69	0.72 227	9.99 233	3	16	4
			66		69			2		
43 0	45	9.27 073		9.27 842		0.72 158	9.99 231		15	17 0
4	46	9.27 140	67	9.27 911	69	0.72 089	9.99 229	2	14	56
8	47	9.27 206	66	9.27 980	69	0.72 020	9.99 226	3	13	52
12	48	9.27 273	67	9.28 049	69	0.71 951	9.99 224	2	12	48
16	49	9.27 339	66	9.28 117	68	0.71 883	9.99 221	3	11	44
			66		69			2		
43 20	**50**	9.27 405		9.28 186		0.71 814	9.99 219		**10**	16 40
24	51	9.27 471	66	9.28 254	68	0.71 746	9.99 217	2	9	36
28	52	9.27 537	66	9.28 323	69	0.71 677	9.99 214	3	8	32
32	53	9.27 602	65	9.28 391	68	0.71 609	9.99 212	2	7	28
36	54	9.27 668	66	9.28 459	68	0.71 541	9.99 209	3	6	24
			66		68			2		
43 40	55	9.27 734		9.28 527		0.71 473	9.99 207		5	16 20
44	56	9.27 799	65	9.28 595	68	0.71 405	9.99 204	3	4	16
48	57	9.27 864	65	9.28 662	67	0.71 338	9.99 202	2	3	12
52	58	9.27 930	66	9.28 730	68	0.71 270	9.99 200	2	2	8
56	59	9.27 995	65	9,28 798	68	0.71 202	9.99 197	3	1	4
			65		67			2		
44 0	**60**	9.28 060		9.28 865		0.71 135	9.99 195		**0**	16 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0^h 11°

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
44 0	**0**	9.28 060		9.28 865		0.71 135	9.99 195		**60**	16 0
4	1	9.28 125	65	9.28 933	68	0.71 067	9.99 192	3	59	56
8	2	9.28 190	65	9.29 000	67	0.71 000	9.99 190	2	58	52
12	3	9.28 254	64	9.29 067	67	0.70 933	9.99 187	3	57	48
16	4	9.28 319	65	9.29 134	67	0.70 866	9.99 185	2	56	44
44 20	5	9.28 384	65	9.29 201	67	0.70 799	9.99 182	3	55	15 40
24	6	9.28 448	64	9.29 268	67	0.70 732	9.99 180	2	54	36
28	7	9.28 512	64	9.29 335	67	0.70 665	9.99 177	3	53	32
32	8	9.28 577	65	9.29 402	67	0.70 598	9.99 175	2	52	28
36	9	9.28 641	64	9.29 468	66	0.70 532	9.99 172	3	51	24
44 40	**10**	9.28 705	64	9.29 535	67	0.70 465	9.99 170	2	**50**	15 20
44	11	9.28 769	64	9.29 601	66	0.70 399	9.99 167	3	49	16
48	12	9.28 833	64	9.29 668	67	0.70 332	9.99 165	2	48	12
52	13	9.28 896	63	9.29 734	66	0.70 266	9.99 162	3	47	8
56	14	9.28 960	64	9.29 800	66	0.70 200	9.99 160	2	46	4
45 0	15	9.29 024	64	9.29 866	66	0.70 134	9.99 157	3	45	15 0
4	16	9.29 087	63	9.29 932	66	0.70 068	9.99 155	2	44	56
8	17	9.29 150	63	9.29 998	66	0.70 002	9.99 152	3	43	52
12	18	9.29 214	64	9.30 064	66	0.69 936	9.99 150	2	42	48
16	19	9.29 277	63	9.30 130	66	0.69 870	9.99 147	3	41	44
45 20	**20**	9.29 340	63	9.30 195	65	0.69 805	9.99 145	2	**40**	14 40
24	21	9.29 403	63	9.30 261	66	0.69 739	9.99 142	3	39	36
28	22	9.29 466	63	9.30 326	65	0.69 674	9.99 140	2	38	32
32	23	9.29 529	63	9.30 391	65	0.69 609	9.99 137	3	37	28
36	24	9.29 591	62	9.30 457	66	0.69 543	9.99 135	2	36	24
45 40	25	9.29 654	63	9.30 522	65	0.69 478	9.99 132	3	35	14 20
44	26	9.29 716	62	9.30 587	65	0.69 413	9.99 130	2	34	16
48	27	9.29 779	63	9.30 652	65	0.69 348	9.99 127	3	33	12
52	28	9.29 841	62	9.30 717	65	0.69 283	9.99 124	3	32	8
56	29	9.29 903	62	9.30 782	65	0.69 218	9.99 122	2	31	4
46 0	**30**	9.29 966	63	9.30 846	64	0.69 154	9.99 119	3	**30**	14 0
4	31	9.30 028	62	9.30 911	65	0.69 089	9.99 117	2	29	56
8	32	9.30 090	62	9.30 975	64	0.69 025	9.99 114	3	28	52
12	33	9.30 151	61	9.31 040	65	0.68 960	9.99 112	2	27	48
16	34	9.30 213	62	9.31 104	64	0.68 896	9.99 109	3	26	44
46 20	35	9.30 275	62	9.31 168	64	0.68 832	9.99 106	3	25	13 40
24	36	9.30 336	61	9.31 233	65	0.68 767	9.99 104	2	24	36
28	37	9.30 398	62	9.31 297	64	0.68 703	9.99 101	3	23	32
32	38	9.30 459	61	9.31 361	64	0.68 639	9.99 099	2	22	28
36	39	9.30 521	62	9.31 425	64	0.68 575	9.99 096	3	21	24
46 40	**40**	9.30 582	61	9.31 489	64	0.68 511	9.99 093	3	**20**	13 20
44	41	9.30 643	61	9.31 552	63	0.68 448	9.99 091	2	19	16
48	42	9.30 704	61	9.31 616	64	0.68 384	9.99 088	3	18	12
52	43	9.30 765	61	9.31 679	63	0.68 321	9.99 086	2	17	8
56	44	9.30 826	61	9.31 743	64	0.68 257	9.99 083	3	16	4
47 0	45	9.30 887	61	9.31 806	63	0.68 194	9.99 080	3	15	13 0
4	46	9.30 947	60	9.31 870	64	0.68 130	9.99 078	2	14	56
8	47	9.31 008	61	9.31 933	63	0.68 067	9.99 075	3	13	52
12	48	9.31 068	60	9.31 996	63	0.68 004	9.99 072	3	12	48
16	49	9.31 129	61	9.32 059	63	0.67 941	9.99 070	2	11	44
47 20	**50**	9.31 189	60	9.32 122	63	0.67 878	9.99 067	3	**10**	12 40
24	51	9.31 250	61	9.32 185	63	0.67 815	9.99 064	3	9	36
28	52	9.31 310	60	9.32 248	63	0.67 752	9.99 062	2	8	32
32	53	9.31 370	60	9.32 311	63	0.67 689	9.99 059	3	7	28
36	54	9.31 430	60	9.32 373	62	0.67 627	9.99 056	3	6	24
47 40	55	9.31 490	60	9.32 436	63	0.67 564	9.99 054	2	5	12 20
44	56	9.31 549	59	9.32 498	62	0.67 502	9.99 051	3	4	16
48	57	9.31 609	60	9.32 561	63	0.67 439	9.99 048	3	3	12
52	58	9.31 669	60	9.32 623	62	0.67 377	9.99 046	2	2	8
56	59	9.31 728	59	9.32 685	62	0.67 315	9.99 043	3	1	4
48 0	**60**	9.31 788	60	9.32 747	62	0.67 253	9.99 040	3	**0**	12 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0h | **12°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
48	0	**0**	9.31 788	59	9.32 747	63	0.67 253	9.99 040	2	**60**	12	0
	4	1	9.31 847	60	9.32 810	62	0.67 190	9.99 038	3	59		56
	8	2	9.31 907	59	9.32 872	61	0.67 128	9.99 035	3	58		52
	12	3	9.31 966	59	9.32 933	62	0.67 067	9.99 032	2	57		48
	16	4	9.32 025	59	9.32 995	62	0.67 005	9.99 030	3	56		44
48	20	5	9.32 084	59	9.33 057	62	0.66 943	9.99 027	3	55	11	40
	24	6	9.32 143	59	9.33 119	61	0.66 881	9.99 024	2	54		36
	28	7	9.32 202	59	9.33 180	62	0.66 820	9.99 022	3	53		32
	32	8	9.32 261	58	9.33 242	61	0.66 758	9.99 019	3	52		28
	36	9	9.32 319	59	9.33 303	62	0.66 697	9.99 016	3	51		24
48	40	**10**	9.32 378	59	9.33 365	61	0.66 635	9.99 013	2	**50**	11	20
	44	11	9.32 437	58	9.33 426	61	0.66 574	9.99 011	3	49		16
	48	12	9.32 495	58	9.33 487	61	0.66 513	9.99 008	3	48		12
	52	13	9.32 553	59	9.33 548	61	0.66 452	9.99 005	3	47		8
	56	14	9.32 612	58	9.33 609	61	0.66 391	9.99 002	2	46		4
49	0	15	9.32 670	58	9.33 670	61	0.66 330	9.99 000	3	45	11	0
	4	16	9.32 728	58	9.33 731	61	0.66 269	9.98 997	3	44		56
	8	17	9.32 786	58	9.33 792	61	0.66 208	9.98 994	3	43		52
	12	18	9.32 844	58	9.33 853	60	0.66 147	9.98 991	2	42		48
	16	19	9.32 902	58	9.33 913	61	0.66 087	9.98 989	3	41		44
49	20	**20**	9.32 960	58	9.33 974	60	0.66 026	9.98 986	3	**40**	10	40
	24	21	9.33 018	57	9.34 034	61	0.65 966	9.98 983	3	39		36
	28	22	9.33 075	58	9.34 095	60	0.65 905	9.98 980	2	38		32
	32	23	9.33 133	57	9.34 155	60	0.65 845	9.98 978	3	37		28
	36	24	9.33 190	58	9.34 215	61	0.65 785	9.98 975	3	36		24
49	40	25	9.33 248	57	9.34 276	60	0.65 724	9.98 972	3	35	10	20
	44	26	9.33 305	57	9.34 336	60	0.65 664	9.98 969	2	34		16
	48	27	9.33 362	58	9.34 396	60	0.65 604	9.98 967	3	33		12
	52	28	9.33 420	57	9.34 456	60	0.65 544	9.98 964	3	32		8
	56	29	9.33 477	57	9.34 516	60	0.65 484	9.98 961	3	31		4
50	0	**30**	9.33 534	57	9.34 576	59	0.65 424	9.98 958	3	**30**	10	0
	4	31	9.33 591	56	9.34 635	60	0.65 365	9.98 955	2	29		56
	8	32	9.33 647	57	9.34 695	60	0.65 305	9.98 953	3	28		52
	12	33	9.33 704	57	9.34 755	59	0.65 245	9.98 950	3	27		48
	16	34	9.33 761	57	9.34 814	60	0.65 186	9.98 947	3	26		44
50	20	35	9.33 818	56	9.34 874	59	0.65 126	9.98 944	3	25	9	40
	24	36	9.33 874	57	9.34 933	59	0.65 067	9.98 941	3	24		36
	28	37	9.33 931	56	9.34 992	59	0.65 008	9.98 938	2	23		32
	32	38	9.33 987	56	9.35 051	60	0.64 949	9.98 936	3	22		28
	36	39	9.34 043	57	9.35 111	59	0.64 889	9.98 933	3	21		24
50	40	**40**	9.34 100	56	9.35 170	59	0.64 830	9.98 930	3	**20**	9	20
	44	41	9.34 156	56	9.35 229	59	0.64 771	9.98 927	3	19		16
	48	42	9.34 212	56	9.35 288	59	0.64 712	9.98 924	3	18		12
	52	43	9.34 268	56	9.35 347	58	0.64 653	9.98 921	2	17		8
	56	44	9.34 324	56	9.35 405	59	0.64 595	9.98 919	3	16		4
51	0	45	9.34 380	56	9.35 464	59	0.64 536	9.98 916	3	15	9	0
	4	46	9.34 436	55	9.35 523	58	0.64 477	9.98 913	3	14		56
	8	47	9.34 491	56	9.35 581	59	0.64 419	9.98 910	3	13		52
	12	48	9.34 547	55	9.35 640	58	0.64 360	9.98 907	3	12		48
	16	49	9.34 602	56	9.35 698	59	0.64 302	9.98 904	3	11		44
51	20	**50**	9.34 658	55	9.35 757	58	0.64 243	9.98 901	3	**10**	8	40
	24	51	9.34 713	56	9.35 815	58	0.64 185	9.98 898	2	9		36
	28	52	9.34 769	55	9.35 873	58	0.64 127	9.98 896	3	8		32
	32	53	9.34 824	55	9.35 931	58	0.64 069	9.98 893	3	7		28
	36	54	9.34 879	55	9.35 989	58	0.64 011	9.98 890	3	6		24
51	40	55	9.34 934	55	9.36 047	58	0.63 953	9.98 887	3	5	8	20
	44	56	9.34 989	55	9.36 105	58	0.63 895	9.98 884	3	4		16
	48	57	9.35 044	55	9.36 163	58	0.63 837	9.98 881	3	3		12
	52	58	9.35 099	55	9.36 221	58	0.63 779	9.98 878	3	2		8
	56	59	9.35 154	55	9.36 279	57	0.63 721	9.98 875	3	1		4
52	0	**60**	9.35 209		9.36 336		0.63 664	9.98 872		**0**	8	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

77° | **5h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0ʰ **13°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
52	0	**0**	9.35 209	54	9.36 336	58	0.63 664	9.98 872	3	**60**	8	0
	4	1	9.35 263	55	9.36 394	58	0.63 606	9.98 869	2	59		56
	8	2	9.35 318	55	9.36 452	57	0.63 548	9.98 867	3	58		52
	12	3	9.35 373	54	9.36 509	57	0.63 491	9.98 864	3	57		48
	16	4	9.35 427	54	9.36 566	58	0.63 434	9.98 861	3	56		44
52	20	5	9.35 481	55	9.36 624	57	0.63 376	9.98 858	3	55	7	40
	24	6	9.35 536	54	9.36 681	57	0.63 319	9.98 855	3	54		36
	28	7	9.35 590	54	9.36 738	57	0.63 262	9.98 852	3	53		32
	32	8	9.35 644	54	9.36 795	57	0.63 205	9.98 849	3	52		28
	36	9	9.35 698	54	9.36 852	57	0.63 148	9.98 846	3	51		24
52	40	**10**	9.35 752	54	9.36 909	57	0.63 091	9.98 843	3	**50**	7	20
	44	11	9.35 806	54	9.36 966	57	0.63 034	9.98 840	3	49		16
	48	12	9.35 860	54	9.37 023	57	0.62 977	9.98 837	3	48		12
	52	13	9.35 914	54	9.37 080	57	0.62 920	9.98 834	3	47		8
	56	14	9.35 968	54	9.37 137	56	0.62 863	9.98 831	3	46		4
53	0	15	9.36 022	53	9.37 193	57	0.62 807	9.98 828	3	45	7	0
	4	16	9.36 075	54	9.37 250	56	0.62 750	9.98 825	3	44		56
	8	17	9.36 129	53	9.37 306	57	0.62 694	9.98 822	3	43		52
	12	18	9.36 182	54	9.37 363	56	0.62 637	9.98 819	3	42		48
	16	19	9.36 236	53	9.37 419	57	0.62 581	9.98 816	3	41		44
53	20	**20**	9.36 289	53	9.37 476	56	0.62 524	9.98 813	3	**40**	6	40
	24	21	9.36 342	53	9.37 532	56	0.62 468	9.98 810	3	39		36
	28	22	9.36 395	54	9.37 588	56	0.62 412	9.98 807	3	38		32
	32	23	9.36 449	53	9.37 644	56	0.62 356	9.98 804	3	37		28
	36	24	9.36 502	53	9.37 700	56	0.62 300	9.98 801	3	36		24
53	40	25	9.36 555	53	9.37 756	56	0.62 244	9.98 798	3	35	6	20
	44	26	9.36 608	52	9.37 812	56	0.62 188	9.98 795	3	34		16
	48	27	9.36 660	53	9.37 868	56	0.62 132	9.98 792	3	33		12
	52	28	9.36 713	53	9.37 924	56	0.62 076	9.98 789	3	32		8
	56	29	9.36 766	53	9.37 980	55	0.62 020	9.98 786	3	31		4
54	0	**30**	9.36 819	52	9.38 035	56	0.61 965	9.98 783	3	**30**	6	0
	4	31	9.36 871	53	9.38 091	56	0.61 909	9.98 780	3	29		56
	8	32	9.36 924	52	9.38 147	55	0.61 853	9.98 777	3	28		52
	12	33	9.36 976	52	9.38 202	55	0.61 798	9.98 774	3	27		48
	16	34	9.37 028	53	9.38 257	56	0.61 743	9.98 771	3	26		44
54	20	35	9.37 081	52	9.38 313	55	0.61 687	9.98 768	3	25	5	40
	24	36	9.37 133	52	9.38 368	55	0.61 632	9.98 765	3	24		36
	28	37	9.37 185	52	9.38 423	56	0.61 577	9.98 762	3	23		32
	32	38	9.37 237	52	9.38 479	55	0.61 521	9.98 759	3	22		28
	36	39	9.37 289	52	9.38 534	55	0.61 466	9.98 756	3	21		24
54	40	**40**	9.37 341	52	9.38 589	55	0.61 411	9.98 753	3	**20**	5	20
	44	41	9.37 393	52	9.38 644	55	0.61 356	9.98 750	4	19		16
	48	42	9.37 445	52	9.38 699	55	0.61 301	9.98 746	3	18		12
	52	43	9.37 497	52	9.38 754	54	0.61 246	9.98 743	3	17		8
	56	44	9.37 549	51	9.38 808	55	0.61 192	9.98 740	3	16		4
55	0	45	9.37 600	52	9.38 863	55	0.61 137	9.98 737	3	15	5	0
	4	46	9.37 652	51	9.38 918	54	0.61 082	9.98 734	3	14		56
	8	47	9.37 703	52	9.38 972	55	0.61 028	9.98 731	3	13		52
	12	48	9.37 755	51	9.39 027	55	0.60 973	9.98 728	3	12		48
	16	49	9.37 806	52	9.39 082	54	0.60 918	9.98 725	3	11		44
55	20	**50**	9.37 858	51	9.39 136	54	0.60 864	9.98 722	3	**10**	4	40
	24	51	9.37 909	51	9.39 190	55	0.60 810	9.98 719	4	9		36
	28	52	9.37 960	51	9.39 245	54	0.60 755	9.98 715	3	8		32
	32	53	9.38 011	51	9.39 299	54	0.60 701	9.98 712	3	7		28
	36	54	9.38 062	51	9.39 353	54	0.60 647	9.98 709	3	6		24
55	40	55	9.38 113	51	9.39 407	54	0.60 593	9.98 706	3	5	4	20
	44	56	9.38 164	51	9.39 461	54	0.60 539	9.98 703	3	4		16
	48	57	9.38 215	51	9.39 515	54	0.60 485	9.98 700	3	3		12
	52	58	9.38 266	51	9.39 569	54	0.60 431	9.98 697	3	2		8
	56	59	9.38 317	51	9.39 623	54	0.60 377	9.98 694	4	1		4
56	0	**60**	9.38 368		9.39 677		0.60 323	9.98 690		**0**	4	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

0^h 14°

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
56	0	**0**	9.38 368		9.39 677		0.60 323	9.98 690		**60**	4	0
	4	1	9.38 418	50	9.39 731	54	0.60 269	9.98 687	3	59		56
	8	2	9.38 469	51	9.39 785	54	0.60 215	9.98 684	3	58		52
	12	3	9.38 519	50	9.39 838	53	0.60 162	9.98 681	3	57		48
	16	4	9.38 570	51	9.39 892	54	0.60 108	9.98 678	3	56		44
56	20	5	9.38 620	50	9.39 945	53	0.60 055	9.98 675	3	55	3	40
	24	6	9.38 670	50	9.39 999	54	0.60 001	9.98 671	4	54		36
	28	7	9.38 721	51	9.40 052	53	0.59 948	9.98 668	3	53		32
	32	8	9.38 771	50	9.40 106	54	0.59 894	9.98 665	3	52		28
	36	9	9.38 821	50	9.40 159	53	0.59 841	9.98 662	3	51		24
56	40	**10**	9.38 871	50	9.40 212	53	0.59 788	9.98 659	3	**50**	3	20
	44	11	9.38 921	50	9.40 266	54	0.59 734	9.98 656	3	49		16
	48	12	9.38 971	50	9.40 319	53	0.59 681	9.98 652	4	48		12
	52	13	9.39 021	50	9.40 372	53	0.59 628	9.98 649	3	47		8
	56	14	9.39 071	50	9.40 425	53	0.59 575	9.98 646	3	46		4
57	0	15	9.39 121	50	9.40 478	53	0.59 522	9.98 643	3	45	3	0
	4	16	9.39 170	49	9.40 531	53	0.59 469	9.98 640	3	44		56
	8	17	9.39 220	50	9.40 584	53	0.59 416	9.98 636	4	43		52
	12	18	9.39 270	50	9.40 636	52	0.59 364	9.98 633	3	42		48
	16	19	9.39 319	49	9.40 689	53	0.59 311	9.98 630	3	41		44
57	20	**20**	9.39 369	50	9.40 742	53	0.59 258	9.98 627	3	**40**	2	40
	24	21	9.39 418	49	9.40 795	53	0.59 205	9.98 623	4	39		36
	28	22	9.39 467	49	9.40 847	52	0.59 153	9.98 620	3	38		32
	32	23	9.39 517	50	9.40 900	53	0.59 100	9.98 617	3	37		28
	36	24	9.39 566	49	9.40 952	52	0.59 048	9.98 614	3	36		24
57	40	25	9.39 615	49	9.41 005	53	0.58 995	9.98 610	4	35	2	20
	44	26	9.39 664	49	9.41 057	52	0.58 943	9.98 607	3	34		16
	48	27	9.39 713	49	9.41 109	52	0.58 891	9.98 604	3	33		12
	52	28	9.39 762	49	9.41 161	52	0.58 839	9.98 601	3	32		8
	56	29	9.39 811	49	9.41 214	53	0.58 786	9.98 597	4	31		4
58	0	**30**	9.39 860	49	9.41 266	52	0.58 734	9.98 594	3	**30**	2	0
	4	31	9.39 909	49	9.41 318	52	0.58 682	9.98 591	3	29		56
	8	32	9.39 958	49	9.41 370	52	0.58 630	9.98 588	3	28		52
	12	33	9.40 006	48	9.41 422	52	0.58 578	9.98 584	4	27		48
	16	34	9.40 055	49	9.41 474	52	0.58 526	9.98 581	3	26		44
58	20	35	9.40 103	48	9.41 526	52	0.58 474	9.98 578	3	25	1	40
	24	36	9.40 152	49	9.41 578	52	0.58 422	9.98 574	4	24		36
	28	37	9.40 200	48	9.41 629	51	0.58 371	9.98 571	3	23		32
	32	38	9.40 249	49	9.41 681	52	0.58 319	9.98 568	3	22		28
	36	39	9.40 297	48	9.41 733	52	0.58 267	9.98 565	3	21		24
58	40	**40**	9.40 346	49	9.41 784	51	0.58 216	9.98 561	4	**20**	1	20
	44	41	9.40 394	48	9.41 836	52	0.58 164	9.98 558	3	19		16
	48	42	9.40 442	48	9.41 887	51	0.58 113	9.98 555	3	18		12
	52	43	9.40 490	48	9.41 939	52	0.58 061	9.98 551	4	17		8
	56	44	9.40 538	48	9.41 990	51	0.58 010	9.98 548	3	16		4
59	0	45	9.40 586	48	9.42 041	51	0.57 959	9.98 545	3	15	1	0
	4	46	9.40 634	48	9.42 093	52	0.57 907	9.98 541	4	14		56
	8	47	9.40 682	48	9.42 144	51	0.57 856	9.98 538	3	13		52
	12	48	9.40 730	48	9.42 195	51	0.57 805	9.98 535	3	12		48
	16	49	9.40 778	48	9.42 246	51	0.57 754	9.98 531	4	11		44
59	20	**50**	9.40 825	47	9.42 297	51	0.57 703	9.98 528	3	**10**	0	40
	24	51	9.40 873	48	9.42 348	51	0.57 652	9.98 525	3	9		36
	28	52	9.40 921	48	9.42 399	51	0.57 601	9.98 521	4	8		32
	32	53	9.40 968	47	9.42 450	51	0.57 550	9.98 518	3	7		28
	36	54	9.41 016	48	9.42 501	51	0.57 499	9.98 515	3	6		24
59	40	55	9.41 063	47	9.42 552	51	0.57 448	9.98 511	4	5	0	20
	44	56	9.41 111	48	9.42 603	51	0.57 397	9.98 508	3	4		16
	48	57	9.41 158	47	9.42 653	50	0.57 347	9.98 505	3	3		12
	52	58	9.41 205	47	9.42 704	51	0.57 296	9.98 501	4	2		8
	56	59	9.41 252	47	9.42 755	51	0.57 245	9.98 498	3	1		4
60	0	**60**	9.41 300	48	9.42 805	50	0.57 195	9.98 494	4	**0**	0	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

75° 5^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1h **15°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
0	0	**0**	9.41 300		9.42 805		0.57 195	9.98 494		**60**	60	0
	4	1	9.41 347	47	9.42 856	51	0.57 144	9.98 491	3	59		56
	8	2	9.41 394	47	9.42 906	50	0.57 094	9.98 488	3	58		52
	12	3	9.41 441	47	9.42 957	51	0.57 043	9.98 484	4	57		48
	16	4	9.41 488	47	9.43 007	50	0.56 993	9.98 481	3	56		44
0	20	5	9.41 535	47	9.43 057	50	0.56 943	9.98 477	4	55	59	40
	24	6	9.41 582	47	9.43 108	51	0.56 892	9.98 474	3	54		36
	28	7	9.41 628	46	9.43 158	50	0.56 842	9.98 471	3	53		32
	32	8	9.41 675	47	9.43 208	50	0.56 792	9.98 467	4	52		28
	36	9	9.41 722	47	9.43 258	50	0.56 742	9.98 464	3	51		24
0	40	**10**	9.41 768	46	9.43 308	50	0.56 692	9.98 460	4	**50**	59	20
	44	11	9.41 815	47	9.43 358	50	0.56 642	9.98 457	3	49		16
	48	12	9.41 861	46	9.43 408	50	0.56 592	9.98 453	4	48		12
	53	13	9.41 908	47	9.43 458	50	0.56 542	9.98 450	3	47		8
	56	14	9.41 954	46	9.43 508	50	0.56 492	9.98 447	3	46		4
1	0	15	9.42 001	47	9.43 558	50	0.56 442	9.98 443	4	45	59	0
	4	16	9.42 047	46	9.43 607	49	0.56 393	9.98 440	3	44		56
	8	17	9.42 093	46	9.43 657	50	0.56 343	9.98 436	4	43		52
	12	18	9.42 140	47	9.43 707	50	0.56 293	9.98 433	3	42		48
	16	19	9.42 186	46	9.43 756	49	0.56 244	9.98 429	4	41		44
1	20	**20**	9.42 232	46	9.43 806	50	0.56 194	9.98 426	3	**40**	58	40
	24	21	9.42 278	46	9.43 855	49	0.56 145	9.98 422	4	39		36
	28	22	9.42 324	46	9.43 905	50	0.56 095	9.98 419	3	38		32
	32	23	9.42 370	46	9.43 954	49	0.56 046	9.98 415	4	37		28
	36	24	9.42 416	46	9.44 004	50	0.55 996	9.98 412	3	36		24
1	40	25	9.42 461	45	9.44 053	49	0.55 947	9.98 409	3	35	58	20
	44	26	9.42 507	46	9.44 102	49	0.55 898	9.98 405	4	34		16
	48	27	9.42 553	46	9.44 151	49	0.55 849	9.98 402	3	33		12
	52	28	9.42 599	46	9.44 201	50	0.55 799	9.98 398	4	32		8
	56	29	9.42 644	45	9.44 250	49	0.55 750	9.98 395	3	31		4
2	0	**30**	9.42 690	46	9.44 299	49	0.55 701	9.98 391	4	**30**	58	0
	4	31	9.42 735	45	9.44 348	49	0.55 652	9.98 388	3	29		56
	8	32	9.42 781	46	9.44 397	49	0.55 603	9.98 384	4	28		52
	12	33	9.42 826	45	9.44 446	49	0.55 554	9.98 381	3	27		48
	16	34	9.42 872	46	9.44 495	49	0.55 505	9.98 377	4	26		44
2	20	35	9.42 917	45	9.44 544	49	0.55 456	9.98 373	4	25	57	40
	24	36	9.42 962	45	9.44 592	48	0.55 408	9.98 370	3	24		36
	28	37	9.43 008	46	9.44 641	49	0.55 359	9.98 366	4	23		32
	32	38	9.43 053	45	9.44 690	49	0.55 310	9.98 363	3	22		28
	36	39	9.43 098	45	9.44 738	48	0.55 262	9.98 359	4	21		24
2	40	**40**	9.43 143	45	9.44 787	49	0.55 213	9.98 356	3	**20**	57	20
	44	41	9.43 188	45	9.44 836	49	0.55 164	9.98 352	4	19		16
	48	42	9.43 233	45	9.44 884	48	0.55 116	9.98 349	3	18		12
	52	43	9.43 278	45	9.44 933	49	0.55 067	9.98 345	4	17		8
	56	44	9.43 323	45	9.44 981	48	0.55 019	9.98 342	3	16		4
3	0	45	9.43 367	44	9.45 029	48	0.54 971	9.98 338	4	15	57	0
	4	46	9.43 412	45	9.45 078	49	0.54 922	9.98 334	4	14		56
	8	47	9.43 457	45	9.45 126	48	0.54 874	9.98 331	3	13		52
	12	48	9.43 502	45	9.45 174	48	0.54 826	9.98 327	4	12		48
	16	49	9.43 546	44	9.45 222	48	0.54 778	9.98 324	3	11		44
3	20	**50**	9.43 591	45	9.45 271	49	0.54 729	9.98 320	4	**10**	56	40
	24	51	9.43 635	44	9.45 319	48	0.54 681	9.98 317	3	9		36
	28	52	9.43 680	45	9.45 367	48	0.54 633	9.98 313	4	8		32
	32	53	9.43 724	44	9.45 415	48	0.54 585	9.98 309	4	7		28
	36	54	9.43 769	45	9.45 463	48	0.54 537	9.98 306	3	6		24
3	40	55	9.43 813	44	9.45 511	48	0.54 489	9.98 302	4	5	56	20
	44	56	9.43 857	44	9.45 559	48	0.54 441	9.98 299	3	4		16
	48	57	9.43 901	44	9.45 606	47	0.54 394	9.98 295	4	3		12
	52	58	9.43 946	45	9.45 654	48	0.54 346	9.98 291	4	2		8
	56	59	9.43 990	44	9.45 702	48	0.54 298	9.98 288	3	1		4
4	0	**60**	9.44 034	44	9.45 750	48	0.54 250	9.98 284	4	**0**	56	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

74° **4h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1h 16°

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
4	0	**0**	9.44 034		9.45 750		0.54 250	9.98 284		**60**	56	0
	4	1	9.44 078	44	9.45 797	47	0.54 203	9.98 281	3	59		56
	8	2	9.44 122	44	9.45 845	48	0.54 155	9.98 277	4	58		52
	12	3	9.44 166	44	9.45 892	47	0.54 108	9.98 273	4	57		48
	16	4	9.44 210	44	9.45 940	48	0.54 060	9.98 270	3	56		44
4	20	5	9.44 253	43	9.45 987	47	0.54 013	9.98 266	4	55	55	40
	24	6	9.44 297	44	9.46 035	48	0.53 965	9.98 262	4	54		36
	28	7	9.44 341	44	9.46 082	47	0.53 918	9.98 259	3	53		32
	32	8	9.44 385	44	9.46 130	48	0.53 870	9.98 255	4	52		28
	36	9	9.44 428	43	9.46 177	47	0.53 823	9.98 251	4	51		24
4	40	**10**	9.44 472	44	9.46 224	47	0.53 776	9.98 248	3	**50**	55	20
	44	11	9.44 516	44	9.46 271	47	0.53 729	9.98 244	4	49		16
	48	12	9.44 559	43	9.46 319	48	0.53 681	9.98 240	4	48		12
	52	13	9.44 602	43	9.46 366	47	0.53 634	9.98 237	3	47		8
	56	14	9.44 646	44	9.46 413	47	0.53 587	9.98 233	4	46		4
5	0	15	9.44 689	43	9.46 460	47	0.53 540	9.98 229	4	45	55	0
	4	16	9.44 733	44	9.46 507	47	0.53 493	9.98 226	3	44		56
	8	17	9.44 776	43	9.46 554	47	0.53 446	9.98 222	4	43		52
	12	18	9.44 819	43	9.46 601	47	0.53 399	9.98 218	4	42		48
	16	19	9.44 862	43	9.46 648	47	0.53 352	9.98 215	3	41		44
5	20	**20**	9.44 905	43	9.46 694	46	0.53 306	9.98 211	4	**40**	54	40
	24	21	9.44 948	43	9.46 741	47	0.53 259	9.98 207	4	39		36
	28	22	9.44 992	44	9.46 788	47	0.53 212	9.98 204	3	38		32
	32	23	9.45 035	43	9.46 835	47	0.53 165	9.98 200	4	37		28
	36	24	9.45 077	42	9.46 881	46	0.53 119	9.98 196	4	36		24
5	40	25	9.45 120	43	9.46 928	47	0.53 072	9.98 192	4	35	54	20
	44	26	9.45 163	43	9.46 975	47	0.53 025	9.98 189	3	34		16
	48	27	9.45 206	43	9.47 021	46	0.52 979	9.98 185	4	33		12
	52	28	9.45 249	43	9.47 068	47	0.52 932	9.98 181	4	32		8
	56	29	9.45 292	43	9.47 114	46	0.52 886	9.98 177	4	31		4
6	0	**30**	9.45 334	42	9.47 160	46	0.52 840	9.98 174	3	**30**	54	0
	4	31	9.45 377	43	9.47 207	47	0.52 793	9.98 170	4	29		56
	8	32	9.45 419	42	9.47 253	46	0.52 747	9.98 166	4	28		52
	12	33	9.45 462	43	9.47 299	46	0.52 701	9.98 162	4	27		48
	16	34	9.45 504	42	9.47 346	47	0.52 654	9.98 159	3	26		44
6	20	35	9.45 547	43	9.47 392	46	0.52 608	9.98 155	4	25	53	40
	24	36	9.45 589	42	9.47 438	46	0.52 562	9.98 151	4	24		36
	28	37	9.45 632	43	9.47 484	46	0.52 516	9.98 147	4	23		32
	32	38	9.45 674	42	9.47 530	46	0.52 470	9.98 144	3	22		28
	36	39	9.45 716	42	9.47 576	46	0.52 424	9.98 140	4	21		24
6	40	**40**	9.45 758	42	9.47 622	46	0.52 378	9.98 136	4	**20**	53	20
	44	41	9.45 801	43	9.47 668	46	0.52 332	9.98 132	4	19		16
	48	42	9.45 843	42	9.47 714	46	0.52 286	9.98 129	3	18		12
	52	43	9.45 885	42	9.47 760	46	0.52 240	9.98 125	4	17		8
	56	44	9.45 927	42	9.47 806	46	0.52 194	9.98 121	4	16		4
7	0	45	9.45 969	42	9.47 852	46	0.52 148	9.98 117	4	15	53	0
	4	46	9.46 011	42	9.47 897	45	0.52 103	9.98 113	4	14		56
	8	47	9.46 053	42	9.47 943	46	0.52 057	9.98 110	3	13		52
	12	48	9.46 095	42	9.47 989	46	0.52 011	9.98 106	4	12		48
	16	49	9.46 136	41	9.48 035	46	0.51 965	9.98 102	4	11		44
7	20	**50**	9.46 178	42	9.48 080	45	0.51 920	9.98 098	4	**10**	52	40
	24	51	9.46 220	42	9.48 126	46	0.51 874	9.98 094	4	9		36
	28	52	9.46 262	42	9.58 171	45	0.51 829	9.98 090	4	8		32
	32	53	9.46 303	41	9.48 217	46	0.51 783	9.98 087	3	7		28
	36	54	9.46 345	42	9.48 262	45	0.51 738	9.98 083	4	6		24
7	40	55	9.46 386	41	9.48 307	45	0.51 693	9.98 079	4	5	52	20
	44	56	9.46 428	42	9.48 353	46	0.51 647	9.98 075	4	4		16
	48	57	9.46 469	41	9.48 398	45	0.51 602	9.98 071	4	3		12
	52	58	9.46 511	42	9.48 443	45	0.51 557	9.98 067	4	2		8
	56	59	9.46 552	41	9.48 489	46	0.51 511	9.98 063	4	1		4
8	0	**60**	9.46 594	42	9.48 534	45	0.51 466	9.98 060	3	**0**	52	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1ʰ **17°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
8 0	**0**	9.46 594		9.48 534		0.51 466	9.98 060		**60**	52 0
4	1	9.46 635	41	9.48 579	45	0.51 421	9.98 056	4	59	56
8	2	9.46 676	41	9.48 624	45	0.51 376	9.98 052	4	58	52
12	3	9.46 717	41	9.48 669	45	0.51 331	9.98 048	4	57	48
16	4	9.46 758	41	9.48 714	45	0.51 286	9.98 044	4	56	44
8 20	5	9.46 800	42	9.48 759	45	0.51 241	9.98 040	4	55	51 40
24	6	9.46 841	41	9.48 804	45	0.51 196	9.98 036	4	54	36
28	7	9.46 882	41	9.48 849	45	0.51 151	9.98 032	4	53	32
32	8	9.46 923	41	9.48 894	45	0.51 106	9.98 029	3	52	28
36	9	9.46 964	41	9.48 939	45	0.51 061	9.98 025	4	51	24
8 40	**10**	9.47 005	41	9.48 984	45	0.51 016	9.98 021	4	**50**	51 20
44	11	9.47 045	40	9.49 029	45	0.50 971	9.98 017	4	49	16
48	12	9.47 086	41	9.49 073	44	0.50 927	9.98 013	4	48	12
52	13	9.47 127	41	9.49 118	45	0.50 882	9.98 009	4	47	8
56	14	9.47 168	41	9.49 163	45	0.50 837	9.98 005	4	46	4
9 0	15	9.47 209	41	9.49 207	44	0.50 793	9.98 001	4	45	51 0
4	16	9.47 249	40	9.49 252	45	0.50 748	9.97 997	4	44	56
8	17	9.47 290	41	9.49 296	44	0.50 704	9.97 993	4	43	52
12	18	9.47 330	40	9.49 341	45	0.50 659	9.97 989	4	42	48
16	19	9.47 371	41	9.49 385	44	0.50 615	9.97 986	3	41	44
9 20	**20**	9.47 411	40	9.49 430	45	0.50 570	9.97 982	4	**40**	50 40
24	21	9.47 452	41	9.49 474	44	0.50 526	9.97 978	4	39	36
28	22	9.47 492	40	9.49 519	45	0.50 481	9.97 974	4	38	32
32	23	9.47 533	41	9.49 563	44	0.50 437	9.97 970	4	37	28
36	24	9.47 573	40	9.49 607	44	0.50 393	9.97 966	4	36	24
9 40	25	9.47 613	40	9.49 652	45	0.50 348	9.97 962	4	35	50 20
44	26	9.47 654	41	9.49 696	44	0.50 304	9.97 958	4	34	16
48	27	9.47 694	40	9.49 740	44	0.50 260	9.97 954	4	33	12
52	28	9.47 734	40	9.49 784	44	0.50 216	9.97 950	4	32	8
56	29	9.47 774	40	9.49 828	44	0.50 172	9.97 946	4	31	4
10 0	**30**	9.47 814	40	9.49 872	44	0.50 128	9.97 942	4	**30**	50 0
4	31	9.47 854	40	9.49 916	44	0.50 084	9.97 938	4	29	56
8	32	9.47 894	40	9.49 960	44	0.50 040	9.97 934	4	28	52
12	33	9.47 934	40	9.50 004	44	0.49 996	9.97 930	4	27	48
16	34	9.47 974	40	9.50 048	44	0.49 952	9.97 926	4	26	44
10 20	35	9.48 014	40	9.50 092	44	0.49 908	9.97 922	4	25	49 40
24	36	9.48 054	40	9.50 136	44	0.49 864	9.97 918	4	24	36
28	37	9.48 094	40	9.50 180	44	0.49 820	9.97 914	4	23	32
32	38	9.48 133	39	9.50 223	43	0.49 777	9.97 910	4	22	28
36	39	9.48 173	40	9.50 267	44	0.49 733	9.97 906	4	21	24
10 40	**40**	9.48 213	40	9.50 311	44	0.49 689	9.97 902	4	**20**	49 20
44	41	9.48 252	39	9.50 355	44	0.49 645	9.97 898	4	19	16
48	42	9.48 292	40	9.50 398	43	0.49 602	9.97 894	4	18	12
52	43	9.48 332	40	9.50 442	44	0.49 558	9.97 890	4	17	8
56	44	9.48 371	39	9.50 485	43	0.49 515	9.97 886	4	16	4
11 0	45	9.48 411	40	9.50 529	44	0.49 471	9.97 882	4	15	49 0
4	46	9.48 450	39	9.50 572	44	0.49 428	9.97 878	4	14	56
8	47	9.48 490	40	9.50 616	44	0.49 384	9.97 874	4	13	52
12	48	9.48 529	39	9.50 659	43	0.49 341	9.97 870	4	12	48
16	49	9.48 568	39	9.50 703	44	0.49 297	9.97 866	4	11	44
11 20	**50**	9.48 607	39	9.50 746	43	0.49 254	9.97 861	5	**10**	48 40
24	51	9.48 647	40	9.50 789	43	0.49 211	9.97 857	4	9	36
28	52	9.48 686	39	9.50 833	44	0.49 167	9.97 853	4	8	32
32	53	9.48 725	39	9.50 876	43	0.49 124	9.97 849	4	7	28
36	54	9.48 764	39	9.50 919	43	0.49 081	9.97 845	4	6	24
11 40	55	9.48 803	39	9.50 962	43	0.49 038	9.97 841	4	5	48 20
44	56	9.48 842	39	9.51 005	43	0.48 995	9.97 837	4	4	16
48	57	9.48 881	39	9.51 048	43	0.48 952	9.97 833	4	3	12
52	58	9.48 920	39	9.51 092	44	0.48 908	9.97 829	4	2	8
56	59	9.48 959	39	9.51 135	43	0.48 865	9.97 825	4	1	4
12 0	**60**	9.48 998	39	9.51 178	43	0.48 822	9.97 821	4	**0**	48 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h **18°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
12	0	**0**	9.48 998	39	9.51 178	43	0.48 822	9.97 821	4	**60**	48	0
	4	1	9.49 037	39	9.51 221	43	0.48 779	9.97 817	5	59		56
	8	2	9.49 076	39	9.51 264	42	0.48 736	9.97 812	4	58		52
	12	3	9.49 115	38	9.51 306	43	0.48 694	9.97 808	4	57		48
	16	4	9.49 153	39	9.51 349	43	0.48 651	9.97 804	4	56		44
12	20	5	9.49 192	39	9.51 392	43	0.48 608	9.97 800	4	55	47	40
	24	6	9.49 231	38	9.51 435	43	0.48 565	9.97 796	4	54		36
	28	7	9.49 269	39	9.51 478	42	0.48 522	9.97 792	4	53		32
	32	8	9.49 308	39	9.51 520	43	0.48 480	9.97 788	4	52		28
	36	9	9.49 347	38	9.51 563	43	0.48 437	9.97 784	5	51		24
12	40	**10**	9.49 385	39	9.51 606	42	0.48 394	9.97 779	4	**50**	47	20
	44	11	9.49 424	38	9.51 648	43	0.48 352	9.97 775	4	49		16
	48	12	9.49 462	38	9.51 691	43	0.48 309	9.97 771	4	48		12
	52	13	9.49 500	39	9.51 734	42	0.48 266	9.97 767	4	47		8
	56	14	9.49 539	38	9.51 776	43	0.48 224	9.97 763	4	46		4
13	0	15	9.49 577	38	9.51 819	42	0.48 181	9.97 759	5	45	47	0
	4	16	9.49 615	39	9.51 861	42	0.48 139	9.97 754	4	44		56
	8	17	9.49 654	38	9.51 903	43	0.48 097	9.97 750	4	43		52
	12	18	9.49 692	38	9.51 946	42	0.48 054	9.97 746	4	42		48
	16	19	9.49 730	38	9.51 988	43	0.48 012	9.97 742	4	41		44
13	20	**20**	9.49 768	38	9.52 031	42	0.47 969	9.97 738	4	**40**	46	40
	24	21	9.49 806	38	9.52 073	42	0.47 927	9.97 734	5	39		36
	28	22	9.49 844	38	9.52 115	42	0.47 885	9.97 729	4	38		32
	32	23	9.49 882	38	9.52 157	43	0.47 843	9.97 725	4	37		28
	36	24	9.49 920	38	9.52 200	42	0.47 800	9.97 721	4	36		24
13	40	25	9.49 958	38	9.52 242	42	0.47 758	9.97 717	4	35	46	20
	44	26	9.49 996	38	9.52 284	42	0.47 716	9.97 713	5	34		16
	48	27	9.50 034	38	9.52 326	42	0.47 674	9.97 708	4	33		12
	52	28	9.50 072	38	9.52 368	42	0.47 632	9.97 704	4	32		8
	56	29	9.50 110	38	9.52 410	42	0.47 590	9.97 700	4	31		4
14	0	**30**	9.50 148	37	9.52 452	42	0.47 548	9.97 696	5	**30**	46	0
	4	31	9.50 185	38	9.52 494	42	0.47 506	9.97 691	4	29		56
	8	32	9.50 223	38	9.52 536	42	0.47 464	9.97 687	4	28		52
	12	33	9.50 261	37	9.52 578	42	0.47 422	9.97 683	4	27		48
	16	34	9.50 298	38	9.52 620	41	0.47 380	9.97 679	5	26		44
14	20	35	9.50 336	38	9.52 661	42	0.47 339	9.97 674	4	25	45	40
	24	36	9.50 374	37	9.52 703	42	0.47 297	9.97 670	4	24		36
	28	37	9.50 411	38	9.52 745	42	0.47 255	9.97 666	4	23		32
	32	38	9.50 449	37	9.52 787	42	0.47 213	9.97 662	5	22		28
	36	39	9.50 486	37	9.52 829	41	0.47 171	9.97 657	4	21		24
14	40	**40**	9.50 523	38	9.52 870	42	0.47 130	9.97 653	4	**20**	45	20
	44	41	9.50 561	37	9.52 912	41	0.47 088	9.97 649	4	19		16
	48	42	9.50 598	37	9.52 953	42	0.47 047	9.97 645	5	18		12
	52	43	9.50 635	38	9.52 995	42	0.47 005	9.97 640	4	17		8
	56	44	9.50 673	37	9.53 037	41	0.46 963	9.97 636	4	16		4
15	0	45	9.50 710	37	9.53 078	42	0.46 922	9.97 632	4	15	45	0
	4	46	9.50 747	37	9.53 120	41	0.46 880	9.97 628	5	14		56
	8	47	9.50 784	37	9.53 161	41	0.46 839	9.97 623	4	13		52
	12	48	9.50 821	37	9.53 202	42	0.46 798	9.97 619	4	12		48
	16	49	9.50 858	38	9.53 244	41	0.46 756	9.97 615	5	11		44
15	20	**50**	9.50 896	37	9.53 285	42	0.46 715	9.97 610	4	**10**	44	40
	24	51	9.50 933	37	9.53 327	41	0.46 673	9.97 606	4	9		36
	28	52	9.50 970	37	9.53 368	41	0.46 632	9.97 602	5	8		32
	32	53	9.51 007	36	9.53 409	41	0.46 591	9.97 597	4	7		28
	36	54	9.51 043	37	9.53 450	42	0.46 550	9.97 593	4	6		24
15	40	55	9.51 080	37	9.53 492	41	0.46 508	9.97 589	5	5	44	20
	44	56	9.51 117	37	9.53 533	41	0.46 467	9.97 584	4	4		16
	48	57	9.51 154	37	9.53 5 4	41	0.46 426	9.97 580	4	3		12
	52	58	9.51 191	36	9.53 615	41	0.46 385	9.97 576	5	2		8
	56	59	9.51 227	37	9.53 656	41	0.46 344	9.97 571	4	1		4
16	0	**60**	9.51 264		9.53 697		0.46 303	9.97 567		**0**	44	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

71° **4^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1ʰ **19°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
16	0	**0**	9.51 264	37	9.53 697	41	0.46 303	9.97 567	4	**60**	44	0
	4	1	9.51 301	37	9.53 738	41	0.46 262	9.97 563	5	59		56
	8	2	9.51 338	36	9.53 779	41	0.46 221	9.97 558	4	58		52
	12	3	9.51 374	37	9.53 820	41	0.46 180	9.97 554	4	57		48
	16	4	9.51 411	36	9.53 861	41	0.46 139	9.97 550	5	56		44
16	20	5	9.51 447	37	9.53 902	41	0.46 098	9.97 545	4	55	43	40
	24	6	9.51 484	36	9.53 943	41	0.46 057	9.97 541	5	54		36
	28	7	9.51 520	37	9.53 984	41	0.46 016	9.97 536	4	53		32
	32	8	9.51 557	36	9.54 025	40	0.45 975	9.97 532	4	52		28
	36	9	9.51 593	36	9.54 065	41	0.45 935	9.97 528	5	51		24
16	40	**10**	9.51 629	37	9.54 106	41	0.45 894	9.97 523	4	**50**	43	20
	44	11	9.51 666	36	9.54 147	40	0.45 853	9.97 519	4	49		16
	48	12	9.51 702	36	9.54 187	41	0.45 813	9.97 515	5	48		12
	52	13	9.51 738	36	9.54 228	41	0.45 772	9.97 510	4	47		8
	56	14	9.51 774	37	9.54 269	40	0.45 731	9.97 506	5	46		4
17	0	15	9.51 811	36	9.54 309	41	0.45 691	9.97 501	4	45	43	0
	4	16	9.51 847	36	9.54 350	40	0.45 650	9.97 497	5	44		56
	8	17	9.51 883	36	9.54 390	41	0.45 610	9.97 492	4	43		52
	12	18	9.51 919	36	9.54 431	40	0.45 569	9.97 488	4	42		48
	16	19	9.51 955	36	9.54 471	41	0.45 529	9.97 484	5	41		44
17	20	**20**	9.51 991	36	9.54 512	40	0.45 488	9.97 479	4	**40**	42	40
	24	21	9.52 027	36	9.54 552	41	0.45 448	9.97 475	5	39		36
	28	22	9.52 063	36	9.54 593	40	0.45 407	9.97 470	4	38		32
	32	23	9.52 099	36	9.54 633	40	0.45 367	9.97 466	5	37		28
	36	24	9.52 135	36	9.54 673	41	0.45 327	9.97 461	4	36		24
17	40	25	9.52 171	36	9.54 714	40	0.45 286	9.97 457	4	35	42	20
	44	26	9.52 207	35	9.54 754	40	0.45 246	9.97 453	5	34		16
	48	27	9.52 242	36	9.54 794	41	0.45 206	9.97 448	4	33		12
	52	28	9.52 278	36	9.54 835	40	0.45 165	9.97 444	5	32		8
	56	29	9.52 314	36	9.54 875	40	0.45 125	9.97 439	4	31		4
18	0	**30**	9.52 350	35	9.54 915	40	0.45 085	9.97 435	5	**30**	42	0
	4	31	9.52 385	36	9.54 955	40	0.45 045	9.97 430	4	29		56
	8	32	9.52 421	35	9.54 995	40	0.45 005	9.97 426	5	28		52
	12	33	9.52 456	36	9.55 035	40	0.44 965	9.97 421	4	27		48
	16	34	9.52 492	35	9.55 075	40	0.44 925	9.97 417	5	26		44
18	20	35	9.52 527	36	9.55 115	40	0.44 885	9.97 412	4	25	41	40
	24	36	9.52 563	35	9.55 155	40	0.44 845	9.97 408	5	24		36
	28	37	9.52 598	36	9.55 195	40	0.44 805	9.97 403	4	23		32
	32	38	9.52 634	35	9.55 235	40	0.44 765	9.97 399	5	22		28
	36	39	9.52 669	36	9.55 275	40	0.44 725	9.97 394	4	21		24
18	40	**40**	9.52 705	35	9.55 315	40	0.44 685	9.97 390	5	**20**	41	20
	44	41	9.52 740	35	9.55 355	40	0.44 645	9.97 385	4	19		16
	48	42	9.52 775	36	9.55 395	39	0.44 605	9.97 381	5	18		12
	52	43	9.52 811	35	9.55 434	40	0.44 566	9.97 376	4	17		8
	56	44	9.52 846	35	9.55 474	40	0.44 526	9.97 372	5	16		4
19	0	45	9.52 881	35	9.55 514	40	0.44 486	9.97 367	4	15	41	0
	4	46	9.52 916	35	9.55 554	39	0.44 446	9.97 363	5	14		56
	8	47	9.52 951	35	9.55 593	40	0.44 407	9.97 358	5	13		52
	12	48	9.52 986	35	9.55 633	40	0.44 367	9.97 353	4	12		48
	16	49	9.53 021	35	9.55 673	39	0.44 327	9.97 349	5	11		44
19	20	**50**	9.53 056	36	9.55 712	40	0.44 288	9.97 344	4	**10**	40	40
	24	51	9.53 092	34	9.55 752	39	0.44 248	9.97 340	5	9		36
	28	52	9.53 126	35	9.55 791	40	0.44 209	9.97 335	4	8		32
	32	53	9.53 161	35	9.55 831	39	0.44 169	9.97 331	5	7		28
	36	54	9.53 196	35	9.55 870	40	0.44 130	9.97 326	4	6		24
19	40	55	9.53 231	35	9.55 910	39	0.44 090	9.97 322	5	5	40	20
	44	56	9.53 266	35	9.55 949	40	0.44 051	9.97 317	5	4		16
	48	57	9.53 301	35	9.55 989	39	0.44 011	9.97 312	4	3		12
	52	58	9.53 336	34	9.56 028	39	0.43 972	9.97 308	5	2		8
	56	59	9.53 370	35	9.56 067	40	0.43 933	9.97 303	4	1		4
20	0	**60**	9.53 405		9.56 107		0.43 893	9.97 299		**0**	40	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h 20°

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
20 0	**0**	9.53 405		9.56 107		0.43 893	9.97 299		**60**	40 0
4	1	9.53 440	35	9.56 146	39	0.43 854	9.97 294	5	59	56
8	2	9.53 475	35	9.56 185	39	0.43 815	9.97 289	5	58	52
12	3	9.53 509	34	9.56 224	39	0.43 776	9.97 285	4	57	48
16	4	9.53 544	35	9.56 264	40	0.43 736	9.97 280	5	56	44
20 20	5	9.53 578	34	9.56 303	39	0.43 697	9.97 276	4	55	39 40
24	6	9.53 613	35	9.56 342	39	0.43 658	9.97 271	5	54	36
28	7	9.53 647	34	9.56 381	39	0.43 619	9.97 266	5	53	32
32	8	9.53 682	35	9.56 420	39	0.43 580	9.97 262	4	52	28
36	9	9.53 716	34	9.56 459	39	0.43 541	9.97 257	5	51	24
20 40	**10**	9.53 751	35	9.56 498	39	0.43 502	9.97 252	5	**50**	39 20
44	11	9.53 785	34	9.56 537	39	0.43 463	9.97 248	4	49	16
48	12	9.53 819	34	9.56 576	39	0.43 424	9.97 243	5	48	12
52	13	9.53 854	35	9.56 615	39	0.43 385	9.97 238	5	47	8
56	14	9.53 888	34	9.56 654	39	0.43 346	9.97 234	4	46	4
21 0	15	9.53 922	34	9.56 693	39	0.43 307	9.97 229	5	45	39 0
4	16	9.53 957	35	9.56 732	39	0.43 268	9.97 224	5	44	56
8	17	9.53 991	34	9.56 771	39	0.43 229	9.97 220	4	43	52
12	18	9.54 025	34	9.56 810	39	0.43 190	9.97 215	5	42	48
16	19	9.54 059	34	9.56 849	39	0.43 151	9.97 210	5	41	44
21 20	**20**	9.54 093	34	9.56 887	38	0.43 113	9.97 206	4	**40**	38 40
24	21	9.54 127	34	9.56 926	39	0.43 074	9.97 201	5	39	36
28	22	9.54 161	34	9.56 965	39	0.43 035	9.97 196	5	38	32
32	23	9.54 195	34	9.57 004	39	0.42 996	9.97 192	4	37	28
36	24	9.54 229	34	9.57 042	38	0.42 958	9.97 187	5	36	24
21 40	25	9.54 263	34	9.57 081	39	0.42 919	9.97 182	5	35	38 20
44	26	9.54 297	34	9.57 120	39	0.42 880	9.97 178	4	34	16
48	27	9.54 331	34	9.57 158	38	0.42 842	9.97 173	5	33	12
52	28	9.54 365	34	9.57 197	39	0.42 803	9.97 168	5	32	8
56	29	9.54 399	34	9.57 235	38	0.42 765	9.97 163	5	31	4
22 0	**30**	9.54 433	34	9.57 274	39	0.42 726	9.97 159	4	**30**	38 0
4	31	9.54 466	33	9.57 312	38	0.42 688	9.97 154	5	29	56
8	32	9.54 500	34	9.57 351	39	0.42 649	9.97 149	5	28	52
12	33	9.54 534	34	9.57 389	38	0.42 611	9.97 145	4	27	48
16	34	9.54 567	33	9.57 428	39	0.42 572	9.97 140	5	26	44
22 20	35	9.54 601	34	9.57 466	38	0.42 534	9.97 135	5	25	37 40
24	36	9.54 635	34	9.57 504	38	0.42 496	9.97 130	5	24	36
28	37	9.54 668	33	9.57 543	39	0.42 457	9.97 126	4	23	32
32	38	9.54 702	34	9.57 581	38	0.42 419	9.97 121	5	22	28
36	39	9.54 735	33	9.57 619	38	0.42 381	9.97 116	5	21	24
22 40	**40**	9.54 769	34	9.57 658	39	0.42 342	9.97 111	5	**20**	37 20
44	41	9.54 802	33	9.57 696	38	0.42 304	9.97 107	4	19	16
48	42	9.54 836	34	9.57 734	38	0.42 266	9.97 102	5	18	12
52	43	9.54 869	33	9.57 772	38	0.42 228	9.97 097	5	17	8
56	44	9.54 903	34	9.57 810	38	0.42 190	9.97 092	5	16	4
23 0	45	9.54 936	33	9.57 849	39	0.42 151	9.97 087	5	15	37 0
4	46	9.54 969	33	9.57 887	38	0.42 113	9.97 083	4	14	56
8	47	9.55 003	34	9.57 925	38	0.42 075	9.97 078	5	13	52
12	48	9.55 036	33	9.57 963	38	0.42 037	9.97 073	5	12	48
16	49	9.55 069	33	9.58 001	38	0.41 999	9.97 068	5	11	44
23 20	**50**	9.55 102	33	9.58 039	38	0.41 961	9.97 063	5	**10**	36 40
24	51	9.55 136	34	9.58 077	38	0.41 923	9.97 059	4	9	36
28	52	9.55 169	33	9.58 115	38	0.41 885	9.97 054	5	8	32
32	53	9.55 202	33	9.58 153	38	0.41 847	9.97 049	5	7	28
36	54	9.55 235	33	9.58 191	38	0.41 809	9.97 044	5	6	24
23 40	55	9.55 268	33	9.58 229	38	0.41 771	9.97 039	5	5	36 20
44	56	9.55 301	33	9.58 267	38	0.41 733	9.97 035	4	4	16
48	57	9.55 334	33	9.58 304	37	0.41 696	9.97 030	5	3	12
52	58	9.55 367	33	9.58 342	38	0.41 658	9.97 025	5	2	8
56	59	9.55 400	33	9.58 380	38	0.41 620	9.97 020	5	1	4
24 0	**60**	9.55 433	33	9.58 418	38	0.41 582	9.97 015	5	**0**	36 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1h **21°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m. s.
24 0	**0**	9.55 433	33	9.58 418	37	0.41 582	9.97 015	5	**60**	36 0
4	1	9.55 466	33	9.58 455	38	0.41 545	9.97 010	5	59	56
8	2	9.55 499	33	9.58 493	38	0.41 507	9.97 005	4	58	52
12	3	9.55 532	32	9.58 531	38	0.41 469	9.97 001	5	57	48
16	4	9.55 564	33	9.58 569	37	0.41 431	9.96 996	5	56	44
24 20	5	9.55 597	33	9.58 606	38	0.41 394	9.96 991	5	55	35 40
24	6	9.55 630	33	9.58 644	37	0.41 356	9.96 986	5	54	36
28	7	9.55 663	32	9.58 681	38	0.41 319	9.96 981	5	53	32
32	8	9.55 695	33	9.58 719	38	0.41 281	9.96 976	5	52	28
36	9	9.55 728	33	9.58 757	37	0.41 243	9.96 971	5	51	24
24 40	**10**	9.55 761	32	9.58 794	38	0.41 206	9.96 966	4	**50**	35 20
44	11	9.55 793	33	9.58 832	37	0.41 168	9.96 962	5	49	16
48	12	9.55 826	32	9.58 869	38	0.41 131	9.96 957	5	48	12
52	13	9.55 858	33	9.58 907	37	0.41 093	9.96 952	5	47	8
56	14	9.55 891	32	9.58 944	37	0.41 056	9.96 947	5	46	4
25 0	15	9.55 923	33	9.58 981	38	0.41 019	9.96 942	5	45	35 0
4	16	9.55 956	32	9.59 019	37	0.40 981	9.96 937	5	44	56
8	17	9.55 988	33	9.59 056	38	0.40 944	9.96 932	5	43	52
12	18	9.56 021	32	9.59 094	37	0.40 906	9.96 927	5	42	48
16	19	9.56 053	32	9.59 131	37	0.40 869	9.96 922	5	41	44
25 20	**20**	9.56 085	33	9.59 168	37	0.40 832	9.96 917	5	**40**	34 40
24	21	9.56 118	32	9.59 205	38	0.40 795	9.96 912	5	39	36
28	22	9.56 150	32	9.59 243	37	0.40 757	9.96 907	4	38	32
32	23	9.56 182	33	9.59 280	37	0.40 720	9.96 903	5	37	28
36	24	9.56 215	32	9.59 317	37	0.40 683	9.96 898	5	36	24
25 40	25	9.56 247	32	9.59 354	37	0.40 646	9.96 893	5	35	34 20
44	26	9.56 279	32	9.59 391	38	0.40 609	9.96 888	5	34	16
48	27	9.56 311	32	9.59 429	37	0.40 571	9.96 883	5	33	12
52	28	9.56 343	32	9.59 466	37	0.40 534	9.96 878	5	32	8
56	29	9.56 375	33	9.59 503	37	0.40 497	9.96 873	5	31	4
26 0	**30**	9.56 408	32	9.59 540	37	0.40 460	9.96 868	5	**30**	34 0
4	31	9.56 440	32	9.59 577	37	0.40 423	9.96 863	5	29	56
8	32	9.56 472	32	9.59 614	37	0.40 386	9.96 858	5	28	52
12	33	9.56 504	32	9.59 651	37	0.40 349	9.96 853	5	27	48
16	34	9.56 536	32	9.59 688	37	0.40 312	9.96 848	5	26	44
26 20	**35**	9.56 568	31	9.59 725	37	0.40 275	9.96 843	5	25	33 40
24	36	9.56 599	32	9.59 762	37	0.40 238	9.96 838	5	24	36
28	37	9.56 631	32	9.59 799	36	0.40 201	9.96 833	5	23	32
32	38	9.56 663	32	9.59 835	37	0.40 165	9.96 828	5	22	28
36	39	9.56 695	32	9.59 872	37	0.40 128	9.96 823	5	21	24
26 40	**40**	9.56 727	32	9.59 909	37	0.40 091	9.96 818	5	**20**	33 20
44	41	9.56 759	31	9.59 946	37	0.40 054	9.96 813	5	19	16
48	42	9.56 790	32	9.59 983	36	0.40 017	9.96 808	5	18	12
52	43	9.56 822	32	9.60 019	37	0.39 981	9.96 803	5	17	8
56	44	9.56 854	32	9.60 056	37	0.39 944	9.96 798	5	16	4
27 0	45	9.56 886	31	9.60 093	37	0.39 907	9.96 793	5	15	33 0
4	46	9.56 917	32	9.60 130	36	0.39 870	9.96 788	5	14	56
8	47	9.56 949	31	9.60 166	37	0.39 834	9.96 783	5	13	52
12	48	9.56 980	32	9.60 203	37	0.39 797	9.96 778	6	12	48
16	49	9.57 012	32	9.60 240	36	0.39 760	9.96 772	5	11	44
27 20	**50**	9.57 044	31	9.60 276	37	0.39 724	9.96 767	5	**10**	32 40
24	51	9.57 075	32	9.60 313	36	0.39 687	9.96 762	5	9	36
28	52	9.57 107	31	9.60 349	37	0.39 651	9.96 757	5	8	32
32	53	9.57 138	31	9.60 386	36	0.39 614	9.96 752	5	7	28
36	54	9.57 169	32	9.60 422	37	0.39 578	9.96 747	5	6	24
27 40	55	9.57 201	31	9.60 459	36	0.39 541	9.96 742	5	5	32 20
44	56	9.57 232	32	9.60 495	37	0.39 505	9.96 737	5	4	16
48	57	9.57 264	31	9.60 532	36	0.39 468	9.96 732	5	3	12
52	58	9.57 295	31	9.60 568	37	0.39 432	9.96 727	5	2	8
56	59	9.57 326	32	9.60 605	36	0.39 395	9.96 722	5	1	4
28 0	**60**	9.57 358		9.60 641		0.39 359	9.96 717		**0**	32 0
		L. Los.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

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TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h **22°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
28 0	**0**	9.57 358	31	9.60 641	36	0.39 359	9.96 717	6	**60**	32 0
4	1	9.57 389	31	9.60 677	37	0.39 323	9.96 711	5	59	56
8	2	9.57 420	31	9.60 714	36	0.39 286	9.96 706	5	58	52
12	3	9.57 451	31	9.60 750	36	0.39 250	9.96 701	5	57	48
16	4	9.57 482	32	9.60 786	37	0.39 214	9.96 696	5	56	44
28 20	5	9.57 514	31	9.60 823	36	0.39 177	9.96 691	5	55	31 40
24	6	9.57 545	31	9.60 859	36	0.39 141	9.96 686	5	54	36
28	7	9.57 576	31	9.60 895	36	0.39 105	9.96 681	5	53	32
32	8	9.57 607	31	9.60 931	36	0.39 069	9.96 676	6	52	28
36	9	9.57 638	31	9.60 967	37	0.39 033	9.96 670	5	51	24
28 40	**10**	9.57 669	31	9.61 004	36	0.38 996	9.96 665	5	**50**	31 20
44	11	9.57 700	31	9.61 040	36	0.38 960	9.96 660	5	49	16
48	12	9.57 731	31	9.61 076	36	0.38 924	9.96 655	5	48	12
52	13	9.57 762	31	9.61 112	36	0.38 888	9.96 650	5	47	8
56	14	9.57 793	31	9.61 148	36	0.38 852	9.96 645	5	46	4
29 0	15	9.57 824	31	9.61 184	36	0.38 816	9.96 640	6	45	31 0
4	16	9.57 855	30	9.61 220	36	0.38 780	9.96 634	5	44	56
8	17	9.57 885	31	9.61 256	36	0.38 744	9.96 629	5	43	52
12	18	9.57 916	31	9.61 292	36	0.38 708	9.96 624	5	42	48
16	19	9.57 947	31	9.61 328	36	0.38 672	9.96 619	5	41	44
29 20	**20**	9.57 978	30	9.61 364	36	0.38 636	9.96 614	6	**40**	30 40
24	21	9.58 008	31	9.61 400	36	0.38 600	9.96 608	5	39	36
28	22	9.58 039	31	9.61 436	36	0.38 564	9.96 603	5	38	32
32	23	9.58 070	31	9.61 472	36	0.38 528	9.96 598	5	37	28
36	24	9.58 101	30	9.61 508	36	0.38 492	9.96 593	5	36	24
29 40	25	9.58 131	31	9,61 544	35	0.38 456	9.96 588	6	35	30 20
44	26	9.58 162	30	9.61 579	36	0.38 421	9.96 582	5	34	16
48	27	9.58 192	31	9.61 615	36	0.38 385	9.96 577	5	33	12
52	28	9.58 223	30	9.61 651	36	0.38 349	9.96 572	5	32	8
56	29	9.58 253	31	9.61 687	35	0.38 313	9.96 567	5	31	4
30 0	**30**	9.58 284	30	9.61 722	36	0.38 278	9.96 562	6	**30**	30 0
4	31	9.58 314	31	9.61 758	36	0.38 242	9.96 556	5	29	56
8	32	9.58 345	30	9.61 794	36	0.38 206	9.96 551	5	28	52
12	33	9.58 375	31	9.61 830	35	0.38 170	9.96 546	5	27	48
16	34	9.58 406	30	9.61 865	36	0.38 135	9.96 541	6	26	44
30 20	35	9.58 436	31	9.61 901	35	0.38 099	9.96 535	5	25	29 40
24	36	9.58 467	30	9.61 936	36	0.38 064	9.96 530	5	24	36
28	37	9.58 497	30	9.61 972	36	0.38 028	9.96 525	5	23	32
32	38	9.58 527	30	9.62 008	35	0.37 992	9.96 520	6	22	28
36	39	9.58 557	31	9.62 043	36	0.37 957	9.96 514	5	21	24
30 40	**40**	9.58 588	30	9.62 079	35	0.37 921	9.96 509	5	**20**	29 20
44	41	9.58 618	30	9.62 114	36	0.37 886	9.96 504	6	19	16
48	42	9.58 648	30	9.62 150	35	0.37 850	9.96 498	5	18	12
52	43	9.58 678	31	9.62 185	36	0.37 815	9.96 493	5	17	8
56	44	9.58 709	30	9.62 221	35	0.37 779	9.96 488	5	16	4
31 0	45	9.58 739	30	9,62 256	36	0.37 744	9.96 483	6	15	29 0
4	46	9.58 769	30	9.62 292	35	0.37 708	9.96 477	5	14	56
8	47	9.58 799	30	9.62 327	35	0.37 673	9.96 472	5	13	52
12	48	9.58 829	30	9.62 362	36	0.37 638	9.96 467	6	12	48
16	49	9.58 859	30	9.62 398	35	0.37 602	9.96 461	5	11	44
31 20	**50**	9.58 889	30	9.62 433	35	0.37 567	9.96 456	5	**10**	28 40
24	51	9.58 919	30	9.62 468	36	0.37 532	9.96 451	6	9	36
28	52	9.58 949	30	9.62 504	35	0.37 496	9.96 445	5	8	32
32	53	9.58 979	30	9.62 539	35	0.37 461	9.96 440	5	7	28
36	54	9.59 009	30	9.62 574	35	0.37 426	9.96 435	6	6	24
31 40	55	9.59 039	30	9.62 609	36	0.37 391	9.96 429	5	5	28 20
44	56	9.59 069	29	9.62 645	35	0.37 355	9.96 424	5	4	16
48	57	9.59 098	30	9.62 680	35	0.37 320	9.96 419	6	3	12
52	58	9.59 128	30	9.62 715	35	0.37 285	9.96 413	5	2	8
56	59	9.59 158	30	9.62 750	35	0.37 250	9.96 408	5	1	4
32 0	**60**	9.59 188		9.62 785		0.37 215	9.96 403		**0**	28 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

67° 4^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h **23°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
32	0	**0**	9.59 188	30	9.62 785	35	0.37 215	9.96 403	6	**60**	28	0
	4	1	9.59 218	29	9.62 820	35	0.37 180	9.96 397	5	59		56
	8	2	9.59 247	30	9.62 855	35	0.37 145	9.96 392	5	58		52
	12	3	9.59 277	30	9.62 890	36	0.37 110	9.96 387	6	57		48
	16	4	9.59 307	29	9.62 926	35	0.37 074	9.96 381	5	56		44
32	20	5	9.59 336	30	9.62 961	35	0.37 039	9.96 376	6	55	27	40
	24	6	9.59 366	30	9.62 996	35	0.37 004	9.96 370	5	54		36
	28	7	9.59 396	29	9.63 031	35	0.36 969	9.96 365	5	53		32
	32	8	9.59 425	30	9.63 066	35	0.36 934	9.96 360	6	52		28
	36	9	9.59 455	29	9.63 101	34	0.36 899	9.96 354	5	51		24
32	40	**10**	9.59 484	30	9.63 135	35	0.36 865	9.96 349	6	**50**	27	20
	44	11	9.59 514	29	9.63 170	35	0.36 830	9.96 343	5	49		16
	48	12	9.59 543	30	9.63 205	35	0.36 795	9.96 338	5	48		12
	52	13	9.59 573	29	9.63 240	35	0.36 760	9.96 333	6	47		8
	56	14	9.59 602	30	9.63 275	35	0.36 725	9.96 327	5	46		4
33	0	15	9.59 632	29	9.63 310	35	0.36 690	9.96 322	6	45	27	0
	4	16	9.59 661	29	9.63 345	34	0.36 655	9.96 316	5	44		56
	8	17	9.69 690	30	9.63 379	35	0.36 621	9.96 311	6	43		52
	12	18	9.59 720	29	9.63 414	35	0.36 586	9.96 305	5	42		48
	16	19	9.59 749	29	9.63 449	35	0.36 551	9.96 300	6	41		44
33	20	**20**	9.59 778	30	9.63 484	35	0.36 516	9.96 294	5	**40**	26	40
	24	21	9.59 808	29	9.63 519	34	0.36 481	9.96 289	5	39		36
	28	22	9.59 837	29	9.63 553	35	0.36 447	9.96 284	6	38		32
	32	23	9.59 866	29	9.63 588	35	0.36 412	9.96 278	5	37		28
	36	24	9.59 895	29	9.63 623	34	0.36 377	9.96 273	6	36		24
33	40	25	9.59 924	30	9.63 657	35	0.36 343	9.96 267	5	35	26	20
	44	26	9.59 954	29	9.63 692	34	0.36 308	9.96 262	6	34		16
	48	27	9.59 983	29	9.63 726	35	0.36 274	9.96 256	5	33		12
	52	28	9.60 012	29	9.63 761	35	0.36 239	9.96 251	6	32		8
	56	29	9.60 041	29	9.63 796	34	0.36 204	9.96 245	5	31		4
34	0	**30**	9.60 070	29	9.63 830	35	0.36 170	9.96 240	6	**30**	26	0
	4	31	9.60 099	29	9.63 865	34	0.36 135	9.96 234	5	29		56
	8	32	9.60 128	29	9.63 899	35	0.36 101	9.96 229	6	28		52
	12	33	9.60 157	29	9.63 934	34	0.36 066	9.96 223	5	27		48
	16	34	9.60 186	29	9.63 968	35	0.36 032	9.96 218	6	26		44
34	20	35	9.60 215	29	9.64 003	34	0.35 997	9.96 212	5	25	25	40
	24	36	9.60 244	29	9.64 037	35	0.35 963	9.96 207	6	24		36
	28	37	9.60 273	29	9.64 072	34	0.35 928	9.96 201	5	23		32
	32	38	9.60 302	29	9.64 106	34	0.35 894	9.96 196	6	22		28
	36	39	9.60 331	28	9.64 140	35	0.35 860	9.96 190	5	21		24
34	40	**40**	9.60 359	29	9.64 175	34	0.35 825	9.96 185	6	**20**	25	20
	44	41	9.60 388	29	9.64 209	34	0.35 791	9.96 179	5	19		16
	48	42	9.60 417	29	9.64 243	35	0.35 757	9.96 174	6	18		12
	52	43	9.60 446	28	9.64 278	34	0.35 722	9.96 168	6	17		8
	56	44	9.60 474	29	9.64 312	34	0.35 688	9.96 162	5	16		4
35	0	45	9.60 503	29	9.64 346	35	0.35 654	9.96 157	6	15	25	0
	4	46	9.60 532	29	9.64 381	34	0.35 619	9.96 151	5	14		56
	8	47	9.60 561	28	9.64 415	34	0.35 585	9.96 146	6	13		52
	12	48	9.60 589	29	9.64 449	34	0.35 551	9.96 140	5	12		48
	16	49	9.60 618	28	9.64 483	34	0.35 517	9.96 135	6	11		44
35	20	**50**	9.60 646	29	9.64 517	35	0.35 483	9.96 129	6	**10**	24	40
	24	51	9.60 675	29	9.64 552	34	0.35 448	9.96 123	5	9		36
	28	52	9.60 704	28	9.64 586	34	0.35 414	9.96 118	6	8		32
	32	53	9.60 732	29	9.64 620	34	0.35 380	9.96 112	5	7		28
	36	54	9.60 761	28	9.64 654	34	0.35 346	9.96 107	6	6		24
35	40	55	9.60 789	29	9.64 688	34	0.35 212	9.96 101	6	5	24	20
	44	56	9.60 818	28	9.64 722	34	0.35 278	9.96 095	5	4		16
	48	57	9.60 846	29	9.64 756	34	0.35 244	9.96 090	6	3		12
	52	58	9.60 875	28	9.64 790	34	0.35 210	9.96 084	5	2		8
	56	59	9.60 903	28	9.64 824	34	0.35 176	9.96 079	6	1		4
36	0	**60**	9.60 931		9.64 858		0.35 142	9.96 073		**0**	24	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

