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TABLES FOR DETERMINING THE FORM OF THE GEOID AND ITS INDIRECT EFFECT ON GRAVITY

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FOREWORD

It has long been realized, at least since 1849, when Stokes published his classical memoir, "On the Variation of Gravity at the Surface of the Earth,"[1] that the deviation of the geoid from the spheroid has a considerable effect on the values of the gravity anomalies. If this effect has hitherto been neglected in practice, it was either because of our ignorance of the actual amount of the deviation, or because the computation of the theoretical deviation, corresponding to any set of assumptions as to the distribution of matter, involved a great deal of labor.

The present work is intended to facilitate the solution of problems involving the deviation of the geoid from the spheroid of reference, with especial reference to the intensity of gravity. It contains two essentially different sets of tables, one set in part IV giving values of the function proposed by Stokes for determining the form of the geoid, and of allied functions, the other set affording the means of determining the effect on the form of the geoid of various distributions of matter and the consequent effect on gravity at the geoid surface, which is necessarily our surface of reference, since elevations determined by spirit leveling are referred to the geoid and not to the spheroid.

These latter tables are arranged in two sets: (1) the "Fundamental Tables" in part I containing both the deformation of the geoid and its resultant effect for masses of unit density; the tables are of the same type as those of Cassinis and Dore[2] for the direct effect; and (2) a "special" isostatic reduction table of the effect of the deformation on gravity in part III, in the form used by Hayford for the isostatic reduction tables for the direct effect.[3]

Tables for Stokes' functions (functions allied to the one actually given by Stokes himself being included in that designation) were published by Schumann.[4] The tables here given were enlarged from those of Schumann by interpolation with second differences and those of higher order so as to reduce the tabular interval to a more convenient size and, when necessary, by independent computation for the same purpose. These tables of Stokes' functions were included in this volume somewhat as an afterthought and are placed in part IV.

A large part of this publication and the portion requiring by far the heaviest labor is that devoted to the computation of general or fundamental tables of the Cassinis type for the warping of a level surface corresponding to assumed distributions or transfers of mass.

[1] Transactions of the Cambridge Philosophical Society, vol. 8, p. 672, or Mathematical and Physical Papers, vol. II, p. 131.

[2] These tables were issued in preliminary form for the Lisbon meeting of the International Association of Geodesy, September 1933, and copies were distributed to various geodesists and geodetic institutions. A definitive edition is expected shortly.

[3] See report by Hayford to the International Geodetic Association at London in 1909, printed as pp. 365-389 of vol. 1 of the Report of the Sixteenth General Conference of the International Geodetic Association. The tables for the direct effect are given in U. S. Coast and Geodetic Survey Special Publication No. 10, The Effect of Topography and Isostatic Compensation upon the Intensity of Gravity, by John F. Hayford and William Bowie. A revised table for one of the zones and several tables for zones divided into two parts are given in Special Publication No. 40, Investigations of Gravity and Isostasy, by William Bowie.

[4] R. Schumann, Geoidabstände nach der Formel von Stokes bei schematischen Schwerebelegungen. Sitzungsberichte der kaiserlichen Akademie der Wissenschafter in Wien. Mathem.-Naturw. Kl. vol. 120, Abt. IIa, p. 1655.

No special assumption regarding the distribution of mass, such as that of isostatic compensation, underlies these tables. The primal purpose of the general or fundamental tables was the computation of the special isostatic tables that follow them; the computation of the general tables seemed the easiest intermediate step, even if only the special isostatic tables for a particular depth of compensation were wanted, and the fundamental tables have the additional advantage of being adaptable within their range to any depth of isostatic compensation and to any type of isostasy; or even to no isostasy, to undercompensation and to overcompensation.

The level surface that naturally interests us most is the geoid. The warping computed from the special tables that follow the fundamental tables when applied to the spheroid gives what the Survey of India calls the *isostatic geoid.* This probably in most regions approximates the actual geoid. Conversely, again assuming the correctness of the theory of isostasy, the warping subtracted from the actual geoid should give the spheroid and enable gravity observations to be reduced from the geoid to the spheroid. If the hypothesis of isostasy is not correct in precisely the form assumed—and it can hardly be so for every part of the globe—the warping subtracted from the actual geoid gives what the Survey of India calls the *compensated geoid* and enables gravity observations to be reduced to this new geoid, which is a level surface consistent with the assumed isostatic redistribution of mass. If the hypothesis of isostasy is true in precisely the form adopted, the compensated geoid is identical with the spheroid.

The Survey of India believes that the theory of isostasy does not apply very well to India, but nevertheless recommends that the compensated geoid be used for the practical reason that it gives a more regular variation of the gravity anomalies. In any case the use of the compensated geoid, whether or not it be the spheroid, or a close approximation to it, is a theoretical necessity. Unless the observations are reduced to the compensated geoid or to some level surface consistent with the assumed distribution of matter, they are not homogeneous and sound conclusions cannot be drawn from them.

The importance of the difference between the actual and the compensated geoid, or between the actual geoid and the spheroid, has been recognized almost from the beginning. A list of those who have discussed the matter at more or less length would be largely a list of those most eminent in theoretical geodesy: Stokes, Bruns, Clarke, Helmert, Bowie, Hopfner; the list might be extended at pleasure. Helmert and others have made interesting calculations for ideal cases roughly approximating those of nature, but the labor involved was great. It remained for Dr. Bowie, Chief of the Division of Geodesy of this Survey, to suggest that something more practical be done to reduce the labor and to make the assumptions adopted correspond with sufficient accuracy to the facts of nature. The question had been repeatedly discussed at the meetings of the gravity committee of the International Association of Geodesy. Finally the problem of the necessary tables was referred to Dr. Bowie, who arranged to have the work done in his division, the Division of Geodesy of the United States Coast and Geodetic Survey, under the general supervision of C. H. Swick, Chief of the section of Gravity and Astronomy. The present tables are the result.

The immediate occasion for the preparation of these tables was the desirability of applying what may be called the "geoid" corrections to the values of gravity at sea observed by Vening Meinesz. Since the theoretical values of gravity are based on the standard mathematical spheroid, the fact that the geoid, the surface to which observed values of gravity are referred, is probably lower than the spheroid over the oceans and above it over the continents results in a systematic discrepancy between the sea and land anomalies. The special tables in this publication make it possible to derive for any given point the difference in gravity between the two surfaces. The theory of isostasy was used as a basis in computing the tables.

The formulas used for the actual computation and the methods used in applying them are explained on pages 3–10. The fundamental tables (pp. 15–51) involved rather heavy and intricate computation. The preliminary computations and the laying out of the work were nearly all done by the junior author. The remainder of the actual computations was done chiefly by a field party in New York City (R. L. Pfau in charge) under the immediate direction of Earl S. Belote.

The special isostatic tables (explained on pp. 67–68), used, for instance, in reducing the observations of Vening Meinesz, were computed from the fundamental tables in the Washington office of the Survey by or under the immediate direction of the junior author.

TABLES FOR DETERMINING THE FORM OF THE GEOID AND ITS INDIRECT EFFECT ON GRAVITY

EXPLANATION OF THE TABLES

There are four sets of tables published in the main section of this volume: In part I, Fundamental Tables, are given in the form used by Cassinis and Dore (see reference, p. v), the deformation of the geoid and its effect on gravity for masses of unit density; in part II, Density of Compensation for Computing Special Bowie Tables, are given densities for land and water, both for a 96-kilometer depth of compensation and for a 113.7-kilometer depth of compensation; in part III, Bowie Isostatic Reduction Tables, are given tables in the Hayford form (see U. S. Coast and Geodetic Survey Special Publication No. 10, pp. 30–43) for the isostatic reduction of the effect of the deformation of the geoid for a depth of compensation equal to 96 kilometers; and in part IV, Determination of the Geoid from Gravity Anomalies, are given tables for Stokes' functions. Each set of tables is described in detail in the part in which it occurs.

In parts I and III the zones used are the Hayford zones defined in United States Coast and Geodetic Survey Special Publication No. 10, page 18, with the one exception that in place of the zones from A out to G, there has been substituted a single zone or cap which has for its boundary the outer boundary of zone G, and which, therefore, includes the areas of all the zones beginning at the station and extending outward to include zone G.

The division into smaller zones, for which tables are given in Coast and Geodetic Survey Special Publication No. 40 (see footnote, p. v), although sometimes needed for calculating the vertical component, would have been needlessly burdensome when applied to these tables. For the same reason Hayford's original zone O was not subdivided [1] in the tables published. However, the fundamental tables for all the subdivided zones were computed and are available at the office of the United States Coast and Geodetic Survey.

The tables for density of compensation are 8 in number, 4 for each depth of compensation assumed. Two of these are for land compartments, one when the elevation is given in kilometers, the other when it is given in feet and the remaining two are for ocean compartments, one when the depth of compartment is given in kilometers and the other when it is given in fathoms.

These tables were placed in part II between the fundamental tables and the Bowie isostatic reduction tables, because the tables for the depth of compensation of 96 kilometers were used in forming the latter tables and, furthermore, because of the probability that these density tables would be used frequently in connection with the fundamental tables in the application of the latter to gravity problems.

[1] See Bulletin Géodésique, No. 36 (1930), pp. 202–213, Isostatic Reduction Tables for two new Equal-Area Zones, O_1 and O_2, into which Zone O is subdivided.

In addition there are five minor tables of miscellaneous data which have been placed in an appendix. These tables of data will be useful in extending the scope of the fundamental tables and the Bowie isostatic reduction tables or in making additional investigations.

Table 12, page 119, contains the radii defining the Hayford zones expressed as angles in degrees, minutes, and seconds of arc, and the logarithmic and natural sines, cosines, and tangents both of the angles and of the half angles. This table has data necessary for formulas (2) to (5), (8) and (9).

Table 13, page 122, contains the logarithms of the coefficients of the power series (equations (2) and (5), pp. 4, 5).

Table 14, page 123, contains, for values of h between $+10$ kilometers and -15 kilometers and between -80 kilometers and -130 kilometers, the following data: Ten-place logarithms of $\frac{h}{a}$; seven-place logarithms of $R=1+\frac{2h}{3a}$; and the numerical value of $4a^2\,|B_0|=h^2R$.

This table applies primarily to the approximate formula (10), but the logarithmic values of $\frac{h}{a}$ will be of use in the computation by the other formulas.

Table 15, page 125, contains the numerical values of the powers of $\frac{h}{a}$, for $h=1, 2, \ldots 6$ kms. From these values the values of the powers of $\frac{h}{a}$ for any value of h may be obtained by a simple multiplication. The values in this table are useful when the computation is to be done by machine and not by logarithms.

Table 16, page 125, is a convenient table for converting fathoms and feet into kilometers and was designed to facilitate the use of the fundamental tables when the depths and heights are expressed in fathoms and feet, respectively.

PART I.—FUNDAMENTAL TABLES

GENERAL STATEMENT

These tables consist of three columns for each zone. Column 1 contains the argument h, the elevation above or depression below the station in kilometers, positive values denoting elevations above, negative values depressions below the station. The range is from $h=+10$ kilometers to $h=-15$ kilometers and from $h=-80$ kilometers to $h=-130$ kilometers, inclusive. Column 2 contains the value of H, the deformation of the geoid, in centimeters, for each value of h. In column 3 on the same horizontal line is the value of $\Delta_2 g$, the resultant Bowie effect of this deformation in units of the sixth decimal place of gals.

The values of H and $\Delta_2 g$ in the table are proportional (but with different constant factors of proportionality for H and $\Delta_2 g$, respectively) to the potential V of a mass of unit density covering the zone and extending from the level of the station upward or downward to a distance h, positive values of h indicating elevations above the level of the station, negative values of h indicating depressions below the level of the station.

The first stage of the computation consisted of the calculation by means of various formulas of a quantity N proportional to the potential V. The second stage was the multiplication of N by the factors of proportionality necessary to convert N into H and $\Delta_2 g$, respectively.

In the formulas for the Newtonian potential and in the factors of proportionality for $\Delta_2 g$ and H certain assumptions have been made and certain constants adopted.

The mean radius of the new International Ellipsoid, 6,371.2 kilometers, was adopted and is represented by a. The earth was assumed to be a perfect sphere and the difference between the equatorial and polar radii of the ellipsoid was ignored as well as the elevation of the station, the radius from the center of the earth to the station being assumed constant and equal to 6,371.2 kilometers. The effect of neglecting the ellipsoidal form of the earth is practically negligible within the limits of the accuracy desired.

The constant of gravitation adopted, namely

$k=6.670\times10^{-8}$ c. g. s. units is that of P. R. Heyl.

(Bureau of Standards Journal of Research, vol. 5, December 1930.)

