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FORMULAS AND TABLES

FOR THE

CONSTRUCTION OF POLYCONIC PROJECTIONS

COMPILED BY
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PREFACE

The primary purpose of this publication is to provide tables for the construction of polyconic projections of topographic maps of standard quadrangles without any interpolation. Bulletin 650, "Geographic tables and formulas," gives many of the data needed, but the projection tables in that bulletin are incomplete, and many of them require difficult interpolation. The tables given herewith have been prepared with arguments for each meridian and parallel represented on maps of standard quadrangles, and the data are given in inches for each of the standard field scales employed by the Geological Survey. Tables in the same form have also been prepared for the two scales on which most of the quadrangle maps of the Geological Survey are published in final form—1:62,500, 1:125,000—and also for the scales 1:63,360, 1:20,000, 1:12,000, and 1:10,000. On account of lack of funds for printing, these tables have not been included in this publication, but it is hoped that they can be published at a later date.

A secondary purpose is to present in one publication all of the theory of the polyconic projection, with the formulas developed in detail and their use so explained that the engineer or cartographer with only an average knowledge of mathematics can understand and use them. Complete instructions are given for making polyconic projections of standard quadrangles by means of these tables.

The theory of the modified polyconic projection of the international map of the world is also explained, and tables for its construction are given with the data in meters on the natural scale as well as in inches on the scale of 1 : 1,000,000. For the first time these data have been computed for each degree of latitude.

The tables have been computed by members of the computing section of the United States Geological Survey, under the supervision of George T. Hawkins. The author is indebted to David H. Baldwin and Edward W. Tibbott, of the Geological Survey, and to Oscar Adams, of the United States Coast and Geodetic Survey, for valuable advice and critical review. Notices of errors and suggestions for improvement of the material are invited.

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FORMULAS AND TABLES FOR THE CONSTRUCTION OF POLYCONIC PROJECTIONS

Compiled by C. H. BIRDSEYE

GENERAL CONSIDERATIONS

Choice of a projection.—In mapping large areas the engineer is confronted with the problem of representing accurately on the plane surface of a map the details that exist on the earth's spherical surface. As it is impossible to do this exactly, he must resort to the use of some convention that will represent the earth's surface with the least distortion. The systematic drawing on a plane surface of lines that represent reference lines on the spherical surface of the earth is called a map projection. There are many systems of projection, each of which fulfills certain desirable conditions but none of which is ideal. The choice of the proper projection to use for a certain map is not always easy but depends largely on the extent of the area to be represented and on the use to which the map will be put. The best treatise on map projection published in English is United States Coast and Geodetic Survey Special Publication 68, "Elements of map projection."

Advantages and disadvantages of the polyconic projection.—The topographic engineer needs a projection which is simple in construction, which can be used to represent small areas on any part of the globe, and which, for each small area to which it is applied, preserves shapes, areas, distances, and azimuths in their true relation to the surface of the earth. For areas of small extent the polyconic projection meets all these needs, and it was adopted for the standard topographic map of the United States, in which the 1° quadrangle is the largest unit and the 15′ quadrangle is the average unit. Misuse of this projection in attempts to spread it over large areas—that is, to construct a single map of a large area—has developed serious errors and gross exaggeration of details. For example, the polyconic projection is not at all suitable for a single-sheet map of the United States or of a large State, although it has been so employed. Its greatest advantage lies in the facts that it has been computed for all latitudes of the entire spheroid and that it represents a small area on any part of the earth's surface just as well as one on any other part.

Characteristics of the polyconic projection.—The polyconic projection takes its name from the fact that it is based on the development of a large number of cones each conceived to be tangent to the spheroid at a parallel of latitude to be represented on the map. It has been computed for every minute of latitude from 0° to 90°, and existing tables make its construction very easy. It was devised by Ferdinand Hassler, the first superintendent of the United States Coast and Geodetic Survey, and has been computed by that bureau. The theory of the projection and tables for its construction are given in Coast and Geodetic Survey Special Publications 57 and 5.

In this projection a central meridian is drawn as a straight line, and the intersections of the parallels are spaced true to scale along this central meridian. Each parallel is then laid down separately by means of a cone whose base is tangent to the earth's surface at that parallel, with the vertex of the developed cone on the extension of the central meridian. The arcs of the parallels thus drawn are subdivided to true scale, and the meridians are drawn through these subdivisions. As a result the central meridian is shown as a straight line, and theoretically all other meridians are shown as curves. As the meridians and parallels nowhere intersect at right angles, except along the central meridian, and as all the other meridians are drawn as curves concave toward the central meridian, it is theoretically impossible to fit together in a row, east and west, two maps each of which is developed on its own central meridian, as their joining edges are curved in opposite directions. However, in practice and within certain limits this theoretical condition does not exist. It is impossible for a draftsman or an engraver to draw the limiting meridians of a 1° or smaller quadrangle within the latitudinal limits of the United States other than as straight lines. Moreover, as the projection is extended from the central meridian the length of the meridians is theoretically increased, but even in latitude 60° the difference in length between the line representing the limiting meridian of a 1° quadrangle and the line representing the central meridian is too small to be plotted, and the lengths of all the meridians on a projection of 1° or smaller may be assumed to be the same. Therefore, a row of maps east and west will join perfectly, although as the north edge of each map is shorter than the south edge the row will form a curve. A tier of maps north and south will also join with sufficient accuracy. Theoretically, there will be small gores between the edges of each east-west row of maps and the next row to the north or south, but in actual practice the distortion of map paper due to changes in atmospheric conditions is greater than the error of joining, so that by slightly stretching the outer tiers a moderate number of maps—say five or six each way—can be joined with approximately perfect accuracy. Seldom, if ever, will a map user

wish to join more than five or six quadrangle maps in any direction. The limits in the size of tables or wall space make further extension impracticable, and therefore the theoretical weaknesses of this projection can be ignored so far as maps of small quadrangles are concerned.

THEORY OF THE AMERICAN POLYCONIC PROJECTION

Clarke's spheroid.—The data in the following tables for the polyconic projection of maps are based on the dimensions of the spheroid determined by Col. A. R. Clarke, R. E., in 1866, as expressed by Clarke in meters but not as expressed by him in feet. Although the International Geophysical Union has adopted the Hayford spheroid as the most exactly determined representation of the size and shape of the earth, and the dimensions of the Hayford spheroid are now used in geophysical research, still the Clarke spheroid represents very closely the true size and shape of the earth, and most of the existing tables for the projection of maps are based on it. In the following tables the data are merely converted from measurements on the spheroid in meters, given in United States Coast and Geodetic Survey Special Publication 5, to inches on the several map scales employed by the United States Geological Survey. Some interpolation has been required in order to provide data for arguments for use in the construction of standard projections of $7\frac{1}{2}'$ and $15'$ quadrangles, such as latitude and longitude intervals of $1\frac{1}{4}'$, $2\frac{1}{2}'$, $3\frac{3}{4}'$, and $7\frac{1}{2}'$. Interpolation has also been employed in the conversion of the data, which may have resulted in errors of 0.001 inch in the tables, but one one-thousandth of an inch can not be plotted.

Tables are given for all the standard field scales employed by the Geological Survey for latitudes 0° to 51° or more. As the computation of special projections may be required, the fundamental formulas and demonstrations of their development are given with instructions for their use. The nomenclature employed in the formulas given in different publications on this subject differs, and in some demonstrations of the development of the formulas there may be some doubt as to the meaning of the symbols employed and some confusion in the use of mathematical expressions, such as an arc expressed in terms of the radius. An attempt has therefore been made to explain fully the meaning of each symbol or expression and to make the demonstrations and the instructions as to the use of the formulas so clear that a cartographer with only average knowledge of mathematics can follow them. In these demonstrations the following publications have been consulted freely and to some extent are quoted verbatim: United States Coast and Geodetic Survey Special Publications 5 and 57, Smithsonian Geographic Tables, and United States Geological Survey Bulletins 50 and 650.

Clarke expressed the dimensions of the spheroid in meters and also in English feet. According to him 1 meter = 39.370432 inches = 3.28086933 feet. The Smithsonian Geographic Tables and United States Geological Survey Bulletin 50, both prepared by R. S. Woodward, depend on the Clarke spheroid as expressed by him in feet. Some of the tables given in United States Geological Survey Bulletin 650 are extracts from the Smithsonian Geographic Tables and some are extracts from the United States Coast and Geodetic Survey tables. The polyconic projection tables computed by the United States Coast and Geodetic Survey depend on the dimensions of the spheroid as expressed by Clarke in meters, and the tables given herein depend on these dimensions and on the legal value in the United States of 1 meter = 39.37 inches = 3.28083333 feet. This figure does not express the absolutely correct relation between the international meter and the inch, but it is close enough for all practical purposes of map projection. Therefore, in order to reduce the dimensions of the spheroid as given by Clarke and Woodward in feet, and any tables of length based thereon, to corresponding values given in the United States Coast and Geodetic Survey Tables and those in this publication, it is necessary to multiply by the fraction $\frac{39.37}{39.370432} = 0.99998903$ (log. 9.99999523–10).

Constants of the generating ellipse.—The constants of the generating ellipse of a spheroid for which values are required in the computation of projection tables are defined as follows:

a = semimajor axis.
b = semiminor axis.
e = eccentricity.

$$n = \frac{a-b}{a+b} = \frac{1-\sqrt{1-e^2}}{1+\sqrt{1-e^2}}$$

The values of these constants with their logarithms for the Clarke spheroid of 1866 expressed in meters as used in computing the tables in this publication are:

a = 6,378,206.4 meters.	$\log a$ = 6.8046985690.
b = 6,356,583.8 meters.	$\log b$ = 6.8032237768.
e^2 = 0.0067686580.	$\log e^2$ = 7.8305025710–10.
n = 0.0016979157.	$\log n$ = 7.2299161198–10.

Radii of curvature.—The principal radii of curvature of an ellipsoid (see fig. 1) are

ρ_m = the radius of curvature of a meridional section.
ρ_n = the radius of curvature of a section normal to the meridian.

Both are constant for a given latitude, but for precise computations infinitely small sections of the circumference of the meridional ellipse must be considered, because meridional arcs cover a range of latitude,

and therefore ρ_m must be evaluated for infinitely small changes in latitude.

In Figure 1, let APP'D represent a quadrant of the generating ellipse; AQQ'B, a quadrant of the circumscribed circle; EFF'D, a quadrant of the inscribed circle; P and P', two contiguous points on the ellipse at the ends of the infinitely small arc ds; PK and P'K ($=\rho_m$), the normals at P and P', or the radius of curvature of the infinitely small meridional arc ds; PK' ($=\rho_n$), the radius of curvature of a section normal to the meridian; OA ($=a$), the semimajor axis; OD ($=b$), the semiminor axis; the angle $XRP=\phi$, the latitude of the point P; and the angle $XOQ=\psi$, the geocentric latitude of the point P.

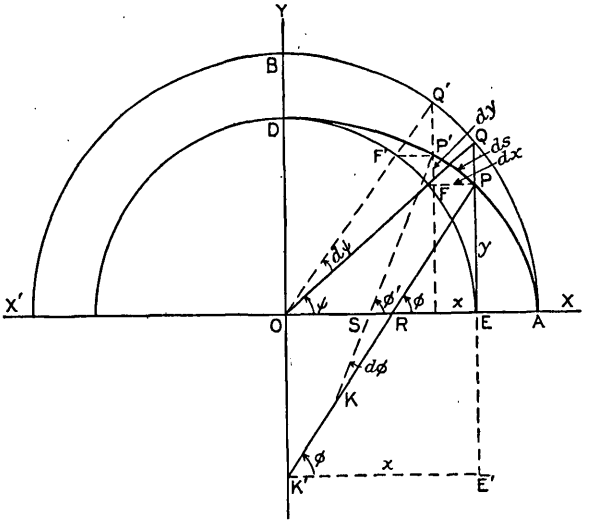

FIGURE 1.—Elements of generating ellipse

Expressing the coordinates of the point P in parametric form, we have

$$x = a \cos \psi$$

$$y = b \sin \psi$$

As the point moves from P to P' the small changes in x and y are PF ($=-dx$) and FP' ($=dy$), respectively. If the two equations are differentiated, ψ being regarded as a variable angle and x and y as functions of ψ, then

$$dx = -a \sin \psi \, d\psi$$

$$dy = \quad b \cos \psi \, d\psi$$

The triangles RPE and PP'F are similar and the angle PP'F = angle PRE = ϕ, therefore

$$\tan \phi = \frac{-dx}{dy}.$$

Substituting the values of dx and dy, we have

$$\tan \phi = \frac{a \sin \psi}{b \cos \psi} = \frac{a}{b} \tan \psi$$

or

$$\tan \psi = \frac{b}{a} \tan \phi$$

The eccentricity of the ellipse, represented by e, is defined by the equation

$$e^2 = \frac{a^2 - b^2}{a^2} = 1 - \frac{b^2}{a^2}$$

or

$$\frac{b^2}{a^2} = 1 - e^2$$

and

$$\frac{b}{a} = \sqrt{1 - e^2}$$

Substituting this value, we have

$$\tan \psi = \sqrt{1 - e^2} \tan \phi$$

but

$$\sin \psi = \tan \psi \cos \psi = \frac{\tan \psi}{\sec \psi} = \frac{\tan \psi}{\sqrt{1 + \tan^2 \psi}} = \frac{\sqrt{1 - e^2} \tan \phi}{\sqrt{1 + \tan^2 \phi - e^2 \tan^2 \phi}} =$$

$$\frac{\sqrt{1 - e^2} \dfrac{\sin \phi}{\cos \phi}}{\sqrt{1 + \dfrac{\sin^2 \phi}{\cos^2 \phi} - e^2 \dfrac{\sin^2 \phi}{\cos^2 \phi}}} = \frac{\dfrac{\sqrt{1 - e^2} \sin \phi}{\cos \phi}}{\dfrac{\sqrt{\cos^2 \phi + \sin^2 \phi - e^2 \sin^2 \phi}}{\cos \phi}} = \frac{\sqrt{1 - e^2} \sin \phi}{\sqrt{1 - e^2 \sin^2 \phi}}$$

and

$$\cos \psi = \frac{\sin \psi}{\tan \psi} = \frac{1}{\sqrt{1 + \tan^2 \psi}} = \frac{1}{\sqrt{1 + \tan^2 \phi - e^2 \tan^2 \phi}} =$$

$$\frac{1}{\sqrt{1 + \dfrac{\sin^2 \phi}{\cos^2 \phi} - e^2 \dfrac{\sin^2 \phi}{\cos^2 \phi}}} = \frac{1}{\dfrac{\sqrt{\cos^2 \phi + \sin^2 \phi - e^2 \sin^2 \phi}}{\cos \phi}} = \frac{\cos \phi}{\sqrt{1 - e^2 \sin^2 \phi}}$$

Using the fundamental differential formula $d \tan x = \sec^2 x \, dx$, we have

$$\sec^2 \psi \, d\psi = d \tan \psi$$

Substituting the value of $\tan \psi$ and differentiating, we have

$$\sec^2 \psi \, d\psi = \sqrt{1 - e^2} \sec^2 \phi \, d\phi$$

or

$$d\psi = \frac{\sqrt{1-e^2}\sec^2\phi\, d\phi}{\sec^2\psi} = \sqrt{1-e^2}\sec^2\phi\, d\phi\cos^2\psi = \frac{\cos^2\phi\sqrt{1-e^2}\sec^2\phi\, d\phi}{1-e^2\sin^2\phi} =$$

$$\frac{\sqrt{1-e^2}\, d\phi}{1-e^2\sin^2\phi}$$

Let ds denote the infinitely small meridional arc PP′ of the generating ellipse; $\rho_m = PK$, the radius of curvature of the small arc; and $d\phi$ the angle PKP′, expressed in circular measure, through which the end of the radius moves in generating the small arc. Then considering the infinitely small arc of the ellipse as an arc of a circle and using the relation arc = radius times generating angle, we get

$$\rho_m\, d\phi = ds.$$

But

$$ds = \sqrt{\overline{dx}^2 + \overline{dy}^2} = \sqrt{a^2\sin^2\psi + b^2\cos^2\psi}\, d\psi =$$

$$\sqrt{a^2\sin^2\psi + a^2(1-e^2)\cos^2\psi}\, d\psi = a\sqrt{\sin^2\psi + \cos^2\psi - e^2\cos^2\psi}\, d\psi =$$

$$a\sqrt{1-e^2\cos^2\psi}\, d\psi$$

also

$$\sqrt{1-e^2\cos^2\psi} = \sqrt{1-e^2\left(\frac{\cos^2\phi}{1-e^2\sin^2\phi}\right)} = \sqrt{\frac{1-e^2\sin^2\phi - e^2\cos^2\phi}{1-e^2\sin^2\phi}} =$$

$$\sqrt{\frac{1-e^2(\sin^2\phi+\cos^2\phi)}{1-e^2\sin^2\phi}} = \frac{\sqrt{1-e^2}}{\sqrt{1-e^2\sin^2\phi}}$$

and

$$d\psi = \frac{\sqrt{1-e^2}\, d\phi}{1-e^2\sin^2\phi}$$

therefore

$$\sqrt{1-e^2\cos^2\psi}\, d\psi = \frac{(1-e^2)\, d\phi}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$

and

$$ds = \frac{a(1-e^2)\, d\phi}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$

but

$$\rho_m = \frac{ds}{d\phi}$$

therefore

$$\rho_m = \frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{\frac{3}{2}}} \text{ ----------[I]}$$

If we pass a plane through any point P on the ellipsoid, parallel to the equatorial plane of the ellipsoid, this plane intersects the ellipsoid in a circle which represents the parallel at the point P, and the normals to the surface of the ellipsoid at every point on this

parallel circle intersect in a point K′ on the minor axis of the ellipsoid. If we pass a plane through the normals of any two contiguous points on the parallel circle and then let these normals approach each other until they coincide, we obtain a plane tangent to the given parallel and perpendicular to the meridian at the point of tangency. The radius of curvature in this plane corresponding to a small arc of the parallel is represented by PK′, because the normals of each point on the arc intersect at K′. If we denote this radius by ρ_n we have in the triangle PK′E′,

$$\cos \phi = \frac{x}{\rho_n}$$

Hence

$$\rho_n = \frac{x}{\cos \phi} = \frac{a \cos \psi}{\cos \phi} = \frac{\sqrt{1-e^2 \sin^2 \phi}}{\cos \phi} = \frac{a}{(1-e^2 \sin^2 \phi)^{\frac{1}{2}}} \text{------[II]}$$

It is evident that ρ_n is always greater than ρ_m except when $\phi = \pm 90°$; in that event $\rho_n = \rho_m$.

Logarithms of ρ_m and ρ_n in English feet are given in the Smithsonian Geographic Tables for each minute from 0° to 90° and in Geological Survey Bulletin 50 for each minute from 21° to 51°; to reduce these logarithms to logarithms of the radii expressed in American feet to correspond to the relation with the legal value of the meter in the United States, 47.7 in the last (7th) place must be subtracted. To reduce logarithms of American feet to logarithms of meters (United States legal value) the logarithm 9.48401583–10 should be added. Consequently the logarithms given in the Smithsonian Geographic Tables or in Geological Survey Bulletin 50 may be used for computations of formulas and tables given in the present publication by adding the logarithm 9.48401106–10.

However, in connection with geodetic computations the Coast and Geodetic Survey has adopted several factors based on the Clarke spheroid as expressed in meters (United States legal value), and it is more convenient to use two of these factors, log A and log B, than to use the values of ρ_m and ρ_n given in the Smithsonian Geographic Tables. The logarithms of these factors have been computed to the seventh place for each minute from 0° to 72° and are given in Geological Survey Bulletin 650 and in Coast and Geodetic Survey Special Publication 8. These factors are

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

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

Introducing these factors into the formulas for ρ_m and ρ_n given above, we have

$$\rho_m = \frac{1}{B \text{ arc } 1''} \text{----------[III]}$$

$$\rho_n = \frac{1}{A \text{ arc } 1''} \text{----------[IV]}$$

In these factors arc $1''$ is expressed in radians [1] and is 0.0000048481368 log arc $1'' = 4.6855748668-10$, which is the same as log sin $1''$ to the tenth decimal place.

Meridional arcs.—The length of an arc of a circle equals the length of its radius times the length of the arc expressed in radians. If a very short section of a meridional ellipse is considered as an arc of a circle, the length of this short section can be found by the use of simple formulas with sufficient exactness for use in ordinary large-scale map projections. But if it is desired to find the length of a long arc or to determine exactly the length of a short arc, it is necessary to take the summation of the lengths of the infinitely small arcs making up the arc whose length is desired, by the process of integrating between the limiting parallels the variable lengths of the small arcs corresponding to infinitely small uniform subdivisions of the difference of latitude.

The length of a short meridional arc lying between two given parallels of latitude can be computed by the simple formulas given below, in which

ϕ_1 and ϕ_2 are the latitudes, expressed in degrees, minutes, and seconds, of the ends of the arc.

$\phi = \frac{1}{2}(\phi_1 + \phi_2)$ and is the mean latitude of the arc.

$\Delta\phi = \phi_2 - \phi_1$ and is here taken as the length of the arc expressed in radians.

$\Delta\phi' = \phi_2 - \phi$ and is here taken as the length of the arc expressed in minutes.

Arc $1' = 0.0002908882$ radian, or the length of an arc of $1'$ for a unit radius.

ΔM is the required length of the arc, or the meridional distance expressed in meters. Then, as the length of the arc equals the length of the radius times the arc expressed in radians,

$$\Delta M = \rho_m \Delta\phi = \rho_m \text{ arc } 1' \ \Delta\phi'$$

But

$$\rho_m = \frac{1}{B \text{ arc } 1''}$$

[1] A radian is an arc of a circle equal to its radius and is a unit arc in circular measure. Its value in degrees is $\frac{360}{2\pi}$, which equals 57°.29577951 or 3437'.746771 or 206264".80625.

therefore

$$\Delta M = \frac{\text{arc } 1'\Delta\phi'}{\text{arc } 1''B} = \frac{60\Delta\phi'}{B} \quad \text{[V]}$$

Log 60 = 1.7781513. Log B for the mean latitude ϕ is given for each minute of latitude in Table 28, Geological Survey Bulletin 650, and in Coast and Geodetic Survey Special Publication 8. The approximate formula for ΔM should not be used for arcs of the meridian longer than 1°. The error will depend on the latitude but for 1° will be approximately +0.8 meter, for 30′ about +0.4 meter, for 15′ about +0.2 meter, and for 7½′ about +0.1 meter. The latitude, the scale, and the size of the projection will control largely the selection of formulas.

For the computation of the length of a long meridional arc or the precise computation of a short arc, a formula must be used which will give the sum of the varying lengths corresponding to infinitely small subdivisions of the difference of latitude. In other words, the approximate formula $\Delta M = \rho_m \Delta\phi$ must be integrated between the limits of the latitudes of the ends of the arc. The expression will be integrated first in general form between latitude 0° and any latitude ϕ.

$d\phi$ = an infinitely small difference in latitude, or the differential of the latitude.

M = the length of the arc in meters, from the Equator to latitude ϕ. Using the value of ρ_m given in [I], we have

$$M = \int_0^{\phi} \frac{a(1-e^2)\, d\phi}{(1-e^2 \sin^2\phi)^{\frac{3}{2}}}$$

Expanding the binomial reciprocal of the denominator, we have

$$(1-e^2 \sin^2\phi)^{-\frac{3}{2}} = 1 + \frac{3}{2}e^2 \sin^2\phi + \frac{15}{8}e^4 \sin^4\phi + \frac{35}{16}e^6 \sin^6\phi + \frac{315}{128}e^8 \sin^8\phi + \cdots\cdots$$

But,

$$\sin^2\phi = \frac{1}{2}(1-\cos 2\phi) = \frac{1}{2} - \frac{1}{2}\cos 2\phi$$

$$\sin^4\phi = \frac{3}{8} - \frac{1}{2}\cos 2\phi + \frac{1}{8}\cos 4\phi$$

$$\sin^6\phi = \frac{5}{16} - \frac{15}{32}\cos 2\phi + \frac{3}{16}\cos 4\phi - \frac{1}{32}\cos 6\phi$$

$$\sin^8\phi = \frac{35}{128} - \frac{7}{16}\cos 2\phi + \frac{7}{32}\cos 4\phi - \frac{1}{16}\cos 6\phi + \frac{1}{128}\cos 8\phi$$

Substituting these values and arranging the terms as constants and as coefficients of cos 2ϕ, cos 4ϕ, etc., we have

$$(1-e^2\sin^2\phi)^{-\frac{1}{2}}=\overbrace{\left(1+\frac{3}{4}e^2+\frac{45}{64}e^4+\frac{175}{256}e^6+\frac{11025}{16384}e^8+\cdots\right)}^{A}$$

$$-\overbrace{\left(\frac{3}{4}e^2+\frac{15}{16}e^4+\frac{525}{512}e^6+\frac{2205}{2048}e^8+\cdots\right)}^{B}\cos 2\phi$$

$$+\overbrace{\left(\frac{15}{64}e^4+\frac{105}{256}e^6+\frac{2205}{4096}e^8+\cdots\right)}^{C}\cos 4\phi$$

$$-\overbrace{\left(\frac{315}{512}e^6+\frac{315}{2048}e^8+\cdots\right)}^{D}\cos 6\phi$$

$$+\overbrace{\left(\frac{315}{16384}e^8+\cdots\right)}^{E}\cos 8\phi$$

$$-(\cdots)$$

Then

$$M=\int_0^{\phi} a(1-e^2)[A-B\cos 2\phi+C\cos 4\phi-D\cos 6\phi+E\cos 8\phi-\cdots]\,d\phi$$

But

$$\left.\begin{aligned}\int m\,dx&=mx+k\\ \text{and } \int m\cos nx\,dx&=\frac{m}{n}\sin nx+k\end{aligned}\right\}$$

fundamental formulas in which
m is a definite coefficient
x is a variable quantity
n is a coefficient of the variable
k is a constant.

Therefore

$$\int a(1-e^2)\,A\,d\phi=a(1-e^2)\,A\phi+k$$

$$\int a(1-e^2)\,B\cos 2\phi\,d\phi=a(1-e^2)\,B\frac{1}{2}\sin 2\phi+k$$

$$\int a(1-e^2)\,C\cos 4\phi\,d\phi=a(1-e^2)\,C\frac{1}{4}\sin 4\phi+k$$

$$\int a(1-e^2)\,D\cos 6\phi\,d\phi=a(1-e^2)\,D\frac{1}{6}\sin 6\phi+k$$

$$\int a(1-e^2)\,E\cos 8\phi\,d\phi=a(1-e^2)\,E\frac{1}{8}\sin 8\phi+k.$$

The value of M between the limits 0° and ϕ° is the difference between the integrals when $\phi=\phi°$ and when $\phi=0°$. If $\phi=0°$, then sin 2ϕ, sin 4ϕ, etc., $=0$, and the integral of each of the five terms given above is equal to k. In the subtraction of integrals all the k's cancel. Therefore,

$$M=a(1-e^2)\left[A\phi-\frac{1}{2}B\sin 2\phi+\frac{1}{4}C\sin 4\phi-\frac{1}{6}D\sin 6\phi+\frac{1}{8}E\sin 8\phi-\cdots\right]$$

Substituting the values of A, B, C, D, and E, we get

$$\begin{aligned}M=a(1-e^2)\Bigg[&\left(1+\frac{3}{4}e^2+\frac{45}{64}e^4+\frac{175}{256}e^6+\frac{11025}{16384}e^8+\cdots\right)\phi\\&-\frac{1}{2}\left(\frac{3}{4}e^2+\frac{15}{16}e^4+\frac{525}{512}e^6+\frac{2205}{2048}e^8+\cdots\right)\sin 2\phi\\&+\frac{1}{4}\left(\frac{15}{64}e^4+\frac{105}{256}e^6+\frac{2205}{4096}e^8+\cdots\right)\sin 4\phi\\&-\frac{1}{6}\left(\frac{35}{512}e^6+\frac{315}{2048}e^8+\cdots\right)\sin 6\phi\\&+\frac{1}{8}\left(\frac{315}{16384}e^8+\cdots\right)\sin 8\phi\\&-\cdots\Bigg]\end{aligned}$$

Let

$$A_0=a(1-e^2)\left(1+\frac{3}{4}e^2+\frac{45}{64}e^4+\frac{175}{256}e^6+\frac{11025}{16384}e^8+\cdots\right)$$
$$=6{,}367{,}399.6891 \text{ meters.}$$

$$A_2=a(1-e^2)\left(\frac{3}{4}e^2+\frac{15}{16}e^4+\frac{525}{512}e^6+\frac{2205}{2048}e^8+\cdots\right)$$
$$=32{,}433.8882 \text{ meters.}$$

$$A_4=\frac{1}{2}a(1-e^2)\left(\frac{15}{64}e^4+\frac{105}{256}e^6+\frac{2205}{4096}e^8+\cdots\right)=34.4187 \text{ meters.}$$

$$A_6=\frac{1}{3}a(1-e^2)\left(\frac{35}{512}e^6+\frac{315}{2048}e^8+\cdots\right)=0.0454 \text{ meters.}$$

$$A_8=\frac{1}{4}a(1-e^2)\left(\frac{315}{16384}e^8+\cdots\right)=0.00006 \text{ meters.}$$

Then

$$M=A_0\phi-\frac{1}{2}A_2\sin 2\phi+\frac{1}{2}A_4\sin 4\phi-\frac{1}{2}A_6\sin 6\phi+\frac{1}{2}A_8\sin 8\phi-\cdots \quad [VI]$$

This expression, in which ϕ is expressed in radians, gives the length of the arc of the meridian (in meters, if a is taken in meters) from the

Equator to the parallel at latitude ϕ. The length of the arc of the meridian represented by the difference between two values of ϕ is found by taking the difference in the values of M for the two latitudes.

Let M_2 = length of the arc of the meridian from the Equator to latitude ϕ_2.

M_1 = length of the arc of the meridian from the Equator to latitude ϕ_1.

$\Delta M = M_2 - M_1$ = length of the arc between latitudes ϕ_1 and ϕ_2.

$\phi = \frac{1}{2}(\phi_2 + \phi_1)$ = mean latitude of the arc.

$\Delta\phi = \phi_2 - \phi_1$

Then

$$\Delta M = A_0(\phi_2 - \phi_1) - \frac{1}{2}A_2(\sin 2\phi_2 - \sin 2\phi_1) + \frac{1}{2}A_4(\sin 4\phi_2 - \sin 4\phi_1$$

$$-\frac{1}{2}A_6(\sin 6\phi_2 - \sin 6\phi_1) + \frac{1}{2}A_8(\sin 8\phi_2 - \sin 8\phi_1) - \cdots\cdot$$

But

$$\sin\alpha - \sin\beta = 2\cos\frac{1}{2}(\alpha+\beta)\sin\frac{1}{2}(\alpha-\beta)$$

Substituting

$2\phi_2$, $4\phi_2$, etc., for α and $2\phi_1$, $4\phi_1$, etc., for β, we have

$$\Delta M = A_0(\phi_2 - \phi_1) - \frac{1}{2}A_2\left[2\cos\frac{1}{2}(2\phi_2+2\phi_1)\sin\frac{1}{2}(2\phi_2-2\phi_1)\right]$$

$$+\frac{1}{2}A_4\left[2\cos\frac{1}{2}(4\phi_2+4\phi_1)\sin\frac{1}{2}(4\phi_2-4\phi_1)\right]$$

$$-\frac{1}{2}A_6\left[2\cos\frac{1}{2}(6\phi_2+6\phi_1)\sin\frac{1}{2}(6\phi_2-6\phi_1)\right]$$

$$+\frac{1}{2}A_8\left[2\cos\frac{1}{2}(8\phi_2+8\phi_1)\sin\frac{1}{2}(8\phi_2-8\phi_1)\right]$$

But

$$\frac{1}{2}(2\phi_2+2\phi_1) = 2\phi, \quad \frac{1}{2}(4\phi_2+4\phi_1) = 4\phi, \text{ etc.}$$

and

$$\frac{1}{2}(2\phi_2-2\phi_1) = \Delta\phi, \quad \frac{1}{2}(4\phi_2-4\phi_1) = 2\Delta\phi, \text{ etc.}$$

therefore

$$\Delta M = A_0\Delta\phi - A_2\cos 2\phi\sin\Delta\phi + A_4\cos 4\phi\sin 2\Delta\phi$$
$$-A_6\cos 6\phi\sin 3\Delta\phi + A_8\cos 8\phi\sin 4\Delta\phi - \cdots\cdots \quad \text{[VII]}$$

In the first term of the formula given above, $\Delta\phi$ is expressed in radians, and the value of A_0 is 6,367,399.6891 meters. If it is desired to use

the formula with $\Delta\phi$ expressed in degrees, minutes, or seconds, values of A_0 must be taken as follows:

$$A^\circ_0 = \frac{2\pi}{360} A_0 = 111{,}132.0894 \text{ meters} \qquad \log = 5.0458394793$$

$$A'_0 = \frac{2\pi}{21600} A_0 = 1{,}852.2015 \text{ meters} \qquad \log = 3.2676882316$$

$$A''_0 = \frac{2\pi}{1296000} A_0 = 30.8700 \text{ meters} \qquad \log = 1.4895366$$

In computing lengths of arcs of the meridian for the projection tables given in this publication, in which the arcs are taken in terms of minutes, the following formula should be used, the last term containing A_8 being dropped:

$$\Delta M = 1{,}852.2015\Delta\phi' - 32{,}433.8882 \cos 2\phi \sin \Delta\phi + 34.4187 \cos 4\phi \sin 2\Delta\phi - 0.0454 \cos 6\phi \sin 3\Delta\phi + \cdots \text{[VIII]}$$

$$\log\ 1{,}852.2015 = 3.2676882316$$
$$32{,}433.8882 = 4.5109990154$$
$$34.4187 = 1.5367944629$$
$$0.0454 = 8.6570559 - 10$$

Arcs of the parallel.—For computations of the length of the arc of the parallel lying between two given meridians of longitude the formulas given below may be used, in which—

ϕ is the latitude of the parallel, expressed in degrees, minutes, and seconds.

r is the length of the radius of the parallel, expressed in meters.

ρ_n is the length of the radius of curvature of the section normal to the meridian, expressed in meters.

λ_1 and λ_2 are the longitudes of the ends of the arc, expressed in degrees, minutes, and seconds.

$\Delta\lambda = \lambda_2 - \lambda_1$ and is the arc of the parallel expressed in degrees or minutes or seconds, the unit depending on the formula used. If fractional parts of degrees or minutes or seconds are required they must be expressed decimally.

ΔP is the required length of the arc expressed in meters.

The radius of any parallel is equal to the product of the radius of curvature of the normal section for the same latitude by the cosine of that latitude, as is seen in Figure 2 in the triangle PK'M, in which $\cos \phi = \frac{r}{\rho_n}$. Therefore

$$r = \rho_n \cos \phi$$

and the entire length of the parallel is

$$2\pi r = 2\pi \rho_n \cos \phi$$

Any arc of the parallel is equal to the entire length of the parallel divided by the number of units in the circumference and multiplied by the number of the same units in the arc. Therefore

$$\Delta P = \frac{2\pi\rho_n \cos\phi}{360} \ (\Delta\lambda \text{ in degrees})$$

But

$$\rho_n = \frac{1}{A \text{ arc } 1''}$$

therefore

$$\Delta P = \left(\frac{2\pi}{360 \text{ arc } 1''}\right)\left(\frac{\cos\phi}{A}\right)(\Delta\lambda \text{ in degrees})$$

$$= \left(\frac{20\pi}{\text{arc } 1^\circ}\right)\left(\frac{\cos\phi}{A}\right)(\Delta\lambda \text{ in degrees})$$

But

$$\text{arc } 1^\circ = \frac{\pi}{180} \cdot \text{ and } \frac{20\pi}{\text{arc } 1^\circ} = \frac{20\pi}{\frac{\pi}{180}} = 3600$$

therefore

$$\left.\begin{aligned} \Delta P \text{ (meters)} &= 3600 \frac{\cos\phi}{A} \ \Delta\lambda \text{ (degrees)} \\ &= 60 \frac{\cos\phi}{A} \Delta\lambda \text{ (minutes)} \\ &= \frac{\cos\phi}{A} \Delta\lambda \text{ (seconds)} \end{aligned}\right\} \text{---------[IX]}$$

Rectangular coordinates.—In the polyconic system of map projection each parallel of latitude represented on the map appears as the developed circumference of the base of a right cone tangent to the spheroid along that parallel. Thus the parallel PN (fig. 2) and the arc P_1P_2 (fig. 3) will appear in projection as the arc of a circle PP_1P_2N (fig. 4) whose radius $GP_1 = l$ is equal to the slant height of the tangent cone PGN (fig. 2).

In constructing a map projection on this system the meridians and parallels are usually delineated by plotting and joining their points of intersection. The coordinates of these points may be expressed in the following manner (see figs. 3 and 4): For any parallel, as PP_1P_2N, take the origin P_1 at the intersection with the central meridian and let the rectangular axes of $Y(P_1G)$ and of $X(P_1Q)$ be respectively coincident with and perpendicular to this meridian.

Let $\Delta\lambda$ represent the difference of longitude between the central meridian and the next adjacent one; $\Delta P = P_1P_2$ the arc of the parallel between the central meridian and the next adjacent one; θ the angle

at the apex of the developed tangent cone between the central meridian and the next adjacent one; ϕ the latitude of the parallel, which is also the angle at the apex of the tangent cone between a meridional element of the surface of the cone and its axis; l the slant height of the tangent cone and the radius of the developed parallel; r the radius of the parallel in the plane of the parallel; and ρ_n the radius of curvature at P_1 of the cross section of the ellipsoid through the point P_1 normal to the central meridian.

Then from Figure 4, in the triangle GP_2S, it is apparent that

$$x = l \sin \theta$$

and in the triangle P_1P_2S that

$$y = x \tan \frac{\theta}{2}$$

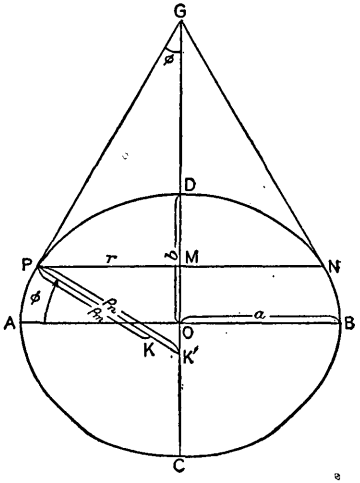

FIGURE 2.—Elements of ellipsoid and tangent cone

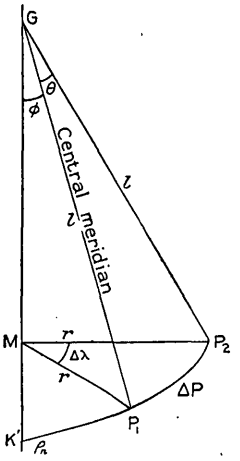

FIGURE 3.—Sector of tangent cone

Substituting the value of x and remembering that $\sin \theta = 2 \sin \frac{\theta}{2} \cos \frac{\theta}{2}$, we have

$$y = 2 l \sin^2 \frac{\theta}{2}$$

From Figure 3, in the triangle GP_1K', it is apparent that

$$l = \rho_n \cot \phi$$

The length of the arc ΔP (fig. 3) is measured by the length of the radius r of the parallel times the central angle $\Delta\lambda$ (in radians), and the same arc is also measured by the length l of the radius of the developed cone times the angle θ (in radians); therefore

$$l\theta = r\Delta\lambda$$

But from Figure 3, in the triangle $P_1K'M$, it is apparent that $r=\rho_n \cos \phi$; therefore

$$\theta=\frac{\rho_n \Delta\lambda \cos \phi}{l}$$

Substituting in this the value of l given above, we have

$$\theta=\Delta\lambda \sin \phi$$

Then, substituting in the expressions for x and y the values of l and θ, we have

$$x=\rho_n \cot \phi \sin (\Delta\lambda \sin \phi)=\frac{\cot \phi \sin (\Delta\lambda \sin \phi)}{A \text{ arc } 1''} \text{-------[X]}$$

$$y=2\rho_n \cot \phi \sin^2 \frac{1}{2}(\Delta\lambda \sin \phi)=\frac{2 \cot \phi \sin^2 \frac{1}{2}(\Delta\lambda \sin \phi)}{A \text{ arc } 1''} \text{--[XI]}$$

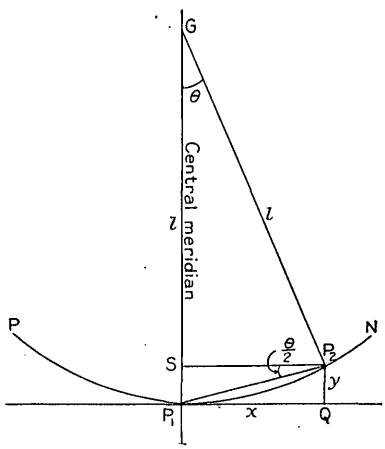

FIGURE 4.—Developed cone

In the two formulas given above the expression $\Delta\lambda \sin \phi$ is approximately the convergence of the meridian, and it will give an angle in the same units as are used for $\Delta\lambda$. For example, if $\Delta\lambda$ is taken in radians, degrees, or minutes the angle $(\Delta\lambda \sin \phi)$ will be in radians, degrees, or minutes, respectively. The expression $\sin \phi$ is really a coefficient of $\Delta\lambda$ just as if it were a quantity like 2 or 4.

Log A is given for each minute of latitude from 0° to 72° in Table 28, Geological Survey Bulletin 650, and in Coast and Geodetic Survey Special Publication 8.

Log arc $1''=4.6855749-10$.

The formulas for x and y given above are exact expressions of the coordinates of the point P. But when $\Delta\lambda$ is small substitution for the quantities $\sin (\Delta\lambda \sin \phi)$ and $\sin^2 \frac{1}{2}(\Delta\lambda \sin \phi)$ of the first two

terms of their expansions will yield formulas more convenient to use and at the same time give satisfactory results. These expressions are

$$\sin(\Delta\lambda \sin\phi) = \Delta\lambda \sin\phi - \frac{1}{6}(\Delta\lambda \sin\phi)^3 + \cdots\cdots$$

$$\sin^2\frac{1}{2}(\Delta\lambda \sin\phi) = \frac{1}{4}(\Delta\lambda \sin\phi)^2 - \frac{1}{48}(\Delta\lambda \sin\phi)^4 + \cdots\cdot$$

Substituting these values in the formulas for x and y, we have

$$x = \rho_n \cot\phi\, \Delta\lambda \sin\phi - \frac{1}{6}\rho_n \cot\phi\, (\Delta\lambda \sin\phi)^3 + \cdots\cdots$$

But $\cot\phi \sin\phi = \cos\phi$; therefore

$$x = \rho_n \Delta\lambda \cos\phi - \frac{1}{6}\rho_n \Delta\lambda \cos\phi\, (\Delta\lambda \sin\phi)^2 + \cdots\cdot$$

or

$$x = \rho_n \Delta\lambda \cos\phi \left[1 - \frac{1}{6}(\Delta\lambda \sin\phi)^2 + \cdots\cdot\right]$$

But

$$\rho_n = \frac{1}{A \text{ arc } 1''}$$

therefore

$$x = \frac{\Delta\lambda \cos\phi}{A \text{ arc } 1''}\left[1 - \frac{1}{6}(\Delta\lambda \sin\phi)^2 + \cdots\cdot\right] \text{---------[XII]}$$

also

$$y = 2\rho_n \cot\phi \frac{1}{4}(\Delta\lambda \sin\phi)^2 - 2\rho_n \cot\phi \frac{1}{48}(\Delta\lambda \sin\phi)^4 + \cdots\cdot$$

$$= \frac{1}{2}\rho_n \Delta\lambda^2 \sin\phi \cos\phi - \frac{1}{24}\rho_n \Delta\lambda^2 \sin\phi \cos\phi\, (\Delta\lambda \sin\phi)^2 + \cdots$$

$$= \frac{1}{2}\rho_n \Delta\lambda^2 \sin\phi \cos\phi \left[1 - \frac{1}{12}(\Delta\lambda \sin\phi)^2 + \cdots\cdot\right]$$

But

$$\sin\phi \cos\phi = \frac{1}{2}\sin 2\phi \text{ and } \rho_n = \frac{1}{A \text{ arc } 1''}$$

therefore

$$y = \frac{\Delta\lambda^2 \sin 2\phi}{4A \text{ arc } 1''}\left[1 - \frac{1}{12}(\Delta\lambda \sin\phi)^2 + \cdots\cdot\right] \text{------[XIII]}$$

In these two formulas for x and y $\Delta\lambda$ is expressed in radians. $\Delta\lambda$ may be taken in seconds, minutes, or degrees by using the following relations:

$$\Delta\lambda^r = \Delta\lambda'' \text{ arc } 1''$$

$$\Delta\lambda^r = \Delta\lambda' \text{ arc } 1' = 60\ \Delta\lambda' \text{ arc } 1''$$

$$\Delta\lambda^r = \Delta\lambda^\circ \text{ arc } 1^\circ = 3600\ \Delta\lambda^\circ \text{ arc } 1''$$

and the formulas may be written as follows by substituting in the coefficient the proper value of $\Delta\lambda$ expressed in terms of arc 1″, so as to cancel the term arc 1″ in the denominator, and by substituting in the series the proper value of $\Delta\lambda$ expressed in terms of arc 1″, arc 1′, or arc°, as the case may require:

$$\left.\begin{aligned} x &= \frac{\Delta\lambda''\cos\phi}{A}\left[1-\frac{1}{6}(\Delta\lambda''\text{ arc }1''\sin\phi)^2+\cdots\right] \\ y &= \frac{(\Delta\lambda'')^2\,\text{arc}\,1''\sin 2\phi}{4A}\left[1-\frac{1}{12}(\Delta\lambda''\text{arc }1''\sin\phi)^2+\cdots\right] \end{aligned}\right\}\ \Delta\lambda\text{ in seconds}\quad[\text{XIV}]$$

$$\left.\begin{aligned} x &= \frac{60\Delta\lambda'\cos\phi}{A}\left[1-\frac{1}{6}(\Delta\lambda'\text{arc }1'\sin\phi)^2+\cdots\right] \\ y &= \frac{15(\Delta\lambda')^2\,\text{arc}\,1'\sin 2\phi}{A}\left[1-\frac{1}{12}(\Delta\lambda'\text{arc }1'\sin\phi)^2+\cdots\right] \end{aligned}\right\}\ \Delta\lambda\text{ in minutes}\quad[\text{XV}]$$

$$\left.\begin{aligned} x &= \frac{3600\Delta\lambda^\circ\cos\phi}{A}\left[1-\frac{1}{6}(\Delta\lambda^\circ\text{arc }1^\circ\sin\phi)^2+\cdots\right] \\ y &= \frac{900(\Delta\lambda^\circ)^2\,\text{arc}\,1^\circ\sin 2\phi}{A}\left[1-\frac{1}{12}(\Delta\lambda^\circ\text{arc }1^\circ\sin\phi)^2+\cdots\right] \end{aligned}\right\}\ \Delta\lambda\text{ in degrees}\quad[\text{XVI}]$$

The constants in these formulas with their logarithms are as follows:

arc 1″ = 0.0000048481 radian	log = 4.6855749 − 10
arc 1′ = 0.0002908882 radian	log = 6.4637262 − 10
arc 1° = 0.0174532925 radian	log = 8.2418774 − 10

This group of formulas seems more complex than the formulas for x and y given in X and XI, but the terms are so arranged that their use will be found more convenient in making a large number of computations, especially if the terms within the brackets can be dropped.

Analysis of formulas.—Analysis of the last group of formulas for x will show that for values of $\Delta\lambda$ of 1° or less and for latitudes of 60° or less the terms within the brackets can be disregarded with a resulting maximum error of +2.2 meters in the abscissa of the developed parallel. The ordinate of the developed parallel of 45° has the greatest value for the same value of $\Delta\lambda$, and for values of $\Delta\lambda$ of 1° or less the terms within the brackets in the formulas for y can be disregarded with a resulting maximum error of +0.007 meter. The following table gives an idea of the errors in the values of x and y resulting from the use of the first term only of these formulas:

Value of $\Delta\lambda$	Latitude 25°				Latitude 50°			
	60′	30′	15′	7½′	60′	30′	15′	7½′
Errors in x, in meters	+0.915	+0.114	+0.014	+0.002	+2.121	+0.267	+0.033	+0.004
Errors in y, in meters	+.0017	+.0001	+.0000	+.0000	+.0071	+.0004	+.0000	+.0000

Even the maximum error of 2.2 meters on the spheroid can not be plotted on any ordinary map projection; consequently where $\Delta\lambda$ does not exceed 60 minutes it is sufficient to use only the first term in the bracket in any one of the last group of formulas for x and y.

Analysis of the formula for ΔP and of the rigid formula for x shows that for short arcs of the parallel of 30′ or less and for latitudes of 50° or less there is very little difference between the actual lengths of the arcs of the parallels and the abscissas of their development, and that either formula may be used for the other. The following table gives an idea of these differences:

Value of $\Delta\lambda$	Latitude 25°			Latitude 50°		
	30′	15′	7½′	30′	15′	7½′
Value of ΔP, in meters	50, 475. 93	25, 237. 96	12, 618. 98	35, 849. 06	17, 924. 53	8, 962. 26
Value of x, in meters	50, 475. 82	25, 237. 95	12, 618. 98	35, 848. 79	17, 924. 50	8, 962. 26

CONVERSION DATA

Values in meters on the spheroid can be transformed easily into measurements in inches on any map scale by reducing meters to inches and dividing the result by the scale relation. In the following table the two operations have been combined into one factor, and the table will be found convenient for use in conversion by logarithms or for use by direct multiplication in a computing machine. The tables are based on the United States legal value of 1 meter = 39.37 inches, log = 1.5951654

Scale	Log to be added	Multiplication factor
1 : 5, 000	7. 8966954–10	0. 0078740000
1 : 10, 000	7. 5951654–10	. 0039370000
1 : 12, 000	7. 5159842–10	. 0032808333
1 : 20, 000	7. 2941354–10	. 0019685000
1 : 24, 000	7. 2149542–10	. 0016404167
1 : 31, 250	7. 1003154–10	. 0012598400
1 : 31, 680	7. 0943802–10	. 0012427399
1 : 48, 000	6. 9139242–10	. 0008202083
1 : 62, 500	6. 7992854–10	. 0006299200
1 : 63, 360	6. 7933502–10	. 0006213699
1 : 96, 000	6. 6128942–10	. 0004101042
1 : 125, 000	6. 4982554–10	. 0003149600
1 : 192, 000	6. 3118642–10	. 0002050521
1 : 250, 000	6. 1972254–10	. 0001574800
1 : 500, 000	5. 8961954–10	. 0000787400
1 : 750, 000	5. 7201041–10	. 0000524933
1 : 1, 000, 000	5. 5951654–10	. 0000393700

Other interesting data concerning scale relations will be found in Tables 40 and 44, Geological Survey Bulletin 650.

CONSTRUCTION OF PROJECTIONS

Different methods of construction.—Polyconic projections may be constructed by hand, by using the instructions and tables published in Coast and Geodetic Survey Special Publication 5, which gives the required values in meters on the surface of the spheroid, or by using the instructions and tables given in this publication with measurements in inches on the map scale desired; or they may be constructed mechanically by means of a Bumstead projection plate. The practice of the Geological Survey indicates preference in the reverse order from that given above. Directions for constructing projections by hand can be given best by means of practical examples, but in general a central meridian is assumed upon which the intersections of the parallels are plotted to scale. Each parallel is then developed separately as an arc of a circle with its center lying in the extension of the central meridian. The arcs of the developed parallels are subdivided to scale, and the meridians are drawn through the corresponding subdivisions. However, in actual practice on projections of small quadrangles the parallels are not drawn as arcs of circles, but their intersections with the meridians are plotted from the computed x and y values, and the sections of the parallels between adjacent meridians are drawn as straight lines. On polyconic projections of quadrangles of 1° or smaller all meridians may be drawn as straight lines, and in large-scale projections of small quadrangles in low latitudes both meridians and parallels may be drawn as straight lines. For example, the curvature of the parallels of a projection of a 15′ quadrangle in latitudes from 0° to 25° on a scale of 1 : 48,000 or for a 7½′ quadrangle in any latitude on a scale of 1 : 31,680 or larger is so small that it can not be plotted.

The meridional distances given in the tables apply to the central meridian of the projection, but for any standard quadrangle the difference in the curvature of the several parallels is so slight that the distances given for the central meridian can be taken for all other meridians.

Geological Survey method.—For making a polyconic projection by the Geological Survey method it is necessary to have a metal straightedge graduated in inches, with one inch at one end subdivided into hundredths of an inch, the scale being standardized and the straightedge being as long as the longest dimension of the projection; a good rigid-beam compass with micrometer movement; a hard chisel-point pencil; a plotting needle; and the tables in this publication.

To illustrate this method the construction of a polyconic projection on a scale of 1:48,000 of the 15-minute quadrangle lying between north latitudes 40° 15′ and 40° 30′ and between west longitudes 88° 00′ and 88° 15′ is described. (See fig. 5.) The projection will show each 5-minute meridian and parallel. The central meridian of the

projection will represent the meridian of longitude 88° 07½′ and will be used for construction only. Likewise the perpendicular crossing the central meridian at latitude 40° 22½′ will be used for construction only. The geometry of the construction given below is slightly different from previously established practice, owing principally to an effort to eliminate the plotting of the small ordinates of curvature, which is very difficult in a projection of a small quadrangle.