66° **4^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h 24°

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.			
36	0	**0**	9.60 931		9.64 858		0.35 142	9.96 073		**60**	24	0
	4	1	9.60 960	29	9.64 892	34	0.35 108	9.96 067	6	59		56
	8	2	9.60 988	28	9.64 926	34	0.35 074	9.96 062	5	58		52
	12	3	9.61 016	28	9.64 960	34	0.35 040	9.96 056	6	57		48
	16	4	9.61 045	29	9.64 994	34	0.35 006	9.96 050	6	56		44
36	20	5	9.61 073	28	9.65 028	34	0.34 972	9.96 045	5	55	23	40
	24	6	9.61 101	28	9.65 062	34	0.34 938	9.96 039	6	54		36
	28	7	9.61 129	28	9.65 096	34	0.34 904	9.96 034	5	53		32
	32	8	9.61 158	29	9.65 130	34	0.34 870	9.96 028	6	52		28
	36	9	9.61 186	28	9.65 164	34	0.34 836	9.96 022	6	51		24
36	40	**10**	9.61 214	28	9.65 197	33	0.34 803	9.96 017	5	**50**	23	20
	44	11	9.61 242	28	9.65 231	34	0.34 769	9.96 011	6	49		16
	48	12	9.61 270	28	9.65 265	34	0.34 735	9.96 005	6	48		12
	52	13	9.61 298	28	9.65 299	34	0.34 701	9.96 000	5	47		8
	56	14	9.61 326	28	9.65 333	34	0.34 667	9.95 994	6	46		4
37	0	15	9.61 354	28	9.65 366	33	0.34 634	9.95 988	6	45	23	0
	4	16	9.61 382	28	9.65 400	34	0.34 600	9.95 982	6	44		56
	8	17	9.61 411	29	9.65 434	34	0.34 566	9,95 977	5	43		52
	12	18	9.61 438	27	9.65 467	33	0.34 533	9.95 971	6	42		48
	16	19	9.61 466	28	9.65 501	34	0.34 499	9.95 965	6	41		44
37	20	**20**	9.61 494	28	9.65 535	34	0.34 465	9.95 960	5	**40**	22	40
	24	21	9.61 522	28	9.65 568	33	0.34 432	9.95 954	6	39		36
	28	22	9.61 550	28	9.65 602	34	0.34 398	9.95 948	6	38		32
	32	23	9.61 578	28	9.65 636	34	0.34 364	9.95 942	6	37		28
	36	24	9.61 606	28	9.65 669	33	0.34 331	9.95 937	5	36		24
37	40	25	9.61 634	28	9.65 703	34	0.34 297	9.95 931	6	35	22	20
	44	26	9.61 662	28	9.65 736	33	0.34 264	9.95 925	6	34		16
	48	27	9.61 689	27	9.65 770	34	0.34 230	9.95 920	5	33		12
	52	28	9.61 717	28	9.65 803	33	0.34 197	9.95 914	6	32		8
	56	29	9.61 745	28	9.65 837	34	0.34 163	9.95 908	6	31		4
38	0	**30**	9.61 773	28	9.65 870	33	0.34 130	9.95 902	6	**30**	22	0
	4	31	9.61 800	27	9.65 904	34	0.34 096	9.95 897	5	29		56
	8	32	9.61 828	28	9.65 937	33	0.34 063	9.95 891	6	28		52
	12	33	9.61 856	28	9.65 971	34	0.34 029	9.95 885	6	27		48
	16	34	9.61 883	27	9.66 004	33	0.33 996	9.95 879	6	26		44
38	20	35	9.61 911	28	9.66 038	34	0.33 962	9.95 873	6	25	21	40
	24	36	9.61 939	28	9.66 071	33	0.33 929	9.95 868	5	24		36
	28	37	9.61 966	27	9.66 104	33	0.33 896	9.95 862	6	23		32
	32	38	9.61 994	28	9.66 138	34	0.33 862	9.95 856	6	22		28
	36	39	9.62 021	27	9.66 171	33	0.33 829	9.95 850	6	21		24
38	40	**40**	9.62 049	28	9.66 204	33	0.33 796	9.95 844	6	**20**	21	20
	44	41	9.62 076	27	9.66 238	34	0.33 762	9.95 839	5	19		16
	48	42	9.62 104	28	9.66 271	33	0.33 729	9.95 833	6	18		12
	52	43	9.62 131	27	9.66 304	33	0.33 696	9.95 827	6	17		8
	56	44	9.62 159	28	9.66 337	33	0.33 663	9.95 821	6	16		4
39	0	45	9.62 186	27	9.66 371	34	0.33 629	9.95 815	6	15	21	0
	4	46	9.62 214	28	9.66 404	33	0.33 596	9.95 810	5	14		56
	8	47	9.62 241	27	9.66 437	33	0.33 563	9.95 804	6	13		52
	12	48	9.62 268	27	9.66 470	33	0.33 530	9.95 798	6	12		48
	16	49	9.62 296	28	9.66 503	33	0.33 497	9.95 792	6	11		44
39	20	**50**	9.62 323	27	9.66 537	34	0.33 463	9.95 786	6	**10**	20	40
	24	51	9.62 350	27	9.66 570	33	0.33 430	9.95 780	6	9		36
	28	52	9.62 377	27	9.66 603	33	0.33 397	9.95 775	5	8		32
	32	53	9.62 405	28	9.66 636	33	0.33 364	9.95 769	6	7		28
	36	54	9.62 432	27	9.66 669	33	0.33 331	9.95 763	6	6		24
39	40	55	9.62 459	27	9.66 702	33	0.33 298	9.95 757	6	5	20	20
	44	56	9.62 486	27	9.66 735	33	0.33 265	9.95 751	6	4		16
	48	57	9.62 513	27	9.66 768	33	0.33 232	9.95 745	6	3		12
	52	58	9.62 541	28	9.66 801	33	0.33 199	9.95 739	6	2		8
	56	59	9.62 568	27	9.66 834	33	0.33 166	9.95 733	6	1		4
40	0	**60**	9.62 595	27	9.66 867	33	0.33 133	9.95 728	5	**0**	20	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

65° 4^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1h **25°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
40 0	**0**	9.62 595		9.66 867		0.33 133	9.95 728		**60**	20 0
4	1	9.62 622	27	9.66 900	33	0.33 100	9.95 722	6	59	56
8	2	9.62 649	27	9.66 933	33	0.33 067	9.95 716	6	58	52
12	3	9.62 676	27	9.66 966	33	0.33 034	9.95 710	6	57	48
16	4	9.62 703	27	9.66 999	33	0.33 001	9.95 704	6	56	44
40 20	5	9.62 730	27	9.67 032	33	0.32 968	9.95 698	6	55	19 40
24	6	9.62 757	27	9.67 065	33	0.32 935	9.95 692	6	54	36
28	7	9.62 784	27	9.67 098	33	0.32 902	9.95 686	6	53	32
32	8	9.62 811	27	9.67 131	33	0.32 869	9.95 680	6	52	28
36	9	9.62 838	27	9.67 163	32	0.32 837	9.95 674	6	51	24
40 40	**10**	9.62 865	27	9.67 196	33	0.32 804	9.95 668	6	**50**	19 20
44	11	9.62 892	27	9.67 229	33	0.32 771	9.95 663	5	49	16
48	12	9.62 918	26	9.67 262	33	0.32 738	9.95 657	6	48	12
52	13	9.62 945	27	9.67 295	33	0.32 705	9.95 651	6	47	8
56	14	9.62 972	27	9.67 327	32	0.32 673	9.95 645	6	46	4
41 0	15	9.62 999	27	9.67 360	33	0.32 640	9.95 639	6	45	19 0
4	16	9.63 026	27	9.67 393	33	0.32 607	9.95 633	6	44	56
8	17	9.63 052	26	9.67 426	33	0.32 574	9.95 627	6	43	52
12	18	9.63 079	27	9.67 458	32	0.32 542	9.95 621	6	42	48
16	19	9.63 106	27	9.67 491	33	0.32 509	9.95 615	6	41	44
41 20	**20**	9.63 133	27	9.67 524	33	0.32 476	9.95 609	6	**40**	18 40
24	21	9.63 159	26	9.67 556	32	0.32 444	9.95 603	6	39	36
28	22	9.63 186	27	9.67 589	33	0.32 411	9.95 597	6	38	32
32	23	9.63 213	27	9.67 622	33	0.32 378	9.95 591	6	37	28
36	24	9.63 239	26	9.67 654	32	0.32 346	9.95 585	6	36	24
41 40	25	9.63 266	27	9.67 687	33	0.32 313	9.95 579	6	35	18 20
44	26	9.63 292	26	9.67 719	32	0.32 281	9.95 573	6	34	16
48	27	9.63 319	27	9.67 752	33	0.32 248	9.95 567	6	33	12
52	28	9.63 345	26	9.67 785	33	0.32 215	9.95 561	6	32	8
56	29	9.63 372	27	9.67 817	32	0.32 183	9.95 555	6	31	4
42 0	**30**	9.63 398	26	9.67 850	33	0.32 150	9.95 549	6	**30**	18 0
4	31	9.63 425	27	9.67 882	32	0.32 118	9.95 543	6	29	56
8	32	9.63 451	26	9.67 915	33	0.32 085	9.95 537	6	28	52
12	33	9.63 478	27	9.67 947	32	0.32 053	9.95 531	6	27	48
16	34	9.63 504	26	9.67 980	33	0.32 020	9.95 525	6	26	44
42 20	35	9.63 531	27	9.68 012	32	0.31 988	9.95 519	6	25	17 40
24	36	9.63 557	26	9.68 044	32	0.31 956	9.95 513	6	24	36
28	37	9.63 583	26	9.68 077	33	0.31 923	9.95 507	6	23	32
32	38	9.63 610	27	9.68 109	32	0.31 891	9.95 500	7	22	28
36	39	9.63 636	26	9.68 142	33	0.31 858	9.95 494	6	21	24
42 40	**40**	9.63 662	26	9.68 174	32	0.31 826	9.95 488	6	**20**	17 20
44	41	9.63 689	27	9.68 206	32	0.31 794	9.95 482	6	19	16
48	42	9.63 715	26	9.68 239	33	0.31 761	9.95 476	6	18	12
52	43	9.63 741	26	9.68 271	32	0.31 729	9.95 470	6	17	8
56	44	9.63 767	26	9.68 303	32	0.31 697	9.95 464	6	16	4
43 0	45	9.63 794	27	9.68 336	33	0.31 664	9.95 458	6	15	17 0
4	46	9.63 820	26	9.68 368	32	0.31 632	9.95 452	6	14	56
8	47	9.63 846	26	9.68 400	32	0.31 600	9.95 446	6	13	52
12	48	9.63 872	26	9.68 432	32	0.31 568	9.95 440	6	12	48
16	49	9.63 898	26	9.68 465	33	0.31 535	9.95 434	6	11	44
43 20	**50**	9.63 924	26	9.68 497	32	0.31 503	9.95 427	7	**10**	16 40
24	51	9.63 950	26	9.68 529	32	0.31 471	9.95 421	6	9	36
28	52	9.63 976	26	9.68 561	32	0.31 439	9.95 415	6	8	32
32	53	9.64 002	26	9.68 593	32	0.31 407	9.95 409	6	7	28
36	54	9.64 028	26	9.68 626	33	0.31 374	9.95 403	6	6	24
43 40	55	9.64 054	26	9.68 658	32	0.31 342	9.95 397	6	5	16 20
44	56	9.64 080	26	9.68 690	32	0.31 310	9.95 391	6	4	16
48	57	9.64 106	26	9.68 722	32	0.31 278	9.95 384	7	3	12
52	58	9.64 132	26	9.68 754	32	0.31 246	9.95 378	6	2	8
56	59	9.64 158	26	9.68 786	32	0.31 214	9.95 372	6	1	4
44 0	**60**	9.64 184	26	9.68 818	32	0.31 182	9.95 366	6	**0**	16 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

64° **4h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1h 26°

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
44	0	**0**	9.64 184	26	9.68 818	32	0.31 182	9.95 366	6	**60**	16	0
	4	1	9.64 210	26	9.68 850	32	0.31 150	9.95 360	6	59		56
	8	2	9.64 236	26	9.68 882	32	0.31 118	9.95 354	6	58		52
	12	3	9.64 262	26	9.68 914	32	0.31 086	9.95 348	7	57		48
	16	4	9.64 288	25	9.68 946	32	0.31 054	9.95 341	6	56		44
44	20	5	9.64 313	26	9.68 978	32	0.31 022	9.95 335	6	55	15	40
	24	6	9.64 339	26	9.69 010	32	0.30 990	9.95 329	6	54		36
	28	7	9.64 365	26	9.69 042	32	0.30 958	9.95 323	6	53		32
	32	8	9.64 391	26	9.69 074	32	0.30 926	9.95 317	7	52		28
	36	9	9.64 417	25	9.69 106	32	0.30 894	9.95 310	6	51		24
44	40	**10**	9.64 442	26	9.69 138	32	0.30 862	9.95 304	6	**50**	15	20
	44	11	9.64 468	26	9.69 170	32	0.30 830	9.95 298	6	49		16
	48	12	9.64 494	25	9.69 202	32	0.30 798	9.95 292	6	48		12
	52	13	9.64 519	26	9.69 234	32	0.30 766	9.95 286	7	47		8
	56	14	9.64 545	26	9.69 266	32	0.30 734	9.95 279	6	46		4
45	0	15	9.64 571	25	9.69 298	31	0.30 702	9.95 273	6	45	15	0
	4	16	9.64 596	26	9.69 329	32	0.30 671	9.95 267	6	44		56
	8	17	9.64 622	25	9.69 361	32	0.30 639	9.95 261	7	43		52
	12	18	9.64 647	26	9.69 393	32	0.30 607	9.95 254	6	42		48
	16	19	9.64 673	25	9.69 425	32	0.30 575	9.95 248	6	41		44
45	20	**20**	9.64 698	26	9.69 457	31	0.30 543	9.95 242	6	**40**	14	40
	24	21	9.64 724	25	9.69 488	32	0.30 512	9.95 236	7	39		36
	28	22	9.64 749	26	9.69 520	32	0.30 480	9.95 229	6	38		32
	32	23	9.64 775	25	9.69 552	32	0.30 448	9.95 223	6	37		28
	36	24	9.64 800	26	9.69 584	31	0.30 416	9.95 217	6	36		24
45	40	25	9.64 826	25	9.69 615	32	0.30 385	9.95 211	7	35	14	20
	44	26	9.64 851	26	9.69 647	32	0.30 353	9.95 204	6	34		16
	48	27	9.64 877	25	9.69 679	31	0.30 321	9.95 198	6	33		12
	52	28	9.64 902	25	9.69 710	32	0.30 290	9.95 192	7	32		8
	56	29	9.64 927	26	9.69 742	32	0.30 258	9.95 185	6	31		4
46	0	**30**	9.64 953	25	9.69 774	31	0.30 226	9.95 179	6	**30**	14	0
	4	31	9.64 978	25	9.69 805	32	0.30 195	9.95 173	6	29		56
	8	32	9.65 003	26	9.69 837	31	0.30 163	9.95 167	7	28		52
	12	33	9.65 029	25	9.69 868	32	0.30 132	9.95 160	6	27		48
	16	34	9.65 054	25	9.69 900	32	0.30 100	9.95 154	6	26		44
46	20	35	9.65 079	25	9.69 932	31	0.30 068	9.95 148	7	25	13	40
	24	36	9.65 104	26	9.69 963	32	0.30 037	9.95 141	6	24		36
	28	37	9.65 130	25	9.69 995	31	0.30 005	9.95 135	6	23		32
	32	38	9.65 155	25	9.70 026	32	0.29 974	9.95 129	7	22		28
	36	39	9.65 180	25	9.70 058	31	0.29 942	9.95 122	6	21		24
46	40	**40**	9.65 205	25	9.70 089	32	0.29 911	9.95 116	6	**20**	13	20
	44	41	9.65 230	25	9.70 121	31	0.29 879	9.95 110	7	19		16
	48	42	9.65 255	26	9.70 152	32	0.29 848	9.95 103	6	18		12
	52	43	9.65 281	25	9.70 184	31	0.29 816	9.95 097	7	17		8
	56	44	9.65 306	25	9.70 215	32	0.29 785	9.95 090	6	16		4
47	0	45	9.65 331	25	9.70 247	31	0.29 753	9.95 084	6	15	13	0
	4	46	9.65 356	25	9.70 278	31	0.29 722	9.95 078	7	14		56
	8	47	9.65 381	25	9.70 309	32	0.29 691	9.95 071	6	13		52
	12	48	9.65 406	25	9.70 341	31	0.29 659	9.95 065	6	12		48
	16	49	9.65 431	25	9.70 372	32	0.29 628	9.95 059	7	11		44
47	20	**50**	9.65 456	25	9.70 404	31	0.29 596	9.95 052	6	**10**	12	40
	24	51	9.65 481	25	9.70 435	31	0.29 565	9.95 046	7	9		36
	28	52	9.65 506	25	9.70 466	32	0.29 534	9.95 039	6	8		32
	32	53	9.65 531	25	9.70 498	31	0.29 502	9.95 033	6	7		28
	36	54	9.65 556	24	9.70 529	31	0.29 471	9.95 027	7	6		24
47	40	55	9.65 580	25	9.70 560	32	0.29 440	9.95 020	6	5	12	20
	44	56	9.65 605	25	9.70 592	31	0.29 408	9.95 014	7	4		16
	48	57	9.65 630	25	9.70 623	31	0.29 377	9.95 007	6	3		12
	52	58	9.65 655	25	9.70 654	31	0.29 346	9.95 001	6	2		8
	56	59	9.65 680	25	9.70 685	32	0.29 315	9.94 995	7	1		4
48	0	**60**	9.65 705		9.70 717		0.29 283	9.94 988		**0**	12	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

63° 4h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h **27°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
48	0	**0**	9.65 705		9.70 717		0.29 283	9.94 988		**60**	12	0
	4	1	9.65 729	24	9.70 748	31	0.29 252	9.94 982	6	59		56
	8	2	9.65 754	25	9.70 779	31	0.29 221	9.94 975	7	58		52
	12	3	9.65 779	25	9.70 810	31	0.29 190	9.94 969	6	57		48
	16	4	9.65 804	25	9.70 841	31	0.29 159	9.94 962	7	56		44
48	20	5	9.65 828	24	9.70 873	32	0.29 127	9.94 956	6	55	11	40
	24	6	9.65 853	25	9.70 904	31	0.29 096	9.94 949	7	54		36
	28	7	9.65 878	25	9.70 935	31	0.29 065	9.94 943	6	53		32
	32	8	9.65 902	24	9.70 966	31	0.29 034	9.94 936	7	52		28
	36	9	9.65 927	25	9.70 997	31	0.29 003	9.94 930	6	51		24
48	40	**10**	9.65 952	25	9.71 028	31	0.28 972	9.94 923	7	**50**	11	20
	44	11	9.65 976	24	9.71 059	31	0.28 941	9.94 917	6	49		16
	48	12	9.66 001	25	9.71 090	31	0.28 910	9.94 911	6	48		12
	52	13	9.66 025	24	9.71 121	31	0.28 879	9.94 904	7	47		8
	56	14	9.66 050	25	9.71 153	32	0.28 847	9.94 898	6	46		4
49	0	15	9.66 075	25	9.71 184	31	0.28 816	9.94 891	7	45	11	0
	4	16	9.66 099	24	9.71 215	31	0.28 785	9.94 885	6	44		56
	8	17	9.66 124	25	9.71 246	31	0.28 754	9.94 878	7	43		52
	12	18	9.66 148	24	9.71 277	31	0.28 723	9.94 871	7	42		48
	16	19	9.66 173	25	9.71 308	31	0.28 692	9.94 865	6	41		44
49	20	**20**	9.66 197	24	9.71 339	31	0.28 661	9.94 858	7	**40**	10	40
	24	21	9.66 221	24	9.71 370	31	0.28 630	9.94 852	6	39		36
	28	22	9.66 246	25	9.71 401	31	0.28 599	9.94 845	7	38		32
	32	23	9.66 270	24	9.71 431	30	0.28 569	9.94 839	6	37		28
	36	24	9.66 295	25	9.71 462	31	0.28 538	9.94 832	7	36		24
49	40	25	9.66 319	24	9.71 493	31	0.28 507	9.94 826	6	35	10	20
	44	26	9.66 343	24	9.71 524	31	0.28 476	9.94 819	7	34		16
	48	27	9.66 368	25	9.71 555	31	0.28 445	9.94 813	6	33		12
	52	28	9.66 392	24	9.71 586	31	0.28 414	9.94 806	7	32		8
	56	29	9.66 416	24	9.71 617	31	0.28 383	9.94 799	7	31		4
50	0	**30**	9.66 441	25	9.71 648	31	0.28 352	9.94 793	6	**30**	10	0
	4	31	9.66 465	24	9.71 679	31	0.28 321	9.94 786	7	29		56
	8	32	9.66 489	24	9.71 709	30	0.28 291	9.94 780	6	28		52
	12	33	9.66 513	24	9.71 740	31	0.28 260	9.94 773	7	27		48
	16	34	9.66 537	24	9.71 771	31	0.28 229	9.94 767	6	26		44
50	20	35	9.66 562	25	9.71 802	31	0.28 198	9.94 760	7	25	9	40
	24	36	9.66 586	24	9.71 833	31	0.28 167	9.94 753	7	24		36
	28	37	9.66 610	24	9.71 863	30	0.28 137	9.94 747	6	23		32
	32	38	9.66 634	24	9.71 894	31	0.28 106	9.94 740	7	22		28
	36	39	9.66 658	24	9.71 925	31	0.28 075	9.94 734	6	21		24
50	40	**40**	9.66 682	24	9.71 955	30	0.28 045	9.94 727	7	**20**	9	20
	44	41	9.66 706	24	9.71 986	31	0.28 014	9.94 720	7	19		16
	48	42	9.66 731	25	9.72 017	31	0.27 983	9.94 714	6	18		12
	52	43	9.66 755	24	9.72 048	31	0.27 952	9.94 707	7	17		8
	56	44	9.66 779	24	9.72 078	30	0.27 922	9.94 700	7	16		4
51	0	45	9.66 803	24	9.72 109	31	0.27 891	9.94 694	6	15	9	0
	4	46	9.66 827	24	9.72 140	31	0.27 860	9.94 687	7	14		56
	8	47	9.66 851	24	9.72 170	30	0.27 830	9.94 680	7	13		52
	12	48	9.66 875	24	9.72 201	31	0.27 799	9.94 674	6	12		48
	16	49	9.66 899	24	9.72 231	30	0.27 769	9.94 667	7	11		44
51	20	**50**	9.66 922	23	9.72 262	31	0.27 738	9.94 660	7	**10**	8	40
	24	51	9.66 946	24	9.72 293	31	0.27 707	9.94 654	6	9		36
	28	52	9.66 970	24	9.72 323	30	0.27 677	9.94 647	7	8		32
	32	53	9.66 994	24	9.72 354	31	0.27 646	9.94 640	7	7		28
	36	54	9.67 018	24	9.72 384	30	0.27 616	9.94 634	6	6		24
51	40	55	9.67 042	24	9.72 415	31	0.27 585	9.94 627	7	5	8	20
	44	56	9.67 066	24	9.72 445	30	0.27 555	9.94 620	7	4		16
	48	57	9.67 090	24	9.72 476	31	0.27 524	9.94 614	6	3		12
	52	58	9.67 113	23	9.72 506	30	5.27 494	9.94 607	7	2		8
	56	59	9.67 137	24	9.72 537	31	0.27 463	9.94 600	7	1		4
52	0	**60**	9.67 161	24	9.72 567	30	0.27 433	9.94 593	7	**0**	8	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

62° **4^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1^h **28°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
52	0	**0**	9.67 161	24	9.72 567	31	0.27 433	9.94 593	6	**60**	8	0
	4	1	9.67 185	23	9.72 598	30	0.27 402	9.94 587	7	59		56
	8	2	9.67 208	24	9.72 628	31	0.27 372	9.94 580	7	58		52
	12	3	9.67 232	24	9.72 659	30	0.27 341	9.94 573	6	57		48
	16	4	9.67 256	24	9.72 689	31	0.27 311	9.94 567	7	56		44
52	20	5	9.67 280	23	9.72 720	30	0.27 280	9.94 560	7	55	7	40
	24	6	9.67 303	24	9.72 750	30	0.27 250	9.94 553	7	54		36
	28	7	9.67 327	23	9.72 780	31	0.27 220	9.94 546	6	53		32
	32	8	9.67 350	24	9.72 811	30	0.27 189	9.94 540	7	52		28
	36	9	9.67 374	24	9.72 841	31	0.27 159	9.94 533	7	51		24
52	40	**10**	9.67 398	23	9.72 872	30	0.27 128	9.94 526	7	**50**	7	20
	44	11	9.67 421	24	9.72 902	30	0.27 098	9.94 519	6	49		16
	48	12	9.67 445	23	9.72 932	31	0.27 068	9.94 513	7	48		12
	52	13	9.67 468	24	9.72 963	30	0.27 037	9.94 506	7	47		8
	56	14	9.67 492	23	9.72 993	30	0.27 007	9.94 499	7	46		4
53	0	15	9.67 515	24	9.73 023	31	0.26 977	9.94 492	7	45	7	0
	4	16	9.67 539	23	9.73 054	30	0.26 946	9.94 485	6	44		56
	8	17	9.67 562	24	9.73 084	30	0.26 916	9.94 479	7	43		52
	12	18	9.67 586	23	9.73 114	30	0.26 886	9.94 472	7	42		48
	16	19	9.67 609	24	9.73 144	31	0.26 856	9.94 495	7	41		44
53	20	**20**	9.67 633	23	9.73 175	30	0.26 825	9.94 458	7	**40**	6	40
	24	21	9.67 656	24	9.73 205	30	0.26 795	9.94 451	6	39		36
	28	22	9.67 680	23	9.73 235	30	0.26 765	9.94 445	7	38		32
	32	23	9.67 703	23	9.73 265	30	0.26 735	9.94 438	7	37		28
	36	24	9.67 726	24	9.73 295	31	0.26 705	9.94 431	7	36		24
53	40	25	9.67 750	23	9.73 326	30	0.26 674	9.94 424	7	35	6	20
	44	26	9.67 773	23	9.73 356	30	0.26 644	9.94 417	7	34		16
	48	27	9.67 796	24	9.73 386	30	0.26 614	9.94 410	6	33		12
	52	28	9.67 820	23	9.73 416	30	0.26 584	9.94 404	7	32		8
	56	29	9.67 843	23	9.73 446	30	0.26 554	9.94 397	7	31		4
54	0	**30**	9.67 866	24	9.73 476	31	0.26 524	9.94 390	7	**30**	6	0
	4	31	9.67 890	23	9.73 507	30	0.26 493	9.94 383	7	29		56
	8	32	9.67 913	23	9.73 537	30	0.26 463	9.94 376	7	28		52
	12	33	9.67 936	23	9.73 567	30	0.26 433	9.94 369	7	27		48
	16	34	9.67 959	23	9.73 597	30	0.26 403	9.94 362	7	26		44
54	20	35	9.67 982	24	9.73 627	30	0.26 373	9.94 355	6	25	5	40
	24	36	9.68 006	23	9.73 657	30	0.26 343	9.94 349	7	24		36
	28	37	9.68 029	23	9.73 687	30	0.26 313	9.94 342	7	23		32
	32	38	9.68 052	23	9.73 717	30	0.26 283	9.94 335	7	22		28
	36	39	9.68 075	23	9.73 747	30	0.26 253	9.94 328	7	21		24
54	40	**40**	9.68 098	23	9.73 777	30	0.26 223	9.94 321	7	**20**	5	20
	44	41	9.68 121	23	9.73 807	30	0.26 193	9.94 314	7	19		16
	48	42	9.68 144	23	9.73 837	30	0.26 163	9.94 307	7	18		12
	52	43	9.68 167	23	9.73 867	30	0.26 133	9.94 300	7	17		8
	56	44	9.68 190	23	9.73 897	30	0.26 103	9.94 293	7	16		4
55	0	45	9.68 213	24	9.73 927	30	0.26 073	9.94 286	7	15	5	0
	4	46	9.68 237	23	9.73 957	30	0.26 043	9.94 279	6	14		56
	8	47	9.68 260	23	9.73 987	30	0.26 013	9.94 273	7	13		52
	12	48	9.68 283	22	9.74 017	30	0.25 983	9.94 266	7	12		48
	16	49	9.68 305	23	9.74 047	30	0.25 953	9.94 259	7	11		44
55	20	**50**	9.68 328	23	9.74 077	30	0.25 923	9.94 252	7	**10**	4	40
	24	51	9.68 351	23	9.74 107	30	0.25 893	9.94 245	7	9		36
	28	52	9.68 374	23	9.74 137	29	0.25 863	9.94 238	7	8		32
	32	53	9.68 397	23	9.74 166	30	0.25 834	9.94 231	7	7		28
	36	54	9.68 420	23	9.74 196	30	0.25 804	9.94 224	7	6		24
55	40	55	9.68 443	23	9.74 226	30	0.25 774	9.94 217	7	5	4	20
	44	56	9.68 466	23	9.74 256	30	0.25 744	9.94 210	7	4		16
	48	57	9.68 489	23	9.74 286	30	0.25 714	9.94 203	7	3		12
	52	58	9.68 512	22	9.74 316	29	0.25 684	9.94 196	7	2		8
	56	59	9.68 534	23	9.74 345	30	0.25 655	9.94 189	7	1		4
56	0	**60**	9.68 557		9.74 375		0.25 625	9.94 182		**0**	4	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

61° 4^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

1h **29°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
56 0	**0**	9.68 557	23	9.74 375	30	0.25 625	9.94 182	7	**60**	4 0
4	1	9.68 580	23	9.74 405	30	0.25 595	9.94 175	7	59	56
8	2	9.68 603	22	9.74 435	30	0.25 565	9.94 168	7	58	52
12	3	9.68 625	23	9.74 465	29	0.25 535	9.94 161	7	57	48
16	4	9.68 648	23	9.74 494	30	0.25 506	9.94 154	7	56	44
56 20	5	9.68 671	23	9.74 524	30	0.25 476	9.94 147	7	55	3 40
24	6	9.68 694	22	9.74 554	29	0.25 446	9.94 140	7	54	36
28	7	9.68 716	23	9.74 583	30	0.25 417	9.94 133	7	53	32
32	8	9.68 739	23	9.74 613	30	0.25 387	9.94 126	7	52	28
36	9	9.68 762	22	9.74 643	30	0.25 357	9.94 119	7	51	24
56 40	**10**	9.68 784	23	9.74 673	29	0.25 327	9.94 112	7	**50**	3 20
44	11	9.68 807	22	9.74 702	30	0.25 298	9.94 105	7	49	16
48	12	9.68 829	23	9.74 732	30	0.25 268	9.94 098	8	48	12
52	13	9.68 852	23	9.74 762	29	0.25 238	9.94 090	7	47	8
56	14	9.68 875	22	9.74 791	30	0.25 209	9.94 083	7	46	4
57 0	15	9.68 897	23	9.74 821	30	0.25 179	9.94 076	7	45	3 0
4	16	9.68 920	22	9.74 851	29	0.25 149	9.94 069	7	44	56
8	17	9.68 942	23	9.74 880	30	0.25 120	9.94 062	7	43	52
12	18	9.68 965	22	9.74 910	29	0.25 090	9.94 055	7	42	48
16	19	9.68 987	23	9.74 939	30	0.25 061	9.94 048	7	41	44
57 20	**20**	9.69 010	22	9.74 969	29	0.25 031	9.94 041	7	**40**	2 40
24	21	9.69 032	23	9.74 998	30	0.25 002	9.94 034	7	39	36
28	22	9.69 055	22	9.75 028	30	0.24 972	9.94 027	7	38	32
32	23	9.69 077	23	9.75 058	29	0.24 942	9.94 020	8	37	28
36	24	9.69 100	22	9.75 087	30	0.24 913	9.94 012	7	36	24
57 40	25	9.69 122	22	9.75 117	29	0.24 883	9.94 005	7	35	2 20
44	26	9.69 144	23	9.75 146	30	0.24 854	9.93 998	7	34	16
48	27	9.69 167	22	9.75 176	29	0.24 824	9.93 991	7	33	12
52	28	9.69 189	23	9.75 205	30	0.24 795	9.93 984	7	32	8
56	29	9.69 212	22	9.75 235	29	0.24 765	9.93 977	7	31	4
58 0	**30**	9.69 234	22	9.75 264	30	0.24 736	9.93 970	7	**30**	2 0
4	31	9.69 256	23	9.75 294	29	0.24 706	9.93 963	8	29	56
8	32	9.69 279	22	9.75 323	30	0.24 677	9.93 955	7	28	52
12	33	9.69 301	22	9.75 353	29	0.24 647	9.93 948	7	27	48
16	34	9.69 323	22	9.75 382	29	0.24 618	9.93 941	7	26	44
58 20	35	9.69 345	23	9.75 411	30	0.24 589	9.93 934	7	25	1 40
24	36	9.69 368	22	9.75 441	29	0.24 559	9.93 927	7	24	36
28	37	9.69 390	22	9.75 470	30	0.24 530	9.93 920	8	23	32
32	38	9.69 412	22	9.75 500	29	0.24 500	9.93 912	7	22	28
36	39	9.69 434	22	9.75 529	29	0.24 471	9.93 905	7	21	24
58 40	**40**	9.69 456	23	9.75 558	30	0.24 442	9.93 898	7	**20**	1 20
44	41	9.69 479	22	9.75 588	29	0.24 412	9.93 891	7	19	16
48	42	9.69 501	22	9.75 617	30	0.24 383	9.93 884	8	18	12
52	43	9.69 523	22	9.75 647	29	0.24 353	9.93 876	7	17	8
56	44	9.69 545	22	9.75 676	29	0.24 324	9.93 869	7	16	4
59 0	45	9.69 567	22	9.75 705	30	0.24 295	9.93 862	7	15	1 0
4	46	9.69 589	22	9.75 735	29	0.24 265	9.93 855	8	14	56
8	47	9.69 611	22	9.75 764	29	0.24 236	9.93 847	7	13	52
12	48	9.69 633	22	9.75 793	29	0.24 207	9.93 840	7	12	48
16	49	9.69 655	22	9.75 822	30	0.24 178	9.93 833	7	11	44
59 20	**50**	9.69 677	22	9.75 852	29	0.24 148	9.93 826	7	**10**	0 40
24	51	9.69 699	22	9.75 881	29	0.24 119	9.93 819	8	9	36
28	52	9.69 721	22	9.75 910	29	0.24 090	9.93 811	7	8	32
32	53	9.69 743	22	9.75 939	30	0.24 061	9.93 804	7	7	28
36	54	9.69 765	22	9.75 969	29	0.24 031	9.93 797	8	6	24
59 40	55	9.69 787	22	9.75 998	29	0.24 002	9.93 789	7	5	0 20
44	56	9.69 809	22	9.76 027	29	0.23 973	9.93 782	7	4	16
48	57	9.69 831	22	9.76 056	30	0.23 944	9.93 775	7	3	12
52	58	9.69 853	22	9.76 086	29	0.23 914	9.93 768	8	2	8
56	59	9.69 875	22	9.76 115	29	0.23 885	9.93 760	7	1	4
60 0	**60**	9.69 897		9.76 144		0.23 856	9.93 753		**0**	0 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

60° **4h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2^h 30°

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		
0 0	**0**	9.69 897	22	9.76 144	29	0.23 856	9.93 753	7	**60**	60 0
4	1	9.69 919	22	9.76 173	29	0.23 827	9.93 746	8	59	56
8	2	9.69 941	22	9.76 202	29	0.23 798	9.93 738	7	58	52
12	3	9.69 963	21	9.76 231	30	0.23 769	9.93 731	7	57	48
16	4	9.69 984	22	9.76 261	29	0.23 739	9.93 724	7	56	44
0 20	5	9.70 006	22	9.76 290	29	0.23 710	9.93 717	8	55	59 40
24	6	9.70 028	22	9.76 319	29	0.23 681	9.93 709	7	54	36
28	7	9.70 050	22	9.76 348	29	0.23 652	9.93 702	7	53	32
32	8	9.70 072	21	9.76 377	29	0.23 623	9.93 695	8	52	28
36	9	9.70 093	22	9.76 406	29	0.23 594	9.93 687	7	51	24
0 40	**10**	9.70 115	22	9.76 435	29	0.23 565	9.93 680	7	**50**	59 20
44	11	9.70 137	22	9.76 464	29	0.23 536	9.93 673	8	49	16
48	12	9.70 159	21	9.76 493	29	0.23 507	9.93 665	7	48	12
52	13	9.70 180	22	9.76 522	29	0.23 478	9.93 658	8	47	8
56	14	9.70 202	22	9.76 551	29	0.23 449	9.93 650	7	46	4
1 0	15	9.70 224	21	9.76 580	29	0.23 420	9.93 643	7	45	59 0
4	16	9.70 245	22	9.76 609	30	0.23 391	9.93 636	8	44	56
8	17	9.70 267	21	9.76 639	29	0.23 361	9.93 628	7	43	52
12	18	9.70 288	22	9.76 668	29	0.23 332	9.93 621	7	42	48
16	19	9.70 310	22	9.76 697	28	0.23 303	9.93 614	8	41	44
1 20	**20**	9.70 332	21	9.76 725	29	0.23 275	9.93 606	7	**40**	58 40
24	21	9.70 353	22	9.76 754	29	0.23 246	9.93 599	8	39	36
28	22	9.70 375	21	9.76 783	29	0.23 217	9.93 591	7	38	32
32	23	9.70 396	22	9.76 812	29	0.23 188	9.93 584	7	37	28
36	24	9.70 418	21	9.76 841	29	0.23 159	9.93 577	8	36	24
1 40	25	9.70 439	22	9.76 870	29	0.23 130	9.93 569	7	35	58 20
44	26	9.70 461	21	9.76 899	29	0.23 101	9.93 562	8	34	16
48	27	9.70 482	22	9.76 928	29	0.23 072	9.93 554	7	33	12
52	28	9.70 504	21	9.76 957	29	0.23 043	9.93 547	8	32	8
56	29	9.70 525	22	9.76 986	29	0.23 014	9.93 539	7	31	4
2 0	**30**	9.70 547	21	9.77 015	29	0.22 985	9.93 532	7	**30**	58 0
4	31	9.70 568	22	9.77 044	29	0.22 956	9.93 525	8	29	56
8	32	9.70 590	21	9.77 073	28	0.22 927	9.93 517	7	28	52
12	33	9.70 611	22	9.77 101	29	0.22 899	9.93 510	8	27	48
16	34	9.70 633	21	9.77 130	29	0.22 870	9.93 502	7	26	44
2 20	35	9.70 654	21	9.77 159	29	0.22 841	9.93 495	8	25	57 40
24	36	9.70 675	22	9.77 188	29	0.22 812	9.93 487	7	24	36
28	37	9.70 697	21	9.77 217	29	0.22 783	9.93 480	8	23	32
32	38	9.70 718	21	9.77 246	28	0.22 754	9.93 472	7	22	28
36	39	9.70 739	22	9.77 274	29	0.22 726	9.93 465	8	21	24
2 40	**40**	9.70 761	21	9.77 303	29	0.22 697	9.93 457	7	**20**	57 20
44	41	9.70 782	21	9.77 332	29	0.22 668	9.93 450	8	19	16
48	42	9.70 803	21	9.77 361	29	0.22 639	9.93 442	7	18	12
52	43	9.70 824	22	9.77 390	28	0.22 610	9.93 435	8	17	8
56	44	9.70 846	21	9.77 418	29	0.22 582	9.93 427	7	16	4
3 0	45	9.70 867	21	9.77 447	29	0.22 553	9.93 420	8	15	57 0
4	46	9.70 888	21	9.77 476	29	0.22 524	9.93 412	7	14	56
8	47	9.70 909	22	9.77 505	28	0.22 495	9.93 405	8	13	52
12	48	9.70 931	21	9.77 533	29	0.22 467	9.93 397	7	12	48
16	49	9.70 952	21	9.77 562	29	0.22 438	9.93 390	8	11	44
3 20	**50**	9.70 973	21	9.77 591	28	0.22 409	9.93 382	7	**10**	56 40
24	51	9.70 994	21	9.77 619	29	0.22 381	9.93 375	8	9	36
28	52	9.71 015	21	9.77 648	29	0.22 352	9.93 367	7	8	32
32	53	9.71 036	22	9.77 677	29	0.22 323	9.93 360	8	7	28
36	54	9.71 058	21	9.77 706	28	0.22 294	9.93 352	8	6	24
3 40	55	9.71 079	21	9.77 734	29	0.22 266	9.93 344	7	5	56 20
44	56	9.71 100	21	9.77 763	28	0.22 237	9.93 337	8	4	16
48	57	9.71 121	21	9.77 791	29	0.22 209	9.93 329	7	3	12
52	58	9.71 142	21	9.77 820	29	0.22 180	9.93 322	8	2	8
56	59	9.71 163	21	9.77 849	28	0.22 151	9.93 314	7	1	4
4 0	**60**	9.71 184		9.77 877		0.22 123	9.93 307		**0**	56 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

59° 3^h

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **31°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
4	0	**0**	9.71 184	21	9.77 877	29	0.22 123	9.93 307	8	**60**	56	0
	4	1	9.71 205	21	9.77 906	29	0.22 094	9.93 299	8	59		56
	8	2	9.71 226	21	9.77 935	28	0.22 065	9.93 291	7	58		52
	12	3	9.71 247	21	9.77 963	29	0.22 037	9.93 284	8	57		48
	16	4	9.71 268	21	9.77 992	28	0.22 008	9.93 276	7	56		44
4	20	5	9.71 289	21	9.78 020	29	0.21 980	9.93 269	8	55	55	40
	24	6	9.71 310	21	9.78 049	28	0.21 951	9.93 261	8	54		36
	28	7	9.71 331	21	9.78 077	29	0.21 923	9.93 253	7	53		32
	32	8	9.71 352	21	9.78 106	29	0.21 894	9.93 246	8	52		28
	36	9	9.71 373	20	9.78 135	28	0.21 865	9.93 238	8	51		24
4	40	**10**	9.71 393	21	9.78 163	29	0.21 837	9.93 230	7	**50**	55	20
	44	11	9.71 414	21	9.78 192	28	0.21 808	9.93 223	8	49		16
	48	12	9.71 435	21	9.78 220	29	0.21 780	9.93 215	8	48		12
	52	13	9.71 456	21	9.78 249	28	0.21 751	9.93 207	7	47		8
	56	14	9.71 477	21	9.78 277	29	0.21 723	9.93 200	8	46		4
5	0	15	9.71 498	21	9.78 306	28	0.21 694	9.93 192	8	45	55	0
	4	16	9.71 519	20	9.78 334	29	0.21 666	9.93 184	7	44		56
	8	17	9.71 539	21	9.78 363	28	0.21 637	9.93 177	8	43		52
	12	18	9.71 560	21	9.78 391	28	0.21 609	9.93 169	8	42		48
	16	19	9,71 581	21	9.78 419	29	0.21 581	9.93 161	7	41		44
5	20	**20**	9.71 602	20	9.78 448	28	0.21 552	9.93 154	8	**40**	54	40
	24	21	9.71 622	21	9.78 476	29	0.21 524	9.93 146	8	39		36
	28	22	9.71 643	21	9.78 505	28	0.21 495	9.93 138	7	38		32
	32	23	9.71 664	21	9.78 533	29	0.21 467	9.93 131	8	37		28
	36	24	9.71 685	20	9.78 562	28	0.21 438	9.93 123	8	36		24
5	40	25	9.71 705	21	9.78 590	28	0.21 410	9.93 115	7	35	54	20
	44	26	9.71 726	21	9.78 618	29	0.21 382	9.93 108	8	34		16
	48	27	9.71 747	20	9.78 647	28	0.21 353	9.93 100	8	33		12
	52	28	9.71 767	21	9.78 675	29	0.21 325	9.93 092	8	32		8
	56	29	9.71 788	21	9.78 704	28	0.21 296	9.93 084	7	31		4
6	0	**30**	9.71 809	20	9.78 732	28	0.21 268	9.93 077	8	**30**	54	0
	4	31	9.71 829	21	9.78 760	29	0.21 240	9.93 069	8	29		56
	8	32	9.71 850	20	9.78 789	28	0.21 211	9.93 061	8	28		52
	12	33	9.71 870	21	9.78 817	28	0.21 183	9.93 053	7	27		48
	16	34	9.71 891	20	9.78 845	29	0.21 155	9.93 046	8	26		44
6	20	35	9.71 911	21	9.78 874	28	0.21 126	9.93 038	8	25	53	40
	24	36	9.71 932	20	9.78 902	28	0.21 098	9.93 030	8	24		36
	28	37	9.71 952	21	9.78 930	29	0.21 070	9.93 022	8	23		32
	32	38	9.71 973	21	9.78 959	28	0.21 041	9.93 014	7	22		28
	36	39	9.71 994	20	9.78 987	28	0.21 013	9.93 007	8	21		24
6	40	**40**	9.72 014	20	9.79 015	28	0.20 985	9.92 999	8	**20**	53	20
	44	41	9.72 034	21	9.79 043	29	0.20 957	9.92 991	8	19		16
	48	42	9.72 055	20	9.79 072	28	0.20 928	9.92 983	7	18		12
	52	43	9.72 075	21	9.79 100	28	0.20 900	9.92 976	8	17		8
	56	44	9.72 096	20	9.79 128	28	0.20 872	9.92 968	8	16		4
7	0	45	9.72 116	21	9.79 156	29	0.20 844	9.92 960	8	15	53	0
	4	46	9.72 137	20	9.79 185	28	0.20 815	9.92 952	8	14		56
	8	47	9.72 157	20	9.79 213	28	0.20 787	9.92 944	8	13		52
	12	48	9.72 177	21	9.79 241	28	0.20 759	9.92 936	7	12		48
	16	49	9.72 198	20	9.79 269	28	0.20 731	9.92 929	8	11		44
7	20	**50**	9.72 218	20	9.79 297	29	0.20 703	9.92 921	8	**10**	52	40
	24	51	9.72 238	21	9.79 326	28	0.20 674	9.92 913	8	9		36
	28	52	9.72 259	20	9.79 354	28	0.20 646	9.92 905	8	8		32
	32	53	9.72 279	20	9.79 382	28	0.20 618	9.92 897	8	7		28
	36	54	9.72 299	21	9.79 410	28	0.20 590	9.92 889	8	6		24
7	40	55	9.72 320	20	9.79 438	28	0.20 562	9.92 881	7	5	52	20
	44	56	9.72 340	20	9.79 466	29	0.20 534	9.92 874	8	4		16
	48	57	9.72 360	21	9.79 495	28	0.20 505	9.92 866	8	3		12
	52	58	9.72 381	20	9.79 523	28	0.20 477	9.92 858	8	2		8
	56	59	9.72 401	20	9.79 551	28	0.20 449	9.92 850	8	1		4
8	0	**60**	9.72 421		9.79 579		0.20 421	9.92 842		**0**	52	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

58° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2ʰ **32°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m. s.
8 0	**0**	9.72 421		9.79 579		0.20 421	9.92 842		**60**	52 0
4	1	9.72 441	20	9.79 607	28	0.20 393	9.92 834	8	59	56
8	2	9.72 461	20	9.79 635	28	0.20 365	9.92 826	8	58	52
12	3	9.72 482	21	9.79 663	28	0.20 337	9.92 818	8	57	48
16	4	9.72 502	20	9.79 691	28	0.20 309	9.92 810	8	56	44
8 20	5	9.72 522	20	9.79 719	28	0.20 281	9.92 803	7	55	51 40
24	6	9.72 542	20	9.79 747	28	0.20 253	9.92 795	8	54	36
28	7	9.72 562	20	9.79 776	29	0.20 224	9.92 787	8	53	32
32	8	9.72 582	20	9.79 804	28	0.20 196	9.92 779	8	52	28
36	9	9.72 602	20	9.79 832	28	0.20 168	9.92 771	8	51	24
8 40	**10**	9.72 622	20	9.79 860	28	0.20 140	9.92 763	8	**50**	51 20
44	11	9.72 643	21	9.79 888	28	0.20 112	9.92 755	8	49	16
48	12	9.72 663	20	9.79 916	28	0.20 084	9.92 747	8	48	12
52	13	9.72 683	20	9.79 944	28	0.20 056	9.92 739	8	47	8
56	14	9.72 703	20	9.79 972	28	0.20 028	9.92 731	8	46	4
9 0	15	9.72 723	20	9.80 000	28	0.20 000	9.92 723	8	45	51 0
4	16	9.72 743	20	9.80 028	28	0.19 972	9.92 715	8	44	56
8	17	9.72 763	20	9.80 056	28	0.19 944	9.92 707	8	43	52
12	18	9.72 783	20	9.80 084	28	0.19 916	9.92 699	8	42	48
16	19	9.72 803	20	9.80 112	28	0.19 888	9.92 691	8	41	44
9 20	**20**	9.72 823	20	9.80 140	28	0.19 860	9.92 683	8	**40**	50 40
24	21	9.72 843	20	9.80 168	28	0.19 832	9.92 675	8	39	36
28	22	9.72 863	20	9.80 195	27	0.19 805	9.92 667	8	38	32
32	23	9.72 883	20	9.80 223	28	0.19 777	9.92 659	8	37	28
36	24	9.72 902	19	9.80 251	28	0.19 749	9.92 651	8	36	24
9 40	25	9.72 922	20	9.80 279	28	0.19 721	9.92 643	8	35	50 20
44	26	9.72 942	20	9.80 307	28	0.19 693	9.92 635	8	34	16
48	27	9.72 962	20	9.80 335	28	0.19 665	9.92 627	8	33	12
52	28	9.72 982	20	9.80 363	28	0.19 637	9.92 619	8	32	8
56	29	9.73 002	20	9.80 391	28	0.19 609	9.92 611	8	31	4
10 0	**30**	9.73 022	20	9.80 419	28	0.19 581	9.92 603	8	**30**	50 0
4	31	9.73 041	19	9.80 447	28	0.19 553	9.92 595	8	29	56
8	32	9.73 061	20	9.80 474	27	0.19 426	9.92 587	8	28	52
12	33	9.73 081	20	9.80 502	28	0.19 498	9.92 579	8	27	48
16	34	9.73 101	20	9.80 530	28	0.19 470	9.92 571	8	26	44
10 20	35	9.73 121	20	9.80 558	28	0.19 442	9.92 563	8	25	49 40
24	36	9.73 140	19	9.80 586	28	0.19 414	9.92 555	8	24	36
28	37	9.73 160	20	9.80 614	28	0.19 386	9.92 546	9	23	32
32	38	9.73 180	20	9.80 642	28	0.19 358	9.92 538	8	22	28
36	39	9.73 200	20	9.80 669	27	0.19 331	9.92 530	8	21	24
10 40	**40**	9.73 219	19	9.80 697	28	0.19 303	9.92 522	8	**20**	49 20
44	41	9.73 239	20	9.80 725	28	0.19 275	9.92 514	8	19	16
48	42	9.73 259	20	9.80 753	28	0.19 247	9.92 506	8	18	12
52	43	9.73 278	19	9.80 781	28	0.19 219	9.92 498	8	17	8
56	44	9.73 298	20	9.80 808	27	0.19 192	9.92 490	8	16	4
11 0	45	9.73 318	20	9.80 836	28	0.19 164	9.92 482	8	15	49 0
4	46	9.73 337	19	9.80 864	28	0.19 136	9.92 473	9	14	56
8	47	9.73 357	20	9.80 892	28	0.19 108	9.92 465	8	13	52
12	48	9.73 377	20	9.80 919	27	0.19 081	9.92 457	8	12	48
16	49	9.73 396	19	9.80 947	28	0.19 053	9.92 449	8	11	44
11 20	**50**	9.73 416	20	9.80 975	28	0.19 025	9.92 441	8	**10**	48 40
24	51	9.73 435	19	9.81 003	28	0.18 997	9.92 433	8	9	36
28	52	9.73 455	20	9.81 030	27	0.18 970	9.92 425	8	8	32
32	53	9.73 474	19	9.81 058	28	0.18 942	9.92 416	9	7	28
36	54	9.73 494	20	9.81 086	28	0.18 914	9.92 408	8	6	24
11 40	55	9.73 513	19	9.81 113	27	0.18 887	9.92 400	8	5	48 20
44	56	9.73 533	20	9.81 141	28	0.18 859	9.92 392	8	4	16
48	57	9.73 552	19	9.81 169	28	0.18 831	9.92 384	8	3	12
52	58	9.73 572	20	9.81 196	27	0.18 804	9.92 376	8	2	8
56	59	9.73 591	19	9.81 224	28	0.18 776	9.92 367	9	1	4
12 0	**60**	9.73 611	20	9.81 252	28	0.18 748	9.92 359	8	**0**	48 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

57° **3ʰ**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **33°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
12	0	**0**	9.73 611		9.81 252		0.18 748	9.92 359		**60**	48	0
	4	1	9.73 630	19	9.81 279	27	0.18 721	9.92 351	8	59		56
	8	2	9.73 650	20	9.81 307	28	0.18 693	9.92 343	8	58		52
	12	3	9.73 669	19	9.81 335	28	0.18 665	9.92 335	8	57		48
	16	4	9.73 689	20	9.81 362	27	0.18 638	9.92 326	9	56		44
12	20	5	9.73 708	19	9.81 390	28	0.18 610	9.92 318	8	55	47	40
	24	6	9.73 727	19	9.81 418	28	0.18 582	9.92 310	8	54		36
	28	7	9.73 747	20	9.81 445	27	0.18 555	9.92 302	8	53		32
	32	8	9.73 766	19	9.81 473	28	0.18 527	9.92 293	9	52		28
	36	9	9.73 785	19	9.81 500	27	0.18 500	9.92 285	8	51		24
12	40	**10**	9.73 805	20	9.81 528	28	0.18 472	9.92 277	8	**50**	47	20
	44	11	9.73 824	19	9.81 556	28	0.18 444	9.92 269	8	49		16
	48	12	9.73 843	19	9.81 583	27	0.18 417	9.92 260	9	48		12
	52	13	9.73 863	20	9.81 611	28	0.18 389	9.92 252	8	47		8
	56	14	9.73 882	19	9.81 638	27	0.18 362	9.92 244	8	46		4
13	0	15	9.73 901	19	9.81 666	28	0.18 334	9.92 235	9	45	47	0
	4	16	9.73 921	20	9.81 693	27	0.18 307	9.92 227	8	44		56
	8	17	9.73 940	19	9.81 721	28	0.18 279	9.92 219	8	43		52
	12	18	9.73 959	19	9.81 748	27	0.18 252	9.92 211	8	42		48
	16	19	9.73 978	19	9.81 776	28	0.18 224	9.92 202	9	41		44
13	20	**20**	9.73 997	19	9.81 803	27	0.18 197	9.92 194	8	**40**	46	40
	24	21	9.74 017	20	9.81 831	28	0.18 169	9.92 186	8	39		36
	28	22	9.74 036	19	9.81 858	27	0.18 142	9.92 177	9	38		32
	32	23	9.74 055	19	9.81 886	28	0.18 114	9.92 169	8	37		28
	36	24	9.74 074	19	9.81 913	27	0.18 087	9.92 161	8	36		24
13	40	25	9.74 093	19	9.81 941	28	0.18 059	9.92 152	9	35	46	20
	44	26	9.74 113	20	9.81 968	27	0.18 032	9.92 144	8	34		16
	48	27	9.74 132	19	9.81 996	28	0.18 004	9.92 136	8	33		12
	52	28	9.74 151	19	9.82 023	27	0.17 977	9.92 127	9	32		8
	56	29	9.74 170	19	9.82 051	28	0.17 949	9.92 119	8	31		4
14	0	**30**	9.74 189	19	9.82 078	27	0.17 922	9.92 111	8	**30**	46	0
	4	31	9.74 208	19	9.82 106	28	0.17 894	9.92 102	9	29		56
	8	32	9.74 227	19	9.82 133	27	0.17 867	9.92 094	8	28		52
	12	33	9.74 246	19	9.82 161	28	0.17 839	9.92 086	8	27		48
	16	34	9.74 265	19	9.82 188	27	0.17 812	9.92 077	9	26		44
14	20	35	9.74 284	19	9.82 215	27	0.17 785	9.92 069	8	25	45	40
	24	36	9.74 303	19	9.82 243	28	0.17 757	9.92 060	9	24		36
	28	37	9.74 322	19	9.82 270	27	0.17 730	9.92 052	8	23		32
	32	38	9.74 341	19	9.82 298	28	0.17 702	9.92 044	8	22		28
	36	39	9.74 360	19	9.82 325	27	0.17 675	9.92 035	9	21		24
14	40	**40**	9.74 379	19	9.82 352	27	0.17 648	9.92 027	8	**20**	45	20
	44	41	9.74 398	19	9.82 380	28	0.17 620	9.92 018	9	19		16
	48	42	9.74 417	19	9.82 407	27	0.17 593	9.92 010	8	18		12
	52	43	9.74 436	19	9.82 435	28	0.17 565	9.92 002	8	17		8
	56	44	9.74 455	19	9.82 462	27	0.17 538	9.91 993	9	16		4
15	0	45	9.74 474	19	9.82 489	27	0.17 511	9.91 985	8	15	45	0
	4	46	9.74 493	19	9.82 517	28	0.17 483	9.91 976	9	14		56
	8	47	9.74 512	19	9.82 544	27	0.17 456	9.91 968	8	13		52
	12	48	9.74 531	19	9.82 571	27	0.17 429	9.91 959	9	12		48
	16	49	9.74 549	18	9.82 599	28	0.17 401	9.91 951	8	11		44
15	20	**50**	9.74 568	19	9.82 626	27	0.17 374	9.91 942	9	**10**	44	40
	24	51	9.74 587	19	9.82 653	27	0.17 347	9.91 934	8	9		36
	28	52	9.74 606	19	9.82 681	28	0.17 319	9.91 925	9	8		32
	32	53	9.74 625	19	9.82 708	27	0.17 292	9.91 917	8	7		28
	36	54	9.74 644	19	9.82 735	27	0.17 265	9.91 908	9	6		24
15	40	55	9.74 662	18	9.82 762	27	0.17 238	9.91 900	8	5	44	20
	44	56	9.74 681	19	9.82 790	28	0.17 210	9.91 891	9	4		16
	48	57	9.74 700	19	9.82 817	27	0.17 183	9.91 883	8	3		12
	52	58	9.74 719	19	9.82 844	27	0.17 156	9.91 874	9	2		8
	56	59	9.74 737	18	9.82 871	27	0.17 129	9.91 866	8	1		4
16	0	**60**	9.74 756	19	9.82 899	28	0.17 101	9.91 857	9	**0**	44	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

56° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2^h **34°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
16	0	**0**	9.74 756	19	9.82 899	27	0.17 101	9.91 857	8	**60**	44	0
	4	1	9.74 775	19	9.82 926	27	0.17 074	9.91 849	9	59		56
	8	2	9.74 794	18	9.82 953	27	0.17 047	9.91 840	8	58		52
	12	3	9.74 812	19	9.82 980	28	0.17 020	9.91 832	9	57		48
	16	4	9.74 831	19	9.83 008	27	0.16 992	9.91 823	8	56		44
16	20	5	9.74 850	18	9.83 035	27	0.16 965	9.91 815	9	55	43	40
	24	6	9.74 868	19	9.83 062	27	0.16 938	9.91 806	8	54		36
	28	7	9.74 887	19	9.83 089	28	0.16 911	9.91 798	9	53		32
	32	8	9.74 906	18	9.83 117	27	0.16 883	9.91 789	8	52		28
	36	9	9.74 924	19	9.83 144	27	0.16 856	9.91 781	9	51		24
16	40	**10**	9.74 943	18	9.83 171	27	0.16 829	9.91 772	9	**50**	43	20
	44	11	9.74 961	19	9.83 198	27	0.16 802	9.91 763	8	49		16
	48	12	9.74 980	19	9.83 225	27	0.16 775	9.91 755	9	48		12
	52	13	9.74 999	18	9.83 252	28	0.16 748	9.91 746	8	47		8
	56	14	9.75 017	19	9.83 280	27	0.16 720	9.91 738	9	46		4
17	0	15	9.75 036	18	9.83 307	27	0.16 693	9.91 729	9	45	43	0
	4	16	9.75 054	19	9.83 334	27	0.16 666	9.91 720	8	44		56
	8	17	9.75 073	18	9.83 361	27	0.16 639	9.91 712	9	43		52
	12	18	9.75 091	19	9.83 388	27	0.16 612	9.91 703	8	42		48
	16	19	9.75 110	18	9.83 415	27	0.16 585	9.91 695	9	41		44
17	20	**20**	9.75 128	19	9.83 442	28	0.16 558	9.91 686	9	**40**	42	40
	24	21	9.75 147	18	9.83 470	27	0.16 530	9.91 677	8	39		36
	28	22	9.75 165	19	9.83 497	27	0.16 503	9.91 669	9	38		32
	32	23	9.75 184	18	9.83 524	27	0.16 476	9.91 660	9	37		28
	36	24	9.75 202	19	9.83 551	27	0.16 449	9.91 651	8	36		24
17	40	25	9.75 221	18	9.83 578	27	0.16 422	9.91 643	9	35	42	20
	44	26	9.75 239	19	9.83 605	27	0.16 395	9.91 534	9	34		16
	48	27	9.75 258	18	9.83 632	27	0.16 368	9.91 625	8	33		12
	52	28	9.75 276	18	9.83 659	27	0.16 341	9.91 617	9	32		8
	56	29	9.75 294	19	9.83 686	27	0.16 314	9.91 608	9	31		4
18	0	**30**	9.75 313	18	9.83 713	27	0.16 287	9.91 599	8	**30**	42	0
	4	31	9.75 331	19	9.83 740	28	0.16 260	9.91 591	9	29		56
	8	32	9.75 350	18	9.83 768	27	0.16 232	9.91 582	9	28		52
	12	33	9.75 368	18	9.83 795	27	0.16 205	9.91 573	8	27		48
	16	34	9.75 386	19	9.83 822	27	0.16 178	9.91 565	9	26		44
18	20	35	9.75 405	18	9.83 849	27	0.16 151	9.91 556	9	25	41	40
	24	36	9.75 423	18	9.83 876	27	0.16 124	9.91 547	9	24		36
	28	37	9.75 441	18	9.83 903	27	0.16 097	9.91 538	8	23		32
	32	38	9.75 459	19	9.83 930	27	0.16 070	9.91 530	9	22		28
	36	39	9.75 478	18	9.83 957	27	0.16 043	9.91 521	9	21		24
18	40	**40**	9.75 496	18	9.83 984	27	0.16 016	9.91 512	8	**20**	41	20
	44	41	9.75 514	19	9.84 011	27	0.15 989	9.91 504	9	19		16
	48	42	9.75 533	18	9.84 038	27	0.15 962	9.91 495	9	18		12
	52	43	9.75 551	18	9.84 065	27	0.15 935	9.91 486	9	17		8
	56	44	9.75 569	18	9.84 092	27	0.15 908	9.91 477	8	16		4
19	0	45	9.75 587	18	9.84 119	27	0.15 881	9.91 469	9	15	41	0
	4	46	9.75 605	19	9.84 146	27	0.15 854	9.91 460	9	14		56
	8	47	9.75 624	18	9.84 173	27	0.15 827	9.91 451	9	13		52
	12	48	9.75 642	18	9.84 200	27	0.15 800	9.91 442	9	12		48
	16	49	9.75 660	18	9.84 227	27	0.15 773	9.91 433	8	11		44
19	20	**50**	9.75 678	18	9.84 254	26	0.15 746	9.91 425	9	**10**	40	40
	24	51	9.75 696	18	9.84 280	27	0.15 720	9.91 416	9	9		36
	28	52	9.75 714	19	9.84 307	27	0.15 693	9.91 407	9	8		32
	32	53	9.75 733	18	9.84 334	27	0.15 666	9.91 398	9	7		28
	36	54	9.75 751	18	9.84 361	27	0.15 639	9.91 389	8	6		24
19	40	55	9.75 769	18	9.84 388	27	0.15 612	9.91 381	9	5	40	20
	44	56	9.75 787	18	9.84 415	27	0.15 585	9.91 372	9	4		16
	48	57	9.75 805	18	9.84 442	27	0.15 558	9.91 363	9	3		12
	52	58	9.75 823	18	9.84 469	27	0.15 531	9.91 354	9	2		8
	56	59	9.75 841	18	9.84 496	27	0.15 504	9.91 345	9	1		4
20	0	**60**	9.75 859		9.84 523		0.15 477	9.91 336		**0**	40	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

55° **3^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **35°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m. s.
20 0	**0**	9.75 859		9.84 523		0.15 477	9.91 336		**60**	40 0
4	1	9.75 877	18	9.84 550	27	0.15 450	9.91 328	8	59	56
8	2	9.75 895	18	9.84 576	26	0.15 424	9.91 319	9	58	52
12	3	9.75 913	18	9.84 603	27	0.15 397	9.91 310	9	57	48
16	4	9.75 931	18	9.84 630	27	0.15 370	9.91 301	9	56	44
20 20	5	9.75 949	18	9.84 657	27	0.15 343	9.91 292	9	55	39 40
24	6	9.75 967	18	9.84 684	27	0.15 316	9.91 283	9	54	36
28	7	9.75 985	18	9.84 711	27	0.15 289	9.91 274	9	53	32
32	8	9.76 003	18	9.84 738	27	0.15 262	9.91 266	8	52	28
36	9	9.76 021	18	9.84 764	26	0.15 236	9.91 257	9	51	24
20 40	**10**	9.76 039	18	9.84 791	27	0.15 209	9.91 248	9	**50**	39 20
44	11	9.76 057	18	9.84 818	27	0.15 182	9.91 239	9	49	16
48	12	9.76 075	18	9.84 845	27	0.15 155	9.91 230	9	48	12
52	13	9.76 093	18	9.84 872	27	0.15 128	9.91 221	9	47	8
56	14	9.76 111	18	9.84 899	27	0.15 101	9.91 212	9	46	4
21 0	15	9.76 129	18	9.84 925	26	0.15 075	9.91 203	9	45	39 0
4	16	9.76 146	17	9.84 952	27	0.15 048	9.91 194	9	44	56
8	17	9.76 164	18	9.84 979	27	0.15 021	9.91 185	9	43	52
12	18	9.76 182	18	9.85 006	27	0.14 994	9.91 176	9	42	48
16	19	9.76 200	18	9.85 033	27	0.14 967	9.91 167	9	41	44
21 20	**20**	9.76 218	18	9.85 059	26	0.14 941	9.91 158	9	**40**	38 40
24	21	9.76 236	18	9.85 086	27	0.14 914	9.91 149	9	39	36
28	22	9.76 253	17	9.85 113	27	0.14 887	9.91 141	8	38	32
32	23	9.76 271	18	9.85 140	27	0.14 860	9.91 132	9	37	28
36	24	9.76 289	18	9.85 166	26	0.14 834	9.91 123	9	36	24
21 40	25	9.76 307	18	9.85 193	27	0.14 807	9.91 114	9	35	38 20
44	26	9.76 324	17	9.85 220	27	0.14 780	9.91 105	9	34	16
48	27	9.76 342	18	9.85 247	27	0.14 753	9.91 096	9	33	12
52	28	9.76 360	18	9.85 273	26	0.14 727	9.91 087	9	32	8
56	29	9.76 378	18	9.85 300	27	0.14 700	9.91 078	9	31	4
22 0	**30**	9.76 395	17	9.85 327	27	0.14 673	9.91 069	9	**30**	38 0
4	31	9.76 413	18	9.85 354	27	0.14 646	9.91 060	9	29	56
8	32	9.76 431	18	9.85 380	26	0.14 620	9.91 051	9	28	52
12	33	9.76 448	17	9.85 407	27	0.14 593	9.91 042	9	27	48
16	34	9.76 466	18	9.85 434	27	0.14 566	9.91 033	9	26	44
22 20	35	9.76 884	18	9.85 460	26	0.14 540	9.91 023	10	25	37 40
24	36	9.76 501	17	9.85 487	27	0.14 513	9.91 014	9	24	36
28	37	9.76 519	18	9.85 514	27	0.14 486	9.91 005	9	23	32
32	38	9.76 537	18	9.85 540	26	0.14 460	9.90 996	9	22	28
36	39	9.76 554	17	9.85 567	27	0.14 433	9.90 987	9	21	24
22 40	**40**	9.76 572	18	9.85 594	27	0.14 406	9.90 978	9	**20**	37 20
44	41	9.76 590	18	9.85 620	26	0.14 380	9.90 969	9	19	16
48	42	9.76 607	17	9.85 647	27	0.14 353	9.90 960	9	18	12
52	43	9.76 625	18	9.85 674	27	0.14 326	9.90 951	9	17	8
56	44	9.76 642	17	9.85 700	26	0.14 300	9.90 942	9	16	4
23 0	45	9.76 660	18	9.85 727	27	0.14 273	9.90 933	9	15	37 0
4	46	9.76 677	17	9.85 754	27	0.14 246	9.90 924	9	14	56
8	47	9.76 695	18	9.85 780	26	0.14 220	9.90 915	9	13	52
12	48	9.76 712	17	9.85 807	27	0.14 193	9.90 906	9	12	48
16	49	9.76 730	18	9.85 834	27	0.14 166	9.90 896	10	11	44
23 20	**50**	9.76 747	17	9.85 860	26	0.14 140	9.90 887	9	**10**	36 40
24	51	9.76 765	18	9.85 887	27	0.14 113	9.90 878	9	9	36
28	52	9.76 782	17	9.85 913	26	0.14 087	9.90 869	9	8	32
32	53	9.76 800	18	9.85 940	27	0.14 060	9.90 860	9	7	28
36	54	9.76 817	17	9.85 967	27	0.14 033	9.90 851	9	6	24
23 40	55	9.76 835	18	9.85 993	26	0.14 007	9.90 842	9	5	36 20
44	56	9.76 852	17	9.86 020	27	0.13 980	9.90 832	10	4	16
48	57	9.76 870	18	9.86 046	26	0.13 954	9.90 823	9	3	12
52	58	9.76 887	17	9.86 073	27	0.13 927	9.90 814	9	2	8
56	59	9.76 904	17	9.86 100	27	0.13 900	9.90 805	9	1	4
24 0	**60**	9.76 922	18	9.86 126	26	0.13 874	9.90 796	9	**0**	36 0
		L.Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

54° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **36°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		
24 0	**0**	9.76 922	17	9.86 126	27	0.13 874	9.90 796	9	**60**	36 0
4	1	9.76 939	18	9.86 153	26	0.13 847	9.90 787	10	59	56
8	2	9.76 957	17	9.86 179	27	0.13 821	9.90 777	9	58	52
12	3	9.76 974	17	9.86 206	26	0.13 794	9.90 768	9	57	48
16	4	9.76 991	18	9.86 232	27	0.13 768	9.90 759	9	56	44
24 20	5	9.77 009	17	9.86 259	26	0.13 741	9.90 750	9	55	35 40
24	6	9.77 026	17	9.86 285	27	0.13 715	9.90 741	10	54	36
28	7	9.77 043	18	9.86 312	26	0.13 688	9.90 731	9	53	32
32	8	9.77 061	17	9.86 338	27	0.13 662	9.90 722	9	52	28
36	9	9.77 078	17	9.86 365	27	0.13 635	9.90 713	9	51	24
24 40	**10**	9.77 095	17	9.86 392	26	0.13 608	9.90 704	10	**50**	35 20
44	11	9.77 112	18	9.86 418	27	0.13 582	9.90 694	9	49	16
48	12	9.77 130	17	9.86 445	26	0.13 555	9.90 685	9	48	12
52	13	9.77 147	17	9.86 471	27	0.13 529	9.90 676	9	47	8
56	14	9.77 164	17	9.86 498	26	0.13 502	9.90 667	10	46	4
25 0	15	9.77 181	18	9.86 524	27	0.13 476	9.90 657	9	45	35 0
4	16	9.77 199	17	9.86 551	26	0.13 449	9.90 648	9	44	56
8	17	9.77 216	17	9.86 577	26	0.13 423	9.90 639	9	43	52
12	18	9.77 233	17	9.86 603	27	0.13 397	9.90 630	10	42	48
16	19	9.77 250	18	9.86 630	26	0.13 370	9.90 620	9	41	44
25 20	**20**	9.77 268	17	9.86 656	27	0.13 344	9.90 611	9	**40**	34 40
24	21	9.77 285	17	9.86 683	26	0.13 317	9.90 602	10	39	36
28	22	9.77 302	17	9.86 709	27	0.13 291	9.90 592	9	38	32
32	23	9.77 319	17	9.86 736	26	0.13 264	9.90 583	9	37	28
36	24	9.77 336	17	9.86 762	27	0.13 238	9.90 574	9	36	24
25 40	25	9.77 353	17	9.86 789	26	0.13 211	9.90 565	10	35	34 20
44	26	9.77 370	17	9.86 815	27	0.13 185	9.90 555	9	34	16
48	27	9.77 387	18	9.86 842	26	0.13 158	9.90 546	9	33	12
52	28	9.77 405	17	9.86 868	26	0.13 132	9.90 537	10	32	8
56	29	9.77 422	17	9.86 894	27	0.13 106	9.90 527	9	31	4
26 0	**30**	9.77 439	17	9.86 921	26	0.13 079	9.90 518	9	**30**	34 0
4	31	9.77 456	17	9.86 947	27	0.13 053	9.90 509	10	29	56
8	32	9.77 473	17	9.86 974	26	0.13 026	9.90 499	9	28	52
12	33	9.77 490	17	9.87 000	27	0.13 000	9.90 490	10	27	48
16	34	9.77 507	17	9.87 027	26	0.12 973	9.90 480	9	26	44
26 20	35	9.77 524	17	9.87 053	26	0.12 947	9.90 471	9	25	33 40
24	36	9.77 541	17	9.87 079	27	0.12 921	9.90 462	10	24	36
28	37	9.77 558	17	9.87 106	26	0.12 894	9.90 442	9	23	32
32	38	9.77 575	17	9.87 132	26	0.12 868	9.90 443	9	22	28
36	39	9.77 592	17	9.87 158	27	0.12 842	9.90 434	10	21	24
26 40	**40**	9.77 609	17	9.87 185	26	0.12 815	9.90 424	9	**20**	33 20
44	41	9.77 626	17	9.87 211	27	0.12 789	9.90 415	10	19	16
48	42	9.77 643	17	9.87 238	26	0.12 762	9.90 405	9	18	12
52	43	9.77 660	17	9.87 264	26	0.12 736	9.90 396	10	17	8
56	44	9.77 677	17	9.87 290	27	0.12 710	9.90 386	9	16	4
27 0	45	9.77 694	17	9.87 317	26	0.12 683	9.90 377	9	15	33 0
4	46	9.77 711	17	9.87 343	26	0.12 657	9.90 368	10	14	56
8	47	9.77 728	16	9.87 369	27	0.12 631	9.90 358	9	13	52
12	48	9.77 744	17	9.87 396	26	0.12 604	9.90 349	10	12	48
16	49	9.77 761	17	9.87 422	26	0.12 578	9.90 339	9	11	44
27 20	**50**	9.77 778	17	9.87 448	27	0.12 552	9.90 330	10	**10**	32 40
24	51	9.77 795	17	9.87 475	26	0.12 525	9.90 320	9	9	36
28	52	9.77 812	17	9.87 501	26	0.12 499	9.90 311	10	8	32
32	53	9.77 829	17	9.87 527	27	0.12 473	9.90 301	9	7	28
36	54	9.77 846	16	9.87 554	26	0.12 446	9.90 292	10	6	24
27 40	55	9.77 862	17	9.87 580	26	0.12 420	9.90 282	9	5	32 20
44	56	9.77 879	17	9.87 606	27	0.12 394	9.90 273	10	4	16
48	57	9.77 896	17	9.87 633	26	0.12 367	9.90 263	9	3	12
52	58	9.77 913	17	9.87 659	26	0.12 341	9.90 254	10	2	8
56	59	9.77 930	16	9.87 685	26	0.12 315	9.90 244	9	1	4
28 0	**60**	9.77 946		9.87 711		0.12 289	9.90 235		**0**	32 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

53° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **37°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
28	0	**0**	9.77 946	17	9.87 711	27	0.12 289	9.90 235	10	**60**	32	0
	4	1	9.77 963	17	9.87 738	26	0.12 262	9.90 225	9	59		56
	8	2	9.77 980	17	9.87 764	26	0.12 236	9.90 216	10	58		52
	12	3	9.77 997	16	9.87 790	27	0.12 210	9.90 206	9	57		48
	16	4	9.78 013	17	9.87 817	26	0.12 183	9.90 197	10	56		44
28	20	5	9.78 030	17	9.87 843	26	0.12 157	9.90 187	9	55	31	40
	24	6	9.78 047	16	9.87 869	26	0.12 131	9.90 178	10	54		36
	28	7	9.78 063	17	9.87 895	27	0.12 105	9.90 168	9	53		32
	32	8	9.78 080	17	9.87 922	26	0.12 078	9.90 159	10	52		28
	36	9	9.78 097	16	9.87 948	26	0.12 052	9.90 149	10	51		24
28	40	**10**	9.78 113	17	9.87 974	26	0.12 026	9.90 139	9	**50**	31	20
	44	11	9.78 130	17	9.88 000	27	0.12 000	9.90 130	10	49		16
	48	12	9.78 147	16	9.88 027	26	0.11 973	9.90 120	9	48		12
	52	13	9.78 163	17	9.88 053	26	0.11 947	9.90 111	10	47		8
	56	14	9.78 180	17	9.88 079	26	0.11 921	9.90 101	10	46		4
29	0	15	9.78 197	16	9.88 105	26	0.11 895	9.90 091	9	45	31	0
	4	16	9.78 213	17	9.88 131	27	0.11 869	9.90 082	10	44		56
	8	17	9.78 230	16	9.88 158	26	0.11 842	9.90 072	9	43		52
	12	18	9.78 246	17	9.88 184	26	0.11 816	9.90 063	10	42		48
	16	19	9.78 263	17	9.88 210	26	0.11 790	9.90 053	10	41		44
29	20	**20**	9.78 280	16	9.88 236	26	0.11 764	9.90 043	9	**40**	30	40
	24	21	9.78 296	17	9.88 262	27	0.11 738	9.90 034	10	39		36
	28	22	9.78 313	16	9.88 289	26	0.11 711	9.90 024	10	38		32
	32	23	9.78 329	17	9.88 315	26	0.11 685	9.90 014	9	37		28
	36	24	9.78 346	16	9.88 341	26	0.11 659	9.90 005	10	36		24
29	40	25	9.78 362	17	9.88 367	26	0.11 633	9.89 995	10	35	30	20
	44	26	9.78 379	16	9.88 393	27	0.11 607	9.89 985	9	34		16
	48	27	9.78 395	17	9.88 420	26	0.11 580	9.89 976	10	33		12
	52	28	9.78 412	16	9.88 446	26	0.11 554	9.89 966	10	32		8
	56	29	9.78 428	17	9.88 472	26	0.11 528	9.89 956	9	31		4
30	0	**30**	9.78 445	16	9.88 498	26	0.11 502	9.89 947	10	**30**	30	0
	4	31	9.78 461	17	9.88 524	26	0.11 476	9.89 937	10	29		56
	8	32	9.78 478	16	9.88 550	27	0.11 450	9.89 927	9	28		52
	12	33	9.78 494	16	9.88 577	26	0.11 423	9.89 918	10	27		48
	16	34	9.78 510	17	9.88 603	26	0.11 397	9.89 908	10	26		44
30	20	35	9.78 527	16	9.88 629	26	0.11 371	9.89 898	10	25	29	40
	24	36	9.78 543	17	9.88 655	26	0.11 345	9.89 888	9	24		36
	28	37	9.78 560	16	9.88 681	26	0.11 319	9.89 879	10	23		32
	32	38	9.78 576	16	9.88 707	26	0.11 293	9.89 869	10	22		28
	36	39	9.78 592	17	9.88 733	26	0.11 267	9.89 859	10	21		24
30	40	**40**	9.78 609	16	9.88 759	27	0.11 241	9.89 849	9	**20**	29	20
	44	41	9.78 625	17	9.88 786	26	0.11 214	9.89 840	10	19		16
	48	42	9.78 642	16	9.88 812	26	0.11 188	9.89 830	10	18		12
	52	43	9.78 658	16	9.88 838	26	0.11 162	9.89 820	10	17		8
	56	44	9.78 674	17	9.88 864	26	0.11 136	9.89 810	9	16		4
31	0	45	9.78 691	16	9.88 890	26	0.11 110	9.89 801	10	15	29	0
	4	46	9.78 707	16	9.88 916	26	0.11 084	9.89 791	10	14		56
	8	47	9.78 723	16	9.88 942	26	0.11 058	9.89 781	10	13		52
	12	48	9.78 739	17	9.88 968	26	0.11 032	9.89 771	10	12		48
	16	49	9.78 756	16	9.88 994	26	0.11 006	9.89 761	9	11		44
31	20	**50**	9.78 772	16	9.89 020	26	0.10 980	9.89 752	10	**10**	28	40
	24	51	9.78 788	17	9.89 046	27	0.10 954	9.89 742	10	9		36
	28	52	9.78 805	16	9.89 073	26	0.10 927	9.89 732	10	8		32
	32	53	9.78 821	16	9.89 099	26	0.10 901	9.89 722	10	7		28
	36	54	9.78 837	16	9.89 125	26	0.10 875	9.89 712	10	6		24
31	40	55	9.78 853	16	9.89 151	26	0.10 849	9.89 702	9	5	28	20
	44	56	9.78 869	17	9.89 177	26	0.10 823	9.89 693	10	4		16
	48	57	9.78 886	16	9.89 203	26	0.10 797	9.89 683	10	3		12
	52	58	9.78 902	16	9.89 229	26	0.10 771	9.89 673	10	2		8
	56	59	9.78 918	16	9.89 255	26	0.10 745	9.89 663	10	1		4
32	0	**60**	9.78 934		9.89 281		0.10 719	9.89 653		**0**	28	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

52° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **38°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
32	0	**0**	9.78 934		9.89 281		0.10 719	9.89 653		**60**	28	0
	4	1	9.78 950	16	9.89 307	26	0.10 693	9.89 643	10	59		56
	8	2	9.78 967	17	9.89 333	26	0.10 667	9.89 633	10	58		52
	12	3	9.78 983	16	9.89 359	26	0.10 641	9.89 624	9	57		48
	16	4	9.78 999	16	9.89 385	26	0.10 615	9.89 614	10	56		44
32	20	5	9.79 015	16	9.89 411	26	0.10 589	9.89 604	10	55	27	40
	24	6	9.79 031	16	9.89 437	26	0.10 563	9.89 594	10	54		36
	28	7	9.79 047	16	9.89 463	26	0.10 537	9.89 584	10	53		32
	32	8	9.79 063	16	9.89 489	26	0.10 511	9.89 574	10	52		28
	36	9	9.79 079	16	9.89 515	26	0.10 485	9.89 564	10	51		24
32	40	**10**	9.79 095	16	9.89 541	26	0.10 459	9.89 554	10	**50**	27	20
	44	11	9.79 111	16	9.89 567	26	0.10 433	9.89 544	10	49		16
	48	12	9.79 128	17	9.89 593	26	0.10 407	9.89 534	10	48		12
	52	13	9.79 144	16	9.89 619	26	0.10 381	9.89 524	10	47		8
	56	14	9.79 160	16	9.89 645	26	0.10 355	9.89 514	10	46		4
33	0	15	9.79 176	16	9.89 671	26	0.10 329	9.89 504	10	45	27	0
	4	16	9.79 192	16	9.89 697	26	0.10 303	9.89 495	9	44		56
	8	17	9.79 208	16	9.89 723	26	0.10 277	9.89 485	10	43		52
	12	18	9.79 224	16	9.89 749	26	0.10 251	9.89 475	10	42		48
	16	19	9.79 240	16	9.89 775	26	0.10 225	9.89 465	10	41		44
33	20	**20**	9.79 256	16	9.89 801	26	0.10 199	9.89 455	10	**40**	26	40
	24	21	9.79 272	16	9.89 827	26	0.10 173	9.89 445	10	39		36
	28	22	9.79 288	16	9.89 853	26	0.10 147	9.89 435	10	38		32
	32	23	9.79 304	16	9.89 879	26	0.10 121	9.89 425	10	37		28
	36	24	9.79 319	15	9.89 905	26	0.10 095	9.89 415	10	36		24
33	40	25	9.79 335	16	9.89 931	26	0.10 069	9.89 405	10	35	26	20
	44	26	9.79 351	16	9.89 957	26	0.10 043	9.89 395	10	34		16
	48	27	9.79 367	16	9.89 983	26	0.10 017	9.89 385	10	33		12
	52	28	9.79 383	16	9.90 009	26	0.09 991	9.89 375	10	32		8
	56	29	9.79 399	16	9.90 035	26	0.09 965	9.89 364	11	31		4
34	0	**30**	9.79 415	16	9.90 061	26	0.09 939	9.89 354	10	**30**	26	0
	4	31	9.79 431	16	9.90 086	25	0.09 914	9.89 344	10	29		56
	8	32	9.79 447	16	9.90 112	26	0.09 888	9.89 334	10	28		52
	12	33	9.79 463	16	9.90 138	26	0.09 862	9.89 324	10	27		48
	16	34	9.79 478	15	9.90 164	26	0.09 836	9.89 314	10	26		44
34	20	35	9.79 494	16	9.90 190	26	0.09 810	9.89 304	10	25	25	40
	24	36	9.79 510	16	9.90 216	26	0.09 784	9.89 294	10	24		36
	28	37	9.79 526	16	9.90 242	26	0.09 758	9.89 284	10	23		32
	32	38	9.79 542	16	9.90 268	26	0.09 732	9.89 274	10	22		28
	36	39	9.79 558	16	9.90 294	26	0.09 706	9.89 264	10	21		24
34	40	**40**	9.79 573	15	9.90 320	26	0.09 680	9.89 254	10	**20**	25	20
	44	41	9.79 589	16	9.90 346	26	0.09 654	9.89 244	10	19		16
	48	42	9.79 605	16	9.90 371	25	0.09 629	9.89 233	11	18		12
	52	43	9.79 621	16	9.90 397	26	0.09 603	9.89 223	10	17		8
	56	44	9.79 636	15	9.90 423	26	0.09 577	9.89 213	10	16		4
35	0	45	9.79 652	16	9.90 449	26	0.09 551	9.89 203	10	15	25	0
	4	46	9.79 668	16	9.90 475	26	0.09 525	9.89 193	10	14		56
	8	47	9.79 684	16	9.90 501	26	0.09 499	9.89 183	10	13		52
	12	48	9.79 699	15	9.90 527	26	0.09 473	9.89 173	10	12		43
	16	49	9.79 715	16	9.90 553	26	0.09 447	9.89 162	11	11		44
35	20	**50**	9.79 731	16	9.90 578	25	0.09 422	9.89 152	10	**10**	24	40
	24	51	9.79 746	15	9.90 604	26	0.09 396	9.89 142	10	9		36
	28	52	9.79 762	16	9.90 630	26	0.09 370	9.89 132	10	8		32
	32	53	9.79 778	16	9.90 656	26	0.09 344	9.89 122	10	7		28
	36	54	9.79 793	15	9.90 682	26	0.09 318	9.89 112	10	6		24
35	40	55	9.79 809	16	9.90 708	26	0.09 292	9.89 101	11	5	24	20
	44	56	9.79 825	16	9.90 734	26	0.09 266	9.89 091	10	4		16
	48	57	9.79 840	15	9.90 759	25	0.09 241	9.89 081	10	3		12
	52	58	9.79 856	16	9.90 785	26	0.09 215	9.89 071	10	2		8
	56	59	9.79 872	16	9.90 811	26	0.09 189	9.89 060	11	1		4
36	0	**60**	9.79 887	15	9.90 837	26	0.09 163	9.89 050	10	**0**	24	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

51° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2ʰ **39°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
36	0	**0**	9.79 887		9.90 837		0.09 163	9.89 050		**60**	24	0
	4	1	9.79 903	16	9.90 863	26	0.09 137	9.89 040	10	59		56
	8	2	9.79 918	15	9.90 889	26	0.09 111	9.89 030	10	58		52
	12	3	9.79 934	16	9.90 914	25	0.09 086	9.89 020	10	57		48
	16	4	9.79 950	16	9.90 940	26	0.09 060	9.89 009	11	56		44
36	20	5	9.79 965	15	9.90 966	26	0.09 034	9.88 999	10	55	23	40
	24	6	9.79 981	16	9.90 992	26	0.09 008	9.88 989	10	54		36
	28	7	9.79 996	15	9.91 018	26	0.08 982	9.88 978	11	53		32
	32	8	9.80 012	16	9.91 043	25	0.08 957	9.88 968	10	52		28
	36	9	9.80 027	15	9.91 069	26	0.08 931	9.88 958	10	51		24
36	40	**10**	9.80 043	16	9.91 095	26	0.08 905	9.88 948	10	**50**	23	20
	44	11	9.80 058	15	9.91 121	26	0.08 879	9.88 937	11	49		16
	48	12	9.80 074	16	9.91 147	26	0.08 853	9.88 927	10	48		12
	52	13	9.80 089	15	9.91 172	25	0.08 828	9.88 917	10	47		8
	56	14	9.80 105	16	9.91 198	26	0.08 802	9.88 906	11	46		4
37	0	15	9.80 120	15	9.91 224	26	0.08 776	9.88 896	10	45	23	0
	4	16	9.80 136	16	9.91 250	26	0.08 750	9.88 886	10	44		56
	8	17	9.80 151	15	9.91 276	26	0.08 724	9.88 875	11	43		52
	12	18	9.80 166	15	9.91 301	25	0.08 699	9.88 865	10	42		48
	16	19	9.80 182	16	9.91 327	26	0.08 673	9.88 855	10	41		44
37	20	**20**	9.80 197	15	9.91 353	26	0.08 647	9.88 844	11	**40**	22	40
	24	21	9.80 213	16	9.91 379	26	0.08 621	9.88 834	10	39		36
	28	22	9.80 228	15	9.91 404	25	0.08 596	9.88 824	10	38		32
	32	23	9.80 244	16	9.91 430	26	0.08 570	9.88 813	11	37		28
	36	24	9.80 259	15	9,91 456	26	0.08 544	9.88 803	10	36		24
37	40	25	9.80 274	15	9.91 482	26	0.08 518	9.88 793	10	35	22	20
	44	26	9.80 290	16	9.91 507	25	0.08 493	9.88 782	11	34		16
	48	27	9.80 305	15	9.91 533	26	0.08 467	9.88 772	10	33		12
	52	28	9.80 320	15	9.91 559	26	0.08 441	9.88 761	11	32		8
	56	29	9.80 336	16	9.91 585	26	0.08 415	9.88 751	10	31		4
38	0	**30**	9.80 351	15	9.91 610	25	0.08 390	9.88 741	10	**30**	22	0
	4	31	9.80 366	15	9.91 636	26	0.08 364	9.88 730	11	29		56
	8	32	9.80 382	16	9.91 662	26	0.08 338	9.88 720	10	28		52
	12	33	9.80 397	15	9.91 688	26	0.08 312	9.88 709	11	27		48
	16	34	9.80 412	15	9.91 713	25	0.08 287	9.88 699	10	26		44
38	20	35	9.80 428	16	9.91 739	26	0.08 261	9.88 688	11	25	21	40
	24	36	9.80 443	15	9.91 765	26	0.08 235	9.88 678	10	24		36
	28	37	9.80 458	15	9.91 791	26	0.08 209	9.88 668	10	23		32
	32	38	9.80 473	15	9.91 816	25	0.08 184	9.88 657	11	22		28
	36	39	9.80 489	16	9.91 842	26	0.08 158	9.88 647	10	21		24
38	40	**40**	9.80 504	15	9.91 868	26	0.08 132	9.88 636	11	**20**	21	20
	44	41	9.80 519	15	9.91 893	25	0.08 107	9.88 626	10	19		16
	48	42	9.80 534	15	9.91 919	26	0.08 081	9.88 615	11	18		12
	52	43	9.80 550	16	9.91 945	26	0.08 055	9.88 605	10	17		8
	56	44	9.80 565	15	9.91 971	26	0.08 029	9.88 594	11	16		4
39	0	45	9.80 580	15	9.91 996	25	0.08 004	9.88 584	10	15	21	0
	4	46	9.80 595	15	9.92 022	26	0.07 978	9.88 573	11	14		56
	8	47	9.80 610	15	9.92 048	26	0.07 952	9.88 563	10	13		52
	12	48	9.80 625	15	9.92 073	25	0.07 927	9.88 552	11	12		48
	16	49	9.80 641	16	9.92 099	26	0.07 901	9.88 542	10	11		44
39	20	**50**	9.80 656	15	9.92 125	26	0.07 875	9.88 531	11	**10**	20	40
	24	51	9.80 671	15	9.92 150	25	0.07 850	9.88 521	10	9		36
	28	52	9.80 686	15	9.92 176	26	0.07 824	9.88 510	11	8		32
	32	53	9.80 701	15	9.92 202	26	0.07 798	9.88 499	11	7		28
	36	54	9.80 716	15	9.92 227	25	0.07 773	9.88 489	10	6		24
39	40	55	9.80 731	15	9.92 253	26	0.07 747	9.88 478	11	5	20	20
	44	56	9.80 746	15	9.92 279	26	0.07 721	9.88 468	10	4		16
	48	57	9.80 762	16	9.92 304	25	0.07 696	9.88 457	11	3		12
	52	58	9.80 777	15	9.92 330	26	0.07 670	9.88 447	10	2		8
	56	59	9.80 792	15	9.92 356	26	0.07 644	9.88 436	11	1		4
40	0	**60**	9.80 807	15	9.92 381	25	0.07 619	9.88 425	11	**0**	20	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

50° **3ʰ**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **40°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		m.	s.
40	0	**0**	9.80 807	15	9.92 381	26	0.07 619	9.88 425	10	**60**	20	0
	4	1	9.80 822	15	9.92 407	26	0.07 593	9.88 415	11	59		56
	8	2	9.80 837	15	9.92 433	25	0.07 567	9.88 404	10	58		52
	12	3	9.80 852	15	9.92 458	26	0.07 542	9.88 394	11	57		48
	16	4	9.80 867	15	9.92 484	26	0.07 516	9.88 383	11	56		44
40	20	5	9.80 882	15	9.92 510	25	0.07 490	9.88 372	10	55	19	40
	24	6	9.80 897	15	9.92 535	26	0.07 465	9.88 362	11	54		36
	28	7	9.80 912	15	9.92 561	26	0.07 439	9.88 351	11	53		32
	32	8	9.80 927	15	9.92 587	25	0.07 413	9.88 340	10	52		28
	36	9	9.80 942	15	9.92 612	26	0.07 388	9.88 330	11	51		24
40	40	**10**	9.80 957	15	9.92 638	25	0.07 362	9.88 319	11	**50**	19	20
	44	11	9.80 972	15	9.92 663	26	0.07 337	9.88 308	10	49		16
	48	12	9.80 987	15	9.92 689	26	0.07 311	9.88 298	11	48		12
	52	13	9.81 002	15	9.92 715	25	0.07 285	9.88 287	11	47		8
	56	14	9.81 017	15	9.92 740	26	0.07 260	9.88 276	10	46		4
41	0	15	9.81 032	15	9.92 766	26	0.07 234	9.88 266	11	45	19	0
	4	16	9.81 047	14	9.92 792	25	0.07 208	9.88 255	11	44		56
	8	17	9.81 061	15	9.92 817	26	0.07 183	9.88 244	10	43		52
	12	18	9.81 076	15	9.92 843	25	0.07 157	9.88 234	11	42		48
	16	19	9.81 091	15	9.92 868	26	0.07 132	9.88 223	11	41		44
41	20	**20**	9.81 106	15	9.92 894	26	0.07 106	9.88 212	11	**40**	18	40
	24	21	9.81 121	15	9.92 920	25	0.07 080	9.88 201	10	39		36
	28	22	9.81 136	15	9.92 945	26	0.07 055	9.88 191	11	38		32
	32	23	9.81 151	15	9.92 971	25	0.07 029	9.88 180	11	37		28
	36	24	9.81 166	14	9.92 996	26	0.07 004	9.88 169	11	36		24
41	40	25	9.81 180	15	9.93 022	26	0.06 978	9.88 158	10	35	18	20
	44	26	9.81 195	15	9.93 048	25	0.06 952	9.88 148	11	34		16
	48	27	9.81 210	15	9.93 073	26	0.06 927	9.88 137	11	33		12
	52	28	9.81 225	15	9.93 099	25	0.06 901	9.88 126	11	32		8
	56	29	9.81 240	14	9.93 124	26	0.06 876	9.88 115	10	31		4
42	0	**30**	9.81 254	15	9.93 150	25	0.06 850	9.88 105	11	**30**	18	0
	4	31	9.81 269	15	9.93 175	26	0.06 825	9.88 094	11	29		56
	8	32	9.81 284	15	9.93 201	26	0.06 799	9.88 083	11	28		52
	12	33	9.81 299	15	9.93 227	25	0.06 773	9.88 072	11	27		48
	16	34	9.81 314	14	9.93 252	26	0.06 748	9.88 061	10	26		44
42	20	35	9.81 328	15	9.93 278	25	0.06 722	9.88 051	11	25	17	40
	24	36	9.81 343	15	9.93 303	26	0.06 697	9.88 040	11	24		36
	28	37	9.81 358	14	9.93 329	25	0.06 671	9.88 029	11	23		32
	32	38	9.81 372	15	9.93 354	26	0.06 646	9.88 018	11	22		28
	36	39	9.81 387	15	9.93 380	26	0.06 620	9.88 007	11	21		24
42	40	**40**	9.81 402	15	9.93 406	25	0.06 594	9.87 996	11	**20**	17	20
	44	41	9.81 417	14	9.93 431	26	0.06 569	9.87 985	10	19		16
	48	42	9.81 431	15	9.93 457	25	0.06 543	9.87 975	11	18		12
	52	43	9.81 446	15	9.93 482	26	0.06 518	9.87 964	11	17		8
	56	44	9.81 461	14	9.93 508	25	0.06 492	9.87 953	11	16		4
43	0	45	9.81 475	15	9.93 533	26	0.06 467	9.87 942	11	15	17	0
	4	46	9.81 490	15	9.93 559	25	0.06 441	9.87 931	11	14		56
	8	47	9.81 505	14	9.93 584	26	0.06 416	9.87 920	11	13		52
	12	48	9.81 519	15	9.93 610	26	0.06 390	9.87 909	11	12		48
	16	49	9.81 534	15	9.93 636	25	0.06 364	9.87 898	11	11		44
43	20	**50**	9.81 549	14	9.93 661	26	0.06 339	9.87 887	10	**10**	16	40
	24	51	9.81 563	15	9.93 687	25	0.06 313	9.87 877	11	9		36
	28	52	9.81 578	14	9.93 712	26	0.06 288	9.87 866	11	8		32
	32	53	9.81 592	15	9.93 738	25	0.06 262	9.87 855	11	7		28
	36	54	9.81 607	15	9.93 763	26	0.06 237	9.87 844	11	6		24
43	40	55	9.81 622	14	9.93 789	25	0.06 211	9.87 833	11	5	16	20
	44	56	9.81 636	15	9.93 814	26	0.06 186	9.87 822	11	4		16
	48	57	9.81 651	14	9.93 840	25	0.06 160	9.87 811	11	3		12
	52	58	9.81 665	15	9.93 865	26	0.06 135	9.87 800	11	2		8
	56	59	9.81 680	14	9.93 891	25	0.06 109	9.87 789	11	1		4
44	0	**60**	9.81 694		9.93 916		0.06 084	9.87 778		**0**	16	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s

49° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2^h **41°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
44	0	**0**	9.81 694	15	9.93 916	26	0.06 084	9.87 778	11	**60**	16	0
	4	1	9.81 709	14	9.93 942	25	0.06 058	9.87 767	11	59		56
	8	2	9.81 723	15	9.93 967	26	0.06 033	9.87 756	11	58		52
	12	3	9.81 738	14	9.93 993	25	0.06 007	9.87 745	11	57		48
	16	4	9.81 752	15	9.94 018	26	0.05 982	9.87 734	11	56		44
44	20	5	9.81 767	14	9.94 044	25	0.05 956	9.87 723	11	55	15	40
	24	6	9.81 781	15	9.94 069	26	0.05 931	9.87 712	11	54		36
	28	7	9.81 796	14	9.94 095	25	0.05 905	9.87 701	11	53		32
	32	8	9.81 810	15	9.94 120	26	0.05 880	9.87 690	11	52		28
	36	9	9.81 825	14	9.94 146	25	0.05 854	9.87 679	11	51		24
44	40	**10**	9.81 839	15	9.94 171	26	0.05 829	9.87 668	11	**50**	15	20
	44	11	9.81 854	14	9.94 197	25	0.05 803	9.87 657	11	49		16
	48	12	9.81 868	14	9.94 222	26	0.05 778	9.87 646	11	48		12
	52	13	9.81 882	15	9.94 248	25	0.05 752	9.87 635	11	47		8
	56	14	9.81 897	14	9.94 273	26	0.05 727	9.87 624	11	46		4
45	0	15	9.81 911	15	9.94 299	25	0.05 701	9.87 613	12	45	15	0
	4	16	9.81 926	14	9.94 324	26	0.05 676	9.87 601	11	44		56
	8	17	9.81 940	15	9.94 350	25	0.05 650	9.87 590	11	43		52
	12	18	9.81 955	14	9.94 375	26	0.05 625	9.87 579	11	42		48
	16	19	9.81 969	14	9.94 401	25	0.05 599	9.87 568	11	41		44
45	20	**20**	9.81 983	15	9.94 426	26	0.05 574	9.87 557	11	**40**	14	40
	24	21	9.81 998	14	9.94 452	25	0.05 548	9.87 546	11	39		36
	28	22	9.82 012	14	9.94 477	26	0.05 523	9.87 535	11	38		32
	32	23	9.82 026	15	9.94 503	25	0.05 497	9.87 524	11	37		28
	36	24	9.82 041	14	9.94 528	26	0.05 472	9.87 513	12	36		24
45	40	25	9.82 055	14	9.94 554	25	0.05 446	9.87 501	11	35	14	20
	44	26	9.82 069	15	9.94 579	25	0.05 421	9.87 490	11	34		16
	48	27	9.82 084	14	9.94 604	26	0.05 396	9.87 479	11	33		12
	52	28	9.82 098	14	9.94 630	25	0.05 370	9.87 468	11	32		8
	56	29	9.82 112	14	9.94 655	26	0.05 345	9.87 457	11	31		4
46	0	**30**	9.82 126	15	9.94 681	25	0.05 319	9.87 446	12	**30**	14	0
	4	31	9.82 141	14	9.94 706	26	0.05 294	9.87 434	11	29		56
	8	32	9.82 155	14	9.94 732	25	0.05 268	9.87 423	11	28		52
	12	33	9.82 169	15	9.94 757	26	0.05 243	9.87 412	11	27		48
	16	34	9.82 184	14	9.94 783	25	0.05 217	9.87 401	11	26		44
46	20	35	9.82 198	14	9.94 808	26	0.05 192	9.87 390	12	25	13	40
	24	36	9.82 212	14	9.94 834	25	0.05 166	9.87 378	11	24		36
	28	37	9.82 226	14	9.94 859	25	0.05 141	9.87 367	11	23		32
	32	38	9.82 240	15	9.94 884	26	0.05 116	9.87 356	11	22		28
	36	39	9.82 255	14	9.94 910	25	0.05 090	9.87 345	11	21		24
46	40	**40**	9.82 269	14	9.94 935	26	0.05 065	9.87 334	12	**20**	13	20
	44	41	9.82 283	14	9.94 961	25	0.05 039	9.87 322	11	19		16
	48	42	9.82 297	14	9.94 986	26	0.05 014	9.87 311	11	18		12
	52	43	9.82 311	15	9.95 012	25	0.04 988	9.87 300	12	17		8
	56	44	9.82 326	14	9.95 037	25	0.04 963	9.87 288	11	16		4
47	0	45	9.82 340	14	9.95 062	26	0.04 938	9.87 277	11	15	13	0
	4	46	9.82 354	14	9.95 088	25	0.04 912	9.87 266	11	14		56
	8	47	9.82 368	14	9.95 113	26	0.04 887	9.87 255	12	13		52
	12	48	9.82 382	14	9.95 139	25	0.04 861	9.87 243	11	12		48
	16	49	9.82 396	14	9.95 164	26	0.04 836	9.87 232	11	11		44
47	20	**50**	9.82 410	14	9.95 190	25	0.04 810	9.87 221	12	**10**	12	40
	24	51	9.82 424	15	9.95 215	25	0.04 785	9.87 209	11	9		36
	28	52	9.82 439	14	9.95 240	26	0.04 760	9.87 198	11	8		32
	32	53	9.82 453	14	9.95 266	25	0.04 734	9.87 187	12	7		28
	36	54	9.82 467	14	9.95 291	26	0.04 709	9.87 175	11	6		24
47	40	55	9.82 481	14	9.95 317	25	0.04 683	9.87 164	11	5	12	20
	44	56	9.82 495	14	9.95 342	26	0.04 658	9.87 153	12	4		16
	48	57	9.82 509	14	9.95 368	25	0.04 632	9.87 141	11	3		12
	52	58	9.82 523	14	9.95 393	25	0.04 607	9.87 130	11	2		8
	56	59	9.82 537	14	9.95 418	26	0.04 582	9.87 119	12	1		4
48	0	**60**	9.82 551		9.95 444		0.04 556	9.87 107		**0**	12	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

48° **3^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2h **42°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
48	0	**0**	9.82 551	14	9.95 444	25	0.04 556	9.87 107	11	**60**	12	0
	4	1	9.82 565	14	9.95 469	26	0.04 531	9.87 096	11	59		56
	8	2	9.82 579	14	9.95 495	25	0.04 505	9.87 085	12	58		52
	12	3	9.82 593	14	9.95 520	25	0.04 480	9.87 073	11	57		48
	16	4	9.82 607	14	9.95 545	26	0.04 455	9.87 062	12	56		44
48	20	5	9.82 621	14	9.95 571	25	0.04 429	9.87 050	11	55	11	40
	24	6	9.82 635	14	9.95 596	26	0.04 404	9.87 039	11	54		36
	28	7	9.82 649	14	9.95 622	25	0.04 378	9.87 028	12	53		32
	32	8	9.82 663	14	9.95 647	25	0.04 353	9.87 016	11	52		28
	36	9	9.82 677	14	9.95 672	26	0.04 328	9.87 005	12	51		24
48	40	**10**	9.82 691	14	9.95 698	25	0.04 302	9.86 993	11	**50**	11	20
	44	11	9.82 705	14	9.95 723	25	0.04 277	9.86 982	12	49		16
	48	12	9.82 719	14	9.95 748	26	0.04 252	9.86 970	11	48		12
	52	13	9.82 733	14	9.95 774	25	0.04 226	9.86 959	12	47		8
	56	14	9.82 747	14	9.95 799	26	0.04 201	9.86 947	11	46		4
49	0	15	9.82 761	14	9.95 825	25	0.04 175	9.86 936	12	45	11	0
	4	16	9.82 775	13	9.95 850	25	0.04 150	9.86 924	11	44		56
	8	17	9.82 788	14	9.95 875	26	0.04 125	9.86 913	11	43		52
	12	18	9.82 802	14	9.95 901	25	0.04 099	9.86 902	12	42		48
	16	19	9.82 816	14	9.95 926	26	0.04 074	9.86 890	11	41		44
49	20	**20**	9.82 830	14	9.95 952	25	0.04 048	9.86 879	12	**40**	10	40
	24	21	9.82 844	14	9.95 977	25	0.04 023	9.86 867	12	39		36
	28	22	9.82 858	14	9.96 002	26	0.03 998	9.86 855	11	38		32
	32	23	9.82 872	13	9.96 028	25	0.03 972	9.86 844	12	37		28
	36	24	8.82 885	14	9.96 053	25	0.03 947	9.86 832	11	36		24
49	40	25	9.82 899	14	9.96 078	26	0.03 922	9.86 821	12	35	10	20
	44	26	9.82 913	14	9.96 104	25	0.03 896	9.86 809	11	34		16
	48	27	9.82 927	14	9.96 129	26	0.03 871	9.86 798	12	33		12
	52	28	9.82 941	14	9.96 155	25	0.03 845	9.86 786	11	32		8
	56	29	9.82 955	13	9.96 180	25	0.03 820	9.86 775	12	31		4
50	0	**30**	9.82 968	14	9.96 205	26	0.03 795	9.86 763	11	**30**	10	0
	4	31	9.82 982	14	9.96 231	25	0.03 769	9.86 752	12	29		56
	8	32	9.82 996	14	9.96 256	25	0.03 744	9.86 740	12	28		52
	12	33	9.83 010	13	9.96 281	26	0.03 719	9.86 728	11	27		48
	16	34	9.83 023	14	9.96 307	25	0.03 693	9.86 717	12	26		44
50	20	35	9.83 037	14	9.96 332	25	0.03 668	9.86 705	11	25	9	40
	24	36	9.83 051	14	9.96 357	26	0.03 643	9.86 694	12	24		36
	28	37	9.83 065	13	9.96 383	25	0.03 617	9.86 682	12	23		32
	32	38	9.83 078	14	9.96 408	25	0.03 592	9.86 670	11	22		28
	36	39	9.83 092	14	9.96 433	26	0.03 567	9.86 659	12	21		24
50	40	**40**	9.83 106	14	9.96 459	25	0.03 541	9.86 647	12	**20**	9	20
	44	41	9.83 120	13	9.96 484	26	0.03 516	9.86 635	11	19		16
	48	42	9.83 133	14	9.96 510	25	0.03 490	9.86 624	12	18		12
	52	43	9.83 147	14	9.96 535	25	0.03 465	9.86 612	12	17		8
	56	44	9.83 161	13	9.96 560	26	0.03 440	9.86 600	11	16		4
51	0	45	9.83 174	14	9.96 586	25	0.03 414	9.86 589	12	15	9	0
	4	46	9.83 188	14	9.96 611	25	0.03 389	9.86 577	12	14		56
	8	47	9.83 202	13	9.96 636	26	0.03 364	9.86 565	11	13		52
	12	48	9.83 215	14	9.96 662	25	0.03 338	9.86 554	12	12		48
	16	49	9.83 229	13	9.96 687	25	0.03 313	9.86 542	12	11		44
51	20	**50**	9.83 242	14	9.96 712	26	0.03 288	9.86 530	12	**10**	8	40
	24	51	9.83 256	14	9.96 738	25	0.03 262	9.86 518	11	9		36
	28	52	9.83 270	13	9.96 763	25	0.03 237	9.86 507	12	8		32
	32	53	9.83 283	14	9.96 788	26	0.03 212	9.86 495	12	7		28
	36	54	9.83 297	13	9.96 814	25	0.03 186	9.86 483	11	6		24
51	40	55	9.83 310	14	9.96 839	25	0.03 161	9.86 472	12	5	8	20
	44	56	9.83 324	14	9.96 864	26	0.03 136	9.86 460	12	4		16
	48	57	9.83 338	13	9.96 890	25	0.03 110	9.86 448	12	3		12
	52	58	9.83 351	14	9.96 915	25	0.03 085	9.86 436	11	2		8
	56	59	9.83 365	13	9.96 940	26	0.03 060	9.86 425	12	1		4
52	0	**60**	9.83 378		9.96 966		0.03 034	9.86 413		**0**	8	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

47° **3h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2^h **43°**

m.	s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.	′	m.	s.
52	0	**0**	9.83 378	14	9.96 966	25	0.03 034	9.86 413	12	**60**	8	0
	4	1	9.83 392	13	9.96 991	25	0.03 009	9.86 401	12	59		56
	8	2	9.83 405	14	9.97 016	26	0.02 984	9.86 389	12	58		52
	12	3	9.83 419	13	9.97 042	25	0.02 958	9.86 377	11	57		48
	16	4	9.83 432	14	9.97 067	25	0.02 933	9.86 366	12	56		44
52	20	5	9.83 446	13	9.97 092	26	0.02 908	9.86 354	12	55	7	40
	24	6	9.83 459	14	9.97 118	25	0.02 882	9.86 342	12	54		36
	28	7	9.83 473	13	9.97 143	25	0.02 857	9.86 330	12	53		32
	32	8	9.83 486	14	9.97 168	25	0.02 832	9.86 318	12	52		28
	36	9	9.83 500	13	9.97 193	26	0.02 807	9.86 306	11	51		24
52	40	**10**	9.83 513	14	9.97 219	25	0.02 781	9.86 295	12	**50**	7	20
	44	11	9.83 527	13	9.97 244	25	0.02 756	9.86 283	12	49		16
	48	12	9.83 540	14	9.97 269	26	0.02 731	9.86 271	12	48		12
	52	13	9.83 554	13	9.97 295	25	0.02 705	9.86 259	12	47		8
	56	14	9.83 567	14	9.97 320	25	0.02 680	9.86 247	12	46		4
53	0	15	9.83 581	13	9.97 345	26	0.02 655	9.86 235	12	45	7	0
	4	16	9.83 594	14	9.97 371	25	0.02 629	9.86 223	12	44		56
	8	17	9.83 608	13	9.97 396	25	0.02 604	9.86 211	11	43		52
	12	18	9.83 621	13	9.97 421	26	0.02 579	9.86 200	12	42		48
	16	19	9.83 634	14	9.97 447	25	0.02 553	9.86 188	12	41		44
53	20	**20**	9.83 648	13	9.97 472	25	0.02 528	9.86 176	12	**40**	6	40
	24	21	9.83 661	13	9.97 497	26	0.02 503	9.86 164	12	39		36
	28	22	9.83 674	14	9.97 523	25	0.02 477	9.86 152	12	38		32
	32	23	9.83 688	13	9.97 548	25	0.02 452	9.86 140	12	37		28
	36	24	9.83 701	14	9.97 573	25	0.02 427	9.86 128	12	36		24
53	40	25	9.83 715	13	9.97 598	26	0.02 402	9.86 116	12	35	6	20
	44	26	9.83 728	13	9.97 624	25	0.02 376	9.86 104	12	34		16
	48	27	9.83 741	14	9.97 649	25	0.02 351	9.86 092	12	33		12
	52	28	9.83 755	13	9.97 674	26	0.02 326	9.86 080	12	32		8
	56	29	9.83 768	13	9.97 700	25	0.02 300	9.86 068	12	31		4
54	0	**30**	9.83 781	14	9.97 725	25	0.02 275	9.86 056	12	**30**	6	0
	4	31	9.83 795	13	9.97 750	26	0.02 250	9.86 044	12	29		56
	8	32	9.83 808	13	9.97 776	25	0.02 224	9.86 032	12	28		52
	12	33	9.83 821	13	9.97 801	25	0.02 199	9.86 020	12	27		48
	16	34	9.83 834	14	9.97 826	25	0.02 174	9.86 008	12	26		44
54	20	35	9.83 848	13	9.97 851	26	0.02 149	9.85 996	12	25	5	40
	24	36	9.83 861	13	9.97 877	25	0.02 123	9.85 984	12	24		36
	28	37	9.83 874	13	9.97 902	25	0.02 098	9.85 972	12	23		32
	32	38	9.83 887	14	9.97 927	26	0.02 073	9.85 960	12	22		28
	36	39	9.83 901	13	9.97 953	25	0.02 047	9.85 948	12	21		24
54	40	**40**	9.83 914	13	9.97 978	25	0.02 022	9.85 936	12	**20**	5	20
	44	41	9.83 927	13	9.98 003	26	0.01 997	9.85 924	12	19		16
	48	42	9.83 940	14	9.98 029	25	0.01 971	9.85 912	12	18		12
	52	43	9.83 954	13	9.98 054	25	0.01 946	9.85 900	12	17		8
	56	44	9.83 967	13	9.98 079	25	0.01 921	9.85 888	12	16		4
55	0	45	9.83 980	13	9.98 104	26	0.01 896	9.85 876	12	15	5	0
	4	46	9.83 993	13	9.98 130	25	0.01 870	9.85 864	13	14		56
	8	47	9.84 006	14	9.98 155	25	0.01 845	9.85 851	12	13		52
	12	48	9.84 020	13	9.98 180	26	0.01 820	9.85 839	12	12		48
	16	49	9.84 033	13	9.98 206	25	0.01 794	9.85 827	12	11		44
55	20	**50**	9.84 046	13	9.98 231	25	0.01 769	9.85 815	12	**10**	4	40
	24	51	9.84 059	13	9.98 256	25	0.01 744	9.85 803	12	9		36
	28	52	9.84 072	13	9.98 281	26	0.01 719	9.85 791	12	8		32
	32	53	9.84 085	13	9.98 307	25	0.01 693	9.85 779	13	7		28
	36	54	9.84 098	14	9.98 332	25	0.01 668	9.85 766	12	6		24
55	40	55	9.84 112	13	9.98 357	26	0.01 643	9.85 754	12	5	4	20
	44	56	9.84 125	13	9.98 383	25	0.01 617	9.85 742	12	4		16
	48	57	9.84 138	13	9.98 408	25	0.01 592	9.85 730	12	3		12
	52	58	9.84 151	13	9.98 433	25	0.01 567	9.85 718	12	2		8
	56	59	9.84 164	13	9.98 458	26	0.01 542	9.85 706	13	1		4
56	0	**60**	9.84 177		9.98 484		0.01 516	9.85 693		**0**	4	0
			L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m.	s.

46° **3^h**

TABLE 22.—*Five-place logarithms of circular functions, etc.*—Continued.

2ʰ **44°**

m. s.	′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		
56 0	**0**	9.84 177	13	9.98 484	25	0.01 516	9.85 693	12	**60**	4 0
4	1	9.84 190	13	9.98 509	25	0.01 491	9.85 681	12	59	56
8	2	9.84 203	13	9.98 534	26	0.01 466	9.85 669	12	58	52
12	3	9.84 216	13	9.98 560	25	0.01 440	9.85 657	12	57	48
16	4	9.84 229	13	9.98 585	25	0.01 415	9.85 645	13	56	44
56 20	5	9.84 242	13	9.98 610	25	0.01 390	9.85 632	12	55	3 40
24	6	9.84 255	14	9.98 635	26	0.01 365	9.85 620	12	54	36
28	7	9.84 269	13	9.98 661	25	0.01 339	9.85 608	12	53	32
32	8	9.84 282	13	9.98 686	25	0.01 314	9.85 596	13	52	28
36	9	9.84 295	13	9.98 711	26	0.01 289	9.85 583	12	51	24
56 40	**10**	9.84 308	13	9.98 737	25	0.01 263	9.85 571	12	**50**	3 20
44	11	9.84 321	13	9.98 762	25	0.01 238	9.85 559	12	49	16
48	12	9.84 334	13	9.98 787	25	0.01 213	9.85 547	13	48	12
52	13	9.84 347	13	9.98 812	26	0.01 188	9.85 534	12	47	8
56	14	9.84 360	13	9.98 838	25	0.01 162	9.85 522	12	46	4
57 0	15	9.84 373	12	9.98 863	25	0.01 137	9.85 510	13	45	3 0
4	16	9.84 385	13	9.98 888	25	0.01 112	9.85 497	12	44	56
8	17	9.84 398	13	9.98 913	26	0.01 087	9.85 485	12	43	52
12	18	9.84 411	13	9.98 939	25	0.01 061	9.85 473	13	42	48
16	19	9.84 424	13	9.98 964	25	0.01 036	9.85 460	12	41	44
57 20	**20**	9.84 437	13	9.98 989	26	0.01 011	9.85 448	12	**40**	2 40
24	21	9.84 450	13	9.99 015	25	0.00 985	9.85 436	13	39	36
28	22	9.84 463	13	9.99 040	25	0.00 960	9.85 423	12	38	32
32	23	9.84 476	13	9.99 065	25	0.00 935	9.85 411	12	37	28
36	24	9.84 499	13	9.99 090	26	0.00 910	9.85 399	13	36	24
57 40	25	9.84 502	13	9.99 116	25	0.00 884	9.85 386	12	35	2 20
44	26	9.84 515	13	9.99 141	25	0.00 859	9.85 374	13	34	16
48	27	9.84 528	12	9.99 166	25	0.00 834	9.85 361	12	33	12
52	28	9.84 540	13	9.99 191	26	0.00 809	9.85 349	12	32	8
56	29	9.84 553	13	9.99 217	25	0.00 783	9.85 337	13	31	4
58 0	**30**	9.84 566	13	9.99 242	25	0.00 758	9.85 324	12	**30**	2 0
4	31	9.84 579	13	9.99 267	26	0.00 733	9.85 312	13	29	56
8	32	9.84 592	13	9.99 293	25	0.00 707	9.85 299	12	28	52
12	33	9.84 605	13	9.99 318	25	0.00 682	9.85 287	13	27	48
16	34	9.84 618	12	9.99 343	25	0.00 657	9.85 274	12	26	44
58 20	35	9.84 630	13	9.99 368	26	0.00 632	9.85 262	12	25	1 40
24	36	9.84 643	13	9.99 394	25	0.00 606	9.85 250	13	24	36
28	37	9.84 656	13	9.99 419	25	0.00 581	9.85 237	12	23	32
32	38	9.84 669	13	9.99 444	25	0.00 556	9.85 225	13	22	28
36	39	9.84 682	12	9.99 469	26	0.00 531	9.85 212	12	21	24
58 40	**40**	9.84 694	13	9.99 495	25	0.00 505	9.85 200	13	**20**	1 20
44	41	9.84 707	13	9.99 520	25	0.00 480	9.85 187	12	19	16
48	42	9.84 720	13	9.99 545	25	0.00 455	9.85 175	13	18	12
52	43	9.84 733	12	9.99 570	26	0.00 430	9.85 162	12	17	8
56	44	9.84 745	13	9.99 596	25	0.00 404	9.85 150	13	16	4
59 0	45	9.84 758	13	9.99 621	25	0.00 379	9.85 137	12	15	1 0
4	46	9.84 771	13	9.99 646	26	0.00 354	9.85 125	13	14	56
8	47	9.84 784	12	9.99 672	25	0.00 328	9.85 112	12	13	52
12	48	9.84 796	13	9.99 697	25	0.00 303	9.85 100	13	12	48
16	49	9.84 809	13	9.99 722	25	0.00 278	9.85 087	13	11	44
59 20	**50**	9.84 822	13	9.99 747	26	0.00 253	9.85 074	12	**10**	0 40
24	51	9.84 835	12	9.99 773	25	0.00 227	9.85 062	13	9	36
28	52	9.84 847	13	9.99 798	25	0.00 202	9.85 049	12	8	32
32	53	9.84 860	13	9.99 823	25	0.00 177	9.85 037	13	7	28
36	54	9.84 873	12	9.99 848	26	0.00 152	9.85 024	12	6	24
59 40	55	9.84 885	13	9.99 874	25	0.00 126	9.85 012	13	5	0 20
44	56	9.84 898	13	9.99 899	25	0.00 101	9.84 999	13	4	16
48	57	9.84 911	12	9.99 924	25	0.00 076	9.84 986	12	3	12
52	58	9.84 923	13	9.99 949	26	0.00 051	9.84 974	13	2	8
56	59	9.84 936	13	9.99 975	25	0.00 025	9.84 961	12	1	4
60 0	**60**	9.84 949		0.00 000		0.00 000	9.84 949		**0**	0 0
		L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	m. s.

45° **3ʰ**

TABLE 23.—GEODETIC POSITION COMPUTATIONS.

TABLE OF LOGARITHMS OF FACTORS A, B, C, D, E, F, BASED UPON THE CLARKE SPHEROID OF 1866 AND THE METRIC SYSTEM, BETWEEN LATITUDES 0° AND 72°.

[Extracted from reports of the U. S. Coast and Geodetic Survey.]

CONSTANTS.

$$A=\frac{(1-e^2\sin^2\varphi)^{\frac{1}{2}}}{a\ \text{arc}\ 1''}$$

$$B=\frac{(1-e^2\sin^2\varphi)^{\frac{3}{2}}}{a\ (1-e^2)\ \text{arc}\ 1''}$$

$$C=\frac{(1-e^2\sin^2\varphi)^2\tan\varphi}{2a^2\ (1-e^2)\ \text{arc}\ 1''}$$

$$D=\frac{\frac{3}{2}\ e^2\sin\varphi\cos\varphi\ \text{arc}\ 1''}{1-e^2\sin^2\varphi}$$

$$E=\frac{(1+3\tan^2\varphi)\ (1-e^2\sin^2\varphi)}{6a^2}$$

$$F=\tfrac{1}{12}\sin\varphi\cos^2\varphi\ \text{arc}^2\ 1''$$

$$\log a=6.804\ 698\ 57$$

$$\log b=6.803\ 223\ 78$$

$$\log e^2=\bar{7}.830\ 502\ 57$$

$$\log\frac{1}{a\ \text{arc}\ 1''}=\bar{8}.509\ 726\ 56$$

$$\log\frac{1}{a\ (1-e^2)\ \text{arc}\ 1''}=\bar{8}.512\ 676\ 15$$

$$\log\frac{1}{2a^2\ (1-e^2)\ \text{arc}\ 1''}=\bar{1}.406\ 947\ 6$$

$$\log\ (\tfrac{3}{2}\ e^2\ \text{arc}\ 1'')=\bar{2}.692\ 168\ 7$$

$$\log\frac{1}{6a^2}=\bar{5}.612\ 45$$

$$\log\ (\tfrac{1}{12}\ \text{arc}^2\ 1'')=\bar{8}.291\ 96$$

Ratio adopted in this table is the Clarke value of the meter, namely, 1 meter = 39.370432 inches.

The formulas for the computation of the geodetic differences in latitude $\Delta\varphi$, in longitude $\Delta\lambda$, and in azimuth $\Delta\alpha$ are as follows:

$$\begin{cases}-\Delta\varphi=s\cos\alpha\ .\ B+s^2\sin^2\alpha\ .\ C+(\delta\varphi)^2\ D-h\ .\ s^2\sin^2\alpha\ .\ E\\ \quad\Delta\lambda=s\sin\alpha\sec\varphi'\ .\ A\\ -\Delta\alpha=\Delta\lambda\sin\tfrac{1}{2}\ (\varphi+\varphi')\sec\tfrac{1}{2}\ (\Delta\varphi)+(\Delta\lambda)^3\ F\end{cases}$$

where

$$\begin{cases}\varphi'=\varphi+\Delta\varphi\\ \lambda'=\lambda+\Delta\lambda\\ \alpha'=\alpha+\Delta\alpha+180\end{cases}\qquad\text{and}\begin{cases}-\delta\varphi=s\cos\alpha\ .\ B+s^2\sin^2\alpha\ .\ C-h\ .\ s^2\sin^2\alpha\ .\ E\\ \quad\text{also } h=s\cos\alpha\ .\ B\end{cases}$$

For subordinate triangulation when the sides do not exceed say 25 kilometers, or about 15 statute miles, the term involving E in $\Delta\varphi$ and the factor $\sec\frac{1}{2}\ (\Delta\varphi)$, as well as the term involving F in $\Delta\alpha$, may be omitted.

EXAMPLES OF COMPUTATION OF GEODETIC COORDINATES.

		°	′	″
Azimuth a:	Nell—Chusca.	159	29	08.728
Spherical angle:		120	54	13.980
Azimuth a':	Nell—Zuni.	38	34	54.748
$\delta\ a+180°$		179	50	02.124
Azimuth (a):	Zuni—Nell.	218	24	56.872

Latitude.

	°	′	″
ϕ:	35	25	13.473
$d\ \phi$		−17	47.546
ϕ'	35	07	25.927

Nell.
Geo. Pos. No. 5.

Zuni.
Geo. Pos. No. 6.

Longitude.

	°	′	″
λ:	108	37	24.925
$d\ \lambda$	+	17	15.360
λ'	108	54	40.285

Computation for latitude:

log s	4.6236305
" B	8.5111933
" cos a'	9.8930500
log (I)	3.0278738
log s^2	9.24726
" C	1.25696
" $\sin^2 a'$	9.58986
log (II)	0.09408
log D	2.3674
" $[I+II]^2$	6.0568
log (III)	8.4242
log E	6.0124
" $s^2 \sin^2 a'$	8.8371
" (I)	3.0279
log (IV)	7.8774

	″
(I)	1066.286+
(II)	1.242+
(III)	.026+
(IV)	.008−
$-d\phi$	1067.546+

	[I+II]	1067.528
log	"	3.0283792
"	$[I+II]^2$	6.0567584

Computation for longitude:

log s	4.6236305
" sin a'	9.7949286
" A′	8.5092394
" sec ϕ	0.0872944
Corr. for diff. arc & sine=	−15
log (V)	3.0150914
$d\ \lambda$	1035″.360

Computation of azimuth:

log (V)	3.015091
" sin $\left(\frac{\phi+\phi'}{2}\right)$	9.761522
" sec $\left(\frac{d\ \phi}{2}\right)$	0.000001
log (VI)	2.776614
da	− 597″.876
	−9′ 57″.876

Azimuth check.

Check:
Spher. angle
at ———

		°	′	″
Azimuth a:	Chusca—Nell.	339	21	40.150
Spherical angle:		25	11	38.601
Azimuth a':	Chusca—Zuni.	4	33	18.751
$d\,a + 180°$		179	57	25.650
Azimuth (a):	Zuni—Chusca.	184	30	44.401

Latitude.

	°	′	″
ϕ:	35	53	06.746
$d\,\phi$	—	45	40.818
ϕ'	35	07	25.928

Chusca.
Geo. Pos. No. 4.

Zuni.
Geo. Pos. No. 6.

Longitude.

	°	′	″
λ:	108	50	14.518
$d\,\lambda$		+ 4	25.768
λ'	108	54	40.286

Computation for latitude:

log s	4.9280539
" B	8.5111594
" cos a'	9.9986260
log (I)	3.4378393
log s^2	9.85610
" C	1.26435
" $\sin^2 a'$	7.79982
log (II)	8.92027
log D	2.3698
" $[I+II]^2$	6.8757
log (III)	9.2460
log E	6.0214
" $s^2\sin^2 a'$	7.6559
" (I)	3.4378
log (IV)	7.1151

	″
(I)	2740.560+
(II)	.083+
(III)	.176+
(IV)	.001—
$-d$ L	+2740.818

	[I+II]	2740.643
log	"	3.4378525
"	$[I+II]^2$	6.875705

Computation for longitude:

log s	4.9280539
" sin a'	8.8999280
" A′	8.5092394
" sec ϕ'	0.0872944
Corr. for diff. arc & sine	—129
log (V)	2.4245028
$d\,\lambda$	+265″.768

Computation of azimuth:

log (V)	2.424503
" $\sin\left(\dfrac{\phi+\phi'}{2}\right)$	9.764002
" $\sec\left(\dfrac{d\ \phi}{2}\right)$	0.000009
log (VI)	2.188514
$d\,a$	— 154″.350
	—2′ 34″.350

Azimuth check:

	°	′	″
	218	24	56.872
	184	30	44.401
Check:	33	54	12.471
Spher. angle at Zuni	33	54	12.469

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 0°.

Lat. ° ′	log A	log B	log C	log D	log E	log F
00 00	$\bar{8}$.509 7266	$\bar{8}$.512 6761	−∞	−∞	$\bar{\bar{5}}$.6125	−∞
1	66	61	$\bar{\bar{7}}$.8707	$\bar{\bar{9}}$.156	5	
2	66	61	8.1717	457	5	
3	66	61	3477	633	5	
4	66	61	4727	758	5	
05	66	61	5696	855	5	
6	66	61	6488	$\bar{\bar{9}}$.934	5	
7	66	61	7158	$\bar{0}$.001	5	
8	66	61	7740	059	5	
9	66	61	8249	110	5	
10	8.509 7266	8.512 6761	8.8707	0.156	5.6125	
11	65	61	9121	197	5	
12	65	61	9499	235	5	
13	65	61	8.9846	270	5	
14	65	61	9.0168	302	5	
15	65	61	0468	332	5	
16	65	61	0748	360	5	
17	65	60	1011	386	5	
18	65	60	1259	411	5	
19	65	60	1494	435	5	
20	8.509 7265	8.512 6760	9.1717	0.457	5.6125	$\bar{\bar{6}}$.057
21	65	60	1929	478	5	
22	65	60	2131	498	5	
23	65	60	2324	518	5	
24	65	59	2509	536	5	
25	65	59	2686	554	5	
26	65	59	2857	571	5	
27	65	59	3020	587	5	
28	55	59	3178	603	5	
29	65	58	3331	618	5	
30	8.509 7265	8.512 6758	9.3478	0.633	5.6126	
31	64	58	3620	647	6	
32	64	58	3758	661	6	
33	64	57	9.3892	674	6	
34	64	57	9.4022	687	6	
35	64	57	4148	700	6	
36	64	57	4270	712	6	
37	64	56	4389	724	6	
38	64	56	4505	736	6	
39	64	56	4618	747	6	
40	8.509 7264	8.512 6756	9.4728	0.758	5.6126	6.358
41	64	55	4835	769	6	
42	64	55	9.4939	779	6	
43	64	55	9.5042	789	6	
44	63	54	5141	799	7	
45	63	54	5239	809	7	
46	63	54	5335	819	7	
47	63	53	5428	828	7	
48	63	53	5519	837	7	
49	63	53	5609	846	7	
50	8.509 7263	8.512 6752	9.5697	0.855	5.6127	
51	63	52	5783	863	7	
52	62	51	5866	872	7	
53	62	51	9.5950	880	7	
54	62	51	9.6031	888	8	
55	62	50	6111	896	8	
56	62	50	6189	904	8	
57	62	49	6266	912	8	
58	61	49	6341	919	8	
59	61	49	6416	927	8	
60	8.509 7261	8.512 6748	9.6489	0.934	5.6128	6.534

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 1°.

Lat.	log A	log B	log C	log D	log E	log F
° ′						
1 00	$\bar{8}$.509 7261	$\bar{8}$.512 6748	$\bar{\bar{9}}$.6489	$\bar{0}$.934	$\bar{\bar{5}}$.6128	$\bar{\bar{6}}$.534
1	61	48	560	941	29	
2	61	47	631	948	29	
3	61	47	701	955	29	
4	61	46	769	962	29	
05	60	46	836	969	29	
6	60	45	903	975	29	
7	60	45	9.6968	982	29	
8	60	44	9.7032	988	30	
9	60	44	096	0.995	30	
10	8.509 7260	8.512 6743	9.7158	1.001	5.6130	
11	59	43	220	007	30	
12	59	42	281	013	30	
13	59	42	341	019	30	
14	59	41	400	025	31	
15	59	41	458	031	31	
16	58	40	516	037	31	
17	58	39	572	042	31	
18	58	39	628	048	31	
19	58	38	684	053	31	
20	8.509 7258	8.512 6738	9.7738	1.059	5.6132	6.658
21	57	37	792	064	32	
22	57	36	846	070	32	
23	57	36	898	075	32	
24	57	35	9.7950	080	32	
25	57	35	9.8002	085	32	
26	56	34	053	090	33	
27	56	33	103	095	33	
28	56	33	152	100	33	
29	56	32	202	105	33	
30	8.509 7256	8.512 6731	9.8250	1.110	5.6133	
31	55	31	298	115	34	
32	55	30	346	119	34	
33	55	29	393	124	34	
34	55	29	439	129	34	
35	54	28	485	133	34	
36	54	27	531	138	35	
37	54	26	576	142	35	
38	54	26	620	147	35	
39	53	25	664	151	35	
40	8.509 7253	8.512 6724	9.8708	1.156	5.6136	6.755
41	53	23	751	160	36	
42	53	23	794	164	36	
43	52	22	836	168	36	
44	52	21	878	173	36	
45	52	20	920	177	37	
46	52	20	961	181	37	
47	51	19	9.9002	185	37	
48	51	18	042	189	37	
49	51	17	082	193	38	
50	8.509 7251	8.512 6716	9.9122	1.197	5.6138	
51	50	16	161	201	38	
52	50	15	200	205	38	
53	50	14	239	209	39	
54	49	13	277	212	39	
55	49	12	315	216	39	
56	49	11	353	220	39	
57	49	10	390	224	40	
58	48	10	427	227	40	
59	48	09	464	231	40	
60	8.509 7248	8.512 6708	9.9500	1.2347	5.6140	6.834

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 2°.

Lat.	log A	log B	log C	log D	log E	log F
° ′						
2 00	$\bar{8}$.509 7248	$\bar{8}$.512 6708	$\bar{\bar{9}}$.95002	$\bar{1}$.2347	$\bar{\bar{5}}$.6140	$\bar{\bar{6}}$.834
1	47	07	5363	383	41	
2	47	06	5721	419	41	
3	47	05	6076	454	41	
4	47	04	6428	489	41	
05	46	03	6777	524	42	
6	46	02	7123	559	42	
7	46	01	7467	593	42	
8	45	6700	7808	627	43	
9	45	6699	8146	661	43	
10	8.509 7245	8.512 6698	$\bar{\bar{9}}$.98482	1.2694	5.6143	
11	44	97	8815	727	43	
12	44	97	9145	760	44	
13	44	96	9473	793	44	
14	43	95	$\bar{\bar{9}}$.99799	826	44	
15	43	94	$\bar{0}$.00122	858	45	
16	43	93	0443	890	45	
17	42	91	0762	922	45	
18	42	90	1078	953	45	
19	42	89	1392	1.2984	46	
20	8.509 7241	8.512 6688	0.01703	1.3015	5.6146	6.901
21	41	87	2013	046	46	
22	41	86	2320	077	47	
23	40	85	2625	107	47	
24	40	84	2928	138	47	
25	40	83	3229	168	48	
26	39	82	3528	197	48	
27	39	81	3825	227	48	
28	38	80	4119	256	49	
29	38	79	4412	285	49	
30	8.509 7238	8.512 6678	0.04703	1.3314	5.6149	
31	37	76	4992	343	50	
32	37	75	5279	372	50	
33	37	74	5564	400	50	
34	36	73	5847	428	51	
35	36	72	6129	456	51	
36	35	71	6408	484	51	
37	35	70	6686	512	52	
38	35	68	6962	539	52	
39	34	67	7237	567	52	
40	8.509 7234	8.512 6666	0.07509	1.3594	5.6153	6.959
41	33	65	7780	621	53	
42	33	64	8050	648	53	
43	33	62	8317	674	54	
44	32	61	8583	701	54	
45	32	60	8848	727	54	
46	31	59	9111	753	55	
47	31	58	9372	779	55	
48	31	56	9631	805	56	
49	30	55	0.09890	831	56	
50	8.509 7230	8.512 6654	0.10146	1.3856	5.6156	
51	29	52	0401	882	57	
52	29	51	0655	907	57	
53	28	50	0907	932	57	
54	28	49	1158	957	58	
55	28	47	1407	1.3982	58	
56	27	46	1655	1.4007	59	
57	27	45	1902	031	59	
58	26	43	2147	055	59	
59	26	42	2390	080	60	
60	8.509 7225	8.512 6641	0.12633	1.4104	5.6160	7.010

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 3°.

Lat.	log A	log B diff. 1″=−0.03	log C	log D	log E	log F
° ′						
3 00	$\bar{8}$.509 7225	$\bar{8}$.512 6641	$\bar{0}$.12633	$\bar{1}$.4104	$\bar{\bar{5}}$.6160	$\bar{\bar{7}}$.010
1	25	39	2874	28	61	
2	24	38	3113	52	61	
3	24	37	3352	75	61	
4	24	35	3589	1.4199	62	
05	23	34	3825	1.4222	62	
6	23	33	4059	46	62	
7	22	31	4293	69	63	
8	22	30	4525	1.4292	63	
9	21	28	4756	1.4315	64	
10	8.509 7221	8.512 6627	0.14985	1.4338	5.6164	
11	20	26	5214	60	65	
12	20	24	5441	1.4383	65	
13	19	23	5667	1.4405	65	
14	19	21	5892	28	66	
15	18	20	6116	50	66	
16	18	18	6338	72	67	
17	17	17	6560	1.4494	67	
18	17	15	6780	1.4516	68	
19	16	14	6999	38	68	
20	8.509 7216	8.512 6612	0.17217	1.4560	5.6168	7.05$\bar{5}$
21	15	11	7434	1.4581	69	
22	15	09	7650	1.4603	69	
23	14	08	7665	24	70	
24	14	06	8079	45	70	
25	13	05	8292	66	71	
26	13	03	8504	1.4687	71	
27	12	02	8715	1.4708	72	
28	12	6600	8925	29	72	
29	11	6599	9133	50	72	
30	8.509 7211	8.512 6597	0.19341	1.4770	5.6173	
31	10	96	9548	1.4791	73	
32	10	94	9754	1.4811	74	
33	09	92	19959	32	74	
34	09	91	20163	52	75	
35	08	89	0366	72	75	
36	08	88	0568	1.4892	76	
37	07	86	0769	1.4912	76	
38	07	84	0969	32	77	
39	06	83	1168	52	77	
40	8.509 7206	8.512 6581	0.21367	1.4971	5.6178	7.096
41	05	80	1564	1.4991	78	
42	04	78	1761	1.5011	79	
43	04	76	1956	30	79	
44	03	75	2151	49	80	
45	03	73	2345	68	80	
46	02	71	2538	1.5088	81	
47	02	69	2731	1.5107	81	
48	01	68	2922	26	81	
49	01	66	3113	45	82	
50	8.509 7200	8.512 6564	0.23302	1.5163	5.6182	
51	7199	63	3491	1.5182	83	
52	99	61	3680	1.5201	84	
53	98	59	3867	19	84	
54	98	58	4053	38	85	
55	97	56	4239	56	85	
56	96	54	4424	75	86	
57	96	52	4608	1.5293	86	
58	95	50	4792	1.5311	87	
59	95	49	4974	29	87	
60	8.509 7194	8.512 6547	0.25156	1.5347	5.6188	7.133

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 4°.

Lat.	log A	log B diff. 1″=−0.04	log C	log D	log E	log F
° ′						
4 00	$\bar{8}$.509 7194	$\bar{8}$.512 6547	$\bar{0}$.25156	$\bar{1}$.5347	$\bar{\bar{5}}$.6188	$\bar{\bar{7}}$.133
1	93	45	5337	65	88	
2	93	43	5518	1.5383	89	
3	92	42	5697	1.5401	89	
4	92	40	5876	18	90	
05	91	38	6055	36	90	
6	91	36	6232	54	91	
7	90	34	6409	71	91	
8	89	32	6585	1.5489	92	
9	89	31	6760	1.5506	92	
10	8.509 7188	8.512 6529	0.26935	1.5523	5.6193	
11	87	27	7109	40	93	
12	87	25	7282	58	94	
13	86	23	7455	75	95	
14	86	21	7627	1.5592	95	
15	85	19	7798	1.5609	96	
16	84	17	7968	25	96	
17	84	16	8138	42	97	
18	83	14	8308	59	97	
19	82	12	8476	76	98	
20	8.509 7182	8.512 6510	0.28644	1.5692	5.6199	7.168
21	81	08	8812	1.5709	5.6199	
22	80	06	8978	25	5.6200	
23	80	04	9144	42	00	
24	79	02	9310	58	01	
25	78	6500	9475	74	01	
26	78	6498	9639	1.5791	02	
27	77	96	9802	1.5807	03	
28	76	94	0.29965	23	03	
29	76	92	0.30128	39	04	
30	8.509 7175	8.512 6490	0.30290	1.5855	5.6204	
31	74	88	0451	71	05	
32	74	86	0611	1.5887	05	
33	73	84	0771	1.5902	06	
34	72	82	0931	18	07	
35	72	80	1090	34	07	
36	71	78	1248	50	08	
37	70	76	1406	65	08	
38	70	74	1563	81	09	
39	69	72	1719	1.5996	10	
40	8.509 7168	8.512 6470	0.31875	1.6011	5.6210	7.200
41	67	68	2031	27	11	
42	67	65	2186	42	12	
43	66	63	2340	57	12	
44	66	61	2494	73	13	
45	65	59	2647	1.6088	13	
46	64	57	2800	1.6103	14	
47	63	55	2953	18	15	
48	63	53	3104	33	15	
49	62	51	3255	48	16	
50	8.509 7161	8.512 6448	0.33406	1.6163	5.6216	
51	60	46	3556	77	17	
52	60	44	3706	1.6192	18	
53	59	42	3855	1.6207	18	
54	58	40	4004	21	19	
55	57	38	4152	36	20	
56	57	35	4300	51	20	
57	56	33	4447	65	21	
58	55	31	4594	80	22	
59	55	29	4740	1.6294	22	
60	8.509 7154	8.512 6427	0.34885	1.6308	5.6223	7.229

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 5°.

Lat.	log A	log B diff. 1″=−0.04	log C	log D diff. 1″=+0.22	log E.	log F
° ′						
5 00	$\bar{8}$.509 7154	$\bar{8}$.512 6427	$\bar{0}$.34885	$\bar{1}$.6308	$\bar{\bar{5}}$.6223	$\bar{\bar{7}}$.229
1	53	24	5030	23	24	
2	53	22	5175	37	24	
3	52	20	5320	51	25	
4	51	18	5464	65	26	
05	50	15	5607	79	26	
6	49	13	5750	1.6393	27	
7	49	11	5892	1.6407	28	
8	48	08	6034	21	28	
9	47	06	6176	35	29	
10	8.509 7146	8.512 6404	0.36317	1.6449	5.6230	
11	46	6402	6457	63	30	
12	45	6399	6597	77	31	
13	44	97	6737	1.6491	32	
14	43	95	6876	1.6504	32	
15	43	92	7015	18	33	
16	42	90	7154	32	34	
17	41	88	7292	45	34	
18	40	85	7429	59	35	
19	39	83	7566	72	36	
20	8.509 7139	8.512 6381	0.37703	1.6586	5.6236	7.256
21	38	78	7839	1.6599	37	
22	37	76	7975	1.6612	38	
23	36	73	8111	26	38	
24	35	71	8246	39	39	
25	35	69	8380	52	40	
26	34	66	8514	65	41	
27	33	64	8648	78	41	
28	32	61	8781	1.6692	42	
29	31	59	8914	1.6705	43	
30	8.509 7131	8.512 6356	0.39047	1.6718	5.6243	
31	30	54	9179	31	44	
32	29	52	9311	44	45	
33	28	49	9442	56	46	
34	27	47	9573	69	46	
35	27	44	9704	82	47	
36	26	42	9834	1.6795	48	
37	25	39	0.39964	1.6808	48	
38	24	37	0.40094	20	49	
39	23	34	0223	33	50	
40	8.509 7122	8.512 6332	0.40351	1.6846	5.6251	7.282
41	21	29	0480	58	51	
42	21	27	0608	71	52	
43	20	24	0735	83	53	
44	19	21	0863	1.6896	54	
45	18	19	0990	1.6908	54	
46	17	16	1116	21	55	
47	16	14	1242	33	56	
48	16	11	1368	45	57	
49	15	09	1493	58	57	
50	8.509 7114	8.512 6306	0.41619	1.6970	5.6258	
51	13	03	1743	82	59	
52	12	6301	1868	1.6994	60	
53	11	6298	1992	1.7006	60	
54	10	96	2115	19	61	
55	09	93	2239	31	62	
56	09	90	2362	43	63	
57	08	88	2484	55	63	
58	07	85	2607	67	64	
59	06	82	2729	79	65	
60	8.509 7105	8.512 6280	0.42850	1.7090	5.6266	7.306

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 6°.