FORMULAS

Four different formulas were used in computing the Newtonian potential V. The choice of a formula was dictated partly by convenience and partly by the desirability of checking the results found by one method against those found by another. Two formulas are

taken from Bulletin Géodésique No. 26 (1930), namely, (I) a power series formula (27d–e–f) page 155, and (II) a closed formula (28c) page 158. A closed formula (III) based on a formula communicated by Cassinis in a letter, and differing from (28c) in appearance only, is the third formula. The fourth formula (IV) is an approximate formula used only for the zones close to the station.

In formulas (I), (II), (III)

θ=angular radius of cap

h=distance above or below level of the station, positive values denoting distances above; negative, distances below.

$$B_0=-\left[\frac{1}{4}\left(\frac{h}{a}\right)^2+\frac{1}{6}\left(\frac{h}{a}\right)^3\right]=-\frac{1}{4}\left(\frac{h}{a}\right)^2\left[1+\frac{2}{3}\left(\frac{h}{a}\right)\right]$$

Obviously B_0 is intrinsically negative whatever the sign of h. Since the potential of a zone is the difference of the potentials of two caps, B_0, being dependent only on h, disappears in the potential of the zone. Consequently, if the potentials of zones only are required, the B_0 term may be omitted in the actual computation.

FORMULA (I)

The power series (27d) in full is

$$V=\pm 4\pi k\rho a^2\left[\pm B_0+B_1\left(\frac{h}{a}\right)+B_2\left(\frac{h}{a}\right)^2+\ldots\right] \tag{1}$$

Omitting the term B_0 and the factor $\pi k\rho$, the form used in the computation is

$$N=4a^2\left[B_1\left(\frac{h}{a}\right)+B_2\left(\frac{h}{a}\right)^2+\ldots\right] \tag{2}$$

The formulas for the coefficients of the power series (I) in terms of $\alpha=\sin\frac{\theta}{2}$ are given on page 5. The first seven were taken with slight changes from Bulletin Géodésique, No. 26 (1930), p. 155. The remaining terms B_8, B_9, B_{10}, B_{11}, B_{12}, B_{13} have been derived since the publication of the above bulletin by means of formula (27f), an expression for B_n in terms of the derivative of the zonal harmonics, and by means of the new formula (4) discussed below.

This formula [a] (27f) is

$$B_n=\frac{(-1)^{n-2}(1-\alpha^2)[2\alpha(n-1)P'_{n-3}(\alpha)-(n-3)P'_{n-2}(\alpha)]}{2^{n-1}\alpha^{n-2}n(n-1)(n-2)(n-3)} \tag{3}$$

Here the P's represent zonal harmonics (Legendrians).[2] The derivatives, or primed P's, occur naturally because of the way in which the formula was originally derived, but it is obvious that B_n may be expressed directly in terms of the zonal harmonics themselves, because there are simple relations between these functions and their derivatives. Since the zonal harmonics are polynomials in α, the

[a] There is a misprint in (27f), Bulletin Géodésique No. 26.

[2] For formulas and numerical tables for zonal and spherical harmonics extended to high degrees and high orders, see G. Prévost: Tables de fonctions sphériques et de leurs intégrales pour calculer les coefficients du développement en série de polynomes de Laplace d'une fonction de deux variables indépendantes. Paris and Bordeaux. 1933.

coefficients of which follow fairly simple laws, it has been found possible to express B_n directly in terms of α; after various transformations there is found

$$B_n=\frac{(-1)^{n-2}(1-\alpha^2)[1\cdot3\cdot5\ldots(2n-7)]}{2^{n-1}\alpha^{n-2}n!}\Big[3\alpha^{n-3}+\frac{(n-4)(-n+11)}{2(2n-7)}\alpha^{n-5}$$
$$-\frac{(n-4)(n-5)(n-6)(n+13)}{2^2 2!(2n-7)(2n-9)}\alpha^{n-7}\ldots \tag{4}$$
$$+\frac{(-1)^r(n-4)(n-5)\ldots(n-2r)[(2r-5)n+2r+7]}{2^{r-1}(r-1)!(2n-7)(2n-9)\ldots(2n-2r-3)}\alpha^{n-2r-1}$$

where r is the number of the term; $r\geqq2$.

Formulas (3) and (4) apply only when $n\geqq4$. Formula (4) continues until $2r+1\leqq n$. Hence when n is even, the exponent of α in the last term of the series will be unity. But if n is odd, the exponent of α in the last term will be zero.

Formulas for the coefficients

$$\left.\begin{aligned}
B_1&=+\alpha=+\sin\frac{\theta}{2}\\
B_2&=+\frac{3\alpha}{4}\\
B_3&=+\frac{1+3\alpha^2}{24\alpha}\\
B_4&=+\frac{1-\alpha^2}{64\alpha}\\
B_5&=-\frac{12}{5\alpha}B_3B_4\\
B_6&=+\frac{B_3B_4}{\alpha}=-\frac{5}{12}B_5\\
B_7&=+\frac{B_4(1-2\alpha^2-7\alpha^4)}{112\alpha^4}\\
B_8&=-\frac{B_4(3-2\alpha^2-9\alpha^4)}{256\alpha^4}\\
B_9&=-\frac{B_4(5-55\alpha^2+15\alpha^4+99\alpha^6)}{4608\alpha^6}\\
B_{10}&=+\frac{B_4(25-115\alpha^2+11\alpha^4+143\alpha^6)}{10240\alpha^6}\\
B_{11}&=+\frac{B_4(7-168\alpha^2+462\alpha^4-429\alpha^8)}{45056\alpha^8}\\
B_{12}&=-\frac{B_4(49-476\alpha^2+910\alpha^4+52\alpha^6-663\alpha^8)}{98304\alpha^8}\\
B_{13}&=-\frac{B_4(21-861\alpha^2+4914\alpha^4-7098\alpha^6-663\alpha^8+4199\alpha^{10})}{851968\alpha^{10}}
\end{aligned}\right\} \tag{5}$$

At the end of this volume, table 13 gives the logarithmic values of the B's out to B_{11} corresponding to the various values of α, begin-

ning with the outer radius of zone K and extending out to the antipodes.

FORMULA (II) (LAMBERT)

The closed formula (28c)[3] in its complete trigonometric form, when rearranged, becomes:

$$V=\pm\pi k\rho\Big\{a^2\sin^2\theta\Big[\Big\{\frac{2}{3}\sin\theta\sec^3\psi_2+\cos\theta\tan\psi_2\sec\psi_2 +\frac{\cos\theta}{M}\log_{10}\tan\Big(45^\circ+\frac{\psi_2}{2}\Big)\Big\}-\Big\{\frac{2}{3}\sin\theta\sec^3\psi_1 +\cos\theta\tan\psi_1\sec\psi_1+\frac{\cos\theta}{M}\log_{10}\tan\Big(45^\circ+\frac{\psi_1}{2}\Big)\Big\}\Big] \pm 4a^2B_0\Big\} \tag{6}$$

where $\tan\psi_2=\tan\frac{\theta}{2}$

and $\tan\psi_1=\tan\frac{\theta}{2}+\frac{h}{a\sin\theta}$

M, following the usual custom, represents $\log_{10}e$, the modulus of the common logarithms.

Then in symbolic notation equation (6) becomes:

$$V=\pm\pi k\rho\{a^2\sin^2\theta[f(\theta,0)-f(\theta,h)]\pm 4a^2B_0\} \tag{7}$$

where $f(\theta,h)=\frac{2}{3}\sin\theta\sec^3\psi+\cos\theta\tan\psi\sec\psi+\frac{\cos\theta}{M}\log_{10}\tan\Big(45^\circ+\frac{\psi}{2}\Big)$

with $\tan\psi=\tan\frac{\theta}{2}+\frac{h}{a\sin\theta}$.

Then by omitting the term in B_0 and the factor $\pi k\rho$, as we did before, we have

$$N=\pm a^2\sin^2\theta\{f(\theta,0)-f(\theta,h)\} \tag{8}$$

Since $f(\theta,0)$ depends only on functions of the constant angular radius of a zone, it needs only to be computed once for that radius.

In all the formulas, since the potential is positive for all positive values of ρ, the value of N is positive.

FORMULA (III) (CASSINIS)

Cassinis' formula in the notation of the above formulas, i. e., $\sin\frac{\theta}{2}=\alpha$, after omitting the factor $\pi k\rho$ and the term equivalent to the B_0 term of the other formulas, becomes

[3] There is a misprint in the formula (28c) Bulletin Géodésique No. 26, p. 158. The formula should read:

$$V=\pm 4\pi k\rho a^2\Big\{\frac{\sin^3\theta}{6}(\cosh^3\phi_2-\cosh^3\phi_1)+\frac{\sin^2\theta\cos\theta}{4}(\sinh\phi_2\cosh\phi_2-\sinh\phi_1\cosh\phi_1) +\frac{\sin^2\theta\cos\theta}{4}(\phi_2-\phi_1)\pm B_0\Big\} \tag{6a}$$

$$N=a^2\left\{\frac{1}{3}\left[2\left(\frac{h}{a}\right)^2+(3+2\alpha^2)\frac{h}{a}+2\alpha^2(7-6\alpha^2)\right]\sqrt{T}\right.$$
$$\left.-\frac{4}{3}\alpha^3(7-6\alpha^2)+\frac{\sin^2\theta\cos\theta}{M}\log_{10}\frac{\frac{h}{a}+2\alpha^2+\sqrt{T}}{2\alpha(1+\alpha)}\right\} \tag{9}$$

where

$$\sqrt{T}=+\sqrt{\left(\frac{h}{a}\right)^2+4\frac{h}{a}\alpha^2+4\alpha^3}$$

Table 12, page 119, gives data concerning θ and $\frac{\theta}{2}$ and their sines, cosines, and tangents for all zones. These data will be useful in the computation by formulas (2) to (5), (8) and (9).

FORMULA (IV)

The approximate formula is:

$$V=\pi k\rho c^2\left\{\frac{R\tan\frac{\lambda}{2}}{\tan\lambda}+\frac{1}{M}\log_{10}\cot\frac{\lambda}{2}+\frac{5h}{3a}\tan\left(45°-\frac{\lambda}{2}\right)\right\} \tag{10}$$

where

c=the radius of the cap in linear units

$$R=1+\frac{2h}{3a}$$

$\tan\lambda=\frac{c}{|h|}$, λ being an auxiliary quantity.

Since $|h|$ represents the absolute value of h, $\tan\lambda$ is always positive, and λ is to be taken in the first quadrant.

This formula applies only to the zones near the station, for which we have very nearly

$$\sin\theta=\tan\theta=\theta \text{ in radians.}$$

Since V in formula (10) includes the term equivalent to $4a^2B_0$ then

$$N=\frac{V}{\pi k\rho}-4a^2B_0 \tag{11}$$

In other words to compare the results obtained by the use of equation (10) with those obtained by the use of any of the other formulas for N, for the same cap and the same values of h, it is necessary to increase the results obtained from (10) by the absolute values of $4a^2B_0$ corresponding to the values of h used. See table 14.

If $R=1+\frac{2h}{3a}$ were put equal to unity and the small term $\frac{5h}{3a}\tan\left(45°-\frac{\lambda}{2}\right)$ were omitted, the remaining terms would be proportional to the Newtonian potential of a cylinder at the center of its upper or lower surface. The small term $\frac{5h}{3a}\tan\left(45°-\frac{\lambda}{2}\right)$ and the factor R, therefore, represent approximately the effect of the curvature of the earth's surface.

In the computations the linear quantities were taken in kilometers in order to avoid excessively large numbers and the proper power of 10 was included in the constant factors by which N was multiplied in order to obtain H or $\Delta_2 g$.

FACTORS OF PROPORTIONALITY

The assumption commonly made is that the deformation, H, of the geoid due to a mass whose potential is V may be obtained from the equation:

$$H=\frac{V}{g} \tag{12}$$

where g is the acceleration of gravity.

This equation is subject to various limitations, which are discussed at length in Bulletin Géodésique, No. 26 (1930), p. 158. When a level surface like the geoid changes its form by the shifting of matter, the real criterion for the propriety of the statement that the new geoid is really the old geoid deformed in a certain way is the identity of volume of the two geoids.[4]

Where the total mass of the matter connected with the two geoids is involved, the propriety of describing the new geoid as the old geoid deformed may be a matter of definition, but if the total mass be different in the two cases, then equation (12) does not apply to the calculation of H except by arbitrary definition, and the value of $\Delta_2 g$ computed in the usual way from such a value of H certainly does not apply.

Again if the shifting of mass causes a shift in the center of gravity of the whole system of masses, equation (12) does not apply to H; neither does it apply to $\Delta_2 g$ by itself computed in the ordinary way from H. However, the combination of the direct effect $\Delta_1 g$ (the vertical pull of the masses considered) with $\Delta_2 g$ to obtain the total effect in gravity is not affected by a shift of the center of gravity, as Stokes [5] showed in his classical memoir. Also see pages 71, 102, 103, 105, 108, and 109.