In Table 2 the group of ordinates and meridional distances computed for latitude 40° may safely be used for all latitudes between 39° 30′ and 40° 30′ without interpolation between the values given and those computed for latitudes 39° and 41°. The meridional distance

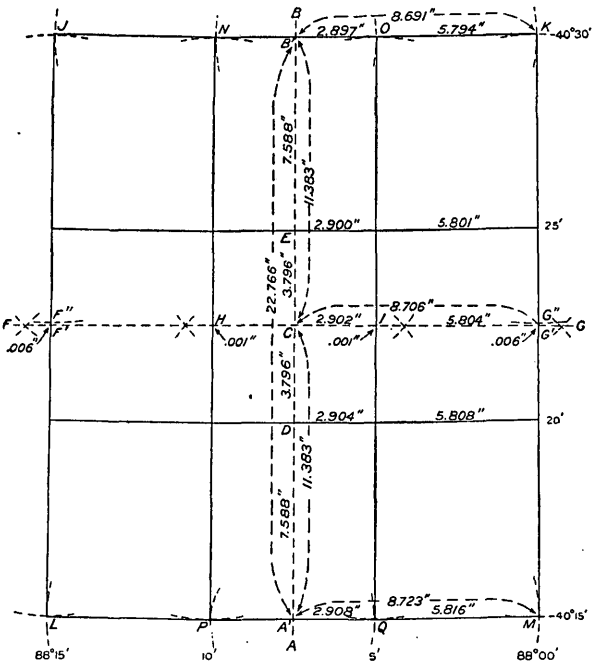

FIGURE 5.—Polyconic projection of 15-minute quadrangle

for 2½′ of latitude is found to be 3.796 inches; for 5′, 7.588 inches; for 7½′ 11.383 inches; for 10′, 15.179 inches; and for 15′, 22.766 inches. In the part of the table headed "Abscissas of developed parallel" the x values for 2½′ and 7½′ of longitude in latitude 40° 15′ are found to be 2.908 inches and 8.723 inches, respectively. The x values for latitude 40° 20′, 40° 22½′, 40° 25′, and 40° 30′ are shown in Figure 5. It should be noted that the measurements given here and on Figure 5 were taken from an old table, and some of them contain small errors in the third decimal place, which have been corrected in Table 2. In the group of ordinates of developed parallel the y value for 7½′ of longitude is found to be 0.006 inch, and for 2½′ of longitude 0.001 inch. These are all the measurements

needed to proceed with the constuction of the projection. It is impossible to plot the y value for 2½′ of longitude and difficult to make an individual plotting of the y value for 7½′ of longitude; but 0.006 can be added to or subtracted from any tabulated length of meridional arcs and the resultant distance measured on the metal scale, and this is done in the following description.

Draw the central construction meridian AB in vertical position near the center of the map; select the mid-point C as the center of the projection, and lay off from C the meridional distances for 2½′ and 7½′ of latitude—CE (3.796 inches) and CB′ (11.383 inches) above and CD (3.796 inches) and CA′(11.383 inches) below. The over-all distance A′B′ (22.766 inches) for 15′ of latitude should be used to check the plotting. At the mid-point C erect the perpendicular FG, using the points A′ and B′ as centers for long arcs and the points D and E as centers for short arcs. Lay off on the construction line FG the abscissas of the developed parallel for 2½′ and 7½′ of longitude for latitude 40° 22½′—CH and CI (2.902 inches) and CF′ and CG′ (8.706 inches).

With the points F′ and G′ as centers and a radius equal to the meridional distance for 7½′ of latitude plus the ordinate for 7½′ of longitude (11.383 + 0.006 = 11.389 inches), strike arcs at J and K. Then with the same points as centers and a radius of 11.377 (11.383 − 0.006) strike arcs at L and M. In striking these arcs use the metal point of the beam compass rather than the pencil point, and either scratch the paper lightly or place under the metal point a small piece of carbon paper made by rubbing a piece of thin tracing paper with a hard pencil. This obviates the inaccuracy of using the pencil point of the beam compass to take an exact measurement from the scale.

With the points H and I as centers and a radius equal to the meridional distance for 7½′ of latitude (11.383 inches), strike arcs at N and O above and P and Q below. The true meridional distance as here used is generally taken in constructing the inner meridional distance of 7½′ of latitude on a scale of 1:48,000 or larger, as it is impracticable to use the small ordinate for 2½′ of longitude. However, should the more rigid construction be required, it may be done in the following manner: With points H and I as centers and a radius equal to the meridional distance for 7½′ of latitude plus the ordinate for 2½′ of longitude (11.383 + 0.001 = 11.384 inches), strike arcs at N and O. Then with the same points as centers and a radius equal to the meridional distance minus the 2½′ ordinate (11.383 − 0.001 = 11.382 inches), strike arcs at P and Q.

With the points B′ and A′ as centers and radii equal to the proper abscissas, strike arcs at J, K, L, and M, and also at N, O, P, and Q. Check the length of the diagonals JM and KL, which should be exactly the same. Draw the straight lines JL and KM through the

intersections of the arcs at J, L, K, and M, and the straight lines NP and OQ through the intersections of the arcs at N, P, O, and Q. These lines represent the four meridians on the projection, and although theoretically they are curves concave to the central meridian, yet in practice they can be drawn only as straight lines. The four intersections at the top and the four at the bottom of the projection are the exact intersections of the four meridians with the limiting parallels.

With the beam compass set at the length of the meridional distance for 5′ of latitude, plot along all four meridians down from J, N, O, and K and up from L, P, Q, and M, and check the middle 5′ sections of the meridians, thus locating the intersections of the four meridians with the parallels 40° 20′ and 40° 25′.

All the necessary intersections for the projection of this 15′ quadrangle have now been plotted without trying to make an individual plotting of 0.006 inch from the points F′ and G′, which only the most skilled draftsmen can accomplish, and the same setting of the beam compass has been used for all equal measurements, thereby strengthening the construction.

Check the construction by measuring over-all distances and by testing corresponding diagonals of all combinations of projection blocks.

Although it is customary to show only the 5′ intervals on a projection for a 15′ quadrangle, it may be desired to develop the central parallel, which, in the projection under construction, would fall on latitude 40° 22½′. If so, proceed in the following manner: With the beam compass set at the meridional distance for 7½′ and plotting along the meridians down from J and K and checking by plotting up from L and M, locate the points F″ and G″, which are the intersections of the limiting meridians with the central parallel at latitude 40° 22½′. The points H and I already determined are the intersections of this parallel with the inner meridians, as no ordinates can be plotted at these intersections. Draw the parallels by drawing straight lines between the plotted intersections, as the curvature of the parallels of any standard quadrangle within the limits of the United States is too small to be drawn as a curve. Letter the latitude and longitude as shown in Figure 5, add the scale, the name of the quadrangle, and the initials or name of the person making the construction, and the projection is completed. It should, however, be checked carefully by another person.

In any projection where the ordinate of a developed parallel at the limiting meridians is less than 0.005 inch it is impracticable to plot the curvature, and the parallels should be represented as straight lines perpendicular to the central meridian. This will be true of projections of maps of standard 15′ quadrangles between latitudes 0°

and 25° on the scale of 1:48,000 and of standard 7½′ quadrangles in any latitude on scales of 1:31,680 and larger.

Interpolation for other scales.—This bulletin gives tables for all the standard field scales employed by the Geological Survey, but use of other projections may be required, and any table may, with certain limitations, be used for scales half as large or twice as large. The abscissas of developed parallels and the meridional distances are both in direct proportion to the scales and practically in proportion to the latitude and longitude intervals, so that the abscissa for 2′ of longitude at latitude 40° on the scale of 1:24,000 is the same for 1′ of longitude at latitude 40° on the scale of 1:12,000. Likewise the meridional distance given for a latitude interval of 2′ on the scale of 1:24,000 is the same for 1′ on the scale of 1:12,000.

The ordinates of developed parallels are also directly proportional to the scales, but the ordinates are also proportional to the squares of the distances from the central meridian, which may lead to confusion in interpolation for a different scale. For example: For a longitude interval of 5′ in latitude 40° on a scale of 1:24,000 the ordinate of developed parallel is 0.0054 inch. The ordinate is not the same for a longitude interval of 2½′ on a scale of 1:12,000 but is 0.027, or one-half as much.

The following rules may develop discrepancies in the third decimal place, but these will be too small to plot: To halve the scale (for example, to make a projection on a scale of 1:48,000 from tables for the scale of 1:24,000), use correct arguments for the scale desired and divide all values given in the table by 2. To double the scale (for example, to make a projection on a scale of 1:12,000 from tables for the scale of 1:24,000), use correct arguments for the scale desired and multiply all values given in the table by 2.

Polyconic projections on scales for which no convenient tables are given with data in inches are best constructed directly from the data given in Coast and Geodetic Survey Special Publication 5, the dimensions in meters on the spheroid being reduced to meters on the map scale and plotted by means of a metric scale. Instructions for making projections by this method are given in Special Publication 5 and also in Geological Survey Bulletin 788–E.

MODIFIED POLYCONIC PROJECTION OF MAP OF THE WORLD ON THE MILLIONTH SCALE

GENERAL SPECIFICATIONS

On November 22, 1909, the International Map Committee adopted uniform specifications for the sheets of the map of the world on a scale of 1:1,000,000. Each sheet of this series of maps covers an area of 4° of latitude by 6° of longitude and is designated by a letter and a number preceded by the word "North" for the northern hemisphere

and by the word "South" for the southern hemisphere. Reckoning from the Equator to the north or to the south, each 4° belt of latitude is designated by a letter—A for the belt from 0° to 4°, B for the belt from 4° to 8°, etc. Reckoning from the international date line at 180° longitude (east or west of Greenwich) each zone of 6° of longitude is designated by a number—1 for the zone from 180° to 174° west longitude, 2 for the zone 174° to 168°, etc., up to 60 for the zone 174° to 180° east longitude. Thus the Boston sheet, covering the area between north latitudes 40° and 44° and between west longitudes 66° and 72°, is designated "North K–19."

The projection adopted for the sheets of this series of maps is a modified polyconic projection so designed as to represent all the meridians as straight lines on the map and to make the average scale error as nearly zero as possible by bringing the top and bottom parallels of the ordinary American polyconic development closer together without alteration, so that the scale will be true along these two parallels and along the meridians 2° east and west of the central meridian. The result is that the scales along the other interior meridians are reduced and the scale along the limiting meridians is enlarged. This arrangement gives four instead of three lines of strength in which the scale is true, and the maximum error in any other line is much less than in the American polyconic projection.

The top and bottom parallels of each sheet are drawn in the usual way, as circles with centers lying in the prolongation of the central meridian, but are actually plotted from the rectangular coordinates of the intersections of the two parallels with the several meridians. These two parallels are therefore subdivided true to scale. Straight lines representing the meridians are then drawn connecting corresponding intersections on the top and bottom parallels.

In the resolutions of the International Map Committee it is not stated how the 4° lengths of the meridians are to be subdivided. United States Coast and Geodetic Survey Special Publication 68 states that "no doubt, an equal division of the central meridian was intended." Arthur R. Hinks, in his admirable treatise "Map projections," states, "it may be supposed that they are divided equally." Antoni Lomnicki, in a paper entitled "Projekcja Miedzynarodowej Mapy Swiata," published at Lwow in 1927, comments as follows: "It has been ascertained that these differences are so insignificant as to be a negligible quantity on a map drawn to a scale of 1/M, a fact which nevertheless should not be omitted in the instructions."

It has been the practice of the United States Geological Survey to compile the sheets in four quarters on the scale of 1:500,000 and to subdivide each meridian in proportion to the correct length of each 1° interval of latitude. Therefore, these new tables have been constructed on that basis.

JOINING OF SHEETS

Any 4° by 6° sheet will join exactly with the four sheets on its margins, but the corner sheets to complete a block of nine will not fit along their two adjacent edges simultaneously; they will fit on one edge, but there will be in theory on the other a small wedge-shaped gap, as is shown in Figure 6. In practice these gaps will be found to be very small, usually less than the average expansion or shrinkage of map paper. The map user will seldom desire to join together exactly more than nine sheets at once. Many objections have been made to the use of this projection because of this difficulty in joining corner sheets and because of distortions in scale, azimuth, and shapes near the east and west limits of the sheets, but there does not seem to be any other projection of sufficiently greater merit to offset the principal advantages of the modified polyconic projection, which are its ease of construction from simple tables and its adaptability to

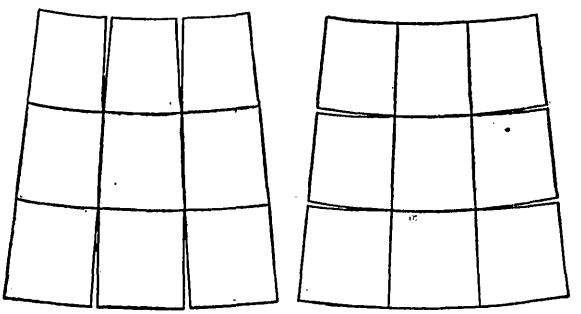

FIGURE 6.—Junction of sheets of map of the world

small groups of sheets representing areas in any part of the world. Any errors in a single sheet are negligible in view of the limitations of drafting, engraving, and quality of map paper. For example, the maximum error in scale occurs along the east and west meridians of a sheet representing an area between latitudes 0° and 4° and is about 1/1300, or +0.076 per cent; on the scale of 1 : 1,000,000 this amounts to about one-third of a millimeter in the total height of the sheet. The substitution of the Lambert conformal projection or the Albers conical equal-area projection has been suggested. The writer has investigated the effect of the use of the Lambert conformal projection for the millionth-scale sheets of the area of the United States and finds that, in the area between latitudes 24° and 52°, the Lambert conformal projection would probably be based on two standard parallels at latitudes 29° and 47°. Such a projection would introduce scale errors averaging about +1 per cent in sheets representing areas adjacent to the limiting parallels (24° and 52°) and averaging

−1 per cent in sheets representing areas between latitudes 36° and 40°, although the scale would be correct in sheets for areas along the two standard parallels. Sheets on the modified polyconic projection representing areas between latitudes 24° and 28° introduce maximum scale errors of only 0.06 per cent, and between latitudes 48° and 52° of only 0.03 per cent, which are less than the usual distortion of map paper. Therefore for all practical purposes maps on the modified polyconic projection covering any area in the United States are as true to scale as maps on the Lambert conformal projection for areas along the standard parallels. Surely the necessity of correcting all distance measurements on a sheet by an amount as large as 1 per cent would be a distinct disadvantage. Of course it would be possible to select zones of lesser extent in latitude, even to the extreme case of considering each row of 4° by 6° areas a separate zone, with two standard parallels for each zone, but any of these selections would involve difficulty in joining sheets in adjacent zones, and much confusion would be caused if each country used one or more different pairs of standard parallels.

The resolutions of the International Map Committee state that "north of latitude 60° N. and south of latitude 60° S. it shall be permissible to join two or more adjoining sheets of the same zone, so that the combined sheet covers 12°, 18°, etc., of longitude." United States Coast and Geodetic Survey Special Publication 68 comments on this statement as follows: "The provisions also fail to state whether, in the sheets covering 12° of longitude instead of 6°, the meridians of true length shall be 4° instead of 2° on each side of the central meridian; but such was no doubt the intention." A. R. Hinks makes a similar statement in his book on map projections. The writer doubts the correctness of this interpretation but thinks that the committee had in mind simply the assemblage of two or more independently constructed sheets in a single map so as to avoid a series of maps of very small width. In other words, he thinks that the committee had in mind a printing and distribution problem rather than a cartographic problem. A row of 4° by 12° sheets would fail to join a row of 4° by 6° sheets immediately to the south by wedges similar to those illustrated in Figure 6, whether the sheets were constructed with 4° or 8° between the standard meridians, but if the interval were 8° the maximum scale error in the northern row would be increased four times. The Geological Survey has not yet compiled any sheets of the millionth-scale series for areas north of latitude 60°, and it hopes that before it is required to do so the International Map Committee will decide the matter definitely.

DRAWING OF PARALLELS

There has been considerable discussion of the difficulty of drawing the arcs of circles representing the limiting parallels and the curves representing the three interior parallels, which Lomnicki calls shortened epicycloids. The maximum deviation of the curve representing a 1° arc of a parallel from the chord joining the ends of such a curve is in latitude approximately 45°, and on a scale of 1:1,000,000 the maximum ordinate from the mid-point of such a chord to the curve is 0.1 millimeter. It is practically impossible for a draftsman to draw such a curve, as the deviation from a straight line is only about the width of a finely inked line. It is equally impracticable to construct and use a compass bar long enough to draw the arcs of the parallels, requiring for the scale of 1:1,000,000 a radius of about 4 meters for the circle representing the parallel of 60°, one of about 8 meters for the parallel of 40°, and one of over 90 meters for the parallel of 4°. Therefore the United States Geological Survey constructs these parallels by drawing straight lines joining adjacent intersections of the parallels with meridians 1° apart. For arcs of parallels below 50° the deviation from true circles can not be detected even on an engraved copper plate, although theoretically such methods of construction introduce angles at the crossings of the meridians. Such errors on a printed map are less than the usual distortion of map paper. For short arcs of the parallels above 60° it may be practicable to use mechanically constructed curves. As a matter of fact, the Geological Survey compiles the millionth-scale sheets on a scale of 1:500,000 by plotting the intersection of each half degree meridian and parallel, but in publication the engraver constructs a new projection on the copper plate instead of copying photographically the results of the cartographer's compilation.

DESCRIPTION OF TABLES

Table 5 gives the length of each developed meridian and the x and y coordinates of the intersection of each meridian with each of the developed parallels, in meters on the natural scale. To convert these data into map distances on the scale of 1:1,000,000, move the decimal point three places to the left and plot in millimeters. For the scale of 1:500,000 follow the same rule and then double all the measurements. Table 6 gives the data in inches on the scale of 1:1,000,000. Each 1° length of the standard meridians (2° from the central meridian) and the x and y coordinates of the intersections of all three meridians east and west of the center meridian with the upper and lower developed parallels of each sheet (0°, 4°, 8°, 12°, etc.) were computed by the rigid formulas given hereafter in this paper. In making these computations the dimensions of the spheroid

given in the proceedings of the International Map Committee at the meeting in London in November, 1909, were used, as follows:

Semimajor axis a = 6,378,240 meters
Semiminor axis b = 6,356,560 meters

These dimensions differ slightly from those developed by Col. A. R. Clarke in 1880, which were—

a = 6,378,249 meters
b = 6,356,515 meters

After the x and y coordinates of the intersections of each of the meridians with the upper and lower parallels were computed, each 4° length of the central meridian and of the meridians 1° and 3° from the central meridian were computed by simple formulas, as described hereafter in this paper. The length of the shortened central meridian could have been computed directly by the formulas given by M. Ch. Lallemand[1] and the lengths of the other developed meridians could then be computed by applying the simple formulas for the magnification of meridians of the polyconic projection. Each 4° length of these three meridians was then divided into 1° lengths in direct proportion to the true 1° lengths of the meridian as represented by the 1° lengths of the standard meridians 2° from the center. These 4° meridional lengths could be divided into four equal parts, and the errors introduced would be small—for example, in the 1° meridional length between latitudes 43° and 44° the maximum error would be about 30 meters, or 0.03 millimeter on a scale of 1:1,000,000. This difference can not be plotted, but for the purpose of analysis and for large-scale compilations it seemed desirable to calculate the meridional lengths in their true relation. The x and y coordinates for the intersections of the meridians with the three inner parallels were then calculated by subdividing the 4° differences in the values of x and y into 1° units in the same proportion as the 4° lengths of the meridians were subdivided. It would have been sufficient for all practical purposes to divide by 4 the 4° differences in the values of x and y and then add one-fourth, one-half, and three-fourths of these quantities to the x and y values for the proper limiting parallel. Moreover, the simple approximate formulas for x and y (with slight modifications) given by Lallemand could have been used without seriously affecting the accuracy of the results.

Lomnicki has suggested that tables for the modified polyconic projection should be computed on the basis of the Hayford spheroid, which probably represents the actual shape of the earth better than

[1] Paris Acad. Sci. Compt. Rend., vol. 153, p. 561, 1911.

any other spheroid yet developed. The dimensions of this spheroid were published by Hayford as follows:

$$a = 6{,}378{,}388 \text{ meters}$$
$$b = 6{,}356{,}909 \text{ meters}$$

The writer has computed the lengths of each 1° meridional arc for the standard meridian 2° from the central meridian between latitudes 40° and 44°, based on the Hayford spheroid, and the table given below permits a comparison of these values with those based on the Clarke spheroid.

Lengths of meridian 2° from central meridian, in meters, natural scale

Latitude	Clarke spheroid, 1880	Hayford spheroid
40°–41°	111,042.2	111,047.4
41°–42°	111,061.8	111,066.8
42°–43°	111,081.5	111,086.3
43°–44°	111,101.3	111,105.9
40°–44°	444,286.8	444,306.4

The difference in the 4° length of the meridian is less than 20 meters on the spheroid, or 0.02 millimeter on a scale of 1 : 1,000,000. It is apparent that these small differences can not be plotted, but if for any reason the commission should desire to have these tables computed on the basis of the Hayford spheroid, the Geological Survey will be glad to do the work. However, before taking any such action it seems desirable to have comments and criticism on the tables presented herewith, particularly as to their general form. Moreover, it seems desirable to have the commission settle definitely the size of sheets and the arrangement of standard meridians to be used in latitudes above 60°.

METHOD OF CONSTRUCTION OF PROJECTION

If a map of a millionth-scale unit area is to be compiled in a single sheet on a scale of 1 : 1,000,000, it will not be necessary to plot the x and y coordinates of the interior intersections but only to plot the intersections of each meridian with the upper and lower parallels and then draw the meridians as straight lines and subdivide each one of them either into four equal parts or in proportion to their actual 1° lengths. If the map is to be compiled on a scale much larger than that of publication, it is advisable to plot the x and y coordinates of the intersection of each 1° meridian and parallel, and it may be desirable for the cartographer to construct the intersection of each half degree meridian and parallel.

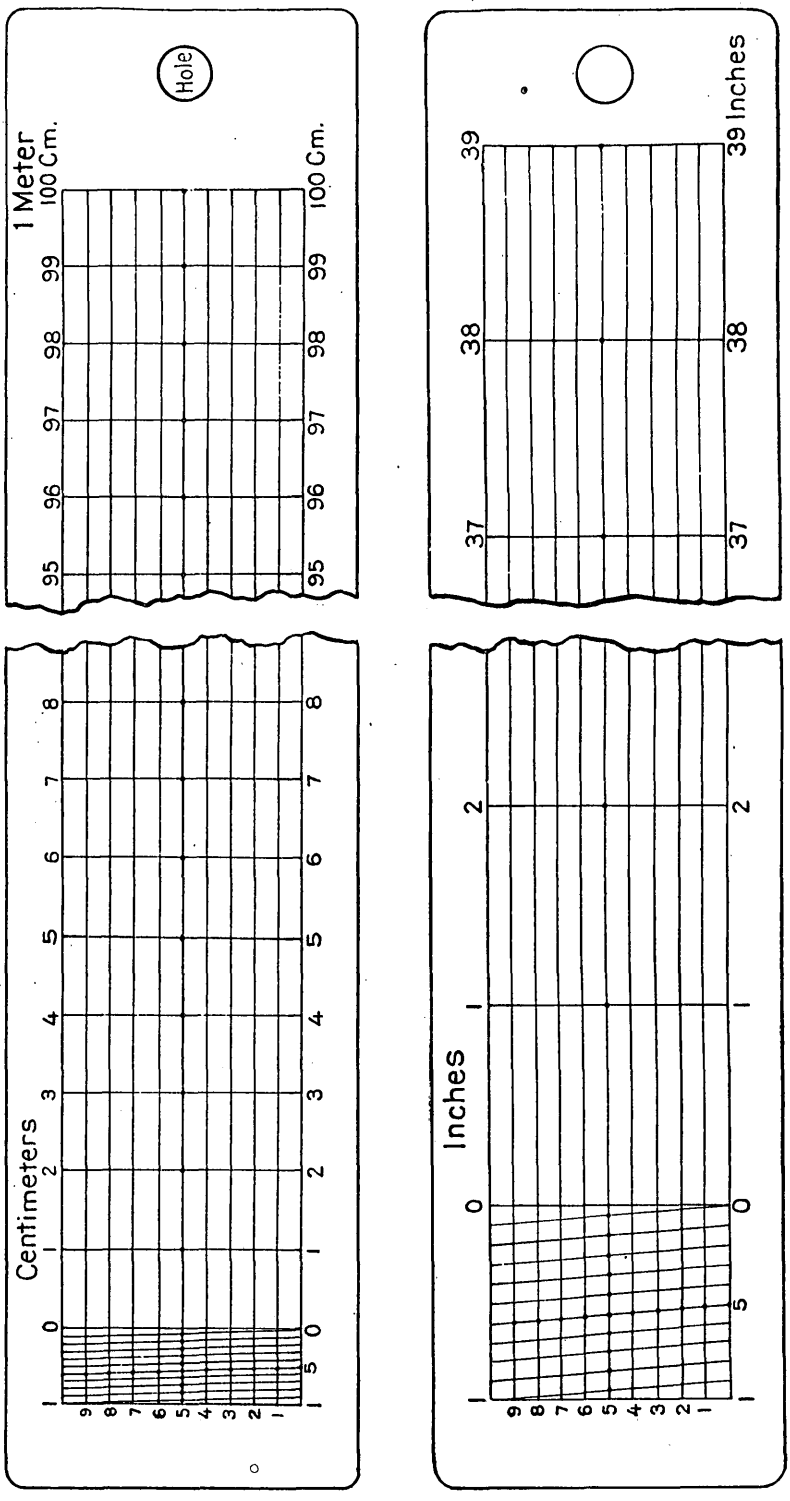

FIGURE 7.—Special scale used by the United States Geological Survey

It is often difficult to plot the small ordinates of the intersections, but it is practicable to add these values to or subtract them from the lengths of the meridional arcs and to construct the projection without making a single individual plotting of a small ordinate. This method involves the initial construction of the abscissa of the central parallel and permits the construction of each intersection, by coordinates, or only the intersections of the meridians with the limiting parallels, as may be desired. The difficulty of constructing abscissas at right angles to the central meridian near the upper and lower edges of the compilation sheet, together with the difficulty of making individual plottings of the small ordinates, seems to warrant the presentation of this method in this paper. In so doing the writer has taken the example of the construction of sheet K–18, embracing the area between latitudes 40° and 44° north and longitudes 72° and 78° west.

The following materials are required: A standard metal scale 1 meter long subdivided throughout in centimeters and with 1 centimeter length at one end subdivided into tenths of millimeters (scales used by the United States Geological Survey accomplish the graduation of millimeters into tenths by means of diagonal scales; see fig. 7); a good rigid-beam compass with micrometer movement; a hard chisel-point pencil; a plotting needle; and a copy of United States Geological Survey Modified Polyconic Projection Tables.

Make a working diagram of the projection and enter on it from the tables all the dimensions that are needed. (See fig. 8.)

Draw the central meridian AB, representing the meridian of 75° west, near the center of the map sheet; select the middle point C as the center of the projection, and lay off from C the meridional distances for 2° of latitude on the central meridian above and below the central parallel of 42° north; $CB' = 222.11$ millimeters and $CA' = 222.03$ millimeters. Subdivide these into 1° lengths, as $B'E = 111.07$ millimeters, $CE = 111.04$ millimeters; check the over-all distance $A'B' = 444.14$ millimeters. If there is any material difference between the computed lengths of CA' and CB' (more than 0.1 millimeter) lay off for purposes of construction the points A and B about 1 centimeter below and above A' and B', respectively, and exactly equidistant from C. At the point C erect the perpendicular FG, using the points A' and B' (or A and B) as centers of long arcs and the points D and E as centers of short arcs. This line FG is the X axis of the parallel representing latitude 42°. Lay off on the line FG the abscissas (x values) of the developed parallel for 1°, 2°, and 3° of longitude from the central meridian; $CJ = CK = 82.80$ millimeters, $CH = CI = 165.59$ millimeters, and $CF' = CG' = 248.36$ millimeters.

With the points F' and G' as centers and a radius equal to the meridional distance between latitudes 42° and 44° along the meridian

3° from the central meridian plus the ordinate (y value) of the developed parallel for latitude 44° at the meridian 3° from the central meridian (222.28+4.36=226.64 millimeters), strike arcs at L and M. Then with the same points as centers and a radius equal to the meridional distance between latitudes 40° and 42° minus the ordinate for 40° (222.20−4.31=217.89 millimeters), strike arcs at N and O. In drawing these arcs use the metal point of the beam compass rather than the pencil point, and either scratch the paper lightly or place under the metal point a small piece of carbon paper made by rubbing a piece of thin tracing paper with a hard pencil. This eliminates the

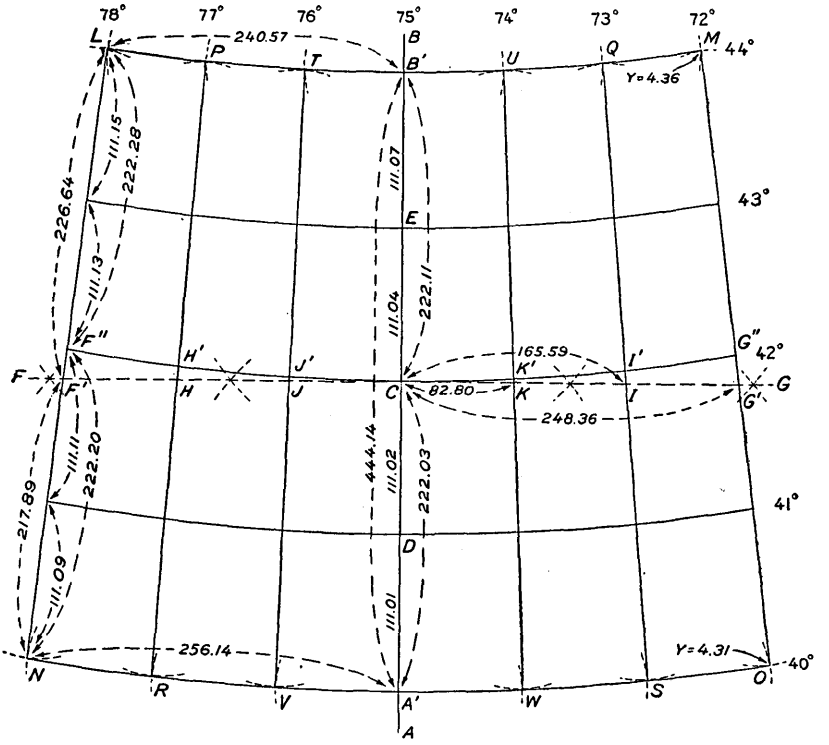

FIGURE 8.—Construction of modified polyconic projection

inaccuracy of using the pencil point of the beam compass to take an exact measurement from the scale.

Then in a similar manner and with the points H and I and the points J and K as centers and with radii equal to the proper meridional distances plus or minus the corresponding ordinates, as the case may be, strike arcs at P, Q, R, and S and at T, U, V, and W. With the points B′ and A′ as centers and with radii equal to the proper abscissas strike arcs at L, M, N, and O, at P, Q, R, and S, and at T, U, V, and W. (Note that theoretically these radii should be the chords joining the ends of the developed parallel, but in the maximum curvature of the developed 3° parallel of 60° latitude the difference between the chord

and the abscissa on the scale of 1 : 1,000,000 is only +0.04 millimeter, which can not be plotted.)

Before proceeding further check the over-all diagonals of the projection LO=MN and if not exactly the same try the diagonals CL=CM and CN=CO so as to locate and correct any inaccuracy of the construction thus far. Draw the developed meridians as straight lines joining L and N, P and R, etc., and draw the developed limiting parallels as straight lines (or smooth curves) joining B′ and T, A′ and V, etc. This gives all of the projection except the three interior parallels.

With the beam compass set at the length of the developed meridional arc between 42° and 44° for each meridian, plot downward along the meridians from L and M, from P and Q, etc., locating the intersections F″, G″, H′, I′, etc. Then with the beam compass set at the length of the developed meridional arc between 40° and 42° for each pair of meridians plot upward along the meridians from N and O, from R and S, etc., thus checking the locations of the intersections along the central parallel. In a similar manner locate the intersections of the meridians with the parallels of 41° and 43° by plotting 1° lengths of developed meridian from the extreme parallels and checking from the central parallel. Construct the three central parallels by drawing straight lines between adjacent points of intersection with meridians or by drawing smooth curves through these points.

Add the latitude and longitude designations of each degree intersection along the limiting meridians and parallels. Add the name and number of the sheet, the scale, the type of projection, and the name of the man making the projection and the date on which it was made. These may seem to be matters of minor detail, but the writer has noticed failure to include these data so many times that he ventures to call attention to their importance.

The projection is now completed and has been constructed in an orderly manner, with a minimum number of settings of the beam compass and without making a single individual plotting of any of the small ordinates. The projection should be checked carefully by another cartographer.

THEORY OF THE MODIFIED POLYCONIC PROJECTION

Nomenclature.—The practical cartographer is often confused by the nomenclature relating to map projections, largely because cartographers and mathematicians of different countries use different symbols for the same thing. Except for one or two terms, the writer has used the nomenclature employed by the United States Coast and Geodetic Survey in its recent publications. The symbols used in

developing the theory of the polyconic projection, with their corresponding definitions, are as follows:

a = semimajor axis of the earth or spheroid.

b = semiminor axis of the earth or spheroid.

e = eccentricity of generating ellipse $= \sqrt{\frac{a^2-b^2}{a^2}}$

f = flattening of generating ellipse $= \frac{a-b}{a}$

n = constant $= \frac{a-b}{a+b}$

ρ_m = radius of curvature of a meridional section.

ρ_n = radius of curvature of a section normal to the meridian.

ϕ = astronomic or geographic latitude of a point on the earth.

Ψ = geocentric latitude of a point on the earth.

$\Delta\phi$ = difference of latitude between two points on the same meridian.

λ = longitude of a point on the earth with reference to Greenwich.

$\Delta\lambda$ = difference of longitude between two points on the same parallel or the angle at the pole between the meridians passing through these points.

M = length of arc of a meridian from the Equator to latitude ϕ.

ΔM = length of arc of a meridian between two parallels.

L = length of an arc of a parallel from the meridian of Greenwich to longitude λ.

ΔL = length of an arc of a parallel between two meridians.

θ = angle at the apex of the developed tangent cone between the central meridian and another meridian.

l = slant height of the tangent cone or the radius of the developed parallel.

x = abscissa of any point on a developed parallel with reference to the central meridian.

y = ordinate of any point on a developed parallel with reference to the tangent to that parallel at the central meridian.

Dimensions of the spheroid.—In the modified polyconic projection dimensions of the spheroid differing only slightly from those developed by Clarke in 1880 have been used, as follows:

$a = 6{,}378{,}240$ meters	$\log a = 6.8047008568$
$b = 6{,}356{,}560$ meters	$\log b = 6.8032221507$
$\frac{b}{a} = 0.9966009432$	$\log \frac{b}{a} = 9.9985212938-10$
$\frac{b^2}{a^2} = 0.9932134400$	$\log \frac{b^2}{a^2} = 9.9970425877-10$
$e^2 = 0.0067865600$	$\log e^2 = 7.8316496930-10$
$f = \frac{1}{294.199}$	$\log f = 7.5313588078-10$
$n = 0.0017024217$	$\log n = 7.2310671463-10$

Radii of curvature.—It is not necessary to compute the radius of curvature of a meridional section, as the meridional arcs are too long to permit the computation of their length by the approximate formula $\Delta M = \rho_m \Delta\phi$. However, in case it is desired to find the values of ρ_m the following formula may be used:

$$\rho_m = \frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$

Values of the radius of curvature of a section normal to the meridian (ρ_n) are needed in the computation of x and y and must be computed for each fourth degree of latitude, 0°, 4°, 8°, etc. Values of ρ_n are used in computing the lengths of the arcs of the parallel, but as the lengths of these arcs are not needed in constructing or checking the projection, it is not necessary to compute the values of ΔL. The following formula is used for values of ρ_n:

$$\rho_n = \frac{a}{(1-e^2\sin^2\phi)^{\frac{1}{2}}}$$

Values of ρ_n and their logarithms for each fourth degree of latitude from 0° to 60° are given in the following table:

Radii and logarithms of radii of curvature of section normal to meridian for each fourth degree of latitude from 0° to 60°

[Values of ρ_n in meters, based on Clarke spheroid of 1880]

Latitude	ρ_n	Log ρ_n
°		
0	6, 378, 240. 000	6. 8047008568
4	6, 378, 345. 318	6. 8047080207
8	6, 378, 659. 251	6. 8047294026
12	6, 379, 175. 780	6. 8047645694
16	6, 379, 884. 995	6. 8048128504
20	6, 380, 773. 276	6. 8048733134
24	6, 381, 823. 547	6. 8049447921
28	6, 383, 015. 586	6. 8050259049
32	6, 384, 326. 402	6. 8051150824
36	6, 385, 730. 701	6. 8052105995
40	6, 387, 201. 280	6. 8053106023
44	6, 388, 709. 631	6. 8054131407
48	6, 390, 226. 444	6. 8055162481
52	6, 391, 722. 180	6. 8056178898
56	6, 393, 167. 653	6. 8057160934
60	6, 394, 534. 596	6. 8058089413

Order of computations.—The procedure followed in computing the lengths of the meridional arcs and the values of the x and y coordinates is not as simple as for the American polyconic projection, because only the length of the standard meridians and the x and y values of intersections of the meridians with the upper and lower parallels can be computed by the formulas used for the American polyconic projection. Lomnicki, in the publication cited above, gives rigid formulas for computing the x and y coordinates of any point on the map, but these formulas are very intricate, and their

use is not advised. Lallemand, in the paper cited above, gives approximate formulas for the length of the central meridian and for the x and y coordinates of intersections of the meridians with the central parallel. These formulas in their general terms are intricate, and in simplifying them for application to the scale of 1:1,000,000 Lallemand has apparently used the Hayford spheroid rather than the Clarke spheroid of 1880. The writer has attempted to modify these simplified approximate formulas to apply to the Clarke spheroid of 1880 and has given them below, following the formulas used in computing these tables. Lallemand's formula for length of the central meridian (as modified) can be used without introducing serious errors, and the length of the other meridians can be computed with reasonable accuracy by applying simple factors of magnification. The writer has, however, further modified this approximate formula by giving a separate one for each meridian. Lallemand's formulas for x and y (as modified) can be used for the coordinates of the intersections of the meridians with any of the parallels without introducing serious errors on the scale of 1:1,000,000. Besides modifying these to conform to the Clarke spheroid of 1880, the writer has given a separate formula for x for each of the five parallels.

However, it seemed desirable to compute the tables presented herewith as follows: Compute the 1° lengths of the standard meridians 2° from the central meridian on the assumption that these lengths are exactly true to scale; compute the x and y coordinates of each meridian with the two standard (upper and lower) parallels; calculate the 4° meridional lengths for the central meridian and for the meridians 1° and 3° from the central meridian; subdivide these 4° meridional lengths into 1° lengths in the same proportion as the computed 1° lengths of the standard meridian bear to the 4° length of that meridian; and finally calculate the x and y coordinates of the points of intersections of the meridians with the three inner parallels. By orderly tabulation and use of computing machines the task was not difficult. The values were computed to tenths of a meter on the natural scale, which, while far beyond the needs of map projection on a scale of 1:1,000,000, may be useful in making computations on a larger scale.

Lengths of the meridians.—The length of the standard meridians 2° from the central meridian is true to scale, and each 1° length may be computed by the following formula for the American polyconic projection (see VII, p. 13), it being sufficient for all practical purposes to use the first three terms only:

$$\Delta M_2 = A_0\Delta\phi - A_2 \cos 2\phi \sin \Delta\phi + A_4 \cos 4\phi \sin 2\Delta\phi - A_6 \cos 6\phi \sin 3\Delta\phi + \ldots . \qquad \text{[XVII]}$$

in which

ΔM_2 = length of arc of the standard meridian, expressed in meters.
$\phi = \frac{1}{2}(\phi_2 + \phi_1)$ = mean latitude of meridional arc.
$\Delta\phi = (\phi_2 - \phi_1)$ = arc of standard meridian, expressed in degrees.

$A_0 = 111{,}132.1753$ meters	$\log = 5.0458398153$
$A_2 = 32{,}519.9882$ meters	$\log = 4.5121503781$
$A_4 = 34.6017$ meters	$\log = 1.5390974$
$A_6 = 0.0458$ meters	$\log = 8.66108 - 10$

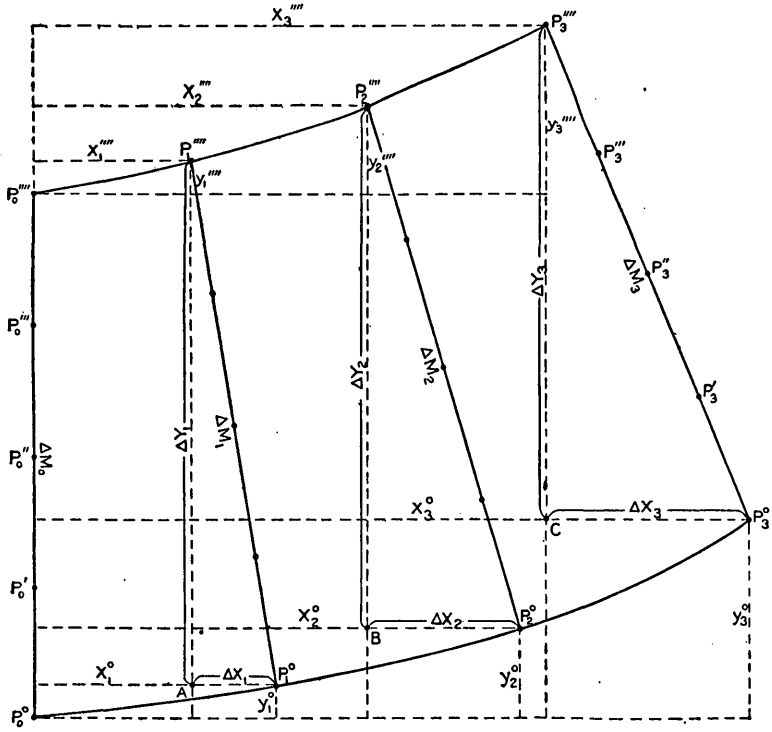

FIGURE 9.—Computation of modified polyconic projection tables

The formula given above may of course be used to compute either the 1° or the 4° length of the standard meridian, by using $\Delta\phi = 1°$ or 4°, respectively.

After the x and y coordinates of the intersections of all the meridians with the upper and lower parallels are computed, the length of the central meridian and of the meridians 1° and 3° from the central meridian may be computed by formulas developed as follows (see fig. 9):

In the right triangle B $P_2°$ P_2''''

$$\Delta Y_2 = \sqrt{(\Delta M_2)^2 - (\Delta X_2)^2} = \Delta M_2 \sqrt{1 - \left(\frac{\Delta X_2}{\Delta M_2}\right)^2}$$

Expanding the radical as a binomial series into terms which can be handled conveniently, we have

$$\Delta Y_2 = \Delta M_2 \left[1 - \frac{1}{2}\left(\frac{\Delta X_2}{\Delta M_2}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_2}{\Delta M_2}\right)^4 - \cdots \right]$$

but

$$\Delta M_0 = \Delta Y_2 - (y_2'''' - y_2^\circ);$$

therefore

$$\Delta M_0 = \Delta M_2 \left[1 - \frac{1}{2}\left(\frac{\Delta X_2}{\Delta M_2}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_2}{\Delta M_2}\right)^4 \right] - [y_2'''' - y_2^\circ] \quad \text{[XVIII]}$$

Similarly,

$$\Delta M_1 = \sqrt{(\Delta Y_1)^2 + (\Delta X_1)^2} = \Delta Y_1 \sqrt{1 + \left(\frac{\Delta X_1}{\Delta Y_1}\right)^2}$$

or

$$\Delta M_1 = \Delta Y_1 \left[1 + \frac{1}{2}\left(\frac{\Delta X_1}{\Delta Y_1}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_1}{\Delta Y_1}\right)^4 + \cdots \right] \quad \text{[XIX]}$$

This equation can be solved easily by using the relation

$$\Delta Y_1 = \Delta M y_0 + (y_1'''' - y_1^\circ)$$

Similarly,

$$\Delta M_3 = \sqrt{(\Delta Y_3)^2 + (\Delta X_3)^2} = \Delta Y_3 \sqrt{1 + \left(\frac{\Delta X_3}{\Delta Y_3}\right)^2}$$

or

$$\Delta M_3 = \Delta Y_3 \left[1 + \frac{1}{2}\left(\frac{\Delta X_3}{\Delta Y_3}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_3}{\Delta Y_3}\right)^4 + \cdots \right] \quad \text{[XX]}$$

This equation can be solved easily by using the relation

$$\Delta Y_3 = \Delta M_0 + (y_3'''' - y_3^\circ)$$

After the 4° lengths of each meridian are found they may be subdivided into 1° lengths as follows: Take the difference between the 4° length of the standard meridian and the 4° length of each of the other meridians, divide these differences by 4, and subtract the results from or add them to each 1° length of the standard meridian. If the 4° lengths of a meridian are divided into four equal parts, as is the practice of most cartographers, the errors introduced are small; for example, in the belt between latitudes 40° and 41° the maximum error is 30 meters on the spheroid, or 0.03 millimeter on the scale of 1:1,000,000. This difference can not be plotted, but if the sheets are compiled on a larger scale it may be advisable to subdivide the 4° lengths in true proportion.

The 4° lengths of these meridians can be computed in terms of millimeters on the scale of 1:1,000,000 without introducing serious errors by the use of Lallemand's approximate formulas, modified slightly to conform to the Clarke spheroid of 1880 and to the nomenclature used in this paper, as follows:

Length of central meridian,

$$\Delta M_0 = 444.40 \text{ mm.} - 2.35 \text{ mm. } \cos 2\phi \text{ ---------- [XXI]}$$

Length of meridian 1° from center,

$$\Delta M_1 = 444.45 \text{ mm.} - 2.30 \text{ mm. } \cos 2\phi \text{ ---------- [XXII]}$$

Length of meridian 2° from center,

$$\Delta M_2 = 444.50 \text{ mm.} - 2.25 \text{ mm. } \cos 2\phi \text{ ---------- [XXIII]}$$

Length of meridian 3° from center,

$$\Delta M_3 = 444.70 \text{ mm.} - 2.10 \text{ mm. } \cos 2\phi \text{ ---------- [XXIV]}$$

Rectangular coordinates.—In the modified polyconic projection each of the parallels marking the boundaries of zones of 4° of latitude is represented as the base of a right cone tangent to the spheroid along that parallel. Each 4° developed parallel is a circle with center on the prolongation of the central meridian and with radius $l = \rho_n \cot\phi$, and the origin of the rectangular coordinates of each parallel is the point at which the developed parallel intersects the central meridian.

The rectangular coordinates of the intersections of the meridians with the upper and lower parallels are computed in the same way as for the American polyconic projection. The tables presented with this paper were computed by means of the following rigid formulas (see X and XI, p. 17):

$$x = \rho_n \cot \phi \sin (\Delta\lambda \sin \phi) \text{ ---------- [XXV]}$$

$$y = 2\rho_n \cot \phi \sin^2 \tfrac{1}{2}(\Delta\lambda \sin \phi) \text{ ---------- [XXVI]}$$

As each meridian on the modified polyconic projection is drawn as a straight line, whereas a true polyconic representation of each meridian except the central one would be a curve, owing to the constantly changing values of convergence, the usual formulas for the x and y coordinates can not be used for the intersections with the interior parallels. For all practical purposes it is sufficient to calculate the values of x and y for the intermediate intersections by dividing by 4 the differences of the x and y values of the intersections of each meridian with the upper and lower parallels, adding one-fourth, one-half, and three-fourths of the x difference to the x value for the upper parallel (or subtracting them from the x value for the lower parallel), and adding one-fourth, one-half, and three-fourths of the y difference to the y value for the lower parallel (or subtracting them from the y value for the upper parallel.) If more accuracy is desired the values of the 4° differences in x and y can be subdivided into 1° units in the same proportion as the 4° lengths of the meridians are subdivided. In this event it is sufficient to use the proportional parts of the standard meridian in subdividing the coordinates of all the meridians, and the following procedure may be used:

Divide each 1° length of the standard meridian by the 4° length of that meridian and multiply the differences of the x and y values of the

ends of each of the other 4° meridians by the corresponding decimal fractions thus obtained. Subtract the resulting x increments for the lower 1° interval from the corresponding x values for the lower parallel; then subtract the x increments for the second 1° interval from the x values just obtained for the parallel 1° above the lower parallel, etc. Follow the same procedure with the y values, except that the increments should be added to the y values of the lower parallel. As the decimal fractions vary but slightly from 0.25, the calculations can be simplified by applying one-fourth of the 4° difference $\mp$ the residual of the decimal fraction, as follows:

$$\frac{\Delta M_2(40°–41°)}{\Delta M_2(40°–44°)}=\frac{111042.242}{444286.870}=0.24993365=\tfrac{1}{4}-0.00006635$$

$$\frac{\Delta M_2(43°–44°)}{\Delta M_2(40°–44°)}=\frac{111101.271}{444286.870}=0.25006652=\tfrac{1}{4}+0.00006652$$

In a map unit lying between latitudes 40° and 44° the maximum difference between subdivision of a 4° meridian into four equal parts and subdivision in true proportion is 1.38 meters in the x value and 0.01 meter in the y value of points along the meridian 3° from the central meridian. These differences can not be plotted on a scale of 1:1,000,000 or even on a scale of 1:500,000. However, in the tables presented with this paper the x values have been computed in direct proportion to the correct subdivision of the standard meridian.