Lat.	log A diff. 1″=−0.02	log B diff. 1″=−0.05	log C	log D diff. 1″=+0.18	log E	log F
° ′						
6 00	$\bar{8}$.509 7105	$\bar{8}$.512 6280	$\bar{0}$.42850	$\bar{1}$.7090	$\bar{5}$.6266	$\bar{7}$.306
1	04	77	2972	7102	67	
2	03	74	3093	14	67	
3	02	72	3213	26	68	
4	01	69	3334	38	69	
05	01	66	3454	50	70	
6	7100	64	3573	61	70	
7	7099	61	3693	73	71	
8	98	58	3812	85	72	
9	97	55	3931	1.7196	73	
10	8.509 7096	8.512 6253	0.44049	1.7208	5.6274	
11	95	50	4167	19	74	
12	94	47	4285	31	75	
13	93	44	4402	42	76	
14	92	42	4519	54	77	
15	91	39	4636	65	78	
16	91	36	4753	76	78	
17	90	33	4869	88	79	
18	89	31	4985	1.7299	80	
19	88	28	5101	1.7310	81	
20	8.509 7087	8.512 6225	0.45216	1.7322	5.6282	7.329
21	86	22	5331	33	83	
22	85	19	5446	44	83	
23	84	16	5560	55	84	
24	83	14	5674	66	85	
25	82	11	5788	78	86	
26	81	08	5902	1.7389	87	
27	80	05	6015	1.7400	88	
28	79	6202	6128	11	88	
29	78	6199	6241	22	89	
30	8.509 7077	8.512 6196	0.46353	1.7433	5.6290	
31	76	94	6465	44	91	
32	75	91	6577	54	92	
33	74	88	6689	65	93	
34	73	85	6800	76	93	
35	72	82	6911	87	94	
36	71	79	7022	1.7498	95	
37	70	76	7132	1.7508	96	
38	70	73	7242	19	97	
39	69	70	7352	30	98	
40	8.509 7068	8.512 6167	0.47462	1.7541	5.6299	7.351
41	67	64	7571	51	5.6299	
42	66	61	7681	62	5.6300	
43	65	58	7789	73	01	
44	64	55	7898	83	02	
45	63	52	8006	1.7594	03	
46	62	49	8114	1.7604	04	
47	61	46	8222	15	05	
48	60	43	8330	25	06	
49	59	40	8437	36	06	
50	8.509 7058	8.512 6137	0.48544	1.7646	5.6207	
51	57	34	8651	56	08	
52	56	31	8757	67	09	
53	55	28	8864	77	10	
54	53	25	8970	87	11	
55	52	22	9075	1.7698	12	
56	51	19	9181	1.7708	13	
57	50	16	9286	18	13	
58	49	13	9391	28	14	
59	48	10	9496	38	15	
60	8.509 7047	8.512 6107	0.49600	1.7749	5.6216	7.371

TABLE 23.—*Geodetic position computations*—Continned.

LATITUDE 7°.

Lat.	log A diff. 1″=−0.02	log B diff. 1″=−0.06	log C	log D diff. 1″=+0.16	log E	log F
° ′						
7 00	$\bar{8}$.509 7047	$\bar{8}$.512 6107	$\bar{0}$.49600	$\bar{1}$.7749	$\bar{\bar{5}}$.6316	$\bar{\bar{7}}$.371
1	46	03	705	59	17	
2	45	6100	809	69	18	
3	44	6097	0.49913	79	19	
4	43	94	0.50016	89	20	
05	42	91	119	1.7799	21	
6	41	88	222	1.7809	22	
7	40	85	325	19	23	
8	39	82	428	29	23	
9	38	78	530	39	24	
10	8.509 7037	8.512 6075	0.50632	1.7849	5.6325	
11	36	72	734	59	26	
12	35	69	836	68	27	
13	34	66	0.50937	78	28	
14	33	62	0.51039	88	29	
15	32	59	140	1.7898	30	
16	30	56	240	1.7908	31	
17	29	53	341	17	32	
18	28	50	441	27	33	
19	27	46	541	37	34	
20	8.509 7026	8.512 6043	0.51641	1.7946	5.6335	7.391
21	25	40	741	56	36	
22	24	37	840	66	37	
23	23	33	0.51939	75	37	
24	22	30	0.52038	85	38	
25	21	27	137	1.7994	39	
26	20	23	236	1.8004	40	
27	19	20	334	13	41	
28	17	17	432	23	42	
29	16	14	530	32	43	
30	8.509 7015	8.512 6010	0.52628	1.8042	5.6344	
31	14	07	725	51	45	
32	13	04	822	61	46	
33	12	6000	0.52919	70	47	
34	11	5997	0.53016	79	48	
35	10	94	113	89	49	
36	09	90	209	1.8098	50	
37	07	87	306	1.8107	51	
38	06	83	402	17	52	
39	05	80	497	26	53	
40	8.509 7004	8.512 5977	0.53593	1.8135	5.6354	7.409
41	03	73	688	44	55	
42	02	70	784	53	56	
43	01	66	879	63	57	
44	7000	63	0.53973	72	58	
45	6998	60	0.54068	81	59	
46	97	56	162	90	60	
47	96	53	257	1.8199	61	
48	95	49	351	1.8208	62	
49	94	46	444	17	63	
50	8.509 6993	8.512 5942	0.54538	1.8226	5.6364	
51	91	39	631	35	65	
52	90	35	725	44	66	
53	89	32	818	53	67	
54	88	28	0.54911	62	68	
55	87	25	0.55003	71	69	
56	86	21	096	80	70	
57	84	18	188	89	71	
58	83	14	280	1.8298	72	
59	82	11	372	1.8307	73	
60	8.509 6981	8.512 5907	0.55464	1.8315	5.6374	7.427

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 8°.

Lat.	log A diff. 1″=−0.02	log B diff. 1″=−0.06	log C	log D diff. 1″=+0.14	log E diff. 1″=+0.02	log F
° ′						
8 00	$\bar{8}$.509 6981	$\bar{8}$.512 5907	$\bar{0}$.55464	$\bar{1}$.8315	$\bar{\bar{5}}$.6374	$\bar{\bar{7}}$.427
1	80	04	555	24	75	
2	79	5900	646	33	76	
3	77	5897	738	42	77	
4	76	93	829	50	78	
05	75	90	0.55919	59	79	
6	74	86	0.56010	68	80	
7	73	82	100	77	81	
8	71	79	191	85	82	
9	70	75	281	1.8394	83	
10	8.509 6969	8.512 5872	0.56371	1.8403	5.6384	
11	68	68	460	12	85	
12	67	64	550	20	86	
13	65	61	639	28	87	
14	64	57	728	37	88	
15	63	54	817	45	90	
16	62	50	906	54	91	
17	61	46	0.56995	62	92	
18	59	43	0.57083	71	93	
19	58	39	172	79	94	
20	8.509 6957	8.512 5835	0.57260	1.8488	5.6395	7.444
21	56	32	348	1.8496	96	
22	54	28	436	1.8505	97	
23	53	24	523	13	98	
24	52	20	611	21	99	
25	51	17	698	30	5.6400	
26	49	13	785	38	5.6401	
27	48	09	872	46	02	
28	47	06	0.57959	55	03	
29	46	5802	0.58045	63	04	
30	8.509 6945	8.512 5798	0.58132	1.8571	5.6406	
31	43	94	218	80	07	
32	42	91	304	88	08	
33	41	87	390	1.8596	09	
34	39	83	476	1.8604	10	
35	38	79	562	13	11	
36	37	75	647	21	12	
37	36	72	732	29	13	
38	34	68	818	37	14	
39	33	64	903	45	15	
40	8.509 6932	8.512 5760	0.58987	1.8653	5.6416	7.461
41	31	56	0.59072	61	18	
42	29	53	157	69	19	
43	28	49	241	77	20	
44	27	45	325	85	21	
45	25	41	409	1.8693	22	
46	24	37	493	1.8701	23	
47	23	33	577	09	24	
48	22	29	660	17	25	
49	20	26	744	25	26	
50	8.509 6919	8.512 5722	0.59827	1.8733	5.6428	
51	18	18	910	41	29	
52	16	14	0.59993	49	30	
53	15	10	0.60076	57	31	
54	14	06	159	65	32	
55	12	5702	241	73	33	
56	11	5698	324	81	34	
57	10	94	406	89	35	
58	09	90	488	1.8796	37	
59	07	86	570	1.8804	38	
60	8.509 6906	8.512 5682	0.60652	1.8812	5.6439	7.476

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 9°.

Lat.	log A diff. 1″=−0.02	log B diff. 1″=−0.07	log C	log D diff. 1″=+0.12	log E diff. 1″=+0.02	log F
° ′						
9 00	$\bar{8}$.509 6906	$\bar{8}$.512 5682	$\bar{0}$.60652	$\bar{1}$.8812	$\bar{\bar{5}}$.6439	$\bar{\bar{\bar{7}}}$.476
1	05	78	733	20	40	
2	03	74	815	27	41	
3	02	70	896	35	42	
4	6901	66	0.60977	43	44	
05	6899	62	0.61058	51	45	
6	98	58	139	58	46	
7	97	54	220	66	47	
8	95	50	301	74	48	
9	94	46	881	81	49	
10	8.509 6893	8.512 5642	0.61461	1.8889	5.6450	
11	91	38	542	1.8897	52	
12	90	34	622	1.8904	53	
13	89	30	702	12	54	
14	87	26	781	19	55	
15	86	22	861	27	56	
16	84	18	0.61941	34	57	
17	83	14	0.62020	42	59	
18	82	10	099	50	60	
19	80	06	178	57	61	
20	8.509 6879	8.512 5602	0.62257	1.8964	5.6462	7.490
21	78	5598	336	72	63	
22	76	93	415	79	65	
23	75	89	493	87	66	
24	74	85	572	1.8994	67	
25	72	81	650	1.9002	68	
26	71	77	728	09	69	
27	69	73	806	17	70	
28	68	69	884	24	72	
29	67	64	0.62962	31	73	
30	8.509 6865	8.512 5560	0.63039	1.9039	5.6474	
31	64	56	117	46	75	
32	62	52	194	53	76	
33	61	48	271	61	78	
34	60	43	349	68	79	
35	58	39	426	75	80	
36	57	35	502	82	81	
37	55	31	579	90	83	
38	54	27	656	1.9097	84	
39	53	22	732	1.9104	85	
40	8.509 6851	8.512 5518	0.63808	1.9111	5.6486	7.505
41	50	14	885	19	87	
42	48	10	0.63961	26	89	
43	47	05	0.64037	33	90	
44	45	5501	112	40	91	
45	44	5497	188	47	92	
46	43	92	264	54	94	
47	41	88	339	61	95	
48	40	84	415	69	96	
49	38	80	490	76	97	
50	8.509 6837	8.512 5475	0.64565	1.9183	5.6498	
51	35	71	640	90	5.6500	
52	34	67	715	1.9197	01	
53	33	62	789	1.9204	02	
54	31	58	864	11	03	
55	30	54	0.64938	18	05	
56	28	49	0.65013	25	06	
57	27	45	087	32	07	
58	25	40	161	39	08	
59	24	36	235	46	10	
60	8.509 6822	8.512 5432	0.65309	1.9253	5.6411	7.518

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 10°.

Lat.	log A diff. 1″=−0.03	log B diff. 1″=−0.08	log C	log D diff. 1″=+0.11	log E diff. 1″=+0.02	log F
° ′						
10 00	$\bar{8}$.509 6822	$\bar{8}$.512 5432	$\bar{0}$.65309	$\bar{1}$.9253	$\bar{\bar{5}}$.6511	$\bar{\bar{7}}$.518
1	21	27	383	60	12	
2	19	23	456	67	13	
3	18	19	530	74	15	
4	17	14	603	80	16	
05	15	10	677	87	17	
6	14	05	750	1.9294	18	
7	12	5401	823	1.9301	20	
8	11	5396	896	08	21	
9	9	92	0.65968	15	22	
10	8.509 6808	8.512 5388	0.66041	1.9322	5.6524	
11	06	83	114	28	25	
12	05	79	186	35	26	
13	03	74	259	42	27	
14	02	70	331	49	29	
15	6800	65	403	56	30	
16	6799	61	475	62	31	
17	97	56	547	69	33	
18	96	52	619	76	34	
19	94	47	691	82	35	
20	8.509 6793	8.512 5343	0.66762	1.9389	5.6536	7.532
21	91	38	834	1.9396	38	
22	90	33	905	1.9403	39	
23	88	29	0.66976	09	40	
24	87	24	0.67047	16	42	
25	85	20	118	23	43	
26	84	15	189	29	44	
27	82	11	260	36	46	
28	81	06	331	42	47	
29	79	5302	401	49	48	
30	8.509 6777	8.512 5297	0.67472	1.9456	5.6549	
31	76	92	542	62	51	
32	74	88	613	69	52	
33	73	83	683	75	53	
34	71	79	753	82	55	
35	70	74	823	88	56	
36	68	69	893	1.9495	57	
37	67	65	0.67962	1.9501	59	
38	65	60	0.68032	08	60	
39	64	55	102	14	61	
40	8.509 6762	8.512 5251	0.68171	1.9521	5.6563	7.544
41	60	46	240	27	64	
42	59	41	310	34	65	
43	57	37	379	40	67	
44	56	32	448	47	68	
45	54	27	517	53	69	
46	53	23	586	60	71	
47	51	18	654	66	72	
48	50	13	723	72	73	
49	48	08	791	79	75	
50	8.509 6746	8.512 5204	0.68860	1.9585	5.6576	
51	45	5199	928	91	78	
52	43	94	0.68996	1.9598	79	
53	42	89	0.69064	1.9604	80	
54	40	85	132	10	82	
55	38	80	200	17	83	
56	37	75	268	23	84	
57	35	70	336	29	86	
58	34	66	404	36	87	
59	32	61	471	42	88	
60	8.509 6730	8.512 5156	0.69539	1.9648	5.6590	7.556

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 11°.

Lat.	log A diff. 1″ = −0.03	log B diff. 1″ = −0.08	log C	log D diff. 1″ = +0.10	log E diff. 1″ = +0.02	log F
° ′						
11 00	$\bar{8}$.509 6730	$\bar{8}$.512 5156	$\bar{0}$.69539	$\bar{1}$.9648	$\bar{\bar{5}}$.6590	$\bar{\bar{7}}$.556
1	29	51	606	54	91	
2	27	46	673	61	93	
3	26	41	740	67	94	
4	24	37	807	73	95	
05	22	32	874	79	97	
6	21	27	0.69941	86	98	
7	19	22	0.70008	92	5.6599	
8	18	17	074	1.9698	5.6601	
9	16	12	141	1.9704	02	
10	8.509 6714	8.512 5108	0.70208	1.9710	5.6604	
11	13	5103	274	16	05	
12	11	5098	340	23	06	
13	09	5093	406	29	08	
14	08	88	473	35	09	
15	06	83	539	41	11	
16	05	78	604	47	12	
17	03	73	670	53	13	
18	01	68	736	59	15	
19	6700	63	802	65	16	
20	8.509 6698	8.512 5058	0.70867	1.9771	5.6618	7.568
21	96	53	933	77	19	
22	95	49	0.70998	83	20	
23	93	44	0.71063	89	22	
24	91	39	128	1.9795	23	
25	90	34	194	1.9801	25	
26	88	29	259	07	26	
27	86	24	323	13	27	
28	85	19	388	19	29	
29	83	14	453	25	30	
30	8.509 6681	8.512 5009	0.71518	1.9831	5.6632	
31	80	04	582	37	33	
32	78	4999	647	43	35	
33	76	94	711	49	36	
34	75	89	775	55	37	
35	73	83	840	61	39	
36	71	78	904	67	40	
37	70	73	0.71968	73	42	
38	68	68	0.72032	79	43	
39	66	63	095	85	45	
40	8.509 6665	8.512 4958	0.72159	1.9890	5.6646	7.580
41	63	53	223	1.9896	47	
42	61	48	286	1.9902	49	
43	59	43	350	08	50	
44	58	38	413	14	52	
45	56	33	477	20	53	
46	54	28	540	25	55	
47	53	22	603	31	56	
48	51	17	666	37	58	
49	49	12	729	43	59	
50	8.509 6647	8.512 4907	0.72792	1.9949	5.6661	
51	46	4902	855	54	62	
52	44	4897	918	60	64	
53	43	92	0.72980	66	65	
54	41	86	0.73043	72	66	
55	39	81	106	77	68	
56	37	76	168	83	69	
57	35	71	230	89	71	
58	34	66	293	94	72	
59	32	60	355	1.9900	74	
60	8.509 6630	8.512 4855	0.73417	2.0006	5.6675	7.591

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 12°.

Lat.	log A diff. 1″ = −0.03	log B diff. 1″ = −0.09	log C	log D diff. 1″ = +0.09	log E diff. 1″ = +0.04	log F
° ′						
12 00	$\bar{8}$.509 6630	$\bar{8}$.512 4855	$\bar{0}$.73417	$\bar{2}$.0006	$\bar{\bar{5}}$.6675	$\bar{\bar{7}}$.591
1	29	50	479	11	77	
2	27	45	541	17	78	
3	25	39	603	23	80	
4	23	34	664	28	81	
05	21	29	726	34	83	
6	20	24	788	40	84	
7	18	18	849	45	86	
8	16	13	911	51	87	
9	14	08	0.73972	57	89	
10	8.509 6613	8.512 4803	0.74033	2.0062	5.6690	
11	11	4797	094	67	92	
12	09	92	156	73	93	
13	07	87	217	79	95	
14	06	81	278	84	96	
15	04	76	339	90	98	
16	02	71	399	2.0096	99	
17	6600	65	460	2.0101	5.6701	
18	6599	60	521	07	02	
19	97	55	581	12	04	
20	8.509 6595	8.512 4749	0.74642	2.0118	5.6705	7.601
21	93	44	702	23	07	
22	91	39	763	29	08	
23	90	33	823	34	10	
24	88	28	883	40	11	
25	86	23	0.74943	45	13	
26	84	17	0.75003	50	14	
27	82	12	063	56	16	
28	81	06	123	61	17	
29	79	4701	183	67	19	
30	8.509 6577	8 512 4696	0.75243	2.0172	5.6720	
31	75	90	302	77	22	
32	73	85	362	83	24	
33	72	79	422	88	25	
34	70	74	481	94	27	
35	68	68	540	2.0199	28	
36	66	63	600	2.0205	30	
37	64	57	659	10	31	
38	62	52	718	15	33	
39	61	46	777	21	34	
40	8.509 6559	8.512 4641	0.75836	2.0226	5.6736	7.611
41	57	35	895	32	37	
42	55	30	0.75954	37	39	
43	53	24	0.76013	42	41	
44	51	19	072	47	42	
45	50	13	130	53	44	
46	48	08	189	58	45	
47	46	4602	247	63	47	
48	44	4597	306	69	48	
49	42	91	364	74	50	
50	8.509 6540	8.512 4586	0.76422	2.0279	5.6751	
51	39	80	481	84	53	
52	37	75	539	90	55	
53	35	69	597	2.0295	56	
54	33	63	655	2.0300	58	
55	31	58	713	05	59	
56	29	52	771	10	61	
57	27	47	828	16	62	
58	25	41	886	21	64	
59	24	35	0.76944	26	66	
60	8.509 6522	8.512 4530	0.77001	2.0331	5.6767	7.621

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 13°.

Lat.	log A diff. 1″=−0.03	log B diff. 1″=−0.10	log C diff. 1″=+0.93	log D diff. 1″=+0.08	log E diff. 1″=+0.03	log F
° ′						
13 00	$\bar{8}$.509 6522	$\bar{8}$.512 4530	$\bar{0}$.77001	$\bar{2}$.0331	$\bar{\bar{5}}$.6767	$\bar{\bar{7}}$.621
1	20	24	059	36	69	
2	18	19	116	42	70	
3	16	13	174	47	72	
4	14	07	231	52	74	
05	12	4502	288	57	75	
6	10	4496	346	62	77	
7	09	90	403	67	78	
8	07	85	460	73	80	
9	05	79	517	78	82	
10	8.509 6503	8.512 4473	0.77574	2.0383	5.6783	
11	6501	67	630	88	85	
12	6499	62	687	93	86	
13	97	56	744	2.0398	88	
14	95	50	801	2.0403	90	
15	93	45	857	08	91	
16	91	39	914	13	93	
17	90	33	0.77970	18	94	
18	88	27	0.78027	23	96	
19	86	22	083	28	98	
20	8.509 6484	8.512 4416	0.78139	2.0433	5.6799	7.631
21	82	10	195	38	5.6801	
22	80	4404	251	44	03	
23	78	4399	307	49	04	
24	76	93	363	54	06	
25	74	87	419	59	07	
26	72	81	475	64	09	
27	70	76	531	69	11	
28	68	70	587	74	12	
29	66	64	642	78	14	
30	8.509 6464	8.512 4358	0.78698	2.0483	5.6816	
31	63	52	754	88	17	
32	61	46	809	93	19	
33	59	41	865	2.0498	20	
34	57	35	920	2.0503	22	
35	55	29	0.78975	08	24	
36	53	23	0.79030	13	25	
37	51	17	086	18	27	
38	49	11	141	23	29	
39	47	4305	196	28	30	
40	8.509 6445	8.512 4299	0.79251	2.0533	5.6832	7.640
41	43	94	306	38	34	
42	41	88	360	42	35	
43	39	82	415	47	37	
44	37	76	470	52	39	
45	35	70	525	57	40	
46	33	64	579	62	42	
47	31	58	634	67	44	
48	29	52	588	72	45	
49	27	46	743	76	47	
50	8.509 6425	8.512 4240	0.79797	2.0581	5.6849	
51	23	34	851	86	50	
52	21	28	905	91	52	
53	19	22	0.79960	2.0596	54	
54	17	16	0.80014	2.0601	55	
55	15	10	068	05	57	
56	13	4204	122	10	59	
57	11	4198	176	15	60	
58	09	92	230	20	62	
59	07	86	284	24	64	
60	8.509 6405	8.512 4180	0.80337	2.0629	5.6865	7.649

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TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 14°.

Lat.	log A diff.1″=−0.03	log B diff.1″=−0.10	log C diff.1″=+0.87	log D diff.1″=+0.08	log E diff.1″=+0.03	log F
° ′						
14 00	$\bar{8}$.509 6405	$\bar{8}$.512 4180	$\bar{0}$.80337	$\bar{2}$.0629	$\bar{5}$.6865	$\bar{\bar{7}}$.649
1	03	74	391	34	67	
2	6401	68	445	39	69	
3	6399	62	498	43	71	
4	97	56	552	48	72	
05	95	50	605	53	74	
6	93	44	659	58	76	
7	91	38	712	62	77	
8	89	32	765	67	79	
9	87	26	819	72	81	
10	8.509 6385	8.512 4120	0.80872	2.0676	5.6882	
11	83	14	925	81	84	
12	81	08	0.80978	86	86	
13	79	4101	0.81031	90	88	
14	77	4095	084	2.0695	89	
15	75	89	137	2.0700	91	
16	73	83	190	04	93	
17	71	77	243	09	94	
18	69	71	295	14	96	
19	67	65	348	18	98	
20	8.509 6365	8.512 4059	0.81401	2.0723	5.6900	7.658
21	63	52	453	28	01	
22	61	46	506	32	03	
23	58	40	558	36	05	
24	56	34	611	41	06	
25	54	28	663	46	08	
26	52	21	715	51	10	
27	50	15	767	55	12	
28	48	09	820	60	13	
29	46	4003	872	64	15	
30	8.509 6344	8.512 3997	0.81924	2.0769	5.6917	
31	42	90	0.81976	73	19	
32	40	84	0.82028	78	20	
33	38	78	080	83	22	
34	36	72	131	87	24	
35	34	65	183	92	26	
36	32	59	235	2.0796	27	
37	29	53	287	2.0801	29	
38	27	47	338	05	31	
39	25	40	390	10	33	
40	8.509 6323	8.512 3934	0.82441	2.0814	5.6934	7.667
41	21	28	493	19	36	
42	19	22	544	23	38	
43	17	15	596	28	40	
44	15	09	647	32	41	
45	13	3903	698	37	43	
46	11	3896	749	41	45	
47	08	90	800	46	47	
48	06	84	852	50	48	
49	04	77	903	54	50	
50	8.509 6302	8.512 3871	0.82954	2.0859	5.6952	
51	6300	65	0.83005	63	54	
52	6298	58	055	68	55	
53	96	52	106	72	57	
54	94	45	157	77	59	
55	92	39	208	81	61	
56	89	33	258	85	63	
57	87	26	309	90	64	
58	85	20	360	94	66	
59	83	13	410	2.0899	68	
60	8.509 6281	8.512 3807	0.83461	2.0903	5.6970	7.675

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 15°.

Lat.	log A diff. 1″=−0.04	log B diff. 1″=−0.11	log C diff. 1″=+0.82	log D diff. 1″=+0.07	log E diff. 1″=+0.03	log F
° ′						
15 00	$\bar{8}$.509 6281	$\bar{8}$.512 3807	$\bar{0}$.83461	$\bar{2}$.0903	$\bar{\bar{5}}$.6970	$\bar{\bar{7}}$.675
1	79	3801	511	07	72	
2	77	3794	561	12	73	
3	74	88	612	16	75	
4	72	81	662	21	77	
05	70	75	712	25	79	
6	68	68	762	29	80	
7	66	62	813	34	82	
8	64	56	863	38	84	
9	62	49	913	42	86	
10	8.509 6259	8.512 3743	0.83963	2.0947	5.6988	
11	57	36	0.84012	51	89	
12	55	30	062	55	91	
13	53	23	112	59	93	
14	51	17	162	64	95	
15	49	10	212	68	97	
16	46	3704	261	72	5.6999	
17	44	3697	311	77	5.7000	
18	42	91	361	81	02	
19	40	84	410	85	04	
20	8.509 6238	8.512 3677	0.84460	2.0990	5.7006	7.683
21	35	71	509	94	08	
22	33	64	558	2.0998	09	
23	31	58	608	2.1002	11	
24	29	51	657	07	13	
25	27	45	706	11	15	
26	24	38	755	15	17	
27	22	31	804	19	19	
28	20	25	854	23	20	
29	18	18	903	28	22	
30	8.509 6216	8.512 3612	0.84952	2.1032	5.7024	
31	14	3605	0.85001	36	26	
32	11	3598	049	40	28	
33	09	92	098	44	30	
34	07	85	147	49	31	
35	05	79	196	53	33	
36	02	72	245	57	35	
37	6200	65	293	61	37	
38	6198	59	342	65	39	
39	96	52	390	69	41	
40	8.509 6194	8.512 3545	0.85439	2.1074	5.7042	7.691
41	91	39	487	78	44	
42	89	32	536	82	46	
43	87	25	584	86	48	
44	85	19	633	90	50	
45	82	12	681	94	52	
46	80	3505	729	2.1099	54	
47	78	3498	777	2.1103	55	
48	76	92	825	07	57	
49	73	85	874	11	59	
50	8.509 6171	8.512 3478	0.85922	2.1115	5.7061	
51	69	71	0.85970	19	63	
52	67	65	0.86018	23	65	
53	64	58	066	27	67	
54	62	51	113	31	69	
55	60	44	161	35	70	
56	58	38	209	39	72	
57	55	31	257	44	74	
58	53	24	304	48	76	
59	51	17	352	52	78	
60	8.509 6149	8.512 3411	0.86400	2.1156	5.7080	7.698

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 16°.

Lat.	log A diff. 1″=−0.04	log B diff. 1″=−0.12	log C diff. 1″=+0.77	log D diff. 1″=+0.06	log E diff. 1″=+0.03	log F
° ′						
16 00	$\bar{8}$.509 6149	$\bar{8}$.512 3411	$\bar{0}$.86400	$\bar{2}$.1156	$\bar{\bar{5}}$.7080	$\bar{\bar{7}}$.698
1	46	3404	447	60	82	
2	44	3397	495	64	84	
3	42	90	542	68	85	
4	40	83	590	72	87	
05	37	76	637	76	89	
6	35	70	684	80	91	
7	33	63	732	84	93	
8	30	56	779	88	95	
9	28	49	826	92	97	
10	8.509 6126	8.512 3342	0.86873	2.1196	5.7099	
11	24	35	921	2.1200	5.7101	
12	21	28	0.86968	04	03	
13	19	22	0.87015	08	04	
14	17	15	062	12	06	
15	14	08	109	16	08	
16	12	3301	156	20	10	
17	10	3294	202	24	12	
18	08	87	249	28	14	
19	05	80	296	32	16	
20	8.509 6103	8.512 3273	0.87343	2.1236	5.7118	7.705
21	6101	66	389	40	20	
22	6098	59	436	44	22	
23	96	52	483	47	24	
24	94	45	529	51	25	
25	91	39	576	55	27	
26	89	32	622	59	29	
27	87	25	669	63	31	
28	84	18	715	67	33	
29	82	11	761	71	35	
30	8.509 6080	8.512 3204	0.87808	2.1275	5.7137	
31	77	3197	854	79	39	
32	75	90	900	83	41	
33	73	83	947	87	43	
34	70	76	0.87993	90	45	
35	68	69	0.88039	94	47	
36	66	62	085	2.1298	49	
37	63	55	131	2.1302	51	
38	61	48	177	06	52	
39	59	41	223	10	54	
40	8.509 6056	8.512 3133	0.88269	2.1314	5.7156	7.712
41	54	26	315	17	58	
42	52	19	360	21	60	
43	49	12	406	25	62	
44	47	3105	452	29	64	
45	45	3098	498	33	66	
46	42	91	543	37	68	
47	40	84	589	40	70	
48	37	77	634	44	72	
49	35	70	680	48	74	
50	8.509 6033	8.512 3063	0.88726	2.1352	5.7176	
51	30	56	771	56	78	
52	28	48	816	59	80	
53	26	41	862	63	82	
54	23	34	907	67	84	
55	21	27	952	71	86	
56	18	20	0.88998	74	88	
57	16	13	0.89043	78	90	
58	14	3006	088	82	92	
59	11	2998	133	86	94	
60	8.509 6009	8.512 2991	0.89178	2.1390	5.7196	7.719

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 17°.

Lat.	log A diff. 1″=−0.04	log B diff. 1″=−0.12	log C diff. 1″=−0.73	log D diff. 1″=+0.06	log E diff. 1″=+0.03	log F
° ′						
17 00	$\bar{8}$.509 6009	$\bar{8}$.512 2991	$\bar{0}$.89178	$\bar{2}$.1390	$\bar{\bar{5}}$.7196	$\bar{\bar{7}}$.719
1	06	84	223	93	97	
2	04	77	268	2.1397	99	
3	6002	70	313	2.1401	5.7201	
4	5999	62	358	04	03	
05	97	55	403	08	05	
6	94	48	448	12	07	
7	92	41	493	16	09	
8	90	34	538	19	11	
9	87	26	583	23	13	
10	8.509 5985	8.512 2919	0.89627	2.1427	5.7215	
11	82	12	672	30	17	
12	80	2905	717	34	19	
13	78	2897	761	38	21	
14	75	90	806	42	23	
15	73	83	850	45	25	
16	70	76	895	49	27	
17	68	68	939	53	29	
18	65	61	0.89984	56	31	
19	63	54	0.90028	60	33	
20	8.509 5961	8.512 2846	0.90072	2.1464	5.7235	7.726
21	58	39	117	67	37	
22	56	32	161	71	39	
23	53	24	205	75	41	
24	51	17	249	78	43	
25	48	10	294	82	45	
26	46	2802	338	85	47	
27	44	2795	382	89	49	
28	41	88	426	93	51	
29	39	80	470	2.1496	53	
30	8.509 5936	8.512 2773	0.90514	2.1500	5.7255	
31	34	66	558	04	57	
32	31	58	602	07	59	
33	29	51	646	11	61	
34	26	44	689	14	64	
35	24	36	733	18	66	
36	21	29	777	22	68	
37	19	21	821	25	70	
38	16	14	864	29	72	
39	14	2707	908	32	74	
40	8.509 5912	8.512 2699	0.90952	2.1536	5.7276	7.732
41	09	92	0.90995	39	78	
42	07	84	0.91039	43	80	
43	04	77	082	47	82	
44	5902	69	126	50	84	
45	5899	62	169	54	86	
46	97	55	212	57	88	
47	94	47	256	61	90	
48	92	40	299	64	92	
49	89	32	342	68	94	
50	8.509 5887	8.512 2625	0.91386	2.1571	5.7296	
51	84	17	429	75	5.7298	
52	82	10	472	78	5.7300	
53	79	2602	515	82	02	
54	77	2595	558	85	04	
55	74	87	601	89	06	
56	72	80	644	92	08	
57	69	72	687	96	11	
58	67	65	730	2.1599	13	
59	64	57	773	2.1603	15	
60	8.509 5862	8.512 2550	0.91816	2.1606	5.7317	7.738

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 18°.

Lat.	log A diff. 1″=−0.04	log B diff. 1″=−0.13	log C diff. 1″=+0.70	log D diff. 1″=+0.06	log E diff. 1″=+0.03	log F diff. 10′=+3.0
° ′						
18 00	$\bar{8}$.509 5862	$\bar{8}$.512 2550	$\bar{0}$.91816	$\bar{2}$.1606	$\bar{5}$.7317	$\bar{7}$.738
1	59	42	859	10	19	
2	57	35	902	13	21	
3	54	27	945	17	23	
4	52	19	0.91987	20	25	
05	49	12	0.92030	24	27	
6	46	8.512 2504	073	27	29	
7	44	8.512 2497	115	31	31	
8	41	89	158	34	33	
9	39	81	201	38	35	
10	8.509 5836	8.512 2474	0.92243	2.1641	5.7337	
11	34	66	286	44	39	
12	31	59	328	48	41	
13	29	51	371	51	44	
14	26	43	413	55	46	
15	24	36	456	58	48	
16	21	28	498	62	50	
17	19	20	540	65	52	
18	16	13	582	68	54	
19	13	8.512 2405	625	72	56	
20	8.509 5811	8.512 2397	0.92667	2.1675	5.7358	7.744
21	08	90	709	79	60	
22	06	82	751	82	62	
23	03	74	793	85	64	
24	8.509 5801	67	836	89	67	
25	8.509 5798	59	878	92	69	
26	96	51	920	95	71	
27	93	44	0.92962	2.1699	73	
28	90	36	0.93004	2.1702	75	
29	88	28	046	06	77	
30	8.509 5785	8.512 2320	0.93088	2.1709	5.7379	
31	83	13	129	12	81	
32	80	8.512 2305	171	16	83	
33	78	8.512 2297	213	19	85	
34	75	90	255	22	88	
35	72	82	296	26	90	
36	70	74	338	29	92	
37	67	66	380	32	94	
38	65	58	421	36	96	
39	62	51	463	39	5.7398	
40	8.509 5759	8.512 2243	0.93505	2.1742	5.7400	7.750
41	57	35	546	46	02	
42	54	27	588	49	05	
43	52	19	629	52	07	
44	49	12	671	56	09	
45	46	8.512 2204	712	59	11	
46	44	8.512 2196	753	62	13	
47	41	88	795	65	15	
48	39	80	836	69	17	
49	36	72	877	72	19	
50	8.509 5733	8.512 2165	0.93919	2.1775	5.7422	
51	31	57	0.93960	79	24	
52	28	49	0.94001	82	26	
53	25	41	042	85	28	
54	23	33	083	88	30	
55	20	25	125	92	32	
56	18	17	166	95	34	
57	15	10	207	2.1798	37	
58	12	8.512 2102	248	2.1801	39	
59	10	8.512 2094	289	05	41	
60	8.509 5707	8.512 2086	0.94330	2.1808	5.7443	7.756

Table 23.—*Geodetic position computations*—Continued.

LATITUDE 19°.

Lat.	log A diff. 1″ = −0.04	log B diff. 1″ = −0.13	log C diff. 1″ = +0.67	log D diff. 1″ = +0.05	log E diff. 1″ = +0.04	log F diff. 10′ = +2.7
° ′						
19 00	8.509 5707	8.512 2086	0.94330	2.1808	5.7443	7.756
1	04	78	370	11	45	
2	8.509 5702	70	411	14	47	
3	8.509 5699	62	452	18	49	
4	96	54	493	21	52	
05	94	46	534	24	54	
6	91	38	575	27	56	
7	89	30	615	30	58	
8	86	22	656	34	60	
9	83	14	697	37	62	
10	8.509 5681	8.512 2006	0.94737	2.1840	5.7464	
11	78	8.512 1999	778	43	67	
12	75	91	819	46	69	
13	73	83	859	50	71	
14	70	75	900	53	73	
15	67	67	940	56	75	
16	65	59	0.94981	59	78	
17	62	51	0.95021	62	80	
18	59	43	061	66	82	
19	57	35	102	69	84	
20	8.509 5654	8.512 1927	0.95142	2.1872	5.7486	7.761
21	52	19	182	75	88	
22	49	11	223	78	91	
23	46	8.512 1903	263	81	93	
24	43	8.512 1895	303	84	95	
25	41	87	344	88	97	
26	38	79	384	91	5.7499	
27	35	71	424	94	5.7501	
28	33	63	464	2.1897	04	
29	30	55	504	2.1900	06	
30	8.509 5627	8.512 1847	0.95544	2.1903	5.7508	
31	25	38	584	07	10	
32	22	30	624	10	12	
33	19	22	664	13	15	
34	16	14	704	16	17	
35	14	8.512 1806	744	19	19	
36	11	8.512 1798	784	22	21	
37	08	90	824	25	23	
38	06	82	863	28	26	
39	03	74	903	31	28	
40	8.509 5600	8.512 1766	0.95943	2.1934	5.7530	7.767
41	8.509 5598	57	0.95983	38	32	
42	95	49	0.96022	41	34	
43	92	41	062	44	37	
44	89	33	102	47	39	
45	87	25	142	50	41	
46	84	17	181	53	43	
47	81	08	221	56	46	
48	78	8.512 1700	260	59	48	
49	76	8.512 1692	300	62	50	
50	8.509 5573	8.512 1684	0.96339	2.1965	5.7552	
51	70	75	379	68	54	
52	68	67	418	71	57	
53	65	59	457	74	59	
54	62	51	497	77	61	
55	59	43	536	80	63	
56	57	34	575	83	65	
57	54	26	615	86	68	
58	51	18	654	89	70	
59	48	10	693	92	72	
60	8.509 5546	8.512 1602	0.96733	2.1996	5.7574	7.772

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 20°.

Lat. °	Lat. ′	log A diff. 1″= -0.05	log B diff. 1″=−0.14	log C diff. 1″=+0.64	log D diff. 1″=+0.05	log E diff. 1″=+0.04	log F diff. 10′=+2.5
20	00	8.509 5546	8.512 1602	0.96733	2.1996	5.7574	7.772
	1	43	8.512 1593	772	2.1999	77	
	2	40	85	811	2.2002	79	
	3	37	77	850	05	81	
	4	35	68	889	08	83	
	5	32	60	928	11	86	
	6	29	52	0.96967	14	88	
	7	26	44	0.97006	17	90	
	8	24	35	045	20	92	
	9	21	27	084	23	94	
	10	8.509 5518	8.512 1519	0.97123	2.2026	5.7597	
	11	15	10	162	28	5.7599	
	12	12	8.512 1502	201	31	5.7601	
	13	10	8.512 1494	240	34	03	
	14	07	85	279	37	06	
	15	04	77	318	40	08	
	16	8.509 5501	69	356	43	10	
	17	8.509 5499	60	395	46	12	
	18	96	52	434	49	15	
	19	93	44	472	52	17	
	20	8.509 5490	8.512 1435	0.97511	2.2055	5.7619	7.777
	21	87	27	550	58	21	
	22	85	18	588	61	24	
	23	82	10	627	64	26	
	24	79	8.512 1402	666	67	28	
	25	76	8.512 1393	704	70	30	
	26	73	85	743	73	33	
	27	71	76	781	76	35	
	28	68	68	819	79	37	
	29	65	60	858	81	40	
	30	8.509 5462	8.512 1351	0.97896	2.2084	5.7642	
	31	59	43	935	87	44	
	32	57	34	0.97973	90	46	
	33	54	26	0.98011	93	49	
	34	51	17	050	96	51	
	35	48	09	088	2.2099	53	
	36	45	8.512 1301	126	2.2102	55	
	37	42	8.512 1292	164	05	58	
	88	40	84	203	08	60	
	39	37	75	241	10	62	
	40	8.509 5434	8.512 1267	0.98279	2.2113	5.7664	7.782
	41	31	58	317	16	67	
	42	28	50	355	19	69	
	43	25	41	393	22	71	
	44	23	33	431	25	74	
	45	20	24	469	28	76	
	46	17	16	507	31	78	
	47	14	8.512 1207	545	33	81	
	48	11	8.512 1199	583	36	83	
	49	08	90	621	39	85	
	50	8.509 5406	8.512 1182	0.98659	2.2142	5.7688	
	51	03	73	697	45	90	
	52	8.509 5400	64	735	48	92	
	53	8.509 5397	56	773	50	94	
	54	94	47	811	53	97	
	55	91	39	848	56	5.7699	
	56	88	30	886	59	5.7701	
	57	86	21	924	62	04	
	58	83	13	962	65	06	
	59	80	8.512 1104	0.98999	67	08	
	60	8.509 5377	8.512 1096	0.99037	2.2170	5.7711	7.787

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 21°.

Lat.	log A diff.1″=−0.05	log B diff.1″=−0.15	log C diff.1″=+0.062	log D diff.1″=+0.04	log E diff.1″=+0.04	log F diff.10′=+2.2
° ′						
21 00	8.509 5377	8.512 1096	0.99037	2.2170	5.7711	7.787
1	74	87	075	73	13	
2	71	79	112	76	15	
3	68	70	150	79	18	
4	66	62	187	81	20	
05	63	53	225	84	22	
6	60	45	262	87	24	
7	57	36	300	90	27	
8	54	27	337	93	29	
9	51	19	375	95	31	
10	8.509 5348	8.512 1010	0.99412	2.2198	5.7734	
11	46	8.512 1002	450	2.2201	36	
12	43	8.512 0993	487	04	38	
13	40	84	524	07	41	
14	37	76	562	09	43	
15	34	67	599	12	45	
16	31	58	636	15	48	
17	28	50	673	18	50	
18	25	41	711	20	52	
19	22	32	748	23	55	
20	8.509 5320	8.512 0924	0.99785	2.2226	5.7757	7.791
21	17	15	822	29	59	
22	14	8.512 0906	859	31	62	
23	11	8.512 0897	896	34	64	
24	08	89	933	37	66	
25	05	80	0.99971	40	69	
26	8.509 5302	71	1.00008	42	71	
27	8.509 5299	62	045	45	73	
28	96	54	082	48	76	
29	93	45	119	50	78	
30	8.509 5290	8.512 0836	1.00156	2.2253	5.7780	
31	88	27	192	56	83	
32	85	19	229	59	85	
33	82	10	266	61	87	
34	79	8.512 0801	303	64	90	
35	76	8.512 0792	340	67	92	
36	73	84	377	69	94	
37	70	75	413	72	97	
38	67	66	450	75	5.7799	
39	64	57	487	78	5.7802	
40	8.509 5261	8.512 0748	1.00524	2.2280	5.7804	7.796
41	58	39	560	83	06	
42	55	31	597	86	09	
43	52	22	634	88	11	
44	49	13	670	91	13	
45	46	8.512 0704	707	94	16	
46	44	8.512 0695	743	96	18	
47	41	86	780	2.2299	20	
48	38	78	816	2.2301	23	
49	35	69	853	04	25	
50	8.509 5232	8.512 0660	1.00890	2.2307	5.7828	
51	29	51	926	09	30	
52	26	42	962	12	32	
53	23	33	1.00999	15	35	
54	20	24	1.01035	17	37	
55	17	15	072	20	40	
56	14	8.512 0606	108	23	42	
57	11	8.512 0598	144	25	44	
58	08	89	181	28	47	
59	05	80	217	31	49	
60	8.509 5202	8.512 0571	1.01253	2.2333	5.7851	7.800

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 22°.

Lat.	log A diff. 1″=−0.05	log B diff. 1″=−0.15	log C diff. 1″=+0.59	log D diff. 1″=+0.04	log E diff. 1″=+0.04	log F diff. 10′=+2.0
° ′						
22 00	8.509 5202	8.512 0571	1.01253	2.2333	5.7851	7.800
1	8.509 5199	62	289	36	54	
2	96	53	326	38	56	
3	93	44	362	41	59	
4	90	35	398	44	61	
05	87	26	434	46	63	
6	84	17	470	49	66	
7	81	8.512 0508	506	51	68	
8	78	8.512 0499	542	54	71	
9	75	90	578	57	73	
10	8.509 5172	8.512 0481	1.01615	2.2359	5.7875	
11	69	72	651	62	78	
12	66	63	687	64	80	
13	63	54	723	67	83	
14	60	45	759	70	85	
15	57	36	794	72	87	
16	54	27	830	75	90	
17	51	18	866	77	92	
18	48	09	902	80	95	
19	45	8.512 0400	938	83	97	
20	8.509 5142	8.512 0391	1.01974	2.2385	5.7899	7.804
21	39	82	1.02010	88	5.7902	
22	36	73	045	90	04	
23	33	64	081	93	07	
24	30	55	117	95	09	
25	27	46	153	2.2398	11	
26	24	37	188	2.2400	14	
27	21	28	224	03	16	
28	18	19	260	06	19	
29	15	10	295	08	21	
30	8.509 5112	8.512 0301	1.02331	2.2411	5.7924	
31	09	8.512 0292	367	13	26	
32	06	83	402	16	28	
33	03	73	438	18	31	
34	8.509 5100	64	473	21	33	
35	8.509 5097	55	509	23	36	
36	94	46	544	26	38	
37	91	37	580	28	41	
38	88	28	615	31	43	
39	85	19	651	33	45	
40	8.509 5082	8.512 0210	1.02686	2.2436	5.7948	7.808
41	79	8.512 0200	721	38	50	
42	76	8.512 0191	757	41	53	
43	72	82	792	43	55	
44	69	73	828	46	58	
45	66	64	863	48	60	
46	63	55	898	51	62	
47	60	46	933	53	65	
48	57	36	1.02969	56	67	
49	54	27	1.03004	58	70	
50	8.509 5051	8.512 0118	1.03039	2.2461	5.7972	
51	48	09	074	63	75	
52	45	8.512 0100	109	66	77	
53	42	8.512 0090	145	68	80	
54	39	81	180	70	82	
55	36	72	215	73	84	
56	33	63	250	75	87	
57	30	54	285	78	89	
58	27	44	320	80	92	
59	23	35	355	83	94	
60	8.509 5020	8.512 0026	1.03390	2.2485	5.7997	7.812

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 23°.

Lat.	log A diff. 1″ = −0.05	log B diff. 1″ = −0.16	log C diff. 1″ = +0.57	log D diff. 1″ = +0.04	log E diff. 1″ = +0.04	log F diff. 10′ = +1.8
° ′						
23 00	8.509 5020	8.512 0026	1.03390	2.2485	5.7997	7.812
1	17	17	425	88	5.7999	
2	14	8.512 0008	460	90	5.8002	
3	11	8.511 9998	495	93	04	
4	08	89	530	95	07	
05	05	80	565	2.2497	09	
6	8.509 5002	71	600	2.2500	12	
7	8.509 4999	61	634	02	14	
8	96	52	669	05	16	
9	93	43	704	07	19	
10	8.509 4990	8.511 9934	1.03739	2.2510	5.8021	
11	87	24	774	12	24	
12	83	15	809	14	26	
13	80	8.511 9906	843	17	29	
14	77	8.511 9896	878	19	31	
15	74	87	913	22	34	
16	71	78	947	24	36	
17	68	68	1.03982	26	39	
18	65	59	1.04017	29	41	
19	62	50	052	31	44	
20	8.509 4959	8.511 9840	1.04086	2.2534	5.8046	7.816
21	55	31	121	36	49	
22	52	22	155	38	51	
23	49	12	190	41	54	
24	46	8.511 9803	224	43	56	
25	43	8.511 9794	259	45	59	
26	40	84	293	48	61	
27	37	75	328	50	64	
28	34	66	362	53	66	
29	31	56	397	55	69	
30	8.509 4927	8.511 9747	1.04431	2.2557	5.8071	
31	24	37	466	60	74	
32	21	28	500	62	76	
33	18	19	534	64	79	
34	15	09	569	67	81	
35	12	8.511 9700	603	69	84	
36	09	8.511 9690	637	71	86	
37	05	81	672	74	89	
38	8.509 4902	71	706	76	91	
39	8.509 4899	62	740	78	93	
40	8.509 4896	8.511 9653	1.04775	2.2581	5.8096	7.819
41	93	43	809	83	5.8099	
42	90	34	843	85	5.8101	
43	87	24	877	88	04	
44	83	15	911	90	06	
45	80	8.511 9605	945	92	09	
46	77	8.511 9596	1.04980	95	11	
47	74	86	1.05014	97	14	
48	71	77	048	2.2599	16	
49	68	67	082	2.2601	19	
50	8.509 4865	8.511 9558	1.05116	2.2604	5.8121	
51	61	48	150	06	24	
52	58	39	184	09	26	
53	55	29	218	11	29	
54	52	20	252	13	31	
55	49	10	286	16	34	
56	45	8.511 9501	320	18	36	
57	42	8.511 9491	354	20	39	
58	39	82	388	23	41	
59	36	72	422	25	44	
60	8.509 4833	8.511 9463	1.05456	2.2627	5.8146	7.823

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 24°.

Lat.	log A diff. 1″=−0.05	log B diff. 1″=−0.16	log C diff. 1″=+0.56	log D diff. 1″=+0.04	log E diff. 1″=+0.04	log F diff. 10′=+1.6
° ′						
24 00	8.509 4833	8.511 9463	1.05456	2.2627	5.8146	7.823
1	30	53	490	29	49	
2	26	44	523	31	51	
3	23	34	557	34	54	
4	20	24	591	36	57	
05	17	15	625	38	59	
6	14	8.511 9405	658	41	62	
7	10	8.511 9396	692	43	64	
8	07	86	726	45	67	
9	04	77	760	47	69	
10	8.509 4801	8.511 9367	1.05794	2.2650	5.8172	
11	8.509 4798	58	827	52	74	
12	94	48	861	54	77	
13	91	38	894	56	79	
14	88	29	928	59	82	
15	85	19	962	61	85	
16	82	09	1.05995	63	87	
17	78	8.511 9300	1.06029	65	90	
18	75	8.511 9290	062	68	92	
19	72	81	096	70	95	
20	8.509 4769	8.511 9271	1.06130	2.2672	5.8197	7.826
21	66	61	163	74	5.8200	
22	62	52	197	77	02	
23	59	42	230	79	05	
24	56	32	263	81	07	
25	53	23	297	83	10	
26	50	13	330	85	13	
27	46	8.511 9203	364	88	15	
28	43	8.511 9194	397	90	18	
29	40	84	431	92	20	
30	8.509 4737	8.511 9174	1.06464	2.2694	5.8223	
31	33	65	497	96	25	
32	30	55	530	2.2699	28	
33	27	45	564	2.2701	31	
34	24	35	597	03	33	
35	20	26	630	05	36	
36	17	16	664	07	38	
37	14	8.511 9106	697	10	41	
38	11	8.511 9096	730	12	43	
39	07	87	763	14	46	
40	8.509 4704	8.511 9077	1.06797	2.2716	5.8249	7.829
41	8.509 4701	67	830	18	51	
42	8.509 4698	58	863	20	54	
43	94	48	896	23	56	
44	91	38	929	25	59	
45	88	28	962	27	61	
46	85	18	1.06995	29	64	
47	81	8.511 9009	1.07028	31	67	
48	78	8.511 8999	061	33	69	
49	75	89	095	36	72	
50	8.509 4672	8.511 8979	1.07128	2.2738	5.8274	
51	68	70	161	40	77	
52	65	60	194	42	80	
53	62	50	226	44	82	
54	59	40	259	46	85	
55	55	30	292	49	87	
56	52	21	325	51	90	
57	49	11	358	53	92	
58	45	8.511 8901	391	55	95	
59	42	8.511 8891	424	57	5.8298	
60	8.509 4639	8.511 8881	1.07457	2.2759	5.8300	7.832

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 25°.

Lat.	log A diff. 1″=−0·06	log B diff. 1″=−0·16	log C diff. 1″=+0·54	log D diff. 1″=+0·03	log E diff. 1″=+0·04	log F diff. 10′=+1·5
° ′						
25 00	8.509 4639	8.511 8881	1.07457	2.2759	5.8300	7.832
1	36	71	490	61	03	
2	32	62	523	63	05	
3	29	52	555	66	08	
4	26	42	588	68	11	
05	23	32	621	70	13	
6	19	22	654	72	16	
7	16	12	687	74	18	
8	13	8.511 8802	719	76	21	
9	09	8.511 8793	752	78	24	
10	8.509 4606	8.511 8783	1.07785	2.2780	5.8326	
11	03	73	817	82	29	
12	8.509 4600	63	850	85	32	
13	8.509 4596	53	883	87	34	
14	93	43	915	89	37	
15	90	33	948	91	39	
16	86	23	1.07981	93	42	
17	83	13	1.08013	95	45	
18	80	8.511 8704	046	97	47	
19	76	8.511 8694	078	2.2799	50	
20	8.509 4573	8.511 8684	1.08111	2.2801	5.8352	7.835
21	70	74	143	03	55	
22	66	64	176	05	59	
23	63	54	208	07	60	
24	60	44	241	10	63	
25	56	34	273	12	66	
26	53	24	306	14	68	
27	50	14	338	16	71	
28	46	8.511 8604	370	18	73	
29	43	8.511 8594	403	20	76	
30	8.509 4540	8.511 8584	1.08435	2.2822	5.8379	
31	37	74	468	24	81	
32	33	64	500	26	84	
33	30	54	532	28	87	
34	26	44	565	30	89	
35	23	34	597	32	92	
36	20	24	629	34	94	
37	17	14	662	36	5.8397	
38	13	8.511 8504	694	38	5.8400	
39	10	8.511 8494	726	40	02	
40	8.509 4507	8.511 8484	1.08758	2.2842	5.8405	7.838
41	03	74	791	44	08	
42	8.509 4500	64	823	46	10	
43	8.509 4496	54	855	48	13	
44	93	44	887	50	16	
45	90	34	919	52	18	
46	86	24	951	54	21	
47	83	14	1.08984	56	24	
48	80	8.511 8404	1.09016	58	26	
49	76	8.511 8393	048	60	29	
50	8.509 4473	8.511 8383	1.09080	2.2862	5.8431	
51	70	73	112	64	34	
52	66	63	144	66	37	
53	63	53	176	68	39	
54	60	43	208	70	42	
55	56	33	240	72	45	
56	53	23	272	74	47	
57	50	13	304	76	50	
58	46	8.511 8303	336	78	53	
59	43	8.511 8293	368	80	55	
60	8.509 4439	8.511 8283	1.09400	2.2882	5.8458	7.841

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 26°.

Lat. ° ′	log A diff. 1″=−0·06	log B diff. 1″=−0·17	log C diff. 1″=+0·52	log D diff. 1″=+0·03	log E diff. 1″=+0·04	log F diff. 10′=+1·3
26 00	8.509 4439	8.511 8283	1.09400	2.2882	5.8458	7.841
1	36	72	432	84	61	
2	33	62	464	86	63	
3	29	52	496	88	66	
4	26	42	527	90	69	
05	22	32	559	92	71	
6	19	22	591	94	74	
7	16	12	623	96	77	
8	12	8.511 8201	655	2.2898	79	
9	09	8.511 8191	687	2.2900	82	
10	8.509 4406	8.511 8181	1.09718	2.2902	5.8485	
11	8.509 4402	71	750	04	88	
12	8.509 4399	61	782	06	90	
13	95	51	814	08	93	
14	92	40	845	10	96	
15	88	30	877	12	5.8498	
16	85	20	909	14	5.8501	
17	82	10	940	16	04	
18	78	8.511 8100	1.09972	18	06	
19	75	8.511 8089	1.10004	20	09	
20	8.509 4372	8.511 8079	1.10036	2.2922	5.8512	7.844
21	68	69	067	23	14	
22	65	59	099	25	17	
23	61	48	130	27	20	
24	58	38	162	29	22	
25	54	28	194	31	25	
26	51	18	225	33	28	
27	48	8.511 8008	257	35	30	
28	44	8.511 7997	288	37	33	
29	41	87	320	39	36	
30	8.509 4337	8.511 7977	1.10351	2.2941	5.8539	
31	34	67	383	43	41	
32	31	56	414	45	44	
33	27	46	446	47	47	
34	24	36	477	48	49	
35	20	25	509	50	52	
36	17	15	540	52	55	
37	13	8.511 7905	571	54	57	
38	10	8.511 7895	603	56	60	
39	07	84	634	58	63	
40	8.509 4303	8.511 7874	1.10666	2.2960	5.8566	7.846
41	8.509 4300	.64	697	62	68	
42	8.509 4296	53	728	63	71	
43	93	43	760	65	74	
44	89	33	791	67	76	
45	86	22	822	69	79	
46	83	12	854	71	82	
47	79	8.511 7802	885	73	85	
48	76	8.511 7791	916	75	87	
49	72	81	947	77	90	
50	8.509 4269	8.511 7771	1.10979	2.2978	5.8593	
51	65	60	1.11010	80	95	
52	62	50	041	82	5.8598	
53	58	40	072	84	5.8601	
54	55	29	103	86	04	
55	52	19	134	88	06	
56	48	8.511 7709	166	89	09	
57	45	8.511 7698	197	91	12	
58	41	88	228	93	14	
59	38	77	259	95	17	
60	8.509 4234	8.511 7667	1.11290	2.2997	5.8620	7.849

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 27°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.18	log C diff. 1″=+0.51	log D diff. 1″=+0.03	log E diff. 1″=+0.05	log F diff. 10′=+1.1
° ′						
27 00	8.509 4234	8.511 7667	1.11290	2.2997	5.8620	7.849
1	31	57	321	2.2999	23	
2	27	46	352	2.3001	25	
3	24	36	383	03	28	
4	20	25	414	04	31	
05	17	15	445	06	34	
6	13	8.511 7605	476	08	36	
7	10	8.511 7594	507	10	39	
8	06	84	538	12	42	
9	03	73	569	14	44	
10	8.509 4200	8.511 7563	1.11600	2.3015	5.8647	
11	8.509 4196	53	631	17	50	
12	93	42	662	19	53	
13	89	32	693	21	55	
14	86	21	724	23	58	
15	82	11	755	24	61	
16	79	8.511 7500	786	26	64	
17	75	8.511 7490	817	28	66	
18	72	79	848	30	69	
19	68	69	878	32	72	
20	8.509 4165	5.511 7458	1.11909	2.3033	5.8675	7.851
21	61	48	940	35	77	
22	58	37	1.11971	37	80	
23	54	27	1.12002	39	83	
24	51	16	032	41	86	
25	47	8.511 7406	063	42	88	
26	44	8.511 7395	094	44	91	
27	40	85	125	46	94	
28	37	74	156	48	97	
29	33	64	186	50	5.8699	
30	8.509 4130	8.511 7353	1.12217	2.3051	5.8702	
31	26	43	248	53	05	
32	23	32	278	55	08	
33	19	22	309	57	10	
34	16	11	340	58	13	
35	12	8.511 7301	370	60	16	
36	08	8.511 7290	401	62	19	
37	05	80	432	64	22	
38	8.509 4101	69	462	65	24	
39	8.509 4098	58	493	67	27	
40	8.509 4094	8.511 7248	1.12523	2.3069	5.8730	7.853
41	91	37	554	70	33	
42	87	27	584	72	35	
43	84	16	615	74	38	
44	80	8.511 7206	646	76	41	
45	77	8.511 7195	676	78	44	
46	73	84	707	79	46	
47	70	74	737	81	49	
48	66	63	768	83	52	
49	63	53	798	85	55	
50	8.509 4059	8.511 7142	1.12829	2.3086	5.8757	
51	56	31	859	88	60	
52	52	21	889	90	63	
53	49	10	920	91	66	
54	45	8.511 7100	950	93	69	
55	41	8.511 7089	1.12981	95	72	
56	38	78	1.13011	97	74	
57	34	68	041	2.3099	77	
58	31	57	072	2.3100	80	
59	27	46	102	02	83	
60	8.509 4024	8.511 7036	1.13132	2.3104	5.8785	7.855

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 28°.

Lat. ° ′	log A diff. 1″=−0.06	log B diff. 1″=−0.18	log C diff. 1″=+0.50	log D diff. 1″=+0.03	log E diff. 1″=+0.05	log F diff. 10″=+1.0
28 00	8.509 4024	8.511 7036	1.13132	2.3104	5.8785	7.855
1	20	25	163	05	88	
2	17	14	193	07	91	
3	13	8.511 7004	223	09	94	
4	10	8.511 6993	254	10	97	
05	06	82	284	12	5.8799	
6	8.509 4002	72	314	14	5.8802	
7	8.509 3999	61	345	16	05	
8	95	50	375	17	08	
9	92	40	405	19	11	
10	8.509 3988	8.511 6929	1.13435	2.3121	5.8813	
11	85	18	465	22	16	
12	81	8.511 6908	496	24	19	
13	78	8.511 6897	526	26	22	
14	74	86	556	27	25	
15	70	75	586	29	27	
16	67	65	616	31	30	
17	63	54	646	32	33	
18	60	43	677	34	36	
19	56	33	707	36	39	
20	8.509 3952	8.511 6822	1.13737	2.3137	5.8841	7.857
21	49	11	767	39	44	
22	45	8.511 6800	797	41	47	
23	42	8.511 6790	827	42	50	
24	38	79	857	44	53	
25	35	68	887	46	55	
26	31	57	917	47	58	
27	27	47	947	49	61	
28	24	36	1.13977	51	64	
29	20	25	1.14007	52	67	
30	8.509 3917	8.511 6714	1.14037	2.3154	5.8870	
31	13	8.511 6704	067	56	72	
32	09	8.511 6693	097	57	75	
33	06	82	127	59	78	
34	8.509 3902	71	157	61	81	
35	8.509 3899	61	187	62	84	
36	95	50	217	64	87	
37	92	39	247	65	89	
38	88	28	277	67	92	
39	84	17	307	69	95	
40	8.509 3881	8.511 6607	1.14337	2.3170	5.8898	7.859
41	77	8.511 6596	366	72	5.8901	
42	73	85	396	74	04	
43	70	74	426	75	06	
44	66	63	456	77	09	
45	63	52	486	78	12	
46	59	42	516	80	15	
47	55	31	545	82	18	
48	52	20	575	83	21	
49	48	8.511 6509	605	85	23	
50	8.509 3845	8.511 6498	1.14635	2.3187	5.8926	
51	41	87	664	88	29	
52	37	76	694	90	32	
53	34	66	724	91	35	
54	30	55	754	93	38	
55	26	44	783	95	40	
56	23	33	813	96	43	
57	19	22	843	98	46	
58	16	11	872	2.3199	49	
59	12	8.511 6400	902	2.3201	52	
60	8.509 3808	8.511 6389	1.14932	2.3203	5.8955	7.861

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 29°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.18	log C diff. 1″=+0.49	log D diff. 1″=+0.03	log E diff. 1″=+0.05	log F diff. 10′=+0.8
° ′						
29 00	8.509 3808	8.511 6389	1.14932	2.3203	5.8955	7.861
1	05	78	961	04	58	
2	8.509 3801	68	1.14991	06	60	
3	8.509 3797	57	1.15021	07	63	
4	94	46	050	09	66	
05	90	35	080	10	69	
6	86	24	109	12	72	
7	83	13	139	14	75	
8	79	8.511 6302	168	15	78	
9	76	8.511 6291	198	17	80	
10	8.509 3772	8.511 6280	1.15228	2.3218	5.8983	
11	68	69	257	20	86	
12	65	58	287	21	89	
13	61	47	316	23	92	
14	57	36	346	25	95	
15	54	26	375	26	5.8998	
16	50	15	405	28	5.9000	
17	46	8.511 6204	434	29	03	
18	43	8.511 6193	464	31	06	
19	39	82	493	32	09	
20	8.509 3735	8.511 6171	1.15522	2.3234	5.9012	7.863
21	32	60	552	35	15	
22	28	49	581	37	18	
23	24	38	611	38	21	
24	21	27	640	40	23	
25	17	16	670	42	26	
26	13	8.511 6105	699	43	29	
27	10	8.511 6094	728	45	32	
28	06	83	758	46	35	
29	8.509 3702	72	787	48	38	
30	8.509 3699	8.511 6061	1.15816	2.3249	5.9041	
31	95	50	846	51	43	
32	91	39	875	52	46	
33	88	28	904	54	49	
34	84	17	934	55	52	
35	80	8.511 6006	963	57	55	
36	77	8.511 5995	1.15992	58	58	
37	73	84	1.16021	60	61	
38	69	73	051	61	64	
39	66	61	080	63	67	
40	8.509 3662	8.511 5950	1.16109	2.3264	5.9069	7.864
41	58	39	138	66	72	
42	55	28	167	67	75	
43	51	17	197	69	78	
44	47	8.511 5906	226	70	81	
45	44	8.511 5895	255	72	84	
46	40	84	284	73	87	
47	36	73	313	75	90	
48	33	62	343	76	93	
49	29	51	372	78	96	
50	8.509 3625	8.511 5840	1.16401	2.3279	5.9098	
51	21	29	430	81	5.9101	
52	18	18	459	82	04	
53	14	8.511 5806	488	84	07	
54	10	8.511 5795	517	85	10	
55	07	84	546	87	13	
56	8.509 3603	73	575	88	16	
57	8.509 3599	62	604	90	19	
58	96	51	633	91	22	
59	92	40	663	93	25	
60	8.509 3588	8.511 5729	1.16692	2.3294	5.9127	7.866

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 30°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.19	log C diff. 1″=+0.48	log D diff. 1″=+0.02	log E diff. 1″=+0.05	log F diff. 10′=+0.7
° ′						
30 00	8.509 3588	8.511 5729	1.16692	2.3294	5.9127	7.866
1	84	18	721	96	30	
2	81	8.511 5706	750	97	33	
3	77	8.511 5695	778	2.3298	36	
4	73	84	807	2.3300	39	
05	69	73	836	01	42	
6	66	62	865	03	45	
7	62	51	894	04	48	
8	58	40	923	06	51	
9	55	28	952	07	54	
10	8.509 3551	8.511 5617	1.16981	2.3309	5.9157	
11	47	8.511 5606	1.17010	10	59	
12	43	8.511 5595	039	12	62	
13	40	84	068	13	65	
14	36	73	097	14	68	
15	32	61	126	16	71	
16	29	50	155	17	74	
17	25	39	184	18	77	
18	21	28	212	20	80	
19	17	17	241	22	83	
20	8.509 3514	8.511 5505	1.17270	2.3323	5.9186	7.867
21	10	8.511 5494	299	24	89	
22	06	83	328	26	92	
23	8.509 3502	72	357	27	95	
24	8.509 3499	61	385	29	5.9198	
25	95	49	414	30	5.9200	
26	91	38	443	32	03	
27	88	27	472	33	06	
28	84	16	500	34	09	
29	80	8.511 5404	529	36	12	
30	8.509 3476	8.511 5393	1.17558	2.3337	5.9215	
31	72	82	587	39	18	
32	69	71	615	40	21	
33	65	59	644	41	24	
34	61	48	673	43	27	
35	57	37	701	44	30	
36	54	26	730	46	33	
37	50	14	759	47	36	
38	46	8.511 5303	788	48	39	
39	42	8.511 5292	816	50	42	
40	8.509 3439	8.511 5281	1.17845	2.3351	5.9245	7.869
41	35	69	874	53	48	
42	31	58	902	54	51	
43	27	47	931	55	53	
44	24	35	959	57	56	
45	20	24	1.17988	58	59	
46	16	13	1.18017	59	62	
47	12	8.511 5202	045	61	65	
48	09	8.511 5190	074	62	68	
49	05	79	102	64	71	
50	8.509 3401	8.511 5168	1.18131	2.3365	5.9274	
51	8.509 3397	56	160	66	77	
52	94	45	188	68	80	
53	90	34	217	69	83	
54	86	22	245	70	86	
55	82	11	274	72	89	
56	78	8.511 5100	302	73	92	
57	75	8.511 5088	331	74	95	
58	71	77	359	76	5.9298	
59	67	66	388	77	5.9301	
60	8.509 3363	8.511 5054	1.18416	2.3379	5.9304	7.870

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 31°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.19	log C diff. 1″=+0.47	log D diff. 1″=+0.02	log E diff. 1″=+0.05	log F diff. 10′=+0.5
° ′						
31 00	8.509 3363	8.511 5054	1.18416	2.3379	5.9304	7.870
1	60	43	445	80	07	
2	56	32	473	81	10	
3	52	20	501	83	13	
4	48	8.511 5009	530	84	16	
05	44	8.511 4998	558	85	19	
6	41	86	587	87	22	
7	37	75	615	88	25	
8	33	64	643	89	28	
9	29	52	672	91	31	
10	8.509 3325	8.511 4941	1.18700	2.3392	5.9334	
11	22	29	729	93	37	
12	18	18	757	95	39	
13	14	8.511 4907	785	96	42	
14	10	8.511 4895	813	97	45	
15	06	84	842	2.3399	48	
16	8.509 3303	72	870	2.3400	51	
17	8.509 3299	61	898	01	54	
18	95	50	927	03	57	
19	91	38	955	04	60	
20	8.509 3287	8.511 4827	1.18983	2.3405	5.9363	7.871
21	84	15	1.19012	06	66	
22	80	8.511 4804	040	08	69	
23	76	8.511 4793	068	09	72	
24	72	81	096	10	75	
25	68	70	125	12	78	
26	65	58	153	13	81	
27	61	47	181	14	84	
28	57	35	209	16	87	
29	53	24	238	17	90	
30	8.509 3249	8.511 4713	1.19266	2.3418	5.9393	
31	46	8.511 4701	294	20	96	
32	42	8.511 4690	322	21	5.9399	
33	38	78	351	22	5.9402	
34	34	67	379	23	05	
35	30	55	407	25	08	
36	26	44	435	26	11	
37	23	32	463	27	14	
38	19	21	491	29	17	
39	15	8.511 4609	520	30	20	
40	8.509 3211	8.511 4598	1.19548	2.3431	5.9423	7.872
41	07	86	576	32	26	
42	03	75	604	34	29	
43	8.509 3200	63	632	35	32	
44	8.509 3196	52	660	36	35	
45	92	40	688	37	38	
46	88	29	716	39	41	
47	84	17	744	40	44	
48	81	8.511 4506	772	41	47	
49	77	8.511 4494	800	43	50	
50	8.509 3173	8.511 4483	1.19828	2.3444	5.9453	
51	69	71	856	45	56	
52	65	60	884	46	59	
53	61	48	912	48	62	
54	57	37	940	49	65	
55	54	25	968	50	68	
56	50	14	1.19996	51	72	
57	46	8.511 4402	1.20024	53	75	
58	42	8.511 4391	052	54	78	
59	38	79	080	55	81	
60	8.509 3134	8.511 4368	1.20108	2.3456	5.9484	7.873

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 32°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.19	log C diff. 1″=+0.46	log D diff. 1″=+0.02	log E diff. 1″=+0.05	log F diff. 10′=+0.3
° ′						
32 00	8.509 3134	8.511 4368	1.20108	2.3456	5.9484	7.873
1	31	56	136	57	87	
2	27	44	164	59	90	
3	23	33	192	60	93	
4	19	21	220	61	96	
05	15	8.511 4310	248	62	5.9499	
6	11	8.511 4298	276	64	5.9502	
7	07	87	304	65	05	
8	04	75	332	66	08	
9	8.509 3100	63	360	67	11	
10	8.509 3096	8.511 4252	1.20387	2.3469	5.9514	
11	92	40	415	70	17	
12	88	29	443	71	20	
13	84	17	471	72	23	
14	80	8.511 4205	499	73	26	
15	76	8.511 4194	527	75	29	
16	73	82	555	76	32	
17	69	71	582	77	35	
18	65	59	610	78	38	
19	61	47	638	79	41	
20	8.509 3057	8.511 4136	1.20666	2.3481	5.9544	7.874
21	53	24	694	82	47	
22	49	13	722	83	50	
23	46	8.511 4101	749	84	53	
24	42	8.511 4089	777	85	56	
25	38	78	805	87	60	
26	34	66	833	88	63	
27	30	54	860	89	66	
28	26	43	888	90	69	
29	22	31	916	91	72	
30	8.509 3018	8.511 4020	1.20944	2.3493	5.9575	
31	15	8.511 4008	971	94	78	
32	11	8.511 3996	1.20999	95	81	
33	07	85	1.21027	96	84	
34	8.509 3003	73	054	97	87	
35	8.509 2999	61	082	2.3499	90	
36	95	50	110	2.3500	93	
37	91	38	137	01	96	
38	87	26	165	02	5.9599	
39	83	15	193	03	5.9602	
40	8.509 2980	8.511 3903	1.21220	2.3504	5.9605	7.875
41	76	8.511 3891	248	06	08	
42	72	79	276	07	11	
43	68	68	303	08	15	
44	64	56	331	09	18	
45	60	44	358	10	21	
46	56	33	386	11	24	
47	52	21	414	13	27	
48	48	8.511 3809	441	14	30	
49	44	8.511 3798	469	15	33	
50	8.509 2940	8.511 3786	1.21496	2.3516	5.9636	
51	37	74	524	17	39	
52	33	63	551	18	42	
53	29	51	579	19	45	
54	25	39	607	21	48	
55	21	27	634	22	51	
56	17	16	662	23	54	
57	13	8.511 3704	689	24	58	
58	09	8.511 3692	717	25	61	
59	05	80	744	26	64	
60	8.509 2901	8.511 3669	1.21772	2.3527	5.9667	7.875

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 33°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.20	log C diff. 1″=+0.45	log D diff. 1″=+0.02	log E diff. 1″=+0.05	log F diff. 10′=+0.2
° ′						
33 00	8.509 2901	8.511 3669	1.21772	2.3527	5.9667	7.875
1	8.509 2897	57	799	29	70	
2	94	45	827	30	73	
3	90	33	854	31	76	
4	86	22	882	32	79	
05	82	8.511 3610	909	33	82	
6	78	8.511 3598	937	34	85	
7	74	86	964	35	88	
8	70	75	1.21992	36	92	
9	66	63	1.22019	38	95	
10	8.509 2862	8.511 3551	1.22047	2.3539	5.9698	
11	58	39	074	40	5.9701	
12	54	28	101	41	04	
13	51	16	129	42	07	
14	47	8.511 3504	156	43	10	
15	43	8.511 3492	184	44	13	
16	39	80	211	45	16	
17	35	69	238	46	19	
18	31	57	266	48	22	
19	27	45	293	49	26	
20	8.509 2823	8.511 3433	1.22321	2.3550	5.9729	7.876
21	19	21	348	51	32	
22	15	8.511 3410	375	52	35	
23	11	8.511 3398	403	53	38	
24	07	86	430	54	41	
25	8.509 2803	74	457	55	44	
26	8.509 2799	62	485	56	47	
27	95	51	512	57	50	
28	91	39	539	58	53	
29	88	27	567	60	57	
30	8.509 2784	8.511 3315	1.22594	2.3561	5.9760	
31	80	8.511 3303	621	62	63	
32	76	8.511 3291	648	63	66	
33	72	80	676	64	69	
34	68	68	703	65	72	
35	64	56	730	66	75	
36	60	44	757	67	78	
37	56	32	785	68	81	
38	52	20	812	69	85	
39	48	8.511 3209	839	70	88	
40	8.509 2744	8.511 3197	1.22866	2.3571	5.9791	7.876
41	40	85	893	72	94	
42	36	73	921	73	5.9797	
43	32	61	948	75	5.9800	
44	28	49	1.22975	76	03	
45	24	37	1.23002	77	06	
46	20	25	029	78	10	
47	16	13	057	79	13	
48	12	8.511 3102	084	80	16	
49	08	8.511 3090	111	81	19	
50	8.509 2704	8.511 3078	1.23138	2.3582	5.9822	
51	8.509 2701	66	165	83	25	
52	8.509 2697	54	192	84	28	
53	93	42	220	85	31	
54	89	30	247	86	35	
55	85	18	274	87	38	
56	81	8.511 3006	301	88	41	
57	77	8.511 2995	328	89	44	
58	73	83	355	90	47	
59	69	71	382	91	50	
60	8.509 2665	8.511 2959	1.23409	2.3592	5.9853	7.877

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 34°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.20	log C diff. 1″=+0.45	log D diff. 1″=+0.02	log E diff. 1″=+0.05	log F diff. 10′=+0.0
° ′						
34 00	8.509 2665	8.511 2959	1.23409	2.3592	5.9853	7.877
1	61	47	437	93	57	
2	57	35	464	94	60	
3	53	23	491	95	63	
4	49	8.511 2911	518	96	66	
05	45	8.511 2899	545	97	69	
6	41	87	572	98	72	
7	37	75	599	2.3599	75	
8	33	63	626	2.3600	79	
9	29	51	653	01	82	
10	8.509 2625	8.511 2840	1.23680	2.3602	5.9885	
11	21	28	707	03	88	
12	17	16	734	04	91	
13	13	8.511 2804	761	05	94	
14	09	8.511 2792	788	06	5.9897	
15	05	80	815	07	5.9901	
16	8.509 2601	68	842	08	04	
17	8.509 2597	56	869	09	07	
18	93	44	896	10	10	
19	89	32	923	11	13	
20	8.509 2585	8.511 2720	1.23950	2.3612	5.9916	7.877
21	81	8.511 2708	1.23977	13	19	
22	77	8.511 2696	1.24004	14	23	
23	73	84	031	15	26	
24	69	72	058	16	29	
25	65	60	085	17	32	
26	61	48	112	18	35	
27	57	36	139	19	38	
28	53	24	165	20	42	
29	49	12	192	21	45	
30	8.509 2545	8.511 2600	1.2 219	2.3622	5.9948	
31	41	8.511 2588	246	23	51	
32	37	76	273	24	54	
33	33	64	300	25	57	
34	29	52	327	26	61	
35	25	40	354	27	64	
36	21	28	381	28	67	
37	17	16	408	29	70	
38	13	8.511 2504	431	30	73	
39	09	8.511 2492	461	31	76	
40	8.509 2505	8.511 2480	1.24488	2.3632	5.9980	7.877
41	8.509 2501	68	515	33	83	
42	8.509 2497	56	542	34	86	
43	93	44	569	35	89	
44	89	32	595	36	92	
45	85	20	622	37	96	
46	81	8.511 2408	649	38	5.9999	
47	77	8.511 2396	676	39	6.0002	
48	73	84	703	40	05	
49	69	72	729	41	08	
50	8.509 2465	8.511 2360	1.24756	2.3642	6.0011	
51	61	48	783	43	15	
52	57	35	810	43	18	
53	53	23	837	44	21	
54	49	8.511 2311	863	45	24	
55	45	8.511 2299	890	46	27	
56	41	87	917	47	31	
57	37	75	944	48	34	
58	33	63	970	49	37	
59	29	51	1.24997	50	40	
60	8.509 2425	8.511 2239	1.25024	2.3651	6.0043	7.877

Table 23.—*Geodetic position computations*—Continued.