CONVENTIONS AS TO SIGN

In passing, something should be said regarding the convention as to the signs of $\Delta_1 g$ and $\Delta_2 g$. In the work of Hayford and Bowie $\Delta_1 g$ (the correction for abnormal vertical attraction) is applied to the theoretical value of gravity and is positive when the masses considered produce an increase in the downward pull over the normal theoretical pull. With this convention the total correction Δg is given by:

$$\Delta g=\Delta_1 g-\Delta_2 g \tag{13}$$

where $\Delta_2 g$ has the sign given it by the use of the tables in this publication and the precepts accompanying them.

On the other hand the European practice is to apply the reduction to observed gravity. An excess of downward pull requires according to this convention an intrinsically negative correction. Δg and $\Delta_1 g$ are, therefore, given signs opposite to what they would have according to the practice of Hayford and Bowie.

[4] A. R. Clarke, Geodesy, p. 98.
[5] G. G. Stokes. On the Variation of Gravity at the Surface of the Earth. Mathematical and Physical Papers, Vol. II, p. 141.

If the reductions are applied, according to European usage, to theoretical gravity, that is, in the reverse direction, the combination of signs is different and for clarity we introduce additional notation.

Let $\Delta'_1 g$ and $\Delta' g$ denote the direct effect and the complete effect, respectively, according to the prevailing European convention; then

$$\Delta'_1 g = -\Delta_1 g$$
$$\Delta' g = -\Delta g$$

We further have

$$\Delta' g = \Delta'_1 g + \Delta_2 g, \tag{14}$$

where $\Delta_2 g$ is the same quantity as before. It may therefore be derived from the tables and the precepts of this publication without change of sign.

In any case the tables for H and $\Delta_2 g$ are merely tables of the Newtonian potential of certain masses, apart from a constant positive factor differing for H and $\Delta_2 g$. The precautions due to a change in the total mass or a shift of the center of gravity must be separately considered. Since in

$$V = \pi k \rho N \tag{15}$$

ρ represents unit density, and N contains a^2, a being expressed in kilometers, then

$$H = \frac{\pi k N}{g}(10)^{10} \text{ (centimeters)} \tag{16}$$

Under the same conditions to the same degree of approximation $\frac{\delta g}{\delta H}$, the vertical gravity gradient (change in gravity per unit change in elevation) is

$$\frac{\delta g}{\delta H} = \frac{2g}{a} \tag{17}$$

which is positive because we consider the reduction as being downward through a distance H.

The value of $\Delta_2 g$, the indirect reduction due to the deformation of the geoid, that is the effect of reducing gravity from the original geoid to a geoid warped through a distance H, is found by multiplying H by the gravity gradient, that is

$$\Delta_2 g = H\frac{\delta g}{\delta H} = \frac{2g}{a}H = \frac{2V}{a} \tag{18}$$

or

$$\Delta_2 g = \frac{2\pi k N}{a}(10)^5 \text{ (c. g. s. units, or gals)} \tag{19}$$

the factor 10^5 being introduced, since N was originally computed with the kilometer as the unit.

The formula for g was found from the equation

$$g = \frac{4}{3}\pi k \rho_m a \tag{20}$$

where ρ_m is the mean density of the earth, which is assumed to be an exact ellipsoid of revolution, by the formula

$$\rho_m=\frac{3g_e}{4\pi k a_0}\left\{1+\frac{3}{2}m\left(1+\frac{2}{7}f+\frac{125}{441}f^2\right)\right\} \tag{21}$$

where

g_e=acceleration of gravity at the Equator
a_0=equatorial radius
f=the flattening (ellipticity) of the terrestrial ellipsoid
m=ratio of the centrifugal force of rotation at the Equator to gravity at the Equator.

BASIC NUMERICAL VALUES

For the International Ellipsoid:

$$a_0=6{,}378{,}388 \text{ meters}$$
$$f=\frac{1}{297}$$
$$g_e=978.049 \text{ gals}$$

hence

$$\log m=7.54005735-10$$

and

$$\rho_m=5.5168 \text{ g/cm}^3$$

From this it follows that

$$g=982.03$$

This gives a gravity gradient=0.0000030827 gal per centimeter of elevation. The value generally used is 0.000003086. Since the difference is very small and in view of the approximations already adopted it seems hardly worth while to take this into account.

We now have from the foregoing by computation

$$\begin{aligned} H \text{ (centimeters)}&=2.1337787\ N \\ \Delta_2 g \text{ (in gals)}&=65.778575\ N\times 10^{-7} \end{aligned} \tag{22}$$

Since the computed value of N in the table pertained to the outer radius of a zone, it was necessary first to obtain the N for a zone by subtracting the N computed for the outer radius of the preceding zone from the N computed for the outer radius of the zone in question.

The value of H and $\Delta_2 g$ in the fundamental tables were now obtained from the values of N for the zones by multiplication by the proper factors. Intermediate values were interpolated using second differences where necessary. The seventh decimal place of gals and the second decimal place of centimeters were held until the tables were complete, then one set of tables was formed for H and another for $\Delta_2 g$ with the values rounded off to one less figure.[3] In these tables for zones from A to L, inclusive, between $h=-10$ kilometers and -15 kilometers, the values of H and $\Delta_2 g$ are given for each tenth kilometer value of h, and for each one kilometer value of h from $h=-80$ kilometers to $h=-130$ kilometers. In the remaining zones from M out to the antipodes, between $h=+10$ kilometers and $h=-15$ kilometers, the values are given for each one-hundredth kilometer value of h. Between $h=-80$ kilometers and $h=-130$ kilometers the values of

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H and $\Delta_2 g$ are given for each one-tenth kilometer value of h.[6] From the tables just described the set of tables in part I was derived.

USE OF THE TABLES

The potential V of a mass and the quantities H and $\Delta_2 g$, which are proportional to V, are all positive for positive density. There is no question of upward or downward pull of a given mass, as there is in the Cassinis tables for the direct effect. The precepts for using the tables for H and $\Delta_2 g$ differ, therefore, from those for using the tables of Cassinis and Dore. The following precepts apply only to the tables for H and $\Delta_2 g$.

As was stated previously, the tables give a quantity proportional to the potential of a mass extending from the level of the station to a level h above or below the station. For a level above the station h is positive, for a level below, negative. Let h_1 and h_2 be two heights, positive or negative, reckoned from the level of the station, representing the levels bounding the mass in question, the lateral extent of the mass being determined by the zone considered. Let h_2 correspond to the upper level, and h_1 to the lower level of the mass. Then let $f(h_1)$ and $f(h_2)$ be the quantities taken from the table either for H or $\Delta_2 g$ with the arguments h_1 and h_2, respectively. There are three cases to be considered.

Case I.—Both h_2 and h_1 positive, hence $h_2 > h_1$. The quantity sought from tables is

$$f(h_2) - f(h_1). \tag{23}$$

Case II.—With h_2 positive and h_1 negative, the quantity sought is

$$f(h_2) + f(h_1). \tag{24}$$

Case III.—Both h_2 and h_1 negative. Here $h_2 > h_1$, but $|h_2| < |h_1|$. Then the quantity sought will be

$$f(h_1) - f(h_2). \tag{25}$$

The results of cases I, II, III are, of course, for masses of unit density. If a density other than this is assumed for a mass, the results must be multiplied by that density.

EXAMPLE I

[Zone 17, $\Delta_2 g$ $(10)^6$ for unit density]

CASE I

h_2 (km) =	+8	+7	+6	+5	+4
h_1 (km) =	+4	+3	+2	+1	0
$f(h_2)$ =	2, 664	2, 331	1, 998	1, 665	1, 332
$f(h_1)$ =	1, 332	999	666	333	0
$f(h_2) - f(h_1)$ =	1, 332	1, 332	1, 332	1, 332	1, 332

[6] These tables are on file in manuscript form at the U. S. Coast and Geodetic Survey, Washington, D. C., and may be consulted by anyone interested.

EXAMPLE I—Continued

CASE II

h_2 (km) =	+3	+2	+1	0
h_1 (km) =	−1	−2	−3	−4
$f(h_2)$ =	999	666	333	0
$f(h_1)$ =	333	665	998	1, 330
$f(h_2)+f(h_1)$ =	1, 332	1, 331	1, 331	1, 330

CASE III

h_2 (km) =	−1	−2	−3	−4	−5
h_1 (km) =	−5	−6	−7	−8	−9
$f(h_2)$ =	333	665	998	1, 330	1, 663
$f(h_1)$ =	1, 663	1, 995	2, 327	2, 659	2, 991
$f(h_1)-f(h_2)$ =	1, 330	1, 330	1, 329	1, 329	1, 328

The thickness of the mass is the same, 4 kilometers in each of the above instances, while the elevation of the station varies with reference to the elevation of the mass. In case I the mass is above the station; in case II the mass is partly above and partly below the station except in the one instance where its upper level coincides with the station level. In case III, the mass is entirely below the level of the station. Yet the greatest variation in the values of $\Delta_2 g$ is only 4 units of the sixth decimal place of gals. In other words, the elevation of the station appears to exert very little influence on the results.

EXAMPLE II

To compute the indirect effect of topography and isostatic compensation ($\Delta_2 g$) for zone N as a water zone, 5 kilometers deep, with the station at sea level, and the depth of compensation 96 kilometers below the surface of the lithosphere.

Topography.— $h_2=0$, $h_1=-5$ km, density $=-1.643$.

Since $f(h_2)=0$, this may be either case II or case III, that is, we have either

$$f(h_2)+f(h_1) \text{ or } f(h_1)-f(h_2)=2641\times10^{-6} \text{ gal.}$$

Hence topographic effect$=2641\times(-1.643)\times10^{-6}=-.004339$ gal.

Compensation.— $h_2=-5$ km, $h_1=(-5-96)$ km$=-101$ km.

Case III applies here:

$$f(h_1)-f(h_2)=(43726-2641)\times10^{-6} \text{ gal}=41085\times10^{-6} \text{ gal.}$$

Density of compensation for 5 km depth$=+.08694$. See table 3.

Hence compensation effect$=41085\times(+.08694)\times10^{-6}=+.003572$ gal.

$\Delta_2 g$=resultant effect$=-.004339+.003572=-.000767$ gal.

EXAMPLE III

To compute the indirect effect of topography and isostatic compensation ($\Delta_2 g$) for zone N as a water zone of 5 km depth with station 2 km above sea level.

Topography.— $h_2=-2$ km, $h_1=(-2-5)$ km$=-7$ km, density$=-1.643$.

Case III applies:

$$f(h_1)-f(h_2)=(3694-1057)\times10^{-6}=2637\times10^{-6}\text{ gal.}$$

Hence topographic effect$=2637\times(-1.643)\times10^{-6}=-.004333$ gal.

Compensation.— $h_2=-7$ km, $h_1=(-7-96)$ km$=-103$ km.

Case III applies:

$$f(h_1)-f(h_2)=(44349-3694)\times10^{-6}\text{ gal}=40655\times10^{-6}\text{ gal.}$$

Density of compensation for 5 km depth$=+.08694$. See table 3.

Hence compensation effect $=40655\times(+.08694)\times10^{-6}$ gal$=+.003535$ gal.

$\Delta_2 g$=resultant effect$=-.004333+.003535=-.000798$ gal.

EXAMPLE IV

To compute $\Delta_2 g$ for zone N as a land zone with an elevation of 5 km and with the station 1 km above the zone.

Topography.— $h_2=-1$ km, $h_1=(-1-5)$ km$=-6$ km, density$=2.67$.

Case III applies:

$$f(h_1)-f(h_2)=(3168-529)\times10^{-6}=2639\times10^{-6}\text{ gal.}$$

Topographic effect$=2639\times2.67\times10^{-6}=+.007046$ gal.

Compensation.— $h_2=-1$ km, $h_1=(-1-96)$ km$=-97$ km.

Case III applies:

$$f(h_1)-f(h_2)=(42454-529)\times10^{-6}=41925\times10^{-6}\text{ gal.}$$

Density of compensation for 5 km elevation$=-.14107$. See table 2

Compensation effect$=41925\times(-.14107)\times10^{-6}=-.005914$ gal.

$\Delta_2 g$=resultant effect$=+.007046-.005914=+.001132$ gal.

EXAMPLE V

To compute $\Delta_2 g$ for zone N as a land zone with an elevation of 5 kilometers and with the station 1 kilometer below the zone.

Topography.— $h_2=+1$ km, $h_1=-4$ km, density$=2.67$.