Lallemand's approximate formulas for the rectangular coordinates were developed by him for the x and y coordinates of the central parallel of the projection. The writer has modified these formulas somewhat, and as given below they may be used for the x and y coordinates of any of the parallels on a scale of 1:1,000,000 without introducing serious errors. In these modified formulas for x the five coefficients of cos ϕ apply to the five parallels of the projection, the upper coefficient applying to the upper parallel, etc. $\Delta\lambda$ is taken in degrees from the central meridian. Coordinates for ½° intersections may be computed by taking values of $\Delta\lambda=\frac{1}{2}°$, 1°, 1½°, etc. All values of x and y will be in millimeters on a scale of 1:1,000,000.

$$x(\text{in millimeters})=\Delta\lambda\left[\begin{Bmatrix}111.40\\111.37\\111.33\\111.37\\111.40\end{Bmatrix}\cos\phi-0.08\cos 3\phi\right]\text{----[XXVII]}$$

$$y(\text{in millimeters})=\Delta\lambda^2[0.49\sin 2\phi]\text{----------[XXVIII]}$$

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
0 00	3.804	7.609	11.413	15.218	22.827
10	.804	.609	.413	.218	.826
15	.804	.609	.413	.218	.826
20	.804	.609	.413	.217	.826
30	3.804	7.609	11.413	15.217	22.826
40	.804	.608	.413	.217	.825
45	.804	.608	.412	.216	.825
50	.804	.608	.412	.216	.824
1 00	3.804	7.608	11.412	15.215	22.823
10	.804	.607	.411	.215	.822
15	.804	.607	.411	.214	.821
20	.803	.607	.410	.214	.820
30	3.803	7.606	11.409	15.213	22.819
40	.803	.606	.408	.211	.817
45	.803	.605	.408	.211	.816
50	.802	.605	.407	.210	.815
2 00	3.802	7.604	11.407	15.208	22.813
10	.802	.603	.405	.207	.810
15	.802	.603	.405	.206	.809
20	.801	.603	.404	.205	.808
30	3.801	7.602	11.403	15.203	22.805
40	.800	.601	.401	.201	.802
45	.800	.600	.400	.200	.800
50	.800	.600	.399	.199	.799
3 00	3.799	7.598	11.398	15.197	22.795
10	.799	.597	.396	.195	.792
15	.798	.597	.395	.193	.790
20	.798	.596	.394	.192	.788
30	3.797	7.595	11.392	15.190	22.784
40	.797	.593	.390	.187	.780
45	.796	.593	.389	.185	.778
50	.796	.592	.388	.184	.776
4 00	3.795	7.590	11.386	15.181	22.771
10	.794	.589	.383	.178	.767
15	.794	.588	.382	.176	.764
20	.794	.587	.382	.174	.762
30	3.793	7.586	11.378	15.171	22.757
40	.792	.584	.376	.168	.751
45	.791	.583	.374	.166	.749
50	.791	.582	.373	.164	.746
5 00	3.790	7.580	11.370	15.160	22.740
10	.789	.578	.367	.156	.734
15	.789	.577	.366	.154	.731
20	.788	.576	.364	.152	.728
30	3.787	7.574	11.361	15.148	22.722
40	.786	.572	.358	.144	.716
45	.785	.571	.356	.142	.712
50	.785	.570	.355	.139	.709
6 00	3.784	7.567	11.351	15.135	22.702
10	.783	.565	.348	.130	.695
15	.782	.564	.346	.128	.692
20	.781	.563	.344	.125	.688
30	3.780	7.560	11.340	15.121	22.681
40	.779	.558	.337	.115	.673
45	.778	.556	.335	.113	.669
50	.778	.555	.333	.110	.665
7 00	3.776	7.552	11.329	15.105	22.658

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 0°	5	3.779	0.000
	10	7.557	.000
	15	11.336	.000
	20	15.115	.000
	25	18.893	.000
	30	22.672	.000
For latitude 1°	5	3.779	0.000
	10	7.557	.000
	15	11.336	.000
	20	15.115	.001
	25	18.893	.001
	30	22.672	.002
For latitude 2°	5	3.779	0.000
	10	7.557	.000
	15	11.336	.001
	20	15.115	.002
	25	18.894	.002
	30	22.672	.003
For latitude 3°	5	3.779	0.000
	10	7.558	.001
	15	11.336	.001
	20	15.115	.002
	25	18.894	.004
	30	22.673	.005
For latitude 4°	5	3.779	0.000
	10	7.558	.001
	15	11.337	.002
	20	15.115	.003
	25	18.894	.005
	30	22.673	.007
For latitude 5°	5	3.779	0.000
	10	7.558	.001
	15	11.337	.002
	20	15.116	.004
	25	18.895	.006
	30	22.674	.009
For latitude 6°	5	3.779	0.000
	10	7.558	.001
	15	11.337	.003
	20	15.116	.005
	25	18.896	.007
	30	22.675	.010
For latitude 7°	5	3.779	0.000
	10	7.559	.001
	15	11.338	.003
	20	15.117	.005
	25	18.896	.008
	30	22.676	.012

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
7 00	3.776	7.552	11.329	15.105	22.658
10	.775	.550	.325	.100	.649
15	.774	.548	.323	.097	.645
20	.774	.547	.321	.094	.641
30	3.772	7.544	11.316	15.088	22.633
40	.771	.541	.312	.083	.624
45	.770	.540	.310	.080	.619
50	.769	.538	.307	.077	.615
8 00	3.768	7.535	11.303	15.071	22.606
10	.766	.532	.298	.064	.597
15	.765	.531	.296	.061	.592
20	.765	.529	.294	.058	.587
30	3.763	7.526	11.289	15.052	22.577
40	.761	.522	.284	.045	.568
45	.760	.521	.281	.042	.563
50	.760	.519	.279	.038	.558
9 00	3.758	7.516	11.274	15.032	22.547
10	.756	.512	.268	.025	.537
15	.755	.511	.266	.021	.532
20	.754	.509	.263	.018	.526
30	3.753	7.505	11.258	15.010	22.516
40	.751	.502	.252	.003	.505
45	.750	.500	.249	14.999	.499
50	.749	.498	.247	.996	.493
10 00	3.747	7.494	11.241	14.988	22.482
10	.745	.490	.235	.980	.470
15	.744	.488	.232	.976	.465
20	.743	.486	.229	.973	.459
30	3.741	7.482	11.223	14.965	22.447
40	.739	.478	.217	.956	.435
45	.738	.476	.214	.952	.429
50	.737	.474	.211	.948	.422
11 00	3.735	7.470	11.205	14.940	22.410
10	.733	.466	.199	.931	.397
15	.732	.464	.195	.927	.391
20	.731	.461	.192	.923	.384
30	3.729	7.457	11.186	14.914	22.371
40	.726	.453	.179	.905	.358
45	.725	.450	.176	.901	.351
50	.724	.448	.172	.896	.345
12 00	3.722	7.444	11.165	14.887	22.331
10	.720	.439	.159	.878	.317
15	.718	.437	.155	.873	.310
20	.717	.434	.152	.869	.303
30	3.715	7.430	11.145	14.859	22.289
40	.712	.425	.137	.850	.275
45	.711	.422	.134	.845	.267
50	.710	.420	.130	.840	.260
13 00	3.708	7.415	11.123	14.830	22.245
10	.705	.410	.115	.820	.230
15	.704	.408	.111	.815	.223
20	.703	.405	.108	.810	.215
30	3.700	7.400	11.100	14.800	22.200
40	.697	.395	.092	.790	.184
45	.696	.392	.088	.784	.177
50	.695	.390	.084	.779	.169
14 00	3.692	7.384	11.077	14.769	22.153

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 7°	5	3.779	0.000
	10	7.559	.001
	15	11.338	.003
	20	15.117	.005
	25	18.896	.008
	30	22.676	.012
For latitude 8°	5	3.779	0.000
	10	7.559	.001
	15	11.338	.003
	20	15.118	.006
	25	18.897	.010
	30	22.677	.014
For latitude 9°	5	3.780	0.000
	10	7.559	.002
	15	11.339	.004
	20	15.119	.007
	25	18.898	.011
	30	22.678	.015
For latitude 10°	5	3.780	0.000
	10	7.560	.002
	15	11.340	.004
	20	15.119	.008
	25	18.899	.012
	30	22.679	.017
For latitude 11°	5	3.780	0.001
	10	7.560	.002
	15	11.340	.005
	20	15.120	.008
	25	18.901	.013
	30	22.681	.019
For latitude 12°	5	3.780	0.001
	10	7.561	.002
	15	11.341	.005
	20	15.122	.009
	25	18.902	.014
	30	22.682	.020
For latitude 13°	5	3.781	0.001
	10	7.561	.002
	15	11.342	.005
	20	15.123	.010
	25	18.903	.015
	30	22.684	.022
For latitude 14°	5	3.781	0.001
	10	7.562	.003
	15	11.343	.006
	20	15.124	.010
	25	18.905	.016
	30	22.686	.023

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel	Abscissas of developed parallel — Longitude interval 5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
14 00	3.692	7.384	11.077	14.769	22.153
10	.689	.379	.068	.758	.137
15	.688	.376	.064	.752	.129
20	.687	.374	.060	.747	.121
30	3.684	7.368	11.052	14.736	22.104
40	.681	.363	.044	.725	.088
45	.680	.360	.040	.719	.079
50	.678	.357	.035	.714	.071
15 00	3.676	7.351	11.027	14.702	22.054
10	.673	.346	.018	.691	.037
15	.671	.343	.014	.685	.028
20	.670	.340	.010	.679	.019
30	3.667	7.334	11.001	14.668	22.002
40	.664	.328	10.992	.656	21.984
45	.662	.325	.987	.650	.975
50	.661	.322	.983	.644	.966
16 00	3.658	7.316	10.974	14.632	21.948
10	.655	.310	.965	.620	.930
15	.653	.307	.960	.614	.920
20	.652	.304	.956	.607	.911
30	3.649	7.297	10.946	14.595	21.893
40	.646	.291	.937	.582	.874
45	.644	.288	.932	.576	.864
50	.642	.285	.927	.570	.855
17 00	3.639	7.278	10.918	14.557	21.835
10	.636	.272	.908	.544	.816
15	.634	.269	.903	.538	.806
20	.633	.265	.898	.531	.796
30	3.629	7.259	10.888	14.518	21.777
40	.626	.252	.878	.505	.757
45	.624	.249	.873	.498	.747
50	.623	.246	.868	.491	.737
18 00	3.619	7.239	10.858	14.478	21.716
10	.616	.232	.848	.464	.696
15	.614	.228	.843	.457	.686
20	.613	.225	.838	.450	.675
30	3.609	7.218	10.827	14.436	21.654
40	.606	.211	.817	.422	.633
45	.604	.208	.811	.415	.623
50	.602	.204	.806	.408	.612
19 00	3.598	7.197	10.795	14.394	21.591
10	.595	.190	.785	.379	.569
15	.593	.186	.779	.372	.558
20	.591	.182	.774	.365	.547
30	3.588	7.175	10.763	14.350	21.525
40	.584	.168	.752	.335	.503
45	.582	.164	.746	.328	.492
50	.580	.160	.741	.321	.481
20 00	3.576	7.153	10.729	14.306	21.458
10	.573	.145	.718	.290	.436
15	.571	.141	.712	.283	.424
20	.569	.138	.706	.275	.413
30	3.565	7.130	10.695	14.260	21.390
40	.561	.122	.683	.244	.367
45	.559	.118	.678	.237	.355
50	.557	.114	.672	.229	.343
21 00	3.553	7.107	10.660	14.213	21.320

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 14°	5	3.781	0.001
	10	7.562	.003
	15	11.343	.006
	20	15.124	.010
	25	18.905	.016
	30	22.686	.023
For latitude 15°	5	3.781	0.001
	10	7.563	.003
	15	11.344	.006
	20	15.125	.011
	25	18.907	.017
	30	22.688	.025
For latitude 16°	5	3.782	0.001
	10	7.563	.003
	15	11.345	.007
	20	15.127	.012
	25	18.908	.018
	30	22.690	.026
For latitude 17°	5	3.782	0.001
	10	7.564	.003
	15	11.346	.007
	20	15.128	.012
	25	18.910	.019
	30	22.692	.028
For latitude 18°	5	3.782	0.001
	10	7.565	.003
	15	11.347	.007
	20	15.130	.013
	25	18.912	.020
	30	22.694	.029
For latitude 19°	5	3.783	0.001
	10	7.566	.003
	15	11.348	.008
	20	15.131	.014
	25	18.914	.021
	30	22.697	.031
For latitude 20°	5	3.783	0.001
	10	7.566	.004
	15	11.350	.008
	20	15.133	.014
	25	18.916	.022
	30	22.700	.032
For latitude 21°	5	3.784	0.001
	10	7.567	.004
	15	11.351	.008
	20	15.135	.015
	25	18.919	.023
	30	22.702	.033

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{96000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		5′	10′	15′	20′	30′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
21	00	3.553	7.107	10.660	14.213	21.320
	10	.549	.099	.648	.197	.296
	15	.547	.095	.642	.189	.284
	20	.545	.091	.636	.181	.272
	30	3.541	7.083	10.624	14.165	21.248
	40	.537	.075	.612	.149	.224
	45	.535	.070	.606	.141	.211
	50	.533	.066	.600	.133	.199
22	00	3.529	7.058	10.587	14.116	21.174
	10	.525	.050	.575	.100	.150
	15	.523	.046	.569	.091	.137
	20	.521	.042	.562	.083	.125
	30	3.517	7.033	10.550	14.066	21.099
	40	.512	.025	.537	.049	.074
	45	.510	.020	.531	.041	.061
	50	.508	.016	.524	.032	.049
23	00	3.504	7.008	10.511	14.015	21.023
	10	.499	6.999	.498	13.998	20.997
	15	.497	.995	.492	.989	.984
	20	.495	.990	.485	.981	.971
	30	3.491	6.982	10.472	13.963	20.945
	40	.486	.973	.459	.945	.918
	45	.484	.968	.452	.937	.905
	50	.482	.964	.446	.928	.892
24	00	3.477	6.955	10.432	13.910	20.865
	10	.473	.946	.419	.892	.838
	15	.471	.941	.412	.883	.824
	20	.468	.937	.405	.874	.811
	30	3.464	6.928	10.392	13.856	20.783
	40	.459	.919	.378	.837	.756
	45	.457	.914	.371	.828	.742
	50	.455	.909	.364	.819	.728
25	00	3.450	6.900	10.350	13.800	20.700
	10	.445	.891	.336	.782	.672
	15	.443	.886	.329	.772	.658
	20	.441	.881	.322	.763	.644
	30	3.436	6.872	10.308	13.744	20.616
	40	.431	.862	.294	.725	.587
	45	.429	.858	.286	.715	.573
	50	.426	.853	.279	.706	.559
26	00	3.422	6.843	10.265	13.686	20.530
	10	.417	.834	.250	.667	.501
	15	.414	.829	.243	.657	.486
	20	.412	.824	.236	.648	.471
	30	3.407	6.814	10.221	13.628	20.442
	40	.402	.804	.206	.608	.412
	45	.400	.799	.199	.598	.398
	50	.397	.794	.191	.588	.383
27	00	3.392	6.784	10.176	13.569	20.353
	10	.387	.774	.161	.548	.323
	15	.385	.769	.154	.538	.308
	20	.382	.764	.146	.528	.292
	30	3.377	6.754	10.131	13.508	20.262
	40	.372	.744	.116	.488	.231
	45	.369	.739	.108	.477	.216
	50	.367	.734	.100	.467	.201
28	00	3.362	6.723	10.085	13.446	20.170

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 21°	5	3.784	0.001
	10	7.567	.004
	15	11.351	.008
	20	15.135	.015
	25	18.919	.023
	30	22.702	.033
For latitude 22°	5	3.704	0.001
	10	7.568	.004
	15	11.352	.009
	20	15.137	.015
	25	18.921	.024
	30	22.705	.025
For latitude 23°	5	3.785	0.001
	10	7.569	.004
	15	11.354	.009
	20	15.138	.016
	25	18.923	.025
	30	22.708	.036
For latitude 24°	5	3.785	0.001
	10	7.570	.004
	15	11.355	.009
	20	15.140	.016
	25	18.926	.026
	30	22.711	.037
For latitude 25°	5	3.786	0.001
	10	7.571	.004
	15	11.357	.010
	20	15.142	.017
	25	18.928	.026
	30	22.714	.038
For latitude 26°	5	3.786	0.001
	10	7.572	.004
	15	11.358	.010
	20	15.144	.017
	25	18.930	.027
	30	22.716	.039
For latitude 27°	5	3.787	0.001
	10	7.573	.004
	15	11.360	.010
	20	15.147	.018
	25	18.934	.028
	30	22.720	.040
For latitude 28°	5	3.787	0.001
	10	7.574	.005
	15	11.362	.010
	20	15.149	.018
	25	18.936	.029
	30	22.724	.041

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{9\,8\,0\,0\,0}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		5′	10′	15′	20′	30′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
28	00	3.362	6.723	10.085	13.446	20.170
	10	.356	.713	.069	.426	.139
	15	.354	.708	.061	.415	.123
	20	.351	.702	.054	.405	.107
	30	3.346	6.692	10.038	13.384	20.076
	40	.341	.681	.022	.363	.044
	45	.338	.676	.014	.352	.028
	50	.335	.671	10.006	.342	20.012
29	00	3.330	6.660	9.990	13.320	19.980
	10	.325	.649	.974	.299	.948
	15	.322	.644	.966	.288	.932
	20	.319	.639	.958	.277	.916
	30	3.314	6.628	9.942	13.256	19.884
	40	.308	.617	.925	.234	.851
	45	.306	.611	.917	.223	.835
	50	.303	.606	.909	.212	.818
30	00	3.298	6.595	9.893	13.190	19.785
	10	.292	.584	.876	.168	.752
	15	.289	.578	.868	.157	.735
	20	.286	.573	.859	.146	.719
	30	3.281	6.562	9.843	13.123	19.685
	40	.275	.551	.826	.101	.652
	45	.272	.545	.817	.090	.635
	50	.270	.539	.809	.078	.618
31	00	3.264	6.528	9.792	13.056	19.584
	10	.258	.517	.775	.033	.550
	15	.255	.511	.766	.022	.532
	20	.253	.505	.758	13.010	.515
	30	3.247	6.494	9.740	12.987	19.481
	40	.241	.482	.723	.964	.446
	45	.238	.476	.714	.953	.429
	50	.235	.470	.706	.941	.411
32	00	3.229	6.459	9.688	12.918	19.376
	10	.224	.447	.671	.894	.341
	15	.221	.441	.662	.882	.324
	20	.218	.435	.653	.871	.307
	30	3.212	6.424	9.635	12.847	19.271
	40	.206	.412	.617	.823	.235
	45	.203	.406	.608	.811	.217
	50	.200	.400	.600	.799	.199
33	00	3.194	6.388	9.582	12.775	19.163
	10	.188	.376	.564	.751	.127
	15	.185	.370	.554	.739	.109
	20	.182	.364	.545	.727	.091
	30	3.176	6.351	9.527	12.703	19.054
	40	.170	.339	.509	.679	19.018
	45	.167	.333	.500	.666	18.999
	50	.164	.327	.491	.654	.981
34	00	3.157	6.315	9.472	12.629	18.944
	10	.151	.302	.453	.605	.907
	15	.148	.296	.444	.592	.888
	20	.145	.290	.435	.580	.870
	30	3.139	6.277	9.416	12.555	18.832
	40	.132	.265	.397	.530	.795
	45	.129	.259	.388	.517	.776
	50	.126	.252	.379	.505	.757
35	00	3.120	6.240	9.360	12.480	18.719

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 28°	5	3.787	0.001
	10	7.574	.005
	15	11.362	.010
	20	15.149	.018
	25	18.936	.029
	30	22.724	.041
For latitude 29°	5	3.788	0.001
	10	7.576	.005
	15	11.363	.011
	20	15.151	.019
	25	18.939	.029
	30	22.727	.042
For latitude 30°	5	3.788	0.001
	10	7.577	.005
	15	11.365	.011
	20	15.154	.019
	25	18.942	.030
	30	22.731	.043
For latitude 31°	5	3.789	0.001
	10	7.578	.005
	15	11.367	.011
	20	15.156	.020
	25	18.945	.031
	30	22.734	.044
For latitude 32°	5	3.789	0.001
	10	7.579	.005
	15	11.369	.011
	20	15.158	.020
	25	18.948	.031
	30	22.738	.045
For latitude 33°	5	3.790	0.001
	10	7.580	.005
	15	11.370	.011
	20	15.161	.020
	25	18.951	.032
	30	22.741	.046
For latitude 34°	5	3.791	0.001
	10	7.582	.005
	15	11.372	.012
	20	15.163	.021
	25	18.954	.032
	30	22.745	.046
For latitude 35°	5	3.791	0.001
	10	7.583	.005
	15	11.374	.012
	20	15.166	.021
	25	18.957	.033
	30	22.749	.047

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{9\,6\,0\,0\,0}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
35 00	3.120	6.240	9.360	12.480	18.719
10	.114	.227	.341	.454	.681
15	.110	.221	.331	.441	.662
20	.107	.214	.321	.429	.643
30	3.101	6.202	9.302	12.403	18.605
40	.094	.189	.283	.377	.566
45	.091	.182	.273	.365	.547
50	.088	.176	.264	.352	.528
36 00	3.081	6.163	9.244	12.326	18.489
10	.075	.150	.225	.300	.450
15	.072	.143	.215	.287	.430
20	.068	.137	.205	.274	.411
30	3.062	6.124	9.186	12.248	18.371
40	.055	.111	.166	.221	.332
45	.052	.104	.156	.208	.312
50	.049	.097	.146	.195	.292
37 00	3.042	6.084	9.126	12.168	18.252
10	.035	.071	.106	.142	.213
15	.032	.064	.096	.128	.193
20	.029	.057	.086	.115	.172
30	3.022	6.044	9.066	12.088	18.132
40	.015	.031	.046	.061	.092
45	.012	.024	.036	.048	.072
50	.009	.017	.026	.034	.051
38 00	3.002	6.004	9.005	12.007	18.011
10	2.995	5.990	8.985	11.980	17.970
15	.992	.983	.975	.996	.949
20	.988	.976	.964	.953	.929
30	2.982	5.963	8.944	11.925	17.888
40	.974	.949	.923	.898	.846
45	.971	.942	.913	.884	.826
50	.968	.935	.903	.870	.805
39 00	2.961	5.921	8.882	11.842	17.763
10	.954	.907	.861	.814	.722
15	.950	.900	.850	.800	.701
20	.947	.893	.840	.786	.680
30	2.940	5.879	8.819	11.758	17.638
40	.933	.865	.798	.730	.595
45	.929	.858	.787	.716	.574
50	.926	.851	.777	.702	.553
40 00	2.918	5.837	8.755	11.674	17.511
10	.911	.823	.734	.645	.468
15	.908	.816	.723	.631	.447
20	.904	.808	.713	.617	.425
30	2.897	5.794	8.691	11.588	17.382
40	.890	.780	.670	.559	.339
45	.886	.773	.659	.545	.318
50	.883	.765	.648	.531	.296
41 00	2.875	5.751	8.626	11.502	17.253
10	.868	.736	.605	.473	.209
15	.864	.729	.594	.458	.187
20	.861	.722	.583	.444	.165
30	2.854	5.707	8.561	11.414	17.122
40	.846	.692	.539	.385	.078
45	.843	.685	.528	.370	.056
50	.839	.678	.517	.356	.033
42 00	2.832	5.663	8.495	11.326	16.989

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 35°	5	3.791	0.001
	10	7.583	.005
	15	11.374	.012
	20	15.166	.021
	25	18.957	.033
	30	22.749	.047
For latitude 36°	5	3.792	0.001
	10	7.584	.005
	15	11.376	.012
	20	15.168	.021
	25	18.961	.033
	30	22.752	.047
For latitude 37°	5	3.793	0.001
	10	7.585	.005
	15	11.378	.012
	20	15.171	.021
	25	18.964	.033
	30	22.757	.048
For latitude 38°	5	3.793	0.001
	10	7.587	.005
	15	11.380	.012
	20	15.173	.021
	25	18.967	.034
	30	22.761	.048
For latitude 39°	5	3.794	0.001
	10	7.588	.005
	15	11.382	.012
	20	15.176	.022
	25	18.970	.034
	30	22.765	.049
For latitude 40°	5	3.795	0.001
	10	7.589	.005
	15	11.384	.012
	20	15.179	.022
	25	18.974	.034
	30	22.768	.049
For latitude 41°	5	3.795	0.001
	10	7.591	.005
	15	11.386	.012
	20	15.181	.022
	25	18.977	.034
	30	22.772	.049
For latitude 42°	5	3.796	0.001
	10	7.592	.005
	15	11.388	.012
	20	15.184	.022
	25	18.980	.034
	30	22.776	.050

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′ ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
42 00	2.832	5.663	8.495	11.326	16.989
10	.824	.648	.472	.297	.945
15	.820	.641	.461	.282	.923
20	.817	.633	.450	.267	.900
30	2.809	5.619	8.428	11.237	16.856
40	.802	.604	.405	.207	.811
45	.798	.596	.394	.192	.788
50	.794	.589	.383	.177	.766
43 00	2.787	5.574	8.360	11.147	16.721
10	.779	.558	.338	.117	.675
15	.775	.551	.326	.102	.653
20	.772	.543	.315	.087	.630
30	2.764	5.528	8.292	11.056	16.584
40	.756	.513	.269	.026	.539
45	.753	.505	.258	11.011	.516
50	.749	.498	.246	10.995	.493
44 00	2.741	5.482	8.223	10.965	16.447
10	.733	.467	.200	.334	.401
15	.730	.459	.189	.918	.378
20	.726	.452	.177	.903	.355
30	2.718	5.436	8.154	10.872	16.308
40	.710	.421	.131	.841	.262
45	.706	.413	.119	.826	.238
50	.703	.405	.108	.810	.215
45 00	2.695	5.389	8.084	10.779	16.168
10	.687	.374	.061	.747	.121
15	.683	.366	.049	.732	.098
20	.679	.358	.037	.716	.074
30	2.671	5.342	8.014	10.685	16.027
40	.663	.327	7.990	.653	15.980
45	.659	.319	.978	.637	.956
50	.655	.311	.966	.621	.932
46 00	2.647	5.295	7.942	10.590	15.884
10	.639	.279	.918	.558	.837
15	.635	.271	.906	.542	.813
20	.631	.263	.894	.526	.789
30	2.623	5.247	7.870	10.494	15.741
40	.615	.231	.846	.462	.693
45	.611	.223	.834	.446	.669
50	.607	.215	.822	.430	.644
47 00	2.599	5.199	7.798	10.397	15.596
10	.591	.182	.774	.365	.547
15	.587	.174	.762	.349	.523
20	.583	.166	.749	.332	.499
30	2.575	5.150	7.725	10.300	15.450
40	.567	.134	.700	.267	.401
45	.563	.125	.688	.251	.376
50	.559	.117	.676	.235	.352
48 00	2.550	5.101	7.651	10.202	15.303
10	.542	.084	.627	.169	.253
15	.538	.076	.614	.152	.228
20	.534	.068	.602	.136	.204
30	2.526	5.051	7.577	10.103	15.154
40	.517	.035	.552	.070	.104
45	.513	.026	.540	.053	.079
50	.509	.018	.527	.036	.055
49 00	2.501	5.001	7.502	10.003	15.005

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 42°	5	3.796	0.001
	10	7.592	.005
	15	11.388	.012
	20	15.184	.022
	25	18.980	.034
	30	22.776	.050
For latitude 43°	5	3.797	0.001
	10	7.593	.006
	15	11.390	.012
	20	15.187	.022
	25	18.984	.035
	30	22.781	.050
For latitude 44°	5	3.797	0.001
	10	7.595	.006
	15	11.392	.012
	20	15.189	.022
	25	18.987	.035
	30	22.785	.050
For latitude 45°	5	3.798	0.001
	10	7.596	.006
	15	11.394	.012
	20	15.192	.022
	25	18.990	.035
	30	22.789	.050
For latitude 46°	5	3.799	0.001
	10	7.597	.006
	15	11.396	.012
	20	15.195	.022
	25	18.994	.035
	30	22.793	.050
For latitude 47°	5	3.799	0.001
	10	7.599	.006
	15	11.398	.012
	20	15.198	.022
	25	18.997	.035
	30	22.797	.050
For latitude 48°	5	3.800	0.001
	10	7.600	.005
	15	11.400	.012
	20	15.200	.022
	25	19.000	.034
	30	22.801	.050
For latitude 49°	5	3.801	0.001
	10	7.601	.005
	15	11.402	.012
	20	15.203	.022
	25	19.004	.034
	30	22.805	.049

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		5′	10′	15′	20′	30′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
49	00	2.501	5.001	7.502	10.003	15.005
	10	.492	4.985	.477	9.970	14.954
	15	.488	.976	.465	.953	.929
	20	.484	.968	.452	.936	.904
	30	2.476	4.951	7.427	9.902	14.854
	40	.467	.934	.402	.869	.803
	45	.463	.926	.389	.852	.778
	50	.459	.918	.376	.835	.753
50	00	2.450	4.901	7.351	9.801	14.702
	10	.442	.884	.326	.767	.651
	15	.438	.875	.313	.750	.625
	20	.433	.867	.300	.733	.600
	30	2.425	4.850	7.274	9.699	14.549
	40	.416	.833	.249	.665	.498
	45	.412	.824	.236	.648	.472
	50	.408	.815	.223	.631	.446
51	00	2.399	4.798	7.197	9.596	14.395
	10	.391	.781	.172	.562	.343
	15	.386	.772	.159	.545	.317
	20	.382	.764	.146	.528	.291
	30	2.373	4.746	7.120	9.493	14.239
	40	.365	.729	.094	.458	.187
	45	.360	.720	.081	.441	.161
	50	.356	.712	.068	.424	.135
52	00	2.347	4.694	7.042	9.389	14.083
	10	.338	.677	.015	.353	.031
	15	.334	.668	7.002	.336	14.004
	20	.330	.659	6.989	.319	13.978
	30	2.321	4.642	6.963	9.284	13.926
	40	.312	.624	.936	.249	.873
	45	.308	.615	.923	.231	.846
	50	.303	.607	.910	.213	.820
53	00	2.295	4.589	6.884	9.178	13.767
	10	.286	.571	.857	.143	.714
	15	.281	.562	.844	.125	.687
	20	.277	.554	.830	.107	.661
	30	2.268	4.536	6.804	9.072	13.607
	40	.259	.518	.777	.036	.554
	45	.255	.509	.764	.018	.527
	50	.250	.500	.750	9.000	.500
54	00	2.241	4.482	6.723	8.965	13.447
	10	.232	.464	.697	.929	.393
	15	.228	.455	.683	.911	.366
	20	.223	.446	.670	.893	.339
	30	2.214	4.428	6.643	8.857	13.285
	40	.205	.410	.616	.821	.231
	45	.201	.401	.602	.803	.204
	50	.196	.392	.588	.785	.177
55	00	2.187	4.374	6.561	8.748	13.122
	10	.178	.356	.534	.712	.068
	15	.173	.347	.520	.694	.041
	20	.169	.338	.507	.676	13.013
	30	2.160	4.320	6.479	8.639	12.959
	40	.151	.301	.452	.603	.904
	45	.146	.292	.438	.584	.877
	50	.142	.283	.425	.566	.849
56	00	2.132	4.265	6.397	8.529	12.794

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 49°	5	3.801	0.001
	10	7.601	.005
	15	11.402	.012
	20	15.203	.022
	25	19.004	.034
	30	22.805	.049
For latitude 50°	5	3.801	0.001
	10	7.603	.005
	15	11.404	.012
	20	15.206	.022
	25	19.007	.034
	30	22.809	.049
For latitude 51°	5	3.802	0.001
	10	7.604	.005
	15	11.406	.012
	20	15.208	.022
	25	19.011	.034
	30	22.813	.049
For latitude 52°	5	3.803	0.001
	10	7.605	.005
	15	11.408	.012
	20	15.211	.022
	25	19.014	.034
	30	22.817	.048
For latitude 53°	5	3.803	0.001
	10	7.607	.005
	15	11.410	.012
	20	15.214	.021
	25	19.017	.033
	30	22.821	.048
For latitude 54°	5	3.804	0.001
	10	7.608	.005
	15	11.412	.012
	20	15.216	.021
	25	19.020	.033
	30	22.824	.047
For latitude 55°	5	3.805	0.001
	10	7.609	.005
	15	11.414	.012
	20	15.219	.021
	25	19.024	.033
	30	22.828	.047
For latitude 56°	5	3.805	0.001
	10	7.611	.005
	15	11.416	.012
	20	15.221	.021
	25	19.027	.032
	30	22.832	.046

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{4\,800\,000}$

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
0	00	3.804	7.609	11.413	15.218	22.827
	05	.804	.609	.413	.218	.827
	07½	.804	.609	.413	.218	.826
	10	.804	.609	.413	.218	.826
	15	3.804	7.609	11.413	15.218	22.826
	20	.804	.609	.413	.217	.826
	22½	.804	.609	.413	.217	.826
	25	.804	.609	.413	.217	.826
	30	3.804	7.609	11.413	15.217	22.826
	35	.804	.608	.413	.217	.825
	37½	.804	.608	.413	.217	.825
	40	.804	.608	.413	.217	.825
	45	3.804	7.608	11.412	15.216	22.825
	50	.804	.608	.412	.216	.824
	52½	.804	.608	.412	.216	.824
	55	.804	.608	.412	.216	.824
1	00	3.804	7.608	11.412	15.215	22.823
	05	.804	.608	.411	.215	.822
	07½	.804	.607	.411	.215	.822
	10	.804	.607	.411	.215	.822
	15	3.804	7.607	11.411	15.214	22.821
	20	.803	.607	.410	.214	.820
	22½	.803	.607	.410	.213	.820
	25	.803	.607	.410	.213	.820
	30	3.803	7.606	11.409	15.213	22.819
	35	.803	.606	.409	.212	.818
	37½	.803	.606	.409	.212	.817
	40	.803	.606	.408	.211	.817
	45	3.803	7.605	11.408	15.211	22.816
	50	.802	.605	.407	.210	.815
	52½	.802	.605	.407	.210	.814
	55	.802	.605	.407	.209	.814
2	00	3.802	7.604	11.407	15.208	22.813
	05	.802	.604	.406	.208	.812
	07½	.802	.604	.405	.207	.811
	10	.802	.603	.405	.207	.810
	15	3.802	7.603	11.405	15.206	22.809
	20	.801	.603	.404	.205	.808
	22½	.801	.602	.404	.205	.807
	25	.801	.602	.403	.204	.806
	30	3.801	7.602	11.403	15.203	22.805
	35	.801	.601	.402	.202	.803
	37½	.800	.601	.401	.202	.803
	40	.800	.601	.401	.201	.802
	45	3.800	7.600	11.400	15.200	22.800
	50	.800	.600	.399	.199	.799
	52½	.800	.599	.399	.199	.798
	55	.799	.599	.398	.198	.797
3	00	3.799	7.598	11.398	15.197	22.795

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 0°	2½	3.779	0.000
	5	7.557	.000
	7½	11.336	.000
	10	15.115	.000
	12½	18.893	.000
	15	22.672	.000
For latitude 1°	2½	3.779	0.000
	5	7.557	.000
	7½	11.336	.000
	10	15.115	.000
	12½	18.893	.001
	15	22.672	.001
For latitude 2°	2½	3.779	0.000
	5	7.557	.000
	7½	11.336	.000
	10	15.115	.001
	12½	18.894	.001
	15	22.672	.002
For latitude 3°	2½	3.779	0.000
	5	7.558	.000
	7½	11.336	.001
	10	15.115	.001
	12½	18.894	.002
	15	22.673	.003

TABLE 2.—*Coordinates for the 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*
3	00	3.799	7.598	11.398	15.197	22.795
	05	.799	.598	.397	.196	.794
	07½	.799	.598	.396	.195	.793
	10	.799	.597	.396	.195	.792
	15	3.798	7.597	11.395	15.193	22.790
	20	.798	.596	.394	.192	.788
	22½	.798	.596	.394	.191	.787
	25	.798	.595	.393	.191	.786
	30	3.797	7.595	11.392	15.190	22.784
	35	.797	.594	.391	.188	.782
	37½	.797	.594	.391	.187	.781
	40	.797	.593	.390	.187	.780
	45	3.796	7.593	11.389	15.185	22.778
	50	.796	.592	.388	.184	.776
	52½	.796	.592	.387	.183	.775
	55	.796	.591	.387	.182	.774
4	00	3.795	7.590	11.386	15.181	22.771
	05	.795	.590	.385	.179	.769
	07½	.795	.589	.384	.179	.768
	10	.794	.589	.383	.178	.767
	15	3.794	7.588	11.382	15.176	22.764
	20	.794	.587	.382	.174	.762
	22½	.793	.587	.380	.174	.760
	25	.793	.586	.380	.173	.759
	30	3.793	7.586	11.378	15.171	22.757
	35	.792	.585	.377	.169	.754
	37½	.792	.584	.376	.168	.573
	40	.792	.584	.376	.168	.751
	45	3.791	7.583	11.374	15.166	22.749
	50	.791	.582	.373	.164	.746
	52½	.791	.582	.372	.163	.745
	55	.791	.581	.372	.162	.743
5	00	3.790	7.580	11.370	15.160	22.740
	05	.790	.579	.369	.158	.737
	07½	.789	.579	.368	.157	.736
	10	.789	.578	.367	.156	.734
	15	3.789	7.577	11.366	15.154	22.731
	20	.788	.576	.364	.152	.728
	22½	.788	.576	.363	.151	.727
	25	.788	.575	.363	.150	.725
	30	3.787	7.574	11.361	15.148	22.722
	35	.786	.573	.359	.146	.719
	37½	.786	.572	.359	.145	.717
	40	.786	.572	.358	.144	.716
	45	3.785	7.571	11.356	15.142	22.712
	50	.785	.570	.355	.139	.709
	52½	.785	.570	.354	.138	.707
	55	.784	.569	.353	.137	.706
6	00	3.784	7.567	11.351	15.135	22.702

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 3°	2½	3.779	0.000
	5	7.558	.000
	7½	11.336	.001
	10	15.115	.001
	12½	18.894	.002
	15	22.673	.003
For latitude 4°	2½	3.779	0.000
	5	7.558	.000
	7½	11.337	.001
	10	15.115	.002
	12½	18.894	.002
	15	22.673	.003
For latitude 5°	2½	3.779	0.000
	5	7.558	.000
	7½	11.337	.001
	10	15.116	.002
	12½	18.895	.003
	15	22.674	.004
For latitude 6°	2½	3.779	0.000
	5	7.558	.001
	7½	11.337	.001
	10	15.116	.002
	12½	18.896	.004
	15	22.675	.005

TABLE 2.—*Coordinates for the 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*
6 00	3.784	7.567	11.351	15.135	22.702
05	.783	.566	.349	.133	.699
07½	.783	.566	.349	.131	.697
10	.783	.565	.348	.130	.695
15	3.782	7.564	11.346	15.128	22.692
20	.781	.563	.344	.125	.688
22½	.781	.562	.343	.124	.686
25	.781	.561	.342	.123	.685
30	3.780	7.560	11.340	15.121	22.681
35	.779	.559	.338	.118	.677
37½	.779	.558	.338	.117	.675
40	.779	.558	.337	.115	.673
45	3.778	7.556	11.335	15.113	22.669
50	.778	.555	.333	.110	.665
52½	.777	.554	.332	.109	.664
55	.777	.554	.331	.108	.662
7 00	3.776	7.552	11.329	15.105	22.658
05	.776	.551	.327	.102	.653
07½	.775	.550	.326	.101	.651
10	.775	.550	.325	.100	.649
15	3.774	7.548	11.323	15.097	22.645
20	.774	.547	.321	.094	.641
22½	.773	.546	.319	.093	.639
25	.773	.546	.318	.091	.637
30	3.772	7.544	11.316	15.088	22.633
35	.771	.543	.314	.085	.628
37½	.771	.542	.313	.084	.626
40	.771	.541	.312	.083	.624
45	3.770	7.540	11.310	15.080	22.619
50	.769	.538	.307	.077	.615
52½	.769	.538	.306	.075	.613
55	.768	.537	.305	.074	.610
8 00	3.768	7.535	11.303	15.071	22.606
05	.767	.534	.301	.068	.601
07½	.766	.533	.299	.066	.599
10	.766	.532	.298	.064	.597
15	3.765	7.531	11.296	15.061	22.592
20	.765	.529	.294	.058	.587
22½	.764	.528	.292	.056	.585
25	.764	.527	.291	.055	.582
30	3.763	7.526	11.289	15.052	22.577
35	.762	.524	.286	.048	.573
37½	.762	.523	.285	.047	.570
40	.761	.522	.284	.045	.568
45	3.760	7.521	11.281	15.042	22.563
50	.760	.519	.279	.038	.558
52½	.759	.518	.277	.037	.555
55	.758	.517	.276	.035	.553
9 00	3.758	7.516	11.274	15.032	22.547

Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 6°	2½	3.779	0.000
	5	7.558	.001
	7½	11.337	.001
	10	15.116	.002
	12½	18.896	.004
	15	22.675	.005
For latitude 7°	2½	3.779	0.000
	5	7.559	.001
	7½	11.338	.001
	10	15.117	.003
	12½	18.896	.004
	15	22.676	.006
For latitude 8°	2½	3.779	0.000
	5	7.559	.001
	7½	11.338	.002
	10	15.118	.003
	12½	18.897	.005
	15	22.677	.007
For latitude 9°	2½	3.780	0.000
	5	7.559	.001
	7½	11.339	.002
	10	15.118	.003
	12½	18.898	.005
	15	22.678	.008

TABLE 2.—*Coordinates for the 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*
9	00	3.758	7.516	11.274	15.032	22.547
	05	.757	.514	.271	.028	.542
	07½	.757	.513	.270	.026	.540
	10	.756	.512	.268	.025	.537
	15	3.755	7.511	11.266	15.021	22.532
	20	.754	.509	.263	.018	.526
	22½	.754	.508	.262	.016	.524
	25	.753	.507	.260	.014	.521
	30	3.753	7.505	11.258	15.010	22.516
	35	.752	.503	.255	.007	.510
	37½	.751	.502	.254	.005	.507
	40	.751	.502	.252	.003	.505
	45	3.750	7.500	11.249	14.999	22.499
	50	.749	.498	.247	.996	.493
	52½	.748	.497	.245	.994	.491
	55	.748	.496	.244	.992	.488
10	00	3.747	7.494	11.241	14.988	22.482
	05	.746	.492	.238	.984	.476
	07½	.746	.491	.237	.982	.473
	10	.745	.490	.235	.980	.470
	15	3.744	7.488	11.232	14.976	22.465
	20	.743	.486	.229	.973	.459
	22½	.743	.485	.228	.971	.456
	25	.742	.484	.226	.969	.453
	30	3.741	7.482	11.223	14.965	22.447
	35	.740	.480	.220	.961	.441
	37½	.740	.479	.219	.959	.438
	40	.739	.478	.217	.956	.435
	45	3.738	7.476	11.214	14.952	22.429
	50	.737	.474	.211	.948	.422
	52½	.737	.473	.210	.946	.419
	55	.736	.472	.208	.944	.416
11	00	3.735	7.470	11.205	14.940	22.410
	05	.734	.468	.202	.936	.404
	07½	.733	.467	.200	.934	.400
	10	.733	.466	.199	.931	.397
	15	3.732	7.464	11.195	14.927	22.391
	20	.731	.461	.192	.923	.384
	22½	.730	.460	.191	.921	.381
	25	.730	.459	.189	.919	.378
	30	3.729	7.457	11.186	14.914	22.371
	35	.727	.455	.182	.910	.365
	37½	.727	.454	.181	.908	.361
	40	.726	.453	.179	.905	.358
	45	3.725	7.450	11.176	14.901	22.351
	50	.724	.448	.172	.896	.345
	52½	.724	.447	.171	.894	.341
	55	.723	.446	.169	.892	.338
12	00	3.722	7.444	11.165	14.887	22.331

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 9°	2½	3.780	0.000
	5	7.559	.001
	7½	11.339	.002
	10	15.118	.003
	12½	18.898	.005
	15	22.678	.008
For latitude 10°	2½	3.780	0.000
	5	7.560	.001
	7½	11.340	.002
	10	15.119	.004
	12½	18.899	.006
	15	22.679	.009
For latitude 11°	2½	3.780	0.000
	5	7.560	.001
	7½	11.340	.002
	10	15.120	.004
	12½	18.901	.006
	15	22.681	.009
For latitude 12°	2½	3.780	0.000
	5	7.561	.001
	7½	11.341	.003
	10	15.121	.005
	12½	18.902	.007
	15	11.682	.010

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{4800}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	2½′	5′	7½′	10′	15′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
12 00	3.722	7.444	11.165	14.887	22.331
05	.721	.441	.162	.883	.324
07½	.720	.440	.160	.880	.321
10	.720	.439	.159	.878	.317
15	3.718	7.437	11.155	14.873	22.310
20	.717	.434	.152	.869	.303
22½	.717	.433	.150	.866	.300
25	.716	.432	.148	.864	.296
30	3.715	7.430	11.145	14.859	22.289
35	.714	.427	.141	.855	.282
37½	.713	.426	.139	.852	.278
40	.712	.425	.137	.850	.275
45	3.711	7.422	11.134	14.845	22.267
50	.710	.420	.130	.840	.260
52½	.709	.419	.128	.838	.256
55	.709	.418	.126	.835	.253
13 00	3.708	7.415	11.123	14.830	22.245
05	.706	.413	.119	.825	.238
07½	.706	.411	.117	.823	.234
10	.705	.410	.115	.820	.230
15	3.704	7.408	11.111	14.815	22.223
20	.703	.405	.108	.810	.215
22½	.702	.404	.106	.808	.211
25	.701	.403	.104	.805	.208
30	3.700	7.400	11.100	14.800	22.200
35	.699	.397	.096	.795	.192
37½	.698	.396	.094	.792	.188
40	.697	.395	.092	.790	.184
45	3.696	7.392	11.088	14.784	22.177
50	.695	.390	.084	.779	.169
52½	.694	.388	.082	.777	.165
55	.693	.387	.080	.774	.161
14 00	3.692	7.384	11.077	14.769	22.153
05	.691	.382	.072	.763	.145
07½	.690	.380	.070	.761	.141
10	.689	.379	.068	.758	.137
15	3.688	7.376	11.064	14.752	22.129
20	.687	.374	.060	.747	121
22½	.686	.372	.058	.744	.116
25	.685	.371	.056	.742	.112
30	3.684	7.368	11.052	14.736	22.104
35	.683	.365	.048	.731	.096
37½	.682	.364	.046	.728	.092
40	.681	.363	.044	.725	.088
45	3.680	7.360	11.040	14.719	22.079
50	.678	.357	.035	.714	.071
52½	.670	.356	.033	.711	.066
55	.677	.354	.031	.708	.062
15 00	3.676	7.351	11.027	14.702	22.054

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 12°	2½	3.780	0.000
	5	7.561	.001
	7½	11.341	.003
	10	15.121	.005
	12½	18.902	.007
	15	22.682	.010
For latitude 13°	2½	3.781	0.000
	5	7.561	.001
	7½	11.342	.003
	10	15.123	.005
	12½	18.903	.008
	15	22.684	.011
For latitude 14°	2½	3.781	0.000
	5	7.562	.001
	7½	11.343	.003
	10	15.124	.005
	12½	18.905	.008
	15	22.686	.012
For latitude 15°	2½	3.781	0.000
	5	7.562	.001
	7½	11.344	.003
	10	15.125	.006
	12½	18.907	.009
	15	22.688	.012

TABLE 2.—*Coordinates for the 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*
15	00	3.676	7.351	11.027	14.702	22.054
	05	.674	.348	.023	.697	.045
	07½	.673	.347	.020	.694	.041
	10	.673	.346	.018	.691	.037
	15	3.671	7.343	11.014	14.685	22.028
	20	.670	.340	.010	.679	.019
	22½	.669	.338	.007	.677	.015
	25	.668	.337	.005	.674	.010
	30	3.667	7.334	11.001	14.668	22.002
	35	.665	.331	10.996	.662	21.993
	37½	.665	.329	.994	.659	.988
	40	.664	.328	.992	.656	.984
	45	3.662	7.325	10.987	14.650	21.975
	50	.661	.322	.983	.644	.966
	52½	.660	.320	.981	.641	.962
	55	.659	.319	.978	.638	.957
16	00	3.658	7.316	10.974	14.632	21.948
	05	.656	.313	.969	.626	.939
	07½	.656	.311	.967	.623	.934
	10	.655	.310	.965	.620	.930
	15	3.653	7.307	10.960	14.614	21.920
	20	.652	.304	.956	.607	.911
	22½	.651	.302	.953	.604	.907
	25	.650	.301	.951	.601	.902
	30	3.649	7.297	10.946	14.595	21.893
	35	.647	.294	.942	.589	.883
	37½	.646	.293	.939	.586	.878
	40	.646	.291	.937	.582	.874
	45	3.644	7.288	10.932	14.576	21.864
	50	.642	.285	.927	.570	.855
	52½	.642	.283	.925	.567	.850
	55	.641	.282	.922	.563	.845
17	00	3.639	7.278	10.918	14.557	21.835
	05	.638	.275	.913	.551	.826
	07½	.637	.274	.910	.547	.821
	10	.636	.272	.908	.544	.816
	15	3.634	7.269	10.903	14.538	21.806
	20	.633	.265	.898	.531	.796
	22½	.632	.264	.896	.528	.792
	25	.631	.262	.893	.524	.787
	30	3.629	7.259	10.888	14.518	21.777
	35	.628	.256	.883	.511	.767
	37½	.627	.254	.881	.508	.762
	40	.626	.252	.878	.505	.757
	45	3.624	7.249	10.873	14.498	21.747
	50	.623	.246	.868	.491	.737
	52½	.622	.244	.866	.488	.732
	55	.621	.242	.863	.484	.727
18	00	3.619	7.239	10.858	14.478	21.716

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 15°	2½	3.781	0.000
	5	7.562	.001
	7½	11.344	.003
	10	15.125	.006
	12½	18.907	.009
	15	22.688	.012
For latitude 16°	2½	3.782	0.000
	5	7.563	.001
	7½	11.345	.003
	10	15.126	.006
	12½	18.908	.009
	15	22.690	.013
For latitude 17°	2½	3.782	0.000
	5	7.564	.002
	7½	11.346	.003
	10	15.128	.006
	12½	18.910	.010
	15	22.692	.014
For latitude 18°	2½	3.782	0.000
	5	7.565	.002
	7½	11.347	.004
	10	15.129	.006
	12½	18.912	.010
	15	22.694	.015

TABLE 2.—*Coordinates for the 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*
18 00	3.619	7.239	10.858	14.478	21.716
05	.618	.235	.853	.471	.706
07½	.617	.234	.850	.467	.701
10	.616	.232	.848	.464	.696
15	3.614	7.228	10.843	14.457	21.686
20	.613	.225	.838	.450	.675
22½	.612	.223	.835	.447	.670
25	.611	.222	.832	.443	.665
30	3.609	7.218	10.827	14.436	21.654
35	.607	.215	.822	.429	.644
37½	.606	.213	.819	.426	.639
40	.606	.211	.817	.422	.633
45	3.604	7.208	10.811	14.415	21.623
50	.602	.204	.806	.408	.612
52½	.601	.202	.803	.404	.607
55	.600	.200	.801	.401	.601
19 00	3.598	7.197	10.795	14.394	21.591
05	.597	.193	.790	.387	.580
07½	.596	.192	.787	.383	.574
10	.595	.190	.785	.379	.569
15	3.593	7.186	10.779	14.372	21.558
20	.591	.182	.774	.365	.547
22½	.590	.181	.771	.361	.542
25	.589	.179	.768	.358	.536
30	3.588	7.175	10.763	14.350	21.525
35	.586	.171	.757	.343	.514
37½	.585	.170	.754	.339	.509
40	.584	.168	.752	.335	.503
45	3.582	7.164	10.746	14.328	21.492
50	.580	.160	.741	.321	.481
52½	.579	.158	.738	.317	.475
55	.578	.157	.735	.313	.470
20 00	3.576	7.153	10.729	14.306	21.458
05	.575	.149	.724	.298	.447
07½	.574	.147	.721	.294	.441
10	.573	.145	.718	.290	.436
15	3.571	7.141	10.712	14.283	21.424
20	.569	.138	.706	.275	.413
22½	.568	.136	.704	.271	.407
25	.567	.134	.701	.268	.401
30	3.565	7.130	10.695	14.260	21.390
35	.563	.126	.689	.252	.378
37½	.562	.124	.686	.248	.372
40	.561	.122	.683	.244	.367
45	3.559	7.118	10.678	14.237	21.355
50	.557	.114	.672	.229	.343
52½	.556	.112	.669	.225	.337
55	.555	.110	.666	.221	.331
21 00	3.553	7.107	10.660	14.213	21.320

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 18°	2½	3.782	0.000
	5	7.565	.002
	7½	11.347	.004
	10	15.129	.006
	12½	18.912	.010
	15	22.694	.015
For latitude 19°	2½	3.783	0.000
	5	7.566	.002
	7½	11.348	.004
	10	15.131	.007
	12½	18.914	.011
	15	22.697	.015
For latitude 20°	2½	3.783	0.000
	5	7.566	.002
	7½	11.350	.004
	10	15.133	.007
	12½	18.916	.011
	15	22.699	.016
For latitude 21°	2½	3.784	0.000
	5	7.567	.002
	7½	11.351	.004
	10	15.135	.007
	12½	18.919	.012
	15	22.702	.017

TABLE 2.—*Coordinates for the 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*
21	00	3.553	7.107	10.660	14.213	21.320
	05	.551	.103	.654	.205	.308
	07½	.550	.101	.651	.201	.302
	10	.549	.099	.648	.197	.296
	15	3.547	7.095	10.642	14.189	21.284
	20	.545	.091	.636	.181	.272
	22½	.544	.089	.633	.177	.266
	25	.543	.087	.630	.173	.260
	30	3.541	7.083	10.624	14.165	21.248
	35	.539	.079	.618	.157	.236
	37½	.538	.077	.615	.153	.230
	40	.537	.075	.612	.149	.224
	45	3.535	7.070	10.606	14.141	21.211
	50	.533	.066	.600	.133	.199
	52½	.532	.064	.596	.129	.193
	55	.531	.062	.593	.125	.187
22	00	3.529	7.058	10.587	14.116	21.174
	05	.527	.054	.581	.108	.162
	07½	.526	.052	.578	.104	.156
	10	.525	.050	.575	.100	.150
	15	3.523	7.046	10.569	14.091	21.137
	20	.521	.042	.562	.083	.125
	22½	.520	.039	.559	.079	.118
	25	.519	.037	.556	.075	.112
	30	3.517	7.033	10.550	14.066	21.099
	35	.514	.029	.543	.058	.087
	37½	.513	.027	.540	.054	.080
	40	.512	.025	.537	.049	.074
	45	3.510	7.020	10.531	14.041	21.061
	50	.508	.016	.524	.032	.049
	52½	.507	.014	.521	.028	.042
	55	.506	.012	.518	.024	.036
23	00	3.504	7.008	10.511	14.015	21.023
	05	.502	.003	.505	.007	.010
	07½	.501	.001	.502	.002	.003
	10	.499	6.999	.498	13.998	20.997
	15	3.497	6.995	10.492	13.989	20.984
	20	.495	.990	.485	.981	.971
	22½	.494	.988	.482	.976	.964
	25	.493	.986	.479	.972	.958
	30	3.491	6.982	10.472	13.963	20.945
	35	.489	.977	.466	.954	.931
	37½	.487	.975	.462	.950	.925
	40	.486	.973	.459	.945	.918
	45	3.484	6.968	10.452	13.937	20.905
	50	.482	.964	.446	.928	.892
	52½	.481	.962	.442	.923	.885
	55	.480	.959	.439	.919	.878
24	00	3.477	6.955	10.432	13.910	20.865

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 21°	2½	3.784	0.000
	5	7.567	.002
	7½	11.351	.004
	10	15.135	.007
	12½	18.919	.012
	15	22.702	.017
For latitude 22°	2½	3.784	0.000
	5	7.568	.002
	7½	11.352	.004
	10	15.136	.008
	12½	18.921	.012
	15	22.705	.017
For latitude 23°	2½	3.785	0.000
	5	7.569	.002
	7½	11.354	.004
	10	15.138	.008
	12½	18.923	.012
	15	22.708	.018
For latitude 24°	2½	3.785	0.001
	5	7.570	.002
	7½	11.355	.005
	10	15.140	.008
	12½	18.926	.013
	15	22.711	.019

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{1000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
24	00	3.477	6.955	10.432	13.910	20.865
	05	.475	.950	.426	.900	.851
	07½	.474	.948	.422	.896	.845
	10	.473	.946	.419	.892	.838
	15	3.471	6.941	10.412	13.883	20.824
	20	.468	.937	.405	.874	.811
	22½	.467	.935	.402	.869	.804
	25	.466	.932	.398	.865	.797
	30	3.464	6.928	10.392	13.856	20.783
	35	.462	.923	.385	.846	.770
	37½	.460	.921	.381	.842	.763
	40	.459	.919	.378	.837	.756
	45	3.457	6.914	10.371	13.828	20.742
	50	.455	.909	.364	.819	.728
	52½	.454	.907	.361	.814	.721
	55	.452	.905	.357	.810	.714
25	00	3.450	6.900	10.350	13.800	20.700
	05	.448	.895	.343	.791	.686
	07½	.447	.893	.340	.786	.679
	10	.445	.891	.336	.782	.672
	15	3.443	6.886	10.329	13.772	20.658
	20	.441	.881	.322	.763	.644
	22½	.440	.879	.318	.758	.637
	25	.438	.877	.315	.753	.630
	30	3.436	6.872	10.308	13.744	20.616
	35	.434	.867	.301	.734	.602
	37½	.432	.865	.297	.730	.594
	40	.431	.862	.294	.725	.587
	45	3.429	6.858	10.286	13.715	20.573
	50	.426	.853	.279	.706	.559
	52½	.425	.850	.276	.701	.551
	55	.424	.848	.272	.696	.544
26	00	3.422	6.843	10.265	13.686	20.530
	05	.419	.838	.258	.677	.515
	07½	.418	.836	.254	.672	.508
	10	.417	.834	.250	.667	.501
	15	3.414	6.829	10.243	13.657	20.486
	20	.412	.824	.236	.648	.471
	22½	.411	.821	.232	.643	.464
	25	.409	.819	.228	.638	.457
	30	3.407	6.814	10.221	13.628	20.442
	35	.405	.809	.214	.618	.427
	37½	.403	.807	.210	.613	.420
	40	.402	.804	.206	.608	.412
	45	3.400	6.799	10.199	13.598	20.398
	50	.397	.794	.191	.588	.383
	52½	.396	.792	.188	.584	.375
	55	.395	.789	.184	.579	.368
27	00	3.392	6.784	10.176	13.569	20.353

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 24°	2½	3.785	0.001
	5	7.570	.002
	7½	11.355	.005
	10	15.140	.008
	12½	18.926	.013
	15	22.711	.019
For latitude 25°	2½	3.786	0.001
	5	7.571	.002
	7½	11.357	.005
	10	15.142	.008
	12½	18.928	.013
	15	22.714	.019
For latitude 26°	2½	3.786	0.001
	5	7.572	.002
	7½	11.358	.005
	10	15.144	.009
	12½	18.931	.014
	15	22.717	.020
For latitude 27°	2½	3.787	0.001
	5	7.573	.002
	7½	11.360	.005
	10	15.147	.009
	12½	18.934	.014
	15	22.720	.020