LATITUDE 35°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.20	log C diff. 1″=+0.44	log D diff. 1″=+0.01	log E diff. 1″=+0.05	log F diff. 10′=+0.0
° ′						
35 00	8.509 2425	8.511 2239	1.25024	2.3651	6.0043	7.877
1	21	27	050	52	47	
2	17	15	077	53	50	
3	13	8.511 2203	104	54	53	
4	09	8.511 2191	131	55	56	
05	05	78	157	56	59	
6	8.509 2401	66	184	56	63	
7	8.509 2396	54	211	57	66	
8	92	42	237	58	69	
9	88	30	264	59	72	
10	8.509 2384	8.511 2118	1.25291	2.3660	6.0075	
11	80	8.511 2106	317	61	79	
12	76	8.511 2094	344	62	82	
13	72	82	371	63	85	
14	68	70	397	64	88	
15	64	57	424	65	91	
16	60	45	451	66	95	
17	56	33	477	66	6.0098	
18	52	21	504	67	6.0101	
19	48	8.511 2009	531	68	04	
20	8.509 2344	8.511 1997	1.25557	2.3669	6.0107	7.877
21	40	85	584	70	11	
22	36	72	610	71	14	
23	32	60	637	72	17	
24	28	48	664	73	20	
25	24	36	690	74	23	
26	20	24	717	75	27	
27	16	12	743	75	30	
28	12	8.511 1900	770	76	33	
29	08	8.511 1887	796	77	36	
30	8.509 2304	8.511 1875	1.25823	2.3678	6.0140	
31	8.509 2300	63	850	79	43	
32	8.509 2296	51	876	80	46	
33	92	39	903	81	49	
34	87	27	929	82	52	
35	83	15	956	82	56	
36	79	8.511 1802	1.25982	83	59	
37	75	8.511 1790	1.26009	84	62	
38	71	78	035	85	65	
39	67	66	062	86	69	
40	8.509 2263	8.511 1754	1.26088	2.3687	6.0172	7.877
41	59	41	115	88	75	
42	55	29	141	88	78	
43	51	17	168	89	81	
44	47	8.511 1705	194	90	85	
45	43	8.511 1693	221	91	88	
46	39	80	247	92	91	
47	35	68	274	93	94	
48	31	56	300	94	6.0198	
49	27	44	327	94	6.0201	
50	8.509 2222	8.511 1632	1.26353	2.3695	6.0204	
51	18	20	380	96	07	
52	14	8.511 1607	406	97	11	
53	10	8.511 1595	432	98	14	
54	06	83	459	99	17	
55	8.509 2202	71	485	2.3699	20	
56	8.509 2198	58	512	2.3700	24	
57	91	46	538	01	27	
58	90	34	565	02	30	
59	86	22	591	03	33	
60	8.509 2182	8.511 1510	1.26617	2.3704	6.0237	7.877

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 36°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.20	log C diff. 1″=+0.44	log D diff. 1″=+0.01	log E diff. 1″=+0.05	log F diff. 10′=−0.2
° ′						
36 00	8.509 2182	8.511 1510	1.26617	2.3704	6.0237	7.877
1	78	8.511 1497	644	04	40	
2	74	85	670	05	43	
3	70	73	697	06	46	
4	65	61	723	07	50	
05	61	48	749	08	53	
6	57	36	776	09	56	
7	53	24	802	09	59	
8	49	8.511 1412	828	10	63	
9	45	8.511 1399	855	11	66	
10	8.509 2141	8.511 1387	1.26881	2.3712	6.0269	
11	37	75	908	13	72	
12	33	63	934	13	76	
13	29	50	960	14	79	
14	25	38	1.26987	15	82	
15	21	26	1.27013	16	85	
16	16	14	039	17	89	
17	12	8.511 1301	066	17	92	
18	08	8.511 1289	092	18	95	
19	04	77	118	19	6.0299	
20	8.509 2100	8.511 1265	1.27145	2.3720	6.0302	7.877
21	8.509 2096	52	171	21	05	
22	92	40	197	21	08	
23	88	28	223	22	12	
24	84	15	250	23	15	
25	80	8.511 1203	276	24	18	
26	75	8.511 1191	302	25	21	
27	71	79	329	25	25	
28	67	66	355	26	28	
29	63	54	381	27	31	
30	8.509 2059	8.511 1142	1.27407	2.3728	6.0334	
31	55	29	434	29	38	
32	51	17	460	29	41	
33	47	8.511 1105	486	30	44	
34	43	8.511 1092	512	31	48	
35	39	80	539	32	51	
36	35	68	565	32	54	
37	30	56	591	33	57	
38	26	43	617	34	61	
39	22	31	644	35	64	
40	8.509 2018	8.511 1019	1.27670	2.3735	6.0367	7.877
41	14	8.511 1006	696	36	71	
42	10	8.511 0994	722	37	74	
43	06	82	748	38	77	
44	8.509 2002	69	775	39	80	
45	8.509 1998	57	801	39	84	
46	93	45	827	40	87	
47	89	32	853	41	90	
48	85	20	879	42	94	
49	81	8.511 0908	905	42	6.0397	
50	8.509 1977	8.511 0895	1.27932	2.3743	6.0400	
51	73	83	958	44	03	
52	69	71	1.27984	45	07	
53	65	58	1.28010	45	10	
54	61	46	036	46	13	
55	56	34	062	47	17	
56	52	21	088	48	20	
57	48	8.511 0809	114	48	23	
58	44	8.511 0797	141	49	27	
59	40	84	167	50	30	
60	8.509 1936	8.511 0772	1.28193	2.3750	6.0433	7.876

Table 23.—*Geodetic position computations*—Continued.

LATITUDE 37°.

Lat.	log A diff.1″=−0.07	log B diff.1″=−0.21	log C diff.1″=+0.43	log D diff.1″=+0.01	log E diff.1″=+0.05	log. F diff.10′=−0.3
° ′						
37 00	8.509 1936	8.511 0772	1.28193	2.3750	6.0433	7.876
1	32	60	219	51	37	
2	28	47	245	52	40	
3	23	35	271	53	43	
4	19	22	297	53	46	
05	15	8.511 0710	324	54	50	
6	11	8.511 0698	350	55	53	
7	07	85	376	56	56	
8	8.509 1903	73	402	56	60	
9	8.509 1899	61	428	57	63	
10	8.509 1895	8.511 0648	1.28454	2.3758	6.0466	
11	90	36	480	59	70	
12	86	23	506	59	73	
13	82	8.511 0611	532	60	76	
14	78	8.511 0599	558	61	80	
15	74	86	584	61	83	
16	70	74	610	62	86	
17	66	61	636	63	89	
18	62	49	662	73	93	
19	57	37	688	64	96	
20	8.509 1853	8.511 0524	1.28715	2.3765	6.0499	7.876
21	49	12	741	66	6.0503	
22	45	8.511 0500	767	66	06	
23	41	8.511 0487	793	67	09	
24	37	75	819	68	13	
25	33	62	845	68	16	
26	28	50	871	69	19	
27	24	37	897	70	23	
28	20	25	923	70	26	
29	16	13	949	71	29	
30	8.509 1812	8.511 0400	1.28975	2.3772	6.0533	
31	08	8.511 0388	1.29001	72	36	
32	04	75	027	73	39	
33	8.509 1800	63	053	74	43	
34	8.509 1795	51	079	74	46	
35	91	38	104	75	49	
36	87	26	130	76	53	
37	83	13	156	76	56	
38	79	8.511 0301	182	77	59	
39	75	8.511 0288	208	78	63	
40	8.509 1771	8.511 0276	1.29234	2.3779	6.0566	7.875
41	66	64	260	79	69	
42	62	51	286	80	73	
43	58	39	312	81	76	
44	54	26	338	81	79	
45	50	14	364	82	83	
46	46	8.511 0201	390	82	86	
47	41	8.511 0189	416	83	89	
48	37	76	442	84	93	
49	33	64	468	84	6.0596	
50	8.509 1729	8.511 0151	1.29494	2.3785	6.0600	
51	25	39	520	86	03	
52	21	26	546	86	06	
53	16	14	571	87	10	
54	12	8.511 0102	597	88	13	
55	08	8.511 0089	623	88	16	
56	04	77	649	89	20	
57	8.509 1700	64	675	90	23	
58	8.509 1696	52	701	90	26	
59	92	39	727	91	30	
60	8.509 1687	8.511 0027	1.29753	2.3792	6.0633	7.874

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 38°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.43	log D diff. 1″=+0.01	log E diff. 1″=+0.06	log F diff. 10′=−0.4
° ′						
38 00	8.509 1687	8.511 0027	1.29753	2.3792	6.0633	7.874
1	83	14	778	92	36	
2	79	8.511 0002	804	93	40	
3	75	8.510 9989	830	93	43	
4	71	77	856	94	47	
05	67	64	882	95	50	
6	62	52	908	95	53	
7	58	39	934	96	57	
8	54	27	959	97	60	
9	50	14	1.29985	97	63	
10	8.509 1646	8.510 9902	1.30011	2.3798	6.0667	
11	42	8.510 9889	037	2.3799	70	
12	37	77	063	2.3800	73	
13	33	64	089	00	77	
14	29	52	114	01	80	
15	25	39	140	01	84	
16	21	27	166	02	87	
17	17	14	192	02	90	
18	12	8.510 9802	218	03	94	
19	08	8.510 9789	243	03	6.0697	
20	8.509 1604	8.510 9777	1.30269	2.3804	6.0701	7.874
21	8.509 1600	64	295	05	04	
22	8.509 1596	52	321	05	07	
23	92	39	347	06	11	
24	87	27	372	06	14	
25	83	14	398	07	17	
26	79	8.510 9701	424	08	21	
27	75	8.510 9689	450	08	24	
28	71	77	476	09	28	
29	66	64	501	09	31	
30	8.509 1562	8.510 9652	1.30527	2.3810	6.0734	
31	58	39	553	11	38	
32	54	27	579	11	41	
33	50	14	604	12	44	
34	46	8.510 9601	630	12	48	
35	41	8.510 9589	656	13	51	
36	37	76	682	14	55	
37	33	64	707	14	58	
38	29	51	733	15	61	
39	25	39	759	15	65	
40	8.509 1521	8.510 9526	1.30785	2.3816	6.0768	7.873
41	16	14	810	16	72	
42	12	8.510 9501	836	17	75	
43	08	8.510 9488	862	18	78	
44	04	76	887	18	82	
45	8.509 1500	63	913	19	85	
46	8.509 1495	51	939	19	89	
47	91	38	965	20	92	
48	87	26	1.30990	20	95	
49	83	13	1.31016	21	6.0799	
50	8.509 1479	8.510 9401	1.31042	2.3822	6.0802	
51	75	8.510 9388	067	22	06	
52	70	76	093	23	09	
53	66	63	119	23	13	
54	62	50	144	24	16	
55	58	38	170	24	19	
56	53	25	196	25	23	
57	49	13	221	25	26	
58	45	8.510 9300	247	26	30	
59	41	8.510 9287	273	27	33	
60	8.509 1437	8.510 9275	1.31299	2.3827	6.0836	7.872

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 39°.

Lat.	log A diff. 1″ = −0.07	log B diff. 1″ = −0.21	log C diff. 1″ = +0.43	log D diff. 1″ = +0.01	log E diff. 1″ = +0.06	log F diff. 10′ = −0.5
° ′						
39 00	8.509 1437	8.510 9275	1.31299	2.3827	6.0836	7.872
1	33	62	324	28	40	
2	28	50	350	28	43	
3	24	37	375	29	47	
4	20	25	401	29	50	
05	16	8.510 9212	427	30	53	
6	12	8.510 9199	452	30	57	
7	07	87	478	31	60	
8	8.509 1403	74	504	31	64	
9	8.509 1399	62	529	32	67	
10	8.509 1395	8.510 9149	1.31555	2.3832	6.0871	
11	91	36	581	33	74	
12	86	24	606	33	77	
13	82	8.510 9111	632	34	81	
14	78	8.510 9098	658	35	84	
15	74	86	683	35	88	
16	70	73	709	36	91	
17	65	61	734	36	95	
18	61	48	760	37	6.0898	
19	57	36	786	37	6.0902	
20	8.509 1353	8.510 9023	1.31811	2.3838	6.0905	7.871
21	49	8.510 9010	837	38	08	
22	44	8.510 8998	862	39	12	
23	40	85	888	39	15	
24	36	73	913	40	19	
25	32	60	939	40	22	
26	28	47	965	41	26	
27	23	35	1.31990	41	29	
28	19	22	1.32016	42	32	
29	15	8.510 8909	041	42	36	
30	8.509 1311	8.510 8897	1.32067	2.3843	6.0939	
31	07	84	092	43	43	
32	8.509 1302	72	118	44	46	
33	8.509 1298	59	144	44	50	
34	94	46	169	45	53	
35	90	34	195	45	57	
36	86	21	220	46	60	
37	81	8.510 8808	246	46	63	
38	77	8.510 8796	271	47	67	
39	73	83	297	47	70	
40	8.509 1269	8.510 8771	1.32323	2.3848	6.0974	7.870
41	64	58	348	48	77	
42	60	45	374	49	81	
43	56	33	399	49	84	
44	52	20	425	50	88	
45	48	8.510 8707	450	50	91	
46	43	8.510 8695	476	51	95	
47	39	82	501	51	6.0998	
48	35	69	527	52	6.1002	
49	31	57	552	52	05	
50	8.509 1227	8.510 8644	1.32578	2.3852	6.1008	
51	22	31	603	53	12	
52	18	19	629	53	15	
53	14	8.510 8606	654	54	19	
54	10	8.510 8593	680	54	22	
55	06	81	705	55	26	
56	8.509 1201	68	731	55	29	
57	8.509 1197	55	756	56	33	
58	93	43	782	56	36	
59	89	30	807	57	40	
60	8.509 1184	8.510 8517	1.32833	2.3857	6.1043	7.869

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 40°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=+0.01	log E diff. 1″=+0.06	log F diff. 10′=−0.7
° ′						
40 00	8.509 1184	8.510 8517	1.32833	2.3857	6.1043	7.869
1	80	8.510 8505	858	58	47	
2	76	8.510 8492	884	58	50	
3	72	79	909	58	54	
4	67	67	935	59	57	
05	63	54	960	59	61	
6	59	41	1.32986	60	64	
7	55	29	1.33011	60	67	
8	50	16	037	60	71	
9	46	8.510 8403	062	61	74	
10	8.509 1142	8.510 8391	1.33088	2.3861	6.1078	
11	38	78	113	62	81	
12	34	65	139	62	85	
13	29	53	164	63	88	
14	25	40	189	63	92	
15	21	27	215	64	95	
16	17	15	240	64	6.1099	
17	12	8.510 8302	266	65	6.1102	
18	08	8.510 8289	291	65	06	
19	04	77	317	65	09	
20	8.509 1100	8.510 8264	1.33342	2.3866	6.1113	7.867
21	8.509 1096	51	368	66	16	
22	91	38	393	67	20	
23	87	26	418	67	23	
24	83	13	444	68	27	
25	79	8.510 8200	469	68	30	
26	74	8.510 8188	495	68	34	
27	70	75	520	69	37	
28	66	62	546	69	41	
29	62	50	571	70	44	
30	8.509 1057	8.510 8137	1.33596	2.3870	6.1148	
31	53	24	622	70	51	
32	49	8.510 8111	647	71	55	
33	45	8.510 8099	673	71	58	
34	41	86	698	72	62	
35	36	73	723	72	65	
36	32	61	749	72	69	
37	28	48	774	73	72	
38	24	35	800	73	76	
39	19	23	825	74	79	
40	8.509 1015	8.510 8010	1.33850	2.3874	6.1183	7.866
41	11	8.510 7997	876	74	86	
42	07	84	901	75	90	
43	8.509 1002	72	926	75	93	
44	8.509 0998	59	952	76	6.1197	
45	94	46	1.33977	76	6.1200	
46	90	33	1.34003	76	04	
47	85	21	028	77	07	
48	81	8.510 7908	053	77	11	
49	77	8.510 7895	079	77	15	
50	8.509 0973	8.510 7883	1.34104	2.3878	6.1218	
51	68	70	129	78	22	
52	64	57	155	79	25	
53	60	44	180	79	29	
54	56	32	206	79	32	
55	52	19	231	80	36	
56	47	8.510 7806	256	80	39	
57	43	8.510 7793	282	80	43	
58	39	81	307	81	46	
59	34	68	332	81	50	
60	8.509 0930	8.510 7755	1.34358	2.3882	6.1253	7.864

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 41°.

Lat.	log A diff. 1″ = −0.07	log B diff. 1″ = −0.21	log C diff. 1″ = +0.42	log D diff. 1″ = +0.01	log E diff. 1″ = +0.06	log F diff. 10′ = −0.8
° ′						
41 00	8.509 0930	8.510 7755	1.34358	2.3882	6.1253	7.864
1	26	42	383	82	57	
2	22	30	408	82	60	
3	18	17	434	83	64	
4	13	8.510 7704	459	83	67	
05	09	8.510 7691	484	83	71	
6	05	79	510	84	75	
7	8.509 0900	66	535	84	78	
8	8.509 0896	53	560	84	82	
9	92	40	586	85	85	
10	8.509 0888	8.510 7628	1.34611	2.3885	6.1289	
11	83	15	636	85	92	
12	79	8.510 7602	662	86	96	
13	75	8.510 7590	687	86	6.1299	
14	71		712	87	6.1303	
15	67	64	738	87	06	
16	62	51	763	87	10	
17	58	39	788	88	14	
18	54	26	814	88	17	
19	49	13	839	88	21	
20	8.509 0845	8.510 7500	1.34864	2.3889	6.1324	7.863
21	41	8.510 7488	890	89	28	
22	37	75	915	89	31	
23	32	62	940	90	35	
24	28	49	965	90	38	
25	24	36	1.34991	90	42	
26	20	24	1.35016	91	46	
27	15	8.510 7411	041	91	49	
28	11	8.510 7398	066	91	53	
29	07	85	092	91	56	
30	8.509 0803	8.510 7373	1.35117	2.3892	6.1360	
31	8.509 0798	60	142	92	63	
32	94	47	168	92	67	
33	90	34	193	93	70	
34	86	22	218	93	74	
35	81	8.510 7309	243	93	78	
36	77	8.510 7296	269	94	81	
37	73	83	294	94	85	
38	69	70	319	94	88	
39	64	58	345	95	92	
40	8.509 0760	8.510 7245	1.35370	2.3895	6.1395	7.861
41	56	32	395	95	6.1399	
42	52	19	420	96	6.1403	
43	47	8.510 7207	446	96	06	
44	43	8.510 7194	471	96	10	
45	39	81	496	97	13	
46	35	68	522	97	17	
47	30	55	547	97	20	
48	26	43	572	97	24	
49	22	30	597	98	28	
50	8.509 0718	8.510 7117	1.35623	2.3898	6.1431	
51	13	8.510 7104	648	98	35	
52	09	8.510 7091	673	98	38	
53	05	79	698	99	42	
54	8.509 0700	66	723	99	46	
55	8.509 0696	53	749	2.3899	49	
56	92	40	774	2.3900	53	
57	88	27	799	00	56	
58	83	15	824	00	60	
59	79	8.510 7002	850	00	63	
60	8.509 0675	8.510 6989	1.35875	2.3901	6.1467	7.860

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 42°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=+0.00	log E diff. 1″=+0.06	log F diff. 10′=−0.9
° ′						
42 00	8.509 0675	8.510 6989	1.35875	2.3901	6.1467	7.860
1	71	76	900	01	71	
2	66	64	925	01	74	
3	62	51	951	01	78	
4	58	38	1.35976	02	81	
05	54	25	1.36001	02	85	
6	49	12	026	02	89	
7	45	8.510 6900	052	03	92	
8	41	8.510 6887	077	03	96	
9	36	74	102	03	6.1499	
10	8.509 0632	8.510 6861	1.36127	2.3903	6.1503	
11	28	48	152	04	07	
12	24	36	178	04	10	
13	19	23	203	04	14	
14	15	8.510 6810	228	04	17	
15	11	8.510 6797	253	05	21	
16	07	84	278	05	25	
17	8.509 0602	72	304	05	28	
18	8.509 0598	59	329	05	32	
19	94	46	354	06	35	
20	8.509 0590	8.510 6733	1.36379	2.3906	6.1539	7.858
21	85	20	404	06	43	
22	81	8.510 6707	430	06	46	
23	77	8.510 6695	455	07	50	
24	72	82	480	07	54	
25	68	69	505	07	57	
26	64	56	530	07	61	
27	60	43	556	08	64	
28	55	31	581	08	68	
29	51	18	606	08	72	
30	8.509 0547	8.510 6605	1.36631	2.3908	6.1575	
31	43	8.510 6592	656	08	79	
32	38	79	682	09	83	
33	34	66	707	09	86	
34	30	54	732	09	90	
35	25	41	757	09	93	
36	21	28	782	10	6.1597	
37	17	15	808	10	6.1601	
38	13	8.510 6502	833	10	04	
39	08	8.510 6490	858	10	08	
40	8.509 0504	8.510 6477	1.36883	2.3910	6.1612	7.856
41	8.509 0500	64	908	11	15	
42	8.509 0496	51	934	11	19	
43	91	38	959	11	22	
44	87	25	1.36984	11	26	
45	83	13	1.37009	12	30	
46	78	8.510 6400	034	12	33	
47	74	8.510 6387	059	12	37	
48	70	74	085	12	41	
49	66	61	110	12	44	
50	8.509 0461	8.510 6348	1.37135	2.3913	6.1648	
51	57	36	160	13	52	
52	53	23	185	13	55	
53	48	8.510 6310	210	13	59	
54	44	8.510 6297	235	13	63	
55	40	84	261	14	66	
56	36	71	286	14	70	
57	31	59	311	14	73	
58	27	46	336	14	77	
59	23	33	361	14	81	
60	8.509 0419	8.510 6220	1.37386	2.3914	6.1684	7.854

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 43°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=+0.00	log E diff. 1″=+0.06	log F diff. 10′=−1.0
° ′						
43 00	8.509 0419	8.510 6220	1.37386	2.3914	6.1684	7.854
1	14	8.510 6207	412	15	88	
2	10	8.510 6195	437	15	92	
3	06	82	462	15	95	
4	8.509 0401	69	487	15	6.1699	
05	8.509 0397	56	512	15	6.1703	
6	93	43	537	16	06	
7	89	30	563	16	10	
8	84	17	588	16	14	
9	80	8.510 6105	613	16	17	
10	8.509 0376	8.510 6092	1.37638	2.3916	6.1721	
11	71	79	663	16	25	
12	67	66	688	17	28	
13	63	53	713	17	32	
14	59	40	739	17	36	
15	54	28	764	17	39	
16	50	15	789	17	43	
17	46	8.510 6002	814	17	47	
18	41	8.510 5989	839	18	50	
19	37	76	864	18	54	
20	8.509 0333	8.510 5963	1.37889	2.3918	6.1758	7.852
21	29	50	915	18	61	
22	24	38	940	18	65	
23	20	25	965	18	69	
24	16	8.510 5912	1.37990	18	72	
25	12	8.510 5899	1.38015	19	76	
26	07	86	040	19	80	
27	8.509 0303	73	065	19	83	
28	8.509 0299	60	091	19	87	
29	94	48	116	19	91	
30	8.509 0290	8.510 5835	1.38141	2.3919	6.1795	
31	86	22	166	20	6.1798	
32	82	8.510 5809	191	20	6.1802	
33	77	8.510 5796	216	20	06	
34	73	83	241	20	09	
35	69	71	266	20	13	
36	64	58	292	20	17	
37	60	45	317	20	20	
38	56	32	342	20	24	
39	52	19	367	21	28	
40	8.509 0247	8.510 5706	1.38392	2.3921	6.1831	7.850
41	43	8.510 5693	417	21	35	
42	39	81	442	21	39	
43	34	68	467	21	42	
44	30	55	492	21	46	
45	26	42	518	21	50	
46	22	29	543	21	53	
47	17	16	568	22	57	
48	13	8.510 5603	593	22	61	
49	09	8.510 5591	618	22	65	
50	8.509 0204	8.510 5578	1.38643	2.3922	6.1868	
51	8.509 0200	65	668	22	72	
52	8.509 0196	52	693	22	76	
53	92	39	719	22	79	
54	87	26	744	22	83	
55	83	13	769	22	87	
56	79	8.510 5501	794	23	91	
57	74	8.510 5488	819	23	94	
58	70	75	844	23	6.1898	
59	66	62	869	23	6.1902	
60	8.509 0162	8.510 5449	1.38894	2.3923	6.1905	7.848

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 44°.

Lat. ° ′	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff.1″=+0.00	log E diff. 1″=+0.06	log F diff. 10′=1.2
44 00	8.509 0162	8.510 5449	1.38894	2.3923	6.1905	7.848
1	57	36	919	23	09	
2	53	23	945	23	13	
3	49	8.510 5411	970	23	17	
4	44	8.510 5398	1.38995	23	20	
05	40	85	1.39020	23	24	
6	36	72	045	24	28	
7	31	59	070	24	31	
8	27	46	095	24	35	
9	23	33	120	24	39	
10	8.509 0119	8.510 5320	1.39145	2.3924	6.1943	
11	14	8.510 5307	171	24	46	
12	10	8.510 5295	196	24	50	
13	06	82	221	24	54	
14	8.509 0102	69	246	24	58	
15	8.509 0097	56	271	24	61	
16	93	43	296	24	65	
17	89	30	321	24	69	
18	84	18	346	24	72	
19	80	8.510 5205	371	25	76	
20	8.509 0076	8.510 5192	1.39396	2.3925	6.1980	7.845
21	72	79	422	25	84	
22	67	66	447	25	87	
23	63	53	472	25	91	
24	59	40	497	25	95	
25	54	28	522	25	6.1999	
26	50	15	547	25	6.2002	
27	46	8.510 5102	572	25	06	
28	42	8.510 5089	597	25	10	
29	37	76	623	25	14	
30	8.509 0033	8.510 5063	1.39648	2.3925	6.2017	
31	29	50	673	25	21	
32	24	37	698	25	25	
33	20	25	723	25	29	
34	16	8.510 5012	748	25	32	
35	11	8.510 4999	773	25	36	
36	07	86	798	26	40	
37	8.509 0003	73	823	26	44	
38	8.508 9999	60	848	26	47	
39	94	47	873	26	51	
40	8.508 9990	8.510 4935	1.39898	2.3926	6.2055	7.843
41	86	22	924	26	59	
42	81	8.510 4909	949	26	62	
43	77	8.510 4896	974	26	66	
44	73	83	1.39999	26	70	
45	69	70	1.40024	26	74	
46	64	57	049	26	77	
47	60	44	074	26	81	
48	56	32	099	26	85	
49	51	19	124	26	89	
50	8.508 9947	8.510 4806	1.40149	2.3926	6.2092	
51	43	8.510 4793	174	26	6.2096	
52	39	80	200	26	6.2100	
53	34	67	225	26	04	
54	30	54	250	26	08	
55	26	41	275	26	11	
56	21	29	300	26	15	
57	17	16	325	26	19	
58	13	8.510 4703	350	26	23	
59	09	8.510 4690	375	26	27	
60	8.508 9904	8.510 4677	1.40400	2.3926	6.2130	7.840

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 45°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=±0.00	log E diff. 1″=+0.06	log F diff. 10′=−1.3
° ′						
45 00	8.508 9904	8.510 4677	1.40400	2.3926	6.2130	7.840
1	8.508 9900	64	425	26	34	
2	8.508 9896	51	450	26	38	
3	91	39	475	26	42	
4	87	26	501	26	46	
05	83	13	526	26	49	
6	78	8.510 4600	551	26	53	
7	74	8.510 4587	576	26	57	
8	70	74	601	26	61	
9	66	61	626	26	64	
10	8.508 9861	8.510 4548	1.40651	2.3926	6.2168	
11	57	36	676	26	72	
12	53	23	701	26	76	
13	48	8.510 4510	727	26	80	
14	44	8.510 4497	752	26	83	
15	40	84	777	26	87	
16	36	71	802	26	91	
17	31	59	827	26	95	
18	27	46	852	26	6.2199	
19	23	33	877	26	6.2202	
20	8.508 9818	8.510 4420	1.40902	2.3926	6.2206	7.838
21	14	8.510 4407	927	26	10	
22	10	8.510 4394	952	26	14	
23	06	81	1.40978	26	18	
24	8.508 9801	68	1.41003	26	21	
25	8.508 9797	56	028	26	25	
26	93	43	053	26	29	
27	88	30	078	26	33	
28	84	17	103	26	37	
29	80	8.510 4304	128	26	40	
30	8.508 9776	8.510 4291	1.41153	2.3926	6.2244	
31	71	78	178	26	48	
32	67	65	203	26	52	
33	63	52	229	26	56	
34	58	40	254	26	60	
35	54	27	279	26	63	
36	50	14	304	25	67	
37	46	8.510 4201	329	25	71	
38	41	8.510 4188	354	25	75	
39	37	75	379	25	79	
40	8.508 9733	8.510 4162	1.41404	2.3925	6.2283	7.835
41	28	49	429	25	86	
42	24	37	454	25	90	
43	20	24	479	25	94	
44	16	8.510 4111	505	25	6.2298	
45	11	8.510 4098	530	25	6.2302	
46	07	85	555	25	06	
47	8.508 9703	72	580	25	09	
48	8.508 9698	60	605	25	13	
49	94	47	630	25	17	
50	8.508 9689	8.510 4034	1.41655	2.3925	6.2321	
51	85	21	680	25	25	
52	81	8.510 4008	705	25	29	
53	77	8.510 3995	731	25	32	
54	72	82	756	24	36	
55	68	69	781	24	40	
56	64	57	806	24	44	
57	60	44	831	24	48	
58	55	31	856	24	52	
59	51	18	881	24	55	
60	8.508 9647	8.510 3905	1.41906	2.3924	6.2359	7.832

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 46°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=−0.00	log E diff. 1″=+0.06	log F diff. 10′=−1.4
° ′						
46 00	8.508 9647	8.510 3905	1.41906	2.3924	6.2359	7.832
1	43	8.510 3892	931	24	63	
2	38	79	957	24	67	
3	34	67	1.41982	24	71	
4	30	54	1.42007	24	75	
05	25	41	032	24	79	
6	21	28	057	23	82	
7	17	15	082	23	86	
8	13	8.510 3802	107	23	90	
9	08	8.510 3789	132	23	94	
10	8.508 9604	8.510 3776	1.42157	2.3923	6.2398	
11	8.508 9600	64	183	23	6.2402	
12	8.508 9595	51	208	23	06	
13	91	38	233	23	09	
14	87	25	258	23	13	
15	83	8.510 3712	283	23	17	
16	78	8.510 3699	308	23	21	
17	74	86	333	22	25	
18	70	74	358	22	29	
19	65	61	384	22	33	
20	8.508 9561	8.510 3648	1.42409	2.3922	6.2436	7.830
21	57	35	434	22	40	
22	53	22	459	22	44	
23	48	8.510 3609	484	22	48	
24	44	8.510 3596	509	22	52	
25	40	84	534	22	56	
26	35	71	559	21	60	
27	31	58	584	21	64	
28	27	45	610	21	67	
29	23	32	635	21	71	
30	8.508 9518	8.510 3519	1.42660	2.3921	6.2475	
31	14	8.510 3506	685	21	79	
32	10	8.510 3494	710	21	83	
33	05	81	735	21	87	
34	8.508 9501	68	760	20	91	
35	8.508 9497	55	786	20	95	
36	93	42	811	20	6.2499	
37	88	29	836	20	6.2502	
38	84	17	861	20	06	
39	80	8.510 3404	886	20	10	
40	8.508 9475	8.510 3391	1.42911	2.3920	6.2514	7.827
41	71	78	936	19	18	
42	67	65	961	19	22	
43	63	52	1.42987	19	26	
44	58	39	1.43012	19	30	
45	54	27	037	19	34	
46	50	14	062	19	38	
47	45	8.510 3301	087	19	41	
48	41	8.510 3288	112	18	45	
49	37	75	137	18	49	
50	8.508 9433	8.510 3262	1.43163	2.3918	6.2553	
51	28	49	188	18	57	
52	24	37	213	18	61	
53	20	24	238	18	65	
54	16	8.510 3211	263	18	69	
55	11	8.510 3198	288	17	73	
56	07	85	314	17	77	
57	8.508 9403	72	339	17	81	
58	8.508 9398	60	364	17	84	
59	94	47	389	17	88	
60	8.508 9390	8.510 3134	1.43414	2.3917	6.2592	7.824

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 47°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=−0.00	log E diff. 1″=+0.07	log F diff. 10′=−1.6
° ′						
47 00	8.508 9390	8.510 3134	1.43414	2.3917	6.2592	7.824
1	86	21	439	16	6.2596	
2	81	8.510 3108	465	16	6.2600	
3	77	8.510 3095	490	16	04	
4	73	82	515	16	08	
05	68	70	540	16	12	
6	64	57	565	16	16	
7	60	44	590	15	20	
8	56	31	615	15	24	
9	51	18	641	15	28	
10	8.508 9347	8.510 3005	1.43666	2.3915	6.2632	
11	43	8.510 2993	691	15	35	
12	38	80	716	14	39	
13	34	67	741	14	43	
14	30	54	766	14	47	
15	26	41	792	14	51	
16	21	28	817	14	55	
17	17	16	842	13	59	
18	13	8.510 2903	867	13	63	
19	09	8.510 2890	892	13	67	
20	8.508 9304	8.510 2877	1.43917	2.3913	6.2671	7.821
21	8.508 9300	64	943	13	75	
22	8.508 9296	51	968	12	79	
23	91	39	1.43993	12	83	
24	87	26	1.44018	12	87	
25	83	13	043	12	91	
26	79	8.510 2800	069	12	95	
27	74	8.510 2787	094	11	6.2699	
28	70	74	119	11	6.2702	
29	66	62	144	11	06	
30	8.508 9261	8.510 2749	1.44169	2.3911	6.2710	
31	57	36	195	11	14	
32	53	23	220	10	18	
33	49	8.510 2710	245	10	22	
34	44	8.510 2698	270	10	26	
35	40	85	295	10	30	
36	36	72	321	10	34	
37	32	59	346	09	38	
38	27	46	371	09	42	
39	23	33	396	09	46	
40	8.508 9219	8.510 2621	1.44421	2.3909	6.2750	7.817
41	14	8.510 2608	447	08	54	
42	10	8.510 2595	472	08	58	
43	06	82	497	08	62	
44	8.508 9202	69	522	08	66	
45	8.508 9197	57	547	07	70	
46	93	44	573	07	74	
47	89	31	598	07	78	
48	84	18	623	07	82	
49	80	8.510 2505	648	07	86	
50	8.508 9176	8.510 2493	1.44673	2.3906	6.2790	
51	72	80	699	06	94	
52	67	67	724	06	6.2798	
53	63	54	749	06	6.2802	
54	59	41	774	05	06	
55	55	28	800	05	10	
56	50	16	825	05	14	
57	46	8.510 2403	850	05	18	
58	42	8.510 2390	875	04	22	
59	38	77	900	04	26	
60	8.508 9133	8.510 2364	1.44926	2.3904	6.2830	7.814

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 48°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.21	log C diff. 1″=+0.42	log D diff. 1″=−0.00	log E diff. 1″=+0.07	log F diff. 10′=−1.7
° ′						
48 00	8.508 9133	8.510 2364	1.44926	2.3904	6.2830	7.814
1	29	52	951	04	34	
2	25	39	1.44976	03	38	
3	20	26	1.45001	03	42	
4	16	13	027	03	46	
05	12	8.510 2300	052	02	50	
6	08	8.510 2288	077	02	54	
7	8.508 9103	75	102	02	58	
8	8.508 9099	62	128	02	62	
9	95	49	153	01	66	
10	8.508 9091	8.510 2236	1.45178	2.3901	6.2870	
11	86	24	203	01	74	
12	82	8.510 2211	229	01	78	
13	78	8.510 2198	254	00	82	
14	74	85	279	00	86	
15	69	72	304	2.3900	90	
16	65	60	330	2.3899	94	
17	61	47	355	99	6.2898	
18	57	34	380	99	6.2902	
19	52	21	406	99	06	
20	8.508 9048	8.510 2108	1.45431	2.3898	6.2910	7.811
21	44	8.510 2096	456	98	14	
22	39	83	481	98	18	
23	35	70	507	97	22	
24	31	57	532	97	26	
25	27	45	557	97	30	
26	22	32	582	97	34	
27	18	19	608	96	38	
28	14	8.510 2006	633	96	42	
29	10	8.510 1993	658	96	46	
30	8.508 9005	8.510 1981	1.45683	2.3895	6.2950	
31	8.508 9001	68	709	95	54	
32	8.508 8997	55	734	95	58	
33	93	42	759	95	62	
34	88	30	785	94	66	
35	84	17	810	94	70	
36	80	8.510 1904	835	94	74	
37	76	8.510 1891	861	93	78	
38	71	78	886	93	82	
39	67	66	911	93	86	
40	8.508 8963	8.510 1853	1.45937	2.3892	6.2990	7.807
41	59	40	962	92	94	
42	54	27	1.45987	92	6.2998	
43	50	15	1.46012	91	6.3002	
44	46	8.510 1802	038	91	06	
45	41	8.510 1789	063	91	10	
46	37	76	088	90	15	
47	33	64	114	90	19	
48	29	51	139	90	23	
49	24	38	164	89	27	
50	8.508 8920	8.510 1725	1.46190	2.3889	6.3031	
51	16	13	215	89	35	
52	12	8.510 1700	240	88	39	
53	08	8.510 1687	266	88	43	
54	8.508 8903	74	291	88	47	
55	8.508 8899	62	316	87	51	
56	95	49	342	87	55	
57	90	36	367	87	59	
58	86	23	392	86	63	
59	82	8.510 1610	418	86	67	
60	8.508 8878	8.510 1598	1.46443	2.3886	6.3071	7.804

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 49°.

Lat.	log A diff. 1″= −0.07	log B diff. 1″= −0.21	log C diff. 1″= +0.42	log D diff. 1″= −0.01	log E diff. 1″= +0.07	log F diff. 10′= −1.9
° ′						
49 00	8.508 8878	8.510 1598	1.46443	2.3886	6.3071	7.804
1	73	85	468	85	75	
2	69	72	494	85	79	
3	65	59	519	85	84	
4	61	47	544	84	88	
05	57	34	570	84	92	
6	52	21	595	84	6.3096	
7	48	8.510 1508	621	83	6.3100	
8	44	8.510 1496	646	83	04	
9	39	83	671	83	08	
10	8.508 8835	8.510 1470	1.46696	2.3882	6.3112	
11	31	58	722	82	16	
12	27	45	747	81	20	
13	23	32	773	81	24	
14	18	19	798	81	28	
15	14	8.510 1407	824	80	32	
16	10	8.510 1394	849	80	37	
17	06	81	874	80	41	
18	8.508 8801	68	899	79	45	
19	8.508 8797	56	925	79	49	
20	8.508 8793	8.510 1343	1.46950	2.3878	6.3153	7.800
21	89	30	1.46976	78	57	
22	84	17	1.47001	78	61	
23	80	8.510 1305	026	77	65	
24	76	8.510 1292	052	77	69	
25	72	79	077	77	73	
26	67	67	103	76	78	
27	63	54	128	76	82	
28	59	41	153	75	86	
29	55	28	179	75	90	
30	8.508 8750	8.510 1216	1.47204	2.3875	6.3194	
31	46	8.510 1203	230	74	6.3198	
32	42	8.510 1190	255	74	6.3202	
33	38	78	281	73	06	
34	33	65	306	73	10	
35	29	52	331	73	15	
36	25	39	357	72	19	
37	21	27	382	72	23	
38	16	14	408	71	27	
39	12	8.510 1101	433	71	31	
40	8.508 8708	8.510 1088	1.47459	2.3871	6.3235	7.796
41	04	76	484	70	39	
42	8.508 8700	63	509	70	43	
43	8.508 8695	50	535	69	47	
44	91	38	560	69	52	
45	87	25	586	69	56	
46	83	12	611	68	60	
47	78	8.510 1000	637	68	64	
48	74	8.510 0987	662	67	68	
49	70	74	688	67	72	
50	8.508 8666	8.510 0962	1.47713	2.3866	6.3276	
51	61	49	738	66	81	
52	57	36	764	66	85	
53	53	23	789	65	89	
54	49	8.510 0911	815	65	93	
55	45	8.510 0898	840	64	6.3297	
56	40	85	866	64	6.3301	
57	36	73	891	63	05	
58	32	60	917	63	09	
59	28	48	942	63	14	
60	8.508 8623	8.510 0835	1.47968	2.3862	6.3318	7.792

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 50°.

Lat.	log A diff. 1″ = −0.07	log B diff. 1″ = −0.21	log C diff. 1″ = +0.43	log D diff 1″ = −0.01	log E diff. 1″ = +0.07	log F diff. 10′ = −2.0
° ′						
50 00	8.508 8623	8.510 0835	1.47968	2.3862	6.3318	7.792
1	19	22	1.47993	62	22	
2	15	8.510 0809	1.48019	61	26	
3	11	8.510 0797	044	61	30	
4	06	84	070	60	34	
05	8.508 8602	71	095	60	39	
6	8.508 8598	59	121	60	43	
7	94	46	146	59	47	
8	90	33	172	59	51	
9	85	21	197	58	55	
10	8.508 8581	8.510 0708	1.48223	2.3858	6.3359	
11	77	8.510 0695	248	57	63	
12	73	83	274	57	68	
13	68	70	299	56	72	
14	64	57	325	56	76	
15	60	45	350	55	80	
16	56	32	376	55	84	
17	52	19	401	55	88	
18	47	8.510 0607	427	54	93	
19	43	8.510 0594	452	54	6.3397	
20	8.508 8539	8.510 0581	1.48478	2.3853	6.3401	7.788
21	35	69	504	53	05	
22	30	56	529	52	09	
23	26	43	555	52	14	
24	22	31	580	51	18	
25	18	18	606	51	22	
26	14	8.510 0505	631	50	26	
27	09	8.510 0493	657	50	30	
28	05	80	682	49	34	
29	8.508 8501	67	708	49	39	
30	8.508 8497	8.510 0455	1 48734	2.3848	6.3443	
31	93	42	759	48	47	
32	88	29	785	47	51	
33	84	17	810	47	55	
34	80	8.510 0404	836	46	60	
35	76	8.510 0392	861	46	64	
36	71	79	887	45	68	
37	67	66	913	45	72	
38	63	54	938	44	76	
39	59	41	964	44	81	
40	8.508 8455	8 510 0328	1.48989	2.3843	6.3485	7.784
41	50	16	1 49015	43	89	
42	46	8 510 0303	041	42	93	
43	42	8.510 0291	066	42	6 3497	
44	38	78	092	41	6.3502	
45	34	65	117	41	06	
46	29	53	143	40	10	
47	25	40	169	40	14	
48	21	27	194	39	18	
49	17	15	220	39	23	
50	8.508 8413	8.510 0202	1.49246	2.3838	6.3527	
51	08	8.510 0190	271	38	31	
52	04	77	297	37	35	
53	8.508 8400	64	322	37	40	
54	8 508 8396	52	348	36	44	
55	92	39	374	36	48	
56	87	27	399	35	52	
57	83	14	425	35	56	
58	79	8.510 0101	451	34	61	
59	75	8.510 0089	476	34	65	
60	8.508 8371	8.510 0076	1.49502	2.3833	6.3569	7.780

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 51°.

Lat.	log A diff. 1″ = −0.07	log B diff. 1″ = −0.21	log C diff. 1″ = +0.43	log D diff. 1″ = −0.01	log E diff. 1″ = +0.07	log F diff. 10′ = −2.2
° ′						
51 00	8.508 8371	8.510 0076	1.49502	2.3833	6.3569	7.780
1	66	64	528	33	73	
2	62	51	553	32	78	
3	58	38	579	32	82	
4	54	26	605	31	86	
05	50	13	630	31	90	
6	45	8.510 0001	656	30	95	
7	41	8.509 9988	682	29	6.3599	
8	37	75	707	29	6.3603	
9	33	63	733	28	07	
10	8.508 8329	8.509 9950	1.49759	2.3828	6.3612	
11	24	38	785	27	16	
12	20	25	810	27	20	
13	16	13	836	26	24	
14	12	8.509 9900	862	26	28	
15	08	8.509 9887	887	25	33	
16	8.508 8303	75	913	25	37	
17	8.508 8299	62	939	24	41	
18	95	50	965	23	45	
19	91	37	1.49990	23	50	
20	8.508 8287	8.509 9825	1.50016	2.3822	6.3654	7.776
21	82	8.509 9812	042	22	58	
22	78	8.509 9799	067	21	63	
23	74	87	093	21	67	
24	70	74	119	20	71	
25	66	62	145	20	75	
26	62	49	170	19	80	
27	57	37	196	18	84	
28	53	24	222	18	88	
29	49	8.509 9711	248	17	92	
30	8.508 8245	8.509 9699	1.50273	2.3817	6.3697	
31	41	86	299	16	6.3701	
32	36	74	325	16	05	
33	32	61	351	15	10	
34	28	49	376	14	14	
35	24	36	402	14	18	
36	20	24	428	13	22	
37	16	8.509 9611	454	13	27	
38	11	8.509 9599	480	12	31	
39	07	86	505	11	35	
40	8.508 8203	8.509 9574	1.50531	2.3811	6.3740	7.772
41	8.508 8199	61	557	10	44	
42	95	48	583	10	48	
43	90	36	609	09	52	
44	86	23	634	08	57	
45	82	8.509 9511	660	08	61	
46	78	8.509 9498	686	07	65	
47	74	86	712	07	70	
48	70	73	738	06	74	
49	65	61	764	05	78	
50	8.508 8161	8.509 9448	1.50789	2.3805	6.3782	
51	57	36	815	04	87	
52	53	23	841	04	91	
53	49	8.509 9411	867	03	6.3795	
54	45	8.509 9398	893	02	6.3800	
55	40	86	919	02	04	
56	36	73	944	01	08	
57	32	61	970	01	13	
58	28	48	1.50996	2.3800	17	
59	24	36	1.51022	2.3799	21	
60	8.508 8120	8.509 9323	1.51048	2.3799	6.3826	7.767

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 52°.

Lat.	log A diff. 1″ = −0.07	log B diff. 1″ = −0.21	log C diff. 1″ = +0.43	log D diff. 1″ = −0.01	log E diff. 1″ = +0.07	log F diff. 10′ = −2.3
° ′						
52 00	8.508 8120	8.509 9323	1.51048	2.3799	6.3826	7.767
1	15	8.509 9311	074	98	30	
2	11	8.509 9298	100	97	34	
3	07	86	126	97	39	
4	8.508 8103	73	151	96	43	
05	8.508 8099	61	177	96	47	
6	95	48	203	95	52	
7	90	36	229	94	56	
8	86	23	255	94	60	
9	82	8.509 9211	281	93	65	
10	8.508 8078	8.509 9198	1.51307	2.3792	6.3869	
11	74	86	333	92	73	
12	70	73	359	91	78	
13	65	61	385	91	82	
14	61	48	411	90	86	
15	57	36	436	89	91	
16	53	23	462	88	95	
17	49	8.509 9111	488	88	6.3899	
18	45	8.509 9099	514	87	6.3904	
19	41	86	540	87	08	
20	8.508 8036	8.509 9074	1.51566	2.3786	6.3912	7.763
21	32	61	592	85	17	
22	28	49	618	85	21	
23	24	36	644	84	25	
24	20	24	670	83	30	
25	16	8.509 9011	696	83	34	
26	11	8.509 8999	722	82	38	
27	07	86	748	81	43	
28	8.508 8003	74	774	81	47	
29	8.508 7999	62	800	80	51	
30	8.508 7995	8.509 8949	1.51826	2.3779	6.3956	
31	91	37	852	79	60	
32	87	24	878	78	65	
33	82	8.509 8912	904	78	69	
34	78	8.509 8899	930	77	73	
35	74	87	956	76	78	
36	70	74	1.51982	75	82	
37	66	62	1.52008	75	86	
38	62	50	034	74	91	
39	58	37	060	73	6.3995	
40	8.508 7953	8.509 8825	1.52086	2.3773	6.4000	7.758
41	49	12	112	72	04	
42	45	8.509 8800	138	71	08	
43	41	8.509 8788	164	71	13	
44	37	75	190	70	17	
45	33	63	216	69	21	
46	29	50	242	68	26	
47	24	38	268	68	30	
48	20	25	294	67	35	
49	16	13	320	66	39	
50	8.508 7912	8.509 8701	1.52347	2.3766	7.4043	
51	08	8.509 8688	373	65	48	
52	04	76	399	64	52	
53	8.508 7900	63	425	64	57	
54	8.508 7895	51	451	63	61	
55	91	39	477	62	65	
56	87	26	503	61	70	
57	83	14	529	61	74	
58	79	8.509 8602	555	60	79	
59	75	8.509 8589	581	59	83	
60	8.508 7871	8.509 8577	1.52608	2.3759	6.4088	7.753

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 53°.

Lat. ° ′	log A diff. 1″ = −0.07	log B diff. 1″ = −0.21	log C diff. 1″ = +0.44	log D diff. 1″ = −0.01	log E diff. 1″ = +0.07	log F diff. 10′ = −2.5
53 00	8.508 7871	8.509 8577	1.52608	2.3759	6.4088	7.753
1	67	64	634	58	92	
2	62	52	660	57	6.4096	
3	58	40	686	56	6.4101	
4	54	27	712	56	05	
05	50	15	738	55	10	
6	46	8.509 8502	764	54	14	
7	42	8.509 8490	790	53	18	
8	38	78	817	53	23	
9	34	65	843	52	27	
10	8.508 7829	8.509 8453	1.52869	2.3751	6.4132	
11	25	41	895	51	36	
12	21	28	921	50	41	
13	17	16	947	49	45	
14	13	8.509 8404	1.52974	48	49	
15	09	8.509 8391	1.53000	48	54	
16	05	79	026	47	58	
17	8.508 7801	67	052	46	63	
18	8.508 7797	54	078	45	67	
19	92	42	105	45	72	
20	8.508 7788	8.509 8329	1.53131	2.3744	6.4176	7.748
21	84	17	157	43	80	
22	80	8.509 8305	183	42	85	
23	76	8.509 8292	209	42	89	
24	72	80	236	41	94	
25	68	68	262	40	6.4198	
26	64	55	288	39	6.4203	
27	60	43	314	39	07	
28	55	31	341	38	12	
29	51	18	367	37	16	
30	8.508 7747	8.509 8206	1.53393	2.3736	6.4221	
31	43	8.509 8194	419	36	25	
32	39	82	446	35	29	
33	35	69	472	34	34	
34	31	57	498	33	38	
35	27	45	524	33	43	
36	23	32	551	32	47	
37	18	20	577	31	52	
38	14	8.509 8108	603	30	56	
39	10	8.509 8095	630	29	61	
40	8.508 7706	8.509 8083	1.53656	2.3729	6.4265	7.743
41	8.508 7702	71	682	28	70	
42	8.508 7698	58	709	27	74	
43	94	46	735	26	79	
44	90	34	761	26	83	
45	86	22	788	25	88	
46	82	8.509 8009	814	24	92	
47	77	8.509 7997	840	23	6.4297	
48	73	85	867	22	6.4301	
49	69	72	893	22	06	
50	8.508 7665	8.509 7960	1.53919	2.3721	6.4310	
51	61	48	946	20	15	
52	57	36	972	19	19	
53	53	23	1.53998	18	24	
54	49	8.509 7911	1.54025	18	28	
55	45	8.509 7899	051	17	33	
56	41	87	077	16	37	
57	37	74	104	15	42	
58	32	62	130	14	46	
59	28	50	157	14	51	
60	8.508 7624	8.509 7838	1.54183	2.3713	6.4355	7.738

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 54°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.20	log C diff. 1″=+0.44	log D diff. 1″=−0.01	log E diff. 1″=+0.08	log F diff. 10′=−2.6
° ′						
54 00	8.508 7624	8.509 7838	1.54183	2.3713	6.4355	7.738
1	20	25	209	12	60	
2	16	13	236	11	64	
3	12	8.509 7801	262	10	69	
4	08	8.509 7789	288	09	73	
05	04	76	315	09	78	
6	8.508 7600	64	341	08	82	
7	8.508 7596	52	368	07	87	
8	92	40	394	06	91	
9	88	27	421	05	6.4396	
10	8.508 7584	8.509 7715	1.54447	2.3705	6.4400	
11	79	8.509 7703	474	04	05	
12	75	8.509 7691	500	03	09	
13	71	78	527	02	14	
14	67	66	553	01	18	
15	63	54	580	00	23	
16	59	42	606	2.3700	28	
17	55	30	633	2.3699	32	
18	51	17	659	98	37	
19	47	8.509 7605	686	97	41	
20	8.508 7543	8.509 7593	1.54712	2.3696	6.4446	7.733
21	39	81	739	95	50	
22	35	69	765	94	55	
23	31	56	792	94	59	
24	27	44	818	93	64	
25	22	32	845	92	68	
26	18	20	871	91	73	
27	14	8.509 7508	898	90	78	
28	10	8.509 7495	924	89	82	
29	06	83	951	88	87	
30	8.508 7502	8.509 7471	1.54977	2.3688	6.4491	
31	8.508 7498	59	1.55004	87	6.4496	
32	94	47	031	86	6.4500	
33	90	34	057	85	05	
34	86	22	084	84	09	
35	82	8.509 7410	110	83	14	
36	78	8.509 7398	137	82	19	
37	74	86	163	82	23	
38	70	74	190	81	28	
39	66	61	217	80	32	
40	8.508 7462	8.509 7349	1.55243	2.3679	6.4537	7.728
41	58	37	270	78	41	
42	53	25	297	77	46	
43	49	13	323	76	51	
44	45	8.509 7301	350	75	55	
45	41	8.509 7289	376	74	60	
46	37	76	403	74	64	
47	33	64	430	73	69	
48	29	52	456	72	74	
49	25	40	483	71	78	
50	8.508 7421	8.509 7228	1.55510	2.3670	6.4583	
51	17	16	536	69	87	
52	13	8.509 7204	563	68	92	
53	09	8.509 7191	590	67	6.4597	
54	05	79	616	66	6.4601	
55	8.508 7401	67	643	66	06	
56	8.508 7397	55	670	65	10	
57	93	43	696	64	15	
58	89	31	723	63	20	
59	85	19	750	62	24	
60	8.508 7381	8.509 7107	1.55777	2.3661	6.4629	7.723

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 55°.

Lat.	log A diff. 1″=−0.07	log B diff. 1″=−0.20	log C diff. 1″=+0.45	log D diff. 1″=−0.02	log E diff. 1″=+0.08	log F diff. 10′=−2.8
° ′						
55 00	8.508 7381	8.509 7107	1.55777	2.3661	6.4629	7.723
1	77	8.509 7095	803	60	33	
2	73	82	830	59	38	
3	69	70	857	58	43	
4	65	58	884	57	47	
05	61	46	910	56	52	
6	56	34	937	56	57	
7	52	22	964	55	61	
8	48	8.509 7010	1.55991	54	66	
9	44	8.509 6998	1.56017	53	70	
10	8.508 7340	8.509 6986	1.56044	2.3652	6.4675	
11	36	74	071	51	80	
12	32	62	098	50	84	
13	28	49	125	49	89	
14	24	37	151	48	94	
15	20	25	178	47	6.4698	
16	16	13	205	46	6.4703	
17	12	8.509 6901	232	45	08	
18	08	8.509 6889	259	44	12	
19	04	77	286	43	17	
20	8.508 7300	8.509 6865	1.56312	2.3642	6.4721	7.717
21	8.508 7296	53	339	42	26	
22	92	41	366	41	31	
23	88	29	393	40	35	
24	84	17	420	39	40	
25	80	8.509 6805	447	38	45	
26	76	8.509 6793	474	37	49	
27	72	81	500	36	54	
28	68	69	527	35	59	
29	64	57	554	34	63	
30	8.508 7260	8.509 6745	1.56581	2.3633	6.4768	
31	56	33	608	32	73	
32	52	21	635	31	77	
33	48	8.509 6709	662	30	82	
34	44	8.509 6696	689	29	87	
35	40	84	716	28	91	
36	36	72	743	27	6.4796	
37	32	60	770	26	6.4801	
38	28	48	797	25	05	
39	24	36	823	24	10	
40	8.508 7220	8.509 6624	1.56850	2.3623	6.4815	7.711
41	16	12	877	22	20	
42	12	8.509 6600	904	21	24	
43	08	8.509 6588	931	20	29	
44	04	76	958	19	34	
45	8.508 7200	64	1.56985	18	38	
46	8.508 7196	52	1.57012	17	43	
47	92	40	039	16	48	
48	88	28	066	15	52	
49	84	16	093	14	57	
50	8.508 7180	8.509 6505	1.57120	2. 613	6.4862	
51	76	8.509 6493	147	12	66	
52	72	81	174	11	71	
53	68	69	201	10	76	
54	64	57	229	09	81	
55	60	45	256	08	85	
56	56	33	283	07	90	
57	52	21	310	06	6.4895	
58	48	8.509 6409	337	05	6.4900	
59	44	8.509 6397	364	04	04	
60	8.508 7140	8.509 6385	1.57391	2.3603	6.4909	7.706

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 56°.

Lat.	log A diff.1″=−0.07	log B diff.1″=−0.20	log C diff.1″=+0.45	log D diff.1″=−0.02	log E diff.1″=+0.08	log F diff.10′=−3.0
° ′						
56 00	8.508 7140	8.509 6385	1.57391	2.3603	6.4909	7.706
1	36	73	418	02	14	
2	32	61	445	01	18	
3	28	49	472	2.3600	23	
4	24	37	499	2.3599	28	
05	20	25	526	98	33	
6	16	13	554	97	37	
7	12	8.509 6301	581	96	42	
8	08	8.509 6289	608	95	47	
9	04	77	635	94	52	
10	8.508 7100	8.509 6266	1.57662	2.3593	6.4956	
11	8.508 7096	54	689	92	61	
12	92	42	717	91	66	
13	88	30	744	90	71	
14	84	18	771	89	75	
15	80	8.509 6206	798	88	80	
16	76	8.509 6194	825	87	85	
17	72	82	852	86	90	
18	69	70	880	85	94	
19	65	58	907	84	6.4999	
20	8.508 7061	8.509 6147	1.57934	2.3583	6.5004	7.700
21	57	35	961	82	09	
22	53	23	1.57989	81	13	
23	49	8.509 6111	1.58016	80	18	
24	45	8.509 6099	043	78	23	
25	41	87	070	77	28	
26	37	75	098	76	32	
27	33	63	125	75	37	
28	29	51	152	74	42	
29	25	40	179	73	47	
30	8.508 7021	8.509 6028	1.58207	2.3572	6.5052	
31	17	16	234	71	56	
32	13	8.509 6004	261	70	61	
33	09	8.509 5992	289	69	66	
34	05	80	316	68	71	
35	8.508 7001	68	343	67	75	
36	8.508 6997	57	371	66	80	
37	93	45	398	65	85	
38	89	33	425	64	90	
39	86	21	453	62	95	
40	8.508 6982	8.509 5909	1.58480	2.3561	6.5099	7.694
41	78	8.509 5897	507	60	6.5104	
42	74	86	535	59	09	
43	70	74	562	58	14	
44	66	62	589	57	19	
45	62	50	617	56	24	
46	58	38	644	55	28	
47	54	27	672	54	33	
48	50	15	699	53	38	
49	46	8 509 5803	726	52	43	
50	8.508 6942	8.509 5791	1.58754	2.3550	6.5148	
51	38	79	781	49	52	
52	34	67	809	48	57	
53	30	56	836	47	62	
54	26	44	864	46	67	
55	23	32	891	45	72	
56	19	20	919	44	77	
57	15	8.509 5709	946	43	81	
58	11	8.509 5697	1.58974	42	86	
59	07	85	1.59001	41	91	
60	8.508 6903	8.509 5673	1.59028	2.3539	6.5196	7.688

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 57°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.19	log C diff. 1″=+0.46	log D diff. 1″=−0.02	log E diff. 1″=+0.08	log F diff. 10′=−3.2
° ′						
57 00	8.508 6903	8.509 5673	1.59028	2.3539	6.5196	7.688
1	8.508 6899	61	056	38	6.5201	
2	95	50	083	37	06	
3	91	38	111	36	10	
4	87	26	139	35	15	
05	83	14	166	34	20	
6	79	8.509 5603	194	33	25	
7	75	8.509 5591	221	32	30	
8	72	79	249	30	35	
9	68	67	276	29	40	
10	8.508 6864	8.509 5556	1.59304	2.3528	6.5244	
11	60	44	331	27	49	
12	56	32	359	26	54	
13	52	20	387	25	59	
14	48	8.509 5509	414	24	64	
15	44	8.509 5497	442	22	69	
16	40	85	469	21	74	
17	36	73	497	20	79	
18	32	62	525	19	83	
19	28	50	552	18	88	
20	8.508 6825	8.509 5438	1.59580	2.3517	6.5293	7.682
21	21	27	608	16	6.5298	
22	17	15	635	14	6.5303	
23	13	8.509 5403	663	13	08	
24	09	8.509 5392	691	12	13	
25	05	80	718	11	18	
26	8.508 6801	68	746	10	22	
27	8.508 6797	56	774	09	27	
28	93	45	801	07	32	
29	90	33	829	06	37	
30	8.508 6786	8.509 5321	1.59857	2.3505	6.5342	
31	82	8.509 5310	885	04	47	
32	78	8.509 5298	912	03	52	
33	74	86	940	02	57	
44	70	75	968	2.3500	62	
35	66	63	1.59996	2.3499	67	
36	62	51	1.60023	98	72	
37	58	40	051	97	76	
38	54	28	079	96	81	
39	51	16	107	95	86	
40	8.508 6747	8.509 5205	1.60134	2.3493	6.5391	7.675
41	43	8.509 5193	162	92	6.5396	
42	39	81	190	91	6.5401	
43	35	70	218	90	06	
44	31	58	246	89	11	
45	27	46	274	87	16	
46	23	35	301	86	21	
47	20	23	329	85	26	
48	16	12	357	84	31	
49	12	8.509 5100	385	83	36	
50	8.508 6708	8.509 5088	1.60413	2.3481	6.5441	
51	04	77	441	80	46	
52	8.508 6700	65	469	79	50	
53	8.508 6696	54	496	78	55	
54	92	42	524	76	60	
55	89	30	552	75	65	
56	85	19	580	74	70	
57	81	8.509 5007	608	73	75	
58	77	8.509 4996	636	72	80	
59	73	84	664	70	85	
60	8.508 6669	8.509 4972	1.60692	2.3469	6.5490	7.669

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 58°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.19	log C diff. 1″=+0.47	log D diff. 1″=−0.02	log E diff. 1″=+0.08	log F diff. 10′=−3.3
° ′						
58 00	8.508 6669	8.509 4972	1.60692	2.3469	6.5490	7.669
1	65	61	720	68	6.5495	
2	62	49	748	67	6.5500	
3	58	38	776	66	05	
4	54	26	804	64	10	
05	50	14	832	63	15	
6	46	8.509 4903	860	62	20	
7	42	8.509 4891	888	61	25	
8	38	80	916	59	30	
9	35	68	944	58	35	
10	8.508 6631	8.509 4857	1.60972	2.3457	6.5540	
11	27	45	1.61000	56	45	
12	23	33	028	54	50	
13	19	22	056	53	55	
14	15	8.509 4810	084	52	60	
15	11	8.509 4799	112	51	65	
16	08	87	140	49	70	
17	04	76	168	48	75	
18	8.508 6600	64	197	47	80	
19	8.508 6596	53	225	46	85	
20	8.508 6592	8.509 4741	1.61253	2.3444	6.5590	7.662
21	88	30	281	43	6.5595	
22	85	18	309	42	6.5600	
23	81	8.509 4707	337	41	05	
24	77	8.509 4695	365	39	10	
25	73	84	393	38	15	
26	69	72	422	37	20	
27	65	61	450	35	25	
28	62	49	478	34	30	
29	58	38	506	33	35	
30	8.508 6554	8.509 4626	1.61534	2.3432	6.5640	
31	50	15	563	30	45	
32	46	8.509 4603	591	29	50	
33	42	8.509 4592	619	28	55	
34	39	80	647	26	60	
35	35	69	675	25	65	
36	31	57	704	24	70	
37	27	46	732	23	75	
38	23	35	760	21	80	
39	20	23	789	20	86	
40	8.508 6516	8.509 4512	1.61817	2.3419	6.5691	7.656
41	12	8.509 4500	845	17	6.5696	
42	08	8.509 4489	873	16	6.5701	
43	04	77	902	15	06	
44	8.508 6500	66	930	14	11	
45	8.508 6497	54	958	12	16	
46	93	43	1.61987	11	21	
47	89	32	1.62015	10	26	
48	85	20	043	08	31	
49	81	8.509 4409	072	07	36	
50	8.508 6478	8.509 4397	1.62100	2.3406	6.5741	
51	74	86	129	04	46	
52	70	74	157	03	51	
53	66	63	185	02	56	
54	62	52	214	2.3400	62	
55	59	40	242	2.3399	67	
56	55	29	271	98	72	
57	51	17	299	96	77	
58	47	8.509 4306	327	95	82	
59	43	8.509 4295	356	94	87	
60	8.508 6440	8.509 4283	1.62384	2.3392	6.5792	7.649

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 59°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.19	log C diff. 1″=+0.48	log D diff. 1″=−0.02	log E diff. 1″=+0.09	log F diff. 10′=−3.5
° ′						
59 00	8.508 6440	8.509 4283	1.62384	2.3392	6.5792	7.649
1	36	72	413	91	6.5797	
2	32	61	441	90	6.5802	
3	28	49	470	88	07	
4	24	38	498	87	13	
5	21	26	527	86	18	
6	17	15	555	84	23	
7	13	8.509 4204	584	83	28	
8	09	8.509 4192	612	82	33	
9	05	81	641	80	38	
10	8.508 6402	8.509 4170	1.62669	2.3379	6.5843	
11	8.508 6398	58	698	78	48	
12	94	47	727	76	54	
13	90	36	755	75	59	
14	87	24	784	74	64	
15	83	13	812	72	69	
16	79	8.509 4102	841	71	74	
17	75	8.509 4090	870	69	79	
18	71	79	898	68	84	
19	68	68	927	67	89	
20	8.508 6364	8.509 4056	1.62955	2.3365	6.5895	7.642
21	60	45	1.62984	64	6.5900	
22	56	34	1.63013	63	05	
23	53	22	041	61	10	
24	49	11	070	60	15	
25	45	8.509 4000	099	58	20	
26	41	8.509 3989	127	57	26	
27	38	77	156	56	31	
28	34	66	185	54	36	
29	30	55	214	53	41	
30	8.508 6326	8.509 3943	1.63242	2.3351	6.5946	
31	23	32	271	50	51	
32	19	21	300	49	57	
33	15	8.509 3910	329	47	62	
34	11	8.509 3898	357	46	67	
35	08	87	386	44	72	
36	04	76	415	43	77	
37	8.508 6300	65	444	42	82	
38	8.508 6296	53	473	40	88	
39	93	42	501	39	93	
40	8.508 6289	8.509 3831	1.63530	2.3337	6.5998	7.635
41	85	20	559	36	6.6003	
42	81	8.509 3808	588	35	08	
43	78	8.509 3797	617	33	14	
44	74	86	646	32	19	
45	70	75	674	30	24	
46	66	63	703	29	29	
47	63	52	732	28	34	
48	59	41	761	26	40	
49	55	30	790	25	45	
50	8.508 6251	8.509 3719	1.63819	2.3323	6.6050	
51	48	8.509 3708	848	22	55	
52	44	8.509 3696	877	20	61	
53	40	85	906	19	66	
54	36	74	935	17	71	
55	33	63	964	16	76	
56	29	52	1.63993	15	81	
57	25	40	1.64022	13	87	
58	22	29	051	12	92	
59	18	18	080	10	6.6097	
60	8.508 6214	8.509 3607	1.64109	2.3309	6.6102	7.627

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 60°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.18	log C diff. 1″=+0.49	log D diff. 1″=−0.03	log E diff. 1″=+0.09	log F diff. 10′= -3.7
° ′						
60 00	8.508 6214	8.509 3607	1.64109	2.3309	6.6102	7.627
1	10	8.509 3596	138	07	08	
2	07	85	167	06	13	
3	8.508 6203	73	196	04	18	
4	8.508 6199	62	225	03	23	
05	96	51	254	02	29	
6	92	40	283	2.3300	34	
7	88	29	312	2.3299	39	
8	84	18	341	97	44	
9	81	8.509 3507	370	96	50	
10	8.508 6177	8.509 3495	1.64400	2.3294	6.6155	
11	73	84	429	93	60	
12	70	73	458	91	66	
13	66	62	487	90	71	
14	62	51	516	88	76	
15	58	40	545	87	81	
16	55	29	574	85	87	
17	51	18	604	84	92	
18	47	8.509 3407	633	82	6.6197	
19	44	8.509 3395	662	81	6.6203	
20	8.508 6140	8.509 3384	1.64691	2.3279	6.6208	7.620
21	36	73	720	78	13	
22	33	62	750	76	18	
23	29	51	779	75	24	
24	25	40	808	73	29	
25	21	29	838	72	34	
26	18	18	867	70	40	
27	14	8.509 3307	896	69	45	
28	10	8.509 3296	925	67	50	
29	07	85	955	66	56	
30	8.508 6103	8.509 3274	1.64984	2.3264	6.6261	
31	8.508 6099	63	1.65013	63	66	
32	96	52	043	61	72	
33	92	40	072	60	77	
34	88	29	101	58	82	
35	85	18	131	57	87	
36	81	8.509 3207	160	55	93	
37	77	8.509 3196	190	54	6.6298	
38	74	85	219	52	6.6304	
39	70	74	248	51	09	
40	8.508 6066	8.509 3163	1.65278	2.3249	6.6314	7.613
41	63	52	307	48	20	
42	59	41	337	46	25	
43	55	30	366	45	30	
44	52	19	396	43	36	
45	48	8.509 3108	425	41	41	
46	44	8.509 3097	455	40	46	
47	41	86	484	38	52	
48	37	75	514	37	57	
49	33	64	543	35	62	
50	8.508 6030	8.509 3053	1.65573	2.3234	6.6368	
51	26	42	602	32	73	
52	22	31	632	31	79	
53	19	20	661	29	84	
54	15	8.509 3010	691	28	89	
55	11	8.509 2999	721	26	6.6395	
56	08	88	750	24	6.6400	
57	04	77	780	23	05	
58	8.508 6000	66	809	21	11	
59	8.508 5997	55	839	20	16	
60	8.508 5993	8.509 2944	1.65869	2.3218	6.6422	7.605

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 61°.