Case II applies:

$$f(h_2)+f(h_1)=(529+2113)\times10^{-6}=2642\times10^{-6}\text{ gal.}$$

Topographic effect$=2642\times2.67\times10^{-6}=+.007054$ gal.

Compensation.— $h_2=+1$ km, $h_1=(+1-96)$ km$=-95$ km.

Case II applies:

$$f(h_2)+f(h_1)=(529+41805)\times10^{-6}=42334\times10^{-6}\text{ gal.}$$

Density of compensation for 5 km $=-.14107$. See table 2.

Hence compensation effect $=42334\times(-.14107)\times10^{-6}\doteq-.005972$ gal.

$\Delta_2 g$ = resultant effect $=+.007054-.005972=+.001082$ gal.

In the examples $\Delta_2 g$ has been dealt with exclusively. However, it is obvious that values of H could have been obtained in a similar way from the tables.

EXTENSION OF TABLES

Should anyone care to compute the deformation of the geoid and its indirect effect for the interval between $h=-15$ km and $h=-80$ km, there are given in the appendix certain tables of data that will expedite the work. For instance, the logarithms of the coefficients of the series formulas (2) and (5) are given in table 13 for each zone from zone K out to the antipodes. Also there is given a table of the angular radii of all the zones. These angles and their half angles are given along with their natural and logarithmic sines, cosines, and tangents. These data will be of service in computing by either Cassinis' formula or the closed formula.

For zones close to the station the approximate formula (10) may be used to advantage. The closed formula (8) and Cassinis' formula (9) can be used for all of the zones. They are, accordingly, extremely useful for checking the results of other formulas. The series formula (2) is well adapted for computations in the outer zones, where it will rapidly converge. In the zones closer to the station, however, the convergency will have to be reckoned with.

For the results of the power series (2) to be even theoretically convergent the ratio of h to the linear chordal radius must be numerically less than 1; for practical computation, however, the ratio must be numerically less than ⅓, at the very least, and preferably less than ¼. The expression for the linear chordal radius is $2a \sin \frac{1}{2}\theta$. Below is a table giving the approximate values of the chordal radius for several zones and the maximum values of h that may be conveniently used for these zones in the power series (2).

Zone	$2a \sin \frac{\theta}{2}$	h
	Kilometers	*Kilometers*
J	12	±3
K	19	±5
L	29	±7
18	188	±47
13	480	±120
12	642	±160

The above shows that the power series formula cannot be used in the zones near the station, and that the use of this formula is limited to certain values of h up to and including zone 13. Beginning with the outer radius of zone 12, the formula may be employed for all values of h that are likely to be used.

EXPLANATION OF TABLE I

Although the following table has already been completely explained in the preceding text, it seems advisable to repeat here some of the essential facts.

Zones A to G have been combined into a single zone or cap because the corrections are too small to justify the use of individual zones. Factors for use in deriving the mean elevation of this cap from the mean elevations of the individual zones will be found on page 72.

The interpolation interval has been varied throughout the table to conform somewhat with the size and rate of change of the corrections.

The table is based on unit density throughout. If it is used in preference to the special Bowie isostatic reduction table, table 10, factors must be used to take account of the actual densities involved.

In the first column is given h, the mean elevation of the zone, in kilometers. In the second column is given H, the deformation of the geoid, in centimeters. In the third column is given $\Delta_2 g$, the effect of the deformation of the geoid on gravity, in units of the sixth decimal place of gals. All values given in table 1 apply to the entire zone, not to a compartment, as in table 10.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]

Zones A–G

[Inner radius, 0 meters; outer radius, 3,520 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals*×10^6	*km*	*cm*	*gals*×10^6
+10.0	59.6	184	−80	113.5	350
+9.5	58.3	180	−81	113.8	351
+9.0	56.9	175	−82	114.1	352
			−83	114.4	353
+8.5	55.4	171	−84	114.8	354
+8.0	53.9	166	−85	115.1	355
+7.5	52.3	161			
+7.0	50.5	156	−86	115.4	356
+6.5	48.7	150	−87	115.7	356
			−88	115.9	357
+6.0	46.7	144	−89	116.2	358
+5.5	44.6	138	−90	116.5	359
+5.0	42.3	130			
+4.5	39.8	123	−91	116.8	360
+4.0	37.1	114	−92	117.1	361
			−93	117.4	362
+3.5	34.1	105	−94	117.6	363
+3.0	30.8	95	−95	117.9	364
+2.9	30.1	93			
+2.8	29.4	91	−96	118.2	364
+2.7	28.7	88	−97	118.4	365
+2.6	27.9	86	−98	118.7	366
			−99	119.0	367
+2.5	27.2	84	−100	119.2	368
+2.4	26.4	81			
+2.3	25.6	79	−101	119.5	368
+2.2	24.8	76	−102	119.7	369
+2.1	23.9	74	−103	120.0	370
			−104	120.2	371
+2.0	23.1	71	−105	120.5	371
+1.9	22.2	68			
+1.8	21.3	66	−106	120.7	372
+1.7	20.3	63	−107	121.0	373
+1.6	19.4	60	−108	121.2	374
			−109	121.4	374
+1.5	18.4	57	−110	121.7	375
+1.4	17.4	54			
+1.3	16.4	50	−111	121.9	376
+1.2	15.3	47	−112	122.1	376
+1.1	14.2	44	−113	122.3	377
			−114	122.6	378

(Continued on p. 16)

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zones A–G—Continued

[Inner radius, 0 meters; outer radius; 3,520 meters]

h	*H*	$\Delta_2 g$	*h*	*H*	$\Delta_2 g$
km	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶
+1.0	13.1	40	−115	122.8	379
+.9	11.9	37			
+.8	10.8	33	−116	123.0	379
+.7	9.5	29	−117	123.2	380
+.6	8.3	26	−118	123.5	381
			−119	123.7	381
+.5	7.0	22	−120	123.9	382
+.4	5.7	18			
+.3	4.3	13	−121	124.1	382
+.2	2.9	9	−122	124.3	383
+.1	1.5	5	−123	124.5	384
.0	0.0	0	−124	124.7	384
			−125	124.9	385
−.1	1.5	5			
−.2	2.9	9	−126	125.1	386
−.3	4.3	13	−127	125.3	386
−.4	5.7	18	−128	125.5	387
−.5	7.0	22	−129	125.7	388
			−130	125.9	388
−.6	8.3	26			
−.7	9.5	29			
−.8	10.8	33			
−.9	11.9	37			
−1.0	13.1	40			
−1.0	13.1	40			
−1.1	14.2	44			
−1.2	15.3	47			
−1.3	16.4	50			
−1.4	17.4	54			
−1.5	18.4	57			
−1.6	19.4	60			
−1.7	20.3	63			
−1.8	21.3	66			
−1.9	22.2	68			
−2.0	23.0	71			
−2.1	23.9	74			
−2.2	24.8	76			
−2.3	25.6	79			
−2.4	26.4	81			
−2.5	27.2	84			
−2.6	27.9	86			
−2.7	28.7	88			
−2.8	29.4	91			
−2.9	30.1	93			
−3.0	30.8	95			
−3.5	34.1	105			
−4.0	37.1	114			
−4.5	39.8	123			
−5.0	42.3	130			
−5.5	44.6	137			
−6.0	46.7	144			
−6.5	48.6	150			
−7.0	50.5	156			
−7.5	52.2	161			
−8.0	53.8	166			
−8.5	55.3	171			
−9.0	56.8	175			
−9.5	58.2	179			
−10.0	59.5	183			
−10.5	60.7	187			
−11.0	61.9	191			
−11.5	63.1	194			
−12.0	64.2	198			
−12.5	65.2	201			
−13.0	66.2	204			
−13.5	67.2	207			
−14.0	68.2	210			
−14.5	69.1	213			
−15.0	69.9	216			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone H

[Inner radius, 3,520 meters; outer radius, 5.240 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	50.2	155	−80	114.8	354
+9.5	48.7	150	−81	115.1	355
+9.0	47.1	145	−82	115.5	356
			−83	115.9	357
+8.5	45.4	140	−84	116.3	358
+8.0	43.7	135	−85	116.6	360
+7.5	41.9	129			
+7.0	40.0	123	−86	117.0	361
+6.5	38.0	117	−87	117.4	362
			−88	117.7	363
+6.0	35.9	111	−89	118.1	364
+5.5	33.7	104	−90	118.4	365
+5.0	31.4	97			
+4.5	28.9	89	−91	118.8	366
+4.0	26.3	81	−92	119.1	367
			−93	119.4	368
+3.5	23.5	72	−94	119.8	369
+3.0	20.6	63	−95	120.1	370
+2.5	17.5	54			
+2.0	14.2	44	−96	120.4	371
+1.5	10.8	33	−97	120.8	372
			−98	121.1	373
+1.0	7.3	22	−99	121.4	374
+.9	6.6	20	−100	121.7	375
+.8	5.8	18			
+.7	5.1	16	−101	122.0	376
+.6	4.4	14	−102	122.3	377
			−103	122.6	378
+.5	3.7	11	−104	122.9	379
+.4	2.9	9	−105	123.2	380
+.3	2.2	7			
+.2	1.5	4	−106	123.5	381
+.1	.7	2	−107	123.8	382
.0	.0	0	−108	124.1	383
			−109	124.4	383
−.1	.7	2	−110	124.7	384
−.2	1.5	4			
−.3	2.2	7	−111	125.0	385
−.4	2.9	9	−112	125.2	386
−.5	3.7	11	−113	125.5	387
			−114	125.8	388
−.6	4.4	14	−115	126.0	389
−.7	5.1	16			
−.8	5.8	18	−116	126.3	389
−.9	6.6	20	−117	126.6	390
−1.0	7.3	22	−118	126.8	391
			−119	127.1	392
−1.5	10.8	33	−120	127.4	393
−2.0	14.2	44			
−2.5	17.4	54	−121	127.6	393
−3.0	20.5	63	−122	127.9	394
−3.5	23.5	72	−123	128.1	395
			−124	128.4	396
−4.0	26.2	81	−125	128.6	397
−4.5	28.9	89			
−5.0	31.3	97	−126	128.9	397
−5.5	33.7	104	−127	129.1	398
−6.0	35.9	111	−128	129.4	399
			−129	129.6	400
−6.5	38.0	117	−130	129.8	400
−7.0	40.0	123			
−7.5	41.8	129			
−8.0	43.6	134			
−8.5	45.4	140			
−9.0	47.0	145			
−9.5	48.6	150			
−10.0	50.0	154			
−10.5	51.5	159			
−11.0	52.9	163			
−11.5	54.2	167			
−12.0	55.5	171			
−12.5	56.7	175			
−13.0	57.9	178			
−13.5	59.0	182			
−14.0	60.1	185			
−14.5	61.2	189			
−15.0	62.2	192			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone I

[Inner radius, 5,240 meters; outer radius, 8,440 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals*×10^9	*km*	*cm*	*gals*×10^9
+10.0	109.3	337	−80	291.7	899
+9.5	105.4	325	−81	292.8	903
+9.0	101.3	312	−82	293.9	906
			−83	295.0	910
+8.5	97.1	299	−84	296.1	913
+8.0	92.8	286	−85	297.2	916
+7.5	88.3	272			
+7.0	83.6	258	−86	298.2	919
+6.5	78.8	243	−87	299.3	923
			−88	300.3	926
+6.0	73.8	227	−89	301.4	929
+5.5	68.6	211	−90	302.4	932
+5.0	63.2	195			
+4.5	57.6	178	−91	303.4	935
+4.0	51.8	160	−92	304.4	938
			−93	305.3	941
+3.5	45.9	141	−94	306.3	944
+3.0	39.7	122	−95	307.2	947
+2.5	33.4	103			
+2.0	26.9	83	−96	308.2	950
+1.5	20.3	63	−97	309.1	953
			−98	310.1	956
+1.0	13.6	42	−99	311.0	959
+.9	12.2	38	−100	311.9	961
+.8	10.9	34			
+.7	9.5	29	−101	312.8	964
+.6	8.2	25	−102	313.7	967
			−103	314.6	970
+.5	6.8	21	−104	315.4	972
+.4	5.5	17	−105	316.3	975
+.3	4.1	13			
+.2	2.7	8	−106	317.1	978
+.1	1.4	4	−107	318.0	980
.0	0.0	0	−108	318.8	983
			−109	319.6	985
−.1	1.4	4	−110	320.5	988
−.2	2.7	8			
−.3	4.1	13	−111	321.3	990
−.4	5.5	17	−112	322.1	993
−.5	6.8	21	−113	322.9	995
			−114	323.7	998
−.6	8.2	25	−115	324.5	1,000
−.7	9.5	29			
−.8	10.9	34	−116	325.2	1,003
−.9	12.2	38	−117	326.0	1,005
−1.0	13.6	42	−118	326.8	1,007
			−119	327.6	1,010
−1.5	20.3	63	−120	328.3	1,012
−2.0	26.9	83			
−2.5	33.4	103	−121	329.0	1,014
−3.0	39.7	122	−122	329.8	1,017
−3.5	45.8	141	−123	330.5	1,019
			−124	331.2	1,021
−4.0	51.8	160	−125	332.0	1,023
−4.5	57.5	177			
−5.0	63.1	194	−126	332.7	1,026
−5.5	68.5	211	−127	333.4	1,028
−6.0	73.7	227	−128	334.1	1,030
			−129	334.8	1,032
−6.5	78.7	242	−130	335.5	1,034
−7.0	83.5	257			
−7.5	88.1	272			
−8.0	92.6	286			
−8.5	96.9	299			
−9.0	101.1	312			
−9.5	105.1	324			
−10.0	109.0	336			
−10.5	112.8	348			
−11.0	116.4	359			
−11.5	119.9	370			
−12.0	123.3	380			
−12.5	126.6	390			
−13.0	129.8	400			
−13.5	132.9	410			
−14.0	135.9	419			
−14.5	138.9	428			
−15.0	141.7	437			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone J