TABLE 2.—*Coordinates for the 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*
27	00	3.392	6.784	10.176	13.569	20.353
	05	.390	.779	.169	.559	.338
	07½	.388	.777	.165	.553	.330
	10	.387	.774	.161	.548	.323
	15	3.385	6.769	10.154	13.538	20.308
	20	.382	.764	.146	.528	.292
	22½	.381	.762	.142	.523	.285
	25	.380	.759	.139	.518	.277
	30	3.377	6.754	10.131	13.508	20.262
	35	.374	.749	.123	.498	.247
	37½	.373	.746	.120	.493	.239
	40	.372	.744	.116	.488	.231
	45	3.369	6.739	10.108	13.477	20.216
	50	.367	.734	.100	.467	.201
	52½	.365	.731	.096	.462	.193
	55	.364	.728	.093	.457	.185
28	00	3.362	6.723	10.085	13.446	20.170
	05	.359	.718	.077	.436	.154
	07½	.358	.715	.073	.431	.146
	10	.356	.713	.069	.426	.139
	15	3.354	6.708	10.061	13.415	20.123
	20	.351	.702	.054	.405	.107
	22½	.350	.700	.050	.400	.099
	25	.349	.697	.046	.394	.092
	30	3.346	6.692	10.038	13.384	20.076
	35	.343	.687	.030	.373	.060
	37½	.342	.684	.026	.368	.052
	40	.341	.681	.022	.363	.044
	45	3.338	6.676	10.014	13.352	20.028
	50	.335	.671	.006	.342	.012
	52½	.334	.668	.002	.336	.004
	55	.333	.666	9.998	.331	19.996
29	00	3.330	6.660	9.990	13.320	19.980
	05	.327	.655	.982	.310	.964
	07½	.326	.652	.978	.304	.956
	10	.325	.649	.974	.299	.948
	15	3.322	6.644	9.966	13.288	19.932
	20	.319	.639	.958	.277	.916
	22½	.318	.636	.954	.272	.908
	25	.317	.633	.950	.267	.900
	30	3.314	6.628	9.942	13.256	19.884
	35	.311	.622	.934	.245	.867
	37½	.310	.620	.929	.239	.859
	40	.308	.617	.925	.234	.851
	45	3.306	6.611	9.917	13.223	19.835
	50	.303	.606	.909	.212	.818
	52½	.302	.603	.905	.207	.810
	55	.300	.601	.901	.201	.802
30	00	3.298	6.595	9.893	13.190	19.785

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 27°	2½	3.787	0.001
	5	7.573	.002
	7½	11.360	.005
	10	15.147	.009
	12½	18.934	.014
	15	22.720	.020
For latitude 28°	2½	3.787	0.001
	5	7.574	.002
	7½	11.362	.005
	10	15.149	.009
	12½	18.936	.014
	15	22.723	.021
For latitude 29°	2½	3.788	0.001
	5	7.575	.002
	7½	11.363	.005
	10	15.151	.009
	12½	18.939	.015
	15	22.727	.021
For latitude 30°	2½	3.788	0.001
	5	7.577	.002
	7½	11.365	.005
	10	15.153	.010
	12½	18.942	.015
	15	22.730	.022

TABLE 2.—*Coordinates for the 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*
30	00	3.298	6.595	9.893	13.190	19.785
	05	.295	.589	.884	.179	.769
	07½	.293	.587	.880	.174	.760
	10	.292	.584	.876	.168	.752
	15	3.289	6.578	9.868	13.157	19.735
	20	.286	.573	.859	.146	.719
	22½	.285	.570	.855	.140	.710
	25	.284	.567	.851	.135	.702
	30	3.281	6.562	9.843	13.123	19.685
	35	.278	.556	.834	.112	.668
	37½	.277	.553	.830	.107	.660
	40	.275	.551	.826	.101	.652
	45	3.272	6.545	9.817	13.090	19.635
	50	.270	.539	.809	.078	.618
	52½	.268	.536	.805	.073	.609
	55	.267	.534	.800	.067	.601
31	00	3.264	6.528	9.792	13.056	19.584
	05	.261	.522	.783	.044	.567
	07½	.260	.519	.779	.039	.558
	10	.258	.517	.775	.033	.550
	15	3.255	6.511	9.766	13.022	19.532
	20	.253	.505	.758	.010	.515
	22½	.251	.502	.753	.004	.507
	25	.250	.499	.749	12.999	.498
	30	3.247	6.494	9.740	12.987	19.481
	35	.244	.488	.732	.976	.464
	37½	.242	.485	.727	.970	.455
	40	.241	.482	.723	.964	.446
	45	3.238	6.476	9.714	12.953	19.429
	50	.235	.470	.706	.941	.411
	52½	.234	.468	.701	.935	.403
	55	.232	.465	.697	.929	.394
32	00	3.229	6.459	9.688	12.918	19.376
	05	.226	.453	.679	.906	.359
	07½	.225	.450	.675	.900	.350
	10	.224	.447	.671	.894	.341
	15	3.221	6.441	9.662	12.882	19.324
	20	.218	.435	.653	.871	.307
	22½	.216	.432	.649	.865	.297
	25	.215	.429	.644	.859	.288
	30	3.212	6.424	9.635	12.847	19.271
	35	.209	.418	.626	.835	.253
	37½	.207	.415	.622	.829	.244
	40	.206	.412	.617	.823	.235
	45	3.203	6.406	9.608	12.811	19.217
	50	.200	.400	.600	.799	.199
	52½	.198	.397	.595	.793	.190
	55	.197	.394	.591	.787	.181
33	00	3.194	6.388	9.582	12.775	19.163

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 30°	2½	3.788	0.001
	5	7.577	.002
	7½	11.365	.005
	10	15.153	.010
	12½	18.942	.015
	15	22.730	.022
For latitude 31°	2½	3.789	0.001
	5	7.578	.002
	7½	11.367	.005
	10	15.156	.010
	12½	18.945	.015
	15	22.734	.022
For latitude 32°	2½	3.789	0.001
	5	7.579	.002
	7½	11.369	.006
	10	15.158	.010
	12½	18.948	.016
	15	22.737	.022
For latitude 33°	2½	3.790	0.001
	5	7.580	.003
	7½	11.370	.006
	10	15.161	.010
	12½	18.951	.016
	15	22.741	.023

TABLE 2.—*Coordinates for the 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*
33	00	3.194	6.388	9.582	12.775	19.163
	05	.191	.382	.573	.763	.145
	07½	.189	.379	.568	.757	.136
	10	.188	.376	.564	.751	.127
	15	3.185	6.370	9.554	12.739	19.109
	20	.182	.364	.545	.727	.091
	22½	.180	.361	.541	.721	.082
	25	.179	.358	.536	.715	.073
	30	3.176	6.351	9.527	12.703	19.054
	35	.173	.345	.518	.691	.036
	37½	.171	.342	.513	.685	.027
	40	.170	.339	.509	.679	.018
	45	3.167	6.333	9.500	12.666	18.999
	50	.164	.327	.491	.654	.981
	52½	.162	.324	.486	.648	.972
	55	.160	.321	.481	.642	.963
34	00	3.157	6.315	9.472	12.629	18.944
	05	.154	.309	.463	.617	.926
	07½	.153	.305	.458	.611	.916
	10	.151	.302	.453	.605	.907
	15	3.148	6.296	9.444	12.592	18.888
	20	.145	.290	.435	.580	.870
	22½	.143	.287	.430	.574	.860
	25	.142	.284	.426	.567	.851
	30	3.139	6.277	9.416	12.555	18.832
	35	.136	.271	.407	.542	.814
	37½	.134	.268	.402	.536	.804
	40	.132	.265	.397	.530	.795
	45	3.129	6.259	9.388	12.517	18.776
	50	.126	.252	.379	.505	.757
	52½	.125	.249	.374	.498	.748
	55	.123	.246	.369	.492	.738
35	00	3.120	6.240	9.360	12.480	18.719
	05	.117	.233	.350	.467	.700
	07½	.115	.230	.345	.460	.691
	10	.114	.227	.341	.454	.681
	15	3.110	6.221	9.331	12.441	18.662
	20	.107	.214	.321	.429	.643
	22½	.106	.211	.317	.422	.633
	25	.104	.208	.312	.416	.624
	30	3.101	6.202	9.302	12.403	18.605
	35	.098	.195	.293	.390	.585
	37½	.096	.192	.288	.384	.576
	40	.094	.189	.283	.377	.566
	45	3.091	6.182	9.273	12.365	18.547
	50	.088	.176	.264	.352	.528
	52½	.086	.173	.259	.345	.518
	55	.085	.169	.254	.339	.508
36	00	3.081	6.163	9.244	12.326	18.489

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 33°	2½	3.790	0.001
	5	7.580	.003
	7½	11.370	.006
	10	15.161	.010
	12½	18.951	.016
	15	22.741	.023
For latitude 34°	2½	3.791	0.001
	5	7.581	.003
	7½	11.372	.006
	10	15.163	.010
	12½	18.954	.016
	15	22.745	.023
For latitude 35°	2½	3.791	0.001
	5	7.583	.003
	7½	11.374	.006
	10	15.166	.010
	12½	18.957	.016
	15	22.748	.023
For latitude 36°	2½	3.792	0.001
	5	7.584	.003
	7½	11.376	.006
	10	15.168	.010
	12½	18.961	.016
	15	22.752	.024

TABLE 2.—*Coordinates for the 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*
36	00	3.081	6.163	9.244	12.326	18.489
	05	.078	.156	.235	.313	.469
	07½	.077	.153	.230	.306	.459
	10	.075	.150	.225	.300	.450
	15	3.072	6.143	9.215	12.287	18.430
	20	.068	.137	.205	.274	.411
	22½	.067	.134	.200	.267	.401
	25	.065	.130	.195	.261	.391
	30	3.062	6.124	9.186	12.248	.371
	35	.059	.117	.176	.234	.352
	37½	.057	.114	.171	.228	.342
	40	055	.111	.166	.221	.332
	45	3.052	6.104	9.156	12.208	18.312
	50	.049	.097	.146	.195	.292
	52½	.047	.094	.141	.188	.282
	55	.045	.091	.136	.182	.272
37	00	3.042	6.084	9.126	12.168	18.252
	05	.039	.077	.116	.155	.233
	07½	.037	.074	.111	.148	.223
	10	.035	.071	.106	.142	.213
	15	3.032	6.064	9.096	12,128	18.193
	20	.029	.057	.086	.115	.172
	22½	.027	.054	.081	.108	.162
	25	.025	.051	.076	.102	.152
	30	3.022	6.044	9.066	12.088	18.132
	35	.019	.037	.056	.075	.112
	37½	.017	.034	.051	.068	.102
	40	.015	.031	.046	.061	.092
	45	3.012	6.024	9.036	12.048	18.072
	50	.009	.017	.026	.034	.051
	52½	.007	.014	.021	.027	.041
	55	.005	.010	.015	.021	.031
38	00	3.002	6.004	9.005	12.007	18.011
	05	2.998	5.997	8.995	11.994	17.990
	07½	.997	.993	.990	.987	.980
	10	.995	.990	.985	.980	.970
	15	2.992	5.983	8.975	11.966	17.949
	20	.988	.976	.964	.953	.929
	22½	.986	.973	.959	.946	.919
	25	.985	.969	.954	.939	.908
	30	2.982	5.963	8.944	11.925	17.888
	35	.978	.956	.934	.911	.867
	37½	.976	.952	.928	.905	.857
	40	.974	.949	.923	.898	.846
	45	2.971	5.942	8.913	11.884	17.826
	50	.968	.935	.903	.870	.805
	52½	.966	.932	.897	.863	.795
	55	.964	.928	.892	.856	.784
39	00	2.961	5.921	8.882	11.842	17.763

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 36°	2½	3.792	0.001
	5	7.584	.003
	7½	11.376	.006
	10	15.168	.010
	12½	18.961	.016
	15	22.752	.024
For latitude 37°	2½	3.793	0.001
	5	7.585	.003
	7½	11.378	.006
	10	15.171	.011
	12½	18.964	.017
	15	22.756	.024
For latitude 38°	2½	3.793	0.001
	5	7.587	.003
	7½	11.380	.006
	10	15.173	.011
	12½	18.967	.017
	15	22.760	.024
For latitude 39°	2½	3.794	0.001
	5	7.588	.003
	7½	11.382	.006
	10	15.176	.011
	12½	18.970	.017
	15	22.764	.024

TABLE 2.—*Coordinates for the 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*
39	00	2.961	5.921	8.882	11.842	17.763
	05	.957	.914	.871	.828	.743
	07½	.955	.911	.866	.821	.732
	10	.954	.907	.861	.814	.722
	15	2.950	5.900	8.850	11.800	17.701
	20	.947	.893	.840	.786	.680
	22½	.945	.890	.835	.779	.669
	25	.943	.886	.829	.772	.659
	30	2.940	5.879	8.819	11.758	17.638
	35	.936	.872	.808	.744	.617
	37½	.934	.869	.803	.737	.606
	40	.933	.865	.798	.730	.595
	45	2.929	5.858	8.787	11.716	17.574
	50	.926	.851	.777	.702	.553
	52½	.924	.848	.771	.695	.543
	55	.922	.844	.766	.688	.532
40	00	2.918	5.837	8.755	11.674	17.511
	05	.915	.830	.745	.660	.489
	07½	.913	.826	.739	.652	.479
	10	.911	.823	.734	.645	.468
	15	2.908	5.816	8.723	11.631	17.447
	20	.904	.808	.713	.617	.425
	22½	.902	.805	.707	.610	.414
	25	.901	.801	.702	.603	.404
	30	2.897	5.794	8.691	11.588	17.382
	35	.893	.787	.680	.574	.361
	37½	.892	.783	.675	.567	.350
	40	.890	.780	.670	.559	.339
	45	2.886	5.773	8.659	11.545	17.318
	50	.883	.765	.648	.531	.296
	52½	.881	.762	.643	.523	.285
	55	.879	.758	.637	.516	.274
41	00	2.875	5.751	8.626	11.502	17.253
	05	.872	.744	.615	.487	.231
	07½	.870	.740	.610	.480	.220
	10	.868	.736	.605	.473	.209
	15	2.864	5.729	8.594	11.458	17.187
	20	.861	.722	.583	.444	.165
	22½	.859	.718	.577	.436	.154
	25	.857	.714	.572	.429	.143
	30	2.854	5.707	8.561	11.414	17.122
	35	.850	.700	.550	.400	.100
	37½	.848	.696	.544	.392	.089
	40	.846	.692	.539	.385	.078
	45	2.843	5.685	8.528	11.370	17.056
	50	.839	.678	.517	.356	.033
	52½	.837	.674	.511	.348	.022
	55	.835	.670	.506	.341	.011
42	00	2.832	5.663	8.495	11.326	16.989

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 39°	2½	3.794	0.001
	5	7.588	.003
	7½	11.382	.006
	10	15.176	.011
	12½	18.970	.017
	15	22.764	.024
For latitude 40°	2½	3.795	0.001
	5	7.589	.003
	7½	11.384	.006
	10	15.179	.011
	12½	18.974	.017
	15	22.768	.025
For latitude 41°	2½	3.795	0.001
	5	7.591	.003
	7½	11.386	.006
	10	15.181	.011
	12½	18.977	.017
	15	22.772	.025
For latitude 42°	2½	3.796	0.001
	5	7.592	.003
	7½	11.388	.006
	10	15.184	.011
	12½	18.980	.017
	15	22.776	.025

TABLE 2.—*Coordinates for the 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*
42 00	2.832	5.663	8.495	11.326	16.989
05	.828	.656	.483	.311	.967
07½	.826	.652	.478	.304	.956
10	.824	.648	.472	.297	.945
15	2.820	5.641	8.461	11.282	16.923
20	.817	.633	.450	.267	.900
22½	.815	.630	.445	.259	.889
25	.813	.626	.439	.252	.878
30	2.809	5.619	8.428	11.237	16.856
35	.806	.611	.417	.222	.833
37½	.804	.607	.411	.215	.822
40	.802	.604	.405	.207	.811
45	2.798	5.596	8.394	11.192	16.788
50	.794	.589	.383	.177	.766
52½	.792	.585	.377	.170	.754
55	.791	.581	.372	.162	.743
43 00	2.787	5.574	8.360	11.147	16.721
05	.783	.566	.349	.132	.698
07½	.781	.562	.343	.124	.687
10	.779	.558	.338	.117	.675
15	2.775	5.551	8.326	11.102	16.653
20	.772	.543	.315	.087	.630
22½	.770	.540	.309	.079	.619
25	.768	.536	.304	.071	.607
30	2.764	5.528	8.292	11.056	16.584
35	.760	.520	.281	.041	.562
37½	.758	.517	.275	.033	.550
40	.756	.513	.269	.026	.539
45	2.753	5.505	8.258	11.011	16.516
50	.749	.498	.246	10.995	.493
52½	.747	.494	.241	.988	.481
55	.745	.490	.235	.980	.470
44 00	2.741	5.482	8.223	10.965	16.447
05	.737	.475	.212	.949	.424
07½	.735	.471	.206	.942	.412
10	.733	.467	.200	.934	.401
15	2.730	5.459	8.189	10.918	16.378
20	.726	.452	.177	.903	.355
22½	.724	.448	.171	.895	.343
25	.722	.444	.166	.888	.331
30	2.718	5.436	8.154	10.872	16.308
35	.714	.428	.142	.857	.285
37½	.712	.424	.137	.849	.273
40	.710	.421	.121	.841	.262
45	2.706	5.413	8.119	10.826	16.238
50	.703	.405	.108	.810	.215
52½	.701	.401	.102	.802	.203
55	.699	.397	.096	.794	.192
45 00	2.695	5.389	8.084	10.779	16.168

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 42°	2½	3.796	0.001
	5	7.592	.003
	7½	11.388	.006
	10	15.184	.011
	12½	18.980	.017
	15	22.776	.025
For latitude 43°	2½	3.797	0.001
	5	7.593	.003
	7½	11.390	.006
	10	15.187	.011
	12½	18.984	.017
	15	22.780	.025
For latitude 44°	2½	3.797	0.001
	5	7.595	.003
	7½	11.392	.006
	10	15.189	.011
	12½	18.987	.017
	15	22.784	.025
For latitude 45°	2½	3.798	0.001
	5	7.596	.003
	7½	11.394	.006
	10	15.192	.011
	12½	18.990	.017
	15	22.788	.025

TABLE 2.—*Coordinates for the 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*
45	00	2.695	5.389	8.084	10.779	16.168
	05	.691	.382	.072	.763	.145
	07½	.689	.378	.066	.755	.133
	10	.687	.374	.061	.747	.121
	15	2.683	5.366	8.049	10.732	16.098
	20	.679	.358	.037	.716	.074
	22½	.677	.354	.031	.708	.062
	25	.675	.350	.025	.700	.051
	30	2.671	5.342	8.014	10.685	16.027
	35	.667	.334	.002	.669	.003
	37½	.665	.330	7.996	.661	15.991
	40	.663	.327	.990	.653	.980
	45	2.659	5.319	7.978	10.637	15.956
	50	.655	.311	.966	.621	.932
	52½	.653	.307	.960	.613	.920
	55	.651	.303	.954	.606	.908
46	00	2.647	5.295	7.942	10.590	15.884
	05	.643	.287	.930	.574	.861
	07½	.641	.283	.924	.566	.849
	10	.639	.279	.918	.558	.837
	15	2.635	5.271	7.906	10.542	15.813
	20	.631	.263	.894	.526	.789
	22½	.629	.259	.888	.518	.777
	25	.627	.255	.882	.510	.765
	30	2.623	5.247	7.870	10.494	15.741
	35	.619	.239	.858	.478	.717
	37½	.617	.235	.852	.470	.705
	40	.615	.231	.846	.462	.693
	45	2.611	5.223	7.834	10.446	15.669
	50	.607	.215	.822	.430	.644
	52½	.605	.211	.816	.422	.632
	55	.603	.207	.810	.413	.620
47	00	2.599	5.199	7.798	10.397	15.596
	05	.595	.191	.786	.381	.572
	07½	.593	.187	.780	.373	.560
	10	.591	.182	.774	.365	.547
	15	2.587	5.174	7.762	10.349	15.523
	20	.583	.166	.749	.332	.499
	22½	.581	.162	.743	.324	.486
	25	.579	.158	.737	.316	.474
	30	2.575	5.150	7.725	10.300	15.450
	35	.571	.142	.713	.284	.425
	37½	.569	.138	.707	.275	.413
	40	.567	.134	.700	.267	.401
	45	2.563	5.125	7.688	10.251	15.376
	50	.559	.117	.676	.235	.352
	52½	.557	.113	.670	.226	.339
	55	.555	.109	.664	.218	.327
48	00	2.550	5.101	7.651	10.202	15.303

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 45°	2½	3.798	0.001
	5	7.596	.003
	7½	11.394	.006
	10	15.192	.011
	12½	18.990	.017
	15	22.788	.025
For latitude 46°	2½	3.799	0.001
	5	7.597	.003
	7½	11.396	.006
	10	15.195	.011
	12½	18.994	.017
	15	22.792	.025
For latitude 47°	2½	3.799	0.001
	5	7.599	.003
	7½	11.398	.006
	10	15.197	.011
	12½	18.997	.017
	15	22.796	.025
For latitude 48°	2½	3.800	0.001
	5	7.600	.003
	7½	11.400	.006
	10	15.200	.011
	12½	19.000	.017
	15	22.800	.025

TABLE 2.—*Coordinates for the 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*
48 00	2.550	5.101	7.651	10.202	15.303
05	.546	.093	.639	.185	.278
07½	.544	.088	.633	.177	.266
10	.542	.084	.627	.169	.253
15	2.538	5.076	7.614	10.152	15.228
20	.534	.068	.602	.136	.204
22½	.532	.064	.596	.128	.191
25	.530	.060	.589	.119	.179
30	2.526	5.051	7.577	10.103	15.154
35	.522	.043	.565	.086	.129
37½	.519	.039	.558	.078	.117
40	.517	.035	.552	.070	.104
45	2.513	5.026	7.540	10.053	15.079
50	.509	.018	.527	.036	.055
52½	.507	.014	.521	.028	.042
55	.505	.010	.515	.020	.030
49 00	2.501	5.001	7.502	10.003	15.005
05	.497	4.993	.490	9.986	14.979
07½	.494	.989	.483	.978	.967
10	.492	.985	.477	.970	.954
15	2.488	4.976	7.465	9.953	14.929
20	.484	.968	.452	.936	.904
22½	.482	.964	.446	.928	.892
25	.480	.960	.439	.919	.879
30	2.476	4.951	7.427	9.902	14.854
35	.471	.943	.414	.886	.829
37½	.469	.939	.408	.877	.816
40	.467	.934	.402	.869	.803
45	2.463	4.926	7.389	9.852	14.778
50	.459	.918	.376	.835	.753
52½	.457	.913	.370	.827	.740
55	.455	.909	.364	.818	.727
50 00	2.450	4.901	7.351	9.801	14.702
05	.446	.892	.338	.784	.676
07½	.444	.888	.332	.776	.664
10	.442	.884	.326	.767	.651
15	2.438	4.875	7.313	9.750	14.625
20	.433	.867	.300	.733	.600
22½	.431	.862	.294	.725	.587
25	.429	.858	.287	.716	.574
30	2.425	4.850	7.274	9.699	14.549
35	.421	.841	.262	.682	.523
37½	.418	.837	.255	.674	.510
40	.416	.833	.249	.665	.498
45	2.412	4.824	7.236	9.648	14.472
50	.408	.815	.223	.631	.446
52½	.406	.811	.217	.622	.433
55	.403	.807	.210	.614	.420
51 00	2.399	4.798	7.197	9.596	14.395

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 48°	2½	3.800	0.001
	5	7.600	.003
	7½	11.400	.006
	10	15.200	.011
	12½	19.000	.017
	15	22.800	.025
For latitude 49°	2½	3.801	0.001
	5	7.601	.003
	7½	11.402	.006
	10	15.203	.011
	12½	19.004	.017
	15	22.804	.025
For latitude 50°	2½	3.801	0.001
	5	7.603	.003
	7½	11.404	.006
	10	15.205	.011
	12½	19.007	.017
	15	22.808	.025
For latitude 51°	2½	3.802	0.001
	5	7.604	.003
	7½	11.406	.006
	10	15.208	.011
	12½	19.011	.017
	15	22.812	.024

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
0 00	2.306	2.882	5.764	8.646	11.529	17.293
02½	.306	.882	.764	.646	.529	.293
03¾	.306	.882	.764	.646	.529	.293
05	.306	.882	.764	.646	.529	.293
07½	.306	.882	.764	.646	.529	.293
10	2.306	2.882	5.764	8.646	11.529	17.293
11¼	.306	.882	.764	.646	.528	.293
12½	.306	.882	.764	.646	.528	.293
15	.306	.882	.764	.646	.528	.293
17½	.306	.882	.764	.646	.528	.293
18¾	.306	.882	.764	.646	.528	.293
20	2.306	2.882	5.764	8.646	11.528	17.293
22½	.306	.882	.764	.646	.528	.293
25	.306	.882	.764	.646	.528	.292
26¼	.306	.882	.764	.646	.528	.292
27½	.306	.882	.764	.646	.528	.292
30	2.306	2.882	5.764	8.646	11.528	17.292
32½	.306	.882	.764	.646	.528	.292
33¾	.306	.882	.764	.646	.528	.292
35	.306	.882	.764	.646	.528	.292
37½	.306	.882	.764	.646	.528	.292
40	2.306	2.882	5.764	8.646	11.528	17.292
41¼	.306	.882	.764	.646	.528	.292
42½	.306	.882	.764	.646	.528	.291
45	.306	.882	.764	.646	.528	.291
47½	.305	.882	.764	.646	.527	.291
48¾	.305	.882	.764	.646	.527	.291
50	2.305	2.882	5.764	8.645	11.527	17.291
52½	.305	.882	.764	.645	.527	.291
55	.305	.882	.764	.645	.527	.291
56¼	.305	.882	.763	.645	.527	.290
57½	.305	.882	.763	.645	.527	.290
1 00	2.305	2.882	5.763	8.645	11.527	17.290
02½	.305	.882	.763	.645	.527	.290
03¾	.305	.882	.763	.645	.527	.290
05	.305	.882	.763	.645	.527	.290
07½	.305	.882	.763	.645	.526	.290
10	2.305	2.882	5.763	8.645	11.526	17.289
11¼	.305	.882	.763	.645	.526	.289
12½	.305	.881	.763	.644	.526	.289
15	.305	.881	.763	.644	.526	.289
17½	.305	.881	.763	.644	.526	.288
18¾	.305	.881	.763	.644	.526	.288
20	2.305	2.881	5.763	8.644	11.525	17.288
22½	.305	.881	.763	.644	.525	.288
25	.305	.881	.763	.644	.525	.288
26¼	.305	.881	.762	.644	.525	.287
27½	.305	.881	.762	.644	.525	.287
30	2.305	2.881	5.762	8.643	11.525	17.287
32½	.305	.881	.762	.643	.524	.287
33¾	.305	.881	.762	.643	.524	.286
35	.305	.881	.762	.643	.524	.286
37½	.305	.881	.762	.643	.524	.286
40	2.305	2.881	5.762	8.643	11.524	17.286
41¼	.305	.881	.762	.643	.524	.285
42½	.305	.881	.762	.643	.523	.285
45	.305	.881	.762	.642	.523	.285
47½	.305	.881	.761	.642	.523	.284
48¾	.305	.881	.761	.642	.523	.284
50	2.305	2.881	5.761	8.642	11.523	17.284
52½	.304	.881	.761	.642	.522	.284
55	.304	.881	.761	.642	.522	.283
56¼	.304	.881	.761	.642	.522	.283
57½	.304	.880	.761	.641	.522	.283
2 00	2.304	2.880	5.761	8.641	11.522	17.282

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 0°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.450	.000
	6¼	14.313	.000
	7½	17.176	.000
	10	22.901	.000
	12½	28.626	.000
	15	34.352	.000
For latitude 1°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.451	.000
	6¼	14.313	.000
	7½	17.176	.000
	10	22.901	.001
	12½	28.626	.001
	15	34.352	.001
For latitude 2°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.451	.000
	6¼	14.313	.000
	7½	17.176	.001
	10	22.901	.001
	12½	28.627	.002
	15	34.352	.003

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
2 00	2.304	2.880	5.761	8.641	11.522	17.282
02½	.304	.880	.761	.641	.521	.282
03¾	.304	.880	.761	.641	.521	.282
05	.304	.880	.760	.641	.521	.281
07½	.304	.880	.760	.640	.521	.281
10	2.304	2.880	5.760	8.640	11.520	17.281
11¼	.304	.880	.760	.640	.520	.280
12½	.304	.880	.760	.640	.520	.280
15	.304	.880	.760	.640	.520	.280
17½	.304	.880	.760	.640	.519	.279
18¾	.304	.880	.760	.639	.519	.279
20	2.304	2.880	5.760	8.639	11.519	17.279
22½	.304	.880	.759	.639	.519	.278
25	.304	.880	.759	.639	.518	.278
26¼	.304	.880	.759	.639	.518	.277
27½	.304	.880	.759	.639	.518	.277
30	2.304	2.879	5.759	8.638	11.518	17.276
32½	.303	.879	.759	.638	.517	.276
33¾	.303	.879	.759	.638	.517	.276
35	.303	.879	.758	.638	.517	.275
37½	.303	.879	.758	.637	.516	.275
40	2.303	2.879	5.758	8.637	11.516	17.274
41¼	.303	.879	.758	.637	.516	.274
42½	.303	.879	.758	.637	.516	.274
45	.303	.879	.758	.637	.515	.273
47½	.303	.879	.757	.636	.515	.272
48¾	.303	.879	.757	.636	.515	.272
50	2.303	2.879	5.757	8.636	11.515	17.272
52½	.303	.879	.757	.636	.514	.271
55	.303	.878	.757	.635	.514	.271
56¼	.303	.878	.757	.635	.513	.270
57½	.303	.878	.757	.635	.513	.270
3 00	2.303	2.878	5.756	8.635	11.513	17.269
02½	.302	.878	.756	.634	.512	.269
03¾	.302	.878	.756	.634	.512	.268
05	.302	.878	.756	.634	.512	.268
07½	.302	.878	.756	.634	.512	.267
10	2.302	2.878	5.756	8.633	11.511	17.267
11¼	.302	.878	.755	.633	.511	.266
12½	.302	.878	.755	.633	.511	.266
15	.302	.878	.755	.633	.510	.265
17½	.302	.877	.755	.632	.510	.264
18¾	.302	.877	.755	.632	.509	.264
20	2.302	2.877	5.755	8.632	11.509	17.264
22½	.302	.877	.754	.632	.509	.263
25	.302	.877	.754	.631	.508	.262
26¼	.302	.877	.754	.631	.508	.262
27½	.302	.877	.754	.631	.508	.262
30	2.301	2.877	5.754	8.630	11.507	17.261
32½	.301	.877	.753	.630	.507	.260
33¾	.301	.877	.753	.630	.506	.260
35	.301	.877	.753	.630	.506	.259
37½	.301	.876	.753	.629	.506	.258
40	2.301	2.876	5.753	8.629	11.505	17.258
41¼	.301	.876	.752	.629	.505	.257
42½	.301	.876	.752	.628	.505	.257
45	.301	.876	.752	.628	.504	.256
47½	.301	.876	.752	.628	.503	.255
48¾	.301	.876	.752	.627	.503	.255
50	2.301	2.876	5.751	8.627	11.503	17.254
52½	.300	.876	.751	.627	.502	.254
55	.300	.875	.751	.626	.502	.253
56¼	.300	.875	.751	.626	.502	.252
57½	.300	.875	.751	.626	.501	.252
4 00	2.300	2.875	5.750	8.625	11.501	17.251

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 2°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.451	.000
	6¼	14.313	.000
	7½	17.176	.001
	10	22.901	.001
	12½	28.627	.002
	15	34.352	.003
For latitude 3°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.451	.000
	6¼	14.314	.001
	7½	17.176	.001
	10	22.902	.002
	12½	28.627	.003
	15	34.353	.004
For latitude 4°	1¼	2.863	0.000
	2½	5.726	.000
	3¾	8.588	.000
	5	11.451	.001
	6¼	14.314	.001
	7½	17.177	.001
	10	22.902	.002
	12½	28.628	.004
	15	34.353	.005

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
	Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	1′	1¼′	2½′	3¾′	5′	7½′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
4 00	2.300	2.875	5.750	8.625	11.501	17.251			
02½	.300	.875	.750	.625	.500	.250			
03¾	.300	.875	.750	.625	.500	.250			
05	.300	.875	.750	.625	.500	.249			
07½	.300	.875	.749	.624	.499	.248			
10	2.300	2.875	5.749	8.624	11.498	17.247			
11¼	.300	.875	.749	.624	.498	.247			
12½	.300	.874	.749	.623	.498	.247			
15	.299	.874	.749	.623	.497	.246			
17½	.299	.874	.748	.622	.496	.245			
18¾	.299	.874	.748	.622	.496	.244			
20	2.299	2.874	5.748	8.622	11.496	17.244			
22½	.299	.874	.748	.621	.495	.243			
25	.299	.874	.747	.621	.495	.242			
26¼	.299	.874	.747	.621	.494	.241			
27½	.299	.873	.747	.620	.494	.241			
30	2.299	2.873	5.747	8.620	11.493	17.240			
32½	.299	.873	.746	.619	.493	.239			
33¾	.299	.873	.746	.619	.492	.238			
35	.298	.873	.746	.619	.492	.238			
37½	.298	.873	.746	.618	.491	.237			
40	2.298	2.873	5.745	8.618	11.491	17.236			
41¼	.298	.873	.745	.618	.490	.235			
42½	.298	.872	.745	.617	.490	.235			
45	.298	.872	.745	.617	.489	.234			
47½	.298	.872	.744	.616	.489	.233			
48¾	.298	.872	.744	.616	.488	.232			
50	2.298	2.872	5.744	8.616	11.488	17.232			
52½	.297	.872	.744	.615	.487	.231			
55	.297	.872	.743	.615	.486	.230			
56¼	.297	.872	.743	.615	.486	.229			
57½	.297	.871	.743	.614	.486	.229			
5 00	2.297	2.871	5.742	8.614	11.485	17.227			
02½	.297	.871	.742	.613	.484	.226			
03¾	.297	.871	.742	.613	.484	.226			
05	.297	.871	.742	.613	.484	.225			
07½	.297	.871	.741	.612	.483	.224			
10	2.296	2.871	5.741	8.612	11.482	17.223			
11¼	.296	.870	.741	.611	.482	.222			
12½	.296	.870	.741	.611	.481	.222			
15	.296	.870	.740	.610	.480	.221			
17½	.296	.870	.740	.610	.480	.220			
18¾	.296	.870	.740	.609	.479	.219			
20	2.296	2.870	5.739	8.609	11.479	17.218			
22½	.296	.870	.739	.609	.478	.217			
25	.295	.869	.739	.608	.477	.216			
26¼	.295	.869	.738	.608	.477	.215			
27½	.295	.869	.738	.607	.477	.215			
30	2.295	2.869	5.738	8.607	11.476	17.214			
32½	.295	.869	.738	.606	.475	.213			
33¾	.295	.869	.737	.606	.475	.212			
35	.295	.869	.737	.606	.474	.211			
37½	.295	.868	.737	.605	.473	.210			
40	2.294	2.868	5.736	8.604	11.473	17.209			
41¼	.294	.868	.736	.604	.472	.208			
42½	.294	.868	.736	.604	.472	.208			
45	.294	.868	.735	.603	.471	.206			
47½	.294	.868	.735	.603	.470	.205			
48¾	.294	.867	.735	.602	.470	.204			
50	2.294	2.867	5.735	8.602	11.469	17.204			
52½	.294	.867	.734	.601	.468	.203			
55	.293	.867	.734	.601	.468	.201			
56¼	.293	.867	.734	.600	.467	.201			
57½	.293	.867	.733	.600	.467	.200			
6 00	2.293	2.866	5.733	8.599	11.466	17.199			
							For latitude 4° 1¼	2.863	0.000
							2½	5.726	.000
							3¾	8.588	.000
							5	11.451	.001
							6¼	14.314	.001
							7½	17.177	.001
							10	22.902	.002
							12½	28.628	.004
							15	34.353	.005
							For latitude 5° 1¼	2.863	0.000
							2½	5.726	.000
							3¾	8.589	.000
							5	11.451	.001
							6¼	14.314	.001
							7½	17.177	.002
							10	22.903	.003
							12½	28.629	.005
							15	34.354	.007
							For latitude 6° 1¼	2.863	0.000
							2½	5.726	.000
							3¾	8.589	.000
							5	11.452	.001
							6¼	14.315	.001
							7½	17.178	.002
							10	22.904	.003
							12½	28.630	.005
							15	34.356	.008

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6 00	2.293	2.866	5.733	8.599	11.466	17.199
02½	.293	.866	.732	.599	.465	.197
03¾	.293	.866	.732	.598	.464	.197
05	.293	.866	.732	.598	.464	.196
07½	.293	.866	.732	.597	.463	.195
10	2.292	2.866	5.731	8.597	11.462	17.193
11¼	.292	.865	.731	.596	.462	.193
12½	.292	.865	.731	.596	.461	.192
15	.292	.865	.730	.595	.460	.191
17½	.292	.865	.730	.595	.460	.189
18¾	.292	.865	.730	.594	.459	.189
20	2.292	2.865	5.729	8.594	11.459	17.188
22½	.292	.864	.729	.593	.458	.187
25	.291	.864	.728	.593	.457	.185
26¼	.291	.864	.728	.592	.456	.185
27½	.291	.864	.728	.592	.456	.184
30	2.291	2.864	5.727	8.591	11.455	17.182
32½	.291	.863	.727	.590	.454	.181
33¾	.291	.863	.727	.590	.453	.180
35	.291	.863	.727	.590	.453	.180
37½	.290	.863	.726	.589	.452	.178
40	2.290	2.863	5.726	8.588	11.451	17.177
41¼	.290	.863	.725	.588	.451	.176
42½	.290	.863	.725	.588	.450	.175
45	.290	.862	.725	.587	.449	.174
47½	.290	.862	.724	.586	.448	.172
48¾	.290	.862	.724	.586	.448	.172
50	2.289	2.862	5.724	8.585	11.447	17.171
52½	.289	.862	.723	.585	.446	.169
55	.289	.861	.723	.584	.445	.168
56¼	.289	.861	.722	.583	.445	.167
57½	.289	.861	.722	.583	.444	.166
7 00	2.289	2.861	5.722	8.582	11.443	17.165
02½	.288	.861	.721	.582	.442	.163
03¾	.288	.860	.721	.581	.442	.162
05	.288	.860	.721	.581	.441	.162
07½	.288	.860	.720	.580	.440	.160
10	2.288	2.860	5.720	8.579	11.439	17.159
11¼	.288	.860	.719	.579	.439	.158
12½	.288	.859	.719	.578	.438	.157
15	.287	.859	.718	.578	.437	.156
17½	.287	.859	.718	.577	.436	.154
18¾	.287	.859	.718	.577	.435	.153
20	2.287	2.859	5.717	8.576	11.435	17.152
22½	.287	.858	.717	.575	.434	.151
25	.287	.858	.716	.575	.433	.149
26¼	.286	.858	.716	.574	.432	.148
27½	.286	.858	.716	.574	.432	.147
30	2.286	2.858	5.715	8.573	11.431	17.146
32½	.286	.857	.715	.572	.429	.144
33¾	.286	.857	.714	.572	.429	.143
35	.286	.857	.714	.571	.428	.143
37½	.285	.857	.714	.570	.427	.141
40	2.285	2.857	5.713	8.570	11.426	17.139
41¼	.285	.856	.713	.569	.426	.138
42½	.285	.856	.713	.569	.425	.138
45	.285	.856	.712	.568	.424	.136
47½	.285	.856	.711	.567	.423	.134
48¾	.284	.856	.711	.567	.422	.133
50	2.284	2.855	5.711	8.566	11.422	17.133
52½	.284	.855	.710	.565	.421	.131
55	.284	.855	.710	.565	.419	.129
56¼	.284	.855	.709	.564	.419	.128
57½	.284	.855	.709	.564	.418	.127
8 00	2.284	2.854	5.709	8.563	11.417	17.126

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
′	*Inches*	*Inch*
For latitude 6°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.589	.000
5	11.452	.001
6¼	14.315	.001
7½	17.178	.002
10	22.904	.003
12½	28.630	.005
15	34.356	.008
For latitude 7°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.589	.001
5	11.452	.001
6¼	14.315	.002
7½	17.179	.002
10	22.905	.004
12½	28.631	.006
15	34.357	.009
For latitude 8°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.590	.001
5	11.453	.001
6¼	14.316	.002
7½	17.179	.003
10	22.906	.005
12½	28.632	.007
15	34.359	.010

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
8 00	2.284	2.854	5.709	8.563	11.417	17.126
02½	.283	.854	.708	.562	.416	.124
03¾	.283	.854	.708	.561	.415	.123
05	.283	.854	.707	.561	.415	.122
07½	.283	.853	.707	.560	.414	.120
10	2.283	2.853	5.706	8.559	11.412	17.119
11¼	.282	.853	.706	.559	.412	.118
12½	.282	.853	.706	.558	.411	.117
15	.282	.853	.705	.558	.410	.115
17½	.282	.852	.704	.557	.409	.113
18¾	.282	.852	.704	.556	.408	.112
20	2.282	2.852	5.704	8.556	11.408	17.111
22½	.282	.852	.703	.555	.406	.110
25	.282	.851	.703	.554	.405	.108
26¼	.282	.851	.702	.553	.405	.107
27½	.282	.851	.702	.553	.404	.106
30	2.281	2.851	5.701	8.552	11.403	17.104
32½	.280	.850	.701	.551	.402	.102
33¾	.280	.850	.700	.551	.401	.101
35	.280	.850	.700	.550	.400	.100
37½	.280	.850	.699	.549	.399	.099
40	2.280	2.849	5.699	8.548	11.398	17.097
41¼	.279	.849	.699	.548	.397	.096
42½	.279	.849	.698	.547	.397	.095
45	.279	.849	.698	.546	.395	.093
47½	.279	.848	.697	.545	.394	.091
48¾	.279	.848	.697	.545	.393	.090
50	2.279	2.848	5.696	8.545	11.393	17.089
52½	.278	.848	.696	.544	.391	.087
55	.278	.848	.695	.543	.390	.085
56¼	.278	.847	.695	.542	.389	.084
57½	.278	.847	.694	.542	.389	.083
9 00	2.278	2.847	5.694	8.541	11.388	17.081
02½	.277	.847	.693	.540	.386	.079
03¾	.277	.846	.693	.539	.386	.078
05	.277	.846	.692	.539	.385	.077
07½	.277	.846	.692	.538	.384	.075
10	2.276	2.846	5.691	8.537	11.382	17.073
11¼	.276	.845	.691	.536	.382	.072
12½	.276	.845	.690	.536	.381	.071
15	.276	.845	.690	.535	.380	.069
17½	.276	.845	.689	.534	.378	.067
18¾	.275	.844	.689	.533	.378	.066
20	2.275	2.844	5.688	8.533	11.377	17.065
22½	.275	.844	.688	.532	.376	.063
25	.275	.844	.687	.531	.374	.061
26¼	.275	.843	.687	.530	.373	.060
27½	.275	.843	.686	.530	.373	.059
30	2.274	2.843	5.686	8.529	11.371	17.057
32½	.274	.843	.685	.528	.370	.055
33¾	.274	.842	.685	.527	.369	.054
35	.274	.842	.684	.527	.369	.053
37½	.273	.842	.684	.526	.367	.051
40	2.273	2.841	5.683	8.524	11.366	17.049
41¼	.273	.841	.683	.524	.365	.048
42½	.273	.841	.682	.523	.365	.047
45	.273	.841	.682	.522	.363	.045
47½	.272	.840	.681	.521	.362	.043
48¾	.272	.840	.680	.521	.361	.041
50	2.272	2.840	5.680	8.520	11.360	17.040
52½	.272	.840	.679	.519	.359	.038
55	.271	.839	.679	.518	.357	.036
56¼	.271	.839	.678	.518	.357	.035
57½	.271	.839	.678	.517	.356	.034
10 00	2.271	2.839	5.677	8.516	11.355	17.032

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
′	*Inches*	*Inch*
For latitude 8°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.590	.001
5	11.453	.001
6¼	14.316	.002
7½	17.179	.003
10	22.906	.005
12½	28.632	.007
15	34.359	.010
For latitude 9°: 1¼	2.863	0.000
2½	5.727	.000
3¾	8.590	.001
5	11.453	.001
6¼	14.317	.002
7½	17.180	.003
10	22.907	.005
12½	28.634	.008
15	34.360	.012
For latitude 10°: 1¼	2.864	0.000
2½	5.727	.000
3¾	8.591	.001
5	11.454	.001
6¼	14.318	.002
7½	17.181	.003
10	22.908	.006
12½	28.635	.009
15	34.362	.013

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
10	00	2.271	2.839	5.677	8.516	11.355	17.032				
	02½	.271	.838	.677	.515	.353	.030				
	03¾	.270	.838	.676	.514	.353	.029				
	05	.270	.838	.676	.514	.352	.027				
	07½	.270	.838	.675	.513	.350	.025				
	10	2.270	2.837	5.674	8.512	11.349	17.023				
	11¼	.270	.837	.674	.511	.348	.022				
	12½	.269	.837	.674	.510	.347	.021				
	15	.269	.836	.673	.509	.346	.019				
	17½	.269	.836	.672	.508	.344	.016				
	18¾	.269	.836	.672	.508	.344	.115				
	20	2.269	2.836	5.671	8.507	11.343	17.014				
	22½	.268	.835	.671	.506	.341	.012				
	25	.268	.835	.670	.505	.340	.010				
	26¼	.268	.835	.670	.504	.339	.009				
	27½	.268	.835	.669	.504	.338	.007				
	30	2.267	2.834	5.668	8.503	11.337	17.005				
	32½	.267	.834	.668	.501	.335	.003				
	33¾	.267	.834	.667	.501	.334	.002				
	35	.267	.833	.667	.500	.334	.001				
	37½	.266	.233	.666	.499	.332	16.998				
	40	2.266	2.833	5.665	8.498	11.331	16.996				
	41¼	.266	.832	.665	.497	.330	.995				
	42½	.266	.832	.665	.497	.329	.994				
	45	.266	.832	.664	.496	.328	.991				
	47½	.265	.832	.663	.495	.326	.989				
	48¾	.265	.831	.663	.494	.325	.988				
	50	2.265	2.831	5.662	8.493	11.324	16.987				
	52½	.265	.831	.661	.492	.323	.984				
	55	.264	.830	.661	.491	.321	.982				
	56¼	.264	.830	.660	.490	.320	.981				
	57½	.264	.830	.660	.490	.320	980				
11	00	2.264	2.830	5.659	8.489	11.318	16.977				
	02½	.263	.829	.658	.487	.317	.975				
	03¾	.263	.829	.658	.487	.316	.974				
	05	.263	.829	.657	.486	.315	.972				
	07½	.263	.828	.657	.485	.313	.970				
	10	2.262	2.828	5.656	8.484	11.312	16.968				
	11¼	.262	.828	.655	.483	.311	.966				
	12½	.262	.828	.655	.483	.310	.965				
	15	.262	.827	.654	.481	.308	.963				
	17½	.261	.827	.653	.480	.307	.960				
	18¾	.261	.827	.653	.480	.306	.959				
	20	2.261	2.826	5.653	8.479	11.305	16.958				
	22½	.261	.826	.652	.478	.304	.955				
	25	.260	.825	.651	.476	.302	.953				
	26¼	.260	.825	.651	.476	.301	.952				
	27½	.260	.825	.650	.475	.300	.950				
	30	2.260	2.825	5.649	8.474	11.299	16.948				
	32½	.259	.824	.648	.473	.297	.945				
	33¾	.259	.824	.648	.472	.296	.944				
	35	.259	.824	.648	.471	.295	.943				
	37½	.259	.823	.647	.470	.294	.940				
	40	2.258	2.823	5.646	8.469	11.292	16.938				
	41¼	.258	.823	.646	.468	.291	.937				
	42½	.258	.823	.645	.468	.290	.935				
	45	.258	.822	.644	.466	.289	.933				
	47½	.257	.822	.643	.465	.287	.930				
	48¾	.257	.822	.643	.465	.286	.929				
	50	2.257	2.821	5.643	8.464	11.285	16.928				
	52½	.257	.821	.642	.463	.283	.925				
	55	.256	.820	.641	.461	.282	.923				
	56¼	.256	.820	.640	.461	.281	.921				
	57½	.256	.820	.640	.460	.280	.920				
12	00	2.256	2.820	5.639	8.459	11.278	16.917				

For latitude 10°	1¼	2.864	0.000
	2½	5.727	.000
	3¾	8.591	.001
	5	11.454	.001
	6¼	14.318	.002
	7½	17.181	.003
	10	22.908	.006
	12½	28.635	.009
	15	34.362	.013
For latitude 11°	1¼	2.864	0.000
	2½	5.727	.000
	3¾	8.591	.001
	5	11.455	.002
	6¼	14.319	.002
	7½	17.182	.004
	10	22.910	.006
	12½	28.637	.010
	15	34.365	.014
For latitude 12°	1¼	2.864	0.000
	2½	5.728	.000
	3¾	8.592	.001
	5	11.456	.002
	6¼	14.320	.003
	7½	17.183	.004
	10	22.911	.007
	12½	28.639	.011
	15	34.367	.015

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
12	00	2.256	2.820	5.639	8.459	11.278	16.917
	02½	.255	.819	.638	.457	.276	.915
	03¾	.255	.819	.638	.457	.276	.913
	05	.255	.819	.637	.456	.275	.912
	07½	.255	.818	.637	.455	.273	.910
	10	2.254	2.818	5.636	8.453	11.271	16.907
	11¼	.254	.818	.635	.453	.270	.906
	12½	.254	.817	.635	.452	.270	.904
	15	.254	.817	.634	.451	.268	.902
	17½	.253	.816	.633	.449	.266	.899
	18¾	.253	.816	.633	.449	.265	.898
	20	2.253	2.816	5.632	8.448	11.264	16.896
	22½	.252	.816	.631	.447	.262	.894
	25	.252	.815	.630	.445	.261	.891
	26¼	.252	.815	.630	.445	.260	.890
	27½	.252	.815	.629	.444	.259	.888
	30	2.251	2.814	5.629	8.443	11.257	16.886
	32½	.251	.814	.628	.441	.255	.883
	33¾	.251	.814	.627	.441	.254	.881
	35	.251	.813	.627	.440	.253	.880
	37½	.250	.813	.626	.439	.252	.877
	40	2.250	2.812	5.625	8.437	11.250	16.875
	41¼	.250	.812	.624	.437	.249	.873
	42½	.250	.812	.624	.436	.248	.872
	45	.249	.812	.623	.435	.246	.869
	47½	.249	.811	.622	.433	.244	.866
	48¾	.249	.811	.622	.433	.243	.865
	50	2.248	2.811	5.621	8.432	11.242	16.864
	52½	.248	.810	.620	.430	.241	.861
	55	.248	.810	.619	.429	.239	.858
	56¼	.248	.809	.619	.428	.238	.857
	57½	.247	.809	.618	.428	.237	.855
13	00	2.247	2.809	5.618	8.426	11.235	16.852
	02½	.247	.808	.617	.425	.233	.850
	03¾	.246	.808	.616	.424	.232	.848
	05	.246	.808	.616	.423	.231	.847
	07½	.246	.807	.615	.422	.229	.844
	10	2.246	2.807	5.614	8.421	11.227	16.841
	11¼	.245	.807	.613	.420	.226	.840
	12½	.245	.806	.613	.419	.226	.838
	15	.245	.806	.612	.418	.224	.835
	17½	.244	.805	.611	.416	.222	.833
	18¾	.244	.805	.610	.416	.221	.831
	20	2.244	2.805	5.610	8.415	11.220	16.830
	22½	.244	.804	.609	.413	.218	.827
	25	.243	.804	.608	.412	.216	.824
	26¼	.243	.804	.608	.411	.215	.823
	27½	.243	.804	.607	.411	.214	.821
	30	2.242	2.803	5.606	8.409	11.212	16.818
	32½	.242	.803	.605	.408	.210	.815
	33¾	.242	.802	.605	.407	.209	.814
	35	.242	.802	.604	.406	.208	.812
	37½	.241	.802	.603	.405	.206	.809
	40	2.241	2.801	5.602	8.403	11.204	16.806
	41¼	.241	.801	.602	.402	.203	.805
	42½	.240	.801	.601	.402	.202	.803
	45	.240	.800	.600	.400	.200	.800
	47½	.240	.800	.599	.399	.198	.797
	48¾	.239	.799	.599	.398	.197	.796
	50	2.239	2.799	5.598	8.397	11.196	16.795
	52½	.239	.799	.597	.396	.194	.792
	55	.238	.798	.596	.394	.192	.789
	56¼	.238	.798	.596	.394	.191	.787
	57½	.238	.798	.595	.393	.190	.786
14	00	2.238	2.797	5.594	8.391	11.188	16.782

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 12°	1¼	2.864	0.000
	2½	5.728	.000
	3¾	8.592	.001
	5	11.456	.002
	6¼	14.320	.003
	7½	17.183	.004
	10	22.911	.007
	12½	28.639	.011
	15	34.367	.015
For latitude 13°	1¼	2.864	0.000
	2½	5.728	.000
	3¾	8.592	.001
	5	11.456	.002
	6¼	14.321	.003
	7½	17.185	.004
	10	22.913	.007
	12½	28.641	.011
	15	34.370	.017
For latitude 14°	1¼	2.864	0.000
	2½	5.729	.000
	3¾	8.593	.001
	5	11.457	.002
	6¼	14.322	.003
	7½	17.186	.004
	10	22.915	.008
	12½	28.644	.012
	15	34.372	.018