Lat.	log A diff. 1″ = −0.06	log B diff. 1″ = −0.18	log C diff. 1″ = +0.50	log D diff. 1″ = −0.03	log E diff. 1″ = +0.09	log F diff. 10′ = −4.0
° ′						
61 00	8.508 5993	8.509 2944	1.65869	2.3218	6.6422	7.605
1	89	33	898	17	27	
2	86	22	928	15	32	
3	82	11	958	13	38	
4	79	5.509 2900	1.65987	12	43	
05	75	8.509 2889	1.66017	10	48	
6	71	78	047	09	54	
7	68	67	076	07	59	
8	64	56	106	06	65	
9	60	46	136	04	70	
10	8.508 5957	8.509 2835	1.66166	2.3202	6.6476	
11	53	24	195	2.3201	81	
12	49	13	225	2.3199	87	
13	46	8.509 2802	255	98	92	
14	42	8.509 2791	285	96	6.6497	
15	39	80	315	94	6.6503	
16	35	69	344	93	08	
17	31	58	374	91	14	
18	28	48	404	90	19	
19	24	37	434	88	25	
20	8.508 5920	8.509 2726	1.66464	2.3186	6.6530	7.597
21	17	15	494	85	36	
22	13	8.509 2704	524	83	41	
23	10	8.509 2693	553	81	46	
24	06	83	583	80	52	
25	8.508 5902	72	613	78	57	
26	8.508 5899	61	643	77	63	
27	95	50	673	75	68	
28	92	39	703	73	74	
29	88	28	733	72	79	
30	8.508 5884	8.509 2618	1.66763	2.3170	6.6585	
31	81	8.509 2607	793	68	90	
32	77	8.509 2596	823	67	6.6596	
33	74	85	853	65	6.6601	
34	70	74	883	64	07	
35	66	64	913	62	12	
36	63	53	943	60	18	
37	59	42	1.66973	58	23	
38	56	31	1.67003	57	29	
39	52	20	033	55	34	
40	8.508 5848	8.509 2510	1.67063	2.3154	6.6640	7.589
41	45	8.509 2499	094	52	45	
42	41	88	124	50	51	
43	38	77	154	49	56	
44	34	67	184	47	62	
45	30	56	214	45	67	
46	27	45	244	44	73	
47	23	34	274	42	78	
48	20	24	305	40	84	
49	16	13	335	39	89	
50	8.508 5813	8.509 2402	1.67365	2.3137	6.6695	
51	09	8.509 2391	395	35	6.6700	
52	05	81	425	34	06	
53	8.508 5802	70	456	32	12	
54	8.508 5798	59	486	30	17	
55	95	49	516	29	23	
56	91	38	547	27	28	
57	88	27	577	25	34	
58	84	16	607	23	39	
59	80	8.509 2306	637	22	45	
60	8.508 5777	8.509 2295	1.67668	2.3120	6.6750	7.581

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 62°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.18	log C diff. 1″=+0.51	log D diff. 1″=−0.03	log E diff. 1″=+0.09	log F diff. 10′=−4.2
° ′						
62 00	8.508 5777	8.509 2295	1.67668	2.3120	6.6750	7.581
1	73	84	698	18	56	
2	70	74	728	17	61	
3	66	63	759	15	67	
4	63	52	789	13	73	
05	59	42	820	12	78	
6	55	31	850	10	84	
7	52	20	880	08	89	
8	48	8.509 2210	911	06	6.6795	
9	45	8.509 2199	941	05	6.6801	
10	8.508 5741	8.509 2188	1.67972	2.3103	6.6806	
11	38	78	1.68002	01	12	
12	34	67	033	2.3100	17	
13	30	56	063	2.3098	23	
14	27	46	094	96	29	
15	24	35	124	94	34	
16	20	25	155	93	40	
17	16	14	185	91	45	
18	13	8.509 2103	216	89	51	
19	09	8.509 2093	246	87	57	
20	8.508 5706	8.509 2082	1.68277	2.3086	6.6862	7.573
21	8.508 5702	71	307	84	68	
22	8.508 5699	61	338	82	73	
23	95	50	369	80	79	
24	92	40	399	79	85	
25	88	29	430	77	90	
26	85	19	461	75	6.6896	
27	81	8.509 2008	491	74	6.6902	
28	78	8.509 1997	522	72	07	
29	74	87	553	70	13	
30	8.508 5671	8.509 1976	1.68583	2.3068	6.6919	
31	67	66	614	66	24	
32	64	55	645	65	30	
33	60	45	675	63	36	
34	56	34	706	61	41	
35	53	23	737	59	47	
36	49	13	768	58	53	
37	46	8.509 1902	799	56	58	
38	42	8.509 1892	829	54	64	
39	39	81	860	52	70	
40	8.508 5635	8.509 1871	1.68891	2.3050	6.6975	7.564
41	32	60	922	49	81	
42	28	50	953	47	87	
43	25	39	1.68984	45	92	
44	21	29	1.69014	43	6.6998	
45	18	18	045	42	6.7004	
46	14	8.509 1808	076	40	09	
47	11	8.509 1797	107	38	15	
48	07	87	138	36	21	
49	04	76	169	34	26	
50	8.508 5600	8.509 1766	1.69200	2.3033	6.7032	
51	8.508 5597	55	231	31	38	
52	93	45	262	29	44	
53	90	34	293	27	49	
54	86	24	324	25	55	
55	83	14	355	23	61	
56	80	8.509 1703	386	22	67	
57	76	8.509 1693	417	20	72	
58	73	82	448	18	78	
59	69	72	479	16	84	
60	8.508 5566	8.509 1661	1.69510	2.3014	6.7089	7.556

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 63°.

Lat.	log A diff.1″=−0.06	log B diff.1″=−0.17	log C diff.1″=+0.52	log D diff.1″=−0.03	log E diff.1″=+0.10	log F diff.10′=−4.5
° ′						
63 00	8.508 5566	8.509 1661	1.69510	2.3014	6.7089	7.556
1	62	51	541	13	6.7095	
2	59	40	572	11	6.7101	
3	55	30	603	09	07	
4	52	20	635	07	12	
05	48	8.509 1609	666	05	18	
6	45	8.509 1599	697	03	24	
7	41	88	728	02	30	
8	38	78	759	2.3000	35	
9	34	68	791	2.2998	41	
10	8.508 5531	8.509 1557	1.69822	2.2996	6.7147	
11	27	47	853	94	53	
12	24	36	884	92	59	
13	20	26	915	90	64	
14	17	16	947	89	70	
15	14	8.509 1505	1.69978	87	76	
16	10	8.509 1495	1.70009	85	82	
17	07	85	041	83	88	
18	03	74	072	81	93	
19	8.508 5500	64	103	79	6.7199	
20	8.508 5496	8.509 1454	1.70135	2.2977	6.7205	7.547
21	93	43	166	75	11	
22	89	33	197	74	17	
23	86	23	229	72	22	
24	83	12	260	70	28	
25	79	8.509 1402	292	68	34	
26	76	8.509 1392	323	66	40	
27	72	81	355	64	46	
28	69	71	386	62	51	
29	65	61	417	60	57	
30	8.508 5462	8.509 1350	1.70449	2.2958	6.7263	
31	58	40	480	57	69	
32	55	30	512	55	75	
33	52	19	544	53	81	
34	48	8.509 1309	575	51	86	
35	45	8.509 1299	607	49	92	
36	41	89	638	47	6.7298	
37	38	78	670	45	6.7304	
38	34	68	701	43	10	
39	31	58	733	41	16	
40	8.508 5428	8.509 1248	1.70765	2.2939	6.7322	7.538
41	24	37	796	37	28	
42	21	27	828	36	33	
43	17	17	860	34	39	
44	14	8.509 1207	891	32	45	
45	11	8.509 1196	923	30	51	
46	07	86	955	28	57	
47	04	76	1.70986	26	63	
48	8.508 5400	66	1.71018	24	69	
49	8.508 5397	55	050	22	75	
50	8.508 5394	8.509 1145	1.71082	2.2920	6.7381	
51	90	35	114	18	86	
52	87	25	145	16	92	
53	83	15	177	14	6.7398	
54	80	8.509 1104	209	12	6.7404	
55	77	8.509 1094	241	10	10	
56	73	84	273	08	16	
57	70	74	305	06	22	
58	66	64	337	04	28	
59	63	54	368	02	34	
60	8.508 5360	8.509 1043	1.71400	2.2901	6.7440	7.529

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 64°.

Lat.	log A diff. 1″=−0.06	log B diff. 1″=−0.17	log C diff. 1″=+0.54	log D diff. 1″=−0.03	log E diff. 1″=+0.10	log F diff. 10′=−4.7
° ′						
64 00	8.508 5360	8.509 1043	1.71400	2.2901	6.7440	7.529
1	56	33	432	2.2899	46	
2	53	23	464	97	52	
3	49	13	496	95	58	
4	46	8.509 1003	528	93	63	
05	43	8.509 0993	560	91	69	
6	39	82	592	89	75	
7	36	72	624	87	81	
8	33	62	656	85	87	
9	29	52	688	83	93	
10	8.508 5326	8.509 0942	1.71720	2.2881	6.7499	
11	22	32	752	79	6.7505	
12	19	22	785	77	11	
13	16	12	817	75	17	
14	12	8.509 0902	849	73	23	
15	09	8.509 0891	881	71	29	
16	06	81	913	69	35	
17	8.508 5302	71	945	67	41	
18	8.508 5299	61	1.71977	65	47	
19	96	51	1.72010	63	53	
20	8.508 5292	8.509 0841	1.72042	2.2861	6.7559	7.520
21	89	31	074	59	65	
22	85	21	106	57	71	
23	82	11	139	55	77	
24	79	8.509 0801	171	53	83	
25	75	8.509 0791	203	51	89	
26	72	81	235	49	6.7595	
27	69	71	268	47	6.7601	
28	65	61	300	45	07	
29	62	51	332	42	13	
30	8.508 5259	8.509 0741	1.72365	2.2840	6.7619	
31	55	31	397	38	25	
32	52	21	430	36	31	
33	49	11	462	34	37	
34	45	8.509 0701	495	32	43	
35	42	8.509 0691	527	30	49	
36	39	81	559	28	56	
37	35	71	592	26	62	
38	32	61	624	24	68	
39	29	51	657	22	74	
40	8.508 5225	8.509 0641	1.72689	2.2820	6.7680	7.511
41	22	31	722	18	86	
42	19	21	755	16	92	
43	15	11	787	14	6.7698	
44	12	8.509 0601	820	12	6.7704	
45	09	8.509 0591	852	10	10	
46	05	81	885	07	16	
47	8.508 5202	71	918	05	22	
48	8.508 5199	61	950	03	28	
49	95	51	1.72983	2.2801	35	
50	8.508 5192	8.509 0541	1.73016	2.2799	6.7741	
51	89	31	048	97	47	
52	86	21	081	95	53	
53	82	11	114	93	59	
54	79	8.509 0501	146	91	65	
55	76	8.509 0491	179	89	71	
56	72	82	212	87	77	
57	69	72	245	84	84	
58	66	62	278	82	90	
59	62	52	310	80	6.7796	
60	8.508 5159	8.509 0442	1.73343	2.2778	6.7802	7.501

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 65°.

Lat.	log A diff.1″=−0.05	log B diff.1″=−0.16	log C diff.1″=+0.56	log D diff.1″=−0.04	log E diff.1″=+0.10	log F diff.10′=−5.0
° ′						
65 00	8.508 5159	8.509 0442	1.73343	2.2778	6.7802	7.501
1	56	32	376	76	08	
2	52	22	409	74	14	
3	49	12	442	72	20	
4	46	8.509 0402	475	70	27	
05	43	8.509 0393	508	68	33	
6	39	83	541	65	39	
7	36	73	574	63	45	
8	33	63	607	61	51	
9	30	53	640	59	57	
10	8.508 5126	8.509 0344	1.73673	2.2757	6.7864	
11	23	34	706	55	70	
12	20	24	739	53	76	
13	17	14	772	50	82	
14	13	8.509 0304	805	48	88	
15	10	8.509 0295	838	46	6.7895	
16	07	85	871	44	6.7901	
17	03	75	904	42	07	
18	8.508 5100	65	937	40	13	
19	8.508 5097	55	1.73970	38	19	
20	8.508 5094	8.509 0245	1.74004	2.2735	6.7926	7.491
21	90	36	037	33	32	
22	87	26	070	31	38	
23	84	16	103	29	44	
24	81	8.509 0206	136	27	51	
25	77	8.509 0197	170	24	57	
26	74	87	203	22	63	
27	71	77	236	20	69	
28	68	67	270	18	76	
29	64	57	303	16	82	
30	8.508 5061	8.509 0148	1.74336	2.2714	6.7988	
31	58	38	370	11	6.7994	
32	54	28	403	09	6.8001	
33	51	18	436	07	07	
34	48	8.509 0109	470	05	13	
35	45	8.509 0099	503	03	19	
36	41	89	537	2.2700	26	
37	38	80	570	2.2698	32	
38	35	70	604	96	38	
39	32	60	637	94	44	
40	8.508 5029	8.509 0051	1.74670	2.2692	6.8051	7.481
41	25	41	704	89	57	
42	22	31	738	87	63	
43	19	22	771	85	70	
44	16	12	805	83	76	
45	13	8.509 0002	838	80	82	
46	09	8.508 9993	872	78	89	
47	06	83	906	76	6.8095	
48	03	73	939	74	6.8101	
49	8.508 5000	64	1.74973	72	07	
50	8.508 4996	8.508 9954	1.75007	2.2669	6.8114	
51	93	44	040	67	20	
52	90	35	074	65	27	
53	87	25	108	63	33	
54	84	15	142	60	39	
55	80	8.508 9906	175	58	46	
56	77	8.508 9896	209	56	52	
57	74	87	243	53	58	
58	71	77	277	51	65	
59	68	67	311	49	71	
60	8.508 4964	8.508 9858	1.75344	2.2647	6.8177	7.471

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 66°.

Lat.	log A diff.1″=−0.05	log B diff.1″=−0.16	log C diff.1″=+0.57	log D diff.1″=−0.04	log E diff.1″=+0.11	log F diff.10′=−5.3
° ′						
66 00	8.508 4964	8.508 9858	1.75344	2.2647	6.8177	7.471
1	61	48	378	44	84	
2	58	39	412	42	90	
3	55	29	446	40	6.8196	
4	52	20	480	38	6.8203	
05	48	10	514	35	09	
6	45	8.508 9801	548	33	16	
7	42	8.508 9791	582	31	22	
8	39	82	616	28	28	
9	36	72	650	26	35	
10	8.508 4933	8.508 9762	1.75684	2.2624	6.8241	
11	29	53	718	22	48	
12	26	43	752	19	54	
13	23	34	786	17	61	
14	20	24	820	15	67	
15	17	14	854	12	73	
16	13	8.508 9705	889	10	80	
17	10	8.508 9696	923	08	86	
18	07	86	957	05	93	
19	04	77	1.75991	03	6.8299	
20	8.508 4901	8.508 9667	1.76025	2.2601	6.8306	7.461
21	8.508 4898	58	060	2.2598	12	
22	95	48	094	96	19	
23	91	39	128	94	25	
24	88	29	163	91	31	
25	85	20	197	89	38	
26	82	11	231	87	44	
27	79	8.508 9601	266	84	51	
28	76	8.508 9592	300	82	57	
29	73	82	334	80	64	
30	8.508 4869	8.508 9573	1.76369	2.2578	6.8370	
31	66	63	403	75	77	
32	63	54	438	73	83	
33	60	44	472	70	90	
34	57	35	507	68	6.8396	
35	54	25	541	66	6.8403	
36	50	16	576	63	09	
37	47	8.508 9507	610	61	16	
38	44	8.508 9497	645	59	22	
39	41	88	679	56	29	
40	8.508 4838	8.508 9478	1.76714	2.2554	6.8436	7.450
41	35	69	749	51	42	
42	32	60	783	49	49	
43	29	51	818	47	55	
44	26	41	853	44	62	
45	22	32	887	42	68	
46	19	23	922	39	75	
47	16	13	957	37	81	
48	13	8.508 9404	1.76991	35	88	
49	10	8.508 9395	1.77026	32	6.8495	
50	8.508 4807	8.508 9385	1.77061	2.2530	6.8501	
51	04	76	096	27	08	
52	8.508 4801	66	131	25	14	
53	8.508 4797	57	166	23	21	
54	94	48	200	20	27	
55	91	38	235	18	34	
56	88	29	270	15	41	
57	85	20	305	13	47	
58	82	10	340	11	54	
59	79	8.508 9301	375	08	60	
60	8.508 4776	8.508 9292	1.77410	2.2506	6.8567	7.440

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 67°.

Lat.	log A diff. 1″=−0.05	log B diff. 1″=−0.15	log C diff. 1″=+0.59	log D diff. 1″=−0.04	log E diff. 1″=+0.11	log F diff. 10′=−5.6
° ′						
67 00	8.508 4776	8.508 9292	1.77410	2.2506	6.8567	7.440
1	73	83	445	03	74	
2	70	73	480	2.2501	80	
3	66	64	515	2.2498	87	
4	63	55	550	96	6.8594	
05	60	46	585	93	6.8600	
6	57	36	620	91	07	
7	54	27	656	89	14	
8	51	18	691	86	20	
9	48	8.508 9208	726	84	27	
10	8.508 4745	8.508 9199	1.77761	2.2481	6.8634	
11	42	90	796	79	40	
12	39	81	831	76	47	
13	36	72	867	74	54	
14	33	62	902	71	60	
15	30	53	937	69	67	
16	26	44	1.77973	66	74	
17	23	35	1.78008	64	80	
18	20	26	043	61	87	
19	17	16	079	59	6.8694	
20	8.508 4714	8.508 9107	1.78114	2.2456	6.8700	7.429
21	11	8.508 9098	149	54	07	
22	08	89	185	51	14	
23	05	80	220	49	20	
24	8.508 4702	71	256	46	27	
25	8.508 4699	62	291	44	34	
26	96	52	327	41	41	
27	93	43	362	39	47	
28	90	34	398	36	54	
29	87	25	433	34	61	
30	8.508 4684	8.508 9016	1.78469	2.2431	6.8768	
31	81	8.508 9007	505	29	74	
32	78	8.508 8998	540	26	81	
33	75	88	576	24	88	
34	72	79	612	21	6.8795	
35	68	70	647	19	6.8802	
36	65	61	683	16	08	
37	62	52	719	14	15	
38	59	43	755	11	22	
39	56	34	790	09	29	
40	8.508 4653	8.508 8925	1.78826	2.2406	6.8835	7.418
41	50	16	862	03	42	
42	47	8.508 8907	898	2.2401	49	
43	44	8.508 8898	934	2.2398	56	
44	41	89	1.78970	96	63	
45	38	80	1.79006	93	70	
46	35	71	042	91	76	
47	32	62	078	88	83	
48	29	53	114	86	90	
49	26	44	150	83	6.8897	
50	8.508 4623	8.508 8834	1.79186	2.2380	6.8904	
51	20	25	222	78	10	
52	17	16	258	75	17	
53	14	8.508 8807	294	73	24	
54	11	8.508 8798	330	70	31	
55	08	89	366	67	38	
56	05	80	402	65	45	
57	8.508 4602	71	438	62	52	
58	8.508 4599	62	474	60	59	
59	96	54	511	57	65	
60	8.508 4593	8.508 8745	1.79547	2.2354	6.8972	7.406

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 68°.

Lat.	log A diff. 1″ = −0.05	log B diff. 1″ = −0.15	log C diff. 1″ = +0.62	log D diff. 1″ = −0.4	log E diff. 1″ = +0.12	log F diff. 10′ = −5.9
° ′						
68 00	8.508 4593	8.508 8745	1.79547	2.2354	6.8972	7.406
1	90	36	583	52	79	
2	87	27	620	49	86	
3	84	18	656	47	6.8993	
4	81	09	692	44	6.9000	
05	78	8.508 8700	728	41	07	
6	76	8.508 8691	765	39	14	
7	73	82	801	36	21	
8	70	73	838	33	28	
9	67	64	874	31	35	
10	8.508 4564	8.508 8656	1.79911	2.2328	6.9042	
11	61	47	947	26	48	
12	58	38	1.79984	23	55	
13	55	29	1.80020	20	62	
14	52	20	057	18	69	
15	49	11	093	15	76	
16	46	8.508 8602	130	12	83	
17	43	8.508 8593	166	10	90	
18	40	84	203	07	6.9097	
19	37	75	240	04	6.9104	
20	8.508 4534	8.508 8566	1.80276	2.2302	6.9111	7.395
21	31	58	313	2.2299	18	
22	28	49	350	96	25	
23	25	40	387	94	32	
24	22	31	423	91	39	
25	19	22	460	88	46	
26	16	13	497	85	53	
27	13	8.508 8505	534	83	60	
28	10	8.508 8496	571	80	67	
29	07	87	608	77	74	
30	8.508 4504	8.508 8478	1.80645	2.2275	6.9181	
31	8.508 4501	69	682	72	88	
32	8.508 4499	60	719	69	6.9195	
33	96	52	756	67	6.9203	
34	93	43	793	64	10	
35	90	34	830	61	17	
36	87	25	867	58	24	
37	84	17	904	56	31	
38	81	8.508 8408	941	53	38	
39	78	8.508 8399	1.80978	50	45	
40	8.508 4475	8.508 8390	1.81015	2.2248	6.9252	7.383
41	72	82	052	45	59	
42	70	73	089	42	66	
43	67	64	127	39	73	
44	64	56	164	36	80	
45	61	47	201	34	88	
46	58	38	239	31	6.9295	
47	55	30	276	28	6.9302	
48	52	21	313	26	09	
49	49	12	350	23	16	
50	8.508 4446	8.508 8303	1.81388	2.2220	6.9323	
51	43	8.508 8295	425	17	30	
52	40	86	463	14	37	
53	38	77	500	12	45	
54	35	68	538	09	52	
55	32	60	575	06	59	
56	29	51	613	03	66	
57	26	43	650	2.2201	73	
58	23	34	688	2.2198	80	
59	20	25	726	95	88	
60	8.508 4417	8.508 8217	1.81763	2.2192	6.9395	7.371

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 69°.

Lat.	log A diff. 1″=−0.05	log B diff. 1″=−0.14	log C diff. 1″=+0.64	log D diff. 1″=−0.05	log E diff. 1″=+0.12	log F diff. 10′=−6.2
° ′						
69 00	8.508 4417	8.508 8217	1.81763	2.2192	6.9395	7.371
1	14	08	801	89	6.9402	
2	12	8.508 8200	838	87	09	
3	09	8.508 8191	876	84	16	
4	06	82	914	81	24	
05	03	74	952	78	31	
6	8.508 4400	65	1.81989	75	38	
7	8.508 4397	57	1.82027	72	45	
8	94	48	065	70	52	
9	92	39	103	67	60	
10	8.508 4389	8.508 8131	1.82141	2.2164	6.9467	
11	86	22	179	61	74	
12	83	14	217	58	82	
13	80	8.508 8105	255	55	89	
14	77	8.508 8096	293	53	6.9496	
15	74	88	330	50	6.9503	
16	71	79	369	47	11	
17	69	71	407	44	18	
18	66	62	445	41	25	
19	63	54	483	38	32	
20	8.508 4360	8.508 8045	1.82521	2.2136	6.9540	7.358
21	57	37	559	33	47	
22	55	28	597	30	54	
23	52	20	636	27	62	
24	49	11	674	24	69	
25	46	8.508 8003	712	21	76	
26	43	8.508 7994	750	18	84	
27	40	86	789	15	91	
28	37	77	827	12	6.9598	
29	35	69	865	10	6.9606	
30	8.508 4332	8.508 7960	1.82904	2.2107	6.9613	
31	29	52	942	04	20	
32	26	43	1.82981	2.2101	28	
33	23	35	1.83019	2.2098	35	
34	21	26	058	95	42	
35	18	18	096	92	50	
36	15	09	135	89	57	
37	12	8.508 7901	173	86	65	
38	09	8.508 7893	212	83	72	
39	06	84	250	80	79	
40	8.508 4304	8.508 7876	1.83289	2.2078	6.9687	7.346
41	8.508 4301	67	328	75	6.9694	
42	8.508 4298	59	366	72	6.9702	
43	95	51	405	69	09	
44	93	42	444	66	16	
45	90	34	483	63	24	
46	87	26	521	60	31	
47	84	17	560	57	39	
48	81	09	599	54	46	
49	79	8.508 7801	638	51	54	
50	8.508 4276	8.508 7792	1.83677	2.2048	6.9761	
51	73	84	716	45	69	
52	70	75	755	42	76	
53	67	67	794	39	84	
54	65	59	833	36	91	
55	62	50	872	33	6.9799	
56	59	42	911	30	6.9806	
57	56	34	950	27	14	
58	54	25	1.83989	24	21	
59	51	17	1.84028	21	29	
60	8.508 4248	8.508 7709	1.84068	2.2018	6.9836	7.333

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 70°.

Lat.	log A diff. 1″=−0.04	log B diff. 1″=−0.14	log C diff. 1″=+0.67	log D diff. 1″=−0.05	log E diff. 1″=+0.13	log F diff. 10′=−6.7
° ′						
70 00	8.508 4248	8.508 7709	1.84068	2.2018	6.9836	7.333
1	45	8.508 7701	107	15	44	
2	43	8.508 7692	146	12	51	
3	40	84	185	09	59	
4	37	76	225	06	66	
05	34	68	264	03	74	
6	32	59	303	2.2000	81	
7	29	51	343	2.1997	89	
8	26	43	382	94	6.9896	
9	23	35	421	91	6.9904	
10	8.508 4221	8.508 7626	1.84461	2.1988	6.9912	
11	18	18	500	85	19	
12	15	10	540	82	27	
13	12	8.508 7602	579	79	34	
14	10	8.508 7594	619	76	42	
15	07	86	658	73	50	
16	04	78	698	70	57	
17	8.508 4201	69	738	66	65	
18	8.508 4199	61	778	63	73	
19	96	52	817	60	80	
20	8.508 4193	8.508 7544	1.84857	2.1957	6.9988	7.320
21	90	36	897	54	6.9995	
22	88	28	937	51	7.0003	
23	85	20	1.84976	48	11	
24	82	12	1.85016	45	18	
25	80	8.508 7504	056	42	26	
26	77	8.508 7495	096	39	34	
27	74	87	136	36	41	
28	71	79	176	33	49	
29	69	71	216	29	57	
30	8.508 4166	8.508 7462	1.85256	2.1926	7.0064	
31	63	54	296	23	72	
32	60	46	336	20	80	
33	58	38	376	17	88	
34	55	30	416	14	7.0095	
35	52	22	456	11	7.0103	
36	50	14	497	08	11	
37	47	8.508 7406	537	04	19	
38	44	8.508 7398	577	2.1901	26	
39	42	90	618	2.1898	34	
40	8.508 4139	8.508 7382	1.85658	2.1895	7.0142	7.307
41	36	74	698	92	50	
42	34	66	739	89	57	
43	31	58	779	85	65	
44	28	50	819	82	73	
45	26	42	860	79	81	
46	23	34	900	76	88	
47	20	26	941	73	7.0196	
48	18	18	1.85981	70	7.0204	
49	15	10	1.86022	66	12	
50	8.508 4112	8.508 7302	1.86063	2.1863	7.0220	
51	10	8.508 7294	103	60	27	
52	07	86	144	57	35	
53	04	77	185	54	43	
54	8.508 4101	69	225	50	51	
55	8.508 4099	61	266	47	59	
56	96	53	307	44	67	
57	93	45	348	41	75	
58	91	38	389	38	82	
59	88	30	430	34	90	
60	8.508 4086	8.508 7222	1.86470	2.1831	7.0298	7.293

TABLE 23.—*Geodetic position computations*—Continued.

LATITUDE 71°.

Lat.	log A diff. 1″=−0.04	log B diff. 1″=−0.13	log C diff. 1″=+0.70	log D diff. 1″=−0.05	log E diff. 1″=+0.13	log F diff. 10″=−7.2
° ′						
71 00	8.508 4086	8.508 7222	1.86470	2.1831	7.0298	7.293
1	83	14	511	28	7.0306	
2	80	8.508 7206	552	25	14	
3	78	8.508 7198	593	21	22	
4	75	90	634	18	30	
05	72	82	675	15	38	
6	70	74	717	12	46	
7	67	66	758	08	54	
8	64	58	799	05	62	
9	62	50	840	2.1802	70	
10	8.508 4059	8.508 7142	1.86881	2.1799	7.0378	
11	57	34	923	95	85	
12	54	27	1.86964	92	7.0393	
13	51	19	1.87005	89	7.0401	
14	49	11	046	86	09	
15	46	8.508 7103	088	82	17	
16	43	8.508 7095	129	79	25	
17	41	87	171	76	33	
18	38	79	212	72	41	
19	36	72	254	69	49	
20	8.508 4033	8.508 7064	1.87295	2.1766	7.0457	7.279
21	30	56	337	62	65	
22	28	48	378	59	73	
23	25	40	420	56	82	
24	23	33	462	52	90	
25	20	25	503	49	7.0498	
26	17	17	545	46	7.0506	
27	15	09	587	42	14	
28	12	8.508 7002	629	39	22	
29	10	8.508 6994	671	36	30	
30	8.508 4007	8.508 6986	1.87712	2.1732	7.0538	
31	05	78	754	29	46	
32	8.508 4002	71	796	26	54	
33	8.508 3999	63	838	22	62	
34	97	55	880	19	70	
35	94	47	922	16	79	
36	92	40	1.87964	12	87	
37	89	32	1.88006	09	7.0595	
38	86	24	049	06	7.0603	
39	84	16	091	2.1702	11	
40	8.508 3981	8.508 6908	1.88133	2.1699	7.0619	7.265
41	79	8.508 6901	175	95	27	
42	76	8.508 6893	217	92	36	
43	74	85	260	89	44	
44	71	78	302	85	52	
45	68	70	344	82	60	
46	66	62	387	78	68	
47	63	55	429	75	77	
48	61	47	472	72	85	
49	58	40	514	68	7.0693	
50	8.508 3956	8.508 6832	1.88557	2.1665	7.0701	
51	53	24	599	61	09	
52	51	17	642	58	18	
53	48	09	685	54	26	
54	46	8.508 6802	727	51	34	
55	43	8.508 6794	770	48	42	
56	41	86	813	44	51	
57	38	79	855	41	59	
58	36	71	898	37	67	
59	33	64	941	34	75	
60	8.508 3930	8.508 6756	1.88984	2.1630	7.0784	7.250

Table of values of log sec ½ ($\Delta\varphi$).

$\Delta\varphi$	log sec ½ ($\Delta\varphi$)	$\Delta\varphi$	log sec ½ ($\Delta\varphi$)	$\Delta\varphi$	log sec ½ ($\Delta\varphi$)	$\Delta\varphi$	log sec ½ ($\Delta\varphi$)	$\Delta\varphi$	log sec ½ ($\Delta\varphi$)
′		′		′		′		′	
10	0.000 000	28	0.000 004	46	0.000 010	64	0.000 019	82	0.000 031
11	1	29	4	47	10	65	19	83	32
12	1	30	4	48	11	66	20	84	32
13	1	31	4	49	11	67	21	85	33
14	1	32	5	50	11	68	21	86	34
15	1	33	5	51	12	69	22	87	35
16	1	34	5	52	12	70	22	88	36
17	1	35	6	53	13	71	23	89	36
18	1	36	6	54	13	72	24	90	37
19	2	37	6	55	14	73	24	91	38
20	2	38	7	56	14	74	25	92	39
21	2	39	7	57	15	75	26	93	40
22	2	40	7	58	15	76	26	94	41
23	2	41	8	59	16	77	27	95	41
24	3	42	8	60	16	78	28	96	42
25	3	43	8	61	17	79	29	97	43
26	3	44	9	62	18	80	29	98	44
27	3	45	9	63	18	81	30	99	45

To convert:				To convert:			
Meters to feet.		Feet to meters.		Kilometers to statute miles.		Statute miles to kilometers.	
1 =	3.280 833	1 =	0.304 8006	1 =	0.621 3699	1 =	1.609 347
2	6.561 667	2	0.609 6012	2	1.242 7399	2	3.218 694
3	9.842 500	3	0.914 4018	3	1.864 1098	3	4.828 042
4	13.123 333	4	1.219 2024	4	2.485 4798	4	6.437 389
5	16.404 166	5	1.524 0030	5	3.106 8497	5	8.046 736
6	19.685 000	6	1.828 8037	6	3.728 2196	6	9.656 083
7	22.965 833	7	2.133 6043	7	4.349 5896	7	11.265 430
8	26.246 666	8	2.438 4049	8	4.970 9595	8	12.874 778
9	29.527 500	9	2.743 2055	9	5.592 3295	9	14.484 125

Table of corrections to longitude for difference in arc and sine.

log s (−)	log difference.	log $\Delta\lambda$ (+)	log s (−)	log difference.	log $\Delta\lambda$ (+)	log s (−)	log difference.	log $\Delta\lambda$ (+)
3.876	0.000 0001	2.385	4.871	0.000 0098	3.380	5.172	0.000 0392	3.681
4.026	02	2.535	4.882	103	3.391	5.178	402	3.687
4.114	03	2.623	4.892	108	3.401	5.183	412	3.692
4.177	04	2.686	4.903	114	3.412	5.188	422	3.697
4.225	05	2.734	4.913	119	3.422	5.193	433	3.702
4.265	06	2.774	4.922	124	3.431	5.199	443	3.708
4.298	07	2.807	4.932	130	3.441	5.204	453	3.713
4.327	08	2.836	4.941	136	3.450	5.209	464	3.718
4.353	09	2.862	4.950	142	3.459	5.214	474	3.723
4.376	10	2.885	4.959	147	3.468	5.219	486	3.728
4.396	11	2.905	4.968	153	3.477	5.223	497	3.732
4.415	12	2.924	4.976	160	3.485	5.228	508	3.737
4.433	13	2.942	4.985	166	3.494	5.233	519	3.742
4.449	14	2.958	4.993	172	3.502	5.238	530	3.747
4.464	15	2.973	5.002	179	3.511	5.242	541	3.751
4.478	16	2.987	5.010	186	3.519	5.247	553	3.756
4.491	17	3.000	5.017	192	3.526	5.251	565	3.760
4.503	18	3.012	5.025	199	3.534	5.256	577	3.765
4.526	20	3.035	5.033	206	3.542	5.260	588	3.769
4.548	23	3.057	5.040	213	3.549	5.265	600	3.774
4.570	25	3.079	5.047	221	3.556	5.269	613	3.778
4.591	27	3.100	5.054	228	3.563	5.273	625	3.782
4.612	30	3.121	5.062	236	3.571	5.278	637	3.787
4.631	33	3.140	5.068	243	3.577	5.282	650	3.791
4.649	36	3.158	5.075	251	3.584	5.286	663	3.795
4.667	39	3.176	5.082	259	3.591	5.290	674	3.799
4.684	42	3.193	5.088	267	3.597	5.294	687	3.803
4.701	45	3.210	5.095	275	3.604	5.299	702	3.808
4.716	48	3.225	5.102	284	3.611	5.303	716	3.812
4.732	52	3.241	5.108	292	3.617	5.307	729	3.816
4.746	56	3.255	5.114	300	3.623	5.311	743	3.820
4.761	59	3.270	5.120	309	3.629	5.315	757	3.824
4.774	63	3.283	5.126	318	3.635	5.319	771	3.828
4.788	67	3.297	5.132	327	3.641	5.323	785	3.832
4.801	71	3.310	5.138	336	3.647	5.327	800	3.836
4.813	75	3.322	5.144	345	3.653	5.331	814	3.840
4.825	80	3.334	5.150	354	3.659	5.335	829	3.844
4.834	84	3.343	5.156	364	3.665	5.339	845	3.848
4.849	89	3.358	5.161	373	3.670	5.343	861	3.852
4.860	94	3.369	5.167	383	3.676	5.347	877	3.856

INVERSE SOLUTION.

Having Latitudes and Longitudes of Two Points to Compute Azimuths and Distances.

The following example shows the method of performing the operation. The northernmost point should be used as the initial position, then all signs for (I), (II), and (III) are +, and for (IV) −. The value of $\Delta\lambda$ may be either + or −, but this sign need only be used in determining in which quadrant the azimuth angle α falls, i. e., the sign of tan α (12). An inspection of a rough plat of the positions will also determine this. The correction to $\Delta\lambda$ is found from a distance scaled off from the plat, and need not be very close. In (8) the term $(\mathrm{I}+\mathrm{II})^2$ is the square of the difference of latitude $\Delta\varphi$ in seconds. Since (IV) is always small, log (I) in (8) may be taken as log of $\Delta\varphi$ from (1). If cos α is smaller than sin α, find s from log s cos α in (11). As a check on the work compute the second position, using distance and azimuth found as above. The order of solution is shown by figures in parentheses. The cosines of latitudes are proportional to the intercepted parallels.

Latitude $= \varphi = 38^\circ\ 23'\ 27''.00$ Given.
$\varphi' = 37\ \ 45\ \ 09\ \ .30$ Given.

$\Delta\varphi = 38'\ 17''\ .70$
$= 2297''.70$ (1)
$\log \Delta\varphi = 3.3612933$
$\log C = 1.30360$
$\log S^2 \sin^2\alpha = 8.75770$

log (II) 0.06130 (7)
(II) $= 1''.152$
$\log D = 2.3812$
$\log (I + II)^2 = 6.7226$

log (III) 9.1038 (8)
III $= 0''.13$
$\log E = 6.0711$
$\log S^2 \sin^2\alpha = 8.7577$
$\log I = 3.3613$

$\log IV = 8.1901$ (9)
$IV = -''.02$
(II) $= +1.15''$
(III) $= +0.13$
IV $= -\ .02$

Sum $= +1.26''$ (10)
$\Delta\varphi = 2297.70$

(I) $= 2296.44$

Longitude $= \lambda = 104^\circ\ 32'\ 48''.20$ Given
$\lambda' = 104\ \ 49\ \ 05\ \ .50$ Given

$\Delta\lambda = 16'\ 17''.30 +$
$= 977''.30 +$ (2)
$\log \Delta\lambda = 2.9900279$
$\log \Delta\lambda$ correction $= +16$
log S (scaled distance) correction $= -99$
(apply with opposite sign) $-\overline{83}$ (3)
$\log \Delta\lambda' = 2.9900362$ (4)

$\log A' = 8.5091750$ (5)
$\text{Sec}\ \varphi' = 0.1020092$

8.6111842 (+)
$\log \Delta\lambda' = 2.9900362$ (+)

$\log S \sin\alpha = 4.3788520$ (+) (6)
$\log S \cos\alpha = 4.8500742$ (+) (11)

$\dfrac{\sin\alpha}{\cos\alpha} = \tan\alpha = 9.5287778$ (12)
log (I) $= 3.3610475$
log (B) $= 8.5109733$

$\log S \cos\alpha = 4.8500742$ (11)
Azimuth $= \alpha = 18^\circ\ 40'\ 10''.8$ (13)
$\log S \sin\alpha = 4.3788520$
$\log \sin\alpha = 9.5053013$

log distance $= \log S = 4.8735507$ (14)

TABLE 24.—*Log m, for use in computing spherical excess.*

[Computed for the Clarke spheroid of 1866.]

Lat.	Log m.	Lat.	Log m.	Lat.	Log m.
° ′		° ′		° ′	
0 00	1.40695	25 00	1.40590	50 00	1.40349
0 30	1.40695	25 30	1.40586	50 30	1.40344
1 00	1.40695	26 00	1.40582	51 00	1.40339
1 30	1.40694	26 30	1.40578	51 30	1.40334
2 00	1.40694	27 00	1.40573	52 00	1.40329
2 30	1.40694	27 30	1.40569	52 30	1.40324
3 00	1.40693	28 00	1.40565	53 00	1.40319
3 30	1.40693	28 30	1.40560	53 30	1.40314
4 00	1.40692	29 00	1.40556	54 00	1.40309
4 30	1.40691	29 30	1.40552	54 30	1.40304
5 00	1.40690	30 00	1.40548	55 00	1.40299
5 30	1.40689	30 30	1.40544	55 30	1.40295
6 00	1.40688	31 00	1.40539	56 00	1.40290
6 30	1.40687	31 30	1.40534	56 30	1.40285
7 00	1.40686	32 00	1.40530	57 00	1.40280
7 30	1.40685	32 30	1.40525	57 30	1.40276
8 00	1.40683	33 00	1.40520	58 00	1.40271
8 30	1.40682	33 30	1.40516	58 30	1.40266
9 00	1.40680	34 00	1.40511	59 00	1.40262
9 30	1.40679	34 30	1.40506	59 30	1.40257
10 00	1.40677	35 00	1.40501	60 00	1.40253
10 30	1.40675	35 30	1.40496	60 30	1.40249
11 00	1.40673	36 00	1.40491	61 00	1.40244
11 30	1.40671	36 30	1.40486	61 30	1.40240
12 00	1.40669	37 00	1.40482	62 00	1.40235
12 30	1.40667	37 30	1.40477	62 30	1.40231
13 00	1.40665	38 00	1.40472	63 00	1.40227
13 30	1.40663	38 30	1.40467	63 30	1.40223
14 00	1.40660	39 00	1.40462	64 00	1.40219
14 30	1.40658	39 30	1.40457	64 30	1.40215
15 00	1.40655	40 00	1.40452	65 00	1.40210
15 30	1.40653	40 30	1.40446	65 30	1.40207
16 00	1.40650	41 00	1.40441	66 00	1.40203
16 30	1.40647	41 30	1.40436	66 30	1.40199
17 00	1.40644	42 00	1.40431	67 00	1.40195
17 30	1.40642	42 30	1.40426	67 30	1.40192
18 00	1.40639	43 00	1.40421	68 00	1.40188
18 30	1.40636	43 30	1.40416	68 30	1.40185
19 00	1.40632	44 00	1.40411	69 00	1.40181
19 30	1.40629	44 30	1.40406	69 30	1.40178
20 00	1.40626	45 00	1.40400	70 00	1.40174
20 30	1.40623	45 30	1.40395	70 30	1.40171
21 00	1.40619	46 00	1.40390	71 00	1.40168
21 30	1.40616	46 30	1.40385	71 30	1.40164
22 00	1.40612	47 00	1.40380	72 00	1.40161
22 30	1.40608	47 30	1.40375		
23 00	1.40605	48 00	1.40369		
23 30	1.40601	48 30	1.40364		
24 00	1.40597	49 00	1.40359		
24 30	1.40594	49 30	1.40354		

APPROXIMATE SPHERICAL EXCESS.

This may be obtained by dividing the area of the triangle in square miles by 75.5.

Table 25.—*Mean refraction.*

Apparent altitude.	Refraction.		Apparent altitude.	Refraction.		Apparent altitude.	Refraction.		Apparent altitude.	Refraction.		Apparent altitude.	Refraction.	
° ′	′ ″	″	° ′	′ ″	″	° ′	′ ″	″	° ′	′ ″	″	°	″	″
0 0	34 54.1	124.9	7 0	7 19.7	9.2	14 0	3 47.4	5.3	28 0	1 48.2	1.5	42	64.0	2.2
10	32 49.2	116.9	10	7 10.5	8.8	20	3 42.1	5.1	20	1 46.7	1.4	43	61.8	2.1
20	30 52.3	108.8	20	7 1.7	8.4	40	3 37.0	4.9	40	1 45.3	1.5	44	59.7	2.0
30	29 3.5	100.8	30	6 53.3	8.2	15 0	3 32.1	4.7	29 0	1 43.8	1.4	45	57.7	2.0
40	27 22.7	92.9	40	6 45.1	7.9	20	3 27.4	4.5	20	1 42.4	1.4	46	55.7	1.9
50	25 49.8	85.2	50	6 37.2	7.6	40	3 22.9	4.3	40	1 41.0	1.3	47	53.8	1.9
1 0	24 24.6	77.9	8 0	6 29.6	7.3	16 0	3 18.6	4.1	30 0	1 39.7	1.3	48	51.9	1.7
10	23 6.7	71.1	10	6 22.3	7.1	20	3 14.5	4.0	20	1 38.4	1.3	49	50.2	1.8
20	21 55.6	64.7	20	6 15.2	6.8	40	3 10.5	3.9	40	1 37.1	1.3	50	48.4	1.7
30	20 50.9	59.0	30	6 8.4	6.6	17 0	3 6.6	3.7	31 0	1 35.8	1.3	51	46.7	1.6
40	19 51.9	53.9	40	6 1.8	6.4	20	3 2.9	3.6	20	1 34.5	1.2	52	45.1	1.6
50	18 58.0	49.4	50	5 55.4	6.1	40	2 59.3	3.5	40	1 33.3	1.2	53	43.5	1.6
2 0	18 8.6	45.6	9 0	5 49.3	6.0	18 0	2 55.8	3.3	32 0	1 32.1	1.2	54	41.9	1.5
10	17 23.0	42.3	10	5 43.3	5.7	20	2 52.5	3.2	20	1 30.9	1.1	55	40.4	1.5
20	16 40.7	39.8	20	5 37.6	5.6	40	2 49.3	3.2	40	1 29.8	1.1	56	38.9	1.4
30	16 0.9	37.5	30	5 32.0	5.5	19 0	2 46.1	3.0	33 0	1 28.7	1.1	57	37.5	1.4
40	15 23.4	35.6	40	5 26.5	5.2	20	2 43.1	2.9	20	1 27.6	1.1	58	36.1	1.4
50	14 47.8	33.2	50	5 21.3	5.1	40	2 40.2	2.9	40	1 26.5	1.1	59	34.7	1.4
3 0	14 14.6	30.9	10 0	5 16.2	5.0	20 0	2 37.3	2.8	34 0	1 25.4	1.1	60	33.3	1.3
10	13 43.7	28.7	10	5 11.2	4.8	20	2 34.5	2.6	20	1 24.3	1.0	61	32.0	1.3
20	13 15.0	26.7	20	5 6.4	4.7	40	2 31.9	2.6	40	1 23.3	1.0	62	30.7	1.3
30	12 48.3	24.6	30	5 1.7	4.5	21 0	2 29.3	2.5	35 0	1 22.3	1.0	63	29.4	1.2
40	12 23.7	23.0	40	4 57.2	4.4	20	2 26.8	2.5	20	1 21.3	1.0	64	28.2	1.3
50	12 0.7	21.8	50	4 52.8	4.3	40	2 24.3	2.4	40	1 20.3	1.0	65	26.9	1.2
4 0	11 38.9	20.6	11 0	4 48.5	4.2	22 0	2 21.9	2.3	36 0	1 19.3	1.0	66	25.7	1.2
10	11 18.3	19.7	10	4 44.3	4.1	20	2 19.6	2.2	20	1 18.3	0.9	67	24.5	1.2
20	10 58.6	19.0	20	4 40.2	3.9	40	2 17.4	2.2	40	1 17.4	0.9	68	23.3	1.1
30	10 39.6	18.4	30	4 36.3	3.9	23 0	2 15.2	2.2	37 0	1 16.5	0.9	69	22.2	1.2
40	10 21.2	17.9	40	4 32.4	3.7	20	2 13.0	2.1	20	1 15.6	0.9	70	21.0	1.1
50	10 3.3	16.8	50	4 28.7	3.7	40	2 10.9	2.0	40	1 14.7	0.9	71	19.9	1.1
5 0	9 46.5	15.6	12 0	4 25.0	3.6	24 0	2 8.9	1.9	38 0	1 13.8	0.9	72	18.8	1.1
10	9 30.9	14.9	10	4 21.4	3.4	20	2 7.0	1.9	20	1 12.9	0.9	73	17.7	1.1
20	9 16.0	14.1	20	4 18.0	3.4	40	2 5.1	1.9	40	1 12.0	0.8	74	16.6	1.1
30	9 1.9	13.5	30	4 14.6	3.3	25 0	2 3.2	1.8	39 0	1 11.2	0.9	75	15.5	1.0
40	8 48.4	12.8	40	4 11.3	3.2	20	2 1.4	1.8	20	1 10.3	0.8	76	14.5	1.1
50	8 35.6	12.3	50	4 8.1	3.2	40	1 59.6	1.8	40	1 9.5	0.8	77	13.4	1.1
6 0	8 23.3	11.7	13 0	4 4.9	3.1	26 0	1 57.8	1.7	40 0	1 8.7	0.8	78	12.3	1.1
10	8 11.6	11.3	10	4 1.8	3.0	20	1 56.1	1.7	20	1 7.9	0.8	79	11.2	1.0
20	8 0.3	10.8	20	3 58.8	2.9	40	1 54.4	1.6	40	1 7.1	0.8	80	10.2	1.1
30	7 49.5	10.3	30	3 55.9	2.9	27 0	1 52.8	1.6	41 0	1 6.3	0.8	81	9.1	1.0
40	7 39.2	10.0	40	3 53.0	2.8	20	1 51.2	1.5	20	1 5.5	0.8	82	8.1	4.0
50	7 29.2	9.5	50	3 50.2	2.8	40	1 49.7	1.5	40	1 4.7	0.7	86	4.1	4.1
7 0	7 19.7		14 0	3 47.4		28 0	1 48.2		42 0	1 4.0		90	0.0	

TABLE 26.—*Corrections for curvature and refraction, in feet=0.574 (distance, miles)*^{2}.

[Difference in feet between the apparent and true level at distances varying from 1 to 66 miles.]

Distance, miles.	Difference in feet for—			Distance, miles.	Difference in feet for—		
	Curvature.	Refraction.	Curvature and refraction.		Curvature.	Refraction.	Curvature and refraction.
1	0.7	0.1	0.6	34	771.3	108.0	663.3
2	2.7	0.4	2.3	35	817.4	114.4	703.0
3	6.0	0.8	5.2	36	864.8	121.1	743.7
4	10.7	1.5	9.2	37	913.5	127.9	785.6
5	16.7	2.3	14.4	38	963.5	134.9	828.6
6	24.0	3.4	20.6	39	1,014.9	142.1	872.8
7	32.7	4.6	28.1	40	1,067.6	149.5	918.1
8	42 7	6.0	36.7	41	1,121.7	157.0	964.7
9	54.0	7.6	46.4	42	1,177.0	164.8	1,012.2
10	66.7	9.3	57.4	43	1,233.7	172.7	1,061.0
11	80.7	11.3	69.4	44	1,291.8	180.8	1,111.0
12	96.1	13.4	82.7	45	1,351.2	189.2	1,162.0
13	112.8	15.8	97.0	46	1,411.9	197.7	1,214.2
14	130.8	18.3	112.5	47	1,474.0	206.3	1,267.7
15	150.1	21.0	129.1	48	1,537.3	215 2	1,322.1
16	170.8	23.9	146.9	49	1,602.0	224.3	1,377.7
17	192.8	27.0	165.8	50	1,668.1	233.5	1,434.6
18	216.2	30.3	185.9	51	1,735.5	243.0	1,492.5
19	240.9	33.7	207.2	52	1,804.2	252.6	1,551.6
20	266.9	37.4	229.5	53	1,874.3	262.4	1,611.9
21	294.3	41.2	253.1	54	1,945.7	272.4	1,673.3
22	322.9	45.2	277.7	55	2,018.4	282.6	1,735.8
23	353.0	49.4	303.6	56	2,092.5	292.9	1,799.6
24	384.3	53.8	330.5	57	2,167.9	303.5	1,864.4
25	417.0	58.4	358.6	58	2,244.6	314.2	1,930.4
26	451.1	63.1	388.0	59	2,322.7	325.2	1,997.5
27	486.4	68.1	418.3	60	2,402.1	336.3	2,065.8
28	523.1	73.2	449.9	61	2,482.8	347.6	2,135.2
29	561.2	78.6	482.6	62	2,564.9	359.1	2,205.8
30	600.5	84.1	516.4	63	2,648.3	370.8	2,277.5
31	641.2	89.8	551.4	64	2,733.0	382.6	2,350.4
32	683.3	95.7	587.6	65	2,819.1	394.7	2,424.4
33	726.6	101.7	624.9	66	2,906.5	406.9	2,499.6

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TABLE 27.—FOR OBTAINING DIFFERENCES OF ALTITUDE FOR ANY MINUTE UP TO 15 DEGREES, AND FOR ANY DISTANCE.

[Prepared by Arthur P. Davis.]

EXPLANATION OF TABLE.

The left-hand column is the minutes of the vertical angle, the degrees being denoted by the large number at top of page. The bold-face figures at top of column is the distance in miles. Numbers in the body of the table denote the difference of elevation corresponding to the angle on the left and the distance at top. The correction for curvature, refraction, and height of instrument is always plus; it therefore increases the difference of level for angles of elevation, and is subtracted from the difference of level for angles of depression.

Example.—Required the difference of altitude corresponding to a vertical angle of $+ 9° 18'$ at a distance of 3.628 miles. On page 284 the tabular number corresponding to $9° 18'$ and—

	Feet.
A distance of 3 miles is	2,594
For a distance of 6 miles is 5,188—for 0.6 is therefore	519
For a distance of 2 miles is 1,729—for 0.02 is therefore	17
For a distance of 8 miles is 6,917—for 0.008 is therefore	7
Correction for curvature, refraction, and height of instrument for 3.6 miles is +	12
Total difference of altitude	+ 3,149

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

0°

	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
′										*Miles.*	*Feet.*	*Miles.*	*Feet.*
1	1.5	3.1	5	6	8	9	11	12	14				
2	3.1	6.1	9	12	15	18	22	25	28	1.6	6	10.2	64
3	4.6	9.2	14	18	23	28	32	37	41	2.1	7	10.3	65
4	6.1	12.3	18	25	31	37	43	49	55	2.5	8	10.4	67
5	7.7	15.4	23	31	38	46	54	61	69	2.8	9	10.5	68
6	9.2	18.4	28	37	46	55	65	74	83	3.1	10	10.6	69
7	10.8	21.5	32	43	54	65	75	86	97	3.4	11	10.7	70
8	12.3	24.6	37	49	61	74	86	98	111	3.6	12	10.8	71
9	13.8	27.6	41	55	69	83	97	111	124	3.8	13	10.9	73
10	15.4	30.7	46	61	77	92	108	123	138	4.1	14	11.0	74
11	16.9	33.8	51	68	84	101	118	135	152	4.3	15	11.1	75
12	18.4	36.9	55	74	92	111	129	147	166	4.5	16	11.2	77
13	20.0	39.9	60	80	100	120	140	160	180	4.7	17	11.3	78
14	21.5	43.0	65	86	108	129	151	172	194	4.8	18	11.4	79
15	23.0	46.1	69	92	115	138	161	184	207	5.0	19	11.5	80
16	24.6	49.1	74	98	123	147	172	197	221	5.2	20	11.6	82
17	26.1	52.2	78	104	131	157	183	209	235	5.4	21	11.7	83
18	27.6	55.3	83	111	138	166	194	221	249	5.5	22	11.8	84
19	29.2	58.4	88	117	146	175	204	233	263	5.7	23	11.9	86
20	30.7	61.4	92	123	154	184	215	246	276	5.8	24	12.0	87
21	32.3	64.5	97	129	161	194	226	258	290	6.0	25	12.1	89
22	33.8	67.6	101	135	169	203	237	270	304	6.1	26	12.2	90
23	35.3	70.7	106	141	177	212	247	283	318	6.3	27	12.3	91
24	36.9	73.7	111	147	184	221	258	295	332	6.4	28	12.4	93
25	38.4	76.8	115	154	192	230	269	307	346	6.5	29	12.5	94
26	39.9	79.9	120	160	200	240	280	319	359	6.7	30	12.6	96
27	41.5	82.9	124	166	207	249	290	332	373	6.8	31	12.7	97
28	43.0	86.0	129	172	215	258	301	344	387	6.9	32	12.8	99
29	44.5	89.1	134	178	223	267	312	356	401	7.0	33	12.9	100
30	46.1	92.2	138	184	230	276	323	369	415	7.2	34	13.0	102
31	47.6	95.2	143	190	238	286	333	381	429	7.3	35	13.1	103
32	49.2	98.3	147	197	246	295	344	393	442	7.4	36	13.2	105
33	50.7	101.4	152	203	253	304	355	405	456	7.5	37	13.3	106
34	52.2	104.4	157	209	261	313	366	418	470	7.6	38	13.4	108
35	53.8	107.5	161	215	269	323	376	430	484	7.8	39	13.5	109
36	55.3	110.6	166	221	276	332	387	442	498	7.9	40	13.6	111
37	56.8	113.7	170	227	284	341	398	456	512	8.0	41	13.7	112
38	58.4	116.7	175	233	292	350	409	467	525	8.1	42	13.8	114
39	59.9	119.8	180	240	300	359	419	479	539	8.2	43	13.9	115
40	61.4	122.9	184	246	307	369	430	492	553	8.3	44	14.0	117
41	63.0	125.9	189	252	315	378	441	504	567	8.4	45	14.1	119
42	64.5	129.0	194	258	323	387	452	516	581	8.5	46	14.2	120
43	66.0	132.1	198	264	330	396	462	528	594	8.6	47	14.3	122
44	67.6	135.2	203	270	338	405	473	541	608	8.7	48	14.4	124
45	69.1	138.2	207	276	346	415	484	553	622	8.8	49	14.5	125
46	70.6	141.3	212	283	353	424	495	565	636	8.9	50	14.6	127
47	72.2	144.4	217	289	361	433	505	578	650	9.0	51	14.7	129
48	73.7	147.5	221	295	369	442	516	590	664	9.1	52	14.8	130
49	75.3	150.5	226	301	376	452	527	602	677	9.2	53	14.9	132
50	76.8	153.6	230	307	384	461	538	614	691	9.3	54	15.0	134
51	78.3	156.7	235	313	392	470	548	627	705	9.4	55	15.1	135
52	79.9	159.7	240	319	399	479	559	639	719	9.5	56	15.2	137
53	81.4	162.8	244	326	407	488	570	651	733	9.6	58	15.3	139
54	82.9	165.9	249	332	415	498	581	664	747	9.7	59	15.4	141
55	84.5	169.0	253	338	422	507	591	676	760	9.8	60	15.5	142
56	86.0	172.0	258	344	430	516	602	688	774	9.9	61	15.6	144
57	87.5	175.1	263	350	438	525	613	700	788	10.0	62	15.7	146
58	89.1	178.2	267	356	445	535	624	713	802	10.1	63	15.8	148
59	90.6	181.3	272	363	453	544	634	725	816			15.9	150
												16.0	151
60	92.2	184.3	276	369	461	553	645	737	829				

[a] For all distances under 1.6 miles the correction may be taken as +5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

1°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
										Miles.	*Feet.*	*Miles.*	*Feet.*
0	92.2	184.3	276	369	461	553	645	737	829	16.1	153	22.1	285
1	93.7	187.4	281	375	468	562	656	750	843	16.2	155	22.2	287
2	95.2	190.5	286	381	476	571	667	762	857	16.3	157	22.3	290
3	96.8	193.5	290	387	484	581	677	774	871	16.4	159	22.4	293
4	98.3	196.6	295	393	492	590	688	786	885	16.5	161	22.5	295
5	99.8	199.7	300	399	499	599	699	799	899	16.6	163	22.6	298
6	101.4	202.8	304	406	507	608	710	811	912	16.7	165	22.7	300
7	102.9	205.8	309	412	515	618	720	823	926	16.8	167	22.8	303
8	104.4	208.9	313	418	522	627	731	836	940	16.9	168	22.9	306
9	106.0	212.0	318	424	530	636	742	848	954	17.0	170	23.0	308
10	107.5	215.1	323	430	538	645	753	860	968	17.1	172	23.1	311
11	109.1	218.1	327	436	545	654	763	873	982	17.2	174	23.2	313
12	110.6	221.2	332	442	553	664	774	885	995	17.3	176	23.3	316
13	112.1	224.3	336	449	561	673	785	897	1,009	17.4	178	23.4	319
14	113.7	227.3	341	455	568	682	796	909	1,023	17.5	180	23.5	321
15	115.2	230.4	346	461	576	691	806	922	1,037	17.6	182	23.6	324
16	116.7	233.5	350	467	584	700	817	934	1,051	17.7	184	23.7	327
17	118.3	236.6	355	473	591	710	828	946	1,065	17.8	186	23.8	330
18	119.8	239.6	359	479	599	719	839	959	1,078	17.9	188	23.9	332
19	121.4	242.7	364	485	607	728	849	971	1,092	18.0	190	24.0	335
20	122.9	245.8	369	492	614	737	860	983	1,106	18.1	193	24.1	338
21	124.4	248.9	373	498	622	747	871	995	1,120	18.2	195	24.2	341
22	126.0	251.9	378	504	630	756	882	1,008	1,134	18.3	197	24.3	343
23	127.5	255.0	383	510	638	765	893	1,020	1,148	18.4	199	24.4	346
24	129.0	258.1	387	516	645	774	903	1,032	1,161	18.5	201	24.5	349
25	130.6	261.2	392	522	653	783	914	1,045	1,175	18.6	203	24.6	352
26	132.1	264.2	396	528	661	793	925	1,057	1,189	18.7	205	24.7	355
27	133.6	267.3	401	535	668	802	936	1,069	1,203	18.8	207	24.8	358
28	135.2	270.4	406	541	676	811	946	1,082	1,217	18.9	210	24.9	360
29	136.7	273.5	410	547	684	820	957	1,094	1,231	19.0	212	25.0	363
30	138.3	276.5	415	553	691	830	968	1,106	1,244	19.1	214	25.1	366
31	139.8	279.6	419	559	699	839	979	1,118	1,258	19.2	216	25.2	369
32	141.3	282.7	424	565	707	848	989	1,131	1,272	19.3	218	25.3	372
33	142.9	285.7	429	571	714	857	1,000	1,143	1,286	19.4	221	25.4	375
34	144.4	288.8	433	578	722	866	1,011	1,155	1,300	19.5	223	25.5	378
35	146.0	291.9	438	584	730	876	1,022	1,168	1,314	19.6	225	25.6	381
36	147.5	295.0	442	590	737	885	1,032	1,180	1,327	19.7	227	25.7	384
37	149.0	298.0	447	596	745	894	1,043	1,192	1,341	19.8	230	25.8	387
38	150.6	301.1	452	602	753	903	1,054	1,204	1,355	19.9	232	25.9	390
39	152.1	304.2	456	608	760	913	1,065	1,217	1,369	20.0	234	26.0	393
40	153.6	307.3	461	615	768	922	1,075	1,229	1,383	20.1	236	26.2	399
41	155.2	310.3	466	621	776	931	1,086	1,241	1,397	20.2	239	26.4	405
42	156.7	313.4	470	427	784	940	1,097	1,254	1,410	20.3	241	26.6	411
43	158.2	316.5	475	633	791	949	1,108	1,266	1,424	20.4	243	26.8	417
44	159.8	319.6	479	639	799	959	1,118	1,278	1,438	20.5	246	27.0	423
45	161.3	322.6	484	645	807	968	1,129	1,291	1,452	20.6	248	27.2	429
46	162.9	325.7	489	651	814	977	1,140	1,303	1,466	20.7	250	27.4	435
47	164.4	328.8	493	658	822	986	1,151	1,315	1,480	20.8	253	27.6	442
48	165.9	331.9	498	664	830	996	1,162	1,327	1,493	20.9	255	27.8	448
49	167.5	334.9	502	670	837	1,005	1,172	1,340	1,507	21.0	258	28.0	455
50	169.0	338.0	507	676	845	1,014	1,183	1,352	1,521	21.1	260	28.2	461
51	170.6	341.1	512	682	853	1,023	1,194	1,364	1,535	21.2	262	28.4	467
52	172.1	344.2	516	688	860	1,032	1,205	1,377	1,549	21.3	265	28.6	474
53	173.6	347.2	521	694	868	1,042	1,215	1,389	1,563	21.4	267	28.8	480
54	175.2	350.3	525	701	876	1,051	1,226	1,401	1,576	21.5	270	29.0	487
55	176.7	353.4	530	707	883	1,060	1,237	1,414	1,590	21.6	272	29.2	494
56	178.2	356.5	535	713	891	1,069	1,248	1,426	1,604	21.7	275	29.4	501
57	179.8	359.5	539	719	899	1,079	1,258	1,438	1,618	21.8	277	29.6	507
58	181.3	362.6	544	725	907	1,088	1,269	1,450	1,632	21.9	280	29.8	514
59	182.8	365.7	549	731	914	1,097	1,280	1,465	1,643	22.0	282	30.0	521
60	184.4	368.8	553	738	922	1,106	1,291	1,475	1,659				

[a] For all distances under 1.6 miles the correction may be taken as +5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

2°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	184.4	368.8	553	738	922	1,106	1,291	1,475	1,659				
1	185.9	371.8	558	744	930	1,116	1,301	1,487	1,673	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	187.5	374.9	562	750	937	1,125	1,312	1,500	1,687	1.6	6	10.2	64
3	189.0	378.0	567	756	945	1,134	1,323	1,512	1,701	2.1	7	10.3	65
4	190.5	381.1	572	762	953	1,143	1,334	1,524	1,715	2.5	8	10.4	67
5	192.1	384.1	576	768	960	1,152	1,344	1,537	1,729	2.8	9	10.5	68
6	193.6	387.2	581	774	968	1,162	1,355	1,549	1,742	3.1	10	10.6	69
7	195.1	390.3	585	781	976	1,171	1,366	1,561	1,756	3.4	11	10.7	70
8	196.7	393.4	590	787	983	1,180	1,377	1,573	1,770	3.6	12	10.8	71
9	198.2	396.4	595	793	991	1,189	1,388	1,586	1,784	3.8	13	10.9	73
10	199.8	399.5	599	799	999	1,199	1,398	1,598	1,798	4.1	14	11.0	74
11	201.3	402.6	604	805	1,006	1,208	1,409	1,610	1,812	4.3	15	11.1	75
12	202.8	405.7	609	811	1,014	1,217	1,420	1,623	1,826	4.5	16	11.2	77
13	204.4	408.8	613	818	1,022	1,226	1,431	1,635	1,839	4.7	17	11.3	78
14	205.9	411.8	618	824	1,030	1,235	1,441	1,647	1,853	4.8	18	11.4	79
15	207.5	414.9	622	830	1,037	1,245	1,452	1,660	1,867	5.0	19	11.5	80
16	209.0	418.0	627	836	1,045	1,254	1,463	1,672	1,881	5.2	20	11.6	82
17	210.5	421.1	632	842	1,053	1,263	1,474	1,684	1,895	5.4	21	11.7	83
18	212.1	424.1	636	848	1,060	1,272	1,484	1,697	1,909	5.5	22	11.8	84
19	213.6	427.2	641	854	1,068	1,282	1,495	1,709	1,932	5.7	23	11.9	86
20	215.1	430.3	645	861	1,076	1,291	1,506	1,721	1,936	5.8	24	12.0	87
21	216.7	433.4	650	867	1,083	1,300	1,517	1,733	1,950	6.0	25	12.1	89
22	218.2	436.4	655	873	1,091	1,309	1,528	1,746	1,964	6.1	26	12.2	90
23	219.8	439.5	659	879	1,099	1,319	1,538	1,758	1,978	6.3	27	12.3	91
24	221.3	442.6	664	885	1,106	1,328	1,549	1,770	1,992	6.4	28	12.4	93
25	222.8	445.7	669	891	1,114	1,337	1,560	1,783	2,006	6.5	29	12.5	94
26	224.4	448.7	673	897	1,122	1,346	1,571	1,795	2,019	6.7	30	12.6	96
27	225.9	451.8	678	904	1,130	1,355	1,581	1,807	2,033	6.8	31	12.7	97
28	227.5	454.9	682	910	1,137	1,365	1,592	1,820	2,047	6.9	32	12.8	99
29	229.0	458.0	687	916	1,145	1,374	1,603	1,832	2,061	7.0	33	12.9	100
30	230.5	461.1	692	922	1,153	1,383	1,614	1,844	2,075	7.2	34	13.0	102
31	232.1	464.1	696	928	1,160	1,392	1,624	1,857	2,089	7.3	35	13.1	103
32	233.6	467.2	701	934	1,168	1,402	1,635	1,869	2,102	7.4	36	13.2	105
33	235.1	470.3	705	941	1,176	1,411	1,646	1,881	2,116	7.5	37	13.3	106
34	236.7	473.4	711	947	1,183	1,420	1,657	1,893	2,130	7.6	38	13.4	108
35	238.2	476.4	715	953	1,191	1,429	1,668	1,906	2,144	7.8	39	13.5	109
36	239.8	479.5	719	959	1,199	1,439	1,678	1,918	2,158	7.9	40	13.6	111
37	241.3	482.6	724	965	1,207	1,448	1,689	1,930	2,172	8.0	41	13.7	112
38	242.8	485.7	729	971	1,214	1,457	1,700	1,943	2,186	8.1	42	13.8	114
39	244.4	488.8	733	978	1,222	1,466	1,711	1,955	2,199	8.2	43	13.9	115
40	245.9	491.8	738	984	1,230	1,476	1,721	1,967	2,213	8.3	44	14.0	117
41	247.5	494.9	742	990	1,237	1,485	1,732	1,980	2,227	8.4	45	14.1	119
42	249.0	497.0	747	996	1,245	1,494	1,743	1,992	2,241	8.5	46	14.2	120
43	250.5	501.1	752	1,002	1,253	1,503	1,754	2,004	2,255	8.6	47	14.3	122
44	252.1	504.2	756	1,008	1,260	1,512	1,765	2,017	2,269	8.7	48	14.4	124
45	253.6	507.2	761	1,014	1,268	1,522	1,775	2,029	2,283	8.8	49	14.5	125
46	255.2	510.3	765	1,021	1,276	1,531	1,786	2,041	2,296	8.9	50	14.6	127
47	256.7	513.4	770	1,027	1,283	1,540	1,797	2,054	2,310	9.0	51	14.7	129
48	258.2	516.5	775	1,033	1,291	1,549	1,808	2,066	2,324	9.1	52	14.8	130
49	259.8	519.5	779	1,039	1,299	1,559	1,818	2,078	2,338	9.2	53	14.9	132
50	261.3	522.6	784	1,045	1,307	1,568	1,829	2,091	2,352	9.3	54	15.0	134
51	262.9	525.7	789	1,051	1,314	1,577	1,840	2,103	2,366	9.4	55	15.1	135
52	264.4	528.8	793	1,058	1,322	1,586	1,851	2,115	2,380	9.5	56	15.2	137
53	265.9	531.9	798	1,064	1,330	1,596	1,862	2,127	2,393	9.6	58	15.3	139
54	267.5	534.9	802	1,070	1,337	1,605	1,872	2,140	2,407	9.7	59	15.4	141
55	269.0	538.0	807	1,076	1,345	1,614	1,883	2,152	2,421	9.8	60	15.5	142
56	270.6	541.1	812	1,082	1,353	1,623	1,894	2,164	2,435	9.9	61	15.6	144
57	272.1	544.2	816	1,088	1,360	1,633	1,905	2,177	2,449	10.0	52	15.7	146
58	273.6	547.3	821	1,095	1,368	1,642	1,915	2,189	2,463	10.1	63	15.8	148
59	275.2	550.3	826	1,101	1,376	1,651	1,926	2,201	2,477			15.9	150
												16.0	151
60	276.7	553.4	830	1,107	1,384	1,660	1,937	2,214	2,490				

[a] For all distances under 1.6 miles the correction may be taken as +5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

3°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]	
0	276.7	553.4	830	1,107	1,384	1,660	1,937	2,214	2,490	*Miles.*	*Feet.*
1	278.3	556.5	835	1,113	1,391	1,670	1,948	2,226	2,504	10.1	63
2	279.8	559.6	839	1,119	1,399	1,679	1,959	2,238	2,518	10.2	64
3	281.3	562.7	844	1,125	1,407	1,688	1,969	2,251	2,532	10.3	65
4	282.9	565.7	849	1,131	1,414	1,697	1,980	2,263	2,546	10.4	67
5	284.4	568.8	853	1,138	1,422	1,706	1,991	2,275	2,560	10.5	68
6	286.0	571.9	858	1,144	1,430	1,716	2,002	2,288	2,574	10.6	69
7	287.5	575.0	862	1,150	1,437	1,725	2,012	2,300	2,587	10.7	70
8	289.0	578.1	867	1,156	1,445	1,734	2,023	2,312	2,601	10.8	71
9	290.6	581.2	872	1,162	1,453	1,743	2,034	2,325	2,615	10.9	73
10	292.1	584.2	876	1,168	1,461	1,753	2,045	2,337	2,629	11.0	75
11	293.7	587.3	881	1,175	1,468	1,762	2,056	2,349	2,643	11.2	77
12	295.2	590.4	886	1,181	1,576	1,771	2,066	2,362	2,657	11.4	79
13	296.7	593.5	890	1,187	1,484	1,780	2,077	2,373	2,671	11.6	82
14	298.3	596.6	895	1,193	1,491	1,790	2,088	2,386	2,685	11.8	84
15	299.8	599.6	899	1,199	1,499	1,799	2,099	2,399	2,698	12.0	87
16	301.4	602.7	904	1,205	1,507	1,808	2,110	2,411	2,712	12.2	90
17	302.9	605.8	909	1,212	1,515	1,817	2,120	2,423	2,726	12.4	93
18	304.4	608.9	913	1,218	1,522	1,827	2,131	2,436	2,740	12.6	96
19	306.0	612.0	918	1,224	1,530	1,836	2,142	2,448	2,754	12.8	99
20	307.5	615.0	923	1,230	1,538	1,845	2,153	2,460	2,768	13.0	102
21	309.1	618.1	927	1,236	1,545	1,854	2,163	2,473	2,782	13.2	105
22	310.6	621.2	932	1,242	1,553	1,864	2,174	2,485	2,795	13.4	108
23	312.1	624.3	936	1,249	1,561	1,873	2,185	2,497	2,809	13.6	111
24	313.7	627.4	941	1,255	1,568	1,882	2,196	2,510	2,823	13.8	114
25	315.2	930.5	946	1,261	1,576	1,891	2,207	2,522	2,837	14.0	117
26	316.8	633.5	950	1,267	1,584	1,901	2,217	2,534	2,851	14.2	120
27	318.3	636.6	955	1,273	1,592	1,910	2,228	2,547	2,865	14.4	124
28	319.9	639.7	960	1,279	1,599	1,919	2,240	2,559	2,879	14.6	127
29	321.4	642.7	964	1,286	1,607	1,928	2,250	2,571	2,893	14.8	130
30	322.9	645.9	969	1,292	1,615	1,938	2,261	2,584	2,906	15.0	132
31	324.5	649.0	973	1,298	1,622	1,947	2,271	2,596	2,920	15.2	137
32	326.0	652.0	978	1,304	1,630	1,956	2,282	2,608	2,934	15.4	141
33	327.6	655.1	983	1,310	1,638	1,965	2,293	2,621	2,948	15.6	144
34	329.1	658.2	987	1,316	1,646	1,975	2,304	2,633	2,962	15.8	148
35	330.6	661.3	992	1,323	1,653	1,984	2,315	2,645	2,976	16.0	151
36	332.2	664.4	997	1,329	1,661	1,993	2,325	2,658	2,990	16.2	153
37	333.7	667.5	1,001	1,335	1,669	2,002	2,336	2,670	3,004	16.4	159
38	335.3	670.5	1,006	1,341	1,676	2,012	2,347	2,682	3,017	16.6	163
39	336.8	673.6	1,010	1,347	1,684	2,021	2,358	2,695	3,031	16.8	167
40	338.4	676.7	1,015	1,353	1,692	2,030	2,369	2,707	3,045	17.0	170
41	339.9	679.8	1,020	1,360	1,700	2,039	2,379	2,719	3,059	17.2	174
42	341.4	682.9	1,024	1,366	1,707	2,049	2,390	2,732	3,073	17.4	178
43	343.0	686.0	1,029	1,372	1,715	2,058	2,401	2,744	3,087	17.6	182
44	344.5	689.1	1,034	1,378	1,723	2,067	2,412	2,756	3,101	17.8	186
45	346.1	692.1	1,038	1,384	1,730	2,076	2,422	2,769	3,115	18.0	190
46	347.6	695.2	1,043	1,390	1,738	2,086	2,433	2,781	3,129	18.2	195
47	349.2	698.3	1,047	1,397	1,746	2,095	2,444	2,793	3,142	18.4	199
48	350.7	701.4	1,052	1,403	1,753	2,104	2,455	2,806	3,156	18.6	203
49	352.2	704.5	1,057	1,409	1,761	2,113	2,466	2,818	3,170	18.8	207
50	353.8	707.6	1,061	1,415	1,769	2,123	2,476	2,830	3,184	19.0	212
51	355.3	710.7	1,066	1,421	1,777	2,132	2,487	2,843	3,198	19.2	216
52	356.9	713.7	1,071	1,427	1,784	2,141	2,498	2,855	3,212	19.4	221
53	358.4	716.8	1,075	1,434	1,792	2,150	2,509	2,867	3,226	19.6	225
54	360.0	719.9	1,080	1,440	1,800	2,160	2,520	2,880	3,240	19.8	230
55	361.5	723.0	1,085	1,446	1,807	2,169	2,530	2,892	3,253	20.0	234
56	363.0	726.1	1,089	1,452	1,815	2,178	2,541	2,904	3,267	21.0	258
57	364.6	729.2	1,094	1,458	1,823	2,188	2,552	2,917	3,281	22.0	282
58	366.1	732.3	1,098	1,465	1,831	2,197	2,563	2,929	3,295	23.0	308
59	367.7	735.3	1,103	1,471	1,838	2,206	2,574	2,941	3,309	24.0	335
60	369.2	738.4	1,108	1,477	1,846	2,215	2,584	2,954	3,323	25.0	363

[a] For all distances under 1.6 miles the correction may be taken as +5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