[Inner radius, 8,440 meters; outer radius, 12,400 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶
+10.0	150.0	462	−80	477.0	1,470
+9.5	143.8	443	−81	479.1	1,477
+9.0	137.5	424	−82	481.2	1,483
+8.5	131.0	404	−83	483.2	1,490
+8.0	124.4	384	−84	485.3	1,496
+7.5	117.7	363	−85	487.3	1,502
+7.0	110.7	341	−86	489.3	1,508
+6.5	103.7	320	−87	491.2	1,514
+6.0	96.4	297	−88	493.2	1,520
+5.5	89.0	274	−89	495.1	1,526
+5.0	81.5	251	−90	497.0	1,532
+4.5	73.8	228	−91	498.9	1,538
+4.0	66.0	204	−92	500.7	1,544
+3.5	58.1	179	−93	502.6	1,549
+3.0	50.0	154	−94	504.4	1,555
+2.5	41.8	129	−95	506.2	1,560
+2.0	33.6	104	−96	508.0	1,566
+1.5	25.3	78	−97	509.7	1,571
+1.0	16.9	52	−98	511.5	1,577
+.9	15.2	47	−99	513.2	1,582
+.8	13.5	42	−100	514.9	1,587
+.7	11.8	36	−101	516.6	1,592
+.6	10.1	31	−102	518.2	1,598
+.5	8.4	26	−103	519.9	1,603
+.4	6.8	21	−104	521.5	1,608
+.3	5.1	16	−105	523.2	1,613
+.2	3.4	10	−106	524.8	1,618
+.1	1.7	5	−107	526.4	1,623
.0	0.0	0	−108	527.9	1,628
−.1	1.7	5	−109	529.5	1,632
−.2	3.4	10	−110	531.0	1,637
−.3	5.1	16	−111	532.6	1,642
−.4	6.8	21	−112	534.1	1,646
−.5	8.4	26	−113	535.6	1,651
−.6	10.1	31	−114	537.1	1,656
−.7	11.8	36	−115	538.6	1,660
−.8	13.5	42	−116	540.0	1,665
−.9	15.2	47	−117	541.5	1,669
−1.0	16.9	52	−118	542.9	1,674
−1.5	25.3	78	−119	544.3	1,678
−2.0	33.6	103	−120	545.8	1,682
−2.5	41.8	129	−121	547.2	1,687
−3.0	50.0	154	−122	548.5	1,691
−3.5	58.0	179	−123	549.9	1,695
−4.0	66.0	203	−124	551.3	1,700
−4.5	73.8	227	−125	552.6	1,704
−5.0	81.4	251	−126	554.0	1,708
−5.5	88.9	274	−127	555.3	1,712
−6.0	96.3	297	−128	556.6	1,716
−6.5	103.5	319	−129	558.0	1,720
−7.0	110.6	341	−130	559.2	1,724
−7.5	117.4	362			
−8.0	124.2	383			
−8.5	130.8	403			
−9.0	137.2	423			
−9.5	143.5	442			
−10.0	149.6	461			
−10.5	155.6	480			
−11.0	161.4	498			
−11.5	167.1	515			
−12.0	172.7	532			
−12.5	178.1	549			
−13.0	183.4	565			
−13.5	188.6	581			
−14.0	193.7	597			
−14.5	198.6	612			
−15.0	203.4	627			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone K

[Inner radius, 12,400 meters; outer radius, 18,800 meters]

h	*H*	Δ_{sg}	*h*	*H*	Δ_{sg}
km	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶
+10.0	257.0	792	−80	984.7	3,036
+9.5	245.5	757	−81	989.7	3,051
+9.0	233.8	721	−82	994.7	3,066
+8.5	221.9	684	−83	999.7	3,082
+8.0	209.8	647	−84	1,004.6	3,097
+7.5	197.6	609	−85	1,009.4	3,112
+7.0	185.2	571	−86	1,014.2	3,126
+6.5	172.7	532	−87	1,018.9	3,141
+6.0	160.0	493	−88	1,023.5	3,155
+5.5	147.2	454	−89	1,028.1	3,170
+5.0	134.3	414	−90	1,032.7	3,184
+4.5	121.3	374	−91	1,037.2	3,197
+4.0	108.1	333	−92	1,041.7	3,211
+3.5	94.8	292	−93	1,046.1	3,225
+3.0	81.4	251	−94	1,050.4	3,238
+2.5	68.0	210	−95	1,054.8	3,252
+2.0	54.5	168	−96	1,059.0	3,265
+1.5	40.9	126	−97	1,063.2	3,278
+1.0	27.3	84	−98	1,067.4	3,291
+.9	24.6	76	−99	1,071.6	3,303
+.8	21.8	67	−100	1,075.7	3,316
+.7	19.1	59	−101	1,079.7	3,328
+.6	16.4	50	−102	1,083.7	3,341
+.5	13.6	42	−103	1,087.7	3,353
+.4	10.9	34	−104	1,091.7	3,365
+.3	8.2	25	−105	1,095.6	3,377
+.2	5.5	17	−106	1,099.4	3,389
+.1	2.7	8	−107	1,103.2	3,401
.0	0.0	0	−108	1,107.0	3,413
−.1	2.7	8	−109	1,110.8	3,424
−.2	5.5	17	−110	1,114.5	3,436
−.3	8.2	25	−111	1,118.2	3,447
−.4	10.9	34	−112	1,121.8	3,458
−.5	13.6	42	−113	1,125.5	3,470
−.6	16.4	50	−114	1,129.1	3,481
−.7	19.1	59	−115	1,132.6	3,492
−.8	21.8	67	−116	1,136.1	3,502
−.9	24.6	76	−117	1,139.6	3,513
−1.0	27.3	84	−118	1,143.1	3,524
−1.5	40.9	126	−119	1,146.5	3,534
−2.0	54.5	168	−120	1,149.9	3,545
−2.5	68.0	210	−121	1,153.3	3,555
−3.0	81.4	251	−122	1,156.6	3,566
−3.5	94.7	292	−123	1,160.0	3,576
−4.0	108.0	333	−124	1,163.3	3,586
−4.5	121.1	373	−125	1,166.5	3,596
−5.0	134.2	414	−126	1,169.8	3,606
−5.5	147.1	453	−127	1,173.0	3,616
−6.0	159.8	493	−128	1,176.2	3,626
−6.5	172.4	532	−129	1,179.3	3,636
−7.0	184.9	570	−130	1,182.4	3,645
−7.5	197.2	608			
−8.0	209.4	646			
−8.5	221.4	682			
−9.0	233.2	719			
−9.5	244.9	55			
−10.0	256.4	790			
−10.5	267.8	825			
−11.0	278.9	860			
−11.5	289.9	894			
−12.0	300.7	927			
−12.5	311.4	960			
−13.0	321.9	992			
−13.5	332.2	1,024			
−14.0	342.3	1,055			
−14.5	352.3	1,086			
−15.0	362.2	1,116			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone L

[Inner radius, 18,800 meters; outer radius, 28,800 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶
+10.0	415.2	1,280	−80	1,933.0	5,959
+9.5	395.4	1,219	−81	1,944.8	5,995
+9.0	375.5	1,158	−82	1,956.4	6,031
+8.5	355.5	1,096	−83	1,967.9	6,066
+8.0	335.4	1,034	−84	1,979.3	6,102
+7.5	315.1	971	−85	1,990.5	6,136
+7.0	294.6	908	−86	2,001.7	6,171
+6.5	274.1	845	−87	2,012.7	6,204
+6.0	253.5	781	−88	2,023.6	6,238
+5.5	232.7	717	−89	2,034.3	6,271
+5.0	211.9	653	−90	2,045.0	6,304
+4.5	191.0	589	−91	2,055.5	6,337
+4.0	170.0	524	−92	2,066.0	6,369
+3.5	148.9	459	−93	2,076.3	6,401
+3.0	127.7	394	−94	2,086.5	6,432
+2.5	106.5	328	−95	2,096.6	6,463
+2.0	85.3	263	−96	2,106.6	6,494
+1.5	64.0	197	−97	2,116.5	6,525
+1.0	42.7	132	−98	2,126.3	6,555
+.9	38.4	118	−99	2,136.0	6,585
+.8	34.1	105	−100	2,145.6	6,614
+.7	29.9	92	−101	2,155.2	6,644
+.6	25.6	79	−102	2,164.6	6,673
+.5	21.3	66	−103	2,173.9	6,702
+.4	17.1	53	−104	2,183.2	6,730
+.3	12.8	40	−105	2,192.3	6,758
+.2	8.5	26	−106	2,201.4	6,786
+.1	4.3	13	−107	2,210.4	6,814
.0	0.0	0	−108	2,219.3	6,842
−.1	4.3	13	−109	2,228.1	6,869
−.2	8.5	26	−110	2,236.9	6,896
−.3	12.8	40	−111	2,245.6	6,922
−.4	17.1	53	−112	2,254.2	6,949
−.5	21.3	66	−113	2,262.7	6,975
−.6	25.6	79	−114	2,271.1	7,001
−.7	29.9	92	−115	2,279.5	7,027
−.8	34.1	105	−116	2,287.8	7,053
−.9	38.4	118	−117	2,296.0	7,078
−1.0	42.7	132	−118	2,304.2	7,103
−1.5	64.0	197	−119	2,312.3	7,128
−2.0	85.2	263	−120	2,320.3	7,153
−2.5	106.4	328	−121	2,328.2	7,177
−3.0	127.6	393	−122	2,336.1	7,202
−3.5	148.8	458	−123	2,344.0	7,226
−4.0	169.8	523	−124	2,351.7	7,250
−4.5	190.8	588	−125	2,359.4	7,273
−5.0	211.6	652	−126	2,367.1	7,297
−5.5	232.4	716	−127	2,374.6	7,320
−6.0	253.1	780	−128	2,382.2	7,344
−6.5	273.7	844	−129	2,389.6	7,366
−7.0	294.2	907	−130	2,397.0	7,389
−7.5	314.5	970			
−8.0	334.7	1,032			
−8.5	354.8	1,094			
−9.0	374.7	1,155			
−9.5	394.5	1,216			
−10.0	414.2	1,277			
−10.5	433.6	1,337			
−11.0	453.0	1,396			
−11.5	472.2	1,456			
−12.0	491.2	1,514			
−12.5	510.0	1,572			
−13.0	528.7	1,630			
−13.5	547.2	1,687			
−14.0	565.5	1,743			
−14.5	583.7	1,799			
−15.0	601.7	1,855			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone M