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel: Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
14	00	2.238	2.797	5.594	8.391	11.188	16.782
	02½	.237	.797	.593	.390	.186	.780
	03¾	.237	.796	.593	.389	.185	.778
	05	.237	.796	.592	.388	.184	.776
	07½	.236	.796	.591	.387	.182	.773
	10	2.236	2.795	5.590	8.385	11.180	16.770
	11¼	.236	.795	.590	.384	.179	.769
	12½	.236	.795	.589	.384	.178	.767
	15	.235	.794	.588	.382	.176	.764
	17½	.235	.794	.587	.381	.174	.761
	18¾	.235	.793	.587	.380	.173	.760
	20	2.234	2.793	5.586	8.379	11.172	16.758
	22½	.234	.792	.585	.377	.170	.755
	25	.234	.792	.584	.376	.168	.752
	26¼	.233	.792	.583	.375	.167	.750
	27½	.233	.791	.583	.374	.166	.749
	30	2.233	2.791	5.582	8.373	11.164	16.745
	32½	.232	.790	.581	.371	.162	.742
	33¾	.232	.790	.580	.370	.161	.741
	35	.232	.790	.580	.370	.160	.739
	37½	.232	.789	.579	.368	.157	.736
	40	2.231	2.789	5.578	8.366	11.155	16.733
	41¼	.231	.789	.577	.366	.154	.731
	42½	.231	.788	.577	.365	.153	.730
	45	.230	.788	.576	.363	.151	.727
	47½	.230	.787	.574	.362	.149	.723
	48¾	.230	.787	.574	.361	.148	.722
	50	2.229	2.787	5.573	8.360	11.147	16.720
	52½	.229	.786	.572	.359	.145	.717
	55	.229	.786	.571	.357	.143	.714
	56¼	.228	.785	.571	.356	.141	.712
	57½	.228	.785	.570	.355	.140	.711
15	00	2.228	2.785	5.569	8.354	11.138	16.707
	02½	.227	.784	.568	.352	.136	.704
	03¾	.227	.784	.568	.351	.135	.703
	05	.227	.783	.567	.350	.134	.701
	07½	.226	.783	.566	.349	.132	.698
	10	2.226	2.782	5.565	8.347	11.130	16.694
	11¼	.226	.782	.564	.346	.129	.693
	12½	.225	.782	.564	.346	.127	.691
	15	.225	.781	.563	.344	.125	.688
	17½	.225	.781	.562	.342	.123	.685
	18¾	.224	.780	.561	.341	.122	.683
	20	2.224	2.780	5.560	8.341	11.121	16.681
	22½	.224	.780	.559	.339	.119	.678
	25	.224	.779	.558	.337	.116	.675
	26¼	.223	.779	.558	.336	.115	.673
	27½	.223	.779	.557	.336	.114	.671
	30	2.222	2.778	5.556	8.334	11.112	16.668
	32½	.222	.777	.555	.332	.110	.665
	33¾	.222	.777	.554	.331	.109	.663
	35	.222	.777	.554	.331	.107	.661
	37½	.221	.776	.553	.329	.105	.658
	40	2.221	2.776	5.552	8.327	11.103	16.654
	41¼	.220	.775	.551	.326	.102	.653
	42½	.220	.775	.550	.326	.101	.651
	45	.220	.775	.549	.324	.098	.648
	47½	.219	.774	.548	.322	.096	.644
	48¾	.219	.774	.548	.321	.095	.643
	50	2.219	2.773	5.547	8.320	11.094	16.641
	52½	.218	.773	.546	.319	.092	.637
	55	.218	.772	.545	.317	.089	.634
	56¼	.218	.772	.544	.316	.088	.632
	57½	.217	.772	.544	.315	.087	.631
16	00	2.217	2.771	5.542	8.314	11.085	16.627

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 14°	1¼	2.864	0.000
	2½	5.729	.000
	3¾	8.593	.001
	5	11.457	.002
	6¼	14.322	.003
	7½	17.186	.004
	10	22.915	.008
	12½	28.644	.012
	15	34.372	.018
For latitude 15°	1¼	2.865	0.000
	2½	5.729	.001
	3¾	8.594	.001
	5	11.458	.002
	6¼	14.323	.003
	7½	17.188	.005
	10	22.917	.008
	12½	28.646	.013
	15	34.375	.019
For latitude 16°	1¼	2.865	0.000
	2½	5.730	.001
	3¾	8.595	.001
	5	11.459	.002
	6¼	14.325	.003
	7½	17.189	.005
	10	22.919	.009
	12½	28.649	.014
	15	34.379	.020

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
16	00	2.217	2.771	5.542	8.314	11.085	16.627			
	02½	.216	.771	.541	.312	.083	.624			
	03¾	.216	.770	.541	.311	.081	.622			
	05	.216	.770	.540	.310	.080	.620			
	07½	.216	.769	.539	.308	.078	.617			
	10	2.215	2.769	5.538	8.307	11.076	16.613			
	11¼	.215	.769	.537	.306	.074	.612			
	12½	.215	.768	.537	.305	.073	.610			
	15	.214	.768	.535	.303	.071	.606			
	17½	.214	.767	.534	.301	.069	.603			
	18¾	.213	.767	.534	.301	.067	.601			
	20	2.213	2.767	5.533	8.300	11.066	16.599			
	22½	.213	.766	.532	.298	.064	.596			
	25	.212	.765	.531	.296	.062	.592			
	26¼	.212	.765	.530	.295	.060	.590			
	27½	.212	.765	.530	.294	.059	.589			
	30	2.211	2.764	5.528	8.293	11.057	16.585			
	32½	.211	.764	.527	.291	.054	.582			
	33¾	.211	.763	.527	.290	.053	.580			
	35	.210	.763	.526	.289	.052	.578			
	37½	.210	.762	.525	.287	.050	.575			
	40	2.209	2.762	5.524	8.286	11.047	16.571			
	41¼	.209	.762	.523	.285	.046	.569			
	42½	.209	.761	.522	.284	.045	.567			
	45	.208	.761	.521	.282	.043	.564			
	47½	.208	.760	.520	.280	.040	.560			
	48¾	.208	.760	.519	.279	.039	.558			
	50	2.208	2.759	5.519	8.278	11.038	16.557			
	52½	.207	.759	.518	.276	.035	.553			
	55	.207	.758	.516	.275	.033	.549			
	56¼	.206	.758	.516	.274	.032	.547			
	57½	.206	.758	.515	.273	.030	.546			
17	00	2.206	2.757	5.514	8.271	11.028	16.542			
	02½	.205	.756	.513	.269	.026	.538			
	03¾	.205	.756	.512	.268	.024	.536			
	05	.205	.756	.512	.267	.023	.535			
	07½	.204	.755	.510	.266	.021	.531			
	10	2.204	2.755	5.509	8.264	11.018	16.527			
	11¼	.203	.754	.509	.263	.017	.526			
	12½	.203	.754	.508	.262	.016	.524			
	15	.203	.753	.507	.260	.013	.520			
	17½	.202	.753	.505	.258	.011	.516			
	18¾	.202	.752	.505	.257	.010	.514			
	20	2.202	2.752	5.504	8.256	11.008	16.512			
	22½	.201	.751	.503	.254	.006	.509			
	25	.201	.751	.502	.253	.003	.505			
	26¼	.200	.751	.501	.252	.002	.503			
	27½	.200	.750	.500	.251	.001	.501			
	30	2.200	2.750	5.499	8.249	10.998	16.498			
	32½	.199	.749	.498	.247	.996	.494			
	33¾	.199	.749	.497	.246	.995	.492			
	35	.199	.748	.497	.245	.993	.490			
	37½	.198	.748	.495	.243	.991	.486			
	40	2.198	2.747	5.494	8.241	10.988	16.482			
	41¼	.197	.747	.494	.240	.987	.481			
	42½	.197	.746	.493	.239	.986	.479			
	45	.197	.746	.492	.237	.983	.475			
	47½	.196	.745	.490	.235	.981	.471			
	48¾	.196	.745	.490	.235	.979	.469			
	50	2.196	2.745	5.489	8.234	10.978	16.467			
	52½	.195	.744	.488	.232	.976	.463			
	55	.195	.743	.486	.230	.973	.459			
	56¼	.194	.743	.486	.229	.972	.458			
	57½	.194	.743	.485	.228	.970	.456			
18	00	2.194	2.742	5.484	8.226	10.968	16.452			
								For latitude 16° ′	*Inches*	*Inch*
								1¼	2.865	0.000
								2½	5.730	.001
								3¾	8.595	.001
								5	11.459	.002
								6¼	14.325	.003
								7½	17.189	.005
								10	22.919	.009
								12½	28.649	.014
								15	34.379	.020
								For latitude 17° ′	*Inches*	*Inch*
								1¼	2.865	0.000
								2½	5.730	.001
								3¾	8.595	.001
								5	11.461	.002
								6¼	14.326	.004
								7½	17.191	.005
								10	22.921	.009
								12½	28.652	.014
								15	34.382	.021
								For latitude 18° ′	*Inches*	*Inch*
								1¼	2.865	0.000
								2½	5.731	.001
								3¾	8.596	.001
								5	11.462	.002
								6¼	14.327	.004
								7½	17.193	.006
								10	22.923	.010
								12½	28.654	.015
								15	34.385	.022

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
18 00	2.194	2.742	5.484	8.226	10.968	16.452
02½	.193	.741	.483	.224	.965	.448
03¾	.193	.741	.482	.223	.964	.446
05	.193	.741	.481	.222	.963	.444
07½	.192	.740	.480	.220	.960	.440
10	2.191	2.739	5.479	8.218	10.958	16.436
11¼	.191	.739	.478	.217	.956	.434
12½	.191	.739	.477	.216	.955	.432
15	.190	.738	.476	.214	.952	.428
17½	.190	.737	.475	.212	.950	.424
18¾	.190	.737	.474	.211	.948	.423
20	2.189	2.737	5.474	8.210	10.947	16.421
22½	.189	.736	.472	.208	.944	.417
25	.188	.735	.471	.206	.942	.413
26¼	.188	.735	.470	.205	.941	.411
27½	.188	.735	.470	.204	.939	.409
30	2.187	2.734	5.468	8.202	10.937	16.405
32½	.187	.733	.467	.200	.934	.401
33¾	.187	.733	.466	.199	.933	.399
35	.186	.733	.466	.198	.931	.397
37½	.186	.732	.464	.196	.929	.393
40	2.185	2.731	5.463	8.194	10.926	16.389
41¼	.185	.731	.462	.193	.925	.387
42½	.185	.731	.462	.192	.923	.385
45	.184	.730	.460	.190	.921	.381
47½	.184	.729	.459	.188	.918	.377
48¾	.183	.729	.458	.187	.917	.375
50	2.183	2.729	5.458	8.186	10.915	16.373
52½	.183	.728	.456	.184	.913	.369
55	.182	.727	.455	.182	.910	.365
56¼	.182	.727	.454	.181	.908	.363
57½	.181	.727	.454	.180	.907	.361
19 00	2.181	2.726	5.452	8.178	10.904	16.357
02½	.180	.725	.451	.176	.902	.353
03¾	.180	.725	.450	.175	.900	.350
05	.180	.725	.449	.174	.899	.348
07½	.179	.724	.448	.172	.896	.344
10	2.179	2.723	5.447	8.170	10.893	16.340
11¼	.178	.723	.446	.169	.892	.338
12½	.178	.723	.445	.168	.891	.336
15	.178	.722	.444	.166	.888	.332
17½	.177	.721	.443	.164	.885	.328
18¾	.177	.721	.442	.163	.884	.326
20	2.177	2.721	5.441	8.162	10.883	16.324
22½	.176	.720	.440	.160	.880	.320
25	.175	.719	.438	.158	.877	.315
26¼	.175	.719	.438	.157	.876	.313
27½	.175	.719	.437	.156	.874	.311
30	2.174	2.718	5.436	8.154	10.871	16.307
32½	.174	.717	.434	.151	.869	.303
33¾	.173	.717	.434	.150	.867	.301
35	.173	.716	.433	.149	.866	.299
37½	.173	.716	.431	.147	.863	.294
40	2.172	2.715	5.430	8.145	10.860	16.290
41¼	.172	.715	.429	.144	.859	.288
42½	.172	.714	.429	.143	.857	.286
45	.171	.714	.427	.141	.855	.282
47½	.170	.713	.426	.139	.852	.278
48¾	.170	.713	.425	.138	.850	.276
50	2.170	2.712	5.424	8.137	10.849	16.273
52½	.169	.712	.423	.135	.846	.269
55	.169	.711	.422	.132	.843	.265
56¼	.168	.710	.421	.131	.842	.263
57½	.168	.710	.420	.130	.840	.261
20 00	2.167	2.709	5.419	8.128	10.838	16.256

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 18°	1¼	2.865	0.000
	2½	5.731	.001
	3¾	8.596	.001
	5	11.462	.002
	6¼	14.327	.004
	7½	17.193	.006
	10	22.923	.010
	12½	28.654	.015
	15	34.385	.022
For latitude 19°	1¼	2.866	0.000
	2½	5.731	.001
	3¾	8.597	.001
	5	11.463	.003
	6¼	14.329	.004
	7½	17.194	.006
	10	22.926	.010
	12½	28.657	.016
	15	34.389	.023
For latitude 20°	1¼	2.866	0.000
	2½	5.732	.001
	3¾	8.598	.002
	5	11.464	.003
	6¼	14.330	.004
	7½	17.196	.006
	10	22.929	.011
	12½	28.661	.017
	15	34.393	.024

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
20	00	2.167	2.709	5.419	8.128	10.838	16.256			
	02½	.167	.709	.417	.126	.835	.252	1¼	2.866	0.000
	03¾	.167	.708	.417	.125	.833	.250	2½	5.732	.001
	05	.166	.708	.416	.124	.832	.248	3¾	8.598	.002
	07½	.166	.707	.414	.122	.829	.243	5	11.464	.003
								For latitude 20° 6¼	14.330	.004
								7½	17.196	.006
	10	2.165	2.707	5.413	8.120	10.826	16.239	10	22.929	.011
	11¼	.165	.706	.412	.119	.825	.237	12½	28.661	.017
	12½	.165	.706	.412	.117	.823	.235	15	34.393	.024
	15	.164	.705	.410	.115	.820	.231			
	17½	.163	.704	.409	.113	.817	.226			
	18¾	.163	.704	.408	.112	.816	.224			
								1¼	2.866	0.000
	20	2.163	2.704	5.407	8.111	10.815	16.222	2½	5.733	.001
	22½	.162	.703	.406	.109	.812	.217	3¾	8.599	.002
	25	.162	.702	.404	.107	.809	.213	5	11.466	.003
	26¼	.161	.702	.404	.105	.807	.211	For latitude 21° 6¼	14.332	.004
	27½	.161	.701	.403	.104	.806	.209	7½	17.198	.006
								10	22.931	.011
	30	2.161	2.701	5.401	8.102	10.803	16.204	12½	28.664	.018
	32½	.160	.700	.400	.100	.800	.200	15	34.397	.025
	33¾	.160	.700	.399	.099	.799	.198			
	35	.159	.699	.399	.098	.797	.196			
	37½	.159	.699	.397	.096	.794	.191			
								1¼	2.867	0.000
	40	2.158	2.698	5.396	8.093	10.791	16.187	2½	5.733	.001
	41¼	.158	.697	.395	.092	.790	.185	3¾	8.600	.002
	42½	.158	.697	.394	.091	.788	.182	5	11.467	.003
	45	.157	.696	.393	.089	.785	.178	For latitude 22° 6¼	14.334	.005
	47½	.156	.696	.391	.087	.782	.174	7½	17.201	.007
	48¾	.156	.695	.390	.086	.781	.171	10	22.934	.012
								12½	28.668	.018
	50	2.156	2.695	5.390	8.085	10.779	16.169	15	34.401	.026
	52½	.155	.694	.388	.082	.776	.165			
	55	.155	.693	.387	.080	.773	.160			
	56¼	.154	.693	.386	.079	.772	.158			
	57½	.154	.693	.385	.079	.770	.156			
21	00	2.154	2.692	5.384	8.076	10.768	16.151			
	02½	.153	.691	.382	.073	.764	.147			
	03¾	.153	.691	.382	.072	.763	.145			
	05	.152	.690	.381	.071	.762	.142			
	07½	.152	.690	.379	.069	.759	.138			
	10	2.151	2.689	5.378	8.067	10.756	16.133			
	11¼	.151	.688	.377	.066	.754	.131			
	12½	.150	.688	.376	.064	.752	.129			
	15	.150	.687	.375	.062	.749	.124			
	17½	.149	.687	.373	.060	.746	.120			
	18¾	.149	.686	.372	.059	.745	.117			
	20	2.149	2.686	5.372	8.058	10.743	16.115			
	22½	.148	.685	.370	.055	.740	.111			
	25	.147	.684	.369	.053	.737	.106			
	26¼	.147	.684	.368	.052	.736	.104			
	27½	.147	.684	.367	.051	.734	.102			
	30	2.146	2.683	5.366	8.048	10.731	16.097			
	32½	.146	.682	.364	.046	.728	.092			
	33¾	.145	.682	.363	.045	.727	.090			
	35	.145	.681	.363	.044	.725	.088			
	37½	.144	.681	.361	.042	.722	.083			
	40	2.144	2.680	5.359	8.039	10.719	16.078			
	41¼	.144	.679	.359	.038	.717	.076			
	42½	.143	.679	.358	.037	.716	.074			
	45	.143	.678	.356	.035	.713	.069			
	47½	.142	.677	.355	.032	.710	.065			
	48¾	.142	.677	.354	.031	.708	.062			
	50	2.141	2.677	5.353	8.030	10.707	16.060			
	52½	.141	.676	.352	.028	.703	.055			
	55	.140	.675	.350	.025	.700	.051			
	56¼	.140	.675	.349	.024	.699	.048			
	57½	.140	.674	.349	.023	.697	.046			
22	00	2.139	2.674	5.347	8.021	10.694	16.041			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
22 00	2.139	2.674	5.347	8.021	10.694	16.041
02½	.138	.673	.346	.018	.691	.037
03¾	.138	.672	.345	.017	.690	.034
05	.138	.672	.344	.016	.688	.032
07½	.137	.671	.342	.014	.685	.027
10	2.136	2.670	5.341	8.011	10.682	16.022
11¼	.136	.670	.340	.010	.680	.020
12½	.136	.670	.339	.009	.678	.018
15	.135	.669	.338	.006	.675	.013
17½	.134	.668	.336	.004	.672	.008
18¾	.134	.668	.335	.003	.671	.006
20	2.134	2.667	5.334	8.002	10.669	16.003
22½	.133	.666	.333	7.999	.666	15.999
25	.133	.666	.331	.997	.663	.994
26¼	.132	.665	.331	.996	.661	.992
27½	.132	.665	.330	.995	.659	.989
30	2.131	2.664	5.328	7.992	10.656	15.984
32½	.131	.663	.327	.990	.653	.980
33¾	.130	.663	.326	.989	.652	.977
35	.130	.662	.325	.987	.650	.975
37½	.129	.662	.323	.985	.647	.970
40	2.129	2.661	5.322	7.983	10.643	15.965
41¼	.128	.660	.321	.981	.642	.963
42½	.128	.660	.320	.980	.640	.960
45	.127	.659	.319	.978	.637	.956
47½	.127	.658	.317	.975	.634	.951
48¾	.126	.658	.316	.974	.632	.948
50	2.126	2.658	5.315	7.973	10.631	15.946
52½	.125	.657	.314	.970	.627	.941
55	.125	.656	.312	.968	.624	.936
56¼	.124	.656	.311	.967	.622	.934
57½	.124	.655	.310	.966	.621	.931
23 00	2.123	2.654	5.309	7.963	10.618	15.926
02½	.123	.654	.307	.961	.614	.921
03¾	.123	.653	.306	.960	.613	.919
05	.122	.653	.306	.958	.611	.917
07½	.122	.652	.304	.956	.608	.912
10	2.121	2.651	5.302	7.953	10.605	15.907
11¼	.121	.651	.301	.952	.603	.904
12½	.120	.650	.301	.951	.601	.902
15	.120	.649	.299	.948	.598	.897
17½	.119	.649	.297	.946	.595	.892
18¾	.119	.648	.297	.945	.593	.890
20	2.118	2.648	5.296	7.944	10.591	15.887
22½	.118	.647	.294	.941	.588	.882
25	.117	.646	.292	.939	.585	.877
26¼	.117	.646	.292	.937	.583	.875
27½	.116	.645	.291	.936	.581	.872
30	2.116	2.645	5.289	7.934	10.578	15.867
32½	.115	.644	.287	.931	.575	.862
33¾	.115	.643	.287	.930	.573	.860
35	.114	.643	.286	.929	.571	.857
37½	.114	.642	.284	.926	.568	.852
40	2.113	2.641	5.282	7.924	10.565	15.847
41¼	.113	.641	.282	.922	.563	.845
42½	.112	.640	.281	.921	.561	.842
45	.112	.640	.279	.919	.558	.837
47½	.111	.639	.277	.916	.555	.832
48¾	.111	.638	.277	.915	.553	.830
50	2.110	2.638	5.276	7.913	10.551	15.827
52½	.110	.637	.274	.911	.548	.822
55	.109	.636	.272	.908	.545	.817
56¼	.109	.636	.271	.907	.543	.814
57½	.108	.635	.271	.906	.541	.812
24 00	2.108	2.634	5.269	7.903	10.538	15.807

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 22°	1¼	2.867	0.000
	2½	5.733	.001
	3¾	8.600	.002
	5	11.467	.003
	6¼	14.334	.005
	7½	17.201	.007
	10	22.934	.012
	12½	28.668	.018
	15	34.401	.026
For latitude 23°	1¼	2.867	0.000
	2½	5.734	.001
	3¾	8.601	.002
	5	11.468	.003
	6¼	14.336	.005
	7½	17.203	.007
	10	22.937	.012
	12½	28.672	.019
	15	34.405	.027
For latitude 24°	1¼	2.867	0.000
	2½	5.735	.001
	3¾	8.602	.002
	5	11.470	.003
	6¼	14.338	.005
	7½	17.205	.007
	10	22.940	.012
	12½	28.675	.019
	15	34.410	.028

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
24	00	2.108	2.634	5.269	7.903	10.538	15.807
	02½	.107	.634	.267	.901	.534	.802
	03¾	.107	.633	.266	.899	.533	.799
	05	.106	.633	.265	.898	.531	.796
	07½	.105	.632	.264	.896	.527	.791
	10	2.105	2.631	5.262	7.893	10.524	15.786
	11¼	.104	.631	.261	.892	.522	.784
	12½	.104	.630	.260	.891	.521	.781
	15	.103	.629	.259	.888	.517	.776
	17½	.103	.629	.257	.885	.514	.771
	18¾	.102	.628	.256	.884	.512	.768
	20	2.102	2.628	5.255	7.883	10.510	15.766
	22½	.101	.628	.254	.880	.507	.760
	25	.101	.626	.252	.878	.504	.755
	26¼	.100	.625	.251	.876	.502	.753
	27½	.100	.625	.250	.875	.500	.750
	30	2.099	2.624	5.248	7.872	10.497	15.745
	32½	.099	.623	.247	.870	.493	.740
	33¾	.098	.623	.246	.869	.491	.737
	35	.098	.622	.245	.867	.490	.735
	37½	.097	.622	.243	.865	.486	.729
	40	2.097	2.621	5.241	7.862	10.483	15.724
	41¼	.096	.620	.241	.861	.481	.722
	42½	.096	.620	.240	.859	.479	.719
	45	.095	.619	.238	.857	.476	.714
	47½	.095	.618	.236	.854	.472	.708
	48¾	.094	.618	.235	.853	.471	.706
	50	2.094	2.617	5.234	7.852	10.469	15.703
	52½	.093	.616	.233	.849	.465	.690
	55	.092	.615	.231	.846	.462	.693
	56¼	.092	.615	.230	.845	.460	.690
	57½	.092	.615	.229	.844	.458	.687
25	00	2.091	2.614	5.227	7.841	10.455	15.682
	02½	.090	.613	.226	.838	.451	.677
	03¾	.090	.612	.225	.837	.449	.674
	05	.090	.612	.224	.836	.448	.672
	07½	.089	.611	.222	.833	.444	.666
	10	2.088	2.610	5.220	7.830	10.441	15.661
	11¼	.088	.610	.219	.829	.439	.658
	12½	.087	.609	.219	.828	.437	.656
	15	.087	.608	.217	.825	.433	.650
	17½	.086	.608	.215	.822	.430	.645
	18¾	.086	.607	.214	.821	.428	.642
	20	2.085	2.607	5.213	7.820	10.426	15.640
	22½	.085	.606	.211	.817	.423	.634
	25	.084	.605	.210	.814	.419	.629
	26¼	.083	.604	.209	.813	.417	.626
	27½	.083	.604	.208	.812	.416	.623
	30	2.082	2.603	5.206	7.809	10.412	15.618
	32½	.082	.602	.204	.806	.408	.613
	33¾	.081	.602	.203	.805	.407	.610
	35	.081	.601	.202	.804	.405	.607
	37½	.080	.600	.201	.801	.401	.602
	40	2.079	2.599	5.199	7.798	10.398	15.596
	41¼	.079	.599	.198	.797	.396	.594
	42½	.079	.598	.197	.795	.394	.591
	45	.078	.598	.195	.793	.390	.585
	47½	.077	.597	.193	.790	.387	.580
	48¾	.077	.596	.192	.789	.385	.577
	50	2.077	2.596	5.192	7.787	10.383	15.575
	52½	.076	.595	.190	.785	.379	.569
	55	.075	.594	.188	.782	.376	.564
	56¼	.075	.593	.187	.781	.374	.561
	57½	.074	.593	.186	.779	.372	.558
26	00	2.074	2.592	5.184	7.776	10.369	15.553

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 24°	1¼	2.867	0.000
	2½	5.735	.001
	3¾	8.602	.002
	5	11.470	.003
	6¼	14.338	.005
	7½	17.205	.007
	10	22.940	.012
	12½	28.675	.019
	15	34.410	.028
For latitude 25°	1¼	2.868	0.000
	2½	5.736	.001
	3¾	8.604	.002
	5	11.471	.003
	6¼	14.340	.005
	7½	17.207	.007
	10	22.943	.013
	12½	28.679	.020
	15	34.415	.029
For latitude 26°	1¼	2.868	0.000
	2½	5.736	.001
	3¾	8.605	.002
	5	11.473	.003
	6¼	14.342	.005
	7½	17.210	.007
	10	22.946	.013
	12½	28.683	.021
	15	34.419	.030

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
26	00	2.074	2.592	5.184	7.776	10.369	15.553			
	02½	.073	.591	.182	.774	.365	.547	1¼	2.868	0.000
	03¾	.073	.591	.182	.772	.363	.545	2½	5.736	.001
	05	.072	.590	.181	.771	.361	.542	3¾	8.605	.002
	07½	.072	.589	.179	.768	.358	.536	5	11.473	.003
								For latitude 26° 6¼	14.342	.005
	10	2.071	2.588	5.177	7.765	10.354	15.531	7½	17.210	.007
	11¼	.070	.588	.176	.764	.352	.528	10	22.946	.013
	12½	.070	.588	.175	.763	.350	.525	12½	28.683	.021
	15	.069	.587	.173	.760	.346	.520	15	34.419	.030
	17½	.069	.586	.171	.757	.343	.514			
	18¾	.068	.585	.170	.756	.341	.511			
	20	2.068	2.585	5.170	7.754	10.339	15.509			
	22½	.067	.584	.168	.752	.335	.503	1¼	2.869	0.000
	25	.066	.583	.166	.749	.332	.498	2½	5.737	.001
	26¼	.066	.582	.165	.747	.330	.495	3¾	8.606	.002
	27½	.066	.582	.164	.746	.328	.492	5	11.475	.003
								For latitude 27° 6¼	14.344	.005
	30	2.065	2.581	5.162	7.743	10.324	15.486	7½	17.212	.008
	32½	.064	.580	.160	.740	.321	.481	10	22.949	.014
	33¾	.064	.580	.159	.739	.319	.478	12½	28.687	.021
	35	.063	.579	.158	.738	.317	.475	15	34.424	.031
	37½	.063	.578	.157	.735	.313	.470			
	40	2.062	2.577	5.155	7.732	10.309	15.464			
	41¼	.061	.577	.154	.731	.307	.461	1¼	2.869	0.000
	42½	.061	.576	.153	.729	.306	.458	2½	5.738	.001
	45	.060	.575	.151	.726	.302	.453	3¾	8.607	.002
	47½	.060	.575	.149	.724	.298	.447	5	11.476	.003
	48¾	.059	.574	.148	.722	.296	.444	For latitude 28° 6¼	14.346	.005
								7½	17.215	.008
	50	2.059	2.574	5.147	7.721	10.294	15.441	10	22.953	.014
	52½	.058	.573	.145	.718	.291	.436	12½	28.691	.022
	55	.058	.572	.143	.715	.287	.430	15	34.429	.031
	56¼	.057	.571	.142	.714	.285	.427			
	57½	.057	.571	.141	.712	.283	.424			
27	00	2.056	2.570	5.140	7.709	10.279	15.419			
	02½	.055	.569	.138	.707	.275	.413			
	03¾	.055	.568	.137	.705	.274	.410			
	05	.054	.568	.136	.704	.272	.407			
	07½	.054	.567	.134	.701	.268	.402			
	10	2.053	2.566	5.132	7.698	10.264	15.396			
	11¼	.052	.566	.131	.697	.262	.393			
	12½	.052	.565	.130	.695	.260	.390			
	15	.051	.564	.128	.692	.256	.385			
	17½	.051	.563	.126	.689	.253	.379			
	18¾	.050	.563	.125	.688	.251	.376			
	20	2.050	2.562	5.124	7.687	10.249	15.373			
	22½	.049	.561	.122	.684	.245	.367			
	25	.048	.560	.121	.681	.241	.362			
	26¼	.048	.560	.120	.679	.239	.359			
	27½	.047	.559	.119	.678	.237	.356			
	30	2.047	2.558	5.117	7.675	10.233	15.350			
	32½	.046	.557	.115	.672	.229	.344			
	33¾	.046	.557	.114	.671	.228	.341			
	35	.045	.556	.113	.669	.226	.338			
	37½	.044	.555	.111	.666	.222	.333			
	40	2.044	2.554	5.109	7.663	10.218	15.327			
	41¼	.043	.554	.108	.662	.216	.324			
	42½	.043	.553	.107	.660	.214	.321			
	45	.042	.553	.105	.658	.210	.315			
	47½	.041	.552	.103	.655	.206	.309			
	48¾	.041	.551	.102	.653	.204	.306			
	50	2.041	2.551	5.101	7.652	10.202	15.304			
	52½	.040	.550	.100	.649	.198	.298			
	55	.039	.549	.097	.646	.195	.292			
	56¼	.039	.548	.096	.644	.193	.289			
	57½	.038	.548	.095	.643	.191	.286			
28	00	2.037	2.547	5.093	7.640	10.187	15.280			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
28	00	2.037	2.547	5.093	7.640	10.187	15.280
	02½	.037	.546	.091	.637	.183	.274
	03¾	.036	.545	.090	.636	.181	.271
	05	.036	.545	.089	.634	.179	.268
	07½	.035	.544	.088	.631	.175	.262
	10	2.034	2.543	5.085	7.628	10.171	15.256
	11¼	.034	.542	.085	.627	.169	.254
	12½	.033	.542	.084	.625	.167	.251
	15	.033	.541	.082	.622	.163	.245
	17½	.032	.540	.080	.619	.159	.239
	18¾	.031	.539	.079	.618	.157	.236
	20	2.031	2.539	5.078	7.616	10.155	15.233
	22½	.030	.538	.076	.613	.151	.227
	25	.029	.537	.074	.610	.147	.221
	26¼	.029	.536	.073	.609	.145	.218
	27½	.029	.536	.072	.607	.143	.215
	30	2.028	2.535	5.070	7.604	10.139	15.209
	32½	.027	.534	.068	.601	.135	.203
	33¾	.027	.533	.067	.600	.133	.200
	35	.026	.533	.066	.598	.131	.197
	37½	.025	.532	.064	.596	.127	.191
	40	2.025	2.531	5.062	7.593	10.123	15.185
	41¼	.024	.530	.061	.591	.121	.182
	42½	.024	.530	.060	.590	.119	.179
	45	.023	.529	.058	.586	.115	.173
	47½	.022	.528	.056	.583	.111	.167
	48¾	.022	.527	.055	.582	.109	.164
	50	2.021	2.527	5.054	7.580	10.107	15.161
	52½	.021	.526	.052	.577	.103	.155
	55	.020	.525	.050	.574	.099	.149
	56¼	.019	.524	.049	.573	.097	.146
	57½	.019	.524	.048	.571	.095	.143
29	00	2.018	2.523	5.046	7.568	10.091	15.137
	02½	.017	.522	.044	.565	.087	.131
	03¾	.017	.521	.043	.564	.085	.127
	05	.017	.521	.042	.562	.083	.125
	07½	.016	.520	.039	.559	.079	.118
	10	2.015	2.519	5.037	7.556	10.075	15.112
	11¼	.015	.518	.036	.555	.073	.109
	12½	.014	.518	.035	.553	.071	.106
	15	.013	.517	.033	.550	.067	.100
	17½	.012	.516	.031	.547	.063	.094
	18¾	.012	.515	.030	.545	.061	.091
	20	2.012	2.515	5.029	7.544	10.059	15.088
	22½	.011	.514	.027	.541	.055	.082
	25	.010	.513	.025	.538	.050	.076
	26¼	.010	.512	.024	.536	.048	.073
	27½	.009	.512	.023	.535	.046	.069
	30	2.008	2.511	5.021	7.532	10.042	15.063
	32½	.008	.509	.019	.529	.038	.057
	33¾	.007	.509	.018	.527	.036	.054
	35	.007	.508	.017	.525	.034	.051
	37½	.006	.507	.015	.522	.030	.045
	40	2.005	2.506	5.013	7.519	10.026	15.039
	41¼	.005	.506	.012	.518	.024	.035
	42½	.004	.505	.011	.516	.022	.032
	45	.003	.504	.009	.513	.017	.026
	47½	.003	.503	.007	.510	.013	.020
	48¾	.002	.503	.006	.508	.011	.017
	50	2.002	2.502	5.005	7.507	10.009	15.014
	52½	.001	.501	.003	.504	.005	.007
	55	.000	.500	.000	.501	.001	.001
	56¼	.000	.500	4.999	.499	9.999	14.998
	57½	1.999	.499	.998	.497	.997	.995
30	00	1.998	2.498	4.996	7.494	9.992	14.989

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 28°	1¼	2.869	0.000
	2½	5.738	.001
	3¾	8.607	.002
	5	11.476	.003
	6¼	14.346	.005
	7½	17.215	.008
	10	22.953	.014
	12½	28.691	.022
	15	34.429	.031
For latitude 29°	1¼	2.869	0.000
	2½	5.739	.001
	3¾	8.609	.002
	5	11.478	.004
	6¼	14.348	.006
	7½	17.217	.008
	10	22.956	.014
	12½	28.696	.022
	15	34.434	.032
For latitude 30°	1¼	2.870	0.000
	2½	5.740	.001
	3¾	8.611	.002
	5	11.480	.004
	6¼	14.350	.006
	7½	17.220	.008
	10	22.960	.015
	12½	28.700	.023
	15	34.440	.033

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval						Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
30	00	1.998	2.498	4.996	7.494	9.992	14.989			
	02½	.998	.497	.994	.491	.988	.982	1¼	2.870	0.000
	03¾	.997	.497	.993	.490	.986	.979	2½	5.740	.001
	05	.997	.496	.992	.488	.984	.976	3¾	8.611	.002
	07½	.996	.495	.990	.485	.980	.970	5	11.480	.004
	10	1.995	2.494	4.988	7.482	9.976	14.964	For latitude 30° 6¼	14.350	.006
	11¼	.995	.493	.987	.480	.974	.960	7½	17.220	.008
	12½	.994	.493	.986	.479	.971	.957	10	22.960	.015
	15	.993	.492	.984	.476	.967	.951	12½	28.700	.023
	17½	.993	.491	.982	.472	.963	.945	15	34.440	.033
	18¾	.992	.490	.981	.471	.961	.942			
	20	1.992	2.490	4.979	7.469	9.959	14.938	1¼	2.870	0.000
	22½	.991	.489	.977	.466	.955	.932	2½	5.741	.001
	25	.990	.488	.975	.463	.950	.926	3¾	8.611	.002
	26¼	.990	.487	.974	.461	.948	.923	5	11.482	.004
	27½	.989	.487	.973	.460	.946	.919	For latitude 31° 6¼	14.352	.006
	30	1.988	2.486	4.971	7.457	9.942	14.913	7½	17.223	.008
	32½	.988	.484	.969	.453	.938	.907	10	22.963	.015
	33¾	.987	.484	.968	.452	.936	.903	12½	28.704	.023
	35	.987	.483	.967	.450	.934	.900	15	34.445	.033
	37½	.986	.482	.965	.447	.929	.894			
	40	1.985	2.481	4.963	7.444	9.925	14.888	1¼	2.871	0.000
	41¼	.985	.481	.961	.442	.923	.884	2½	5.742	.001
	42½	.984	.480	.960	.441	.921	.881	3¾	8.613	.002
	45	.983	.479	.958	.437	.916	.875	5	11.483	.004
	47½	.982	.478	.956	.434	.912	.868	For latitude 32° 6¼	14.355	.006
	48¾	.982	.478	.955	.433	.910	.865	7½	17.225	.008
	50	1.982	2.477	4.954	7.431	9.908	14.862	10	22.967	.015
	52½	.981	.476	.952	.428	.904	.856	12½	28.709	.024
	55	.980	.475	.950	.425	.899	.849	15	34.450	.034
	56¼	.979	.474	.949	.423	.897	.846			
	57½	.979	.474	.948	.421	.895	.843			
31	00	1.978	2.473	4.945	7.418	9.891	14.836			
	02½	.977	.472	.943	.415	.886	.830			
	03¾	.977	.471	.942	.413	.884	.827			
	05	.976	.471	.941	.412	.882	.823			
	07½	.976	.469	.939	.408	.878	.817			
	10	1.975	2.468	4.937	7.405	9.874	14.810			
	11¼	.974	.468	.936	.403	.871	.807			
	12½	.974	.467	.935	.402	.869	.804			
	15	.973	.466	.932	.399	.865	.797			
	17½	.972	.465	.930	.395	.861	.791			
	18¾	.972	.465	.929	.394	.858	.787			
	20	1.971	2.464	4.928	7.392	9.856	14.784			
	22½	.970	.463	.926	.389	.852	.778			
	25	.969	.462	.924	.386	.848	.771			
	26¼	.969	.461	.923	.384	.845	.768			
	27½	.969	.461	.921	.382	.843	.765			
	30	1.968	2.460	4.919	7.379	9.839	14.758			
	32½	.967	.459	.917	.376	.834	.752			
	33¾	.967	.458	.916	.374	.832	.748			
	35	.966	.458	.915	.373	.830	.745			
	37½	.965	.456	.913	.369	.826	.739			
	40	1.964	2.455	4.911	7.366	9.821	14.732			
	41¼	.964	.455	.910	.364	.819	.729			
	42½	.963	.454	.908	.363	.817	.725			
	45	.963	.453	.906	.359	.813	.719			
	47½	.962	.452	.904	.356	.808	.712			
	48¾	.961	.451	.903	.354	.806	.709			
	50	1.961	2.451	4.902	7.353	9.804	14.706			
	52½	.960	.450	.900	.349	.799	.699			
	55	.959	.449	.897	.346	.795	.692			
	56¼	.959	.448	.896	.345	.793	.689			
	57½	.958	.448	.895	.343	.790	.686			
32	00	1.957	2.447	4.893	7.340	9.786	14.679			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
32	00	1.957	2.447	4.893	7.340	9.786	14.679			
	02½	.956	.445	.891	.336	.782	.672	1¼	2.871	0.000
	03¾	.956	.445	.890	.335	.779	.669	2½	5.742	.001
	05	.955	.444	.889	.333	.777	.666	3¾	8.613	.002
	07½	.955	.443	.886	.330	.773	.659	5	11.483	.004
								For latitude 32° 6¼	14.355	.006
								7½	17.225	.008
	10	1.954	2.442	4.884	7.326	9.768	44.652	10	22.967	.015
	11¼	.953	.441	.883	.325	.766	.649	12½	28.709	.024
	12½	.953	.441	.882	.323	.764	.646	15	34.450	.034
	15	.952	.440	.880	.320	.759	.639			
	17½	.951	.439	.877	.316	.755	.632			
	18¾	.951	.438	.876	.315	.753	.629			
								1¼	2.871	0.000
	20	1.950	2.438	4.875	7.313	9.751	14.626	2½	5.743	.001
	22½	.949	.437	.873	.310	.746	.619	3¾	8.614	.002
	25	.948	.435	.871	.306	.742	.612	5	11.485	.004
	26¼	.948	.435	.870	.305	.739	.609	For latitude 33° 6¼	14.357	.006
	27½	.947	.434	.869	.303	.737	.606	7½	17.228	.009
								10	22.971	.015
								12½	28.714	.024
	30	1.947	2.433	4.866	7.299	9.733	14.599	15	34.456	.035
	32½	.946	.432	.864	.295	.728	.592			
	33¾	.945	.431	.863	.294	.726	.589			
	35	.945	.431	.862	.293	.724	.585			
	37½	.944	.430	.860	.289	.719	.579			
								1¼	2.872	0.000
	40	1.943	2.429	4.857	7.286	9.715	14.572	2½	5.744	.001
	41¼	.942	.428	.856	.284	.712	.569	3¾	8.615	.002
	42½	.942	.428	.855	.283	.710	.565	5	11.487	.004
	45	.941	.426	.853	.279	.706	.558	For latitude 34° 6¼	14.359	.006
	47½	.940	.425	.851	.276	.701	.551	7½	17.231	.009
	48¾	.940	.425	.849	.274	.699	.548	10	22.974	.016
								12½	28.718	.024
	50	1.939	2.424	4.848	7.272	9.697	14.545	15	34.462	.035
	52½	.938	.423	.846	.269	.692	.538			
	55	.937	.422	.844	.266	.687	.531			
	56¼	.937	.421	.843	.264	.685	.528			
	57½	.937	.421	.841	.262	.683	.524			
33	00	1.936	2.420	4.839	7.259	9.678	14.518			
	02½	.935	.418	.837	.255	.674	.511			
	03¾	.934	.418	.836	.254	.671	.507			
	05	.934	.417	.835	.252	.669	.504			
	07½	.933	.416	.832	.249	.665	.497			
	10	1.932	2.415	4.830	7.245	9.660	14.490			
	11¼	.932	.415	.829	.243	.658	.487			
	12½	.931	.414	.828	.242	.656	.483			
	15	.930	.413	.825	.238	.651	.476			
	17½	.929	.412	.823	.235	.646	.470			
	18¾	.929	.411	.822	.233	.644	.466			
	20	1.928	2.410	4.821	7.231	9.642	14.463			
	22½	.927	.409	.819	.228	.637	.456			
	25	.926	.408	.816	.224	.633	.449			
	26¼	.926	.408	.815	.223	.630	.445			
	27½	.926	.407	.814	.221	.628	.442			
	30	1.925	2.406	4.812	7.218	9.623	14.435			
	32½	.924	.405	.809	.214	.619	.428			
	33¾	.923	.404	.808	.212	.617	.425			
	35	.923	.404	.807	.211	.614	.421			
	37½	.922	.402	.805	.207	.610	.414			
	40	1.921	2.401	4.802	7.204	9.605	14.407			
	41¼	.921	.401	.801	.202	.603	.404			
	42½	.920	.400	.800	.200	.600	.400			
	45	.919	.399	.798	.197	.596	.394			
	47½	.918	.398	.795	.193	.591	.387			
	48¾	.918	.397	.794	.191	.589	.383			
	50	1.917	2.397	4.793	7.190	9.586	14.380			
	52½	.916	.395	.791	.186	.582	.373			
	55	.915	.394	.789	.183	.577	.366			
	56¼	.915	.394	.787	.181	.575	.362			
	57½	.915	.393	.786	.179	.572	.358			
34	00	1.914	2.392	4.784	7.176	9.568	14.352			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
34 00	1.914	2.392	4.784	7.176	9.568	14.352
02½	.913	.391	.782	.172	.563	.345
03¾	.912	.390	.780	.171	.561	.341
05	.912	.390	.779	.169	.558	.338
07½	.911	.388	.777	.165	.554	.331
10	1.910	2.387	4.775	7.162	9.549	14.324
11¼	.909	.387	.773	.160	.547	.320
12½	.909	.386	.772	.158	.544	.316
15	.908	.385	.770	.155	.540	.309
17½	.907	.384	.767	.151	.535	.302
18¾	.906	.383	.766	.149	.533	.299
20	1.906	2.383	4.765	7.148	9.530	14.295
22½	.905	.381	.763	.144	.525	.288
25	.904	.380	.760	.141	.521	.281
26¼	.904	.380	.759	.139	.518	.278
27½	.903	.379	.758	.137	.516	.273
30	1.902	2.378	4.756	7.133	9.511	14.267
32½	.901	.377	.753	.130	.507	.260
33¾	.901	.376	.752	.128	.504	.256
35	.900	.375	.751	.126	.502	.253
37½	.899	.374	.749	.123	.497	.246
40	1.898	2.373	4.746	7.119	9.492	14.239
41¼	.898	.373	.745	.117	.490	.235
42½	.897	.372	.744	.116	.488	.231
45	.897	.371	.741	.112	.483	.224
47½	.896	.370	.739	.109	.478	.217
48¾	.895	.369	.738	.107	.476	.213
50	1.895	2.368	4.737	7.105	9.473	14.210
52½	.894	.367	.734	.101	.468	.203
55	.893	.366	.732	.098	.464	.196
56¼	.892	.365	.731	.095	.461	.192
57½	.892	.365	.729	.094	.459	.188
35 00	1.891	2.364	4.727	7.091	9.454	14.181
02½	.890	.362	.725	.087	.449	.174
03¾	.889	.362	.724	.085	.447	.170
05	.889	.361	.722	.083	.445	.167
07½	.888	.360	.720	.079	.439	.160
10	1.887	2.359	4.717	7.076	9.435	14.152
11¼	.886	.358	.716	.074	.433	.149
12½	.886	.357	.715	.073	.430	.145
15	.885	.356	.713	.069	.425	.138
17½	.884	.355	.710	.065	.420	.131
18¾	.884	.354	.709	.064	.418	.127
20	1.883	2.354	4.708	7.062	9.416	14.124
22½	.882	.353	.705	.058	.411	.116
25	.881	.352	.703	.054	.406	.109
26¼	.881	.351	.702	.053	.404	.105
27½	.880	.350	.701	.051	.401	.102
30	1.879	2.349	4.698	7.047	9.396	14.094
32½	.878	.348	.696	.044	.391	.087
33¾	.878	.347	.694	.042	.389	.083
35	.877	.347	.693	.040	.387	.080
37½	.876	.345	.691	.036	.382	.073
40	1.875	2.344	4.688	7.033	9.377	14.065
41¼	.875	.344	.687	.031	.374	.062
42½	.874	.343	.686	.029	.372	.058
45	.873	.342	.684	.025	.367	.051
47½	.872	.341	.681	.022	.362	.043
48¾	.872	.340	.680	.020	.360	.040
50	1.871	2.339	4.679	7.018	9.357	14.036
52½	.870	.338	.676	.014	.352	.029
55	.869	.337	.674	.011	.348	.021
56¼	.869	.336	.673	.009	.345	.018
57½	.869	.336	.671	.007	.343	.014
36 00	1.868	2.334	4.669	7.003	9.338	14.007

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 34°	1¼	2.872	0.000
	2½	5.744	.001
	3¾	8.615	.002
	5	11.487	.004
	6¼	14.359	.006
	7½	17.231	.009
	10	22.974	.016
	12½	28.718	.024
	15	34.462	.035
For latitude 35°	1¼	2.872	0.000
	2½	5.745	.001
	3¾	8.617	.002
	5	11.489	.004
	6¼	14.362	.006
	7½	17.234	.009
	10	22.978	.016
	12½	28.723	.025
	15	34.467	.036
For latitude 36°	1¼	2.873	0.000
	2½	5.745	.001
	3¾	8.618	.002
	5	11.491	.004
	6¼	14.364	.006
	7½	17.237	.009
	10	22.982	.016
	12½	28.728	.025
	15	34.473	.036

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
36	00	1.868	2.334	4.669	7.003	9.338	14.007			
	02½	.867	.333	.666	.000	.333	13.999	1¼	2.873	0.000
	03¾	.866	.333	.665	6.998	.330	.996	2½	5.745	.001
	05	.866	.332	.664	.996	.328	.992	3¾	8.618	.002
	07½	.865	.331	.661	.992	.323	.984	5	11.491	.004
								For latitude 36° 6¼	14.364	.006
	10	1.864	2.330	4.659	6.989	9.318	13.977	7½	17.237	.009
	11¼	.863	.329	.658	.987	.316	.973	10	22.982	.016
	12½	.863	.328	.657	.985	.313	.970	12½	28.728	.025
	15	.862	.327	.654	.981	.308	.962	15	34.473	.036
	17½	.861	.326	652	.977	.303	.955			
	18¾	.860	.325	.650	.976	.301	.951			
								1¼	2.873	0.000
	20	1.860	2.325	4.649	6.974	9.298	13.947	2½	5.746	.001
	22½	.859	.323	.647	.970	.293	.940	3¾	8.620	.002
	25	.858	.322	.644	.966	.288	.933	5	11.493	.004
	26¼	.857	.321	.643	.964	.286	.929	For latitude 37° 6¼	14.366	.006
	27½	.857	.321	.642	.963	.283	.925	7½	17.240	.009
								10	22.986	.016
	30	1.856	2.320	4.639	6.959	9.278	13.918	12½	28.733	.025
	32½	.855	.318	.637	.955	.273	.910	15	34.479	.036
	33¾	.854	.318	.635	.953	.271	.906			
	35	.854	.317	.634	.951	.268	.903			
	37½	.853	.316	.632	.948	.264	.895			
								1¼	2.874	0.000
	40	1.852	2.315	4.629	6.944	9.259	13.888	2½	5.747	.001
	41¼	.851	.314	.628	.942	.256	.884	3¾	8.621	.002
	42½	.851	.313	.627	.940	.254	.880	5	11.495	.004
	45	.850	.312	.624	.936	.249	.873	For latitude 38° 6¼	14.369	.006
	47½	.849	.311	.622	.933	.243	.865	7½	17.242	.009
	48¾	.848	.310	.621	.931	.241	.862	10	22.990	.016
								12½	28.738	.025
	50	1.848	2.310	4.619	6.929	9.238	13.858	15	34.485	.037
	52½	.847	.308	.617	.925	.233	.850			
	55	.846	.307	.614	.921	.228	.843			
	56¼	.845	.306	.613	.919	.226	.839			
	57½	.845	.306	.612	.918	.223	.835			
37	00	1.844	2.305	4.609	6.914	9.218	13.828			
	02½	.843	.303	.607	.910	.213	.820			
	03¾	.842	.303	.605	.908	.211	.816			
	05	.842	.302	.604	.906	.208	.813			
	07½	.841	.301	.602	.902	.203	.805			
	10	1.840	2.300	4.599	6.899	9.198	13.797			
	11¼	.839	.299	.598	.897	.196	.794			
	12½	.839	.298	.597	.895	.193	.790			
	15	.838	.297	.594	.891	.188	.782			
	17½	.837	.296	.592	.887	.183	.775			
	18¾	.836	.295	.590	.885	.181	.771			
	20	1.836	2.295	4.589	6.884	9.178	13.767			
	22½	.835	.293	.587	.880	.173	.759			
	25	.834	.292	.584	.876	.168	.752			
	26¼	.833	.291	.583	.874	.165	.748			
	27½	.833	.291	.581	.872	.163	.744			
	30	1.832	2.289	4.579	6.868	9.158	13.737			
	32½	.831	.288	.576	.864	.153	.729			
	33¾	.830	.288	.575	.863	.150	.725			
	35	.830	.287	.574	.861	.148	.721			
	37½	.829	.286	.571	.857	.142	.714			
	40	1.827	2.284	4.569	6.853	9.137	13.706			
	41¼	.827	.284	.567	.851	.135	.702			
	42½	.826	.283	.566	.849	.132	.698			
	45	.825	.282	.564	.845	.127	.691			
	47½	.824	.280	.561	.841	.122	.683			
	48¾	.824	.280	.560	.840	.119	.679			
	50	1.823	2.279	4.558	6.838	9.117	13.675			
	52½	.822	.278	.556	.834	.112	.668			
	55	.821	.277	.553	.830	.107	.660			
	56¼	.821	.276	.552	.828	.104	.656			
	57½	.820	.275	.551	.826	.101	.652			
38	00	1.819	2.274	4.548	6.822	9.096	13.644			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
38	00	1.819	2.274	4.548	6.822	9.096	13.644
	02½	.818	.273	.546	.818	.091	.636
	03¾	.818	.272	.544	.816	.089	.633
	05	.817	.272	.543	.814	.086	.629
	07½	.816	.270	.540	.811	.081	.621
	10	1.815	2.269	4.538	6.807	9.076	13.614
	11¼	.815	.268	.537	.805	.073	.610
	12½	.814	.268	.535	.803	.071	.606
	15	.813	.266	.533	.799	.065	.598
	17½	.812	.265	.530	.795	.060	.590
	18¾	.812	.264	.529	.793	.058	.586
	20	1.811	2.264	4.527	6.791	9.055	13.582
	22½	.810	.262	.525	.787	.050	.575
	25	.809	.261	.522	.783	.045	.567
	26¼	.808	.260	.521	.781	.042	.563
	27½	.808	.260	.520	.780	.039	.559
	30	1.807	2.259	4.517	6.776	9.034	13.551
	32½	.806	.257	.515	.772	.029	.544
	33¾	.805	.257	.513	.770	.026	.540
	35	.805	.256	.512	.768	.024	.536
	37½	.804	.255	.509	.764	.019	.528
	40	1.803	2.253	4.507	6.760	9.013	13.520
	41¼	.802	.253	.505	.758	.011	.516
	42½	.802	.252	.504	.756	.008	.513
	45	.801	.251	.501	.752	.003	.504
	47½	.800	.249	.499	.748	8.998	.497
	48¾	.799	.249	.498	.746	.995	.493
	50	1.798	2.248	4.496	6.744	8.992	13.489
	52½	.797	.247	.494	.740	.987	.481
	55	.796	.245	.491	.736	.982	.473
	56¼	.796	.245	.490	.734	.979	.469
	57½	.795	.244	.488	.732	.977	.465
39	00	1.794	2.243	4.486	6.729	8.971	13.457
	02½	.793	.242	.483	.725	.966	.449
	03¾	.793	.241	.482	.723	.964	.445
	05	.792	.240	.480	.721	.961	.441
	07½	.791	.239	.478	.717	.956	.433
	10	1.790	2.238	4.475	6.713	8.950	13.425
	11¼	.790	.237	.474	.711	.948	.422
	12½	.789	.236	.473	.709	.945	.418
	15	.788	.235	.470	.705	.940	.410
	17½	.787	.234	.467	.701	.934	.402
	18¾	.786	.233	.466	.699	.932	.398
	20	1.786	2.232	4.465	6.697	8.929	13.394
	22½	.785	.231	.462	.693	.924	.386
	25	.784	.230	.459	.689	.919	.378
	26¼	.783	.229	.458	.687	.916	.374
	27½	.783	.228	.457	.685	.913	.370
	30	1.782	2.227	4.454	6.681	8.908	13.362
	32½	.781	.226	.451	.677	.903	.354
	33¾	.780	.225	.450	.675	.900	.350
	35	.779	.224	.449	.673	.897	.346
	37½	.778	.223	.446	.669	.892	.338
	40	1.777	2.222	4.443	6.665	8.887	13.330
	41¼	.777	.221	.442	.663	.884	.326
	42½	.776	.220	.441	.661	.881	.322
	45	.775	.219	.438	.657	.876	.314
	47½	.774	.218	.435	.653	.871	.306
	48¾	.774	.217	.434	.651	.868	.302
	50	1.773	2.216	4.433	6.649	8.865	13.298
	52½	.772	.215	.430	.645	.860	.290
	55	.771	.214	.427	.641	.855	.282
	56¼	.770	.213	.426	.639	.852	.278
	57½	.770	.212	.425	.637	.849	.274
40	00	1.769	2.211	4.422	6.633	8.844	13.266