4°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	369.2	738	1,108	1,477	1,846	2,215	2,584	2,954	3,323				
1	370.8	742	1,112	1,483	1,854	2,225	2,595	2,966	3,337	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	372.3	745	1,117	1,489	1,862	2,234	2,606	2,978	3,351	1.6	6	10.2	64
3	373.8	748	1,122	1,495	1,869	2,243	2,617	2,991	3,365	2.1	7	10.3	65
4	375.4	751	1,126	1,502	1,877	2,252	2,628	3,003	3,378	2.5	8	10.4	67
5	376.9	754	1,131	1,508	1,885	2,262	2,639	3,015	3,392	2.8	9	10.5	68
6	378.5	757	1,135	1,514	1,892	2,271	2,649	3,028	3,406	3.1	10	10.6	69
7	380.0	760	1,140	1,520	1,900	2,280	2,660	3,040	3,420	3.4	11	10.7	70
8	381.6	763	1,145	1,526	1,908	2,289	2,671	3,053	3,434	3.6	12	10.8	71
9	383.1	766	1,149	1,532	1,916	2,299	2,682	3,065	3,448	3.8	13	10.9	73
10	384.7	769	1,154	1,539	1,923	2,308	2,693	3,077	3,462	4.1	14	11.0	74
11	386.2	772	1,159	1,545	1,931	2,317	2,703	3,090	3,476	4.3	15	11.1	75
12	387.7	775	1,163	1,551	1,939	2,326	2,714	3,102	3,490	4.5	16	11.2	77
13	389.3	779	1,168	1,557	1,946	2,336	2,725	3,114	3,504	4.7	17	11.3	78
14	390.8	782	1,172	1,563	1,954	2,345	2,736	3,127	3,517	4.8	18	11.4	79
15	392.4	785	1,177	1,569	1,962	2,354	2,747	3,139	3,531	5.0	19	11.5	80
16	393.9	788	1,182	1,576	1,970	2,363	2,757	3,151	3,545	5.2	20	11.6	82
17	395.5	791	1,186	1,582	1,977	2,373	2,768	3,164	3,559	5.4	21	11.7	83
18	397.0	794	1,191	1,588	1,985	2,382	2,779	3,176	3,573	5.5	22	11.8	84
19	398.6	797	1,196	1,594	1,993	2,391	2,790	3,188	3,587	5.7	23	11.9	86
20	400.1	800	1,200	1,600	2,000	2,401	2,801	3,201	3,601	5.8	24	12.0	87
21	401.6	803	1,205	1,607	2,008	2,410	2,811	3,213	3,615	6.0	25	12.1	89
22	403.2	806	1,210	1,613	2,016	2,419	2,822	3,225	3,629	6.1	26	12.2	90
23	404.7	809	1,214	1,619	2,024	2,428	2,833	3,238	3,643	6.3	27	12.3	91
24	406.3	813	1,219	1,625	2,031	2,438	2,844	3,250	3,656	6.4	28	12.4	93
25	407.8	816	1,223	1,631	2,039	2,447	2,855	3,263	3,670	6.5	29	12.5	94
26	409.4	819	1,228	1,637	2,047	2,456	2,866	3,275	3,684	6.7	30	12.6	96
27	410.9	822	1,233	1,644	2,055	2,465	2,876	3,287	3,698	6.8	31	12.7	97
28	412.5	825	1,237	1,650	2,062	2,475	2,887	3,300	3,712	6.9	32	12.8	99
29	414.0	828	1,242	1,656	2,070	2,484	2,898	3,312	3,726	7.0	33	12.9	100
30	415.5	831	1,247	1,662	2,078	2,493	2,909	3,324	3,740	7.2	34	13.0	102
31	417.1	834	1,251	1,668	2,085	2,503	2,920	3,337	3,754	7.3	35	13.1	103
32	418.6	837	1,256	1,675	2,093	2,512	2,930	3,349	3,768	7.4	36	13.2	105
33	420.2	840	1,261	1,681	2,101	2,521	2,941	3,361	3,782	7.5	37	13.3	106
34	421.7	843	1,265	1,687	2,109	2,530	2,952	3,374	3,796	7.6	38	13.4	108
35	423.3	847	1,270	1,693	2,116	2,540	2,963	3,386	3,809	7.8	39	13.5	109
36	424.8	850	1,274	1,699	2,124	2,549	2,974	3,399	3,823	7.9	40	13.6	111
37	426.4	853	1,279	1,705	2,132	2,558	2,985	3,411	3,837	8.0	41	13.7	112
38	427.9	856	1,284	1,712	2,140	2,567	2,995	3,423	3,851	8.1	42	13.8	114
39	429.5	859	1,288	1,718	2,147	2,577	3,006	3,436	3,865	8.2	43	13.9	115
40	431.0	862	1,293	1,724	2,155	2,586	3,017	3,448	3,879	8.3	44	14.0	117
41	432.5	865	1,298	1,730	2,163	2,595	3,028	3,460	3,893	8.4	45	14.1	119
42	434.1	868	1,302	1,736	2,170	2,605	3,039	3,473	3,907	8.5	46	14.2	120
43	435.6	871	1,307	1,743	2,178	2,614	3,049	3,485	3,921	8.6	47	14.3	122
44	437.2	874	1,312	1,749	2,186	2,623	3,060	3,498	3,935	8.7	48	14.4	124
45	438.7	877	1,316	1,755	2,194	2,632	3,071	3,510	3,949	8.8	49	14.5	125
46	440.3	881	1,321	1,761	2,201	2,642	3,082	3,522	3,963	8.9	50	14.6	127
47	441.8	884	1,325	1,767	2,209	2,651	3,093	3,535	3,976	9.0	51	14.7	129
48	443.4	887	1,330	1,773	2,217	2,660	3,104	3,547	3,990	9.1	52	14.8	130
49	444.9	890	1,335	1,780	2,225	2,669	3,113	3,558	4,003	9.2	53	14.9	132
50	446.5	893	1,339	1,786	2,232	2,679	3,125	3,572	4,018	9.3	54	15.0	134
51	448.0	896	1,344	1,792	2,240	2,688	3,136	3,584	4,032	9.4	55	15.1	135
52	449.6	899	1,349	1,798	2,248	2,697	3,147	3,596	4,046	9.5	56	15.2	137
53	451.1	902	1,353	1,804	2,256	2,707	3,158	3,609	4,060	9.6	58	15.3	139
54	452.7	905	1,358	1,811	2,263	2,716	3,169	3,621	4,074	9.7	59	15.4	141
55	454.2	908	1,363	1,817	2,271	2,725	3,179	3,634	4,088	9.8	60	15.5	142
56	455.8	912	1,367	1,823	2,279	2,735	3,190	3,646	4,102	9.9	61	15.6	144
57	457.3	915	1,372	1,829	2,286	2,744	3,201	3,658	4,116	10.0	62	15.7	146
58	458.8	918	1,377	1,835	2,294	2,753	3,212	3,671	4,130	10.1	63	15.8	148
59	460.4	921	1,381	1,842	2,302	2,762	3,223	3,683	4,144			15.9	150
												16.0	151
60	461.9	924	1,386	1,848	2,310	2,772	3,234	3,696	4,157				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

5°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
										Miles.	*Feet.*	*Miles.*	*Feet.*
0	461.9	924	1,386	1,848	2,310	2,772	3,234	3,696	4,157				
1	463.5	927	1,390	1,854	2,317	2,781	3,244	3,708	4,171				
2	465.0	930	1,395	1,860	2,325	2,790	3,255	3,720	4,185	1.6	6	10.2	64
3	466.6	933	1,400	1,866	2,333	2,800	3,266	3,733	4,199	2.1	7	10.3	65
4	468.1	936	1,405	1,873	2,341	2,809	3,277	3,745	4,213	2.5	8	10.4	67
5	469.7	939	1,409	1,879	2,348	2,818	3,288	3,757	4,227	2.8	9	10.5	68
6	471.2	942	1,414	1,885	2,356	2,827	3,299	3,770	4,241	3.1	10	10.6	69
7	472.8	946	1,419	1,891	2,364	2,837	3,309	3,782	4,255	3.4	11	10.7	70
8	474.3	949	1,423	1,897	2,372	2,846	3,320	3,795	4,269	3.6	12	10.8	71
9	475.9	952	1,428	1,904	2,379	2,855	3,331	3,807	4,283	3.8	13	10.9	73
10	477.4	955	1,432	1,910	2,387	2,865	3,342	3,819	4,297	4.1	14	11.0	74
11	479.0	958	1,437	1,916	2,395	2,874	3,353	3,832	4,311	4.3	15	11.1	75
12	480.5	961	1,442	1,922	2,403	2,883	3,364	3,844	4,325	4.5	16	11.2	77
13	482.1	964	1,447	1,928	2,410	2,892	3,375	3,857	4,339	4.7	17	11.3	78
14	483.6	967	1,451	1,935	2,418	2,902	3,385	3,869	4,353	4.8	18	11.4	79
15	485.2	970	1,456	1,941	2,426	2,911	3,396	3,881	4,367	5.0	19	11.5	80
16	486.7	973	1,461	1,947	2,434	2,920	3,407	3,894	4,381	5.2	20	11.6	82
17	488.3	976	1,465	1,953	2,441	2,930	3,418	3,906	4,394	5.4	21	11.7	83
18	489.8	980	1,470	1,959	2,449	2,939	3,429	3,919	4,408	5.5	22	11.8	84
19	491.3	983	1,475	1,966	2,457	2,948	3,440	3,931	4,422	5.7	23	11.9	86
20	492.9	986	1,479	1,972	2,465	2,958	3,450	3,943	4,436	5.8	24	12.0	87
21	494.5	989	1,483	1,978	2,472	2,967	3,461	3,956	4,450	6.0	25	12.1	89
22	496.0	992	1,488	1,984	2,480	2,976	3,472	3,968	4,464	6.1	26	12.2	90
23	497.6	995	1,493	1,990	2,488	2,985	3,483	3,981	4,478	6.3	27	12.3	91
24	499.1	998	1,498	1,996	2,496	2,995	3,494	3,993	4,492	6.4	28	12.4	93
25	500.7	1,001	1,502	2,003	2,503	3,004	3,505	4,005	4,506	6.5	29	12.5	94
26	502.2	1,004	1,507	2,009	2,511	3,013	3,515	4,018	4,520	6.7	30	12.6	96
27	503.8	1,007	1,512	2,015	2,519	3,023	3,526	4,030	4,534	6.8	31	12.7	97
28	505.3	1,010	1,516	2,021	2,527	3,032	3,537	4,042	4,548	6.9	32	12.8	99
29	506.9	1,014	1,521	2,027	2,534	3,041	3,548	4,055	4,562	7.0	33	12.9	100
30	508.4	1,017	1,525	2,034	2,542	3,050	3,559	4,067	4,576	7.2	34	13.0	102
31	510.0	1,020	1,530	2,040	2,550	3,060	3,570	4,080	4,590	7.3	35	13.1	103
32	511.5	1,023	1,535	2,046	2,558	3,069	3,581	4,092	4,604	7.4	36	13.2	105
33	513.0	1,026	1,539	2,052	2,565	3,078	3,591	4,105	4,618	7.5	37	13.3	106
34	514.6	1,029	1,544	2,058	2,573	3,088	3,602	4,117	4,632	7.6	38	13.4	108
35	516.2	1,032	1,549	2,065	2,581	3,097	3,613	4,129	4,645	7.8	39	13.5	109
36	517.7	1,035	1,553	2,071	2,589	3,106	3,624	4,142	4,659	7.9	40	13.6	111
37	519.3	1,039	1,558	2,077	2,596	3,116	3,635	4,154	4,673	8.0	41	13.7	112
38	520.8	1,042	1,563	2,083	2,604	3,125	3,646	4,167	4,687	8.1	42	13.8	114
39	522.4	1,045	1,568	2,089	2,612	3,134	3,657	4,179	4,701	8.2	43	13.9	115
40	523.9	1,048	1,572	2,095	2,620	3,144	3,667	4,191	4,715	8.3	44	14.0	117
41	525.5	1,051	1,576	2,102	2,627	3,153	3,678	4,204	4,729	8.4	45	14.1	119
42	527.0	1,054	1,581	2,108	2,635	3,162	3,689	4,216	4,743	8.5	46	14.2	120
43	528.6	1,057	1,586	2,114	2,643	3,172	3,700	4,229	4,757	8.6	47	14.3	122
44	530.1	1,060	1,591	2,121	2,651	3,181	3,711	4,241	4,771	8.7	48	14.4	124
45	531.7	1,063	1,595	2,127	2,658	3,190	3,722	4,253	4,785	8.8	49	14.5	125
46	533.2	1,066	1,600	2,133	2,666	3,199	3,733	4,266	4,799	8.9	50	14.6	127
47	534.8	1,070	1,605	2,139	2,674	3,209	3,743	4,278	4,813	9.0	51	14.7	129
48	536.3	1,073	1,609	2,145	2,682	3,218	3,754	4,291	4,827	9.1	52	14.8	130
49	537.9	1,076	1,614	2,154	2,689	3,227	3,765	4,303	4,841	9.2	53	14.9	132
50	539.4	1,079	1,618	2,158	2,697	3,237	3,776	4,315	4,855	9.3	54	15.0	134
51	541.0	1,082	1,623	2,166	2,705	3,246	3,787	4,328	4,869	9.4	55	15.1	135
52	542.5	1,085	1,628	2,170	2,713	3,255	3,798	4,340	4,883	9.5	56	15.2	137
53	544.1	1,088	1,632	2,176	2,721	3,265	3,809	4,353	4,897	9.6	58	15.3	139
54	545.6	1,091	1,637	2,183	2,728	3,274	3,819	4,365	4,911	9.7	59	15.4	141
55	547.2	1,094	1,642	2,189	2,736	3,283	3,830	4,378	4,925	9.8	60	15.5	142
56	548.7	1,097	1,646	2,195	2,743	3,292	3,841	4,390	4,939	9.9	61	15.6	144
57	550.3	1,101	1,651	2,201	2,752	3,302	3,852	4,402	4,953	10.0	62	15.7	146
58	551.8	1,104	1,656	2,207	2,759	3,311	3,863	4,415	4,967	10.1	63	15.8	148
59	553.4	1,107	1,661	2,214	2,767	3,320	3,874	4,427	4,981			15.9	150
												16.0	151
60	555.0	1,110	1,665	2,220	2,775	3,330	3,885	4,440	4,995				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

6°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction and height of instrument.[a]			
0	555.0	1,110	1,665	2,220	2,775	3,330	3,885	4,440	4,995				
1	556.5	1,113	1,670	2,226	2,783	3,339	3,896	4,452	5 009	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	558.1	1,116	1,674	2,232	2,790	3,348	3,906	4,464	5,023	1.6	6	10.2	64
3	559.6	1,119	1,679	2,238	2,798	3,358	3,917	4,477	5,037	2.1	7	10.3	65
4	561.2	1,122	1,684	2,245	2,806	3,367	3,928	4,489	5,050	2.5	8	10.4	67
5	562.7	1,125	1,688	2,251	2,814	3,376	3,939	4,502	5,064	2.8	9	10.5	68
6	564.3	1,129	1,693	2,257	2,821	3,386	3,950	4,514	5,078	3.1	10	10.6	69
7	565.8	1,132	1,697	2,263	2,829	3,395	3,961	4,527	5,092	3.4	11	10.7	70
8	567.4	1,135	1,702	2,270	2,837	3,404	3,972	4,539	5,106	3.6	12	10.8	71
9	568.9	1,138	1,707	2,276	2,845	3,414	3,983	4,551	5,120	3.8	13	10.9	73
10	570.5	1,141	1,711	2,282	2,852	3,423	3,993	4,564	5,134	4.1	14	11.0	74
11	572.0	1,144	1,716	2,288	2,860	3,432	4,004	4,576	5,148	4.3	15	11.1	75
12	573.6	1,147	1,721	2,294	2,868	3,442	4,015	4,589	5,162	4.5	16	11.2	77
13	575.2	1,150	1,725	2,301	2,876	3,451	4,026	4,601	5,176	4.7	17	11.3	78
14	576.7	1,153	1,730	2,307	2,884	3,460	4,037	4,614	5,190	4.8	18	11.4	79
15	578.3	1,157	1,735	2,313	2,891	3,470	4,048	4,626	5,204	5.0	19	11.5	80
16	579.8	1,160	1,739	2,319	2,899	3,479	4,059	4,639	5,218	5.2	20	11.6	82
17	581.4	1,163	1,744	2,325	2,907	3,488	4,070	4,651	5,232	5.4	21	11.7	83
18	582.9	1,166	1,749	2,332	2,915	3,498	4,080	4,663	5,246	5.5	22	11.8	84
19	584.5	1,169	1,753	2,338	2,922	3,507	4,091	4,676	5,260	5.7	23	11.9	86
20	586.0	1,172	1,758	2,344	2,930	3,516	4,102	4,688	5,274	5.8	24	12.0	87
21	587.6	1,175	1,763	2,350	2,938	3,526	4,113	4,701	5,288	6.0	25	12.1	89
22	589.1	1,178	1,767	2,357	2,946	3,535	4,124	4,713	5,302	6.1	26	12.2	90
23	590.7	1,181	1,772	2,363	2,953	3,544	4,135	4,726	5,316	6.3	27	12.3	91
24	592.2	1,185	1,777	2,369	2,961	3,554	4,146	4,738	5,330	6.4	28	12.4	93
25	593.8	1,188	1,781	2,375	2,969	3,563	4,157	4,750	5,344	6.5	29	12.5	94
26	595.4	1,191	1,786	2,381	2,977	3,572	4,168	4,763	5,358	6.7	30	12.6	96
27	596.9	1,194	1,791	2,388	2,985	3,581	4,178	4,775	5,372	6.8	31	12.7	97
28	598.5	1,197	1,795	2,394	2,992	3,591	4,189	4,788	5,386	6.9	32	12.8	99
29	600.0	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	7.0	33	12.9	100
30	601.6	1,203	1,805	2,406	3,008	3,609	4,211	4,813	5,414	7.2	34	13.0	102
31	603.1	1,206	1,809	2,413	3,016	3,619	4,222	4,825	5,428	7.3	35	13.1	103
32	604.7	1,209	1,814	2,419	3,023	3,628	4,233	4,838	5,442	7.4	36	13.2	105
33	606.3	1,213	1,819	2,425	3,031	3,637	4,244	4,850	5,456	7.5	37	13.3	106
34	607.8	1,216	1,823	2,431	3,039	3,647	4,255	4,862	5,470	7.6	38	13.4	108
35	609.4	1,219	1,828	2,437	3,047	3,656	4,266	4,875	5,484	7.8	39	13.5	109
36	610.9	1,222	1,833	2,444	3,055	3,666	4,276	4,887	5,498	7.9	40	13.6	111
37	612.5	1,225	1,837	2,450	3,062	3,675	4,287	4,900	5,512	8.0	41	13.7	112
38	614.0	1,228	1,842	2,456	3,070	3,684	4,298	4,912	5,526	8.1	42	13.8	114
39	615.5	1,231	1,847	2,462	3,078	3,694	4,309	4,925	5,540	8.2	43	13.9	115
40	617.2	1,234	1,851	2,469	3,086	3,703	4,320	4,937	5,554	8.3	44	14.0	117
41	618.7	1,237	1,856	2,475	3,094	3,712	4,331	4,950	5,568	8.4	45	14.1	119
42	620.3	1,241	1,861	2,481	3,101	3,722	4,342	4,962	5,582	8.5	46	14.2	120
43	621.8	1,244	1,865	2,487	3,109	3,731	4,353	4,975	5,596	8.6	47	14.3	122
44	623.4	1,247	1,870	2,494	3,117	3,740	4,364	4,987	5,610	8.7	48	14.4	124
45	624.9	1,250	1,875	2,500	3,125	3,750	4,374	4,999	5,624	8.8	49	14.5	125
46	626.5	1,253	1,879	2,506	3,132	3,759	4,385	5,012	5,638	8.9	50	14.6	127
47	628.0	1,256	1,884	2,512	3,140	3,768	4,396	5,024	5,653	9.0	51	14.7	129
48	629.6	1,259	1,889	2,518	3,148	3,778	4,407	5,037	5,667	9.1	52	14.8	130
49	631.2	1,262	1,894	2,525	3,156	3,787	4,418	5,049	5,681	9.2	53	14.9	132
50	632.7	1,265	1,898	2,531	3,164	3,796	4,429	5,062	5,695	9.3	54	15.0	134
51	634.3	1,269	1,903	2,537	3,171	3,806	4,440	5,074	5,709	9.4	55	15.1	135
52	635.8	1,272	1,908	2,543	3,179	3,815	4,451	5,087	5,723	9.5	56	15.2	137
53	637.4	1,275	1,912	2,550	3,187	3,824	4,462	5,099	5,737	9.6	58	15.3	139
54	638.9	1,278	1,917	2,556	3,195	3,834	4,473	5,112	5,751	9.7	59	15.4	141
55	640.5	1,281	1,922	2,562	3,203	3,843	4,484	5,124	5,765	9.8	60	15.5	142
56	642.1	1,284	1,926	2,568	3,210	3,852	4,494	5,136	5,779	9.9	61	15.6	144
57	643.6	1,287	1,931	2,575	3,218	3,862	4,505	5,149	5,793	10.0	62	15.7	146
58	645.2	1,290	1,936	2,581	3,226	3,871	4,516	5,161	5,807	10.1	63	15.8	148
59	646.7	1,293	1,940	2,587	3,234	3,880	4,527	5,174	5,821			15.9	150
												16.0	151
60	648.3	1,297	1,945	2,593	3,242	3,890	4,538	5,186	5,835				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

7°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction and height of instrument.[a]			
0	648.3	1,297	1,945	2,593	3,242	3,890	4,538	5,186	5,835				
1	649.9	1,300	1,950	2,599	3,249	3,899	4,549	5,199	5,849	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	651.4	1,303	1,954	2,606	3,257	3,909	4,560	5,211	5,863	1.6	6	10.2	64
3	653.0	1,306	1,959	2,612	3,265	3,918	4,571	5,224	5,877	2.1	7	10.3	65
4	654.5	1,309	1,964	2,618	3,273	3,927	4,582	5,236	5,891	2.5	8	10.4	67
5	656.1	1,312	1,968	2,624	3,281	3,937	4,593	5,249	5,905	2.8	9	10.5	68
6	657.7	1,315	1,973	2,631	3,288	3,946	4,604	5,261	5,919	3.1	10	10.6	69
7	659.2	1,318	1,978	2,637	3,296	3,955	4,615	5,274	5,933	3.4	11	10.7	70
8	660.8	1,322	1,982	2,643	3,304	3,965	4,626	5,286	5,947	3.6	12	10.8	71
9	662.4	1,325	1,987	2,649	3,312	3,974	4,636	5,299	5,961	3.8	13	10.9	73
10	663.9	1,328	1,992	2,656	3,320	3,983	4,647	5,311	5,975	4.1	14	11.0	74
11	665.5	1,331	1,996	2,662	3,327	3,993	4,658	5,324	5,989	4.3	15	11.1	75
12	667.0	1,334	2,001	2,668	3,335	4,002	4,669	5,336	6,003	4.5	16	11.2	77
13	668.6	1,337	2,006	2,674	3,343	4,012	4,680	5,349	6,017	4.7	17	11.3	78
14	670.2	1,340	2,010	2,681	3,351	4,021	4,691	5,361	6,031	4.8	18	11.4	79
15	671.7	1,343	2,015	2,687	3,359	4,030	4,702	5,374	6,045	5.0	19	11.5	80
16	673.3	1,347	2,020	2,693	3,366	4,040	4,713	5,386	6,060	5.2	20	11.6	82
17	674.8	1,350	2,025	2,699	3,374	4,049	4,724	5,399	6,074	5.4	21	11.7	83
18	676.4	1,353	2,029	2,706	3,382	4,058	4,735	5,411	6,088	5.5	22	11.8	84
19	678.0	1,356	2,034	2,712	3,390	4,068	4,746	5,424	6,102	5.7	23	11.9	86
20	679.5	1,359	2,039	2,718	3,398	4,077	4,757	5,436	6,116	5.8	24	12.0	87
21	681.1	1,362	2,043	2,724	3,405	4,087	4,768	5,449	6,130	6.0	25	12.1	89
22	682.6	1,365	2,048	2,731	3,413	4,096	4,779	5,461	6,144	6.1	26	12.2	90
23	684.2	1,368	2,053	2,737	3,421	4,105	4,789	5,474	6,158	6.3	27	12.3	91
24	685.8	1,372	2,057	2,743	3,429	4,115	4,800	5,486	6,172	6.4	28	12.4	93
25	687.3	1,375	2,062	2,749	3,437	4,124	4,811	5,499	6,186	6.5	29	12.5	94
26	688.9	1,378	2,067	2,756	3,444	4,133	4,822	5,511	6,200	6.7	30	12.6	96
27	690.5	1,381	2,071	2,762	3,452	4,143	4,833	5,524	6,214	6.8	31	12.7	97
28	692.0	1,384	2,076	2,768	3,460	4,152	4,844	5,536	6,228	6.9	32	12.8	99
29	693.6	1,387	2,081	2,774	3,468	4,161	4,855	5,549	6,242	7.0	33	12.9	100
30	695.1	1,390	2,085	2,781	3,476	4,171	4,866	5,561	6,256	7.2	34	13.0	102
31	696.7	1,393	2,090	2,787	3,483	4,180	4,877	5,574	6,270	7.3	35	13.1	103
32	698.3	1,396	2,095	2,793	3,491	4,190	4,888	5,586	6,284	7.4	36	13.2	105
33	699.8	1,400	2,099	2,799	3,499	4,199	4,899	5,599	6,298	7.5	37	13.3	106
34	701.4	1,403	2,104	2,806	3,507	4,208	4,910	5,611	6,312	7.6	38	13.4	108
35	702.9	1,406	2,109	2,812	3,515	4,218	4,921	5,624	6,327	7.8	39	13.5	109
36	704.5	1,409	2,114	2,818	3,523	4,227	4,932	5,636	6,341	7.9	40	13.6	111
37	706.1	1,412	2,118	2,824	3,530	4,236	4,943	5,649	6,355	8.0	41	13.7	112
38	707.6	1,415	2,123	2,831	3,538	4,246	4,953	5,661	6,369	8.1	42	13.8	114
39	709.2	1,418	2,128	2,837	3,546	4,255	4,964	5,674	6,383	8.2	43	13.9	115
40	710.8	1,422	2,132	2,843	3,554	4,265	4,975	5,686	6,397	8.3	44	14.0	117
41	712.3	1,425	2,137	2,849	3,562	4,274	4,986	5,699	6,411	8.4	45	14.1	119
42	713.9	1,428	2,142	2,856	3,569	4,283	4,997	5,711	6,425	8.5	46	14.2	120
43	715.5	1,431	2,146	2,862	3,577	4,293	5,008	5,724	6,439	8.6	47	14.3	122
44	717.0	1,434	2,151	2,868	3,585	4,302	5,019	5,736	6,453	8.7	48	14.4	124
45	718.6	1,437	2,156	2,874	3,593	4,312	5,030	5,749	6,467	8.8	49	14.5	125
46	720.2	1,440	2,160	2,881	3,601	4,321	5,041	5,761	6,481	8.9	50	14.6	127
47	721.7	1,443	2,165	2,887	3,609	4,330	5,052	5,774	6,495	9.0	51	14.7	129
48	723.3	1,447	2,170	2,893	3,616	4,340	5,063	5,786	6,510	9.1	52	14.8	130
49	724.8	1,450	2,175	2,899	3,624	4,349	5,074	5,799	6,524	9.2	53	14.9	132
50	726.4	1,453	2,179	2,906	3,632	4,358	5,085	5,811	6,538	9.3	54	15.0	134
51	728.0	1,456	2,184	2,912	3,640	4,368	5,096	5,824	6,552	9.4	55	15.1	135
52	729.5	1,459	2,189	2,918	3,648	4,377	5,107	5,836	6,566	9.5	56	15.2	137
53	731.1	1,462	2,193	2,924	3,656	4,387	5,118	5,849	6,580	9.6	58	15.3	139
54	732.7	1,465	2,198	2,931	3,663	4,396	5,129	5,861	6,594	9.7	59	15.4	141
55	734.2	1,468	2,203	2,937	3,671	4,405	5,140	5,874	6,608	9.8	60	15.5	142
56	735.8	1,472	2,207	2,943	3,679	4,415	5,151	5,886	6,622	9.9	61	15.6	144
57	737.4	1,475	2,212	2,949	3,687	4,424	5,162	5,899	6,636	10.0	62	15.7	146
58	738.9	1,478	2,217	2,956	3,695	4,434	5,172	5,911	6,650	10.1	63	15.8	148
59	740.5	1,481	2,221	2,962	3,702	4,443	5,183	5,924	6,664			15.9	150
												16.0	151
60	742.1	1,484	2,226	2,968	3,710	4,452	5,194	5,936	6,678				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

8°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	742.1	1,484	2,226	2,968	3,710	4,452	5,194	5,936	6,678				
1	743.6	1,487	2,231	2,974	3,718	4,462	5,205	5,949	6,693	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	745.2	1,490	2,236	2,981	3,726	4,471	5,216	5,962	6,707	1.6	6	10.2	64
3	746.8	1,494	2,240	2,987	3,734	4,481	5,227	5,974	6,721	2.1	7	10.3	65
4	748.3	1,497	2,245	2,993	3,742	4,490	5,238	5,987	6,735	2.5	8	10.4	67
5	749.9	1,500	2,250	3,000	3,749	4,499	5,249	5,999	6,749	2.8	9	10.5	68
6	751.5	1,503	2,254	3,006	3,757	4,509	5,260	6,012	6,763	3.1	10	10.6	69
7	753.0	1,506	2,259	3,012	3,765	4,518	5,271	6,024	6,777	3.4	11	10.7	70
8	754.6	1,509	2,264	3,018	3,773	4,528	5,282	6,037	6,791	3.6	12	10.8	71
9	756.2	1,512	2,269	3,025	3,781	4,537	5,293	6,049	6,806	3.8	13	10.9	73
10	757.7	1,515	2,273	3,031	3,789	4,546	5,304	6,062	6,820	4.1	14	11.0	74
11	759.3	1,519	2,278	3,037	3,797	4,556	5,315	6,074	6,834	4.3	15	11.1	75
12	760.9	1,522	2,283	3,043	3,804	4,565	5,326	6,087	6,848	4.5	16	11.2	77
13	762.4	1,525	2,287	3,050	3,812	4,575	5,337	6,100	6,862	4.7	17	11.3	78
14	764.0	1,528	2,292	3,056	3,820	4,584	5,348	6,112	6,876	4.8	18	11.4	79
15	765.6	1,531	2,297	3,062	3,828	4,593	5,359	6,125	6,890	5.0	19	11.5	80
16	767.1	1,534	2,301	3,069	3,836	4,603	5,370	6,137	6,904	5.2	20	11.6	82
17	768.7	1,537	2,306	3,075	3,844	4,612	5,381	6,150	6,918	5.4	21	11.7	83
18	770.3	1,541	2,311	3,081	3,851	4,622	5,392	6,162	6,933	5.5	22	11.8	84
19	771.8	1,544	2,316	3,087	3,859	4,631	5,403	6,175	6,947	5.7	23	11.9	86
20	773.4	1,547	2,320	3,094	3,867	4,640	5,414	6,187	6,961	5.8	24	12.0	87
21	775.0	1,550	2,325	3,100	3,875	4,650	5,425	6,200	6,975	6.0	25	12.1	89
22	776.6	1,553	2,330	3,106	3,883	4,659	5,436	6,212	6,989	6.1	26	12.2	90
23	778.1	1,556	2,334	3,112	3,891	4,669	5,447	6,225	7,003	6.3	27	12.3	91
24	779.7	1,559	2,339	3,119	3,898	4,678	5,458	6,237	7,017	6.4	28	12.4	93
25	781.3	1,562	2,344	3,125	3,906	4,688	5,469	6,250	7,031	6.5	29	12.5	94
26	782.8	1,566	2,348	3,131	3,914	4,697	5,480	6,263	7,045	6.7	30	12.6	96
27	784.4	1,569	2,353	3,138	3,922	4,706	5,491	6,275	7,060	6.8	31	12.7	97
28	786.0	1,572	2,358	3,144	3,930	4,716	5,502	6,288	7,074	6.9	32	12.8	99
29	787.5	1,575	2,363	3,150	3,938	4,725	5,513	6,300	7,088	7.0	33	12.9	100
30	789.1	1,578	2,367	3,156	3,945	4,735	5,524	6,313	7,102	7.2	34	13.0	102
31	790.7	1,581	2,372	3,163	3,953	4,744	5,535	6,325	7,116	7.3	35	13.1	103
32	792.2	1,584	2,377	3,169	3,961	4,753	5,546	6,338	7,130	7.4	36	13.2	105
33	793.8	1,588	2,381	3,175	3,969	4,763	5,557	6,351	7,144	7.5	37	13.3	106
34	795.4	1,591	2,386	3,182	3,977	4,772	5,568	6,363	7,159	7.6	38	13.4	108
35	796.9	1,594	2,391	3,188	3,985	4,782	5,579	6,376	7,173	7.8	39	13.5	109
36	798.5	1,597	2,396	3,194	3,993	4,791	5,590	6,388	7,187	7.9	40	13.6	111
37	800.1	1,600	2,400	3,200	4,001	4,801	5,601	6,401	7,201	8.0	41	13.7	112
38	801.7	1,603	2,405	3,207	4,008	4,810	5,612	6,414	7,215	8.1	42	13.8	114
39	803.2	1,607	2,410	3,213	4,016	4,820	5,623	6,426	7,229	8.2	43	13.9	115
40	804.8	1,610	2,414	3,219	4,024	4,829	5,634	6,439	7,243	8.3	44	14.0	117
41	806.4	1,613	2,419	3,226	4,032	4,838	5,645	6,451	7,258	8.4	45	14.1	119
42	808.0	1,616	2,424	3,232	4,040	4,848	5,656	6,464	7,272	8.5	46	14.2	120
43	809.5	1,619	2,429	3,238	4,048	4,857	5,667	6,476	7,286	8.6	47	14.3	122
44	811.1	1,622	2,433	3,244	4,056	4,867	5,678	6,489	7,300	8.7	48	14.4	124
45	812.7	1,625	2,438	3,251	4,063	4,876	5,689	6,501	7,314	8.8	49	14.5	125
46	814.2	1,628	2,443	3,257	4,071	4,886	5,700	6,514	7,328	8.9	50	14.6	127
47	815.8	1,632	2,447	3,263	4,079	4,895	5,711	6,527	7,342	9.0	51	14.7	129
48	817.4	1,635	2,452	3,270	4,087	4,904	5,722	6,539	7,357	9.1	52	14.8	130
49	819.0	1,638	2,457	3,276	4,095	4,914	5,733	6,552	7,371	9.2	53	14.9	132
50	820.5	1,641	2,462	3,282	4,103	4,923	5,744	6,564	7,385	9.3	54	15.0	134
51	822.1	1,644	2,466	3,288	4,111	4,933	5,755	6,577	7,399	9.4	55	15.1	135
52	823.7	1,647	2,471	3,295	4,118	4,942	5,766	6,590	7,413	9.5	56	15.2	137
53	825.3	1,651	2,476	3,301	4,126	4,952	5,777	6,602	7,427	9.6	58	15.3	139
54	826.8	1,654	2,481	3,307	4,134	4,961	5,788	6,615	7,442	9.7	59	15.4	141
55	828.4	1,657	2,485	3,314	4,142	4,970	5,799	6,627	7,456	9.8	60	15.5	142
56	830.0	1,660	2,490	3,320	4,150	4,980	5,810	6,640	7,470	9.9	61	15.6	144
57	831.5	1,663	2,495	3,326	4,158	4,989	5,821	6,652	7,484	10.0	62	15.7	146
58	833.1	1,666	2,499	3,332	4,166	4,999	5,832	6,665	7,498	10.1	63	15.8	148
59	834.7	1,669	2,504	3,339	4,173	5,008	5,843	6,678	7,512			15.9	150
60	836.3	1,673	2,509	3,345	4,181	5,018	5,854	6,690	7,526			16.0	151

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

9°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
										Miles.	*Feet.*	*Miles.*	*Feet.*
0	836.3	1,673	2,509	3,345	4,181	5,018	5,854	6,690	7,526				
1	837.8	1,676	2,514	3,351	4,189	5,027	5,865	6,703	7,541				
2	839.4	1,679	2,518	3,358	4,197	5,037	5,876	6,715	7,555	1.6	6	10.2	64
3	841.0	1,682	2,523	3,364	4,205	5,046	5,887	6,728	7,569	2.1	7	10.3	65
4	842.6	1,685	2,528	3,370	4,213	5,055	5,898	6,741	7,583	2.5	8	10.4	67
5	844.2	1,688	2,532	3,377	4,221	5,065	5,909	6,753	7,597	2.8	9	10.5	68
6	845.7	1,691	2,537	3,383	4,229	5,074	5,920	6,766	7,612	3.1	10	10.6	69
7	847.3	1,695	2,542	3,389	4,237	5,084	5,931	6,778	7,626	3.4	11	10.7	70
8	848.9	1,698	2,547	3,396	4,244	5,093	5,942	6,791	7,640	3.6	12	10.8	71
9	850.5	1,701	2,551	3,402	4,252	5,103	5,953	6,804	7,654	3.8	13	10.9	73
10	852.0	1,704	2,556	3,408	4,260	5,112	5,964	6,816	7,668	4.1	14	11.0	74
11	853.6	1,707	2,561	3,414	4,268	5,122	5,975	6,829	7,683	4.3	15	11.1	75
12	855.2	1,710	2,566	3,421	4,276	5,131	5,986	6,842	7,697	4.5	16	11.2	77
13	856.8	1,714	2,570	3,427	4,284	5,141	5,997	6,854	7,711	4.7	17	11.3	78
14	858.3	1,717	2,575	3,433	4,292	5,150	6,008	6,867	7,725	4.8	18	11.4	79
15	859.9	1,720	2,580	3,440	4,300	5,160	6,020	6,879	7,739	5.0	19	11.5	80
16	861.5	1,723	2,585	3,446	4,308	5,169	6,031	6,892	7,754	5.2	20	11.6	82
17	863.1	1,726	2,589	3,452	4,315	5,179	6,042	6,905	7,768	5.4	21	11.7	83
18	864.7	1,729	2,594	3,459	4,323	5,188	6,053	6,917	7,782	5.5	22	11.8	84
19	866.2	1,732	2,599	3,465	4,331	5,197	6,064	6,930	7,796	5.7	23	11.9	86
20	867.8	1,736	2,603	3,471	4,339	5,207	6,075	6,943	7,810	5.8	24	12.0	87
21	869.4	1,739	2,608	3,478	4,347	5,216	6,086	6,955	7,825	6.0	25	12.1	89
22	871.0	1,742	2,613	3,484	4,355	5,226	6,097	6,968	7,839	6.1	26	12.2	90
23	872.5	1,745	2,618	3,490	4,363	5,235	6,108	6,980	7,853	6.3	27	12.3	91
24	874.1	1,748	2,622	3,496	4,371	5,245	6,119	6,993	7,867	6.4	28	12.4	93
25	875.7	1,751	2,627	3,503	4,379	5,254	6,130	7,006	7,881	6.5	29	12.5	94
26	877.3	1,755	2,632	3,509	4,386	5,264	6,141	7,018	7,896	6.7	30	12.6	96
27	878.8	1,758	2,637	3,515	4,394	5,273	6,152	7,031	7,910	6.8	31	12.7	97
28	880.4	1,761	2,641	3,522	4,402	5,283	6,163	7,043	7,924	6.9	32	12.8	99
29	882.0	1,764	2,646	3,528	4,410	5,292	6,174	7,056	7,938	7.0	33	12.9	100
30	883.6	1,767	2,651	3,534	4,418	5,302	6,185	7,068	7,952	7.2	34	13.0	102
31	885.2	1,770	2,656	3,541	4,426	5,311	6,196	7,081	7,967	7.3	35	13.1	103
32	886.7	1,774	2,660	3,547	4,434	5,320	6,207	7,094	7,981	7.4	36	13.2	105
33	888.3	1,777	2,665	3,553	4,442	5,330	6,218	7,107	7,995	7.5	37	13.3	106
34	889.9	1,780	2,670	3,560	4,450	5,339	6,229	7,119	8,009	7.6	38	13.4	108
35	891.5	1,783	2,674	3,566	4,457	5,349	6,240	7,132	8,023	7.8	39	13.5	109
36	893.1	1,786	2,679	3,572	4,465	5,358	6,252	7,145	8,038	7.9	40	13.6	111
37	894.6	1,789	2,684	3,579	4,473	5,368	6,263	7,157	8,052	8.0	41	13.7	112
38	896.2	1,792	2,689	3,585	4,481	5,377	6,274	7,170	8,066	8.1	42	13.8	114
39	897.8	1,796	2,693	3,591	4,489	5,387	6,285	7,183	8,080	8.2	43	13.9	115
40	899.4	1,799	2,698	3,598	4,497	5,396	6,296	7,195	8,095	8.3	44	14.0	117
41	901.0	1,802	2,703	3,604	4,505	5,406	6,307	7,208	8,109	8.4	45	14.1	119
42	902.5	1,805	2,708	3,610	4,513	5,415	6,318	7,220	8,123	8.5	46	14.2	120
43	904.1	1,808	2,712	3,617	4,521	5,425	6,329	7,233	8,137	8.6	47	14.3	122
44	905.7	1,811	2,717	3,623	4,529	5,434	6,340	7,246	8,151	8.7	48	14.4	124
45	907.3	1,814	2,722	3,629	4,537	5,444	6,351	7,258	8,166	8.8	49	14.5	125
46	908.9	1,818	2,727	3,636	4,544	5,453	6,362	7,271	8,180	8.9	50	14.6	127
47	910.5	1,821	2,731	3,642	4,552	5,463	6,373	7,284	8,194	9.0	51	14.7	129
48	912.0	1,824	2,736	3,648	4,560	5,472	6,384	7,296	8,208	9.1	52	14.8	130
49	913.6	1,827	2,741	3,654	4,568	5,482	6,395	7,309	8,223	9.2	53	14.9	132
50	915.2	1,830	2,746	3,661	4,576	5,491	6,406	7,322	8,237	9.3	54	15.0	134
51	916.8	1,833	2,750	3,667	4,584	5,501	6,417	7,334	8,251	9.4	55	15.1	135
52	918.4	1,837	2,755	3,673	4,592	5,510	6,429	7,347	8,265	9.5	56	15.2	137
53	919.9	1,840	2,760	3,680	4,600	5,520	6,440	7,360	8,279	9.6	58	15.3	139
54	921.5	1,843	2,765	3,686	4,608	5,529	6,451	7,372	8,294	9.7	59	15.4	141
55	923.1	1,846	2,769	3,692	4,616	5,539	6,462	7,385	8,308	9.8	60	15.5	142
56	924.7	1,849	2,774	3,699	4,623	5,548	6,473	7,397	8,322	9.9	61	15.6	144
57	926.3	1,852	2,779	3,705	4,631	5,558	6,484	7,410	8,336	10.0	62	15.7	146
58	927.8	1,855	2,784	3,711	4,639	5,567	6,495	7,423	8,351	10.1	63	15.8	148
59	929.4	1,859	2,788	3,718	4,647	5,577	6,506	7,435	8,365			15.9	150
												16.0	151
60	931.0	1,862	2,793	3,724	4,655	5,586	6,517	7,448	8,379				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

10°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction and height of instrument.[a]			
0	931.0	1,862	2,793	3,724	4,655	5,586	6,517	7,448	8,379				
1	932.6	1,865	2,798	3,730	4,663	5,596	6,528	7,461	8,393	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	934.2	1,868	2,803	3,737	4,671	5,605	6,539	7,473	8,408	1.6	6	10.2	64
3	935.8	1,872	2,807	3,743	4,679	5,615	6,550	7,486	8,422	2.1	7	10.3	65
4	937.4	1,875	2,812	3,749	4,687	5,624	6,561	7,499	8,436	2.5	8	10.4	67
5	938.9	1,878	2,817	3,756	4,695	5,634	6,573	7,512	8,450	2.8	9	10.5	68
6	940.5	1,881	2,822	3,762	4,703	5,643	6,584	7,524	8,465	3.1	10	10.6	69
7	942.1	1,884	2,826	3,768	4,711	5,653	6,595	7,537	8,479	3.4	11	10.7	70
8	943.7	1,887	2,831	3,775	4,718	5,662	6,606	7,550	8,493	3.6	12	10.8	71
9	945.3	1,891	2,836	3,781	4,726	5,672	6,617	7,562	8,508	3.8	13	10.9	73
10	946.9	1,894	2,841	3,787	4,734	5,681	6,628	7,575	8,522	4.1	14	11.0	74
11	948.5	1,897	2,845	3,794	4,742	5,691	6,639	7,588	8,536	4.3	15	11.1	75
12	950.0	1,900	2,850	3,800	4,750	5,700	6,650	7,600	8,550	4.5	16	11.2	77
13	951.6	1,903	2,855	3,807	4,758	5,710	6,661	7,613	8,565	4.7	17	11.3	78
14	953.2	1,906	2,860	3,813	4,766	5,719	6,672	7,626	8,579	4.8	18	11.4	79
15	954.8	1,910	2,864	3,819	4,774	5,729	6,684	7,638	8,593	5.0	19	11.5	80
16	956.4	1,913	2,869	3,826	4,782	5,738	6,695	7,651	8,607	5.2	20	11.6	82
17	958.0	1,916	2,874	3,832	4,790	5,748	6,706	7,664	8,622	5.4	21	11.7	83
18	959.6	1,919	2,879	3,838	4,798	5,757	6,217	7,676	8,636	5.5	22	11.8	84
19	961.1	1,922	2,883	3,845	4,806	5,767	6,728	7,689	8,650	5.7	23	11.9	86
20	962.7	1,926	2,888	3,851	4,814	5,776	6,739	7,702	8,665	5.8	24	12.0	87
21	964.3	1,929	2,893	3,857	4,822	5,786	6,750	7,715	8,679	6.0	25	12.1	89
22	965.9	1,932	2,898	3,864	4,830	5,795	6,751	7,727	8,693	6.1	26	12.2	90
23	967.5	1,935	2,902	3,870	4,837	5,805	6,772	7,740	8,707	6.3	27	12.3	91
24	969.1	1,938	2,907	3,876	4,845	5,814	6,784	7,753	8,722	6.4	28	12.4	93
25	970.7	1,941	2,912	3,883	4,853	5,824	6,795	7,765	8,736	6.5	29	12.5	94
26	972.2	1,944	2,917	3,889	4,861	5,833	6,806	7,778	8,750	6.7	30	12.6	96
27	973.8	1,948	2,921	3,895	4,869	5,843	6,817	7,791	8,764	6.8	31	12.7	97
28	975.4	1,951	2,926	3,902	4 877	5,853	6,828	7,803	8,779	6.9	32	12.8	99
29	977.0	1,954	2,931	3,908	4,885	5,862	6,839	7,816	8,793	7.0	33	12.9	100
30	978.6	1,957	2,936	3,914	4,893	5,872	6,850	7,829	8,807	7.2	34	13.0	102
31	980.2	1,960	2,941	3,921	4,901	5,881	6,861	7,841	8,822	7.3	35	13.1	103
32	981.8	1,964	2,945	3,927	4,909	5,891	6,872	7,854	8,836	7.4	36	13.2	105
33	983.4	1,967	2,950	3,933	4,917	5,900	6,884	7,867	8,850	7.5	37	13.3	106
34	985.0	1,970	2,955	3,940	4,925	5,910	6,895	7,880	8,865	7.6	38	13.4	108
35	986.5	1,973	2,960	3,946	4,933	5,919	6,906	7,892	8,879	7.8	39	13.5	109
36	988.1	1,976	2,964	3,953	4,941	5,929	6,917	7,905	8,893	7.9	40	13.6	111
37	989.7	1,980	2,969	3,959	4,949	5,938	6,928	7,918	8,908	8.0	41	13.7	112
38	991.3	1,983	2,974	3,965	4,957	5,948	6,939	7,931	8,922	8.1	42	13.8	114
39	992.9	1,986	2,979	3,972	4,965	5,957	6,950	7,943	8,936	8.2	43	13.9	115
40	994.5	1,989	2,984	3,978	4,973	5,967	6,962	7,956	8,951	8.3	44	14.0	117
41	996.1	1,992	2,988	3,984	4,980	5,977	6,973	7,969	8,965	8.4	45	14.1	119
42	997.7	1,995	2,993	3,991	4,988	5,986	6,984	7,981	8,979	8.5	46	14.2	120
43	999.3	1,999	2,998	3,997	4,996	5,996	6,995	7,994	8,993	8.6	47	14.4	122
44	1,000.9	2,002	3,003	4,003	5,004	6,005	7,006	8,007	9,008	8.7	48	14.3	124
45	1,002.5	2,005	3,007	4,010	5,012	6,015	7,017	8,020	9,022	8.8	49	14.5	125
46	1,004.0	2,008	3,012	4,016	5,020	6,024	7,028	8,032	9,036	8.9	50	14.6	127
47	1,005.6	2,011	3,017	4,023	5,028	6,034	7,039	8,045	9,051	9.0	51	14.7	129
48	1,007.2	2,014	3,022	4,029	5,036	6,043	7,051	8,058	9,065	9.1	52	14.8	130
49	1,008.8	2,018	3,026	4,035	5,044	6,053	7,062	8,071	9,079	9.2	53	14.9	132
50	1,010.4	2,021	3,031	4,042	5,052	6,062	7,073	8,083	9,094	9.3	54	15.0	134
51	1,012.0	2,024	3,036	4,048	5,060	6,072	7,084	8,096	9,108	9.4	55	15.1	135
52	1,013.6	2,027	3,041	4,054	5,068	6,082	7,095	8,109	9,122	9.5	56	15.2	137
53	1,015.2	2,030	3,046	4,061	5,076	6,091	7,106	8,121	9,137	9.6	58	15.3	139
54	1,016.8	2,034	3,050	4,067	5,084	6,101	7,117	8,134	9,151	9.7	59	15.4	141
55	1,018.4	2,037	3,055	4,073	5,092	6,110	7,129	8,147	9,165	9.8	60	15.5	142
56	1,020.0	2,040	3,060	4,080	5,100	6,120	7,140	8,160	9,180	9.9	61	15.6	144
57	1,021.5	2,043	3,065	4,086	5,108	6,129	7,151	8,172	9,194	10.0	62	15.7	146
58	1,023.1	2,046	3,069	4,093	5,116	6,139	7,162	8,185	9,208	10.1	63	15.8	148
59	1,024.7	2,049	3,074	4,099	5,124	6,148	7,173	8,198	9,223			15.9	150
												16.0	151
60	1,026.3	2,053	3,079	4,105	5,132	6,158	7,184	8,211	9,237				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

11°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	1,026.3	2,053	3,079	4,105	5,132	6,158	7,184	8,211	9,237				
1	1,027.9	2,056	3,084	4,112	5,140	6,168	7,195	8,223	9,251	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	1,029.5	2,059	3,089	4,118	5,148	6,177	7,207	8,236	9,266	1.6	6	10.2	64
3	1,031.1	2,062	3,093	4,124	5,156	6,187	7,218	8,249	9,280	2.1	7	10.3	65
4	1,032.7	2,065	3,098	4,131	5,164	6,196	7,229	8,262	9,294	2.5	8	10.4	67
5	1,034.3	2,069	3,103	4,137	5,172	6,206	7,240	8,275	9,309	2.8	9	10.5	68
6	1,036	2,072	3,108	4,144	5,180	6,215	7,251	8,287	9,323	3.1	10	10.6	69
7	1,038	2,075	3,113	4,150	5,188	6,225	7,263	8,300	9,338	3.4	11	10.7	70
8	1,039	2,078	3,117	4,156	5,196	6,235	7,274	8,313	9,352	3.6	12	10.8	71
9	1,041	2,081	3,122	4,163	5,204	6,244	7,285	8,326	9,366	3.8	13	10.9	73
10	1,042	2,085	3,127	4,169	5,212	6,254	7,296	8,338	9,381	4.1	14	11.0	74
11	1,044	2,088	3,132	4,176	5,219	6,263	7,307	8,351	9,395	4.3	15	11.1	75
12	1,045	2,091	3,136	4,182	5,227	6,273	7,318	8,364	9,409	4.5	16	11.2	77
13	1,047	2,094	3,141	4,188	5,235	6,283	7,330	8,377	9,424	4.7	17	11.3	78
14	1,049	2,097	3,146	4,195	5,243	6,292	7,341	8,390	9,438	4.8	18	11.4	79
15	1,050	2,101	3,151	4,201	5,251	6,302	7,352	8,402	9,453	5.0	19	11.5	80
16	1,052	2,104	3,156	4,208	5,259	6,311	7,363	8,415	9,467	5.2	20	11.6	82
17	1,053	2,107	3,160	4,214	5,267	6,321	7,374	8,428	8,481	5.4	21	11.7	83
18	1,055	2,110	3,165	4,220	5,275	6,330	7,386	8,441	9,496	5.5	22	11.8	84
19	1,057	2,113	3,170	4,227	5,283	6,340	7,397	8,453	9,510	5.7	23	11.9	86
20	1,058	2,117	3,175	4,233	5,291	6,350	7,408	8,466	9,524	5.8	24	12.0	87
21	1,060	2,120	3,180	4,239	5,299	6,359	7,419	8,479	9,539	6.0	25	12.1	89
22	1,061	2,123	3,184	4,246	5,307	6,369	7,430	8,492	9,553	6.1	26	12.2	90
23	1,063	2,126	3,189	4,252	5,315	6,378	7,441	8,504	9,568	6.3	27	12.3	91
24	1,065	2,129	3,194	4,259	5,323	6,388	7,453	8,517	9,582	6.4	28	12.4	93
25	1,066	2,133	3,199	4,265	5,331	6,398	7,464	8,530	9,596	6.5	29	12.5	94
26	1,068	2,136	3,204	4,271	5,339	6,407	7,475	8,543	9,611	6.7	30	12.6	96
27	1,069	2,139	3,208	4,278	5,347	6,417	7,486	8,556	9,625	6.8	31	12.7	97
28	1,071	2,142	3,213	4,284	5,355	6,426	7,497	8,568	9,639	6.9	32	12.8	99
29	1,073	2,145	3,218	4,291	5,363	6,436	7,509	8,581	9,654	7.0	33	12.9	100
30	1,074	2,148	3,223	4,297	5,371	6,445	7,520	8,594	9,668	7.2	34	13.0	102
31	1,076	2,152	3,227	4,303	5,379	6,455	7,531	8,607	9,682	7.3	35	13.1	103
32	1,077	2,156	3,232	4,310	5,387	6,465	7,542	8,619	9,697	7.4	36	13.2	105
33	1,079	2,158	3,237	4,316	5,395	6,474	7,553	8,632	9,711	7.5	37	13.3	106
34	1,081	2,161	3,242	4,323	5,403	6,484	7,564	8,645	9,726	7.6	38	13.4	108
35	1,082	2,164	3,247	4,329	5,411	6,493	7,576	8,658	9,740	7.8	39	13.5	109
36	1,084	2,168	3,252	4,335	5,419	6,503	7,587	8,671	9,755	7.9	40	13.6	111
37	1,085	2,171	3,256	4,342	5,427	6,513	7,598	8,683	9,769	8.0	41	13.7	112
38	1,087	2,174	3,261	4,348	5,435	6,522	7,609	8,696	9,783	8.1	42	13.8	114
39	1,089	2,177	3,266	4,355	5,443	6,532	7,621	8,709	9,798	8.2	43	13.9	115
40	1,090	2,181	3,271	4,361	5,451	6,542	7,632	8,722	9,812	8.3	44	14.0	117
41	1,092	2,184	3,276	4,367	5,459	6,551	7,643	8,735	9,827	8.4	45	14.1	119
42	1,093	2,187	3,280	4,374	5,467	6,561	7,654	8,748	9,841	8.5	46	14.2	120
43	1,095	2,190	3,285	4,380	5,475	6,570	7,665	8,760	9,856	8.6	47	14.3	122
44	1,097	2,193	3,290	4,387	5,483	6,580	7,677	8,773	9,870	8.7	48	14.4	124
45	1,098	2,197	3,295	4,393	5,491	6,590	7,688	8,786	9,884	8.8	49	14.5	125
46	1,100	2,200	3,300	4,399	5,499	6,599	7,699	8,799	9,899	8.9	50	14.6	127
47	1,101	2,203	3,304	4,406	5,507	6,609	7,710	8,812	9,913	9.0	51	14.7	129
48	1,103	2,206	3,309	4,412	5,515	6,618	7,721	8,825	9,928	9.1	52	14.8	130
49	1,105	2,209	3,314	4,419	5,523	6,628	7,733	8,837	9,942	9.2	53	14.9	132
50	1,106	2,213	3,319	4,425	5,531	6,638	7,744	8,850	9,956	9.3	54	15.0	134
51	1,108	2,216	3,324	4,431	5,539	6,647	7,755	8,863	9,971	9.4	55	15.1	135
52	1,109	2,219	3,328	4,438	5,547	6,657	7,766	8,876	9,985	9.5	56	15.2	137
53	1,111	2,222	3,333	4,444	5,555	6,666	7,778	8,889	10,000	9.6	58	15.3	139
54	1,113	2,225	3,338	4,451	5,563	6,676	7,789	8,901	10,014	9.7	59	15.4	141
55	1,114	2,229	3,343	4,457	5,571	6,686	7,800	8,914	10,029	9.8	60	15.5	142
56	1,116	2,232	3,348	4,464	5,579	6,695	7,811	8,927	10,043	9.9	61	15.6	144
57	1,117	2,235	3,352	4,470	5,587	6,705	7,822	8,940	10,057	10.0	62	15.7	146
58	1,119	2,238	3,357	4,476	5,595	6,715	7,834	8,953	10,072	10.1	63	15.8	148
59	1,121	2,241	3,362	4,483	5,603	6,724	7,845	8,966	10,086			15.9	150
												16.0	151
60	1,122	2,245	3,367	4,489	5,611	6,734	7,856	8,978	10,101				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

12°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	1,122	2,245	3,367	4,489	5,612	6,734	7,856	8,978	10,101				
1	1,124	2,248	3,372	4,496	5,620	6,743	7,867	8,991	10,115	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	1,126	2,251	3,377	4,502	5,628	6,753	7,879	9,004	10,130	1.6	6	10.2	64
3	1,127	2,254	3,381	4,508	5,636	6,763	7,890	9,017	10,144	2.1	7	10.3	65
4	1,129	2,257	3,386	4,515	5,644	6,772	7,901	9,030	10,159	2.5	8	10.4	67
5	1,130	2,261	3,391	4,521	5,652	6,782	7,912	9,043	10,173	2.8	9	10.5	68
6	1,132	2,264	3,396	4,528	5,660	6,792	7,924	9,056	10,188	3.1	10	10.6	69
7	1,134	2,267	3,401	4,534	5,668	6,801	7,935	9,068	10,202	3.4	11	10.7	70
8	1,135	2,270	3,405	4,541	5,676	6,811	7,946	9,081	10,216	3.6	12	10.8	71
9	1,137	2,274	3,410	4,547	5,684	6,821	7,957	9,094	10,231	3.8	13	10.9	73
10	1,138	2,277	3,415	4,554	5,692	6,830	7,969	9,107	10,245	4.1	14	11.0	74
11	1,140	2,280	3,420	4,560	5,700	6,840	7,980	9,120	10,260	4.3	15	11.1	75
12	1,142	2,283	3,425	4,566	5,708	6,850	7,991	9,133	10,274	4.5	16	11.2	77
13	1,143	2,286	3,430	4,573	5,716	6,859	8,002	9,146	10,289	4.7	17	11.3	78
14	1,145	2,290	3,434	4,579	5,724	6,869	8,014	9,158	10,303	4.8	18	11.4	79
15	1,146	2,293	3,439	4,586	5,732	6,879	8,025	9,171	10,318	5.0	19	11.5	80
16	1,148	2,296	3,444	4,592	5,740	6,888	8,036	9,184	10,332	5.2	20	11.6	82
17	1,150	2,299	3,449	4,599	5,748	6,898	8,047	9,197	10,347	5.4	21	11.7	83
18	1,151	2,302	3,454	4,605	5,756	6,907	8,059	9,210	10,361	5.5	22	11.8	84
19	1,153	2,306	3,459	4,611	5,764	6,917	8,070	9,223	10,376	5.7	23	11.9	86
20	1,154	2,309	3,463	4,618	5,772	6,927	8,081	9,236	10,390	5.8	24	12.0	87
21	1,156	2,312	3,468	4,624	5,780	6,936	8,092	9,249	10,405	6.0	25	12.1	89
22	1,158	2,315	3,473	4,631	5,788	6,946	8,104	9,261	10,419	6.1	26	12.2	90
23	1,159	2,319	3,478	4,637	5,796	6,956	8,115	9,274	10,434	6.3	27	12.3	91
24	1,161	2,322	3,483	4,644	5,804	6,965	8,126	9,287	10,448	6.4	28	12.4	93
25	1,163	2,325	3,487	4,650	5,812	6,975	8,138	9,300	10,463	6.5	29	12.5	94
26	1,164	2,328	3,492	4,656	5,821	6,985	8,149	9,313	10,477	6.7	30	12.6	96
27	1,166	2,331	3,497	4,663	5,829	6,994	8,160	9,326	10,491	6.8	31	12.7	97
28	1,167	2,335	3,502	4,669	5,837	7,004	8,171	9,339	10,506	6.9	32	12.8	99
29	1,169	2,338	3,507	4,676	5,845	7,014	8,183	9,351	10,520	7.0	33	12.9	100
30	1,171	2,341	3,512	4,682	5,853	7,023	8,194	9,364	10,535	7.2	34	13.0	102
31	1,172	2,344	3,516	4,689	5,861	7,033	8,205	9,377	10,549	7.3	35	13.1	103
32	1,174	2,348	3,521	4,695	5,869	7,043	8,216	9,390	10,564	7.4	36	13.2	105
33	1,175	2,351	3,526	4,702	5,877	7,052	8,228	9,403	10,579	7.5	37	13.3	106
34	1,177	2,354	3,531	4,708	5,885	7,062	8,239	9,416	10,593	7.6	38	13.4	108
35	1,179	2,357	3,536	4,714	5,893	7,072	8,250	9,429	10,608	7.8	39	13.5	109
36	1,180	2,360	3,541	4,721	5,901	7,081	8,262	9,442	10,622	7.9	40	13.6	111
37	1,182	2,364	3,546	4,727	5,909	7,091	8,273	9,455	10,637	8.0	41	13.7	112
38	1,183	2,367	3,550	4,734	5,917	7,101	8,284	9,468	10,651	8.1	42	13.8	114
39	1,185	2,370	3,555	4,740	5,925	7,110	8,296	9,481	10,666	8.2	43	13.9	115
40	1,187	2,373	3,560	4,747	5,933	7,120	8,307	9,494	10,680	8.3	44	14.0	117
41	1,188	2,377	3,565	4,753	5,942	7,130	8,318	9,506	10,695	8.4	45	14.1	119
42	1,190	2,380	3,570	4,760	5,950	7,140	8,329	9,519	10,709	8.5	46	14.2	120
43	1,192	2,383	3,575	4,766	5,958	7,149	8,341	9,532	10,724	8.6	47	14.3	122
44	1,193	2,386	3,579	4,773	5,966	7,159	8,352	9,545	10,738	8.7	48	14.4	124
45	1,195	2,390	3,584	4,779	5,974	7,169	8,363	9,558	10,753	8.8	49	14.5	125
46	1,196	2,393	3,589	4,785	5,982	7,178	8,375	9,571	10,767	8.9	50	14.6	127
47	1,198	2,396	3,594	4,792	5,990	7,188	8,386	9,584	10,782	9.0	51	14.7	129
48	1,200	2,399	3,599	4,798	5,998	7,198	8,397	9,597	10,796	9.1	52	14.8	130
49	1,201	2,402	3,604	4,805	6,006	7,207	8,409	9,610	10,811	9.2	53	14.9	132
50	1,203	2,406	3,608	4,811	6,014	7,217	8,420	9,623	10,825	9.3	54	15.0	134
51	1,204	2,409	3,613	4,818	6,022	7,227	8,431	9,636	10,840	9.4	55	15.1	135
52	1,206	2,412	3,618	4,824	6,030	7,236	8,442	9,648	10,855	9.5	56	15.2	137
53	1,208	2,415	3,623	4,831	6,038	7,246	8,454	9,661	10,869	9.6	58	15.3	139
54	1,209	2,419	3,628	4,837	6,046	7,256	8,465	9,674	10,884	9.7	59	15.4	141
55	1,211	2,422	3,633	4,844	6,055	7,265	8,476	9,687	10,898	9.8	60	15.5	142
56	1,213	2,425	3,638	4,850	6,063	7,275	8,488	9,700	10,913	9.9	61	15.6	144
57	1,214	2,428	3,642	4,857	6,071	7,285	8,499	9,713	10,927	10.0	62	15.7	146
58	1,216	2,431	3,647	4,863	6,079	7,294	8,510	9,726	10,942	10.1	63	15.8	148
59	1,217	2,435	3,652	4,869	6,087	7,304	8,521	9,739	10,956			15.9	150
												16.0	151
60	1,219	2,438	3,657	4,876	6,095	7,314	8,533	9,752	10,971				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

13°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	1,219	2,438	3,657	4,876	6,095	7,314	8,533	9,752	10,971				
1	1,221	2,441	3,662	4,882	6,103	7,324	8,544	9,765	10,985	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	1,222	2,444	3,667	4,889	6,111	7,333	8,556	9,778	11,000	1.6	6	10.2	64
3	1,224	2,448	3,672	4,895	6,119	7,343	8,567	9,791	11,015	2.1	7	10.3	65
4	1,225	2,451	3,676	4,902	6,127	7,353	8,578	9,804	11,029	2.5	8	10.4	67
5	1,227	2,454	3,681	4,908	6,135	7,362	8,590	9,817	11,044	2.8	9	10.5	68
6	1,229	2,457	3,686	4,915	6,143	7,372	8,601	9,830	11,058	3.1	10	10.6	69
7	1,230	2,461	3,691	4,921	6,152	7,382	8,612	9,843	11,073	3.4	11	10.7	70
8	1,232	2,464	3,696	4,928	6,160	7,392	8,624	9,855	11,087	3.6	12	10.8	71
9	1,234	2,467	3,701	4,934	6,168	7,401	8,635	9,868	11,102	3.8	13	10.9	73
10	1,235	2,470	3,706	4,941	6,176	7,411	8,646	9,881	11,117	4.1	14	11.0	74
11	1,237	2,474	3,710	4,947	6,184	7,421	8,658	9,894	11,131	4.3	15	11.1	75
12	1,238	2,477	3,715	4,954	6,192	7,430	8,669	9,907	11,146	4.5	16	11.2	77
13	1,240	2,480	3,720	4,960	6,200	7,440	8,680	9,920	11,160	4.7	17	11.3	78
14	1,243	2,483	3,725	4,967	6,208	7,450	8,692	9,933	11,175	4.8	18	11.4	79
15	1,243	2,487	3,730	4,973	6,216	7,460	8,703	9,946	11,190	5.0	19	11.5	80
16	1,245	2,490	3,735	4,980	6,224	7,469	8,714	9,959	11,204	5.2	20	11.6	82
17	1,247	2,493	3,740	4,986	6,233	7,479	8,726	9,972	11,219	5.4	21	11.7	83
18	1,248	2,496	3,744	4,993	6,241	7,489	8,737	9,985	11,233	5.5	22	11.8	84
19	1,250	2,500	3,749	4,999	6,249	7,499	8,748	9,998	11,248	5.7	23	11.9	86
20	1,251	2,503	3,754	5,006	6,257	7,508	8,760	10,011	11,262	5.8	24	12.0	87
21	1,253	2,506	3,759	5,012	6,265	7,518	8,771	10,024	11,277	6.0	25	12.1	89
22	1,255	2,509	3,764	5,019	6,273	7,528	8,782	10,037	11,292	6.1	26	12.2	90
23	1,256	2,513	3,769	5,025	6,281	7,537	8,794	10,050	11,306	6.3	27	12.3	91
24	1,258	2,516	3,774	5,032	6,289	7,547	8,805	10,063	11,321	6.4	28	12.4	93
25	1,260	2,519	3,779	5,038	6,297	7,557	8,816	10,076	11,336	6.5	29	12.5	94
26	1,261	2,522	3,783	5,044	6,306	7,567	8,828	10,089	11,350	6.7	30	12.6	96
27	1,263	2,525	3,788	5,051	6,314	7,576	8,839	10,102	11,365	6.8	31	12.7	97
28	1,264	2,529	3,793	5,057	6,322	7,586	8,851	10,115	11,379	6.9	32	12.8	99
29	1,266	2,532	3,798	5,064	6,330	7,596	8,862	10,128	11,394	7.0	33	12.9	100
30	1,268	2,535	3,803	5,070	6,338	7,606	8,873	10,141	11,409	7.2	34	13.0	102
31	1,269	2,538	3,808	5,077	6,346	7,615	8,885	10,154	11,423	7.3	35	13.1	103
32	1,271	2,542	3,813	5,083	6,354	7,625	8,896	10,167	11,438	7.4	36	13.2	105
33	1,273	2,545	3,817	5,090	6,362	7,635	8,907	10,180	11,452	7.5	37	13.3	106
34	1,274	2,548	3,822	5,096	6,371	7,645	8,919	10,193	11,467	7.6	38	13.4	108
35	1,276	2,551	3,827	5,103	6,379	7,654	8,930	10,206	11,482	7.8	39	13.5	109
36	1,277	2,555	3,832	5,109	6,387	7,664	8,942	10,219	11,496	7.9	40	13.6	111
37	1,279	2,558	3,837	5,116	6,395	7,674	8,953	10,232	11,511	8.0	41	13.7	112
38	1,281	2,561	3,842	5,122	6,403	7,684	8,964	10,245	11,526	8.1	42	13.8	114
39	1,282	2,565	3,847	5,129	6,411	7,693	8,976	10,258	11,540	8.2	43	13.9	115
40	1,284	2,568	3,852	5,135	6,419	7,703	8,987	10,271	11,555	8.3	44	14.0	117
41	1,286	2,571	3,857	5,142	6,427	7,713	8,999	10,284	11,569	8.4	45	14.1	119
42	1,287	2,574	3,861	5,149	6,436	7,723	9,010	10,297	11,584	8.5	46	14.2	120
43	1,289	2,578	3,866	5,155	6,444	7,732	9,021	10,310	11,599	8.6	47	14.3	122
44	1,290	2,581	3,871	5,162	6,452	7,742	9,033	10,323	11,613	8.7	48	14.4	124
45	1,292	2,584	3,876	5,168	6,460	7,752	9,044	10,336	11,628	8.8	49	14.5	125
46	1,294	2,587	3,881	5,175	6,468	7,762	9,055	10,349	11,643	8.9	50	14.6	127
47	1,295	2,591	3,886	5,181	6,476	7,771	9,067	10,362	11,657	9.0	51	14.7	129
48	1,297	2,594	3,891	5,188	6,484	7,781	9,078	10,375	11,672	9.1	52	14.8	130
49	1,299	2,597	3,896	5,194	6,493	7,791	9,090	10,388	11,687	9.2	53	14.9	132
50	1,300	2,600	3,900	5,201	6,501	7,801	9,101	10,401	11,701	9.3	54	15.0	134
51	1,302	2,604	3,905	5,207	6,509	7,811	9,112	10,414	11,716	9.4	55	15.1	135
52	1,303	2,607	3,910	5,214	6,517	7,820	9,124	10,427	11,731	9.5	56	15.2	137
53	1,305	2,610	3,915	5,220	6,525	7,830	9,135	10,440	11,745	9.6	58	15.3	139
54	1,307	2,613	3,920	5,227	6,533	7,840	9,147	10,453	11,760	9.7	59	15.4	141
55	1,308	2,617	3,925	5,233	6,541	7,850	9,158	10,466	11,775	9.8	60	15.5	142
56	1,310	2,620	3,930	5,240	6,550	7,859	9,170	10,479	11,789	9.9	61	15.6	144
57	1,312	2,623	3,935	5,246	6,558	7,869	9,181	10,492	11,804	10.0	62	15.7	146
58	1,313	2,626	3,940	5,253	6,566	7,879	9,192	10,506	11,819	10.1	63	15.8	148
59	1,315	2,630	3,944	5,259	6,574	7,889	9,204	10,519	11,833			15.9	150
												16.0	151
60	1,316	2,633	3,949	5,266	6,582	7,899	9,215	10,532	11,848				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 27.—*For obtaining differences of altitude for any minute, etc.*—Continued.