[Inner radius, 28,800 meters; outer radius, 58,800 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	1,269.5	3,914	−80.0	7,496.6	23,110	−112.0	9,144.3	28,190
+9.5	1,207.1	3,721	−80.5	7,526.2	23,201	−112.5	9,166.7	28,258
+9.0	1,144.5	3,528	−81.0	7,555.7	23,292	−113.0	9,188.9	28,327
			−81.5	7,585.0	23,383	−113.5	9,211.1	28,395
+8.5	1,081.7	3,335	−82.0	7,614.3	23,473	−114.0	9,233.2	28,463
+8.0	1,018.8	3,141						
+7.5	955.8	2,946	−82.5	7,643.3	23,562	−114.5	9,255.1	28,531
+7.0	892.7	2,752	−83.0	7,672.2	23,652	−115.0	9,277.0	28,599
+6.5	829.4	2,557	−83.5	7,701.0	23,740	−115.5	9,298.8	28,666
			−84.0	7,729.7	23,828	−116.0	9,320.6	28,733
+6.0	766.0	2,361	−84.5	7,758.2	23,916	−116.5	9,342.2	28,800
+5.5	702.5	2,166						
+5.0	638.9	1,970	−85.0	7,786.6	24,004	−117.0	9,363.8	28,866
+4.5	575.3	1,773	−85.5	7,814.8	24,091	−117.5	9,385.2	28,932
+4.0	511.5	1,577	−86.0	7,842.9	24,178	−118.0	9,406.6	28,998
			−86.5	7,870.9	24,264	−118.5	9,427.9	29,064
+3.5	447.7	1,380	−87.0	7,898.8	24,350	−119.0	9,449.2	29,129
+3.0	383.9	1,183						
+2.5	320.0	986	−87.5	7,926.5	24,435	−119.5	9,470.3	29,194
+2.0	256.0	789	−88.0	7,954.1	24,520	−120.0	9,491.4	29,259
+1.5	192.0	592	−88.5	7,981.5	24,605	−120.5	9,512.4	29,324
			−89.0	8,008.9	24,689	−121.0	9,533.3	29,388
+1.0	128.0	395	−89.5	8,036.1	24,773	−121.5	9,554.1	29,453
+.9	115.2	355						
+.8	102.4	316	−90.0	8,063.2	24,856	−122.0	9,574.9	29,517
+.7	89.6	276	−90.5	8,090.1	24,940	−122.5	9,595.5	29,580
+.6	76.8	237	−91.0	8,116.9	25,022	−123.0	9,616.1	29,644
			−91.5	8,143.7	25,105	−123.5	9,636.6	29,707
+.5	64.0	197	−92.0	8,170.2	25,187	−124.0	9,657.1	29,770
+.4	51.2	158						
+.3	38.4	118	−92.5	8,196.7	25,268	−124.5	9,677.5	29,833
+.2	25.6	79	−93.0	8,223.1	25,350	−125.0	9,697.8	29,896
+.1	12.8	40	−93.5	8,249.3	25,430	−125.5	9,718.0	29,958
.0	0.0	0	−94.0	8,275.4	25,511	−126.0	9,738.1	30,020
			−94.5	8,301.4	25,591	−126.5	9,758.2	30,082
−.1	12.8	40						
−.2	25.6	79	−95.0	8,327.3	25,671	−127.0	9,778.2	30,143
−.3	38.4	118	−95.5	8,353.1	25,750	−127.5	9,798.1	30,205
−.4	51.2	158	−96.0	8,378.7	25,829	−128.0	9,817.9	30,266
−.5	64.0	197	−96.5	8,404.3	25,908	−128.5	9,837.7	30,327
			−97.0	8,429.7	25,986	−129.0	9,857.4	30,388
−.6	76.8	237						
−.7	89.6	276	−97.5	8,455.0	26,064	−129.5	9,877.1	30,448
−.8	102.4	316	−98.0	8,480.2	26,142	−130.0	9,896.6	30,509
−.9	115.2	355	−98.5	8,505.3	26,220			
−1.0	128.0	395	−99.0	8,530.3	26,297			
			−99.5	8,555.2	26,373			
−1.5	192.0	592						
−2.0	255.9	789	−100.0	8,580.0	26,450			
−2.5	319.8	986	−100.5	8,604.6	26,526			
−3.0	383.6	1,182	−101.0	8,629.2	26,602			
−3.5	447.4	1,379	−101.5	8,653.6	26,677			
			−102.0	8,678.0	26,752			
−4.0	511.1	1,576						
−4.5	574.7	1,772	−102.5	8,702.2	26,827			
−5.0	638.2	1,967	−103.0	8,726.4	26,901			
−5.5	701.6	2,163	−103.5	8,750.4	26,975			
−6.0	764.9	2,358	−104.0	8,774.4	27,049			
			−104.5	8,798.2	27,122			
−6.5	828.1	2,553						
−7.0	891.2	2,747	−105.0	8,822.0	27,196			
−7.5	954.1	2,941	−105.5	8,845.6	27,269			
−8.0	1,016.9	3,135	−106.0	8,869.2	27,341			
−8.5	1,079.6	3,328	−106.5	8,892.6	27,414			
			−107.0	8,916.0	27,486			
−9.0	1,142.1	3,521						
−9.5	1,204.4	3,713	−107.5	8,939.2	27,557			
−10.0	1,266.5	3,904	−108.0	8,962.4	27,629			
−10.5	1,328.5	4,095	−108.5	8,985.5	27,700			
−11.0	1,390.3	4,286	−109.0	9,008.4	27,770			
			−109.5	9,031.3	27,841			
−11.5	1,451.9	4,476						
−12.0	1,513.3	4,665	−110.0	9,054.1	27,911			
−12.5	1,574.5	4,854	−110.5	9,076.8	27,981			
−13.0	1,635.5	5,042	−111.0	9,099.4	28,051			
−13.5	1,696.3	5,229	−111.5	9,121.9	28,120			
			−112.0	9,144.3	28,190			
−14.0	1,756.8	5,416						
−14.5	1,817.1	5,602						
−15.0	1,877.2	5,787						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone N

[Inner radius, 58,800 meters; outer radius, 99,000 meters]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	1,712.7	5,280	−80.0	11,892.4	36,661	−112.0	15,265.7	47,060
+9.5	1,627.4	5,017	−80.5	11,950.7	36,841	−112.5	15,313.1	47,206
+9.0	1,542.0	4,754	−81.0	12,008.8	37,020	−113.0	15,360.3	47,352
			−81.5	12,066.8	37,199	−113.5	15,407.4	47,497
+8.5	1,456.7	4,490	−82.0	12,124.6	37,377	−114.0	15,454.4	47,642
+8.0	1,371.2	4,227						
+7.5	1,285.7	3,964	−82.5	12,182.1	37,554	−114.5	15,501.2	47,786
+7.0	1,200.2	3,700	−83.0	12,239.5	37,731	−115.0	15,547.9	47,930
+6.5	1,114.6	3,436	−83.5	12,296.7	37,907	−115.5	15,594.4	48,073
			−84.0	12,353.7	38,083	−116.0	15,640.8	48,216
+6.0	1,029.0	3,172	−84.5	12,410.5	38,258	−116.5	15,687.0	48,359
+5.5	943.3	2,908						
+5.0	857.7	2,644	−85.0	12,467.1	38,433	−117.0	15,733.1	48,501
+4.5	772.0	2,380	−85.5	12,523.5	38,607	−117.5	15,779.1	48,643
+4.0	686.2	2,115	−86.0	12,579.8	38,780	−118.0	15,824.9	48,784
			−86.5	12,635.8	38,953	−118.5	15,870.6	48,925
+3.5	600.5	1,851	−87.0	12,691.7	39,125	−119.0	15,916.1	49,065
+3.0	514.7	1,587						
+2.5	428.9	1,322	−87.5	12,747.4	39,297	−119.5	15,961.5	49,205
+2.0	343.2	1,058	−88.0	12,802.9	39,468	−120.0	16,006.8	49,344
+1.5	257.4	793	−88.5	12,858.2	39,638	−120.5	16,051.9	49,484
			−89.0	12,913.4	39,808	−121.0	16,096.8	49,622
+1.0	171.6	529	−89.5	12,968.3	39,978	−121.5	16,141.7	49,760
+.9	154.4	476						
+.8	137.2	423	−90.0	13,023.1	40,147	−122.0	16,186.4	49,898
+.7	120.1	370	−90.5	13,077.7	40,315	−122.5	16,231.0	50,036
+.6	102.9	317	−91.0	13,132.1	40,483	−123.0	16,275.4	50,173
			−91.5	13,186.4	40,650	−123.5	16,319.7	50,309
+.5	85.8	264	−92.0	13,240.4	40,817	−124.0	16,363.9	50,445
+.4	68.6	212						
+.3	51.5	159	−92.5	13,294.3	40,983	−124.5	16,407.9	50,581
+.2	34.3	106	−93.0	13,348.0	41,148	−125.0	16,451.8	50,716
+.1	17.2	53	−93.5	13,401.6	41,313	−125.5	16,495.6	50,852
.0	0.0	0	−94.0	13,454.9	41,478	−126.0	16,539.3	50,986
			−94.5	13,508.1	41,642	−126.5	16,582.8	51,120
−.1	17.2	53						
−.2	34.3	106	−95.0	13,561.1	41,805	−127.0	16,626.2	51,254
−.3	51.5	159	−95.5	13,614.0	41,968	−127.5	16,669.4	51,387
−.4	68.6	212	−96.0	13,666.6	42,130	−128.0	16,712.5	51,520
−.5	85.8	264	−96.5	13,719.1	42,292	−128.5	16,755.5	51,653
			−97.0	13,771.5	42,454	−129.0	16,798.4	51,785
−.6	102.9	317						
−.7	120.1	370	−97.5	13,823.6	42,614	−129.5	16,841.2	51,917
−.8	137.2	423	−98.0	13,875.6	42,775	−130.0	16,883.8	52,048
−.9	154.4	476	−98.5	13,927.4	42,934			
−1.0	171.5	529	−99.0	13,979.1	43,094			
			−99.5	14,030.6	43,252			
−1.5	257.3	793						
−2.0	343.0	1,057	−100.0	14,081.9	43,411			
−2.5	428.7	1,322	−100.5	14,133.0	43,568			
−3.0	514.3	1,586	−101.0	14,184.0	43,726			
−3.5	600.0	1,850	−101.5	14,234.9	43,882			
			−102.0	14,285.5	44,038			
−4.0	685.6	2,113						
−4.5	771.1	2,377	−102.5	14,336.0	44,194			
−5.0	856.6	2,641	−103.0	14,386.4	44,349			
−5.5	942.1	2,904	−103.5	14,436.6	44,504			
−6.0	1,027.5	3,168	−104.0	14,486.6	44,658			
			−104.5	14,536.4	44,812			
−6.5	1,112.9	3,431						
−7.0	1,198.2	3,694	−105.0	14,586.1	44,965			
−7.5	1,283.4	3,956	−105.5	14,635.7	45,118			
−8.0	1,368.6	4,219	−106.0	14,685.1	45,270			
−8.5	1,453.7	4,482	−106.5	14,734.3	45,422			
			−107.0	14,783.4	45,573			
−9.0	1,538.8	4,744						
−9.5	1,623.8	5,006	−107.5	14,832.3	45,724			
−10.0	1,708.6	5,267	−108.0	14,881.0	45,874			
−10.5	1,793.4	5,529	−108.5	14,929.7	46,024			
−11.0	1,878.2	5,790	−109.0	14,978.1	46,173			
			−109.5	15,026.4	46,322			
−11.5	1,962.8	6,051						
−12.0	2,047.3	6,311	−110.0	15,074.6	46,471			
−12.5	2,131.8	6,572	−110.5	15,122.6	46,619			
−13.0	2,216.1	6,832	−111.0	15,170.4	46,766			
−13.5	2,300.4	7,091	−111.5	15,218.1	46,913			
			−112.0	15,265.7	47,060			
−14.0	2,384.5	7,351						
−14.5	2,468.6	7,610						
−15.0	2,552.5	7,869						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES.—THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone O