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 38°	1¼	2.874	0.000
	2½	5.747	.001
	3¾	8.621	.002
	5	11.495	.004
	6¼	14.369	.006
	7½	17.242	.009
	10	22.990	.016
	12½	28.738	.025
	15	34.485	.037
For latitude 39°	1¼	2.874	0.000
	2½	5.748	.001
	3¾	8.623	.002
	5	11.497	.004
	6¼	14.371	.006
	7½	17.245	.009
	10	22.994	.016
	12½	28.743	.026
	15	34.491	.037
For latitude 40°	1¼	2.875	0.000
	2½	5.749	.001
	3¾	8.624	.002
	5	11.499	.004
	6¼	14.374	.006
	7½	17.248	.009
	10	22.998	.017
	12½	28.748	.026
	15	34.497	.037

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
40	00	1.769	2.211	4.422	6.633	8.844	13.266
	02½	.768	.210	.419	.629	.838	.258
	03¾	.767	.209	.418	.627	.836	.254
	05	.767	.208	.416	.625	.833	.250
	07½	.765	.207	.414	.621	.828	.241
	10	1.764	2.206	4.411	6.617	8.822	13.233
	11¼	.764	.205	.410	.615	.819	.229
	12½	.763	.204	.408	.612	.817	.224
	15	.762	.203	.406	.609	.811	.217
	17½	.761	.202	.403	.605	.806	.209
	18¾	.761	.201	.402	.602	.803	.205
	20	1.760	2.200	4.400	6.600	8.801	13.201
	22½	.759	.199	.398	.596	.795	.193
	25	.758	.197	.395	.592	.790	.185
	26¼	.757	.197	.394	.590	.787	.181
	27½	.757	.196	.392	.588	.784	.177
	30	1.756	2.195	4.389	6.584	8.779	13.168
	32½	.755	.193	.387	.580	.773	.160
	33¾	.754	.193	.385	.578	.771	.156
	35	.754	.192	.384	.576	.768	.152
	37½	.753	.191	.381	.572	.763	.144
	40	1.751	2.189	4.379	6.568	8.757	13.136
	41¼	.751	.189	.377	.566	.754	.132
	42½	.750	.188	.376	.564	.752	.128
	45	.749	.186	.373	.560	.746	.119
	47½	.748	.185	.370	.556	.741	.111
	48¾	.748	.184	.369	.554	.738	.107
	50	1.747	2.184	4.368	6.551	8.735	13.103
	52½	.746	.182	.365	.547	.730	.095
	55	.745	.181	.362	.543	.724	.087
	56¼	.744	.180	.361	.541	.722	.083
	57½	.744	.180	.360	.539	.719	.078
41	00	1.743	2.178	4.357	6.535	8.713	13.070
	02½	.742	.177	.354	.531	.708	.062
	03¾	.741	.176	.353	.529	.705	.058
	05	.740	.176	.351	.527	.702	.054
	07½	.739	.174	.348	.523	.697	.045
	10	1.738	2.173	4.346	6.519	8.691	13.037
	11¼	.738	.172	.344	.517	.689	.033
	12½	.737	.171	.343	.514	.686	.029
	15	.736	.170	.340	.510	.680	.021
	17½	.735	.169	.337	.506	.675	.012
	18¾	.734	.168	.336	.504	.672	.008
	20	1.734	2.167	4.335	6.502	8.669	13.004
	22½	.733	.166	.332	.498	.664	12.996
	25	.732	.165	.329	.494	.658	.987
	26¼	.731	.164	.328	.492	.656	.983
	27½	.731	.163	.326	.490	.653	.979
	30	1.729	2.162	4.324	6.485	8.647	12.971
	32½	.728	.160	.321	.481	.642	.963
	33¾	.728	.160	.319	.479	.639	.958
	35	.727	.159	.318	.477	.636	.954
	37½	.726	.158	.315	.473	.631	.946
	40	1.725	2.156	4.313	6.469	8.625	12.938
	41¼	.724	.156	.311	.467	.622	.933
	42½	.724	.155	.310	.465	.619	.929
	45	.723	.153	.307	.460	.614	.921
	47½	.722	.152	.304	.456	.608	.913
	48¾	.721	.151	.303	.454	.606	.908
	50	1.721	2.151	4.301	6.452	8.603	12.904
	52½	.719	.149	.297	.448	.597	.896
	55	.718	.148	.296	.444	.592	.887
	56¼	.718	.147	.294	.442	.589	.883
	57½	.717	.146	.293	.439	.586	.879
42	00	1.716	2.145	4.290	6.435	8.580	12.871

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 40°	1¼	2.875	0.000
	2½	5.749	.001
	3¾	8.624	.002
	5	11.499	.004
	6¼	14.374	.006
	7½	17.248	.009
	10	22.998	.017
	12½	28.748	.026
	15	34.497	.037
For latitude 41°	1¼	2.875	0.000
	2½	5.750	.001
	3¾	8.626	.002
	5	11.501	.004
	6¼	14.376	.006
	7½	17.252	.009
	10	23.002	.017
	12½	28.753	.026
	15	34.503	.037
For latitude 42°	1¼	2.876	0.000
	2½	5.751	.001
	3¾	8.627	.002
	5	11.503	.004
	6¼	14.379	.007
	7½	17.255	.009
	10	23.006	.017
	12½	28.758	.026
	15	34.509	.038

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
42	00	1.716	2.145	4.290	6.435	8.580	12.871
	02½	.715	.144	.287	.431	.575	.862
	03¾	.714	.143	.286	.429	.572	.858
	05	.714	.142	.285	.427	.569	.854
	07½	.713	.141	.282	.423	.564	.845
	10	1.712	2.140	4.279	6.418	8.558	12.837
	11¼	.711	.139	.278	.416	.555	.833
	12½	.711	.138	.276	.414	.552	.829
	15	.709	.137	.273	.410	.547	.820
	17½	.708	.135	.271	.406	.541	.812
	18¾	.708	.135	.269	.404	.538	.807
	20	1.707	2.134	4.268	6.402	8.535	12.803
	22½	.706	.132	.265	.397	.530	.795
	25	.705	.131	.262	.393	.524	.786
	26¼	.704	.130	.261	.391	.521	.782
	27½	.704	.130	.259	.388	.519	.778
	30	1.703	2.128	4.256	6.385	8.513	12.769
	32½	.701	.127	.254	.380	.507	.761
	33¾	.701	.126	.252	.378	.504	.757
	35	.700	.125	.251	.376	.502	.752
	37½	.699	.124	.248	.372	.496	.744
	40	1.698	2.123	4.245	6.368	8.490	12.735
	41¼	.697	.122	.244	.366	.487	.731
	42½	.697	.121	.242	.363	.485	.727
	45	.696	.120	.239	.359	.479	.718
	47½	.695	.118	.237	.355	.473	.710
	48¾	.694	.118	.235	.353	.470	.706
	50	1.693	2.117	4.234	6.351	8.468	12.701
	52½	.692	.115	.231	.346	.462	.693
	55	.691	.114	.228	.342	.456	.684
	56¼	.691	.113	.227	.340	.453	.680
	57½	.690	.113	.225	.338	.450	.676
43	00	1.689	2.111	4.222	6.334	8.445	12.667
	02½	.688	.110	.220	.329	.439	.659
	03¾	.687	.109	.218	.327	.436	.654
	05	.687	.108	.217	.325	.433	.650
	07½	.686	.107	.214	.321	.428	.641
	10	1.684	2.105	4.211	6.316	8.422	12.633
	11¼	.684	.105	.210	.314	.419	.629
	12½	.683	.104	.208	.312	.416	.624
	15	.682	.103	.205	.308	.410	.616
	17½	.681	.101	.202	.303	.405	.607
	18¾	.680	.100	.201	.301	.402	.603
	20	1.680	2.100	4.199	6.299	8.399	12.598
	22½	.679	.098	.197	.295	.393	.590
	25	.677	.097	.194	.291	.387	.581
	26¼	.677	.096	.192	.289	.385	.577
	27½	.676	.095	.191	.286	.382	.573
	30	1.675	2.094	4.188	6.282	8.376	12.564
	32½	.674	.093	.185	.278	.370	.555
	33¾	.673	.092	.184	.275	.367	.551
	35	.673	.091	.182	.273	.364	.547
	37½	.672	.090	.179	.269	.359	.538
	40	1.671	2.088	4.176	6.265	8.353	12.529
	41¼	.670	.087	.175	.262	.350	.525
	42½	.669	.087	.173	.260	.347	.521
	45	.668	.085	.171	.256	.341	.512
	47½	.667	.084	.168	.252	.336	.503
	48¾	.666	.083	.166	.249	.333	.499
	50	1.666	2.082	4.165	6.247	8.330	12.495
	52½	.665	.081	.162	.243	.324	.486
	55	.664	.080	.159	.239	.318	.477
	56¼	.663	.079	.158	.236	.315	.473
	57½	.662	.078	.156	.234	.312	.468
44	00	1.661	2.077	4.153	6.230	8.307	12.460

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 42°	1¼	2.876	0.000
	2½	5.751	.001
	3¾	8.627	.002
	5	11.503	.004
	6¼	14.379	.007
	7½	17.255	.009
	10	23.006	.017
	12½	28.758	.026
	15	34.509	.038
For latitude 43°	1¼	2.876	0.000
	2½	5.752	.001
	3¾	8.629	.002
	5	11.505	.004
	6¼	14.382	.007
	7½	17.258	.009
	10	23.010	.017
	12½	28.763	.026
	15	34.515	.038
For latitude 44°	1¼	2.877	0.000
	2½	5.753	.001
	3¾	8.630	.002
	7	11.507	.004
	8¼	14.384	.007
	6½	17.261	.009
	10	23.014	.017
	12½	28.768	.026
	15	34.521	.038

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31\,680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
44	00	1.661	2.077	4.153	6.230	8.307	12.460
	02½	.660	.075	.150	.226	.301	.451
	03¾	.660	.074	.149	.223	.298	.447
	05	.659	.074	.147	.221	.295	.442
	07½	.658	.072	.145	.217	.289	.434
	10	1.657	2.071	4.142	6.212	8.283	12.425
	11¼	.656	.070	.140	.210	.280	.420
	12½	.656	.069	.139	.208	.277	.416
	15	.654	.068	.136	.204	.272	.407
	17½	.653	.066	.133	.199	.266	.399
	18¾	.653	.066	.131	.197	.263	.394
	20	1.652	2.065	4.130	6.195	8.260	12.390
	22½	.651	.064	.127	.191	.254	.381
	25	.650	.062	.124	.186	.248	.372
	26¼	.649	.061	.123	.184	.245	.369
	27½	.648	.061	.121	.182	.242	.364
	30	1.647	2.059	4.118	6.177	8.236	12.355
	32½	.646	.058	.115	.173	.231	.346
	33¾	.645	.057	.114	.171	.228	.341
	35	.645	.056	.112	.169	.225	.337
	37½	.644	.055	.109	.164	.219	.328
	40	1.643	2.053	4.106	6.160	8.213	12.319
	41¼	.642	.052	.105	.158	.210	.315
	42½	.641	.052	.104	.155	.207	.311
	45	.640	.050	.101	.151	.201	.302
	47½	.639	.049	.098	.146	.195	.293
	48¾	.639	.048	.096	.144	.192	.289
	50	1.638	2.047	4.095	6.142	8.189	12.284
	52½	.637	.046	.092	.138	.184	.275
	55	.636	.044	.089	.133	.178	.266
	56¼	.635	.044	.087	.131	.175	.262
	57½	.634	.043	.086	.129	.172	.258
45	00	1.633	2.041	4.083	6.124	8.166	12.249
	02½	.632	.040	.080	.120	.160	.240
	03¾	.631	.039	.078	.118	.157	.235
	05	.631	.038	.077	.115	.154	.231
	07½	.630	.037	.074	.111	.148	.222
	10	1.629	2.036	4.071	6.107	8.142	12.213
	11¼	.628	.035	.070	.105	.139	.209
	12½	.627	.034	.068	.102	.136	.204
	15	.626	.033	.065	.098	.130	.195
	17½	.625	.031	.062	.093	.124	.186
	18¾	.624	.030	.061	.091	.121	.182
	20	1.624	2.030	4.059	6.089	8.118	12.177
	22½	.622	.028	.056	.084	.112	.168
	25	.621	.027	.053	.080	.106	.160
	26¼	.621	.026	.052	.078	.103	.155
	27½	.620	.025	.050	.075	.100	.151
	30	1.619	2.024	4.047	6.071	8.094	12.142
	32½	.618	.022	.044	.066	.088	.133
	33¾	.617	.021	.043	.064	.085	.128
	35	.616	.021	.041	.062	.082	.124
	37½	.615	.019	.038	.057	.076	.115
	40	1.614	2.018	4.035	6.053	8.070	12.106
	41¼	.613	.017	.034	.051	.067	.101
	42½	.613	.016	.032	.048	.065	.097
	45	.612	.015	.029	044	.059	.088
	47½	.611	.013	.026	.039	.053	.079
	48¾	.610	.012	.025	.037	.050	.074
	50	1.609	2.012	4.023	6.035	8.047	12.070
	52½	.608	.010	.020	.030	.040	.061
	55	.607	.009	.017	.026	.034	.052
	56¼	.606	.008	.016	.024	.031	.047
	57½	.606	.007	.014	.021	.028	.043
46	00	1.605	2.006	4.011	6.017	8.022	12.034

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 44°	1¼	2.877	0.000
	2½	5.753	.001
	3¾	8.630	.002
	5	11.507	.004
	6¼	14.384	.007
	7½	17.261	.009
	10	23.014	.017
	12½	28.768	.026
	15	34.521	.038
For latitude 45°	1¼	2.877	0.000
	2½	5.755	.001
	3¾	8.632	.002
	5	11.509	.004
	6¼	14.387	.007
	7½	17.264	.009
	10	23.018	.017
	12½	28.773	.026
	15	34.527	.038
For latitude 46°	1¼	2.878	0.000
	2½	5.756	.001
	3¾	8.633	.002
	5	11.511	.004
	6¼	14.389	.007
	7½	17.267	.009
	10	23.022	.017
	12½	28.778	.026
	15	34.534	.038

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
46	00	1.605	2.006	4.011	6.017	8.022	12.034
	02½	.603	.004	.008	.012	.016	.025
	03¾	.603	.003	.007	.010	.013	.020
	05	.602	.003	.005	.008	.010	.016
	07½	.601	.001	.002	.003	.004	.007
	10	1.600	2.000	3.999	5.999	7.998	11.998
	11¼	.599	1.999	.998	.996	.995	.993
	12½	.598	.998	.996	.994	.992	.988
	15	.597	.997	.993	.990	.986	.979
	17½	.596	.995	.990	.985	.980	.970
	18¾	.595	.994	.989	.983	.977	.966
	20	1.595	1.994	3.987	5.981	7.974	11.961
	22½	.594	.992	.984	.976	.968	.952
	25	.592	.990	.981	.972	.962	.943
	26¼	.592	.990	.979	.969	.959	.938
	27½	.591	.989	.978	.967	.956	.934
	30	1.590	1.987	3.975	5.962	7.950	11.925
	32½	.589	.986	.972	.958	.944	.916
	33¾	.588	.985	.970	.956	.941	.911
	35	.588	.984	.969	.953	.938	.907
	37½	.586	.983	.966	.949	.932	.897
	40	1.585	1.981	3.963	5.944	7.926	11.888
	41¼	.584	.981	.961	.942	.923	.884
	42½	.584	.980	.960	.940	.919	.879
	45	.583	.978	.957	.935	.913	.870
	47½	.581	.977	.954	.930	.907	.861
	48¾	.581	.976	.952	.928	.904	.856
	50	1.580	1.975	3.951	5.926	7.901	11.852
	52½	.579	.974	.948	.921	.895	.843
	55	.578	.972	.944	.917	.889	.853
	56¼	.577	.971	.943	.914	.886	.829
	57½	.577	.971	.941	.912	.883	.824
47	00	1.575	1.969	3.938	5.908	7.877	11.815
	02½	.574	.968	.935	.903	.871	.806
	03¾	.574	.967	.934	.901	.868	.801
	05	.573	.966	.932	.898	.864	.797
	07½	.572	.965	.929	.894	.858	.788
	10	1.570	1.963	3.926	5.889	7.852	11.778
	11¼	.570	.962	.925	.887	.849	.774
	12½	.569	.962	.923	.885	.846	.769
	15	.568	.960	.920	.880	.840	.760
	17½	.567	.958	.917	.875	.834	.751
	18¾	.566	.958	.915	.873	.831	.746
	20	1.565	1.957	3.914	5.871	7.828	11.741
	22½	.564	.955	.911	.866	.821	.732
	25	.563	.954	.908	.861	.815	.723
	26¼	.562	.953	.906	.859	.812	.718
	27½	.562	.952	.905	.857	.809	.714
	30	1.561	1.951	3.901	5.852	7.803	11.704
	32½	.559	.949	.898	.848	.797	.695
	33¾	.559	.948	.897	.845	.794	.691
	35	.558	.948	.895	.843	.791	.686
	37½	.557	.946	.892	.838	.784	.677
	40	1.556	1.945	3.889	5.834	7.778	11.667
	41¼	.555	.944	.888	.831	.775	.663
	42½	.554	.943	.886	.829	.772	.658
	45	.553	.941	.883	.824	.766	.649
	47½	.552	.940	.880	.820	.760	.639
	48¾	.551	.939	.878	.817	.757	.635
	50	1.551	1.938	3.877	5.815	7.753	11.630
	52½	.549	.937	.874	.810	.747	.621
	55	.548	.935	.871	.806	.741	.612
	56¼	.548	.934	.869	.803	.738	.607
	57½	.547	.934	.867	.801	.735	.602
48	00	1.546	1.932	3.864	5.796	7.729	11.593

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 46°	1¼	2.878	0.000
	2½	5.756	.001
	3¾	8.633	.002
	5	11.511	.004
	6¼	14.389	.007
	7½	17.267	.009
	10	23.022	.017
	12½	28.778	.026
	15	34.534	.038
For latitude 47°	1¼	2.878	0.000
	2½	5.757	.001
	3¾	8.635	.002
	5	11.513	.004
	6¼	14.392	.007
	7½	17.270	.009
	10	23.026	.017
	12½	28.784	.026
	15	34.540	.038
For latitude 48°	1¼	2.879	0.000
	2½	5.758	.001
	3¾	8.636	.002
	5	11.515	.004
	6¼	14.394	.007
	7½	17.273	.009
	10	23.030	.017
	12½	28.789	.026
	15	34.546	.038

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
48	00	1.546	1.932	3.864	5.796	7.729	11.593
	02½	.544	.931	.861	.792	.722	.583
	03¾	.544	.930	.860	.789	.719	.579
	05	.543	.929	.858	.787	.716	.574
	07½	.542	.927	.855	.782	.710	.565
	10	1.541	1.926	3.852	5.778	7.704	11.555
	11¼	.540	.925	.850	.775	.701	.551
	12½	.540	.924	.849	.773	.697	.546
	15	.538	.923	.846	.768	.691	.537
	17½	.537	.921	.842	.764	.685	.527
	18¾	.536	.920	.841	.761	.682	.523
	20	1.536	1.920	3.839	5.759	7.679	11.518
	22½	.534	.918	.836	.754	.672	.509
	25	.533	.917	.833	.750	.666	.499
	26¼	.533	.916	.831	.747	.663	.494
	27½	.532	.915	.830	.745	.660	.490
	30	1.531	1.913	3.827	5.740	7.654	11.480
	32½	.529	.912	.824	.735	.647	.471
	33¾	.529	.911	.822	.733	.644	.466
	35	.528	.910	.820	.731	.641	.462
	37½	.527	.909	.817	.726	.635	.452
	40	1.526	1.907	3.814	5.721	7.628	11.443
	41¼	.525	.906	.813	.719	.625	.438
	42½	.524	.905	.811	.717	.622	.433
	45	.523	.904	.808	.712	.616	.424
	47½	.522	.902	.805	.707	.610	.414
	48¾	.521	.902	.803	.705	.606	.410
	50	1.521	1.901	3.802	5.702	7.603	11.405
	52½	.519	.899	.798	.698	.597	.395
	55	.518	.898	.795	.693	.591	.386
	56¼	.518	.897	.794	.691	.587	.381
	57½	.517	.896	.792	.688	.584	.376
49	00	1.516	1.894	3.789	5.684	7.578	11.367
	02½	.514	.893	.786	.679	.572	.358
	03¾	.514	.892	.784	.676	.569	.353
	05	.513	.891	.783	.674	.565	.348
	07½	.512	.890	.780	.669	.559	.339
	10	1.511	1.888	3.776	5.665	7.553	11.329
	11¼	.510	.887	.775	.662	.550	.324
	12½	.509	.887	.773	.660	.546	.320
	15	.508	.885	.770	.655	.540	.310
	17½	.507	.883	.767	.650	.534	.301
	18¾	.506	.883	.765	.648	.531	.296
	20	1.505	1.882	3.764	5.646	7.527	11.291
	22½	.504	.880	.760	.641	.521	.281
	25	.503	.879	.757	.636	.515	.272
	26¼	.502	.878	.756	.634	.511	.267
	27½	.502	.877	.754	.631	.508	.262
	30	1.500	1.875	3.751	5.626	7.502	11.253
	32½	.499	.874	.748	.622	.496	.243
	33¾	.498	.873	.746	.619	.492	.238
	35	.498	.872	.745	.617	.489	.234
	37½	.497	.871	.741	.612	.483	.224
	40	1.495	1.869	3.738	5.607	7.476	11.215
	41¼	.495	.868	.737	.605	.473	.210
	42½	.494	.867	.735	.602	.470	.205
	45	.493	.866	.732	.598	.464	.195
	47½	.492	.864	.729	.593	.457	.186
	48¾	.491	.863	.727	.591	.454	.181
	50	1.490	1.863	3.725	5.588	7.451	11.176
	52½	.489	.861	.722	.583	.444	.167
	55	.488	.860	.719	.578	.438	.157
	56¼	.487	.859	.717	.576	.435	.152
	57½	.486	.858	.716	.574	.432	.147
50	00	1.485	1.856	3.713	5.569	7.425	11.138

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 48°	1¼	2.879	0.000
	2½	5.758	.001
	3¾	8.636	.002
	5	11.515	.004
	6¼	14.394	.007
	7½	17.273	.009
	10	23.030	.017
	12½	28.789	.026
	15	34.546	.038
For latitude 49°	1¼	2.879	0.000
	2½	5.759	.001
	3¾	8.638	.002
	5	11.517	.004
	6¼	14.397	.007
	7½	17.276	.009
	10	23.034	.017
	12½	28.794	.026
	15	34.552	.037
For latitude 50°	1¼	2.880	0.000
	2½	5.760	.001
	3¾	8.639	.002
	5	11.519	.004
	6¼	14.399	.006
	7½	17.279	.009
	10	23.039	.017
	12½	28.799	.026
	15	34.558	.037

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
50 00	1.485	1.856	3.713	5.569	7.425	11.138
02½	.484	.855	.709	.564	.419	.128
03¾	.483	.854	.708	.562	.416	.123
05	.482	.853	.706	.559	.412	.118
07½	.481	.851	.703	.554	.406	.109
10	1.480	1.850	3.700	5.550	7.399	11.099
11¼	.479	.849	.698	.547	.396	.094
12½	.479	.848	.697	.545	.393	.090
15	.477	.847	.693	.540	.387	.080
17½	.476	845	.690	.535	.380	.070
18¾	.475	.844	.688	.533	.377	.065
20	1.475	1.843	3.687	5.530	7.374	11.061
22½	.473	.842	.684	.525	.367	.051
25	.472	.840	.680	.521	.361	.041
26¼	.471	.839	.679	.518	.358	.036
27½	.471	.839	.677	.516	.354	.031
30	1.470	1.837	3.674	5.511	7.348	11.022
32½	.468	.835	.671	.506	.341	.012
33¾	.468	.835	.669	.504	.338	.007
35	.467	.834	.667	.501	.335	.002
37½	.466	.832	.664	.496	.328	10.993
40	1.464	1.830	3.661	5.491	7.322	10.983
41¼	.464	.830	.659	.489	.319	.978
42½	.463	.829	.658	.487	.316	.973
45	.462	.827	.655	.482	.309	.964
47½	.461	.826	.651	.477	.303	.954
48¾	.460	.825	.650	.474	.299	.949
50	1.459	1.824	3.648	5.472	7.296	10.944
52½	.458	.822	.645	.467	.290	.934
55	.457	.821	.642	.462	.283	.925
56¼	.456	.820	.640	.460	.280	.920
57½	.455	.819	.638	.457	.277	.915
51 00	1.454	1.818	3.635	5.453	7.270	10.905
02½	.453	.816	.632	.448	.264	.895
03¾	.452	.815	.630	.445	.260	.890
05	.451	.814	.628	.443	.257	.886
07½	.450	.813	.625	.438	.250	.876
10	1.449	1.811	3.622	5.433	7.244	10.866
11¼	.448	.810	.620	.431	.241	.861
12½	.447	.809	.619	.428	.237	.856
15	.446	.808	.615	.423	.231	.846
17½	.445	.806	.612	.418	.224	.837
18¾	.444	.805	.611	.416	.221	.832
20	1.444	1.804	3.609	5.413	7.218	10.827
22½	.442	.803	.606	.408	.211	.817
25	.441	.801	.602	.404	.205	.807
26¼	.440	.800	.601	.401	.201	.802
27½	.440	.800	.599	.399	.198	.797
30	1.438	1.798	3.596	5.394	7.192	10.787
32½	.437	.796	.593	.389	.185	.778
33¾	.436	.795	.591	.386	.182	.773
35	.436	.795	.589	.384	.178	.768
37½	.434	.793	.586	.379	.172	.758
40	1.433	1.791	3.583	5.374	7.165	10.748
41¼	.432	.791	.581	.372	.162	.743
42½	.432	.790	.579	.369	.159	.738
45	.430	.788	.576	.364	.152	.728
47½	.429	.786	.573	.359	.146	.718
48¾	.428	.786	.571	.357	.142	.713
50	1.428	1.735	3.570	5.354	7.139	10.709
52½	.426	.783	.566	.349	.132	.699
55	.425	.781	.563	.344	.126	.689
56¼	.425	.781	.561	.342	.123	.684
57½	.424	.780	.560	.339	.119	.679
52 00	1.423	1.778	3.556	5.334	7.113	10.669

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 50°	1¼	2.880	0.000
	2½	5.760	.001
	3¾	8.639	.002
	5	11.519	.004
	6¼	14.399	.006
	7½	17.279	.009
	10	23.039	.017
	12½	28.799	.026
	15	34.558	.037
For latitude 51°	1¼	2.880	0.000
	2½	5.761	.001
	3¾	8.641	.002
	5	11.521	.004
	6¼	14.402	.006
	7½	17.282	.009
	10	23.043	.016
	12½	28.804	.026
	15	34.564	.037
For latitude 52°	1¼	2.881	0.000
	2½	5.762	.001
	3¾	8.643	.002
	5	11.523	.004
	6¼	14.404	.006
	7½	17.285	.009
	10	23.046	.016
	12½	28.809	.025
	15	34.570	.037

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{240000}$

Latitude of parallel		Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
0	00	3.043	3.804	7.609	11.413	15.217	22.826
	02½	.043	.804	.609	.413	.217	.826
	03¾	.043	.804	.609	.413	.217	.826
	05	.043	.804	.609	.413	.217	.826
	07½	.043	.804	.609	.413	.217	.826
	10	3.043	3.804	7.609	11.413	15.217	22.826
	11¼	.043	.804	.609	.413	.217	.826
	12½	.043	.804	.609	.413	.217	.826
	15	.043	.804	.609	.413	.217	.826
	17½	.043	.804	.609	.413	.217	.826
	18¾	.043	.804	.609	.413	.217	.826
	20	3.043	3.804	7.609	11.413	15.217	22.826
	22½	.043	.804	.609	.413	.217	.826
	25	.043	.804	.609	.413	.217	.826
	26¼	.043	.804	.609	.413	.217	.826
	27½	.043	.804	.609	.413	.217	.826
	30	3.043	3.804	7.609	11.413	15.217	22.826
	32½	.043	.804	.608	.413	.217	.825
	33¾	.043	.804	.608	.413	.217	.825
	35	.043	.804	.608	.413	.217	.825
	37½	.043	.804	.608	.413	.217	.825
	40	3.043	3.804	7.608	11.412	15.217	22.825
	41¼	.043	.804	.608	.412	.216	.825
	42½	.043	.804	.608	.412	.216	.825
	45	.043	.804	.608	.412	.216	.824
	47½	.043	.804	.608	.412	.216	.824
	48¾	.043	.804	.608	.412	.216	.824
	50	3.043	3.804	7.608	11.412	15.216	22.824
	52½	.043	.804	.608	.412	.216	.824
	55	.043	.804	.608	.412	.216	.823
	56¼	.043	.804	.608	.412	.215	.823
	57½	.043	.804	.608	.412	.215	.823
1	00	3.043	3.804	7.608	11.411	15.215	22.823
	02½	.043	.804	.608	.411	.215	.823
	03¾	.043	.804	.607	.411	.215	.822
	05	.043	.804	.607	.411	.215	.822
	07½	.043	.804	.607	.411	.215	.822
	10	3.043	3.804	7.607	11.411	15.214	22.822
	11¼	.043	.804	.607	.411	.214	.821
	12½	.043	.804	.607	.411	.214	.821
	15	.043	.803	.607	.410	.214	.821
	17½	.043	.803	.607	.410	.214	.820
	18¾	.043	.803	.607	.410	.214	.820
	20	3.043	3.803	7.607	11.410	15.213	22.820
	22½	.043	.803	.607	.410	.213	.820
	25	.043	.803	.606	.410	.213	.819
	26¼	.043	.803	.606	.410	.213	.819
	27½	.043	.803	.606	.409	.213	.819
	30	3.042	3.803	7.606	11.409	15.212	22.819
	32½	.042	.803	.606	.409	.212	.818
	33¾	.042	.803	.606	.409	212	.818
	35	.042	.803	.606	.409	.212	.818
	37½	.042	.803	.606	.409	.211	.817
	40	3.042	3.803	7.606	11.408	15.211	22.817
	41¼	.042	.803	.605	.408	.211	.816
	42½	.042	.803	.605	.408	.211	.816
	45	.042	.803	.605	.408	.210	.816
	47½	.042	.803	.605	.408	.210	.815
	48¾	.042	.802	.605	.407	.210	.815
	50	3.042	3.802	7.605	11.407	15.210	22.815
	52½	.042	.802	.605	.407	.209	.814
	55	.042	.802	.605	.407	.209	.814
	56¼	.042	.802	.604	.407	.209	813
	57½	.042	.802	.604	.407	.209	.813
2	00	3.042	3.802	7.604	11.406	15.208	22.812

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 0°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.114	.000
	6¼	18.893	.000
	7½	22.672	.000
	10	30.229	.000
	12½	37.786	.000
	15	45.344	.000
For latitude 1°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.115	.000
	6¼	18.893	.000
	7½	22.672	.000
	10	30.229	.001
	12½	37.787	.001
	15	45.344	.002
For latitude 2°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.115	.000
	6¼	18.893	.001
	7½	22.672	.001
	10	30.229	.001
	12½	37.787	.002
	15	45.344	.003

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
2 00	3.042	3.802	7.604	11.406	15.208	22.812
02½	.042	.802	.604	.406	.208	.812
03¾	.042	.802	.604	.406	.208	.812
05	.041	.802	.604	.406	.207	.811
07½	.041	.802	.604	.405	.207	.811
10	3.041	3.802	7.603	11.405	15.207	22.810
11¼	.041	.802	.603	.405	.206	.810
12½	.041	.802	.603	.405	.206	.809
15	.041	.801	.603	.404	.206	.809
17½	.041	.801	.603	.404	.205	.808
18¾	.041	.801	.603	.404	.205	.808
20	3.041	3.801	7.602	11.404	15.205	22.808
22½	.041	.801	.602	.403	.205	.807
25	.041	.801	.602	.403	.204	.806
26¼	.041	.801	.602	.403	.204	.806
27½	.041	.801	.602	.403	.204	.805
30	3.041	3.801	7.602	11.402	15.203	22.805
32½	.041	.801	.601	.402	.203	.804
33¾	.041	.801	.601	.402	.202	.804
35	.040	.801	.601	.402	.202	.803
37½	.040	.800	.601	.401	.202	.802
40	3.040	3.800	7.601	11.401	15.201	22.802
41¼	.040	.800	.600	.401	.201	.801
42½	.040	.800	.600	.400	.201	.801
45	.040	.800	.600	.400	.200	.800
47½	.040	.800	.600	.400	.200	.799
48¾	.040	.800	.600	.400	.199	.799
50	3.040	3.800	7.600	11.399	15.199	22.799
52½	.040	.800	.599	.399	.198	.798
55	.039	.799	.599	.398	.198	.797
56¼	.039	.799	.599	.398	.198	.796
57½	.039	.799	.599	.398	.197	.796
3 00	3.039	3.799	7.598	11.398	15.197	22.795
02½	.039	.799	.598	.397	.196	.794
03¾	.039	.799	.598	.397	.196	.794
05	.039	.799	.598	.397	.196	.794
07½	.039	.799	.598	.396	.195	.793
10	3.039	3.799	7.597	11.396	15.195	22.792
11¼	.039	.799	.597	.396	.194	.791
12½	.039	.798	.597	.395	.194	.791
15	.039	.798	.597	.395	.193	.790
17½	.039	.798	.596	.394	.193	.789
18¾	.038	.798	.596	.394	.192	.788
20	3.038	3.798	7.596	11.394	15.192	22.788
22½	.038	.798	.596	.393	.191	.787
25	.038	.798	.595	.393	.191	.786
26¼	.038	.798	.595	.393	.190	.786
27½	.038	.798	.595	.393	.190	.785
30	3.038	3.797	7.595	11.392	15.189	22.784
32½	.038	.797	.594	.391	.189	.783
33¾	.038	.797	.594	.391	.188	.782
35	.038	.797	.594	.391	.188	.782
37½	.037	.797	.594	.390	.187	.781
40	3.037	3.797	7.593	11.390	15.187	22.780
41¼	.037	.797	.593	.390	.186	.779
42½	.037	.796	.593	.389	.186	.779
45	.037	.796	.593	.389	.185	.778
47½	.037	.796	.592	.388	.184	.777
48¾	.037	.796	.592	.388	.184	.776
50	3.037	3.796	7.592	11.388	15.184	22.776
52½	.037	.796	.591	.387	.183	.774
55	.036	.796	.591	.387	.182	.773
56¼	.036	.795	.591	.386	.182	.773
57½	.036	.795	.591	.386	.181	.772
4 00	3.036	3.795	7.590	11.386	15.181	22.771

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 2°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.115	.000
	6¼	18.893	.001
	7½	22.672	.001
	10	30.229	.001
	12½	37.787	.002
	15	45.344	.003
For latitude 3°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.115	.001
	6¼	18.894	.001
	7½	22.673	.001
	10	30.230	.002
	12½	37.788	.004
	15	45.345	.005
For latitude 4°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.337	.000
	5	15.115	.001
	6¼	18.894	.001
	7½	22.673	.002
	10	30.231	.003
	12½	37.788	.005
	15	45.346	.007

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
4	00	3.036	3.795	7.590	11.386	15.181	22.771
	02½	.036	.795	.590	.385	.180	.770
	03¾	.036	.795	.590	.385	.180	.769
	05	.036	.795	.590	.385	.179	.769
	07½	.036	.795	.589	.384	.178	.768
	10	3.036	3.794	7.589	11.383	15.178	22.766
	11¼	.035	.794	.589	.383	.177	.766
	12½	.035	.794	.588	.383	.177	.765
	15	.035	.794	.588	.382	.176	.764
	17½	.035	.794	.588	.381	.175	.763
	18¾	.035	.794	.587	.381	.175	.762
	20	3.035	3.794	7.587	11.381	15.174	22.762
	22½	.035	.793	.587	.380	.174	.760
	25	.035	.793	.586	.380	.173	.759
	26¼	.034	.793	.586	.379	.172	.758
	27½	.034	.793	.586	.379	.172	.758
	30	3.034	3.793	7.585	11.378	15.171	22.756
	32½	.034	.793	.585	.378	.170	.755
	33¾	.034	.792	.585	.377	.170	.755
	35	.034	.792	.585	.377	.169	.754
	37½	.034	.792	.584	.376	.168	.753
	40	3.033	3.792	7.584	11.376	15.167	22.751
	41¼	.033	.792	.584	.375	.167	.751
	42½	.033	.792	.583	.375	.167	.750
	45	.033	.791	.583	.374	.166	.748
	47½	.033	.791	.582	.374	.165	.747
	48¾	.033	.791	.582	.373	.164	.746
	50	3.033	3.791	7.582	11.373	15.164	22.746
	52½	.033	.791	.581	.372	.163	.744
	55	.032	.790	.581	.371	.162	.743
	56¼	.032	.790	.581	.371	.161	.742
	57½	.032	.790	.580	.371	.161	.741
5	00	3.032	3.790	7.580	11.370	15.160	22.740
	02½	.032	.790	.580	.369	.159	.739
	03¾	.032	.790	.579	.369	.159	.738
	05	.032	.790	.579	.369	.158	.737
	07½	.031	.789	.579	.368	.157	.736
	10	3.031	3.789	7.578	11.367	15.157	22.734
	11¼	.031	.789	.578	.367	.156	.733
	12½	.031	.789	.578	.366	.155	.733
	15	.031	.789	.577	.366	.154	.731
	17½	.031	.788	.577	.365	.153	.730
	18¾	.031	.788	.576	.364	.153	.729
	20	3.030	3.788	7.576	11.364	15.152	22.728
	22½	.030	.788	.575	.363	.151	.726
	25	.030	.787	.575	.362	.150	.725
	26¼	.030	.787	.575	.362	.149	.724
	27½	.030	.787	.574	.362	.149	.723
	30	3.030	3.787	7.574	11.361	15.148	22.722
	32½	.029	.787	.573	.360	.147	.720
	33¾	.029	.787	.573	.360	.146	.720
	35	.029	.786	.573	.359	.146	.719
	37½	.029	.786	.572	.359	.145	.717
	40	3.029	3.786	7.572	11.358	15.144	22.716
	41¼	.029	.786	.572	.357	.143	.715
	42½	.029	.786	.571	.357	.143	.714
	45	.028	.785	.571	.356	.141	.712
	47½	.028	.785	.570	.355	.140	.710
	48¾	.028	.785	.570	.355	.140	.710
	50	3.028	3.785	7.570	11.354	15.139	22.709
	52½	.028	.785	.569	.354	.138	.707
	55	.027	.784	.568	.353	.137	.705
	56¼	.027	.784	.568	.352	.136	.705
	57½	.027	.784	.568	.352	.136	.704
6	00	3.027	3.784	7.567	11.351	15.135	22.702

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 4°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.337	.000
	5	15.115	.001
	6¼	18.894	.001
	7½	22.673	.002
	10	30.231	.003
	12½	37.788	.005
	15	45.346	.007
For latitude 5°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.337	.001
	5	15.116	.001
	6¼	18.894	.001
	7½	22.674	.002
	10	30.231	.004
	12½	37.789	.006
	15	45.347	.009
For latitude 6°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.337	.001
	5	15.116	.001
	6¼	18.895	.002
	7½	22.674	.003
	10	30.233	.005
	12½	37.791	.007
	15	45.349	.010

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
	Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	1′	1¼′	2½′	3¾′	5′	7½′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
6 00	3.027	3.784	7.567	11.351	15.135	22.702			
02½	.027	.783	.567	.350	.134	.700	1¼	3.779	0.000
03¾	.027	.783	.566	.350	.133	.699	2½	7.558	.000
05	.027	.783	.566	.349	.132	.699	3¾	11.337	.001
07½	.026	.783	.566	.348	.131	.697	5	15.116	.001
							For latitude 6° 6¼	18.895	.002
10	3.026	3.783	7.565	11.348	15.130	22.695	7½	22.674	.003
11¼	.026	.782	.565	.347	.129	.694	10	30.233	.005
12½	.026	.782	.564	.347	.129	.693	12½	37.791	.007
15	.026	.782	.564	.346	.128	.691	15	45.349	.010
17½	.025	.782	.563	.345	.126	.690			
18¾	.025	.781	.563	.344	.126	.689			
20	3.025	3.781	7.563	11.344	15.125	22.688	1¼	3.779	0.000
22½	.025	.781	.562	.343	.124	.686	2½	7.558	.000
25	.025	.781	.561	.342	.123	.684	3¾	11.338	.001
26¼	.024	.781	.561	.342	.122	.683	5	15.117	.001
27½	.024	.780	.561	.341	.122	.682	For latitude 7° 6¼	18.896	.002
							7½	22.675	.003
30	3.024	3.780	7.560	11.340	15.120	22.681	10	30.234	.005
32½	.024	.780	.560	.339	.119	.679	12½	37.792	.008
33¾	.024	.780	.559	.339	.118	.678	15	45.351	.012
35	.024	.779	.559	.338	.118	.677			
37½	.023	.779	.558	.337	.117	.675			
							1¼	3.779	0.000
40	3.023	3.779	7.558	11.336	15.115	22.673	2½	7.559	.000
41¼	.023	.779	.557	.336	.115	.672	3¾	11.338	.001
42½	.023	.778	.557	.335	.114	.671	5	15.118	.001
45	.023	.778	.556	.335	.113	.669	For latitude 8° 6¼	18.897	.002
47½	.022	.778	.556	.334	.111	.667	7½	22.676	.003
48¾	.022	.778	.555	.333	.111	.666	10	30.235	.006
							12½	37.794	.010
50	3.022	3.778	7.555	11.333	15.110	22.665	15	45.353	.014
52½	.022	.777	.554	.332	.109	.663			
55	.021	.777	.554	.331	.107	.661			
56¼	.021	.777	.553	.330	.107	.660			
57½	.021	.777	.553	.330	.106	.659			
7 00	3.021	3.776	7.552	11.329	15.105	22.657			
02½	.021	.776	.552	.328	.103	.655			
03¾	.021	.776	.551	.327	.103	.654			
05	.020	.776	.551	.327	.102	.653			
07½	.020	.775	.550	.326	.101	.651			
10	3.020	3.775	7.550	11.325	15.099	22.649			
11¼	.020	.775	.549	.324	.099	.648			
12½	.020	.774	.549	.323	.098	.647			
15	.019	.774	.548	.322	.097	.645			
17½	.019	.774	.548	.321	.095	.643			
18¾	.019	.774	.547	.321	.095	.642			
20	3.019	3.773	7.547	11.320	15.094	22.641			
22½	.019	.773	.546	.319	.093	.640			
25	.018	.773	.546	.318	.091	.637			
26¼	.018	.773	.545	.318	.090	.635			
27½	.018	.772	.545	.317	.090	.634			
30	3.018	3.772	7.544	11.316	15.088	22.632			
32½	.017	.772	.543	.315	.087	.630			
33¾	.017	.771	.543	.315	.086	.629			
35	.017	.771	.543	.314	.085	.628			
37½	.017	.771	.542	.313	.084	.626			
40	3.017	3.771	7.541	11.312	15.082	22.624			
41¼	.016	.770	.541	.311	.082	.623			
42½	.016	.770	.540	.311	.081	.621			
45	.016	.770	.540	.310	.079	.619			
47½	.016	.769	.539	.308	.078	.617			
48¾	.015	.769	.439	.308	.077	.616			
50	3.015	3.769	7.538	11.307	15.076	22.615			
52½	.015	.769	.537	.306	.075	.612			
55	.015	.768	.537	.305	.073	.610			
56¼	.015	.768	.536	.305	.073	.609			
57½	.014	.768	.536	.304	.072	.608			
8 00	3.014	3.768	7.535	11.303	15.070	22.606			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
8	00	3.014	3.768	7.535	11.303	15.070	22.606
	02½	.014	.767	.534	.302	.069	.603
	03¾	.014	.767	.534	.301	.068	.602
	05	.013	.767	.534	.300	.067	.601
	07½	.013	.766	.533	.299	.066	.599
	10	3.013	3.766	7.532	11.298	15.064	22.596
	11¼	.013	.766	.532	.298	.063	.595
	12½	.013	.766	.531	.297	.063	.594
	15	.012	.765	.531	.296	.061	.592
	17½	.012	.765	.530	.295	.059	.589
	18¾	.012	.765	.529	.294	.059	.588
	20	3.012	3.764	7.529	11.293	15.058	22.587
	22½	.011	.764	.528	.292	.056	.585
	25	.011	.764	.527	.291	.055	.582
	26¼	.011	.764	.527	.290	.054	.581
	27½	.011	.763	.527	.290	.053	.580
	30	3.010	3.763	7.526	11.289	15.051	22.577
	32½	.010	.762	.525	.287	.050	.575
	33¾	.010	.762	.525	.287	.049	.574
	35	.010	.762	.524	.286	.048	.572
	37½	.009	.762	.523	.285	.047	.570
	40	3.009	3.761	7.522	11.284	15.045	22.567
	41¼	.009	.761	.522	.283	.044	.566
	42½	.009	.761	.522	.282	.043	.565
	45	.008	.760	.521	.281	.042	.562
	47½	.008	.760	.520	.280	.040	.560
	48¾	.008	.760	.520	.279	.039	.559
	50	3.008	3.760	7.519	11.279	15.038	22.557
	52½	.007	.759	.518	.277	.036	.555
	55	.007	.759	.517	.276	.035	.552
	56¼	.007	.758	.517	.275	.034	.551
	57½	.007	.758	.517	.275	.033	.550
9	00	3.006	3.758	7.516	11.274	15.031	22.547
	02½	.006	.757	.515	.272	.030	.545
	03¾	.006	.757	.514	.272	.029	.543
	05	.006	.757	.514	.271	.028	.542
	07½	.005	.757	.513	.270	.026	.539
	10	3.005	3.756	7.512	11.268	15.024	22.537
	11¼	.005	.756	.512	.268	.024	.535
	12½	.005	.756	.511	.267	.023	.534
	15	.004	.755	.510	.266	.021	.531
	17½	.004	.755	.510	.264	.019	.529
	18¾	.004	.755	.509	.264	.018	.527
	20	3.003	3.754	7.509	11.263	15.017	22.526
	22½	.003	.754	.508	.262	.016	.523
	25	.003	.753	.507	.260	.014	.521
	26¼	.003	.753	.506	.260	.013	.519
	27½	.002	.753	.506	.259	.012	.518
	30	3.002	3.753	7.505	11.258	15.010	22.515
	32½	.002	.752	.504	.256	.008	.513
	33¾	.001	.752	.504	.256	.007	.511
	35	.001	.752	.503	.255	.007	.510
	37½	.001	.751	.502	.254	.005	.507
	40	3.001	3.751	7.501	11.252	15.003	22.504
	41¼	.000	.750	.501	.251	.002	.503
	42½	.000	.750	.501	.251	.001	.502
	45	.000	.750	.500	249	14.999	.499
	47½	2.999	.749	.499	.248	.997	.496
	48¾	.999	.749	.498	.247	.996	.494
	50	2.999	3.749	7.498	11.247	14.995	22.493
	52½	.999	.748	.497	.245	.993	.490
	55	.998	.748	.496	.244	.992	.487
	56¼	.998	.748	.495	243	.991	.486
	57½	.998	.748	.495	.242	.990	.485
10	00	2.998	3.747	7.494	11.241	14.988	22.482

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 8°	1¼	3.779	0.000
	2½	7.559	.000
	3¾	11.338	.001
	5	15.118	.001
	6¼	18.897	.002
	7½	22.676	.003
	10	30.235	.006
	12½	37.794	.010
	15	45.353	.014
For latitude 9°	1¼	3.780	0.000
	2½	7.559	.000
	3¾	11.339	.001
	5	15.118	.002
	6¼	18.898	.003
	7½	22.678	.004
	10	30.237	.007
	12½	37.796	.011
	15	45.356	.015
For latitude 10°	1¼	3.780	0.000
	2½	7.560	.000
	3¾	11.339	.001
	5	15.119	.002
	6¼	18.899	.003
	7½	22.679	.004
	10	30.238	.008
	12½	37.798	.012
	15	45.358	.017

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
	Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	1′	1¼′	2½′	3¾′	5′	7½′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
10 00	2.998	3.747	7.494	11.241	14.988	22.482			
02½	.997	.747	.493	.239	.986	.479	1¼	3.780	0.000
03¾	.997	.746	.493	.239	.985	.478	2½	7.560	.000
05	.997	.746	.492	.238	.984	.476	3¾	11.339	.001
07½	.996	.746	.491	.237	.982	.473	5	15.119	.002
							For latitude 10° 6¼	18.899	.003
10	2.996	3.745	7.490	11.235	14.980	22.470	7½	22.679	.004
11¼	.996	.745	.490	.234	.979	.469	10	30.238	.008
12½	.996	.745	.489	.234	.978	.467	12½	37.798	.012
15	.995	.744	.488	.232	.976	.464	15	45.358	.017
17½	.995	.744	.487	.231	.974	.461			
18¾	.995	.743	.487	.230	.973	.460			
20	2.995	3.743	7.486	11.229	14.972	22.459			
22½	.994	.743	.485	.228	.970	.456	1¼	3.780	0.000
25	.994	.742	.484	.226	.968	.452	2½	7.560	.001
26¼	.994	.742	.484	.226	.967	.451	3¾	11.340	.001
27½	.993	.742	.483	.225	.966	.450	5	15.120	.002
							For latitude 11° 6¼	18.900	.003
30	2.993	3.741	7.482	11.223	14.964	22.447	7½	22.680	.005
32½	.993	.741	.481	.222	.962	.444	10	30.240	.008
33¾	.992	.740	.481	.221	.961	.442	12½	37.801	.013
35	.992	.740	.480	.220	.960	.440	15	45.361	.019
37½	.992	.740	.479	.219	.958	.437			
40	2.991	3.739	7.478	11.217	14.956	22.435			
41¼	.991	.739	.478	.216	.955	.433	1¼	3.780	0.000
42½	.991	.739	.477	.216	.954	.431	2½	7.561	.001
45	.990	.738	.476	.214	.952	.428	3¾	11.341	.001
47½	.990	.738	.475	.213	.950	.425	5	15.121	.002
48¾	.990	.737	.475	.212	.949	.424	For latitude 12° 6¼	18.902	.004
							7½	22.682	.005
50	2.990	3.737	7.474	11.211	14.948	22.422	10	30.243	.009
52½	.989	.737	.473	.210	.946	.419	12½	37.804	.014
55	.989	.736	.472	.208	.944	.416	15	45.364	.020
56¼	.989	.736	.471	.207	.943	.414			
57½	.988	.735	.471	.206	.942	.413			
11 00	2.988	3.735	7.470	11.205	14.940	22.410			
02½	.988	.734	.469	.203	.938	.406			
03¾	.987	.734	.468	.202	.937	.405			
05	.987	.734	.468	.202	.936	.403			
07½	.987	.733	.467	.200	.933	.400			
10	2.986	3.733	7.466	11.199	14.931	22.397			
11¼	.986	.733	.465	.198	.930	.395			
12½	.986	.732	.465	.197	.929	.394			
15	.985	.732	.463	.195	.927	.390			
17½	.985	.731	.462	.194	.925	.387			
18¾	.985	.731	.462	.193	.924	.386			
20	2.985	3.731	7.461	11.192	14.923	22.384			
22½	.984	.730	.460	.190	.921	.381			
25	.984	.730	.459	.189	.918	.378			
26¼	.983	.729	.459	.188	.917	.376			
27½	.983	.729	.458	.187	.916	.374			
30	2.983	3.728	7.457	11.186	14.914	22.371			
32½	.982	.728	.456	.184	.912	.368			
33¾	.982	.728	.455	.183	.911	.366			
35	.982	.727	.455	.182	.910	.364			
37½	.982	.727	.454	.181	.907	.361			
40	2.981	3.726	7.453	11.179	14.905	22.358			
41¼	.981	.726	.452	.178	.904	.356			
42½	.981	.726	.451	.177	.903	.354			
45	.980	.725	.450	.176	.901	.351			
47½	.980	.725	.449	.174	.899	.348			
48¾	.979	.724	.449	.173	.897	.346			
50	2.979	3.724	7.448	11.172	14.896	22.344			
52½	.979	.724	.447	.171	.894	.341			
55	.978	.723	.446	.169	.892	.338			
56¼	.978	.723	.445	.168	.891	.336			
57½	.978	.722	.445	.167	.889	.334			
12 00	2.977	3.722	7.444	11.165	14.887	22.331			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
12 00	2.977	3.722	7.444	11.165	14.887	22.331
02½	.977	.721	.442	.164	.885	.327
03¾	.977	.721	.442	.163	.884	.326
05	.977	.721	.441	.162	.883	.324
07½	.976	.720	.440	.160	.880	.320
10	2.976	3.719	7.439	11.158	14.878	22.317
11¼	.975	.719	.438	.158	.877	.315
12½	.975	.719	.438	.157	.876	.313
15	.975	.718	.437	.155	.873	.310
17½	.974	.718	.435	.153	.871	.306
18¾	.974	.717	.435	.152	.870	.305
20	2.974	3.717	7.434	11.151	14.869	22.303
22½	.973	.717	.433	.150	.866	.299
25	.973	.716	.432	.148	.864	.296
26¼	.973	.716	.431	.147	.863	.294
27½	.972	.715	.431	.146	.862	.292
30	2.972	3.715	7.430	11.144	14.859	22.289
32½	.971	.714	.428	.143	.857	.285
33¾	.971	.714	.428	.142	.856	.283
35	.971	.714	.427	.141	.854	.281
37½	.970	.713	.426	.139	.852	.278
40	2.970	3.712	7.425	11.137	14.850	22.274
41¼	.970	.712	.424	.136	.848	.273
42½	.969	.712	.424	.135	.847	.271
45	.969	.711	.422	.134	.845	.267
47½	.968	.711	.421	.132	.842	.264
48¾	.968	.710	.421	.131	.841	.262
50	2.968	3.710	7.420	11.130	14.840	22.260
52½	.967	.709	.419	.128	.837	.256
55	.967	.709	.417	.126	.835	.252
56¼	.967	.708	.417	.125	.834	.251
57½	.966	.708	.416	.124	.832	.249
13 00	2.966	3.708	7.415	11.123	14.830	22.245
02½	.966	.707	.414	.121	.828	.241
03¾	.965	.707	.413	.120	.826	.240
05	.965	.706	.413	.119	.825	.238
07½	.965	.706	.411	.117	.823	.234
10	2.964	3.705	7.410	11.115	14.820	22.230
11¼	.964	.705	.409	.114	.819	.228
12½	.964	.704	.409	.113	.818	.226
15	.963	.704	.408	.111	.815	.223
17½	.963	.703	.406	.109	.813	.219
18¾	.962	.703	.406	.108	.811	.217
20	2.962	3.703	7.405	11.107	14.810	22.215
22½	.961	.702	.404	.106	.807	.211
25	.961	.701	.402	.104	.805	.207
26¼	.961	.701	.402	.103	.804	.205
27½	.960	.701	.401	.102	.802	.204
30	2.960	3.700	7.400	11.100	14.800	22.200
32½	.959	.699	.398	.098	.797	.196
33¾	.959	.699	.398	.097	.796	.194
35	.959	.699	.397	.096	.795	.192
37½	.958	.698	.396	.094	.792	.188
40	2.958	3.697	7.395	11.092	14.790	22.184
41¼	.958	.697	.394	.091	.788	.182
42½	.957	.697	.393	.090	.787	.180
45	.957	.696	.392	.088	.784	.176
47½	.956	.695	.391	.086	.782	.172
48¾	.956	.695	.390	.085	.780	.170
50	2.956	3.695	7.390	11.084	14.779	22.169
52½	.955	.694	.388	.082	.776	.165
55	.955	.693	.387	.080	.774	.161
56¼	.954	.693	.386	.079	.772	.159
57½	.954	.693	.386	.078	.771	.157
14 00	2.954	3.692	7.384	11.076	14.769	22.153