14°

′	1	2	3	4	5	6	7	8	9	Corrections for curvature, refraction, and height of instrument.[a]			
0	1,316	2,633	3,949	5,266	6,582	7,899	9,215	10,532	11,848				
1	1,318	2,636	3,954	5,272	6,590	7,909	9,227	10,545	11,863	*Miles.*	*Feet.*	*Miles.*	*Feet.*
2	1,320	2,639	3,959	5,279	6,599	7,918	9,238	10,558	11,877	1.6	6	10.2	64
3	1,321	2,643	3,964	5,285	6,607	7,928	9,249	10,571	11,892	2.1	7	10.3	65
4	1,323	2,646	3,969	5,292	6,615	7,938	9,261	10,584	11,907	2.5	8	10.4	67
5	1,325	2,649	3,974	5,298	6,623	7,948	9,272	10,597	11,923	2.8	9	10.5	68
6	1,326	2,653	3,979	5,305	6,631	7,957	9,284	10,610	11,936	3.1	10	10.6	69
7	1,328	2,656	3,984	5,312	6,639	7,967	9,295	10,623	11,951	3.4	11	10.7	70
8	1,330	2,659	3,989	5,318	6,648	7,977	9,307	10,636	11,966	3.6	12	10.8	71
9	1,331	2,662	3,993	5,325	6,656	7,987	9,318	10,649	11,980	3.8	13	10.9	73
10	1,333	2,666	3,998	5,331	6,664	7,997	9,329	10,662	11,995	4.1	14	11.0	74
11	1,334	2,669	4,003	5,338	6,672	8,006	9,341	10,675	12,010	4.3	15	11.1	75
12	1,336	2,672	4,008	5,344	6,680	8,016	9,352	10,688	12,024	4.5	16	11.2	77
13	1,338	2,675	4,013	5,351	6,688	8,026	9,364	10,701	12,039	4.7	17	11.3	78
14	1,339	2,679	4,018	5,357	6,697	8,036	9,375	10,715	12,054	4.8	18	11.4	79
15	1,341	2,682	4,023	5,364	6,705	8,046	9,387	10,728	12,069	5.0	19	11.5	80
16	1,343	2,685	4,028	5,370	6,713	8,056	9,398	10,741	12,083	5.2	20	11.6	82
17	1,344	2,688	4,033	5,377	6,721	8,065	9,410	10,754	12,098	5.4	21	11.7	83
18	1,346	2,692	4,038	5,383	6,729	8,075	9,421	10,767	12,113	5.5	22	11.8	84
19	1,348	2,695	4,042	5,390	6,737	8,085	9,432	10,780	12,127	5.7	23	11.9	86
20	1,349	2,698	4,047	5,397	6,746	8,095	9,444	10,793	12,142	5.8	24	12.0	87
21	1,351	2,702	4,052	5,403	6,754	8,105	9,455	10,806	12,157	6.0	25	12.1	89
22	1,352	2,705	4,057	5,410	6,762	8,114	9,467	10,819	12,172	6.1	26	12.2	90
23	1,354	2,708	4,062	5,416	6,770	8,124	9,478	10,832	12,186	6.3	27	12.3	91
24	1,356	2,711	4,067	5,423	6,778	8,134	9,490	10,845	12,201	6.4	28	12.4	93
25	1,357	2,715	4,072	5,429	6,787	8,144	9,501	10,859	12,216	6.5	29	12.5	94
26	1,359	2,718	4,077	5,436	6,795	8,154	9,513	10,872	12,231	6.7	30	12.6	96
27	1,361	2,721	4,082	5,442	6,803	8,164	9,524	10,885	12,245	6.8	31	12.7	97
28	1,362	2,724	4,087	5,449	6,811	8,173	9,536	10,898	12,260	6.9	32	12.8	99
29	1,364	2,728	4,092	5,455	6,819	8,183	9,547	10,911	12,275	7.0	33	12.9	100
30	1,366	2,731	4,097	5,462	6,828	8,193	9,559	10,924	12,290	7.2	34	13.0	102
31	1,367	2,734	4,101	5,469	6,836	8,203	9,570	10,937	12,304	7.3	35	13.1	103
32	1,369	2,738	4,106	5,475	6,844	8,213	9,581	10,950	12,319	7.4	36	13.2	105
33	1,370	2,741	4,111	5,482	6,852	8,223	9,593	10,963	12,334	7.5	37	13.3	106
34	1,372	2,744	4,116	5,488	6,860	8,232	9,604	10,976	12,349	7.6	38	13.4	108
35	1,374	2,747	4,121	5,495	6,868	8,242	9,616	10,990	12,363	7.8	39	13.5	109
36	1,375	2,751	4,126	5,501	6,877	8,252	9,627	11,003	12,378	7.9	40	13.6	111
37	1,377	2,754	4,131	5,508	6,885	8,262	9,639	11,016	12,393	8.0	41	13.7	112
38	1,379	2,757	4,136	5,514	6,893	8,272	9,650	11,029	12,408	8.1	42	13.8	114
39	1,380	2,761	4,141	5,521	6,901	8,282	9,662	11,042	12,422	8.2	43	13.9	115
40	1,382	2,764	4,146	5,528	6,910	8,291	9,673	11,055	12,437	8.3	44	14.0	117
41	1,384	2,767	4,151	5,534	6,918	8,301	9,685	11,068	12,452	8.4	45	14.1	119
42	1,385	2,770	4,156	5,541	6,926	8,311	9,696	11,081	12,467	8.5	46	14.2	120
43	1,387	2,774	4,160	5,547	6,934	8,321	9,708	11,095	12,481	8.6	47	14.3	122
44	1,388	2,777	4,165	5,554	6,942	8,331	9,719	11,108	12,496	8.7	48	14.4	124
45	1,390	2,780	4,170	5,560	6,951	8,341	9,731	11,121	12,511	8.8	49	14.5	125
46	1,392	2,784	4,175	5,567	6,959	8,351	9,742	11,134	12,526	8.9	50	14.6	127
47	1,393	2,787	4,180	5,574	6,967	8,360	9,754	11,147	12,541	9.0	51	14.7	129
48	1,395	2,790	4,185	5,580	6,975	8,370	9,765	11,160	12,555	9.1	52	14.8	130
49	1,397	2,793	4,190	5,587	6,983	8,380	9,777	11,173	12,570	9.2	53	14.9	132
50	1,398	2,797	4,195	5,593	6,992	8,390	9,788	11,187	12,585	9.3	54	15.0	134
51	1,400	2,800	4,200	5,600	7,000	8,400	9,800	11,200	12,600	9.4	55	15.1	135
52	1,402	2,803	4,205	5,606	7,008	8,410	9,811	11,213	12,615	9.5	56	15.2	137
53	1,403	2,807	4,210	5,613	7,016	8,420	9,823	11,226	12,629	9.6	58	15.3	139
54	1,405	2,810	4,215	5,620	7,024	8,429	9,834	11,239	12,644	9.7	59	15.4	141
55	1,407	2,813	4,220	5,626	7,033	8,439	9,846	11,252	12,659	9.8	60	15.5	142
56	1,408	2,816	4,225	5,633	7,041	8,449	9,857	11,266	12,674	9.9	61	15.6	144
57	1,410	2,820	4,230	5,639	7,049	8,459	9,869	11,279	12,689	10.0	62	15.7	146
58	1,411	2,823	4,234	5,646	7,057	8,469	9,880	11,292	12,703	10.1	63	15.8	148
59	1,413	2,826	4,239	5,653	7,066	8,479	9,892	11,305	12,718			15.9	150
												16.0	151
60	1,415	2,830	4,244	5,659	7,074	8,489	9,903	11,318	12,733				

[a] For all distances under 1.6 miles the correction may be taken as + 5 feet. Height of instrument is assumed 4.5 feet.

TABLE 28.—HORIZONTAL DISTANCES AND ELEVATIONS FROM STADIA READINGS.

This is a most generally useful stadia table for rods reading 1 foot to the 100 feet and with angles up to 30°. The values of other measures than those given in the table are obtained by multiplying the quantities under the proper vertical angle by stadia readings in hundreds of units. The quantity representing the focal distance is very small and is given at the bottom of each page for focal lengths between three-fourths and $1\frac{1}{4}$ feet and is represented as a constant equal to c. For ordinary work it is not necessary to take the latter into account. The direct use of the table involves a multiplication for each result obtained.

Example.—Let rod intercept be 3.25 feet, and the angle of inclination be 5° 35′. Then the distance on the horizontal would be

$$d=325 \text{ feet.}$$

If we accept the focal distance $f+c$ as 1.25 feet, we have from the tables

$$d'=3.25 \text{ feet} \times 99.05+1.24=323.15 \text{ feet,}$$

and

$$h=3.25 \text{ feet} \times 9.68+0.11=31.57 \text{ feet.}$$

TABLE 28.—*Horizontal distances and elevations from stadia readings.*

Minutes.	0°.		1°.		2°.		3°.	
	Horizontal distance.	Difference of elevation.	Horizontal distance.	Difference of elevation.	Horizontal distance.	Difference of elevation.	Horizontal distance.	Difference of elevation.
0	100.00	0.00	99.97	1.74	99.88	3.49	99.73	5.23
2	100.00	0.06	99.97	1.80	99.87	3.55	99.72	5.28
4	100.00	0.12	99.97	1.86	99.87	3.60	99.71	5.34
6	100.00	0.17	99.96	1.92	99.87	3.66	99.71	5.40
8	100.00	0.23	99.96	1.98	99.86	3.72	99.70	5.46
10	100.00	0.29	99.96	2.04	99.86	3.78	99.69	5.52
12	100.00	0.35	99.96	2.09	99.85	3.84	99.69	5.57
14	100.00	0.41	99.95	2.15	99.85	3.90	99.68	5.63
16	100.00	0.47	99.95	2.21	99.84	3.95	99.68	5.69
18	100.00	0.52	99.95	2.27	99.84	4.01	99.67	5.75
20	100.00	0.58	99.95	2.33	99.83	4.07	99.66	5.80
22	100.00	0.64	99.94	2.38	99.83	4.13	99.66	5.86
24	100.00	0.70	99.94	2.44	99.82	4.18	99.65	5.92
26	99.99	0.76	99.94	2.50	99.82	4.24	99.64	5.98
28	99.99	0.81	99.93	2.56	99.81	4.30	99.63	6.04
30	99.99	0.87	99.93	2.62	99.81	4.36	99.63	6.09
32	99.99	0.93	99.93	2.67	99.80	4.42	99.62	6.15
34	99.99	0.99	99.93	2.73	99.80	4.48	99.62	6.21
36	99.99	1.05	99.92	2.79	99.79	4.53	99.61	6.27
38	99.99	1.11	99.92	2.85	99.79	4.59	99.60	6.33
40	99.99	1.16	99.92	2.91	99.78	4.65	99.59	6.38
42	99.99	1.22	99.91	2.97	99.78	4.71	99.59	6.44
44	99.98	1.28	99.91	3.02	99.77	4.76	99.58	6.50
46	99.98	1.34	99.90	3.08	99.77	4.82	99.57	6.56
48	99.98	1.40	90.90	3.14	99.76	4.88	99.56	6.61
50	99.98	1.45	99.90	3.20	99.76	4.94	99.56	6.67
52	99.98	1.51	99.89	3.26	99.75	4.99	99.55	6.73
54	99.98	1.57	99.89	3.31	99.74	5.05	99.54	6.78
56	99.97	1.63	99.89	3.37	99.74	5.11	99.53	6.84
58	99.97	1.69	99.88	3.43	99.73	5.17	99.52	9.90
60	99.97	1.74	99.88	3.49	99.73	5.23	99.51	6.96
$c=0.75$	0.75	0.01	0.75	0.02	0.75	0.03	0.75	0.05
$c=1.00$	1.00	0.01	1.00	0.03	1.00	0.04	1.00	0.06
$c=1.25$	1.25	0.02	1.25	0.03	1.25	0.05	1.25	0.08

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	4°.		5°.		6°.		7°.	
	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.
0	99.51	6.96	99.24	8.68	98.91	10.40	98.51	12.10
2	99.51	7.02	99.23	8.74	98.90	10.45	98.50	12.15
4	99.50	7.07	99.22	8.80	98.88	10.51	98.48	12.21
6	99.49	7.13	99.21	8.85	98.87	10.57	98.47	12.26
8	99.48	7.19	99.20	8.91	98.86	10.62	98.46	12.32
10	99.47	7.25	99.19	8.97	98.85	10.68	98.44	12.38
12	99.46	7.30	99.18	9.03	98.83	10.74	98.43	12.43
14	99.46	7.36	99.17	9.08	98.82	10.79	98.41	12.49
16	99.45	7.42	99.16	9.14	98.81	10.85	98.40	12.55
18	99.44	7.48	99.15	9.20	98.80	10.91	98.39	12.60
20	99.43	7.53	99.14	9.25	98.78	10.96	98.37	12.66
22	99.42	7.59	99.13	9.31	98.77	11.02	98.36	12.72
24	99.41	7.65	99.11	9.37	98.76	11.08	98.34	12.77
26	99.40	7.71	99.10	9.43	98.74	11.13	98.33	12.83
28	99.39	7.76	99.09	9.48	98.73	11.19	98.31	12.88
30	99.38	7.82	99.08	9.54	98.72	11.25	98.29	12.94
32	99.33	7.88	99.07	9.60	98.71	11.30	98.28	13.00
34	99.37	7.94	99.06	9.65	98.69	11.36	98.27	13.05
36	99.36	7.99	99.05	9.71	98.68	11.42	98.25	13.11
38	99.35	8.05	99.04	9.77	98.67	11.47	98.24	13.17
40	99.34	8.11	99.03	9.83	98.65	11.53	98.22	13.22
42	99.33	8.17	99.01	9.88	98.64	11.59	98.20	13.28
44	99.32	8.22	99.00	9.94	98.63	11.64	98.19	13.33
46	99.31	8.28	98.99	10.00	98.61	11.70	98.17	13.39
48	99.30	8.34	98.98	10.05	98.60	11.76	98.16	13.45
50	99.29	8.40	98.97	10.11	98.58	11.81	98.14	13.50
52	99.28	8.45	98.96	10.17	98.57	11.87	98.13	13.56
54	99.27	8.51	98.94	10.22	98.56	11.93	98.11	13.61
56	99.26	8.57	98.93	10.28	98.54	11.98	98.10	13.67
58	99.25	8.63	98.92	10.34	98.53	12.04	98.08	13.73
60	99.24	8.68	98.91	10.40	98.51	12.10	98.06	13.78
c=0.75	0.75	0.06	0.75	0.07	0.75	0.08	0.74	0.10
c=1.00	1.00	0.08	0.99	0.09	0.99	0.11	0.99	0.13
c=1.25	1.25	0.10	1.24	0.11	1.24	0.14	1.24	0.16

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	8°.		9°.		10°.		11°.	
	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.
0	98.06	13.78	97.55	15.45	96.98	17.10	96.36	18.73
2	98.05	13.84	97.53	15.51	96.96	17.16	96.34	18.78
4	98.03	13.89	97.52	15.56	96.94	17.21	96.32	18.84
6	98.01	13.95	97.50	15.62	96.92	17.26	96.29	18.89
8	98.00	14.01	97.48	15.67	96.90	17.32	96.27	18.95
10	97.98	14.06	97.46	15.73	96.88	17.37	96.25	19.00
12	97.97	14.12	97.44	15.78	96.86	17.43	96.23	19.05
14	97.95	14.17	97.43	15.84	96.84	17.48	96.21	19.11
16	97.93	14.23	97.41	15.89	96.82	17.54	96.18	19.16
18	97.92	14.28	97.39	15.95	96.80	17.59	96.16	19.21
20	97.90	14.34	97.37	16.00	96.78	17.65	96.14	19.27
22	97.88	14.40	97.35	16.06	96.76	17.70	96.12	19.32
24	97.87	14.45	97.33	16.11	96.74	17.76	96.09	19.38
26	97.85	14.51	97.31	16.17	96.72	17.81	96.07	19.43
28	97.83	14.56	97.29	16.22	96.70	17.86	96.05	19.48
30	97.82	14.62	97.28	16.28	96.68	17.92	96.03	19.54
32	97.80	14.67	97.26	16.33	96.66	17.97	96.00	19.59
34	97.78	14.73	97.24	16.39	96.64	18.03	95.98	19.64
36	97.76	14.79	97.22	16.44	96.62	18.08	95.96	19.70
38	97.75	14.84	97.20	16.50	96.60	18.14	95.93	19.75
40	97.73	14.90	97.18	16.55	96.57	18.19	95.91	19.80
42	97.71	14.95	97.16	16.61	96.55	18.24	95.89	19.86
44	97.69	15.01	97.14	16.66	96.53	18.30	95.86	19.91
46	97.68	15.06	97.12	16.72	96.51	18.35	95.84	19.96
48	97.66	15.12	97.10	16.77	96.49	18.41	95.82	20.02
50	97.64	15.17	97.08	16.83	96.47	18.46	95.79	20.07
52	97.62	15.23	97.06	16.88	96.45	18.51	95.77	20.12
54	97.61	15.28	97.04	16.94	96.42	18.57	95.75	20.18
56	97.59	15.34	97.02	16.99	96.40	18.62	95.72	20.23
58	97.57	15.40	97.00	17.05	96.38	18.68	95.70	20.28
60	97.55	15.45	96.98	17.10	96.36	18.73	95.68	20.34
c=0.75	0.74	0.11	0.74	0.12	0.74	0.14	0.73	0.15
c=1.00	0.99	0.15	0.99	0.16	0.98	0.18	0.98	0.20
c=1.25	1.23	0.18	1.23	0.21	1.23	0.23	1.22	0.25

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	12°.		13°.		14°.		15°.	
	Horizontal distances.	Difference of elevation.	Horizontal distances.	Differenec of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.
0	95.68	20.34	94.94	21.92	94.15	23.47	93.30	25.00
2	95.65	20.39	94.91	21.97	94.12	23.52	93.27	25.05
4	95.63	20.44	94.89	22.02	94.09	23.58	93.24	25.10
6	95.61	20.50	94.86	22.08	94.07	23.63	93.21	25.15
8	95.58	20.55	94.84	22.13	94.04	23.68	93.18	25.20
10	95.56	20.60	94.81	22.18	94.01	23.73	93.16	25.25
12	95.53	20.66	94.79	22.23	93.98	23.78	93.13	25.30
14	95.51	20.71	94.76	22.28	93.95	23.83	93.10	25.35
16	95.49	20.76	94.73	22.34	93.93	23.88	93.07	25.40
18	95.46	20 81	94.71	22.39	93.90	23.93	93.04	25.45
20	95.44	20.87	94.68	22.44	93.87	23.99	93.01	25.50
22	95.41	20.92	94.66	22.49	93.84	24.04	92.98	25.55
24	95.39	20.97	94.63	22.54	93.81	24.09	92.95	25.60
26	95.36	21.03	94.60	22.60	93.79	24.14	92.92	25.65
28	95.34	21.08	94.58	22.65	93.76	24.19	92.89	25.70
30	95.32	21.13	94.55	22.70	93.73	24.24	92.86	25.75
32	95.29	21.18	94.52	22.75	93.70	24.29	92.83	25.80
34	95.27	21.24	94.50	22.80	93.67	24.34	92.80	25.85
36	95.24	21.29	94.47	22.85	93.65	24.39	92.77	25.90
38	95.22	21.34	94.44	22.91	93.62	24.44	92.74	25.95
40	95.19	21.39	94.42	22.96	93.59	24.49	92.71	26.00
42	95.17	21.45	94.39	23.01	93.56	24.55	92.68	26.05
44	95.14	21.50	94.36	23.06	93.53	24.60	92.65	26.10
46	95.12	21.55	94.34	23.11	93.50	24.65	92.62	26.15
48	95.09	21.60	94.31	23.16	93.47	24.70	92.59	26.20
50	95.07	21.66	94.28	23.22	93.45	24.75	92.56	26.25
52	95.04	21.71	94.26	23.27	93.42	24.80	92.53	26.30
54	95.02	21.76	94.23	23.32	93.39	24.85	92.49	26.35
56	94.99	21.81	94.20	23.37	93.36	24.90	92.46	26.40
58	94.97	21.87	94.17	23.42	93.33	24.95	92.43	26.45
60	94.94	21.92	94.15	23.47	93.30	25.00	92.40	26.50
c=0.75	0.73	0.16	0.73	0.17	0.73	0.19	0.72	0.20
c=1.00	0.98	0.22	0.97	0.23	0.97	0.25	0.96	0.27
c=1.25	1.22	0.27	1.21	0.29	1.21	0.31	1.20	0.34

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	16°.		17°.		18°.		19°.	
	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.
0	92.40	26.50	91.45	27.96	90.45	29.39	89.40	30.78
2	92.37	26.55	91.42	28.01	90.42	29.44	89.36	30.83
4	92.34	26.59	91.39	28.06	90.38	29.48	89.33	30.87
6	92.31	26.64	91.35	28.10	90.35	29.53	89.29	30.92
8	92.28	26.69	91.32	28.15	90.31	29.58	89.26	30.97
10	92.25	26.74	91.29	28.20	90.28	29.62	89.22	31.01
12	92.22	26.79	91.26	28.25	90.24	29.67	89.18	31.06
14	92.19	26.84	91.22	28.30	90.21	29.72	89.15	31.10
16	92.15	26.89	91.19	28.34	90.18	29.76	89.11	31.15
18	92.12	26.94	91.16	28.39	90.14	29.81	89.08	31.19
20	92.09	26.99	91.12	28.44	90.11	29.86	89.04	31.24
22	92.06	27.04	91.09	28.49	90.07	29.90	89.00	31.28
24	92.03	27.09	91.06	28.54	90.04	29.95	88.96	31.33
26	92.00	27.13	91.02	28.58	90.00	30.00	88.93	31.38
28	91.97	27.18	90.99	28.63	89.97	30.04	88.89	31.42
30	91.93	27.23	90.96	28.68	89.93	30.09	88.86	31.47
32	91.90	27.28	90.92	28.73	89.90	30.14	88.82	31.51
34	91.87	27.33	90.89	28.77	89.86	30.19	88.78	31.56
36	91.84	27.38	90.86	28.82	89.83	30.23	88.75	31.60
38	91.81	27.43	90.82	28.87	89.79	30.28	88.71	31.65
40	91.77	27.48	90.79	28.92	89.76	30.32	88.67	31.69
42	91.74	27.52	90.76	28.96	89.72	30.37	88.64	31.74
44	91.71	27.57	90.72	29.01	89.69	30.41	88.60	31.78
46	91.68	27.62	90.69	29.06	89.65	30.46	88.56	31.83
48	91.65	27.67	90.66	29.11	89.61	30.51	88.53	31.87
50	91.61	27.72	90.62	29.15	89.58	30.55	88.49	31.92
52	91.58	27.77	90.59	29.20	89.54	30.60	88.45	31.96
54	91.55	27.81	90.55	29.25	89.51	30.65	88.41	32.01
56	91.52	27.86	90.52	29.30	89.47	30.69	88.38	32.05
58	91.48	27.91	90.48	29.34	89.44	30.74	88.34	32.09
60	91.45	27.96	90.45	29.39	89.40	30.78	88.30	32.14
c=0.75	0.72	0.21	0.72	0.23	0.71	0.24	0.71	0.25
c=1.00	0.86	0.28	0.95	0.30	0.95	0.32	0.94	0.33
c=1.25	1.20	0.35	1.19	0.38	1.19	0.40	1.18	0.42

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	20°.		21°.		22°.		23°.	
	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.
0	88.30	32.14	87.16	33.46	85.97	34.73	84.73	35.97
2	88.26	32.18	87.12	33.50	85.93	34.77	84.69	36.01
4	88.23	32.23	87.08	33.54	85.89	34.82	84.65	36.05
6	88.19	32.27	87.04	33.59	85.85	34.86	84.61	36.09
8	88.15	32.32	87.00	33.63	85.80	34.90	84.57	36.13
10	88.11	32.36	86.96	33.67	85.76	34.94	84.52	36.17
12	88.08	32.41	86.92	33.72	85.72	34.98	84.48	36.21
14	88.04	32.45	86.88	33.76	85.68	35.02	84.44	36.25
16	88.00	32.49	86.84	33.80	85.64	35.07	84.40	36.29
18	87.96	32.54	86.80	33.84	85.60	35.11	84.35	36.33
20	87.93	32.58	86.77	33.89	85.56	35.15	84.31	36.37
22	87.89	32.63	86.73	33.93	85.52	35.19	84.27	36.41
24	87.85	32.67	86.69	33.97	85.48	35.23	84.23	36.45
26	87.81	32.72	86.65	34.01	85.44	35.27	84.18	36.49
28	87.77	32.76	86.61	34.06	85.40	35.31	84.14	36.53
30	87.74	32.80	86.57	34.10	85.36	35.36	84.10	36.57
32	87.70	32.85	86.53	34.14	85.31	35.40	84.06	36.61
34	87.66	32.89	86.49	34.18	85.27	35.44	84.01	36.65
36	87.62	32.93	86.45	34.23	85.23	35.48	83.97	36.69
38	87.58	32.98	86.41	34.27	85.19	35.52	83.93	36.73
40	87.54	33.02	86.37	34.31	85.15	35.56	83.89	36.77
42	87.51	33.07	86.33	34.35	85.11	35.60	83.84	36.80
44	87.47	33.11	86.29	34.40	85.07	35.64	83.80	36.84
46	87.43	33.15	86.25	34.44	85.02	35.68	83.76	36.88
48	87.39	33.20	86.21	34.48	84.98	35.72	83.72	36.92
50	87.35	33.24	86.17	34.52	84.94	35.76	83.67	36.96
52	87.31	33.28	86.13	34.57	84.90	35.80	83.63	37.00
54	87.27	33.33	86.09	34.61	84.86	35.85	83.59	37.04
56	87.24	33.37	86.05	34.65	84.82	35.89	83.54	37.08
58	87.20	33.41	86.01	34.69	84.77	35.93	83.50	37.12
60	87.16	33.46	85.97	34.73	84.73	35.97	83.46	37.16
$c=0.75$	0.70	0.26	0.70	0.27	0.69	0.29	0.69	0.30
$c=1.00$	0.94	0.35	0.93	0.37	0.92	0.38	0.92	0.40
$c=1.25$	1.17	0.44	1.16	0.46	1.15	0.48	1.15	0.50

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	24°.		25°.		26°.		27°.	
	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.	Horizontal distances.	Difference of elevation.
0	83.46	37.16	82.14	38.30	80.78	39.40	79.39	40.45
2	83.41	37.20	82.09	38.34	80.74	39.44	79.34	40.49
4	83.37	37.23	82.05	38.38	80.69	39.47	79.30	40.52
6	83.33	37.27	82.01	38.41	80.65	39.51	79.25	40.55
8	83.28	37.31	81.96	38.45	80.60	39.54	79.20	40.59
10	83.24	37.35	81.92	38.49	80.55	39.58	79.15	40.62
12	83.20	37.39	81.87	38.53	80.51	39.61	79.11	40.66
14	83.15	37.43	81.83	38.56	80.46	39.65	79.06	40.69
16	83.11	37.47	81.78	38.60	80.41	39.69	79.01	40.72
18	83.07	37.51	81.74	38.64	80.37	39.72	78.96	40.76
20	83.02	37.54	81.69	38.67	80.32	39.76	78.92	40.79
22	82.98	37.58	81.65	38.71	80.28	39.79	78.87	40.82
24	82.93	37.62	81.60	38.75	80.23	39.83	78.82	40.86
26	82.89	37.66	81.56	38.78	80.18	39.86	78.77	40.89
28	82.85	37.70	81.51	38.62	80.14	39.90	78.73	40.92
30	82.80	37.74	81.47	38.86	80.09	39.93	78.68	40.96
32	82.76	37.77	81.42	38.89	80.04	39.97	78.63	40.99
34	82.72	37.81	81.38	38.93	80.00	40.00	78.58	41.02
36	82.67	37.85	81.33	38.97	79.95	40.04	78.54	41.06
38	82.63	37.89	81.28	39.00	79.90	40.07	78.49	41.09
40	82.58	37.93	81.24	39.04	79.86	40.11	78.44	41.12
42	82.54	37.96	81.19	39.08	79.81	40.14	78.39	41.16
44	82.49	38.00	81.15	39.11	79.76	40.18	78.34	41.19
46	82.45	38.04	81.10	39.15	79.72	40.21	78.30	41.22
48	82.41	38.08	81.06	39.18	79.67	40.24	78.25	41.26
50	82.36	38.11	81.01	39.22	79.62	40.28	78.20	41.29
52	82.32	38.15	80.97	39.26	79.58	40.31	78.15	41.32
54	82.27	38.19	80.92	39.29	79.53	40.35	78.10	41.35
56	82.23	38.23	80.87	39.33	79.48	40.38	78.06	41.39
58	82.18	38.26	80.83	39.36	79.44	40.42	78.01	41.42
60	82.14	38.30	80.78	39.40	79.39	40.45	77.96	41.45
c=0.75	0.68	0.31	0.68	0.32	0.67	0.33	0.66	0.35
c=1.00	0.91	0.41	0.90	0.43	0.89	0.45	0.89	0.46
c=1.25	1.14	0.52	1.13	0.54	1.12	0.56	1.11	0.58

TABLE 28.—*Horizontal distances and elevations from stadia readings*—Continued.

Minutes.	28°.		29°.		30°.	
	Horizontal distances.	Difference of elevations.	Horizontal distances.	Difference of elevations.	Horizontal distances.	Difference of elevations.
0	77.96	41.45	76.50	42.40	75.00	43.30
2	77.91	41.48	76.45	42.43	74.95	43.33
4	77.86	41.52	76.40	42.46	74.90	43.36
6	77.81	41.55	76.35	42.49	74.85	43.39
8	77.77	41.58	76.30	42.53	74.80	43.42
10	77.72	41.61	76.25	42.56	74.75	43.45
12	77.67	41.65	76.20	42.59	74.70	43.47
14	77.62	41.68	76.15	42.62	74.65	43.50
16	77.57	41.71	76.10	42.65	74.60	43.53
18	77.52	41.74	76.05	42.68	74.55	43.56
20	77.48	41.77	76.00	42.71	74.49	43.59
22	77.42	41.81	75.95	42.74	74.44	43.62
24	77.38	41.84	75.90	42.77	74.39	43.65
26	77.33	41.87	75.85	42.80	74.34	43.67
28	77.28	41.90	75.80	42.83	74.29	43.70
30	77.23	41.93	75.75	42.86	74.24	43.73
32	77.18	41.97	75.70	42.89	74.19	43.76
34	77.13	42.00	75.65	42.92	74.14	43.79
36	77.09	42.03	75.60	42.95	74.09	43.82
38	77.04	42.06	75.55	42.98	74.04	43.84
40	76.99	42.09	75.50	43.01	73.99	43.87
42	76.94	42.12	75.45	43.04	73.93	43.90
44	76.89	42.15	75.40	43.07	73.88	43.93
46	76.84	42.19	73.35	43.10	73.83	43.95
48	76.79	42.22	75.30	43.13	73.78	43.98
50	76.74	42.25	75.25	43.16	73.73	44.01
52	76.69	42.28	75.20	43.18	73.68	44.04
54	76.64	42.31	75.15	43.21	73.63	44.07
56	76.59	42.34	75.10	43.24	73.58	44.09
58	76.55	42.37	75.05	43.27	73.52	44.12
60	76.50	42.40	75.00	43.30	73.47	44.15
$c=0.75$	0.66	0.36	0.65	0.37	0.65	0.38
$c=1.00$	0.88	0.48	0.87	0.49	0.86	0.51
$c=1.25$	1.10	0.60	1.09	0.62	1.08	0.64

TABLE 29.—*For converting metric into United States measures.*

LINEAR.

Meters.	Inches.	Meters.	Feet.	Meters.	Yards.	Kilometers.	Miles.
1	39. 3700	1	3. 280833	1	1. 093611	1	0. 62137
2	78. 7400	2	6. 561667	2	2. 187222	2	1. 24274
3	118. 1100	3	9. 842500	3	3. 280833	3	. 86411
4	157. 4800	4	13. 123333	4	4. 374444	4	2. 48548
5	196. 8500	5	16. 404166	5	5. 468056	5	3. 10685
6	236. 2200	6	19. 685000	6	6. 561667	6	3. 72822
7	275. 5900	7	22. 965833	7	7. 655278	7	4. 34959
8	314. 9600	8	26. 246666	8	8. 748889	8	4. 97096
9	354. 3300	9	29. 527500	9	9. 842500	9	5. 59233

SQUARE.

Square centimeters.	Square inches.	Square meters.	Square feet.	Square meters.	Square yards.	Hectares.	Acres.
1	0. 1550	1	10. 764	1	1. 196	1	2. 471
2	0. 3100	2	21. 528	2	2. 392	2	4. 942
3	0. 4650	3	32. 292	3	3. 588	3	7. 413
4	0. 6200	4	43. 055	4	4. 784	4	9. 884
5	0. 7750	5	53. 819	5	5. 980	5	12. 355
6	0. 9300	6	64. 583	6	7. 176	6	14. 826
7	1. 0850	7	75. 347	7	8. 372	7	17. 297
8	1. 2400	8	86. 111	8	9. 568	8	19. 768
9	1. 3950	9	96. 875	9	10. 764	9	22. 239

TABLE 30.—*For converting United States measures into metric.*

LINEAR.

Inches.	Millimeters.	Feet.	Meters.	Yards.	Meters.	Miles.	Kilometers.
1	25.4001	1	0.304801	1	0.914402	1	1.60935
2	50.8001	2	0.609601	2	1.828804	2	3.21869
3	76.2002	3	0.914402	3	2.743205	3	4.82804
4	101.6002	4	1.219202	4	3.657607	4	6.43739
5	127.0003	5	1.524003	5	4.572009	5	8.04674
6	152.4003	6	1.828804	6	5.486411	6	9.65608
7	177.8004	7	2.133604	7	6.400813	7	11.26543
8	203.2004	8	2.438405	8	7.315215	8	12.87478
9	228.6005	9	2.743205	9	8.229616	9	14.48412

SQUARE.

Square inches.	Square centimeters.	Square feet.	Square decimeters.	Square yards.	Square meters.	Acres.	Hectares.
1	6.452	1	9.290	1	0.836	1	0.4047
2	12.903	2	18.581	2	1.672	2	0.8094
3	19.355	3	27.871	3	2.508	3	1.2141
4	25.807	4	37.161	4	3.344	4	1.6187
5	32.258	5	46.452	5	4.181	5	2.0234
6	38.710	6	55.742	6	5.017	6	2.4281
7	45.161	7	65.032	7	5.853	7	2.8328
8	51.613	8	74.323	8	6.689	8	3.2375
9	58.065	9	83.613	9	7.525	9	3.6422

TABLE 31.—FOR INTERCONVERSION OF MILES AND LOGARITHMS OF METERS, FOR DISTANCES FROM 10 TO 100 MILES.

The value adopted for the meter is 39.3700 inches. Distances between triangulation stations are given in logarithms of meters, but for general use distances in miles are most frequently desired.

The following examples illustrate use of the table:

To find the number of miles corresponding to log. distance in meters	4.56857
Next lower log. in table is for 23.00 miles	4.56838
Difference	19

Corresponding to tabular difference for 0.01 mile.
Hence distance required is 23.01 miles.

For distances less than 10 miles proceed as above; first adding 1 to the characteristic of the given logarithm and afterwards dividing the corresponding number of miles by 10. Example:

Having given the log. 3.84062, which is less than any given in the table, and therefore for a distance less than 10 miles, adding 1 to the characteristic of the logarithm gives 4.84062, which corresponds to a distance of 43.05 miles. Hence the distance sought is

$$\frac{43.05}{10}=4.305 \text{ miles.}$$

To change—

	(Add.)
Log. of miles to log. of meters	3.2066498
Log. of yards to log. of meters	9.9611371
Log. of feet to log. of meters	9.4840158
Log. of inches to log. of meters	8.4048346
Log. of meters to log. of miles	6.7933502
Log. of meters to log. of yards	0.0388629
Log. of meters to log. of feet	0.5159842
Log. of meters to log. of inches	1.5951654

TABLE 31.—*For interconversion of miles and logarithms of meters.*

[Prepared by S. S. Gannett.]

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
10.00	4.20665	43	10.50	4.22784	41	11.00	4.24804	39
.05	4.20882		.55	4.22990		.05	4.25001	
.10	4.21097		.60	4.23196		.10	4.25197	
.15	4.21312		.65	4.23400		.15	4.25393	
.20	4.21525	42	.70	4.23603		.20	4.25587	
.25	4.21737		.75	4.23806	40	.25	4.25780	
.30	4.21949		.80	4.24007		.30	4.25973	38
.35	4.22159		.85	4.24208		.35	4.26165	
.40	4.22368		.90	4.24408		.40	4.26355	
.45	4.22577	41	.95	4.24606		.45	4.26545	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
11.50	4.26735	38	14.00	4.35278	31	16.50	4.42413	26
.55	4.26923		.05	4.35433		.55	4.42545	
.60	4.27111	37	.10	4.35587		.60	4.42676	
.65	4.27298		.15	4.35741		.65	4.42806	
.70	4.27484		.20	4.35894		.70	4.42937	
.75	4.27669		.25	4.36047	30	.75	4.43067	
.80	4.27853		.30	4.36199		.80	4.43196	
.85	4.28037		.35	4.36350		.85	4.43325	
.90	4.28220	36	.40	4.36501		.90	4.43454	
.95	4.28402		.45	4.36652		.95	4.43582	
12.00	4.28583		.50	4.36802		17.00	4.43710	25
.05	4.28764		.55	4.36951		.05	4.43837	
.10	4.28944		.60	4.37100		.10	4.43964	
.15	4.29123		.65	4.37249		.15	4.44091	
.20	4.29301		.70	4.37397	29	.20	4.44218	
.25	4.29479	35	.75	4.37544		.25	4.44344	
.30	4.29656		.80	4.37691		.30	4.44470	
.35	4.29832		.85	4.37838		.35	4.44595	
.40	4.30007		.90	4.37984		.40	4.44720	
.45	4.30182		.95	4.38129		.45	4.44845	
.50	4.30356		15.00	4.38274		.50	4.44969	
.55	4.30529		.05	4.38419		.55	4.45093	
.60	4.30702	34	.10	4.38563		.60	4.45216	
.65	4.30874		.15	4.38706		.65	4.45339	
.70	4.31046		.20	4.38849		.70	4.45462	
.75	4.31216		.25	4.38992	28	.75	4.45585	24
.80	4.31386		.30	4.39134		.80	4.45707	
.85	4.31555		.35	4.39276		.85	4.45829	
.90	4.31724		.40	4.39417		.90	4.45950	
.95	4.31892	33	.45	4.39558		.95	4.46071	
13.00	4.32059		.50	4.39698		18.00	4.46192	
.05	4.32226		.55	4.39838		.05	4.46313	
.10	4.32392		.60	4.39977		.10	4.46433	
.15	4.32558		.65	4.40116		.15	4.46553	
.20	4.32722		.70	4.40255		.20	4.46672	
.25	4.32887		.75	4.40393		.25	4.46791	
.30	4.33050		.80	4.40531	27	.30	4.46910	
.35	4.33213	32	.85	4.40668		.35	4.47029	
.40	4.33375		.90	4.40805		.40	4.47147	
.45	4.33537		.95	4.40941		.45	4.47265	23
.50	4.33698		16.00	4.41077		.50	4.47382	
.55	4.33859		.05	4.41213		.55	4.47499	
.60	4.34019		.10	4.41348		.60	4.47616	
.65	4.34178		.15	4.41482		.65	4.47733	
.70	4.34337		.20	4.41616		.70	4.47849	
.75	4.34495		.25	4.41750		.75	4.47965	
.80	4.34653	31	.30	4.41884		.80	4.48081	
.85	4.34810		.35	4.42017	26	.85	4.48196	
.90	4.34966		.40	4.42149		.90	4.48311	
.95	4.35122		.45	4.42282		.95	4.48426	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
19.00	4.48540	23	21.50	4.53909	20	24.00	4.58686	18
.05	4.48654		.55	4.54010		.05	4.58777	
.10	4.48768		.60	4.54110		.10	4.58867	
.15	4.48882		.65	4.54211		.15	4.58957	
.20	4.48995		.70	4.54311		.20	4.59047	
.25	4.49108		.75	4.54411		.25	4.59136	
.30	4.49221	22	.80	4.54511		.30	4.59226	
.35	4.49333		.85	4.54610		.35	4.59315	
.40	4.49445		.90	4.54709		.40	4.59404	
.45	4.49557		.95	4.54808		.45	4.59493	
.50	4.49669		22.00	4.54907		.50	4.59582	
.55	4.49780		.05	4.55006		.55	4.59670	
.60	4.49891		.10	4.55104		.60	4.59759	
.65	4.50001		.15	4.55202		.65	4.59847	
.70	4.50112		.20	4.55300		.70	4.59935	
.75	4.50222		.25	4.55398	19	.75	4.60023	
.80	4.50332		.30	4.55495		.80	4.60110	
.85	4.50441		.35	4.55593		.85	4.60198	
.90	4.50550		.40	4.55690		.90	4.60285	17
.95	4.50659		.45	4.55787		.95	4.60372	
20.00	4.50768		.50	4.55883		25.00	4.60459	
.05	4.50876		.55	4.55980		.05	4.60546	
.10	4.50985		.60	4.56076		.10	4.60632	
.15	4.51093		.65	4.56172		.15	4.60719	
.20	4.51200		.70	4.56268		.20	4.60805	
.25	4.51308	21	.75	4.56363		.25	4.60891	
.30	4.51415		.80	4.56459		.30	4.60977	
.35	4.51521		.85	4.56554		.35	4.61063	
.40	4.51628		.90	4.56649		.40	4.61148	
.45	4.51734		.95	4.56743		.45	4.61234	
.50	4.51840		23.00	4.56838		.50	4.61319	
.55	4.51946		.05	4.56932		.55	4.61404	
.60	4.52052		.10	4.57026		.60	4.61489	
.65	4.52157		.15	4.57120		.65	4.61574	
.70	4.52262		.20	4.57214		.70	4.61658	
.75	4.52367		.25	4.57307		.75	4.61743	
.80	4.52471		.30	4.57401		.80	4.61827	
.85	4.52576		.35	4.57494		.85	4.61911	
.90	4.52680		.40	4.57587	18	.90	4.61995	
.95	4.52783		.45	4.57679		.95	4.62079	
21.00	4.52887		.50	4.57772		26.00	4.62162	
.05	4.52990		.55	4.57864		.05	4.62246	
.10	4.53093		.60	4.57956		.10	4.62329	
.15	4.53196		.65	4.58048		.15	4.62412	
.20	4.53299	20	.70	4.58140		.20	4.62495	
.25	4.53401		.75	4.58231		.25	4.62578	
.30	4.53503		.80	4.58323		.30	4.62661	16
.35	4.53605		.85	4.58414		.35	4.62743	
.40	4.53706		.90	4.58505		.40	4.62825	
.45	4.53808		.95	4.58596		.45	4.62908	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
26.50	4.62990	16	29.00	4.66905	15	31.50	4.70496	14
.55	4.63071		.05	4.66980		.55	4.70565	
.60	4.63153		.10	4.67054		.60	4.70634	
.65	4.63235		.15	4.67129		.65	4.70702	
.70	4.63316		.20	4.67203		.70	4.70771	
.75	4.63397		.25	4.67278		.75	4.70839	
.80	4.63479		.30	4.67352		.80	4.70908	
.85	4.63559		.35	4.67426		.85	4.70976	
.90	4.63640		.40	4.67500		.90	4.71044	
.95	4.63721		.45	4.67573		.95	4.71112	
27.00	4.63801		.50	4.67647		32.00	4.71180	
.05	4.63882		.55	4.67721		.05	4.71248	
.10	4.63962		.60	4.67794		.10	4.71315	
.15	4.64042		.65	4.67867		.15	4.71383	
.20	4.64122		.70	4.67941		.20	4.71451	13
.25	4.64202		.75	4.68014		.25	4.71518	
.30	4.64281		.80	4.68087		.30	4.71585	
.35	4.64361		.85	4.68159		.35	4.71652	
.40	4.64440		.90	4.68232		.40	4.71719	
.45	4.64519		.95	4.68305		.45	4.71787	
.50	4.64598		30.00	4.68377	14	.50	4.71853	
.55	4.64677		.05	4.68449		.55	4.71920	
.60	4.64756		.10	4.68522		.60	4.71987	
.65	4.64835		.15	4.68594		.65	4.72053	
.70	4.64913		.20	4.68666		.70	4.72120	
.75	4.64991		.25	4.68737		.75	4.72186	
.80	4.65069		.30	4.68809		.80	4.72252	
.85	4.65147		.35	4.68881		.85	4.72319	
.90	4.65225		.40	4.68952		.90	4.72385	
.95	4.65303		.45	4.69024		.95	4.72451	
28.00	4.65381	15	.50	4.69095		33.00	4.72516	
.05	4.65458		.55	4.69166		.05	4.72582	
.10	4.65536		.60	4.69237		.10	4.72648	
.15	4.65613		.65	4.69308		.15	4.72713	
.20	4.65690		.70	4.69379		.20	4.72779	
.25	4.65767		.75	4.69449		.25	4.72844	
.30	4.65844		.80	4.69520		.30	4.72909	
.35	4.65920		.85	4.69590		.35	4.72975	
.40	4.65997		.90	4.69661		.40	4.73040	
.45	4.66073		.95	4.69731		.45	4.73105	
.50	4.66149		31.00	4.69801		.50	4.73169	
.55	4.66226		.05	4.69871		.55	4.73234	
.60	4.66302		.10	4.69941		.60	4.73299	
.65	4.66377		.15	4.70011		.65	4.73363	
.70	4.66453		.20	4.70081		.70	4.73428	
.75	4.66529		.25	4.70150		.75	4.73492	
.80	4.66604		.30	4.70219		.80	4.73557	
.85	4.66680		.35	4.70289		.85	4.73621	
.90	4.66755		.40	4.70358		.90	4.73685	
.95	4.66830		.45	4.70427		.95	4.73749	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
34.00	4.73813	13	36.50	4.76894	12	39.00	4.79771	11
.05	4.73877		.55	4.76954		.05	4.79727	
.10	4.73940		.60	4.77013		.10	4.79883	
.15	4.74004		.65	4.77072		.15	4.79938	
.20	4.74068		.70	4.77132		.20	4.79994	
.25	4.74131		.75	4.77191		.25	4.80049	
.30	4.74194		.80	4.77250		.30	4.80104	
.35	4.74258		.85	4.77309		.35	4.80159	
.40	4.74321		.90	4.77368		.40	4.80215	
.45	4.74384		.95	4.77426		.45	4.80270	
.50	4.74447		37.00	4.77485		.50	4.80325	
.55	4.74510		.05	4.77544		.55	4.80380	
.60	4.74573		.10	4.77602		.60	4.80435	
.65	4.74635		.15	4.77661		.65	4.80489	
.70	4.74698		.20	4.77719		.70	4.80544	
.75	4.74761	12	.25	4.77778		.75	4.80599	
.80	4.74823		.30	4.77836		.80	4.80653	
.85	4.74885		.35	4.77894		.85	4.80708	
.90	4.74947		.40	4.77952		.90	4.80762	
.95	4.75010		.45	4.78010		.95	4.80817	
35.00	4.75072		.50	4.78068		40.00	4.80871	
.05	4.75134		.55	4.78126		.05	4.80925	
.10	4.75196		.60	4.78184		.10	4.80979	
.15	4.75257		.65	4.78241		.15	4.81034	
.20	4.75319		.70	4.78299		.20	4.81088	
.25	4.75381		.75	4.78357		.25	4.81142	
.30	4.75443		.80	4.78414		.30	4.81195	
.35	4.75504		.85	4.78472		.35	4.81249	
.40	4.75565		.90	4.78529		.40	4.81303	
.45	4.75627		.95	4.78586		.45	4.81357	
.50	4.75688		38.00	4.78643		.50	4.81411	
.55	4.75749		.05	4.78701	11	.55	4.81464	
.60	4.75810		.10	4.78758		.60	4.81518	
.65	4.75871		.15	4.78815		.65	4.81571	
.70	4.75932		.20	4.78871		.70	4.81624	
.75	4.75993		.25	4.78928		.75	4.81677	
.80	4.76053		.30	4.78985		.80	4.81731	
.85	4.76114		.35	4.79041		.85	4.81784	
.90	4.76174		.40	4.79098		.90	4.81837	
.95	4.76235		.45	4.79155		.95	4.81890	
36.00	4.76295		.50	4.79211		41.00	4.81943	
.05	4.76355		.55	4.79267		.05	4.81996	
.10	4.76416		.60	4.79324		.10	4.82049	
.15	4.76476		.65	4.79380		.15	4.82102	
.20	4.76536		.70	4.79436		.20	4.82155	
.25	4.76596		.75	4.79592		.25	4.82207	
.30	4.76656		.80	4.79548		.30	4.82260	
.35	4.76715		.85	4.79604		.35	4.82313	10
.40	4.76775		.90	4.79660		.40	4.82365	
.45	4.76835		.95	4.79716		.45	4.82417	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
41.50	4.82470	10	44.00	4.85010	10	46.50	4.87410	9
.55	4.82522		.05	4.85060		.55	4.87457	
.60	4.82574		.10	4.85109		.60	4.87504	
.65	4.82627		.15	4.85158		.65	4.87550	
.70	4.82679		.20	4.85207		.70	4.87597	
.75	4.82731		.25	4.85256		.75	4.87643	
.80	4.82783		.30	4.85305		.80	4.87690	
.85	4.82835		.35	4.85354		.85	4.87736	
.90	4.82886		.40	4.85403		.90	4.87782	
.95	4.82938		.45	4.85452		.95	4.87829	
42.00	4.82990		.50	4.85501		47.00	4.87875	
.05	4.83042		.55	4.85550		.05	4.87921	
.10	4.83093		.60	4.85599		.10	4.87967	
.15	4.83145		.65	4.85647		.15	4.88013	
.20	4.83196		.70	4.85696		.20	4.88059	
.25	4.83248		.75	4.85744		.25	4.88105	
.30	4.83299		.80	4.85793		.30	4.88151	
.35	4.83350		.85	4.85841		.35	4.88197	
.40	4.83402		.90	4.85890		.40	4.88243	
.45	4.83453		.95	4.85938		.45	4.88289	
.50	4.83504		45.00	4.85986		.50	4.88334	
.55	4.83555		.05	4.86035		.55	4.88380	
.60	4.83606		.10	4.86083		.60	4.88326	
.65	4.83657		.15	4.86131		.65	4.88471	
.70	4.83708		.20	4.86179		.70	4.88517	
.75	4.83759		.25	4.86227		.75	4.88562	
.80	4.83809		.30	4.86275		.80	4.88608	
.85	4.83860		.35	4.86323		.85	4.88653	
.90	4.83911		.40	4.86371		.90	4.88699	
.95	4.83961		.45	4.86418		.95	4.88744	
43.00	4.84012		.50	4.86466		48.00	4.88789	
.05	4.84062		.55	4.86514		.05	4.88834	
.10	4.84113		.60	4.86561		.10	4.88879	
.15	4.84163		.65	4.86609		.15	4.88925	
.20	4.84213		.70	4.86657		.20	4.88970	
.25	4.84264		.75	4.86704		.25	4.89015	
.30	4.84314		.80	4.86751		.30	4.89060	
.35	4.84364		.85	4.86799		.35	4.89105	
.40	4.84414		.90	4.86846		.40	4.89149	
.45	4.84464		.95	4.86894		.45	4.89194	
.50	4.84514		46.00	4.86941	9	.50	4.89239	
.55	4.84564		.05	4.86988		.55	4.89284	
.60	4.84614		.10	4.87035		.60	4.89329	
.65	4.84663		.15	4.87082		.65	4.89373	
.70	4.84713		.20	4.87129		.70	4.89418	
.75	4.84763		.25	4.87176		.75	4.89462	
.80	4.84812		.30	4.87223		.80	4.89507	
.85	4.84862		.35	4.87270		.85	4.89551	
.90	4.84911		.40	4.87317		.90	4.89596	
.95	4.84961		.45	4.87364		.95	4.89640	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
49.00	4.89685	9	51.50	4.91846	8	54.00	4.93904	8
.05	4.89729		.55	4.91888		.05	4.93945	
.10	4.89773		.60	4.91930		.10	4.93985	
.15	4.89817		.65	4.91972		.15	4.94025	
.20	4.89861		.70	4.92014		.20	4.94065	
.25	4.89906		.75	4.92056		.25	4.94105	
.30	4.89950		.80	4.92098		.30	4.94145	
.35	4.89994		.85	4.92140		.35	4.94185	
.40	4.90038		.90	4.92182		.40	4.94225	
.45	4.90082		.95	4.92224		.45	4.94265	
.50	4.90125		52.00	4.92265		.50	4.94305	
.55	4.90169		.05	4.92307		.55	4.94345	
.60	4.90213		.10	4.92349		.60	4.94384	
.65	4.90257		.15	4.92390		.65	4.94424	
.70	4.90301		.20	4.92432		.70	4.94464	
.75	4.90344		.25	4.92474		.75	4.94503	
.80	4.90388		.30	4.92515		.80	4.94543	
.85	4.90431		.35	4.92557		.85	4.94583	
.90	4.90475		.40	4.92598		.90	4.94622	
.95	4.90519		.45	4.92639		.95	4.94662	
50.00	4.90562		.50	4.92681		55.00	4.94701	
.05	4.90605		.55	4.92722		.05	4.94741	
.10	4.90649		.60	4.92764		.10	4.94780	
.15	4.90692		.65	4.92805		.15	4.94820	
.20	4.90735		.70	4.92846		.20	4.94859	
.25	4.90779		.75	4.92887		.25	4.94898	
.30	4.90822		.80	4.92928		.30	4.94937	
.35	4.90865		.85	4.92969		.35	4.94977	
.40	4.90908		.90	4.93011		.40	4.95016	
.45	4.90951		.95	4.93052		.45	4.95055	
.50	4.90994		53.00	4.93093		.50	4.95094	
.55	4.91037		.05	4.93133		.55	4.95133	
.60	4.91080		.10	4.93175		.60	4.95172	
.65	4.91123		.15	4.93215		.65	4.95212	
.70	4.91166		.20	4.93256		.70	4.95251	
.75	4.91209		.25	4.93297		.75	4.95289	
.80	4.91251		.30	4.93338		.80	4.95328	
.85	4.91294		.35	4.93378		.85	4.95367	
.90	4.91337		.40	4.93419		.90	4.95406	
.95	4.91379		.45	4.93460		.95	4.95445	
51.00	4.91422		.50	4.93500		56.00	4.95484	
.05	4.91465		.55	4.93541		.05	4.95523	
.10	4.91507		.60	4.93581		.10	4.95561	
.15	4.91550		.65	4.93622		.15	4.95600	
.20	4.91592		.70	4.93662		.20	4.95639	
.25	4.91634		.75	4.93703		.25	4.95677	
.30	4.91677	8	.80	4.93743		.30	4.95716	
.35	4.91719		.85	4.93784		.35	4.95754	
.40	4.91761		.90	4.93824		.40	4.95793	
.45	4.91803		.95	4.93864		.45	4.95831	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
56. 50	4. 95870	8	59. 00	4. 97750	7	61. 50	4. 99553	7
. 55	4. 95908		. 05	4. 97787		. 55	4. 99588	
. 60	4. 95947		. 10	4. 97824		. 60	4. 99623	
. 65	4. 95985		. 15	4. 97861		. 65	4. 99658	
. 70	4. 96023		. 20	4. 97897		. 70	4. 99693	
. 75	4. 96062		. 25	4. 97934		. 75	4. 99729	
. 80	4. 96100		. 30	4. 97971		. 80	4. 99764	
. 85	4. 96138		. 35	4. 98007		. 85	4. 99799	
. 90	4. 96176		. 40	4. 98044		. 90	4. 99834	
. 95	4. 96214		. 45	4. 98080		. 95	4. 99869	
57. 00	4. 96253		. 50	4. 98117		62. 00	4. 99904	
. 05	4. 96291		. 55	4. 98153		. 05	4. 99939	
. 10	4. 96329		. 60	4. 98190		. 10	4. 99974	
. 15	4. 96367		. 65	4. 98226		. 15	5. 00009	
. 20	4. 96405		. 70	4. 98262		. 20	5. 00044	
. 25	4. 96443		. 75	4. 98299		. 25	5. 00079	
. 30	4. 96481		. 80	4. 98335		. 30	5. 00114	
. 35	4. 96518		. 85	4. 98371		. 35	5. 00149	
. 40	4. 96556		. 90	4. 98408		. 40	5. 00183	
. 45	4. 96594		. 95	4. 98444		. 45	5. 00218	
. 50	4. 96632		60. 00	4. 98480		. 50	5. 00253	
. 55	4. 96669		. 05	4. 98516		. 55	5. 00288	
. 60	4. 96707		. 10	4. 98552		. 60	5. 00322	
. 65	4. 96745		. 15	4. 98589		. 65	5. 00357	
. 70	4. 96783		. 20	4. 98625		. 70	5. 00392	
. 75	4. 96820		. 25	4. 98661		. 75	5. 00426	
. 80	4. 96858	7	. 30	4. 98697		. 80	5. 00461	
. 85	4. 96895		. 35	4. 98733		. 85	5. 00495	
. 90	4. 96933		. 40	4. 98769		. 90	5. 00530	
. 95	4. 96970		. 45	4. 98805		. 95	5. 00565	
58. 00	4. 97008		. 50	4. 98841		63. 00	5. 00599	
. 05	4. 97045		. 55	4. 98876		. 05	5. 00633	
. 10	4. 97083		. 60	4. 98912		. 10	5. 00668	
. 15	4. 97120		. 65	4. 98948		. 15	5. 00702	
. 20	4. 97157		. 70	4. 98984		. 20	5. 00737	
. 25	4. 97195		. 75	4. 99020		. 25	5. 00771	
. 30	4. 97232		. 80	4. 99055		. 30	5. 00805	
. 35	4. 97269		. 85	4. 99091		. 35	5. 00840	
. 40	4. 97306		. 90	4. 99127		. 40	5. 00874	
. 45	4. 97343		. 95	4. 99162		. 45	5. 00908	
. 50	4. 97381		61. 00	4. 99198		. 50	5. 00942	
. 55	4. 97418		. 05	4. 99234		. 55	5. 00977	
. 60	4. 97455		. 10	4. 99269		. 60	5. 01011	
. 65	4. 97492		. 15	4. 99305		. 65	5. 01045	
. 70	4. 97529		. 20	4. 99340		. 70	5. 01079	
. 75	4. 97566		. 25	4. 99376		. 75	5. 01113	
. 80	4. 97603		. 30	4. 99411		. 80	5. 01147	
. 85	4. 97640		. 35	4. 99447		. 85	5. 01181	
. 90	4. 97677		. 40	4. 99482		. 90	5. 01215	
. 95	4. 97713		. 45	4. 99517		. 95	5. 01249	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
64.00	5.01283	7	66.50	5.02947	7	69.00	5.04550	6
.05	5.01317		.55	5.02980		.05	5.04581	
.10	5.01351		.60	5.03012		.10	5.04613	
.15	5.01385		.65	5.03045		.15	5.04644	
.20	5.01419		.70	5.03078		.20	5.04676	
.25	5.01452		.75	5.03110		.25	5.04707	
.30	5.01486		.80	5.03143		.30	5.04738	
.35	5.01520		.85	5.03175		.35	5.04770	
.40	5.01554		.90	5.03208		.40	5.04801	
.45	5.01587		.95	5.03241		.45	5.04832	
.50	5.01621		67.00	5.03273	6	.50	5.04863	
.55	5.01655		.05	5.03305		.55	5.04895	
.60	5.01688		.10	5.03337		.60	5.04926	
.65	5.01722		.15	5.03370		.65	5.04957	
.70	5.01755		.20	5.03402		.70	5.04988	
.75	5.01789		.25	5.03434		.75	5.05019	
.80	5.01823		.30	5.03467		.80	5.05051	
.85	5.01856		.35	5.03499		.85	5.05082	
.90	5.01889		.40	5.03531		.90	5.05113	
.95	5.01923		.45	5.03563		.95	5.05144	
65.00	5.01956		.50	5.03595		70.00	5.05175	
.05	5.01990		.55	5.03627		.05	5.05206	
.10	5.02023		.60	5.03660		.10	5.05237	
.15	5.02056		.65	5.03692		.15	5.05268	
.20	5.02090		.70	5.03724		.20	5.05299	
.25	5.02123		.75	5.03756		.25	5.05330	
.30	5.02156		.80	5.03788		.30	5.05361	
.35	5.02190		.85	5.03820		.35	5.05391	
.40	5.02223		.90	5.03852		.40	5.05422	
.45	5.02256		.95	5.03884		.45	5.05453	
.50	5.02289		68.00	5.03916		.50	5.05484	
.55	5.02322		.05	5.03948		.55	5.05515	
.60	5.02355		.10	5.03980		.60	5.05545	
.65	5.02389		.15	5.04012		.65	5.05576	
.70	5.02421		.20	5.04043		.70	5.05607	
.75	5.02455		.25	5.04075		.75	5.05538	
.80	5.02488		.30	5.04107		.80	5.05668	
.85	5.02521		.35	5.04139		.85	5.05699	
.90	5.02554		.40	5.04171		.90	5.05730	
.95	5.02587		.45	5.04202		.95	5.05760	
66.00	5.02619		.50	5.04234		71.00	5.05791	
.05	5.02652		.55	5.04266		.05	5.05821	
.10	5.02685		.60	5.04297		.10	5.05852	
.15	5.02718		.65	5.04329		.15	5.05883	
.20	5.02751		.70	5.04361		.20	5.05913	
.25	5.02784		.75	5.04392		.25	5.05943	
.30	5.02816		.80	5.04424		.30	5.05974	
.35	5.02849		.85	5.04455		.35	5.06004	
.40	5.02882		.90	5.04487		.40	5.06035	
.45	5.02915		.95	5.04518		.45	5.06065	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
71.50	5.06096	6	74.00	5.07588	6	76.50	5.09031	6
.55	5.06126		.05	5.07617		.55	5.09059	
.60	5.06156		.10	5.07647		.60	5.09088	
.65	5.06187		.15	5.07676		.65	5.09117	
.70	5.06217		.20	5.07705		.70	5.09145	
.75	5.06247		.25	5.07735		.75	5.09173	
.80	5.06277		.30	5.07764		.80	5.09201	
.85	5.06308		.35	5.07793		.85	5.09229	
.90	5.06338		.40	5.07822		.90	5.09258	
.95	5.06368		.45	5.07851		.95	5.09286	
72.00	5.06398		.50	5.07881		77.00	5.09314	
.05	5.06428		.55	5.07910		.05	5.09342	
.10	5.06459		.60	5.07939		.10	5.09370	
.15	5.06489		.65	5.07968		.15	5.09399	
.20	5.06519		.70	5.07997		.20	5.09427	
.25	5.06549		.75	5.08026		.25	5.09455	
.30	5.06579		.80	5.08055		.30	5.09483	
.35	5.06609		.85	5.08084		.35	5.09511	
.40	5.06639		.90	5.08113		.40	5.09539	
.45	5.06669		.95	5.08142		.45	5.09567	
.50	5.06699		75.00	5.08171		.50	5.09595	
.55	5.06729		.05	5.08200		.55	5.09623	
.60	5.06759		.10	5.08229		.60	5.09651	
.65	5.06789		.15	5.08258		.65	5.09679	
.70	5.06818		.20	5.08287		.70	5.09707	
.75	5.06848		.25	5.08316		.75	5.09735	
.80	5.06878		.30	5.08345		.80	5.09763	
.85	5.06908		.35	5.08373		.85	5.09791	
.90	5.06938		.40	5.08402		.90	5.09819	
.95	5.06967		.45	5.08431		.95	5.09847	
73.00	5.06997		.50	5.08460		78.00	5.09875	
.05	5.07027		.55	5.08488		.05	5.09902	
.10	5.07057		.60	5.08517		.10	5.09930	
.15	5.07086		.65	5.08546		.15	5.09958	
.20	5.07116		.70	5.08575		.20	5.09986	
.25	5.07146		.75	5.08603		.25	5.10013	
.30	5.07175		.80	5.08632		.30	5.10041	
.35	5.07205		.85	5.08661		.35	5.10069	
.40	5.07235		.90	5.08689		.40	5.10097	
.45	5.07264		.95	5.08718		.45	5.10124	
.50	5.07294		76.00	5.08746		.50	5.10152	
.55	5.07323		.05	5.08775		.55	5.10180	
.60	5.07353		.10	5.08803		.60	5.10207	
.65	5.07382		.15	5.08832		.65	5.10235	
.70	5.07412		.20	5.08861		.70	5.10263	
.75	5.07441		.25	5.08889		.75	5.10290	
.80	5.07471		.30	5.08917		.80	5.10318	
.85	5.07500		.35	5.08946		.85	5.10345	
.90	5.07529		.40	5.08974		.90	5.10373	
.95	5.07559		.45	5.09003		.95	5.10400	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
79.00	5.10428	5	81.50	5.11781	5	84.00	5.13093	5
.05	5.10455		.55	5.11807		.05	5.13119	
.10	5.10483		.60	5.11834		.10	5.13145	
.15	5.10510		.65	5.11861		.15	5.13170	
.20	5.10537		.70	5.11887		.20	5.13196	
.25	5.10565		.75	5.11913		.25	5.13222	
.30	5.10592		.80	5.11940		.30	5.13248	
.35	5.10620		.85	5.11967		.35	5.13273	
.40	5.10647		.90	5.11993		.40	5.13299	
.45	5.10674		.95	5.12020		.45	5.13325	
.50	5.10702		82.00	5.12046		.50	5.13351	
.55	5.10729		.05	5.12073		.55	5.13376	
.60	5.10756		.10	5.12099		.60	5.13402	
.65	5.10784		.15	5.12126		.65	5.13428	
.70	5.10811		.20	5.12152		.70	5.13453	
.75	5.10838		.25	5.12179		.75	5.13479	
.80	5.10865		.30	5.12205		.80	5.13505	
.85	5.10893		.35	5.12231		.85	5.13530	
.90	5.10920		.40	5.12258		.90	5.13556	
.95	5.10947		.45	5.12284		.95	5.13581	
80.00	5.10974		.50	5.12310		85.00	5.13607	
.05	5.11001		.55	5.12337		.05	5.13632	
.10	5.11028		.60	5.12363		.10	5.13658	
.15	5.11055		.65	5.12389		.15	5.13683	
.20	5.11082		.70	5.12416		.20	5.13709	
.25	5.11109		.75	5.12442		.25	5.13734	
.30	5.11137		.80	5.12468		.30	5.13760	
.35	5.11164		.85	5.12494		.35	5.13785	
.40	5.11191		.90	5.12521		.40	5.13811	
.45	5.11218		.95	5.12547		.45	5.13836	
.50	5.11245		83.00	5.12573		.50	5.13862	
.55	5.11272		.05	5.12599		.55	5.13887	
.60	5.11299		.10	5.12625		.60	5.13912	
.65	5.11325		.15	5.12651		.65	5.13938	
.70	5.11352		.20	5.12677		.70	5.13963	
.75	5.11379		.25	5.12703		.75	5.13988	
.80	5.11406		.30	5.12729		.80	5.14014	
.85	5.11433		.35	5.12756		.85	5.14039	
.90	5.11460		.40	5.12782		.90	5.14064	
.95	5.11487		.45	5.12808		.95	5.14090	
81.00	5.11513		.50	5.12834		86.00	5.14115	
.05	5.11540		.55	5.12860		.05	5.14140	
.10	5.11567		.60	5.12886		.10	5.14165	
.15	5.11594		.65	5.12912		.15	5.14191	
.20	5.11621		.70	5.12937		.20	5.14216	
.25	5.11647		.75	5.12963		.25	5.14241	
.30	5.11674		.80	5.12989		.30	5.14266	
.35	5.11701		.85	5.13015		.35	5.14291	
.40	5.11727		.90	5.13041		.40	5.14316	
.45	5.11754		.95	5.13067		.45	5.14341	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
86.50	5.14367	5	89.00	5.15604	5	91.50	5.16807	5
.55	5.14392		.05	5.15628		.55	5.16831	
.60	5.14417		.10	5.15653		.60	5.16855	
.65	5.14442		.15	5.15677		.65	5.16878	
.70	5.14467		.20	5.15701		.70	5.16902	
.75	5.14492		.25	5.15726		.75	5.16926	
.80	5.14517		.30	5.15750		.80	5.16949	
.85	5.14542		.35	5.15775		.85	5.16973	
.90	5.14567		.40	5.15799		.90	5.16997	
.95	5.14592		.45	5.15823		.95	5.17020	
87.00	5.14617		.50	5.15847		92.00	5.17044	
.05	5.14642		.55	5.15872		.05	5.17067	
.10	5.14667		.60	5.15896		.10	5.17091	
.15	5.14692		.65	5.15920		.15	5.17115	
.20	5.14717		.70	5.15944		.20	5.17138	
.25	5.14741		.75	5.15968		.25	5.17162	
.30	5.14766		.80	5.15993		.30	5.17285	
.35	5.14791		.85	5.16017		.35	5.17209	
.40	5.14816		.90	5.16041		.40	5.17232	
.45	5.14841		.95	5.16065		.45	5.17256	
.50	5.14866		90.00	5.16089		.50	5.17279	
.55	5.14891		.05	5.16113		.55	5.17303	
.60	5.14915		.10	5.16137		.60	5.17326	
.65	5.14940		.15	5.16162		.65	5.17349	
.70	5.14965		.20	5.16186		.70	5.17373	
.75	5.14990		.25	5.16210		.75	5.17396	
.80	5.15014		.30	5.16234		.80	5.17420	
.85	5.15039		.35	5.16258		.85	5.17443	
.90	5.15064		.40	5.16282		.90	5.17467	
.95	5.15089		.45	5.16306		.95	5.17490	
88.00	5.15113		.50	5.16330		93.00	5.17513	
.05	5.15138		.55	5.16354		.05	5.17537	
.10	5.15163		.60	5.16378		.10	5.17560	
.15	5.15187		.65	5.16402		.15	5.17583	
.20	5.15212		.70	5.16426		.20	5.17607	
.25	5.15237		.75	5.16450		.25	5.17630	
.30	5.15261		.80	5.16474		.30	5.17653	
.35	5.15286		.85	5.16497		.35	5.17676	
.40	5.15310		.90	5.16521		.40	5.17700	
.45	5.15335		.95	5.16545		.45	5.17723	
.50	5.15359		91.00	5.16569		.50	5.17746	
.55	5.15384		.05	5.16593		.55	5.17769	
.60	5.15408		.10	5.16617		.60	5.17793	
.65	5.15433		.15	5.16641		.65	5.17816	
.70	5.15457		.20	5.16665		.70	5.17839	
.75	5.15482		.25	5.16688		.75	5.17862	
.80	5.15506		.30	5.16712		.80	5.17885	
.85	5.15531		.35	5.16736		.85	5.17908	
.90	5.15555		.40	5.16760		.90	5.17932	
.95	5.15580		.45	5.16783		.95	5.17955	

TABLE 31.—*For interconversion of miles and logarithms of meters*—Continued.

Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.	Miles.	Log. meters.	Diff. log. .01 mile.
94.00	5.17978	5	96.00	5.18892	5	98.00	5.19788	4
.05	5.18001		.05	5.18915		.05	5.19810	
.10	5.18024		.10	5.18937		.10	5.19832	
.15	5.18047		.15	5.18960		.15	5.19854	
.20	5.18170		.20	5.18983		.20	5.19876	
.25	5.18193		.25	5.19005		.25	5.19898	
.30	5.18116		.30	5.19028		.30	5.19920	
.35	5.18139		.35	5.19050		.35	5.19942	
.40	5.18162		.40	5.19073		.40	5.19965	
.45	5.18185		.45	5.19095		.45	5.19987	
.50	5.18208		.50	5.19118		.50	5.20009	
.55	5.18231		.55	5.19140		.55	5.20031	
.60	5.18254		.60	5.19163		.60	5.20053	
.65	5.18277		.65	5.19185		.65	5.20075	
.70	5.18300		.70	5.19208		.70	5.20097	
.75	5.18323		.75	5.19230		.75	5.20119	
.80	5.18346		.80	5.19253		.80	5.20141	
.85	5.18369		.85	5.19275		.85	5.20163	
.90	5.18392		.90	5.19297		.90	5.20185	
.95	5.18415		.95	5.19320		.95	5.20207	
95.00	5.18437		97.00	5.19342	4	99.00	5.20229	
.05	5.18460		.05	5.19365		.05	5.20250	
.10	5.18483		.10	5.19387		.10	5.20272	
.15	5.18506		.15	5.19409		.15	5.20294	
.20	5.18529		.20	5.19432		.20	5.20316	
.25	5.18551		.25	5.19454		.25	5.20338	
.30	5.18574		.30	5.19476		.30	5.20360	
.35	5.18597		.35	5.19499		.35	5.20382	
.40	5.18620		.40	5.19521		.40	5.20404	
.45	5.18643		.45	5.19543		.45	5.20425	
.50	5.18665		.50	5.19565		.50	5.20447	
.55	5.18688		.55	5.19588		.55	5.20469	
.60	5.18711		.60	5.19610		.60	5.20491	
.65	5.18733		.65	5.19632		.65	5.20513	
.70	5.18756		.70	5.19655		.70	5.20535	
.75	5.18779		.75	5.19677		.75	5.20556	
.80	5.18802		.80	5.19699		.80	5.20578	
.85	5.18824		.85	5.19721		.85	5.20600	
.90	5.18847		.90	5.19743		.90	5.20621	
.95	5.18869		.95	5.19765		.95	5.20643	

CONVENIENT EQUIVALENTS.

1 acre =209 feet square, nearly.
1 acre = 43,560 square feet = 4,840 square yards.
1 statute mile = 1,760 yards = 5,280 feet = 63,360 inches.
1 cubic foot = 7.48 gallons = 0.804 bushel.
1 cubic foot of water weighs 62.4 pounds.
1 wine gallon = 8.34 pounds water.
1 wine gallon = 231 cubic inches.
1 avoirdupois pound = 7,000 grains.
1 troy pound = 5,760 grains.

1 meter = 39.37 inches. Log. 1.5951654.
1 meter = 3.28083 feet. Log. 0.5159842.
1 meter = 1.093611 yards. Log. 0.0388629.
1 meter = 0.00062137 mile. Log. 6.7933502.
1 kilometer = 3,281 feet = five-eighths mile, nearly.
1 cubic meter = 35.314 cubic feet = 1.308 yards.
1 liter = 1.0567 quarts.
1 gram = 15.43 grains.
1 kilogram = 2.2046 avoirdupois pounds.
1 tonneau (metric ton) = 2,204.6 pounds.
1 cubic meter per minute = 0.5886 second-foot.
1 second-foot = 50 California miner's inches.
1 second-foot = 40 Arizona miner's inches.
1 second-foot = 449 gallons per minute.
1 second-foot for one day = 1.9835 acre-feet.
1 second-foot for one day = 646,272 United States gallons.
1 second-foot = about one acre-inch per hour.
1 acre-foot = 325,850 gallons.
1,000,000 gallons = 3.07 acre-feet.
1,000,000 cubic feet = 22.95 acre-feet.
1,000,000 gallons per 24 hours = 1.55 second-feet.
1 horse power = 550 foot-pounds per second.
1 horse power = 76 kilogrammeters per second.
1 horse power = 746 watts.
1 horse power = 1 second-foot water falling 8.8 feet.
1 second-foot falling 10 feet = 1.135 horse power.
1 foot per second = 1.077 kilometers per hour.
1 foot per second = 0.68 miles per hour.
1 inch = 2.54 centimeters.
1 foot = 0.3048 meters.
1 yard = 0.9144 meters.
1 mile = 1.60935 kilometers.
1 square yard = 0.836 square meters.
1 acre = 0.4047 hectares.
1 square mile = 259 hectares.
1 square mile = 2.59 square kilometers.
1 cubic foot = 0.0283 cubic meters.
1 cubic yard = 0.7646 cubic meters.
1 gallon = 3.7854 liters.
1 pound = 0.4536 kilograms.

$$1 \text{ atmosphere} = \text{about} \begin{cases} 15 \text{ pounds per square inch.} \\ 1 \text{ ton per square foot.} \\ 1 \text{ kilo per square centimeter.} \end{cases}$$

Acceleration of gravity = 32.16 feet per second.
To change miles to inches on map:

Scale 1:125000,	1 mile = 0.50688 inches.	Log. = 9.7049052.
Scale 1:90000,	1 mile = 0.70400 inches.	Log. = 9.8475727.
Scale 1:62500,	1 mile = 1.01376 inches.	Log. = 0.0059352.
Scale 1:45000,	1 mile = 1.40800 inches.	Log. = 0.1486027.

To change log. of meters to log. of inches on map:

Scale 1:125000	add 6.4982552.
Scale 1:90000	add 6.6409228.
Scale 1:62500	add 6.7992853.
Scale 1:45000	add 6.9419528.

CONSTANTS.

			Log.
Basis of natural logarithms	e =	2.7182818285	0.4342944819
Modulus of Briggs's logarithms	m =	0.4342944819	9.6377843113—10
Radius of the circle in seconds	r =	206264.8062	5.3144251332
Radius of the circle in minutes	r =	3437.74677	3.5362738828
Radius of the circle in degrees	r =	57.2957795	1.7581226324
Circumference of the circle in seconds		1296000	6.1126050015
Circumference of the circle in minutes		21600	4.3344537512
Circumference of the circle in degrees		360	2.5563025008
Circumference of the circle for the diameter	=	1	0.0000000000
	=	3.1415926536	0.4971498727

ASTRONOMICAL CONSTANTS (HARKNESS).

Sidereal year = 365.256 357 8 mean solar days.
Sidereal day = $23^h\ 56^m\ 4.^s100$ mean solar time.
Mean solar day = $24^h\ 3^m\ 56.^s546$ sidereal time.
Mean distance of the earth from the sun = 92 800 000 miles.

PHYSICAL CONSTANTS.

Velocity of light (Harkness) = 186 337 miles per second = 299 878 km. per second.
Velocity of sound through dry air = $1090 \sqrt{1+0.00367\, t^\circ \text{ C.}}$ feet per second.

LINEAR EXPANSIONS OF PRINCIPAL METALS IN MICRONS PER METER (OR MILLIONTHS PER UNIT LENGTH).

Name of metal.	Expansion per degree C.	Expansion per degree F.
Aluminum	20	11.1
Brass	19	10.5
Copper	17	9.4
Glass	9	5.0
Gold	15	8.3
Iron, cast	11	6.1
Iron, wrought	12	6.7
Lead	28	15.5
Nickel-steel	0	0.0
Platinum	9	5.0
Platinum-iridium	8.7	4.8
Silver	19	10.5
Steel, hard	12	6.7
Steel, soft	11	6.1
Tin	19	10.5
Zinc	29	16.1

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