[Inner radius, 99,000 meters; outer radius, 166,700 meters = 1°29′ 58″]

h	H	Δsg	h	H	Δsg	h	H	Δsg	h	H	Δsg	h	H	Δsg
km	cm	gals×10⁸	km	cm	gals×10⁸	km	cm	gals×10⁸	km	cm	gals×10⁸	km	cm	gals×10
+10.0	2,891.0	8,912	−80.0	21,646.2	66,729	−93.0	24,703.5	76,154	−106.0	27,610.6	85,116	−119.0	30,370.2	93,623
+9.5	2,746.6	8,467	−80.2	21,694.4	66,878	−93.2	24,749.4	76,296	−106.2	27,654.1	85,250	−119.2	30,411.6	93,751
+9.0	2,602.1	8,022	−80.4	21,742.5	67,026	−93.4	24,795.2	76,437	−106.4	27,697.7	85,384	−119.4	30,452.9	93,878
			−80.6	21,790.6	67,174	−93.6	24,841.0	76,578	−106.6	27,741.2	85,518	−119.6	30,494.1	94,005
+8.5	2,457.6	7,576	−80.8	21,838.7	67,323	−93.8	24,886.8	76,719	−106.8	27,784.6	85,652	−119.8	30,535.4	94,132
+8.0	2,313.1	7,131	−81.0	21,886.7	67,471	−94.0	24,932.5	76,860	−107.0	27,828.0	85,786	−120.0	30,576.6	94,259
+7.5	2,168.6	6,685												
+7.0	2,024.0	6,240	−81.2	21,934.7	67,619	−94.2	24,978.2	77,001	−107.2	27,871.4	85,920	−120.2	30,617.7	94,386
+6.5	1,879.5	5,794	−81.4	21,982.7	67,767	−94.4	25,023.8	77,142	−107.4	27,914.8	86,054	−120.4	30,658.9	94,513
			−81.6	22,030.6	67,914	−94.6	25,069.4	77,282	−107.6	27,958.1	86,187	−120.6	30,700.0	94,640
+6.0	1,734.9	5,348	−81.8	22,078.5	68,062	−94.8	25,115.0	77,423	−107.8	28,001.4	86,321	−120.8	30,741.0	94,766
+5.5	1,590.3	4,903	−82.0	22,126.3	68,209	−95.0	25,160.5	77,563	−108.0	28,044.6	86,454	−121.0	30,782.0	94,893
+5.0	1,445.7	4,457												
+4.5	1,301.2	4,011	−82.2	22,174.2	68,357	−95.2	25,206.0	77,703	−108.2	28,087.8	86,587	−121.2	30,823.0	95,019
+4.0	1,156.6	3,565	−82.4	22,222.0	68,504	−95.4	25,251.5	77,843	−108.4	28,131.0	86,720	−121.4	30,864.0	95,145
			−82.6	22,269.7	68,651	−95.6	25,296.9	77,984	−108.6	28,174.2	86,853	−121.6	30,904.9	95,271
+3.5	1,012.0	3,120	−82.8	22,317.4	68,798	−95.8	25,342.3	78,124	−108.8	28,217.3	86,986	−121.8	30,945.8	95,398
+3.0	867.4	2,674	−83.0	22,365.1	68,946	−96.0	25,387.7	78,263	−109.0	28,260.3	87,119	−122.0	30,986.7	95,524
+2.5	722.8	2,228												
+2.0	578.2	1,782	−83.2	22,412.8	69,092	−96.2	25,433.0	78,403	−109.2	28,303.4	87,252	−122.2	31,027.5	95,649
+1.5	433.6	1,337	−83.4	22,460.4	69,239	−96.4	25,478.3	78,543	−109.4	28,346.4	87,384	−122.4	31,068.3	95,775
			−83.6	22,507.9	69,386	−96.6	25,523.6	78,682	−109.6	28,389.4	87,517	−122.6	31,109.1	95,901
+1.0	289.1	891	−83.8	22,555.5	69,532	−96.8	25,568.8	78,822	−109.8	28,432.3	87,649	−122.8	31,149.8	96,026
+.9	260.2	802	−84.0	22,603.0	69,679	−97.0	25,613.9	78,961	−110.0	28,475.2	87,781	−123.0	31,190.5	96,152
+.8	231.3	713												
+.7	202.4	624	−84.2	22,650.4	69,825	−97.2	25,659.1	79,100	−110.2	28,518.1	87,913	−123.2	31,231.2	96,277
+.6	173.4	535	−84.4	22,697.9	69,971	−97.4	25,704.2	79,239	−110.4	28,560.9	88,046	−123.4	31,271.8	96,402
			−84.6	22,745.2	70,117	−97.6	25,749.3	79,378	−110.6	28,603.7	88,178	−123.6	31,312.4	96,528
+.5	144.5	446	−84.8	22,792.6	70,263	−97.8	25,794.3	79,517	−110.8	28,646.4	88,309	−123.8	31,353.0	96,653
+.4	115.6	356	−85.0	22,839.9	70,409	−98.0	25,839.3	79,656	−111.0	28,689.2	88,441	−124.0	31,393.5	96,778
+.3	86.7	267												
+.2	57.8	178	−85.2	22,887.2	70,555	−98.2	25,884.3	79,794	−111.2	28,731.9	88,573	−124.2	31,434.0	96,902
+.1	28.9	89	−85.4	22,934.5	70,701	−98.4	25,929.2	79,933	−111.4	28,774.5	88,704	−124.4	31,474.5	97,027
.0	0.0	0	−85.6	22,981.7	70,846	−98.6	25,974.1	80,071	−111.6	28,817.2	88,836	−124.6	31,514.9	97,152
			−85.8	23,028.9	70,992	−98.8	26,019.0	80,209	−111.8	28,859.7	88,967	−124.8	31,555.3	97,276
−.1	28.9	89	−86.0	23,076.0	71,137	−99.0	26,063.8	80,348	−112.0	28,902.3	89,098	−125.0	31,595.7	97,401
−.2	57.8	178	−86.2	23,123.1	71,282	−99.2	26,108.6	80,486	−112.2	28,944.8	89,229	−125.2	31,636.0	97,525
−.3	86.7	267	−86.4	23,170.2	71,427	−99.4	26,153.4	80,624	−112.4	28,987.3	89,360	−125.4	31,676.3	97,649
−.4	115.6	356	−86.6	23,217.2	71,572	−99.6	26,198.1	80,762	−112.6	29,029.8	89,491	−125.6	31,716.6	97,774
−.5	144.5	446	−86.8	23,264.2	71,717	−99.8	26,242.8	80,899	−112.8	29,072.2	89,622	−125.8	31,756.8	97,898
			−87.0	23,311.2	71,862	−100.0	26,287.4	81,037	−113.0	29,114.6	89,752	−126.0	31,797.0	98,022
−.6	173.4	535												
−.7	202.3	624	−87.2	23,358.1	72,007	−100.2	26,332.0	81,174	−113.2	29,156.9	89,883	−126.2	31,837.2	98,145
−.8	231.2	713	−87.4	23,405.0	72,151	−100.4	26,376.6	81,312	−113.4	29,199.2	90,013	−126.4	31,877.3	98,269
−.9	260.1	802	−87.6	23,451.9	72,296	−100.6	26,421.2	81,449	−113.6	29,241.5	90,144	−126.6	31,917.4	98,393
−1.0	289.0	891	−87.8	23,498.7	72,440	−100.8	26,465.7	81,586	−113.8	29,283.8	90,274	−126.8	31,957.5	98,516
			−88.0	23,545.5	72,584	−101.0	26,510.2	81,724	−114.0	29,326.0	90,404	−127.0	31,997.5	98,640
−1.5	433.5	1,336												
−2.0	577.9	1,782	−88.2	23,592.2	72,728	−101.2	26,554.6	81,860	−114.2	29,368.2	90,534	−127.2	32,037.5	98,763
−2.5	722.4	2,227	−88.4	23,639.0	72,872	−101.4	26,599.0	81,997	−114.4	29,410.3	90,664	−127.4	32,077.5	98,885
−3.0	866.8	2,672	−88.6	23,685.6	73,016	−101.6	26,643.4	82,134	−114.6	29,452.4	90,794	−127.6	32,117.5	99,009
−3.5	1,011.1	3,117	−88.8	23,732.3	73,160	−101.8	26,687.7	82,271	−114.8	29,494.5	90,924	−127.8	32,157.4	99,132
			−89.0	23,778.9	73,304	−102.0	26,732.0	82,407	−115.0	29,536.5	91,053	−128.0	32,197.2	99,256
−4.0	1,155.5	3,562												
−4.5	1,299.8	4,007	−89.2	23,825.5	73,447	−102.2	26,776.3	82,544	−115.2	29,578.5	91,183	−128.2	32,237.1	99,378
−5.0	1,444.0	4,452	−89.4	23,872.0	73,591	−102.4	26,820.5	82,680	−115.4	29,620.5	91,312	−128.4	32,276.9	99,501
−5.5	1,588.3	4,896	−89.6	23,918.5	73,734	−102.6	26,864.7	82,816	−115.6	29,662.4	91,441	−128.6	32,316.7	99,623
−6.0	1,732.4	5,341	−89.8	23,965.0	73,877	−102.8	26,908.8	82,952	−115.8	29,704.4	91,570	−128.8	32,356.4	99,746
			−90.0	24,011.4	74,021	−103.0	26,953.0	83,089	−116.0	29,746.2	91,699	−129.0	32,396.1	99,868
−6.5	1,876.6	5,785												
−7.0	2,020.7	6,229	−90.2	24,057.8	74,164	−103.2	26,997.0	83,224	−116.2	29,788.1	91,828	−129.2	32,435.8	99,991
−7.5	2,164.7	6,673	−90.4	24,104.2	74,306	−103.4	27,041.1	83,360	−116.4	29,829.9	91,957	−129.4	32,475.5	100,113
−8.0	2,308.7	7,117	−90.6	24,150.5	74,449	−103.6	27,085.1	83,496	−116.6	29,871.6	92,086	−129.6	32,515.1	100,235
−8.5	2,452.7	7,561	−90.8	24,196.8	74,592	−103.8	27,129.1	83,632	−116.8	29,913.4	92,215	−129.8	32,554.7	100,357
			−91.0	24,243.0	74,735	−104.0	27,173.0	83,767	−117.0	29,955.1	92,343	−130.0	32,594.2	100,479
−9.0	2,596.6	8,005												
−9.5	2,740.4	8,448	−91.2	24,289.2	74,877	−104.2	27,216.9	83,902	−117.2	29,996.8	92,472			
−10.0	2,884.2	8,891	−91.4	24,335.4	75,019	−104.4	27,260.8	84,038	−117.4	30,038.4	92,600			
−10.5	3,027.9	9,334	−91.6	24,381.5	75,162	−104.6	27,304.7	84,173	−117.6	30,080.0	92,728			
−11.0	3,171.6	9,777	−91.8	24,427.6	75,304	−104.8	27,348.5	84,308	−117.8	30,121.6	92,856			
			−92.0	24,473.7	75,446	−105.0	27,392.2	84,443	−118.0	30,163.1	92,985			
−11.5	3,315.2	10,220												
−12.0	3,458.7	10,662	−92.2	24,519.8	75,588	−105.2	27,436.0	84,578	−118.2	30,204.6	93,112			
−12.5	3,602.1	11,104	−92.4	24,565.8	75,730	−105.4	27,479.7	84,712	−118.4	30,246.0	93,240			
−13.0	3,745.5	11,546	−92.6	24,611.7	75,871	−105.6	27,523.3	84,847	−118.6	30,287.5	93,368			
−13.5	3,888.8	11,988	−92.8	24,657.6	76,013	−105.8	27,567.0	84,981	−118.8	30,328.9	93,496			
			−93.0	24,703.5	76,154	−106.0	27,610.6	85,116	−119.0	30,370.2	93,623			
−14.0	4,032.1	12,430												
−14.5	4,175.2	12,871												
−15.0	4,318.3	13,312												

[1] See explanation on pp. 3 and 15.

1705°—35——3

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 18

[Inner radius, 1°29′58″=166,700 meters; outer radius, 1°41′13″]