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 12°	1¼	3.780	0.000
	2½	7.561	.001
	3¾	11.341	.001
	5	15.121	.002
	6¼	18.902	.004
	7½	22.682	.005
	10	30.243	.009
	12½	37.804	.014
	15	45.364	.020
For latitude 13°	1¼	3.781	0.000
	2½	7.561	.001
	3¾	11.342	.001
	5	15.122	.002
	6¼	18.903	.004
	7½	22.684	.005
	10	30.245	.010
	12½	37.806	.015
	15	45.367	.022
For latitude 14°	1¼	3.781	0.000
	2½	7.562	.001
	3¾	11.343	.002
	5	15.124	.003
	6¼	18.905	.004
	7½	22.686	.006
	10	30.247	.010
	12½	37.809	.016
	15	45.371	.023

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
14	00	2.954	3.692	7.384	11.076	14.769	22.153
	02½	.953	.691	.383	.074	.766	.149
	03¾	.953	.691	.382	.073	.764	.147
	05	.953	.691	.381	.072	.763	.145
	07½	.952	.690	.380	.070	.760	.141
	10	2.952	3.689	7.379	11.068	14.758	22.137
	11¼	.951	.689	.378	.067	.756	.135
	12½	.951	.689	.378	.066	.755	.132
	15	.950	.688	.376	.064	.752	.128
	17½	.950	.687	.375	.062	.750	.124
	18¾	.950	.687	.374	.061	.748	.122
	20	2.949	3.687	7.373	11.060	14.747	22.120
	22½	.949	.686	.372	.058	.744	.116
	25	.948	.685	.371	.056	.741	.112
	26¼	.948	.685	.370	.055	.740	.110
	27½	.948	.685	.369	.054	.739	.108
	30	2.947	3.684	7.368	11.052	14.736	22.104
	32½	.947	.683	.367	.050	.733	.100
	33¾	.946	.683	.366	.049	.732	.098
	35	.946	.683	.365	.048	.730	.096
	37½	.946	.682	.364	.046	.728	.091
	40	2.945	3.681	7.362	11.044	14.725	22.087
	41¼	.944	.681	.362	.043	.723	.035
	42½	.944	.681	.361	.042	.722	.083
	45	.944	.680	.360	.039	.719	.079
	47½	.943	.679	.358	.037	.717	.075
	48¾	.943	.679	.358	.036	.715	.073
	50	2.943	3.678	7.357	11.035	14.714	22.071
	52½	.942	.678	.355	.033	.711	.066
	55	.942	.677	.354	.031	.708	.062
	56¼	.941	.677	.353	.030	.707	.060
	57½	.941	.676	.353	.029	.705	.058
15	00	2.940	3.676	7.351	11.027	14.702	22.054
	02½	.940	.675	.350	.025	.700	.049
	03¾	.940	.675	.349	.024	.698	.047
	05	.939	.674	.348	.023	.697	.045
	07½	.939	.673	.347	.020	.694	.041
	10	2.938	3.673	7.345	11.018	14.691	22.036
	11¼	.938	.672	.345	.017	.689	.034
	12½	.938	.672	.344	.016	.688	.032
	15	.937	.671	.343	.014	.685	.028
	17½	.936	.671	.341	.012	.682	.023
	18¾	.936	.670	.340	.011	.681	.021
	20	2.936	3.670	7.340	11.009	14.679	22.019
	22½	.935	.669	.338	.007	.676	.014
	25	.935	.668	.337	.005	.673	.010
	26¼	.934	.668	.336	.004	.672	.008
	27½	.934	.668	.335	.003	.670	.006
	30	2.934	3.667	7.334	11.001	14.668	22.001
	32½	.933	.666	.332	10.999	.665	21.997
	33¾	.933	.666	.332	.997	.663	.995
	35	.932	.665	.331	.996	.662	.993
	37½	.932	.665	.329	.994	.659	.988
	40	2.931	3.664	7.328	10.992	14.656	21.984
	41¼	.931	.664	.327	.991	.654	.981
	42½	.931	.663	.326	.990	.653	.979
	45	.930	.662	.325	.987	.650	.975
	47½	.929	.662	.323	.985	.647	.970
	48¾	.929	.661	.322	.984	.645	.968
	50	2.929	3.661	7.322	10.983	14.644	21.966
	52½	.928	.660	.320	.981	.641	.961
	55	.928	.659	.319	.978	.638	.957
	56¼	.927	.659	.318	.977	.636	.954
	57½	.927	.659	.317	.976	.635	.952
16	00	2.926	3.658	7.316	10.974	14.632	21.948

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 14°	1¼	3.781	0.000
	2½	7.562	.001
	3¾	11.343	.002
	5	15.124	.003
	6¼	18.905	.004
	7½	22.686	.006
	10	30.247	.010
	12½	37.809	.016
	15	45.371	.023
For latitude 15°	1¼	3.781	0.000
	2½	7.562	.001
	3¾	11.344	.002
	5	15.125	.003
	6¼	18.906	.005
	7½	22.687	.006
	10	30.250	.011
	12½	37.813	.017
	15	45.375	.025
For latitude 16°	1¼	3.781	0.000
	2½	7.563	.001
	3¾	11.345	.002
	5	15.126	.003
	6¼	18.908	.005
	7½	22.690	.007
	10	30.253	.012
	12½	37.816	.018
	15	45.379	.026

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
16	00	2.926	3.658	7.316	10.974	14.632	21.948			
	02½	.926	.657	.314	.972	.629	.943			
	03¾	.925	.657	.314	.970	.627	.941			
	05	.925	.656	.313	.969	.626	.938			
	07½	.925	.656	.311	.967	.623	.934			
	10	2.924	3.655	7.310	10.965	14.620	21.929			
	11¼	.924	.655	.309	.964	.618	.927			
	12½	.923	.654	.308	.962	.617	.925			
	15	.922	.653	.307	.960	.614	.920			
	17½	.922	.653	.305	.958	.610	.916			
	18¾	.921	.652	.304	.957	.609	.913			
	20	2.921	3.652	7.304	10.955	14.607	21.911			
	22½	.921	.651	.302	.953	.604	.907			
	25	.920	.650	.300	.951	.601	.901			
	26¼	.920	.650	.300	.950	.599	.899			
	27½	.920	.649	.299	.948	.598	.897			
	30	2.919	3.649	7.297	10.946	14.595	21.892			
	32½	.918	.648	.296	.944	.592	.888			
	33¾	.918	.648	.295	.943	.590	.885			
	35	.918	.647	.294	.941	.589	.883			
	37½	.917	.646	.293	.939	.585	.878			
	40	2.916	3.646	7.291	10.937	14.582	21.874			
	41¼	.916	.645	.290	.936	.581	.871			
	42½	.916	.645	.290	.934	.579	.869			
	45	.915	.644	.288	.932	.576	.864			
	47½	.915	.643	.286	.930	.573	.859			
	48¾	.914	.643	.286	.928	.571	.857			
	50	2.914	3.642	7.285	10.927	14.570	21.855			
	52½	.913	.642	.283	.925	.566	.850			
	55	.913	.641	.282	.922	.563	.845			
	56¼	.912	.640	.281	.921	.562	.842			
	57½	.912	.640	.280	.920	.560	.840			
17	00	2.911	3.639	7.278	10.918	14.557	21.835			
	02½	.911	.638	.277	.915	.554	.830			
	03¾	.910	.638	.276	.914	.552	.828			
	05	.910	.638	.275	.913	.550	.826			
	07½	.909	.637	.274	.910	.547	.821			
	10	2.909	3.636	7.272	10.908	14.544	21.816			
	11¼	.908	.636	.271	.907	.542	.813			
	12½	.908	.635	.270	.906	.541	.811			
	15	.907	.634	.269	.903	.537	.806			
	17½	.907	.634	.267	.901	.534	.801			
	18¾	.906	.633	.266	.899	.532	.799			
	20	2.906	3.633	7.265	10.898	14.531	21.796			
	22½	.905	.632	.264	.896	.528	.791			
	25	.905	.631	.262	.893	.524	.786			
	26¼	.904	.631	.261	.892	.523	.784			
	27½	.904	.630	.260	.891	.521	.781			
	30	2.904	3.629	7.259	10.888	14.518	21.777			
	32½	.903	.629	.257	.886	.514	.772			
	33¾	.903	.628	.256	.884	.513	.769			
	35	.902	.628	.255	.883	.511	.766			
	37½	.902	.627	.254	.881	.508	.762			
	40	2.901	3.626	7.252	10.878	14.504	21.757			
	41¼	.901	.626	.251	.877	.503	.754			
	42½	.900	.625	.251	.876	.501	.752			
	45	.900	.624	.249	.873	.498	.747			
	47½	.899	.624	.247	.871	.494	.741			
	48¾	.899	.623	.246	.869	.493	.739			
	50	2.898	3.623	7.245	10.868	14.491	21.736			
	52½	.898	.622	.244	.866	.488	.731			
	55	.897	.621	.242	.863	.484	.726			
	56¼	.896	.621	.241	.862	.483	.724			
	57½	.896	.620	.240	.861	.481	.721			
18	00	2.895	3.619	7.239	10.858	14.477	21.716			
								For latitude 16° 1¼′	3.781	0.000
								2½′	7.563	.001
								3¾′	11.345	.002
								5′	15.126	.003
								6¼′	18.908	.005
								7½′	22.690	.007
								10′	30.253	.012
								12½′	37.816	.018
								15′	45.379	.026
								For latitude 17° 1¼′	3.782	0.000
								2½′	7.564	.001
								3¾′	11.346	.002
								5′	15.128	.003
								6¼′	18.910	.005
								7½′	22.692	.007
								10′	30.256	.012
								12½′	37.820	.019
								15′	45.384	.028
								For latitude 18° 1¼′	3.782	0.000
								2½′	7.565	.001
								3¾′	11.347	.002
								5′	15.129	.003
								6¼′	18.912	.005
								7½′	22.694	.007
								10′	30.259	.013
								12½′	37.824	.020
								15′	45.388	.029

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{1\,000\,000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
18	00	2.895	3.619	7.239	10.858	14.477	21.716				
	02½	.895	.618	.237	.855	.474	.711				
	03¾	.894	.618	.236	.854	.472	.708				
	05	.894	.618	.235	.853	.471	.706				
	07½	.893	.617	.234	.850	.467	.701				
	10	2.893	3.616	7.232	10.848	14.464	21.696				
	11¼	.892	.616	.231	847	.462	.693				
	12½	.892	.615	.230	.845	.460	.690				
	15	.891	.614	.228	.843	.457	.685				
	17½	.891	.613	.227	.840	.453	.680				
	18¾	.890	.613	.226	.839	.452	.678				
	20	2.890	3.612	7.225	10.837	14.450	21.675				
	22½	.889	.612	.223	.835	.447	.670				
	25	.889	.611	.222	.832	.443	.665				
	26¼	.888	.610	.221	.831	.441	.662				
	27½	.888	.610	.220	.830	.440	.659				
	30	2.887	3.609	7.218	10.827	14.436	21.654				
	32½	.887	.608	.216	.824	.433	.649				
	33¾	.886	.608	.215	.823	.431	.646				
	35	.886	.607	.215	.822	.429	.644				
	37½	.885	.606	.213	.819	.426	.638				
	40	2.884	3.606	7.211	10.817	14.422	21.633				
	41¼	.884	.605	.210	815	.420	.629				
	42½	.884	.605	.209	.814	.419	.628				
	45	.883	.604	.208	.811	.415	.623				
	47½	.882	.603	.206	.809	.411	.617				
	48¾	.882	.602	.205	.807	.410	.615				
	50	2.882	3.602	7.204	10.806	14.408	21.612				
	52½	.881	.601	.202	.803	.404	.607				
	55	.880	.600	.200	.801	.401	.601				
	56¼	.880	.600	.199	.799	.399	.598				
	57½	.879	.599	.199	.798	.397	.596				
19	00	2.879	3.598	7.197	10.795	14.394	21.591				
	02½	.878	.598	.195	.793	.390	.585				
	03¾	.878	.597	.194	.791	.388	.582				
	05	.877	.597	.193	.790	.386	.580				
	07½	.877	.596	.191	.787	.383	.574				
	10	2.876	3.595	7.190	10.784	14.379	21.569				
	11¼	.875	.594	.189	.783	.377	.566				
	12½	.875	.594	.188	.782	.376	.563				
	15	.874	.593	.186	.779	.372	.558				
	17½	.874	.592	.184	.776	.368	.553				
	18¾	.873	.592	.183	.775	.367	.550				
	20	2.873	3.591	7.182	10.774	14.365	21.547				
	22½	.872	.590	.181	.771	.361	.542				
	25	.872	.589	.179	.768	.357	.536				
	26¼	.871	.589	.178	.766	.356	.533				
	27½	.871	.588	.177	.765	.354	.531				
	30	2.870	3.588	7.175	10.763	14.350	21.525				
	32½	.869	.587	.173	.760	.346	.520				
	33¾	.869	.586	.172	.758	.345	.517				
	35	.869	.586	.171	.757	.343	.514				
	37½	.868	.585	.169	.754	.339	.508				
	40	2.867	3.584	7.168	10.751	14.335	21.503				
	41¼	.867	.583	.167	.750	.333	.500				
	42½	.866	.583	.166	.749	.332	.497				
	45	.866	.582	.164	.746	.328	.492				
	47½	.865	.581	.162	.743	.324	.486				
	48¾	.865	.581	.161	.742	.322	.484				
	50	2.864	3.580	7.160	10.740	14.321	21.481				
	52½	.863	.579	.158	.738	.317	.475				
	55	.863	.578	.156	.735	.313	.469				
	56¼	.862	.578	.156	.733	.311	.467				
	57½	.862	.577	.155	.732	.309	.464				
20	00	2.861	3.576	7.153	10.729	14.305	21.458				

Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 18°	1¼	3.782	0.000
	2½	7.565	.001
	3¾	11.347	.002
	5	15.129	.003
	6¼	18.912	.005
	7½	22.694	.007
	10	30.259	.013
	12½	37.824	.020
	15	45.388	.029
For latitude 19°	1¼	3.783	0.000
	2½	7.565	.001
	3¾	11.348	.002
	5	15.131	.003
	6¼	18.914	.005
	7½	22.697	.008
	10	30.262	.014
	12½	37.828	.021
	15	45.393	.031
For latitude 20°	1¼	3.783	0.000
	2½	7.566	.001
	3¾	11.350	.002
	5	15.133	.004
	6¼	18.916	.006
	7½	22.699	.008
	10	30.265	.014
	12½	37.832	.022
	15	45.398	.032

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude interval	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
20	00	2.861	3.576	7.153	10.729	14.305	21.458			
	02½	.860	.575	.151	.726	.302	.452			
	03¾	.860	.575	.150	.725	.300	.450			
	05	.860	.574	.149	.723	.298	.447			
	07½	.859	.574	.147	.721	.294	.441			
	10	2.858	3.573	7.145	10.718	14.290	21.436			
	11¼	.858	.572	.144	.715	.288	.433			
	12½	.857	.572	.143	.715	.287	.430			
	15	.857	.571	.141	.712	.283	.424			
	17½	.856	.570	.139	.709	.279	.418			
	18¾	.855	.569	.139	.708	.277	.416			
	20	2.855	3.569	7.138	10.706	14.275	21.413			
	22½	.854	.568	.136	.703	.271	.407			
	25	.853	.567	.134	.701	.267	.401			
	26¼	.853	.566	.133	.699	.265	.398			
	27½	.853	.566	.132	.698	.264	.395			
	30	2.852	3.565	7.130	10.695	14.260	21.390			
	32½	.851	.564	.128	.692	.256	.384			
	33¾	.851	.563	.127	.690	.254	.381			
	35	.850	.563	.126	.689	.252	.378			
	37½	.850	.562	.124	.686	.248	.372			
	40	2.849	3.561	7.122	10.683	14.244	21.366			
	41¼	.848	.561	.121	.682	.242	.363			
	42½	.848	.560	.120	.680	.240	.361			
	45	.847	.559	.118	.677	.237	.355			
	47½	.847	.558	.116	.674	.233	.349			
	48¾	.846	.558	.115	.673	.231	.346			
	50	2.846	3.557	7.114	10.672	14.229	21.343			
	52½	.845	.556	.112	.669	.225	.337			
	55	.844	.555	.110	.666	.221	.331			
	56¼	.844	.555	.110	.664	.219	.328			
	57½	.843	.554	.108	.663	.217	.325			
21	00	2.843	3.553	7.106	10.660	14.213	21.319			
	02½	.842	.552	.004	.657	.209	.313			
	03¾	.841	.552	.104	.655	.207	.311			
	05	.841	.551	.103	.654	.205	.308			
	07½	.840	.550	.101	.651	.201	.302			
	10	2.839	3.549	7.099	10.648	14.197	21.296			
	11¼	.839	.549	.098	.646	.195	.294			
	12½	.839	.548	.097	.645	.193	.290			
	15	.838	.547	.095	.642	.189	.284			
	17½	.837	.546	.093	.639	.185	.278			
	18¾	.837	.546	.092	.637	.183	.275			
	20	2.836	3.545	7.091	10.636	14.181	21.272			
	22½	.835	.544	.089	.633	.177	.266			
	25	.835	.543	.087	.630	.173	.260			
	26¼	.834	.543	.086	.628	.171	.257			
	27½	.834	.542	.085	.627	.169	.254			
	30	2.833	3.541	7.083	10.624	14.165	21.248			
	32½	.832	.540	.081	.621	.161	.242			
	33¾	.832	.540	.080	.619	.159	.239			
	35	.831	.539	.078	.618	.157	.235			
	37½	.831	.538	.076	.615	.153	.229			
	40	2.830	3.537	7.074	10.612	14.149	21.223			
	41¼	.829	.537	.073	.610	.147	.220			
	42½	.829	.536	.072	.609	.145	217			
	45	.828	.535	.070	.606	.141	.211			
	47½	.827	.534	.068	.602	.137	.205			
	48¾	.827	.534	.067	.601	.135	.202			
	50	2.827	3.533	7.066	10.599	14.133	21.199			
	52½	.826	.532	.064	.596	.128	.193			
	55	.825	.531	.062	.593	.124	.187			
	56¼	.825	.531	.061	.592	.122	.183			
	57½	.824	.530	.060	.590	.120	.180			
22	00	2.823	3.529	7.058	10.587	14.116	21.174			
								For latitude 20°		
								1¼	3.783	0.000
								2½	7.566	.001
								3¾	11.350	.002
								5	15.133	.004
								6¼	18.916	.006
								7½	22.699	.008
								10	30.265	.014
								12½	37.832	.022
								15	45.398	.032
								For latitude 21°		
								1¼	3.784	0.000
								2½	7.567	.001
								3¾	11.351	.002
								5	15.134	.004
								6¼	18.918	.006
								7½	22.702	.008
								10	30.269	.015
								12½	37.837	.023
								15	45.403	.033
								For latitude 22°		
								1¼	3.784	0.000
								2½	7.568	.001
								3¾	11.352	.002
								5	15.136	.004
								6¼	18.921	.006
								7½	22.705	.009
								10	30.272	.015
								12½	37.841	.024
								15	45.409	.035

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
22 00	2.823	3.529	7.058	10.587	14.116	21.174
02½	.822	.528	.056	.584	.112	.168
03¾	.822	.527	.055	.582	.110	.165
05	.822	.527	.054	.581	.108	.162
07½	.821	.526	.052	.578	.104	.156
10	2.820	3.525	7.050	10.575	14.100	21.149
11¼	.819	.524	.049	.573	.097	.146
12½	.819	.524	.048	.572	.095	.143
15	.818	.523	.046	.568	.091	.137
17½	.817	.522	.044	.565	.087	.131
18¾	.817	.521	.043	.564	.085	.128
20	2.817	3.521	7.041	10.562	14.083	21.124
22½	.816	.520	.039	.559	.079	.118
25	.815	.519	.037	.556	.074	.112
26¼	.815	.518	.036	.554	.072	.109
27½	.814	.518	.035	.553	.070	.105
30	2.813	3.517	7.033	10.550	14.066	21.099
32½	.812	.515	.031	.546	.062	.093
33¾	.812	.515	.030	.545	.060	.090
35	.811	.514	.029	.543	.058	.087
37½	.811	.513	.027	.540	.053	.080
40	2.810	3.512	7.025	10.537	14.049	21.074
41¼	.809	.512	.024	.535	.047	.071
42½	.809	.511	.022	.534	.045	.067
45	.808	.510	.020	.530	.041	.061
47½	.807	.509	.019	.527	.036	.055
48¾	.807	.509	.017	.526	.034	.051
50	2.806	3.508	7.016	10.524	14.032	21.048
52½	.806	.507	.014	.521	.028	.042
55	.805	.506	.012	.518	.024	.035
56¼	.804	.505	.011	.516	.021	.032
57½	.804	.505	.010	.515	.019	.029
23 00	2.803	3.504	7.008	10.511	14.015	21.023
02½	.802	.503	.005	.508	.011	.016
03¾	.802	.502	.004	.506	.009	.013
05	.801	.502	.003	.505	.006	.010
07½	.800	.501	.001	.502	.002	.003
10	2.800	3.499	6.999	10.498	13.998	20.997
11¼	.799	.499	.998	.497	.996	.994
12½	.799	.498	.997	.495	.994	.990
15	.798	.497	.995	.492	.989	.984
17½	.797	.496	.992	.489	.985	.977
18¾	.797	.496	.991	.487	.983	.974
20	2.796	3.495	6.990	10.485	13.980	20.971
22½	.795	.494	.988	.482	.976	.964
25	.794	.493	.986	.479	.972	.957
26¼	.794	.492	.985	.477	.969	.954
27½	.793	.492	.984	.475	.967	.951
30	2.793	3.491	6.981	10.472	13.963	20.944
32½	.792	.490	.979	.469	.958	.938
33¾	.791	.489	.978	.467	.956	.934
35	.791	.489	.977	.466	.954	.931
37½	.790	.487	.975	.462	.950	.925
40	2.789	3.486	6.973	10.459	13.945	20.918
41¼	.789	.486	.972	.457	.943	.915
42½	.788	.485	.970	456	.941	.911
45	.787	.484	.968	.452	.937	.905
47½	.786	.483	.966	.449	.932	.898
48¾	.786	.482	.965	.447	.930	.895
50	2.786	3.482	6.964	10.446	13.928	20.891
52½	.785	.481	.962	.442	.923	.885
55	.784	.480	.959	.439	.919	.878
56¼	.783	.479	.958	.437	.916	.875
57½	.783	.479	.957	.436	.914	.871
24 00	2.782	3.477	6.955	10.432	13.910	20.865

Ordinates of developed parallel and meridional distances

Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 22°	1¼	3.784	0.000
	2½	7.568	.001
	3¾	11.352	.002
	5	15.136	.004
	6¼	18.921	.006
	7½	22.705	.009
	10	30.272	.015
	12½	37.841	.024
	15	45.409	.035
For latitude 23°	1¼	3.784	0.000
	2½	7.569	.001
	3¾	11.354	.002
	5	15.138	.004
	6¼	18.923	.006
	7½	22.707	.009
	10	30.276	.016
	12½	37.846	.025
	15	45.415	.036
For latitude 24°	1¼	3.785	0.000
	2½	7.570	.001
	3¾	11.355	.002
	5	15.140	.004
	6¼	18.925	.006
	7½	22.710	.009
	10	30.280	.016
	12½	37.851	.026
	15	45.421	.037

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
24	00	2.782	3.477	6.955	10.432	13.910	20.865
	02½	.781	.476	.953	.429	.905	.858
	03¾	.781	.476	.952	.427	.903	.855
	05	.780	.475	.950	.426	.901	.851
	07½	.779	.474	.948	.422	.896	.844
	10	2.778	3.473	6.946	10.419	13.892	20.838
	11¼	.778	.472	.945	.417	.889	.834
	12½	.777	.472	.944	.415	.887	.831
	15	.777	.471	.941	.412	.883	.824
	17½	.776	.470	.939	.409	.878	.817
	18¾	.775	.469	.938	.407	.876	.814
	20	2.775	3.468	6.937	10.405	13.874	20.811
	22½	.774	.467	.935	.402	.869	.804
	25	.773	.466	.932	.398	.864	.797
	26¼	.772	.466	.931	.397	.862	.793
	27½	.772	.465	.930	.395	.860	.790
	30	2.771	3.464	6.928	10.392	13.855	20.783
	32½	.770	.463	.925	.388	.851	.776
	33¾	.770	.462	.924	.386	.849	.773
	35	.769	.462	.923	.385	.846	.769
	37½	.768	.460	.921	.381	.842	.763
	40	2.767	3.459	6.919	10.378	13.837	20.756
	41¼	.767	.459	.917	.376	.835	.752
	42½	.766	.458	.916	.374	.833	.749
	45	.766	.457	.914	.371	.828	.742
	47½	.765	.456	.912	.367	.823	.735
	48¾	.764	.455	.911	.366	.821	.732
	50	2.764	3.455	6.909	10.364	13.819	20.728
	52½	.763	.454	.907	.361	.814	.721
	55	.762	.452	.905	.357	.809	.714
	56¼	.761	.452	.904	.355	.807	.711
	57½	.761	.451	.902	.354	.805	.707
25	00	2.760	3.450	6.900	10.350	13.800	20.700
	02½	.759	.449	.898	.347	.796	.693
	03¾	.759	.448	.897	.345	.793	.690
	05	.758	.448	.895	.343	.791	.686
	07½	.757	.447	.893	.340	.786	.679
	10	2.756	3.445	6.891	10.336	13.781	20.672
	11¼	.756	.445	.890	.334	.779	.669
	12½	.755	.444	.888	.333	.777	.665
	15	.754	.443	.886	.329	.772	.658
	17½	.753	.442	.884	.325	.767	.651
	18¾	.753	.441	.882	.324	.765	.647
	20	2.753	3.441	6.881	10.322	13.763	20.644
	22½	.752	.439	.879	.318	.758	.637
	25	.751	.438	.877	.315	.753	.630
	26¼	.750	.438	.875	.313	.751	.626
	27½	.750	.437	.874	.311	.748	.623
	30	2.749	3.436	6.872	10.308	13.744	20.616
	32½	.748	.435	.870	.304	.739	.609
	33¾	.747	.434	.868	.302	.737	.605
	35	.747	.434	.867	.301	734	.601
	37½	.746	.432	.865	.297	.729	.594
	40	2.745	3.431	6.862	10.294	13.725	20.587
	41¼	.744	.431	.861	.292	.722	.583
	42½	.744	.430	.860	.290	.720	.580
	45	.743	.429	.858	.286	.715	.573
	47½	.742	.428	.855	.283	.710	.565
	48¾	.742	.427	.854	.281	.708	.562
	50	2.741	3.426	6.853	10.279	13.706	20.558
	52½	.740	.425	.850	.276	.701	.551
	55	.739	.424	.848	.272	.696	.544
	56¼	.739	.423	.847	.270	.694	.540
	57½	.738	.423	.846	.268	.691	.537
26	00	2.737	3.422	6.843	10.265	13.686	20.530

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 24°	1¼	3.785	0.000
	2½	7.570	.001
	3¾	11.355	.002
	5	15.140	.004
	6¼	18.925	.006
	7½	22.710	.009
	10	30.280	.016
	12½	37.851	.026
	15	45.421	.037
For latitude 25°	1¼	3.786	0.000
	2½	7.571	.001
	3¾	11.357	.002
	5	15.142	.004
	6¼	18.928	.007
	7½	22.713	.010
	10	30.284	.017
	12½	37.856	.026
	15	45.426	.038
For latitude 26°	1¼	3.786	0.000
	2½	7.572	.001
	3¾	11.358	.002
	5	15.144	.004
	6¼	18.931	.007
	7½	22.717	.010
	10	30.289	.017
	12½	37.861	.027
	15	45.433	.039

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
26	00	2.737	3.422	6.843	10.265	13.686	20.530			
	02½	.736	.420	.841	.261	.682	.522	1¼	3.786	0.000
	03¾	.736	.420	.840	.259	.679	.519	2½	7.572	.001
	05	.735	.419	.838	.258	.677	.515	3¾	11.358	.002
	07½	.734	.418	.836	.256	.672	.508	5	15.144	.004
								For latitude 26° 6¼	18.931	.007
	10	2.733	3.417	6.833	10.250	13.667	20.500	7½	22.717	.010
	11¼	.733	.416	.832	.248	.665	.497	10	30.289	.017
	12½	.732	.416	.831	.247	.662	.493	12½	37.861	.027
	15	.731	.414	.829	.243	.657	.486	15	45.433	.039
	17½	.730	.413	.826	.239	.652	.478			
	18¾	.730	.412	.825	.237	.650	.475			
	20	2.729	3.412	6.824	10.236	13.647	20.471	1¼	3.787	0.000
	22½	.728	.411	.821	.232	.643	.464	2½	7.573	.001
	25	.727	.409	.819	.228	.638	.456	3¾	11.360	.003
	26¼	.727	.409	.818	.226	.635	.453	5	15.146	.004
	27½	.727	.408	.816	.225	.633	.449	For latitude 27° 6¼	18.933	.007
	30	2.726	3.407	6.814	10.221	13.628	20.442	7½	22.720	.010
	32½	.725	.406	.811	.217	.623	.434	10	30.293	.018
	33¾	.724	.405	.810	.215	.620	.431	12½	37.867	.028
	35	.724	.404	.809	.213	.618	.427	15	45.439	.040
	37½	.723	.403	.807	.210	.613	.420			
	40	2.722	3.402	6.804	10.206	13.608	20.412	1¼	3.787	0.000
	41¼	.721	.401	.803	.204	.606	.408	2½	7.574	.001
	42½	.721	.401	.802	.202	.603	.405	3¾	11.362	.003
	45	.720	.400	.799	.199	.598	.397	5	15.148	.005
	47½	.719	.398	.797	.195	.593	.390	For latitude 28° 6¼	18.936	.007
	48¾	.718	.398	.795	.193	.591	.386	7½	22.723	.010
	50	2.718	3.397	6.794	10.191	13.588	20.383	10	30.297	.018
	52½	.717	.396	.792	.188	.583	.375	12½	37.872	.029
	55	.716	.395	.789	.184	.578	.368	15	45.446	.041
	56¼	.715	.394	.788	.182	.576	.364			
	57½	.715	.393	.787	.180	.573	.360			
27	00	2.714	3.392	6.784	10.176	13.568	20.353			
	02½	.713	.391	.782	.173	.563	.345			
	03¼	.712	.390	.780	.171	.561	.341			
	05	.712	.390	.779	.169	.558	.338			
	07½	.711	.388	.777	.165	.553	.330			
	10	2.710	3.387	6.774	10.161	13.548	20.323			
	11¼	.709	.386	.773	.159	.546	.319			
	12½	.709	.386	.772	.157	.543	.315			
	15	.708	.384	.769	.154	.538	.307			
	17½	.707	.383	.767	.150	.533	.300			
	18¾	.706	.383	.765	.148	.531	.296			
	20	2.706	3.382	6.764	10.146	13.528	20.292			
	22½	.705	.381	.762	.142	.523	.285			
	25	.704	.380	.759	.139	.518	.277			
	26¼	.703	.379	.758	.137	.516	273			
	27½	.703	.378	.756	.135	.513	.269			
	30	2.702	3.377	6.754	10.131	13.508	20.262			
	32½	.701	.376	.751	.127	.503	.254			
	33¾	.700	.375	.750	.125	.500	.250			
	35	.700	.374	.749	.123	.498	.247			
	37½	.699	.373	.746	.119	.493	.239			
	40	2.697	3.372	6.744	10.116	13.488	20.231			
	41¼	.697	.371	.742	.114	.485	.227			
	42½	.696	.371	.741	.112	.482	.224			
	45	.696	.369	.739	.108	.477	.216			
	47½	.694	.368	.736	.104	.472	.208			
	48¾	.694	.367	.735	.102	.470	.204			
	50	2.693	3.367	6.734	10.100	13.467	20.201			
	52½	.692	.365	.731	.096	.462	.193			
	55	.691	.364	.728	.093	.457	.185			
	56¼	.691	.364	.727	.091	.454	.181			
	57½	.690	.363	.726	.089	.452	.177			
28	00	2.689	3.362	6.723	10.085	13.446	20.170			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
28	00	2.689	3.362	6.723	10.085	13.446	20.170
	02½	.688	.360	.721	.081	.441	.162
	03¾	.688	.360	.719	.079	.439	.158
	05	.687	.359	.718	.077	.436	.154
	07½	.686	.358	.715	.073	.431	.146
	10	2.685	3.356	6.713	10.069	13.426	20.138
	11¼	.685	.356	.711	.067	.423	.134
	12½	.684	.355	.710	.065	.420	.131
	15	.683	.354	.708	.061	.415	.123
	17½	.682	.353	.705	.057	.410	.115
	18¾	.681	.352	.704	.055	.407	.111
	20	2.681	3.351	6.702	10.054	13.405	20.107
	22½	.680	.350	.700	.050	.399	.099
	25	.679	.349	.697	.046	.394	.091
	26¼	.678	.348	.696	.044	.392	.086
	27½	.678	.347	.694	.042	.389	.083
	30	2.677	3.346	6.692	10.038	13.384	20.076
	32½	.676	.345	.689	.034	.378	.068
	33¾	.675	.344	.688	.032	.376	.064
	35	.675	.343	.687	.030	.373	.060
	37½	.674	.342	.684	.026	.368	.052
	40	2.673	3.341	6.681	10.022	13.363	20.044
	41¼	.672	.340	.680	.020	.360	.040
	42½	.671	.339	.679	.018	.357	.036
	45	.670	.338	.676	.014	.352	.028
	47½	.669	.337	.673	.010	.347	.020
	48¾	.669	.336	.672	.008	.344	.016
	50	2.668	3.335	6.671	10.006	13.342	20.012
	52½	.667	.334	.668	.002	.336	.004
	55	.666	.333	.665	9.998	.331	19.996
	56¼	.666	.332	.664	.996	.328	.992
	57½	.665	.331	.663	.994	.326	.988
29	00	2.664	3.330	6.660	9.990	13.320	19.980
	02½	.663	.329	.657	.986	.315	.972
	03¾	.662	.328	.656	.984	.312	.968
	05	.662	.327	.655	.982	.309	.964
	07½	.661	.326	.652	.978	.304	.956
	10	2.660	3.325	6.649	9.974	13.299	19.948
	11¼	.659	.324	.648	.972	.296	.944
	12½	.659	.323	.647	.970	.293	.940
	15	.658	.322	.644	.966	.288	.932
	17½	.657	.321	.641	.962	.283	.924
	18¾	.656	.320	.640	.960	.280	.920
	20	2.655	3.319	6.639	9.958	13.277	19.916
	22½	.654	.318	.636	.954	.272	.908
	25	.653	.317	.633	.950	.266	.900
	26¼	.653	.316	.632	.948	.264	.896
	27½	.652	.315	.630	.946	.261	.891
	30	2.651	3.314	6.628	9.942	13.256	19.883
	32½	.650	.313	.625	.938	.250	.875
	33¾	.649	.312	.624	.936	.247	.871
	35	.649	.311	.622	.933	.245	.867
	37½	.648	.310	.620	.929	.239	.859
	40	2.647	3.308	6.617	9.925	13.234	19.851
	41¼	.646	.308	.616	.923	.231	.847
	42½	.646	.307	.614	.921	.228	.842
	45	.644	.306	.611	.917	.223	.834
	47½	.643	.304	.609	.913	.217	.826
	48¾	.643	.304	.607	.911	.215	.822
	50	2.642	3.303	6.606	9.909	13.212	19.818
	52½	.641	.302	.603	.905	.206	.810
	55	.640	.300	.600	.901	.201	.801
	56¼	.640	.300	.599	.899	.198	.797
	57½	.639	.299	.598	.897	.195	.793
30	00	2.638	3.297	6.595	9.892	13.190	19.785

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 28°	1¼	3.787	0.000
	2½	7.574	.001
	3¾	11.362	.003
	5	15.148	.005
	6¼	18.936	.007
	7½	22.723	.010
	10	30.297	.018
	12½	37.872	.029
	15	45.446	.041
For latitude 29°	1¼	3.788	0.000
	2½	7.575	.001
	3¾	11.363	.003
	5	15.151	.005
	6¼	18.939	.007
	7½	22.726	.011
	0	30.302	.019
	12½	37.878	.029
	15	45.453	.042
For latitude 30°	1¼	3.788	0.000
	2½	7.577	.001
	3¾	11.365	.003
	5	15.153	.005
	6¼	18.942	.007
	7½	22.730	.011
	10	30.306	.019
	12½	37.884	.030
	15	45.460	.043

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
30	00	2.638	3.297	6.595	9.892	13.190	19.785			
	02½	.637	.296	.592	.888	.184	.777			
	03¾	.636	.295	.591	.886	.182	.772			
	05	.636	.295	.589	.884	.179	.768			
	07½	.635	.293	.587	.880	.173	.760			
	10	2.633	3.292	6.584	9.876	13.168	19.752			
	11¼	.633	.291	.583	.874	.165	.748			
	12½	.632	.291	.581	.872	.162	.743			
	15	.631	.289	.578	.867	.157	.735			
	17½	.630	.288	.576	.863	.151	.727			
	18¾	.630	.287	.574	.861	.148	.723			
	20	2.629	3.286	6.573	9.859	13.146	19.719			
	22½	.628	.285	.570	.855	.140	.710			
	25	.627	.284	.567	.851	.135	.702			
	26¼	.626	.283	.566	.849	.132	.698			
	27½	.626	.282	.564	.847	.129	.693			
	30	2.625	3.281	6.562	9.843	13.123	19.685			
	32½	.623	.279	.559	.838	.118	.677			
	33¾	.623	.278	.557	.836	.115	.672			
	35	.622	.278	.556	.834	.112	.668			
	37½	.621	.277	.553	.830	.106	.660			
	40	2.620	3.275	6.550	9.826	13.101	19.651			
	41¼	.620	.275	.549	.824	.098	.647			
	42½	.619	.274	.548	.821	.095	.643			
	45	.618	.272	.545	.817	.090	.634			
	47½	.617	.271	.542	.813	.084	.626			
	48¾	.616	.270	.541	.811	.081	.622			
	50	2.616	3.270	6.539	9.809	13.078	19.618			
	52½	.615	.268	.536	.805	.073	.609			
	55	.613	.267	.534	.800	.067	.601			
	56¼	.613	.266	.532	.798	.064	.596			
	57½	.612	.265	.531	.796	.061	.592			
31	00	2.611	3.264	6.528	9.792	13.056	19.584			
	02½	.610	.263	.525	.788	.050	.575			
	03¾	.609	.262	.524	.785	.047	.571			
	05	.609	.261	.522	.783	.044	.566			
	07½	.608	.260	.519	.779	.039	.558			
	10	2.607	3.258	6.516	9.775	13.033	19.549			
	11¼	.606	.258	.515	.773	.030	.545			
	12½	.605	.257	.514	.770	.027	.541			
	15	.604	.255	.511	.766	.021	.532			
	17½	.603	.254	.508	.762	.016	.524			
	18¾	.603	.253	.506	.760	.013	.519			
	20	2.602	3.253	6.505	9.757	13.010	19.515			
	22½	.601	.251	.502	.753	.004	.506			
	25	.600	.250	.499	.749	12.999	.498			
	26¼	.599	.249	.498	.747	.996	.493			
	27½	.599	.248	.496	.745	.993	.489			
	30	2.597	3.247	6.494	9.740	12.987	19.481			
	32½	.596	.245	.491	.736	.981	.472			
	33¾	.596	.245	.489	.734	.978	.468			
	35	.595	.244	.488	.732	.976	.463			
	37½	.594	.242	.485	.727	.970	.455			
	40	2.593	3.241	6.482	9.723	12.964	19.446			
	41¼	.592	.240	.481	.721	.961	.442			
	42½	.592	.240	.479	.719	.958	.437			
	45	.591	.238	.476	.714	.952	.429			
	47½	.589	.237	.473	.710	.947	.420			
	48¾	.589	.236	.472	.708	.944	.416			
	50	2.588	3.235	6.470	9.706	12.941	19.411			
	52½	.587	.234	.467	.701	.935	.402			
	55	.586	.232	.465	.697	.929	.394			
	56¼	.585	.232	.463	.695	.926	.389			
	57½	.585	.231	.462	.693	.923	.385			
32	00	2.583	3.229	6.459	9.688	12.917	19.376			
								For latitude 30° 1¼′	3.788	0.000
								2½′	7.577	.001
								3¾′	11.365	.003
								5′	15.153	.005
								6¼′	18.942	.007
								7½′	22.730	.011
								10′	30.306	.019
								12½′	37.884	.030
								15′	45.460	.043
								For latitude 31° 1¼′	3.789	0.000
								2½′	7.578	.001
								3¾′	11.367	.003
								5′	15.155	.005
								6¼′	18.945	.008
								7½′	22.733	.011
								10′	30.311	.020
								12½′	37.890	.031
								15′	45.467	.044
								For latitude 32° 1¼′	3.789	0.000
								2½′	7.579	.001
								3¾′	11.369	.003
								5′	15.158	.005
								6¼′	18.948	.008
								7½′	22.737	.011
								10′	30.316	.020
								12½′	37.896	.031
								15′	45.474	.045

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{2\,400}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
32	00	2.583	3.229	6.459	9.688	12.917	19.376			
	02½	.582	.228	.456	.684	.912	.367			
	03¾	.582	.227	.454	.681	.909	.363			
	05	.581	.226	.453	.679	.906	.359			
	07½	.580	.225	.450	.675	.900	.351			
	10	2.579	3.224	6.447	9.671	12.894	19.341			
	11¼	.578	.223	.445	.668	.891	.337			
	12½	.578	.222	.444	.666	.888	.332			
	15	.576	.221	.441	.662	.882	.323			
	17½	.575	.219	.438	.657	.876	.315			
	18¾	.575	.218	.437	.655	.873	.310			
	20	2.574	3.218	6.435	9.653	12.871	19.306			
	22½	.573	.216	.432	.649	.865	.297			
	25	.572	.215	.429	.644	.859	.288			
	26¼	.571	.214	.428	.642	.856	.284			
	27½	.571	.213	.426	.640	.853	.279			
	30	2.569	3.212	6.423	9.635	12.847	19.270			
	32½	.568	.210	.420	.631	.841	.261			
	33¾	.568	.209	.419	.628	.838	.257			
	35	.567	.209	.417	.626	.835	.252			
	37½	.566	.207	.415	.622	.829	.244			
	40	2.565	3.206	6.412	9.617	12.823	19.235			
	41¼	.564	.205	.410	.615	.820	.230			
	42½	.562	.204	.409	.613	.817	.226			
	45	.562	.203	.406	.608	.811	.217			
	47½	.561	.201	.403	.604	.805	.208			
	48¾	.560	.201	.401	.602	.802	.203			
	50	2.560	3.200	6.400	9.599	12.799	19.199			
	52½	.559	.198	.397	.595	.793	.190			
	55	.557	.197	.394	.590	.787	.181			
	56¼	.557	.196	.392	.588	.784	.176			
	57½	.556	.195	.391	.586	.781	.172			
33	00	2.555	3.194	6.388	9.581	12.775	19.163			
	02½	.554	.192	.385	.577	.769	.154			
	03¾	.553	.192	.383	.575	.766	.149			
	05	.553	.191	.382	.572	.763	.145			
	07½	.551	.189	.379	.568	.757	.136			
	10	2.550	3.188	6.376	9.563	12.751	19.127			
	11¼	.550	.187	.374	.561	.748	.122			
	12½	.549	.186	.373	.559	.745	.118			
	15	.548	.185	.370	.554	.739	.109			
	17½	.547	.183	.367	.550	.733	.100			
	18¾	.546	.183	.365	.548	.730	.095			
	20	2.545	3.182	6.364	9.545	12.727	19.091			
	22½	.544	.180	.360	.541	.721	.081			
	25	.543	.179	.357	.536	.715	.072			
	26¼	.542	.178	.356	.534	.712	.068			
	27½	.542	.177	.354	.532	.709	.063			
	30	2.540	3.176	6.351	9.527	12.703	19.054			
	32½	.539	.174	.348	.523	.697	.045			
	33¾	.539	.173	.347	.520	.694	.040			
	35	.538	.173	.345	.518	.691	.036			
	37½	.537	.171	.342	.513	.684	.027			
	40	2.536	3.170	6.339	9.509	12.678	19.017			
	41¼	.535	.169	.338	.506	.675	.013			
	42½	.535	.168	.336	.504	.672	.008			
	45	.533	.167	.333	.500	.666	18.999			
	47½	.532	.165	.330	.495	.660	.990			
	48¾	.531	.164	.328	.493	.657	.985			
	50	2.531	3.163	6.327	9.490	12.654	18.981			
	52½	.530	.162	.324	.486	.648	.972			
	55	.528	.160	.321	.481	.642	.962			
	56¼	.528	.160	.319	.479	.638	.958			
	57½	.527	.159	.318	.477	.635	.953			
34	00	2.526	3.157	6.315	9.472	12.629	18.944			
For latitude 32°								1¼	3.789	0.000
								2½	7.579	.001
								3¾	11.369	.003
								5	15.158	.005
								6¼	18.948	.008
								7½	22.737	.011
								10	30.316	.020
								12½	37.896	.031
								15	45.474	.045
For latitude 33°								1¼	3.790	0.000
								2½	7.580	.001
								3¾	11.370	.003
								5	15.160	.005
								6¼	18.951	.008
								7½	22.741	.011
								10	30.321	.020
								12½	37.902	.032
								15	45.481	.046
For latitude 34°								1¼	3.791	0.000
								2½	7.581	.001
								3¾	11.372	.003
								5	15.162	.005
								6¼	18.954	.008
								7½	22.744	.011
								10	30.326	.021
								12½	37.908	.032
								15	45.489	.046

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{2400000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
34	00	2.526	3.157	6.315	9.472	12.629	18.944			
	02½	.525	.156	.312	.467	.623	.935	1¼	3.791	0.000
	03¾	.524	.155	.310	.465	.620	.930	2½	7.581	.001
	05	.523	.154	.308	.463	.617	.925	3¾	11.372	.003
	07½	.522	.153	.305	.458	.611	.916	5	15.162	.005
								For latitude 34° 6¼	18.954	.008
								7½	22.744	.011
	10	2.521	3.151	6.302	9.453	12.605	18.907	10	30.326	.021
	11¼	.520	.150	.301	.451	.601	.902	12½	37.908	.032
	12½	.520	.150	.299	.449	.598	.898	15	45.489	.046
	15	.519	.148	.296	.444	.592	.888			
	17½	.517	.146	.293	.439	.586	.879			
	18¾	.517	.146	.291	.437	.583	.874			
								1¼	3.791	0.000
	20	2.516	3.145	6.290	9.435	12.580	18.870	2½	7.583	.001
	22½	.515	.143	.287	.430	.574	.860	3¾	11.374	.003
	25	.513	.142	.284	.425	.567	.851	5	15.165	.005
	26¼	.513	.141	.282	.423	.564	.846	For latitude 35° 6¼	18.957	.008
	27½	.512	.140	.281	.421	.561	.842	7½	22.748	.012
								10	30.331	.021
	30	2.511	3.139	6.277	9.416	12.555	18.832	12½	37.914	.033
	32½	.510	.137	.274	.411	.549	.823	15	45.496	.047
	33¾	.509	.136	.273	.409	.545	.818			
	35	.508	.136	.271	.407	.542	.814			
	37½	.507	.134	.268	.402	.536	.804			
								1¼	3.792	0.000
	40	2.506	3.132	6.265	9.397	12.530	18.795	2½	7.584	.001
	41¼	.505	.132	.263	.395	.527	.790	3¾	11.376	.003
	42½	.505	.131	.262	.393	.523	.785	5	15.168	.005
	45	.503	.129	.259	.388	.517	.776	For latitude 36° 6¼	18.960	.008
	47½	.502	.128	.255	.383	.511	.766	7½	22.752	.012
	48¾	.502	.127	.254	.381	.508	.762	10	30.336	.021
								12½	37.921	.033
	50	2.501	3.126	6.252	9.378	12.505	18.757	15	45.504	.047
	52½	.500	.125	.249	.374	.498	.747			
	55	.498	.123	.246	.369	.492	.738			
	56¼	.498	.122	.244	.367	.489	.733			
	57½	.497	.121	.243	.364	.486	.728			
35	00	2.496	3.120	6.240	9.359	12.479	18.719			
	02½	.495	.118	.237	.355	.473	.710			
	03¾	.494	.117	.235	.352	.470	.705			
	05	.493	.117	.233	.350	.467	.700			
	07½	.492	.115	.230	.345	.460	.691			
	10	2.491	3.113	6.227	9.341	12.454	18.681			
	11¼	.490	.113	.225	.338	.451	.676			
	12½	.490	.112	.224	.336	.448	.672			
	15	.488	.110	.221	.331	.441	.662			
	17½	.487	.109	.217	.326	.435	.652			
	18¾	.486	.108	.216	.324	.432	.648			
	20	2.486	3.107	6.214	9.321	12.428	18.643			
	22½	.484	.106	.211	317	.422	.633			
	25	.483	.104	.208	.312	.416	.624			
	26¼	.482	.103	.206	.309	.413	.619			
	27½	.482	.102	.205	.307	.409	.614			
	30	2.481	3.101	6.202	9.302	12.403	18.605			
	32½	.479	.099	.198	.297	.397	.595			
	33¾	.479	.098	.197	.295	.393	.590			
	35	.478	.098	.195	.293	.390	.585			
	37½	.477	.096	.192	.288	.384	.576			
	40	2.476	3.094	6.189	9.283	12.377	18.566			
	41¼	.475	.093	.187	.281	.374	.561			
	42½	.474	.093	.185	.278	.371	.556			
	45	.473	.091	.182	.273	.364	.547			
	47½	.472	.089	.179	.268	.358	.537			
	48¾	.471	.089	.177	.266	.355	.532			
	50	2.470	3.088	6.176	9.264	12.352	18.527			
	52½	.469	.086	.172	.259	.345	.518			
	55	.468	.085	.169	.254	.339	.508			
	56¼	.467	.084	.168	.252	.335	.503			
	57½	.466	.083	.166	.249	.332	.498			
36	00	2.465	3.081	6.163	9.244	12.326	18.488			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{2\,4\,0\,0\,0}$—Continued

Latitude of parallel		Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
36	00	2.465	3.081	6.163	9.244	12.326	18.488
	02½	.464	.080	.160	.239	.319	.479
	03¾	.463	.079	.158	.237	.316	.474
	05	.463	.078	.156	.234	.313	.469
	07½	.461	.077	.153	.230	.306	.459
	10	2.460	3.075	6.150	9.225	12.300	18.450
	11¼	.459	.074	.148	.222	.296	.445
	12½	.459	.073	.147	.220	.293	.440
	15	.457	.072	.143	.215	.287	.430
	17½	.456	.070	.140	.210	.280	.420
	18¾	.455	.069	.138	.208	.277	.415
	20	2.455	3.068	6.137	9.205	12.274	18.410
	22½	.453	.067	.134	.200	.267	.401
	25	.452	.065	.130	.195	.260	.391
	26¼	.451	.064	.129	.193	.257	.386
	27½	.451	.063	.127	.190	.254	.381
	30	2.449	3.062	6.124	9.186	12.247	18.371
	32½	.448	.060	.120	.181	.241	.361
	33¾	.447	.059	.119	.178	.238	.356
	35	.447	.059	.117	.176	.234	.351
	37½	.446	.057	.114	.171	.228	.342
	40	2.444	3.055	6.111	9.166	12.221	18.332
	41¼	.444	.054	.109	.163	.218	.327
	42½	.443	.054	.107	.161	.215	.322
	45	.442	.052	.104	.156	.208	.312
	47½	.440	.050	.101	.151	.201	.302
	48¾	.440	.050	.099	.149	.198	.297
	50	2.439	3.049	6.097	9.146	12.195	18.292
	52½	.438	.047	.094	.141	.188	.282
	55	.436	.045	.091	.136	.181	.272
	56¼	.436	.045	.089	.134	.178	.267
	57½	.435	.044	.087	.131	.175	.262
37	00	2.434	3.042	6.084	9.126	12.168	18.252
	02½	.432	.040	.081	.121	.162	.242
	03¾	.432	.040	.079	.119	.158	.237
	05	.431	.039	.077	.116	.155	.232
	07½	.430	.037	.074	.111	.148	.222
	10	2.428	3.035	6.071	9.106	12.142	18.212
	11¼	.428	.035	.069	.104	.138	.207
	12½	.427	.034	.067	.101	.135	.102
	15	.426	.032	.064	.096	.128	.192
	17½	.424	.030	.061	.091	.121	.182
	18¾	.424	.030	.059	.089	.118	.177
	20	2.423	3.029	6.057	9.086	12.115	18.172
	22½	.422	.027	.054	.081	.108	.162
	25	.420	.025	.051	.076	.101	.152
	26¼	.420	.025	.049	.074	.098	.147
	27½	.419	.024	.047	.071	.095	.142
	30	2.418	3.022	6.044	9.066	12.088	18.132
	32½	.416	.020	.041	.061	.081	.122
	33¾	.416	.020	.039	.059	.078	.117
	35	.415	.019	.037	.056	.075	.112
	37½	.414	.017	.034	.051	.068	.102
	40	2.412	3.015	6.031	9.046	12.061	18.092
	41¼	.412	.014	.029	.043	.058	.087
	42½	.411	.014	.027	.041	.054	.082
	45	.410	.012	.024	.036	.048	.071
	47½	.408	.010	.020	.031	.041	.061
	48¾	.407	.009	.019	.028	.038	.056
	50	2.407	3.009	6.017	9.026	12.034	18.051
	52½	.405	.007	.014	.021	.027	.041
	55	.404	.005	.010	.015	.021	.031
	56¼	.403	.004	.009	.013	.017	.026
	57½	.403	.003	.007	.010	.014	.021
38	00	2.401	3.002	6.004	9.005	12.007	18.011

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 36°	1¼	3.792	0.000
	2½	7.584	.001
	3¾	11.376	.003
	5	15.168	.005
	6¼	18.960	.008
	7½	22.752	.012
	10	30.336	.021
	12½	37.921	.033
	15	45.504	.047
For latitude 37°	1¼	3.793	0.000
	2½	7.585	.001
	3¾	11.378	.003
	5	15.170	.005
	6¼	18.964	.008
	7½	22.756	.012
	10	30.341	.021
	12½	37.927	.033
	15	45.512	.048
For latitude 38°	1¼	3.793	0.000
	2½	7.587	.001
	3¾	11.380	.003
	5	15.173	.005
	6¼	18.967	.008
	7½	22.760	.012
	10	30.346	.021
	12½	37.935	.034
	15	45.520	.048

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
38	00	2.401	3.002	6.004	9.005	12.007	18.011			
	02½	.400	.000	.000	.000	.000	.000	1¼	3.793	0.000
	03¾	.399	2.999	5.998	8.998	11.997	17.995	2½	7.587	.001
	05	.399	.998	.997	.995	.993	.990	3¾	11.380	.003
	07½	.397	.997	.993	.990	.987	.980	5	15.173	.005
								For latitude 38° 6¼	18.967	.008
	10	2.396	2.995	5.990	8.985	11.980	17.970	7½	22.760	.012
	11¼	.395	.994	.988	.982	.976	.965	10	30.346	.021
	12½	.395	.993	.986	.980	.973	.959	12½	37.935	.034
	15	.393	.992	.983	.975	.966	.949	15	45.520	.048
	17½	.392	.990	.980	.969	.959	.939			
	18¾	.391	.989	.978	.967	.956	.934			
	20	2.391	2.988	5.976	8.964	11.952	17.929	1¼	3.794	0.000
	22½	.389	.986	.973	.959	.946	.918	2½	7.588	.001
	25	.388	.985	.969	.954	.939	.908	3¾	11.382	.003
	26¼	.387	.984	.968	.951	.935	.903	5	15.176	.005
	27½	.386	.983	.966	.949	.932	.898	For latitude 39° 6¼	18.970	.008
								7½	22.764	.012
	30	2.385	2.981	5.963	8.944	11.925	17.888	10	30.352	.022
	32½	.384	.980	.959	.939	.918	.877	12½	37.940	.034
	33¾	.383	.979	.957	.936	.915	.872	15	45.527	.049
	35	.382	.978	.956	.933	.911	.867			
	37½	.381	.976	.952	.928	.904	.857			
	40	2.380	2.974	5.949	8.923	11.897	17.846	1¼	3.795	0.000
	41¼	.379	.974	.947	.921	.894	.841	2½	7.589	.001
	42½	.378	.973	.945	.918	.891	.836	3¾	11.384	.003
	45	.377	.971	.942	.913	.884	.826	5	15.178	.005
	47½	.375	.969	.938	.908	.877	.815	For latitude 40° 6¼	18.973	.009
	48¾	.375	.968	.937	.905	.873	.810	7½	22.768	.012
								10	30.357	.022
	50	2.374	2.967	5.935	8.902	11.870	17.805	12½	37.947	.034
	52½	.373	.966	.931	.897	.863	.794	15	45.536	.049
	55	.371	.964	.928	.892	.856	.784			
	56¼	.370	.963	.926	.889	.852	.779			
	57½	.370	.962	.924	.887	.849	.774			
39	00	2.368	2.961	5.921	8.882	11.842	17.763			
	02½	.367	.959	.918	.876	.835	.753			
	03¾	.366	.958	.916	.874	.832	.748			
	05	.366	.957	.914	.871	.828	.742			
	07½	.364	.955	.911	.866	.821	.732			
	10	2.363	2.954	5.907	8.861	11.814	17.721			
	11¼	.362	.953	.905	.858	.811	.716			
	12½	.361	.952	.904	.856	.807	.711			
	15	.360	.950	.900	.850	.800	.701			
	17½	.359	.948	.897	.845	.793	.690			
	18¾	.358	.947	.895	.842	.790	.685			
	20	2.357	2.947	5.893	8.840	11.786	17.680			
	22½	.356	.945	.890	.835	.779	.669			
	25	.354	.943	.886	.829	.772	.658			
	26¼	.354	.942	.884	.827	.769	.653			
	27½	.353	.941	.883	.824	.765	.648			
	30	2.352	2.940	5.879	8.819	11.758	17.638			
	32½	.350	.938	.876	.813	.751	.627			
	33¾	.350	.937	.874	.811	.748	.622			
	35	.349	.936	.872	.808	.744	.616			
	37½	.347	.934	.869	.803	.737	.606			
	40	2.346	2.933	5.865	8.798	11.730	17.595			
	41¼	.345	.932	.863	.795	.727	.590			
	42½	.345	.931	.862	.792	.723	.585			
	45	.343	.929	.858	.787	.716	.574			
	47½	.342	.927	.855	.782	.709	.564			
	48¾	.341	.926	.853	.779	.705	.558			
	50	2.340	2.925	5.851	8.776	11.702	17.553			
	52½	.339	.924	.847	.777	.695	.542			
	55	.338	.922	.844	.766	.688	.532			
	56¼	.337	.921	.842	.763	.684	.526			
	57½	.336	.920	.840	.761	.681	.521			
40	00	2.335	2.918	5.837	8.755	11.674	17.510			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
40 00	2.335	2.918	5.837	8.755	11.674	17.510
02½	.333	.917	.833	.750	.667	.500
03¾	.333	.916	.831	.747	.663	.494
05	.332	.915	.830	.745	.659	.489
07½	.330	.913	.826	.739	.652	.479
10	2.329	2.911	5.823	8.734	11.645	17.468
11¼	.328	.910	.821	.731	.642	.462
12½	.328	.910	.819	.729	.638	.457
15	.326	.908	.815	.723	.631	.446
17½	.325	.906	.812	.718	.624	.436
18¾	.324	.905	.810	.715	.620	.430
20	2.323	2.904	5.808	8.712	11.617	17.425
22½	.322	.902	.805	.707	.610	.414
25	.321	.901	.801	.702	.602	.404
26¼	.320	.900	.799	.699	.599	.398
27½	.319	.899	.798	.696	.595	.393
30	2.318	2.897	5.794	8.691	11.588	17.382
32½	.316	.895	.790	.686	.581	.371
33¾	.315	.894	.789	.683	.577	.366
35	.315	.893	.787	.680	.574	.361
37½	.313	.892	.783	.675	.567	.350
40	2.312	2.890	5.780	8.670	11.559	17.339
41¼	.311	.889	.778	.667	.556	.334
42½	.310	.888	.776	.664	.552	.328
45	.309	.886	.772	.659	.545	.317
47½	.308	.884	.769	.653	.538	.306
48¾	.307	.884	.767	.651	.534	.301
50	2.306	2.883	5.765	8.648	11.531	17.296
52½	.305	.881	.762	.642	.523	.285
55	.303	.879	.758	.637	.516	.274
56¼	.303	.878	.756	.634	.512	.269
57½	.302	.877	.754	.632	.509	.263
41 00	2.300	2.875	5.751	8.626	11.502	17.252
02½	.299	.874	.747	.621	.494	.241
03¾	.298	.873	.745	.618	.491	.236
05	.297	.872	.744	.615	.487	.231
07½	.296	.870	.740	.610	.480	.220
10	2.295	2.868	5.736	8.604	11.473	17.209
11¼	.294	.867	.734	.602	.469	.203
12½	.293	.866	.733	.599	.465	.198
15	.292	.864	.729	.594	.458	.187
17½	.290	.863	.725	.588	.451	.176
18¾	.289	.862	.724	.585	.447	.171
20	2.289	2.862	5.722	8.583	11.443	17.165
22½	.287	.859	.718	.577	.436	.154
25	.286	.857	.714	.572	.429	.143
26¼	.285	.856	.713	.569	.425	.138
27½	.284	.855	.711	.566	.422	.132
30	2.283	2.854	5.707	8.561	11.414	17.121
32½	.281	.852	.703	.555	.407	.110
33¾	.281	.851	.702	.552	.403	.105
35	.280	.850	.700	.550	.400	.099
37½	.279	.848	.696	.544	.392	.088
40	2.277	2.846	5.692	8.539	11.385	17.077
41¼	.276	.845	.691	.536	.381	.072
42½	.276	.844	.689	.533	.378	.066
45	.274	.843	.685	.528	.370	.055
47½	.273	.841	.681	.522	.363	.044
48¾	.272	.840	.680	.519	.359	.039
50	2.271	2.839	5.678	8.517	11.356	17.033
52½	.270	.837	.674	.511	.348	.022
55	.268	.835	.670	.506	.341	.011
56¼	.267	.834	.669	.503	.337	.006
57½	.267	.833	.667	.500	.333	.000
42 00	2.265	2.831	5.663	8.494	11.326	16.989

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 40°	1¼	3.795	0.000
	2½	7.589	.001
	3¾	11.384	.003
	5	15.178	.005
	6¼	18.973	.009
	7½	22.768	.012
	10	30.357	.022
	12½	37.947	.034
	15	45.536	.049
For latitude 41°	1¼	3.795	0.000
	2½	7.590	.001
	3¾	11.386	.003
	5	15.181	.005
	6¼	18.977	.009
	7½	22.772	.012
	10	30.362	.022
	12½	37.953	.034
	15	45.544	.049
For latitude 42°	1¼	3.796	0.000
	2½	7.592	.001
	3¾	11.388	.003
	5	15.184	.006
	6¼	18.980	.009
	7½	22.776	.012
	10	30.367	.022
	12½	37.960	.034
	15	45.551	.050

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
	Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	1′	1¼′	2½′	3¾′	5	7½′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
42 00	2.265	2.831	5.663	8.494	11.326	16.989			
02½	.264	.830	.659	.489	.319	.978	1¼	3.796	0.000
03¾	.263	.829	.657	.486	.315	.972	2½	7.592	.001
05	.262	.828	.656	.483	.311	.967	3¾	11.388	.003
07½	.261	.826	.652	.478	.304	.956	For latitude 42° 5	15.184	.006
							6¼	18.980	.009
10	2.259	2.824	5.648	8.472	11.296	16.945	7½	22.776	.012
11¼	.259	.823	.646	.470	.293	.939	10	30.367	.022
12½	.258	.822	.644	.467	.289	.933	12½	37.960	.034
15	.256	.820	.641	.462	.282	.922	15	45.551	.050
17½	.255	.819	.637	.456	.274	.911			
18¾	.254	.818	.635	.453	.270	.906			
20	2.253	2.817	5.633	8.450	11.267	16.900	1¼	3.797	0.000
22½	.252	.815	.630	.444	.259	.889	2½	7.593	.001
25	.250	.813	.626	.439	.252	.878	3¾	11.390	.003
26¼	.250	.812	.624	.436	.248	.872	For latitude 43° 5	15.186	.006
27½	.249	.811	.622	.433	.244	.867	6¼	18.983	.009
							7½	22.780	.012
30	2.247	2.809	5.618	8.428	11.237	16.855	10	30.373	.022
32½	.246	.807	.615	.422	.229	.844	12½	37.967	.035
33¾	.245	.807	.613	.419	.226	.839	15	45.560	.050
35	.244	.805	.611	.416	.222	.833			
37½	.243	.804	.607	.411	.215	.822			
							1¼	3.797	0.000
40	2.241	2.802	5.604	8.405	11.207	16.811	2½	7.594	.001
41¼	.241	.801	.602	.402	.203	.805	3¾	11.392	.003
42½	.240	.800	.600	.400	.200	.799	For latitude 44° 5	15.189	.006
45	.238	.798	.596	.394	.192	.788	6¼	18.987	.009
47½	.237	.796	.592	.388	.184	.777	7½	22.784	.012
48¾	.236	.795	.590	.386	.181	.771	10	30.378	.022
							12½	37.974	.035
50	2.235	2.794	5.589	8.383	11.177	16.766	15	45.568	.050
52½	.234	.792	.585	.377	.169	.754			
55	.232	.790	.581	.371	.162	.743			
56¼	.232	.790	.579	.369	.158	.737			
57½	.231	.789	.577	.366	.154	.732			
43 00	2.229	2.787	5.574	8.360	11.147	16.721			
02½	.228	.785	.570	.355	.139	.709			
03¾	.227	.784	.568	.352	.136	.704			
05	.226	.783	.566	.349	.132	.698			
07½	.225	.781	.562	.343	.124	.687			
10	2.223	2.779	5.558	8.338	11.117	16.675			
11¼	.223	.778	.557	.335	.113	.670			
12½	.222	.777	.555	.332	.109	.664			
15	.220	.775	.551	.326	.102	652			
17½	.219	.774	.547	.321	.094	.641			
18¾	.218	.773	.545	.318	.090	.635			
20	2.217	2.772	5.543	8.315	11.086	16.630			
22½	.216	.770	.539	.309	.079	.618			
25	.214	.768	.536	.304	.071	.607			
26¼	.213	.767	.534	.301	.068	.601			
27½	.213	.766	.532	.298	.064	.596			
30	2.211	2.764	5.528	8.292	11.056	16.584			
32½	.210	.762	.524	.286	.049	.573			
33¾	.209	.761	.522	.284	.045	.567			
35	.208	.760	.520	.281	.041	.561			
37½	.207	.758	.517	.275	.033	.550			
40	2.205	2.756	5.513	8.269	11.026	16.538			
41¼	.204	.755	.511	.266	.022	.533			
42½	.204	.754	.509	.263	.018	.527			
45	.202	.753	.505	.258	.010	.516			
47½	.201	.751	.501	.252	.003	.504			
48¾	.200	.750	.499	.249	10.999	.498			
50	2.199	2.749	5.498	8.246	10.995	16.493			
52½	.197	.747	.494	.241	.987	.481			
55	.196	.745	.490	.235	.980	.470			
56¼	.195	.744	.488	.232	.976	.464			
57½	.194	.743	.486	.229	.972	.458			
44 00	2.193	2.741	5.482	8.223	10.964	16.447			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
44	00	2.193	2.741	5.482	8.223	10.964	16.447			
	02½	.191	.739	.478	.218	.957	.435	1¼	3.797	0.000
	03¾	.191	.738	.476	.215	.953	.429	2½	7.594	.001
	05	.190	.737	.475	.212	.949	.424	3¾	11.392	.003
	07½	.188	.735	.471	.206	.941	.412	5	15.189	.006
								For latitude 44° 6¼	18.987	.009
	10	2.187	2.733	5.467	8.200	10.934	16.401	7½	22.784	.012
	11¼	.186	.732	.465	.197	.930	.395	10	30.378	.022
	12½	.185	.732	.463	.195	.926	.389	12½	37.974	.035
	15	.184	.730	.459	.189	.918	.376	15	45.568	.050
	17½	.182	.728	.455	.183	.911	.366			
	18¾	.181	.727	.453	.180	.907	.360			
								1¼	3.798	0.000
	20	2.181	2.726	5.451	8.177	10.903	16.354	2½	7.596	.001
	22½	.179	.724	.448	.171	.895	.343	3¾	11.394	.003
	25	.177	.722	.444	.166	.887	.331	5	15.192	.006
	26¼	.177	.721	.442	.163	.884	.325	For latitude 45° 6¼	18.990	.009
	27½	.176	.720	.440	.160	.880	.320	7½	22.788	.012
								10	30.384	.022
	30	2.174	2.718	5.436	8.154	10.872	16.308	12½	37.980	.035
	32½	.173	.716	.432	.148	.864	.296	15	45.576	.050
	33¾	.172	.715	.430	.145	.860	.291			
	35	.171	.714	.428	.142	.856	.285			
	37½	.170	.712	.424	.137	.849	.273			
								1¼	3.799	0.000
	40	2.168	2.710	5.420	8.131	10.841	16.261	2½	7.597	.001
	41¼	.167	.709	.419	.128	.837	.256	3¾	11.396	.003
	42½	.167	.708	.417	.125	.833	.250	5	15.194	.006
	45	.165	.706	.413	.119	.825	.238	For latitude 46° 6¼	18.994	.009
	47½	.164	.704	.409	.113	.818	.227	7½	22.792	.012
	48¾	.163	.703	.407	.110	.814	.221	10	30.389	.022
								12½	37.987	.035
	50	2.162	2.702	5.405	8.107	10.810	16.215	15	45.584	.050
	52½	.160	.701	.401	.102	.802	.203			
	55	.159	.699	.397	.096	.794	.191			
	56¼	.158	.698	.395	.093	.790	.186			
	57½	.157	.697	.393	.090	.787	.180			
45	00	2.156	2.695	5.389	8.084	10.779	16.168			
	02½	.154	.693	.385	.078	.770	.156			
	03¾	.153	.692	.383	.075	.767	.150			
	05	.153	.691	.381	.072	.763	.144			
	07½	.151	.689	.378	.066	.755	.133			
	10	2.149	2.687	5.374	8.061	10.747	16.121			
	11¼	.149	.686	.372	.058	.743	.115			
	12½	.148	.685	.370	.055	.740	.109			
	15	.146	.683	.366	.049	.732	.097			
	17½	.145	.681	.362	.043	.724	.086			
	18¾	.144	.680	.360	.040	.720	.080			
	20	2.143	2.679	5.358	8.037	10.716	16.074			
	22½	.142	.677	.354	.031	.708	.062			
	25	.140	.675	.350	.025	.700	.050			
	26¼	.139	.674	.348	.022	.696	.045			
	27½	.139	.673	.346	.019	.692	.039			
	30	2.137	2.671	5.342	8.013	10.685	16.027			
	32½	.135	.669	.338	.007	.677	.015			
	33¾	.134	.668	.336	.004	.673	.009			
	35	.134	.667	.334	.001	.669	.003			
	37½	.132	.665	.330	7.996	.661	15.991			
	40	2.131	2.663	5.326	7.990	10.653	15.979			
	41¼	.130	.662	.324	.987	.649	.973			
	42½	.129	.661	.323	.984	.645	.968			
	45	.127	.659	.319	.978	.637	.956			
	47½	.126	.657	.315	.972	.629	.944			
	48¾	.125	.656	.313	.969	.625	.938			
	50	2.124	2.655	5.311	7.966	10.621	15.932			
	52½	.123	.653	.307	.960	.613	.920			
	55	.121	.651	.303	.954	.605	.908			
	56¼	.120	.650	.301	.951	.601	.902			
	57½	.119	.649	.299	.948	.597	.896			
46	00	2.118	2.647	5.295	7.942	10.590	15.884			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
46	00	2.118	2.647	5.295	7.942	10.590	15.884
	02½	.116	.645	.291	.936	.582	.872
	03¾	.116	.644	.289	.933	.578	.867
	05	.115	.643	.287	.930	.574	.861
	07½	.113	.641	.283	.924	.566	.849
	10	2.112	2.639	5.279	7.918	10.558	15.837
	11¼	.111	.638	.277	.915	.554	.831
	12½	.110	.637	.275	.912	.550	.825
	15	.108	.635	.271	.906	.542	.813
	17½	.107	.633	.267	.900	.534	.801
	18¾	.106	.632	.265	.897	.530	.795
	20	2.105	2.631	5.263	7.894	10.526	15.789
	22½	.104	.629	.259	.888	.518	.777
	25	.102	.627	.255	.882	.510	.765
	26¼	.101	.626	.253	.879	.506	.759
	27½	.100	.625	.251	.876	.502	.753
	30	2.099	2.623	5.247	7.870	10.494	15.741
	32½	.097	.621	.243	.864	.486	.729
	33¾	.096	.620	.241	.861	.482	.723
	35	.096	.619	.239	.858	.478	.717
	37½	.094	.617	.235	.852	.470	.705
	40	2.092	2.615	5.231	7.846	10.462	15.692
	41¼	.092	.614	.229	.843	.458	.686
	42½	.091	.613	.227	.840	.454	.680
	45	.089	.611	.223	.834	.446	.668
	47½	.087	.609	.219	.828	.438	.656
	48¾	.087	.608	.217	.825	.434	.650
	50	2.086	2.607	5.215	7.822	10.429	15.644
	52½	.084	.605	.211	.816	.421	.632
	55	.083	.603	.207	.810	.413	.620
	56¼	.082	.602	.205	.807	.409	.614
	57½	.081	.601	.203	.804	.405	.608
47	00	2.079	2.599	5.199	7.798	10.397	15.596
	02½	.078	.597	.195	.792	.389	.584
	03¾	.077	.596	.192	.789	.385	.577
	05	.076	.595	.190	.786	.381	.571
	07½	.075	.593	.186	.780	.373	.559
	10	2.073	2.591	5.182	7.774	10.365	15.547
	11¼	.072	.590	.180	.771	.361	.541
	12½	.071	.589	.178	.768	.357	.535
	15	.070	.587	.174	.763	.349	.523
	17½	.068	.585	.170	.755	.341	.511
	18¾	.067	.584	.168	.752	.336	.505
	20	2.066	2.583	5.166	7.749	10.332	15.499
	22½	.065	.581	.162	.743	.324	.486
	25	.063	.579	.158	.737	.316	.474
	26¼	.062	.578	.156	.734	.312	.468
	27½	.062	.577	.154	.731	.308	.462
	30	2.060	2.575	5.150	7.725	10.300	15.450
	32½	.058	.573	.146	.719	.292	.437
	33¾	.058	.572	.144	.716	.288	.431
	35	.057	.571	.142	.713	.284	.425
	37½	.055	.569	.138	.706	.275	.413
	40	2.053	2.566	5.134	7.700	10.267	15.401
	41¼	.053	.566	.131	.697	.263	.394
	42½	.052	.565	.129	.694	.259	.388
	45	.050	.563	.125	.688	.251	.376
	47½	.049	.561	.121	.682	.243	.364
	48¾	.048	.560	.119	.679	.239	.358
	50	2.047	2.559	5.117	7.676	10.234	15.352
	52½	.045	.557	.113	.670	.226	.339
	55	.044	.555	.109	.664	.218	.327
	56¼	.043	.553	.107	.660	.214	.321
	57½	.042	.552	.105	.657	.210	.315
48	00	2.040	2.550	5.101	7.651	10.202	15.302

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 46°	1¼	3.799	0.000
	2½	7.597	.001
	3¾	11.396	.003
	5	15.194	.006
	6¼	18.994	.009
	7½	22.792	.012
	10	30.389	.022
	12½	37.987	.035
	15	45.584	.050
For latitude 47°	1¼	3.799	0.000
	2½	7.599	.001
	3¾	11.398	.003
	5	15.197	.006
	6¼	18.997	.009
	7½	22.796	.012
	10	30.394	.022
	12½	37.994	.035
	15	45.592	.050
For latitude 48°	1¼	3.800	0.000
	2½	7.600	.001
	3¾	11.400	.003
	5	15.200	.006
	6¼	19.000	.009
	7½	22.800	.012
	10	30.400	.021
	12½	38.001	.035
	15	45.600	.050

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{240000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
48	00	2.040	2.550	5.101	7.651	10.202	15.302
	02½	.039	.548	.097	.645	.193	.290
	03¾	.038	.547	.095	.642	.189	.284
	05	.037	.546	.093	.639	.185	.278
	07½	.035	.544	.088	.633	.177	.265
	10	2.034	2.542	5.084	7.626	10.169	15.253
	11¼	.033	.541	.082	.623	.165	.247
	12½	.032	.540	.080	.620	.160	.241
	15	.030	.538	.076	.614	.152	.228
	17½	.029	.536	.072	.608	.144	.216
	18¾	.028	.535	.070	.605	.140	.210
	20	2.027	2.534	5.068	7.602	10.136	15.204
	22½	.025	.532	.064	.596	.127	.191
	25	.024	.530	.060	.589	.119	.179
	26¼	.023	.529	.058	.586	.115	.173
	27½	.022	.528	.055	.583	.111	.166
	30	2.020	2.526	5.051	7.577	10.103	15.154
	32½	.019	.524	.047	.571	.094	.142
	33¾	.018	.523	.045	.568	.090	.135
	35	.017	.521	.043	.564	.086	.129
	37½	.016	.519	.039	.558	.078	.117
	40	2.014	2.517	5.035	7.552	10.069	15.104
	41¼	.013	.516	.033	.549	.065	.098
	42½	.012	.515	.031	.546	.061	.092
	45	.011	.513	.027	.540	.053	.079
	47½	.009	.511	.022	.533	.045	.067
	48¾	.008	.510	.020	.530	.040	.061
	50	2.007	2.509	5.018	7.527	10.036	15.054
	52½	.006	.507	.014	.521	.028	.042
	55	.004	.505	.010	.515	.020	.029
	56¼	.003	.504	.008	.512	.015	.023
	57½	.002	.503	.006	.508	.011	.017
49	00	2.001	2.501	5.001	7.502	10.003	15.004
	02½	1.999	.499	4.997	.496	9.995	14.992
	03¾	.998	.498	.995	.493	.990	.986
	05	.997	.497	.993	.490	.986	.979
	07½	.996	.494	.989	.483	.978	.967
	10	1.994	2.492	4.985	7.477	9.970	14.954
	11¼	.993	.491	.983	.474	.965	.948
	12½	.992	.490	.981	.471	.961	.942
	15	.991	.488	.976	.465	.953	.929
	17½	.989	.486	.972	.458	.944	.917
	18¾	.988	.485	.970	.455	.940	.910
	20	1.987	2.484	4.968	7.452	9.936	14.904
	22½	.986	.482	.964	.446	.928	.891
	25	.984	.480	.960	.439	.919	.879
	26¼	.983	.479	.957	.436	.915	.872
	27½	.982	.478	.955	.433	.911	.866
	30	1.980	2.476	4.951	7.427	9.902	14.854
	32½	.979	.473	.947	.420	.894	.841
	33¾	.978	.472	.945	.417	.890	.835
	35	.977	.471	.943	.414	.886	.828
	37½	.975	.469	.939	.408	.877	.816
	40	1.974	2.467	4.934	7.401	9.869	14.803
	41¼	.973	.466	.932	.398	.864	.797
	42½	.972	.465	.930	.395	.860	.790
	45	.970	.463	.926	.389	.852	.778
	47½	.969	.461	.922	.383	.843	.765
	48¾	.968	.460	.920	.379	.839	.759
	50	1.967	2.459	4.918	7.376	9.835	14.753
	52½	.965	.457	.913	.370	.826	.740
	55	.964	.454	.909	.363	.818	.727
	56¼	.963	.453	.907	.360	.814	.721
	57½	.962	.452	.905	.357	.810	.714
50	00	1.960	2.450	4.901	7.351	9.801	14.702

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 48°	1¼	3.800	0.000
	2½	7.600	.001
	3¾	11.400	.003
	5	15.200	.005
	6¼	19.000	.009
	7½	22.800	.012
	10	30.400	.022
	12½	38.001	.034
	15	45.600	.050
For latitude 49°	1¼	3.801	0.000
	2½	7.601	.001
	3¾	11.402	.003
	5	15.202	.005
	6¼	19.004	.009
	7½	22.804	.012
	10	30.405	.022
	12½	38.007	.034
	15	45.608	.049
For latitude 50°	1¼	3.801	0.000
	2½	7.603	.001
	3¾	11.404	.003
	5	15.205	.005
	6¼	19.007	.009
	7½	22.808	.012
	10	30.411	.022
	12½	38.014	.034
	15	45.617	.049

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
50	00	1.960	2.450	4.901	7.351	9.801	14.702			
	02½	.959	.448	.896	.344	.793	.689	1¼	3.801	0.000
	03¾	.958	.447	.894	.341	.788	.683	2½	7.603	.001
	05	.957	.446	.892	.338	.784	.676	3¾	11.404	.003
	07½	.955	.444	.888	.332	.776	.664	5	15.205	.005
								For latitude 50° 6¼	19.007	.009
	10	1.953	2.442	4.884	7.325	9.767	14.651	7½	22.808	.012
	11¼	.953	.441	.882	.322	.763	.645	10	30.411	.022
	12½	.952	.440	.879	.319	.759	.638	12½	38.014	.034
	15	.950	.438	.875	.313	.750	.625	15	45.617	.049
	17½	.948	.435	.871	.306	.742	.613			
	18¾	.948	.434	.869	.303	.737	.606			
	20	1.947	2.433	4.867	7.300	9.733	14.600			
	22½	.945	.431	.862	.293	.725	.587	1¼	3.802	0.000
	25	.943	.429	.858	.287	.716	.574	2½	7.604	.001
	26¼	.942	.428	.856	.284	.712	.568	3¾	11.406	.003
	27½	.942	.427	.854	.281	.708	.561	5	15.208	.005
								For latitude 51° 6¼	19.010	.008
	30	1.940	2.425	4.850	7.274	9.699	14.549	7½	22.812	.012
	32½	.938	.423	.845	.268	.691	.536	10	30.416	.022
	33¾	.937	.422	.843	.265	.686	.529	12½	38.021	.034
	35	.936	.420	.841	.261	.682	.523	15	45.625	.049
	37½	.935	.418	.837	.255	.674	.510			
	40	1.933	2.416	4.833	7.249	9.665	14.498			
	41¼	.932	.415	.830	.246	.661	.491			
	42½	.931	.414	.828	.242	.656	.485			
	45	.930	.412	.824	.236	.648	.472			
	47½	.928	.410	.820	.229	.639	.459			
	48¾	.927	.409	.818	.226	.635	.453			
	50	1.926	2.408	4.815	7.223	9.631	14.446			
	52½	.924	.406	.811	.217	.622	.433			
	55	.923	.403	.807	.210	.614	.420			
	56¼	.922	.402	.805	.207	.609	.414			
	57½	.921	.401	.802	.204	.605	.408			
51	00	1.919	2.399	4.798	7.197	9.596	14.395			
	02½	.918	.397	.794	.191	.588	.382			
	03¾	.917	.396	.792	.188	.583	.375			
	05	.916	.395	.790	.184	.579	.369			
	07½	.914	.393	.785	.178	.571	.356			
	10	1.912	2.390	4.781	7.171	9.562	14.343			
	11¼	.912	.389	.779	.168	.558	.336			
	12½	.911	.388	.777	.165	.553	.330			
	15	.909	.386	.772	.159	.545	.317			
	17½	.907	.384	.768	.152	.536	.304			
	18¾	.906	.383	.766	.149	.532	.298			
	20	1.906	2.382	4.764	7.146	9.528	14.291			
	22½	.904	.380	.759	.139	.519	.278			
	25	.902	.377	.755	.133	.510	.265			
	26¼	.901	.376	.753	.129	.506	.259			
	27½	.900	.375	.751	.126	.501	.252			
	30	1.899	2.373	4.746	7.120	9.493	14.239			
	32½	.897	.371	.742	.113	.484	.226			
	33¾	.896	.370	.740	.110	.480	.220			
	35	.895	.369	.738	.107	.476	.213			
	37½	.893	.367	.733	.100	.467	.200			
	40	1.892	2.364	4.729	7.094	9.458	14.187			
	41¼	.891	.363	.727	.090	.454	.181			
	42½	.890	.362	.725	.087	.450	.174			
	45	.888	.360	.720	.081	.441	.161			
	47½	.886	.358	.716	.074	.432	.148			
	48¾	.885	.357	.714	.071	.428	.142			
	50	1.885	2.356	4.712	7.068	9.424	14.135			
	52½	.883	.354	.707	.061	.415	.122			
	55	.881	.352	.703	.055	.406	.109			
	56¼	.880	.350	.701	.051	.402	.103			
	57½	.879	.349	.699	.048	.397	.096			
52	00	1.878	2.347	4.694	7.042	9.389	14.083			

TABLE 5.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in meters*

[For modified polyconic projection of map of the world, natural scale]

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
0– 1	110, 498. 2	110, 515. 2	111, 321. 3	0. 0	110, 565. 9	222, 642. 6	0. 0	110, 650. 5	333, 963. 9	0. 0
1– 2	110, 498. 9	110, 515. 8	111, 253. 9	16. 9	110, 566. 6	222, 507. 9	67. 6	110, 651. 2	333, 761. 7	152. 1
2– 3	110, 500. 3	110, 517. 2	111, 186. 6	33. 8	110, 568. 0	222, 373. 1	135. 2	110, 652. 6	333, 559. 5	304. 2
3– 4	110, 502. 3	110, 519. 3	111, 119. 3	50. 7	110, 570. 0	222, 238. 4	202. 8	110, 654. 6	333, 357. 3	456. 3
(0– 4)	441, 999. 7	442, 067. 5			442, 270. 5			442, 608. 9		
4– 5	110, 505. 7	110, 522. 5	111, 051. 9	67. 6	110, 572. 8	222, 103. 7	270. 4	110, 656. 5	333, 155. 1	608. 4
5– 6	110, 509. 1	110, 525. 9	110, 850. 2	84. 2	110, 576. 2	221, 700. 1	336. 7	110, 660. 0	332, 549. 5	757. 6
6– 7	110, 513. 2	110, 530. 0	110, 648. 5	100. 7	110, 580. 2	221, 296. 6	403. 0	110, 664. 0	331, 943. 9	906. 7
7– 8	110, 518. 0	110, 534. 7	110, 446. 8	117. 3	110, 585. 0	220, 893. 0	469. 3	110, 668. 8	331, 338. 2	1, 055. 9
(4– 8)	442, 046. 0	442, 113. 1			442, 314. 2			442, 649. 3		
8– 9	110, 524. 4	110, 540. 9	110, 245. 1	133. 9	110, 590. 4	220, 489. 5	535. 6	110, 672. 9	330, 732. 6	1, 205. 0
9–10	110, 530. 4	110, 546. 9	109, 909. 9	149. 8	110, 596. 4	219, 819. 0	599. 3	110, 678. 9	329, 726. 4	1, 348. 4
10–11	110, 537. 2	110, 553. 7	109, 574. 8	165. 7	110, 603. 2	219, 148. 5	663. 0	110, 685. 7	328, 720. 1	1, 491. 7
11–12	110, 544. 6	110, 561. 1	109, 239. 6	181. 7	110, 610. 6	218. 477. 9	726. 7	110, 693. 1	327, 713. 8	1, 635. 0
(8–12)	442, 136. 6	442, 202. 6			442, 400. 6			442, 730. 6		
12–13	110, 554. 8	110, 570. 7	108, 904. 4	197. 6	110, 618. 6	217, 807. 3	790. 4	110, 698. 3	326, 707. 4	1, 778. 3
13–14	110, 563. 4	110, 579. 3	108, 437. 4	212. 6	110, 627. 2	216, 873. 0	850. 2	110, 707. 0	325, 305. 3	1, 913. 0
14–15	110, 572. 6	110, 588. 6	107, 970. 3	227. 5	110, 636. 4	215, 968. 7	910. 1	110, 716. 2	323, 903. 1	2, 047. 7
15–16	110, 582. 4	110, 598. 4	107, 503. 2	242. 5	110, 646. 2	215, 034. 2	970. 0	110, 726. 0	322, 500. 8	2, 182. 4
(12–16)	442, 273. 2	442, 337. 0			442, 528. 4			442, 847. 5		
16–17	110, 595. 4	110, 610. 7	107, 036. 1	257. 5	110, 656. 7	214, 069. 7	1, 029. 8	110, 733. 3	321, 098. 3	2, 317. 1
17–18	110, 606. 4	110, 621. 7	106, 439. 3	271. 2	110, 667. 7	212, 875. 9	1, 084. 7	110, 744. 3	319, 306. 8	2, 440. 6
18–19	110, 617. 9	110, 633. 3	105, 842. 5	284. 9	110, 679. 2	211, 681. 9	1, 139. 6	110, 755. 9	317, 515. 2	2, 564. 1
19–20	110, 630. 0	110, 645. 4	105, 245. 7	298. 6	110, 691. 4	210, 487. 9	1, 194. 5	110, 768. 0	315, 723. 3	2, 687. 5
(16–20)	442, 449. 7	442, 511. 1			442, 695. 0			443, 001. 5		

20–21	110, 645. 7	110, 660. 3	104, 648. 7	312. 3	110, 704. 0	209, 293. 7	1, 249. 4	110, 776. 9	313, 931. 2	2, 811. 0
21–22	110, 658. 8	110, 673. 4	103, 925. 0	324. 5	110, 717. 2	207, 845. 9	1, 298. 2	110, 790. 1	311, 758. 7	2, 920. 9
22–23	110, 672. 5	110, 687. 1	103, 201. 2	336. 8	110, 730. 8	206, 398. 0	1, 347. 0	110, 803. 8	309, 585. 9	3, 030. 7
23–24	110, 686. 7	110, 701. 3	102, 477. 3	349. 0	110, 745. 0	204, 949. 9	1, 395. 8	110, 817. 9	307, 412. 8	3, 140. 6
(20–24)	442, 663. 7	442, 722. 1			442, 897. 0			443, 188. 7		
24–25	110, 704. 9	110, 718. 6	101, 753. 3	361. 2	110, 759. 7	203, 501. 6	1, 444. 7	110, 828. 1	305, 239. 5	3, 250. 4
25–26	110, 720. 0	110, 733. 7	100, 906. 0	371. 6	110, 774. 8	201, 806. 5	1, 486. 5	110, 843. 2	302, 696. 1	3, 344. 5
26–27	110, 735. 5	110, 749. 2	100, 058. 6	382. 1	110, 790. 3	200, 111. 3	1, 528. 3	110, 858. 8	300, 152. 3	3, 438. 5
27–28	110, 751. 4	110, 765. 1	99, 211. 0	392. 5	110, 806. 2	198, 415. 8	1, 570. 1	110, 874. 7	297, 608. 2	3, 532. 6
(24–28)	442, 911. 8	442, 966. 6			443, 131. 0			443, 404. 8		
28–29	110, 771. 7	110, 784. 4	98, 363. 4	403. 0	110, 822. 6	196, 720. 1	1, 611. 9	110, 886. 2	295, 063. 7	3, 626. 7
29–30	110, 788. 4	110, 801. 1	97, 396. 4	411. 5	110, 839. 3	194, 785. 8	1, 645. 9	110, 902. 9	292, 161. 2	3, 703. 2
30–31	110, 805. 5	110, 818. 2	96, 429. 2	420. 0	110, 856. 4	192, 851. 2	1, 679. 9	110, 920. 0	289, 258. 4	3, 779. 7
31–32	110, 822. 9	110, 835. 6	95, 462. 0	428. 5	110, 873. 8	190, 916. 2	1, 713. 9	110, 937. 4	286, 355. 1	3, 856. 1
(28–32)	443, 188. 5	443, 239. 3			443, 392. 1			443, 646. 5		
32–33	110, 844. 9	110, 856. 6	94, 494. 5	437. 0	110, 891. 5	188, 981. 0	1, 747. 9	110, 949. 8	283, 451. 3	3, 932. 6
33–34	110, 862. 9	110, 874. 6	93, 412. 4	443. 4	110, 909. 6	186, 816. 4	1, 773. 4	110, 967. 9	280, 203. 5	3, 990. 0
34–35	110, 881. 2	110, 892. 9	92, 330. 1	449. 7	110, 927. 9	184, 651. 5	1, 798. 9	110, 986. 2	276, 955. 3	4, 047. 4
35–36	110, 899. 8	110, 911. 5	91, 247. 7	456. 1	110, 946. 4	182, 486. 2	1, 824. 4	111, 004. 8	273, 706. 4	4, 104. 8
(32–36)	443, 488. 8	443, 535. 6			443, 675. 4			443, 908. 7		
36–37	110, 923. 1	110, 933. 6	90, 165. 0	462. 5	110, 965. 2	180, 320. 5	1, 849. 9	111, 017. 9	270, 457. 0	4, 162. 2
37–38	110, 942. 1	110, 952. 6	88, 972. 8	466. 6	110, 984. 2	177, 935. 8	1, 866. 4	111, 036. 9	266, 879. 3	4, 199. 3
38–39	110, 961. 3	110, 971. 8	87, 780. 4	470. 8	111, 003. 4	175, 550. 8	1, 883. 0	111, 056. 1	263, 300. 9	4, 236. 5
39–40	110, 980. 6	110, 991. 1	86, 587. 9	474. 9	111, 022. 8	173, 165. 3	1, 899. 5	111, 075. 4	259, 721. 9	4, 273. 6
(36–40)	443, 807. 1	443, 849. 1			443, 975. 6			444, 186. 3		
40–41	111, 004. 7	111, 014. 1	85, 395. 1	479. 0	111, 042. 2	170, 779. 4	1, 916. 0	111, 089. 1	256, 142. 2	4, 310. 8
41–42	111, 024. 3	111, 033. 7	84, 098. 5	480. 8	111, 061. 8	168, 186. 0	1, 923. 2	111, 108. 7	252, 251. 4	4, 327. 0
42–43	111, 044. 0	111, 053. 4	82, 801. 7	482. 6	111, 081. 5	165, 592. 0	1, 930. 4	111, 128. 4	248, 359. 9	4, 343. 2
43–44	111, 063. 8	111, 073. 1	81, 504. 6	484. 4	111, 101. 3	162, 997. 7	1, 937. 6	111, 148. 2	244, 467. 7	4, 359. 4
(40–44)	444, 136. 8	444, 174. 3			444, 286. 8			444, 474. 4		
44–45	111, 088. 3	111, 096. 5	80, 207. 3	486. 2	111, 121. 1	160, 402. 8	1, 944. 8	111, 162. 0	240, 574. 8	4, 375. 6
45–46	111, 108. 1	111, 116. 3	78, 812. 5	485. 7	111, 140. 9	157, 612. 9	1, 942. 6	111, 181. 8	236, 389. 4	4, 370. 5
46–47	111, 127. 9	111, 136. 1	77, 417. 3	485. 1	111, 160. 7	154, 822. 5	1, 940. 3	111, 201. 6	232, 203. 3	4, 365. 4
47–48	111, 147. 7	111, 155. 9	76, 022. 0	484. 5	111, 180. 4	152, 031. 6	1, 938. 1	111, 221. 4	228, 016. 5	4, 360. 3
(44–48)	444, 472. 0	444, 504. 8			444, 603. 1			444, 766. 8		

TABLE 5.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in meters*—Con.

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
48–49	111, 172. 1	111, 179. 1	74, 626. 4	484. 0	111, 200. 2	149, 240. 2	1, 935. 8	111, 235. 3	223, 828. 9	4, 355. 2
49–50	111, 191. 7	111, 198. 8	73, 139. 9	481. 1	111, 219. 8	146, 267. 1	1, 924. 1	111, 254. 9	219, 369. 1	4, 329. 0
50–51	111, 211. 3	111, 218. 3	71, 653. 2	478. 1	111, 239. 4	143, 293. 6	1, 912. 4	111, 274. 4	214, 908. 4	4, 302. 7
51–52	111, 230. 7	111, 237. 7	70, 166. 2	475. 2	111, 258. 8	140, 319. 5	1, 900. 8	111, 293. 9	210, 447. 0	4, 276. 4
(48–52)	444, 805. 8	444, 833. 9			444, 918. 2			445, 058. 5		
52–53	111, 254. 5	111, 260. 4	68, 678. 9	472. 3	111, 278. 0	137, 344. 9	1, 889. 1	111, 307. 4	205, 984. 8	4, 250. 1
53–54	111, 273. 6	111, 279. 5	67, 108. 0	467. 1	111, 297. 1	134, 203. 0	1, 868. 2	111, 326. 5	201, 272. 0	4, 203. 1
54–55	111, 292. 5	111, 298. 4	65, 536. 8	461. 9	111, 316. 0	131, 060. 6	1, 847. 3	111, 345. 4	196, 558. 3	4, 156. 1
55–56	111, 311. 2	111, 317. 0	63, 965. 3	456. 6	111, 334. 7	127, 917. 6	1, 826. 4	111, 364. 0	191, 843. 8	4, 109. 1
(52–56)	445, 131. 8	445, 155. 3			445, 225. 8			445, 343. 3		
56–57	111, 334. 0	111, 338. 8	62, 393. 6	451. 4	111, 353. 1	124, 774. 1	1, 805. 5	111, 377. 0	187, 128. 5	4, 062. 1
57–58	111, 352. 2	111, 356. 9	60, 745. 8	444. 0	111, 371. 3	121, 478. 6	1, 775. 9	111, 395. 1	182, 185. 4	3, 995. 3
58–59	111, 370. 0	111, 374. 8	59, 097. 7	436. 6	111, 389. 1	118, 182. 5	1, 746. 2	111, 413. 0	177, 241. 4	3, 928. 5
59–60	111, 387. 6	111, 392. 4	57, 449. 3	429. 1	111, 406. 7	114, 885. 8	1, 716. 5	111, 430. 6	172, 296. 7	3, 861. 7
(56–60)	445, 443. 8	445, 462. 9			445, 520. 2			445, 615. 7		
60			55, 800. 7	421. 7		111, 588. 7	1, 686. 8		167, 351. 2	3, 794. 9

TABLE 6.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in inches*

[For modified polyconic projection of map of the world, scale 1:1,000,000]

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
0-1	4.350	4.351	4.383	0.000	4.353	8.765	0.000	4.356	13.148	0.000
1-2	4.350	4.351	4.380	.001	4.353	8.760	.003	4.356	13.140	.006
2-3	4.350	4.351	4.377	.001	4.353	8.755	.005	4.356	13.132	.012
3-4	4.350	4.351	4.375	.002	4.353	8.750	.008	4.356	13.124	.018
(0-4)	17.400	17.404			17.412			17.424		
4-5	4.351	5.351	4.372	.003	4.353	8.744	.011	4.357	13.116	.024
5-6	4.351	4.351	4.364	.003	4.353	8.728	.013	4.357	13.092	.030
6-7	4.351	4.352	4.356	.004	4.354	8.712	.016	4.357	13.069	.036
7-8	4.351	4.352	4.348	.005	4.354	8.697	.018	4.357	13.045	.042
(4-8)	17.404	17.406			17.414			17.428		
8-9	4.351	4.352	4.340	.005	4.354	8.681	.021	4.357	13.021	.047
9-10	4.352	4.352	4.327	.006	4.354	8.654	.024	4.357	12.981	.053
10-11	4.352	4.353	4.314	.007	4.354	8.628	.026	4.358	12.942	.059
11-12	4.352	4.353	4.301	.007	4.355	8.601	.029	4.358	12.902	.064
(8-12)	17.407	17.410			17.417			17.430		
12-13	4.353	4.353	4.288	.008	4.355	8.575	.031	4.358	12.862	.070
13-14	4.353	4.354	4.269	.008	4.355	8.538	.033	4.359	12.807	.075
14-15	4.353	4.354	4.251	.009	4.356	8.503	.036	4.359	12.752	.081
15-16	4.354	4.354	4.232	.010	4.356	8.466	.038	4.359	12.697	.086
(12-16)	17.413	17.415			17.422			17.435		
16-17	4.354	4.355	4.214	.010	4.357	8.428	.041	4.360	12.642	.091
17-18	4.355	4.355	4.191	.011	4.357	8.381	.043	4.360	12.571	.096
18-19	4.355	4.356	4.167	.011	4-357	8.334	.045	4.360	12.501	.101
19-20	4.356	4.356	4.144	.012	4.358	8.287	.047	4.361	12.430	.106
(16-20)	17.420	17.422			17.429			17.441		
20-21	4.356	4.357	4.120	.012	4.358	8.240	.049	4.361	12.359	.111
21-22	4.357	4.357	4.092	.013	4.359	8.183	.051	4.362	12.274	.115
22-23	4.357	4.358	4.063	.013	4.359	8.126	.053	4.362	12.188	.119
23-24	4.358	4.358	4.035	.014	4.360	8.069	.055	4.363	12.103	.124
(20-24)	17.428	17.430			17.436			17.448		
24-25	4.358	4.359	4.006	.014	4.361	8.012	.057	4.363	12.017	.128
25-26	4.359	4.360	3.973	.015	4.361	7.945	.059	4.364	11.917	.132
26-27	4.360	4.360	3.939	.015	4.362	7.878	.060	4.365	11.817	.135
27-28	4.360	4.361	3.906	.015	4.362	7.812	.062	4.365	11.717	.139
(24-28)	17.437	17.440			17.446			17.457		
28-29	4.361	4.362	3.873	.016	4.363	7.745	.063	4.366	11.617	.143
29-30	4.362	4.362	3.834	.016	4.364	7.669	.065	4.366	11.502	.146
30-31	4.362	4.363	3.796	.017	4.364	7.593	.066	4.367	11.388	.149
31-32	4.363	4.364	3.758	.017	4.365	7.516	.067	4.368	11.274	.152
(28-32)	17.448	17.451			17.456			17.467		
32-33	4.364	4.364	3.720	.017	4.366	7.440	.069	4.368	11.159	.155
33-34	4.365	4.365	3.678	.017	4.367	7.355	.070	4.369	11.032	.157
34-35	4.365	4.366	3.635	.018	4.367	7.270	.071	4.370	10.904	.159
35-36	4.366	4.367	3.592	.018	4.368	7.184	.072	4.370	10.776	.162
(32-36)	17.460	17.462			17.468			17.477		
36-37	4.367	4.367	3.550	.018	4.369	7.099	.073	4.371	10.648	.164
37-38	4.368	4.368	3.503	.018	4.369	7.005	.073	4.372	10.507	.165
38-39	4.369	4.369	3.456	.019	4.370	6.911	.074	4.372	10.366	.167
39-40	4.369	4.370	3.409	.019	4.371	6.818	.075	4.373	10.225	.168
(36-40)	17.473	17.474			17.479			17.488		

TABLE 6.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in inches*—Continued

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
40–41	4.370	4.371	3.362	0.019	4.372	6.724	0.075	4.374	10.084	0.170
41–42	4.371	4.371	3.311	.019	4.373	6.621	.076	4.374	9.931	.170
42–43	4.372	4.372	3.260	.019	4.373	6.519	.076	4.375	9.778	.171
43–44	4.373	4.373	3.209	.019	4.374	6.417	.076	4.376	9.625	.172
(40–44)	17.486	17.487			17.492			17.499		
44–45	4.374	4.374	3.158	.019	4.375	6.315	.077	4.376	9.471	.172
45–46	4.374	4.375	3.103	.019	4.376	6.205	.076	4.377	9.307	.172
46–47	4.375	4.375	3.048	.019	4.376	6.095	.076	4.378	9.142	.172
47–48	4.376	4.376	2.993	.019	4.377	5.985	.076	4.379	8.977	.172
(44–48)	17.499	17.500			17.504			17.510		
48–49	4.377	4.377	2.938	.019	4.378	5.876	.076	4.379	8.812	.171
49–50	4.378	4.378	2.880	.019	4.379	5.759	.076	4.380	8.637	.170
50–51	4.378	4.379	2.821	.019	4.379	5.641	.075	4.381	8.461	.169
51–52	4.379	4.379	2.762	.019	4.380	5.524	.075	4.382	8.285	.168
(48–52)	17.512	17.513			17.516			17.522		
52–53	4.380	4.380	2.704	.019	4.381	5.407	.074	4.382	8.110	.167
53–54	4.381	4.381	2.642	.018	4.382	5.284	.074	4.383	7.924	.165
54–55	4.382	4.382	2.580	.018	4.383	5.160	.073	4.384	7.738	.164
55–56	4.382	4.383	2.518	.018	4.383	5.036	.072	4.384	7.553	.162
(52–56)	17.525	17.526			17.529			17.533		
56–57	4.383	4.383	2.456	.018	4.384	4.912	.071	4.385	7.367	.160
57–58	4.384	4.384	2.392	.017	4.385	4.783	.070	4.386	7.173	.157
58–59	4.385	4.385	2.327	.017	4.385	4.653	.069	4.386	6.978	.155
59–60	4.385	4.386	2.262	.017	4.386	4.523	.068	4.387	6.783	.152
(56–60)	17.537	17.538			17.540			17.544		
60			2.197	.017		4.393	.066		6.589	.149

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