h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	890.3	2,744	−80.0	6,829.1	21,052	−112.0	9,270.1	28,577
+9.5	845.7	2,607	−80.5	6,868.8	21,175	−112.5	9,306.6	28,690
+9.0	801.2	2,470	−81.0	6,908.5	21,297	−113.0	9,343.0	28,802
			−81.5	6,948.1	21,419	−113.5	9,379.4	28,914
+8.5	756.7	2,333	−82.0	6,987.6	21,541	−114.0	9,415.8	29,026
+8.0	712.2	2,195						
+7.5	667.7	2,058	−82.5	7,027.2	21,663	−114.5	9,452.0	29,138
+7.0	623.1	1,921	−83.0	7,066.6	21,784	−115.0	9,488.2	29,250
+6.5	578.6	1,784	−83.5	7,106.0	21,906	−115.5	9,524.4	29,361
			−84.0	7,145.4	22,027	−116.0	9,560.5	29,472
+6.0	534.1	1,646	−84.5	7,184.7	22,149	−116.5	9,596.6	29,584
+5.5	489.6	1,509						
+5.0	445.0	1,372	−85.0	7,224.0	22,270	−117.0	9,632.6	29,695
+4.5	400.5	1,235	−85.5	7,263.2	22,391	−117.5	9,668.6	29,806
+4.0	356.0	1,098	−86.0	7,302.4	22,511	−118.0	9,704.5	29,916
			−86.5	7,341.5	22,632	−118.5	9,740.3	30,027
+3.5	311.5	960	−87.0	7,380.6	22,752	−119.0	9,776.1	30,137
+3.0	267.0	823						
+2.5	222.5	686	−87.5	7,419.6	22,873	−119.5	9,811.9	30,247
+2.0	178.0	549	−88.0	7,458.6	22,993	−120.0	9,847.6	30,357
+1.5	133.5	412	−88.5	7,497.5	23,113	−120.5	9,883.2	30,467
			−89.0	7,536.4	23,233	−121.0	9,918.8	30,577
+1.0	89.0	274	−89.5	7,575.2	23,352	−121.5	9,954.4	30,687
+.9	80.1	247						
+.8	71.2	219	−90.0	7,614.0	23,472	−122.0	9,989.9	30,796
+.7	62.3	192	−90.5	7,652.8	23,591	−122.5	10,025.3	30,905
+.6	53.4	165	−91.0	7,691.4	23,711	−123.0	10,060.7	31,014
			−91.5	7,730.1	23,830	−123.5	10,096.0	31,123
+.5	44.5	137	−92.0	7,768.6	23,949	−124.0	10,131.3	31,232
+.4	35.6	110						
+.3	26.7	82	−92.5	7,807.2	24,067	−124.5	10,166.5	31,341
+.2	17.8	55	−93.0	7,845.6	24,186	−125.0	10,201.7	31,449
+.1	8.9	27	−93.5	7,884.1	24,304	−125.5	10,236.8	31,557
0	0.0	0	−94.0	7,922.5	24,423	−126.0	10,271.9	31,666
			−94.5	7,960.8	24,541	−126.5	10,306.9	31,774
−.1	8.9	27						
−.2	17.8	55	−95.0	7,999.1	24,659	−127.0	10,341.9	31,881
−.3	26.7	82	−95.5	8,037.3	24,777	−127.5	10,376.8	31,989
−.4	35.6	110	−96.0	8,075.5	24,894	−128.0	10,411.7	32,096
−.5	44.5	137	−96.5	8,113.6	25,012	−128.5	10,446.5	32,204
			−97.0	8,151.7	25,129	−129.0	10,481.3	32,311
−.6	53.4	164						
−.7	62.3	192	−97.5	8,189.7	25,247	−129.5	10,516.0	32,418
−.8	71.2	219	−98.0	8,227.7	25,364	−130.0	10,550.6	32,525
−.9	80.1	247	−98.5	8,265.6	25,481			
−1.0	89.0	274	−99.0	8,303.5	25,597			
			−99.5	8,341.3	25,714			
−1.5	133.4	411						
−2.0	177.9	548	−100.0	8,379.1	25,830			
−2.5	222.4	686	−100.5	8,416.8	25,947			
−3.0	266.8	822	−101.0	8,454.5	26,063			
−3.5	311.2	960	−101.5	8,492.1	26,179			
			−102.0	8,529.6	26,295			
−4.0	355.7	1,096						
−4.5	400.1	1,233	−102.5	8,567.2	26,410			
−5.0	444.5	1,370	−103.0	8,604.6	26,526			
−5.5	488.9	1,507	−103.5	8,642.0	26,641			
−6.0	533.3	1,644	−104.0	8,679.4	26,756			
			−104.5	8,716.7	26,871			
−6.5	577.7	1,781						
−7.0	622.1	1,918	−105.0	8,754.0	26,986			
−7.5	666.5	2,055	−105.5	8,791.2	27,101			
−8.0	710.8	2,191	−106.0	8,828.3	27,215			
−8.5	755.2	2,328	−106.5	8,865.4	27,330			
			−107.0	8,902.5	27,444			
−9.0	799.5	2,465						
−9.5	843.8	2,601	−107.5	8,939.5	27,558			
−10.0	888.2	2,738	−108.0	8,976.4	27,672			
−10.5	932.5	2,875	−108.5	9,013.3	27,786			
−11.0	976.8	3,011	−109.0	9,050.2	27,899			
			−109.5	9,087.0	28,013			
−11.5	1,021.0	3,148						
−12.0	1,065.3	3,284	−110.0	9,123.7	28,126			
−12.5	1,109.6	3,420	−110.5	9,160.4	28,239			
−13.0	1,153.8	3,557	−111.0	9,197.0	28,352			
−13.5	1,198.0	3,693	−111.5	9,233.6	28,465			
			−112.0	9,270.1	28,577			
−14.0	1,242.2	3,829						
−14.5	1,286.4	3,966						
−15.0	1,330.6	4,102						

[1] See explanation on pp. 3 and 15.

Table 1. FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 17

[Inner radius, 1°41′13″; outer radius, 1°54′52″]

h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	1,080.3	3,330	−80.0	8,340.2	25,711	−112.0	11,378.5	35,077
+9.5	1,026.2	3,164	−80.5	8,389.4	25,862	−112.5	11,424.2	35,218
+9.0	972.2	2,997	−81.0	8,438.4	26,013	−113.0	11,469.9	35,359
			−81.5	8,487.4	26,164	−113.5	11,515.5	35,499
+8.5	918.2	2,830	−82.0	8,536.4	26,315	−114.0	11,561.1	35,640
+8.0	864.2	2,664				−114.5	11,606.6	35,780
+7.5	810.1	2,497	−82.5	8,585.3	26,466	−115.0	11,652.0	35,920
+7.0	756.1	2,331	−83.0	8,634.1	26,617	−115.5	11,697.4	36,060
+6.5	702.1	2,164	−83.5	8,682.9	26,767	−116.0	11,742.8	36,200
			−84.0	8,731.7	26,917	−116.5	11,788.0	36,339
+6.0	648.0	1,998	−84.5	8,780.4	27,068			
+5.5	594.0	1,831				−117.0	11,833.3	36,479
+5.0	540.0	1,665	−85.0	8,829.0	27,218	−117.5	11,878.4	36,618
+4.5	486.0	1,498	−85.5	8,877.6	27,367	−118.0	11,923.6	36,757
+4.0	432.0	1,332	−86.0	8,926.2	27,517	−118.5	11,968.6	36,896
			−86.5	8,974.7	27,666	−119.0	12,013.6	37,035
+3.5	378.0	1,165	−87.0	9,023.1	27,816			
+3.0	323.9	999				−119.5	12,058.6	37,173
+2.5	269.9	832	−87.5	9,071.5	27,965	−120.0	12,103.5	37,312
+2.0	215.9	666	−88.0	9,119.9	28,114	−120.5	12,148.3	37,450
+1.5	162.0	499	−88.5	9,168.2	28,263	−121.0	12,193.1	37,588
			−89.0	9,216.4	28,412	−121.5	12,237.8	37,726
+1.0	108.0	333	−89.5	9,264.6	28,560			
+.9	97.2	300				−122.0	12,282.5	37,864
+.8	86.4	266	−90.0	9,312.8	28,709	−122.5	12,327.1	38,001
+.7	75.6	233	−90.5	9,360.8	28,857	−123.0	12,371.6	38,138
+.6	64.8	200	−91.0	9,408.9	29,005	−123.5	12,416.1	38,276
			−91.5	9,456.9	29,153	−124.0	12,460.6	38,412
+.5	54.0	166	−92.0	9,504.8	29,301			
+.4	43.2	133				−124.5	12,504.9	38,549
+.3	32.4	100	−92.5	9,552.7	29,448	−125.0	12,549.3	38,686
+.2	21.6	67	−93.0	9,600.5	29,596	−125.5	12,593.5	38,822
+.1	10.8	33	−93.5	9,648.3	29,743	−126.0	12,637.8	38,959
0	0.0	0	−94.0	9,696.0	29,890	−126.5	12,681.9	39,095
			−94.5	9,743.7	30,037			
−.1	10.8	33				−127.0	12,726.0	39,231
−.2	21.6	66	−95.0	9,791.3	30,184	−127.5	12,770.1	39,367
−.3	32.4	100	−95.5	9,838.9	30,331	−128.0	12,814.1	39,502
−.4	43.2	133	−96.0	9,886.4	30,477	−128.5	12,858.0	39,638
−.5	54.0	166	−96.5	9,933.9	30,623	−129.0	12,901.9	39,773
			−97.0	9,981.3	30,770			
−.6	64.8	200				−129.5	12,945.7	39,908
−.7	75.6	233	−97.5	10,028.6	30,916	−130.0	12,989.5	40,043
−.8	86.4	266	−98.0	10,076.0	31,061			
−.9	97.2	299	−98.5	10,123.2	31,207			
−1.0	107.9	333	−99.0	10,170.4	31,353			
			−99.5	10,217.6	31,498			
−1.5	161.9	499						
−2.0	215.8	665	−100.0	10,264.6	31,643			
−2.5	269.8	832	−100.5	10,311.7	31,788			
−3.0	323.7	998	−101.0	10,358.7	31,933			
−3.5	377.6	1,164	−101.5	10,405.6	32,078			
			−102.0	10,452.5	32,222			
−4.0	431.6	1,330						
−4.5	485.5	1,497	−102.5	10,499.3	32,366			
−5.0	539.4	1,663	−103.0	10,546.0	32,511			
−5.5	593.2	1,829	−103.5	10,592.8	32,655			
−6.0	647.1	1,995	−104.0	10,639.4	32,798			
			−104.5	10,686.0	32,942			
−6.5	701.0	2,161						
−7.0	754.8	2,327	−105.0	10,732.6	33,086			
−7.5	808.7	2,493	−105.5	10,779.1	33,229			
−8.0	862.5	2,659	−106.0	10,825.5	33,372			
−8.5	916.3	2,825	−106.5	10,871.9	33,515			
			−107.0	10,918.2	33,658			
−9.0	970.2	2,991						
−9.5	1,024.0	3,157	−107.5	10,964.5	33,801			
−10.0	1,077.7	3,322	−108.0	11,010.7	33,943			
−10.5	1,131.5	3,488	−108.5	11,056.9	34,085			
−11.0	1,185.3	3,654	−109.0	11,103.0	34,228			
			−109.5	11,149.1	34,370			
−11.5	1,239.0	3,820						
−12.0	1,292.7	3,985	−110.0	11,195.1	34,511			
−12.5	1,346.5	4,151	−110.5	11,241.0	34,653			
−13.0	1,400.2	4,316	−111.0	11,286.9	34,794			
−13.5	1,453.8	4,482	−111.5	11,332.7	34,936			
			−112.0	11,378.5	35,077			
−14.0	1,507.5	4,647						
−14.5	1,561.2	4,813						
−15.0	1,614.8	4,978						

[1] See explanation on pp. 3 and 15

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 16

[Inner radius, 1°54′52″; outer radius, 2°11′53″]

h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	1,346.8	4,152	−80.0	10,455.8	32,232	−112.0	14,329.7	44,175
+9.5	1,279.4	3,944	−80.5	10,518.1	32,424	−112.5	14,388.4	44,356
+9.0	1,212.0	3,736	−81.0	10,580.3	32,616	−113.0	14,447.0	44,536
+8.5	1,144.7	3,529	−81.5	10,642.4	32,808	−113.5	14,505.6	44,717
+8.0	1,077.3	3,321	−82.0	10,704.5	32,999	−114.0	14,564.1	44,897
+7.5	1,009.9	3,113	−82.5	10,766.5	33,190	−114.5	14,622.5	45,077
+7.0	942.6	2,906	−83.0	10,828.5	33,381	−115.0	14,680.9	45,257
+6.5	875.2	2,698	−83.5	10,890.4	33,572	−115.5	14,739.2	45,437
+6.0	807.9	2,490	−84.0	10,952.3	33,763	−116.0	14,797.5	45,617
+5.5	740.5	2.283	−84.5	11,014.1	33,954	−116.5	14,855.7	45,796
+5.0	673.2	2,075	−85.0	11,075.8	34,144	−117.0	14,913.9	45,975
+4.5	605.8	1,868	−85.5	11,137.6	34,334	−117.5	14,971.9	46,154
+4.0	538.5	1,660	−86.0	11,199.2	34,524	−118.0	15,030.0	46,333
+3.5	471.2	1,452	−86.5	11,260.8	34,714	−118.5	15,087.9	46,512
+3.0	403.8	1,245	−87.0	11,322.4	34,904	−119.0	15,145.8	46,690
+2.5	336.5	1,037	−87.5	11,383.9	35,094	−119.5	15,203.7	46,869
+2.0	269.2	830	−88.0	11,445.4	35,283	−120.0	15,261.5	47,047
+1.5	201.9	622	−88.5	11,506.8	35,472	−120.5	15,319.2	47,225
+1.0	134.6	415	−89.0	11,568.1	35,661	−121.0	15,376.9	47,403
+.9	121.1	373	−89.5	11,629.4	35,850	−121.5	15,434.5	47,580
+.8	107.7	332	−90.0	11,690.6	36,039	−122.0	15,492.0	47,758
+.7	94.2	290	−90.5	11,751.8	36,228	−122.5	15,549.5	47,935
+.6	80.7	249	−91.0	11,812.9	36,416	−123.0	15,606.9	48,112
+.5	67.3	208	−91.5	11,874.0	36,604	−123.5	15,664.3	48,289
+.4	53.8	166	−92.0	11,935.0	36,792	−124.0	15,721.6	48,465
+.3	40.4	124	−92.5	11,996.0	36,980	−124.5	15,778.8	48,642
+.2	26.9	83	−93.0	12,056.9	37,168	−125.0	15,836.0	48,818
+.1	13.5	42	−93.5	12,117.7	37,356	−125.5	15,893.2	48,994
.0	0.0	0	−94.0	12,178.5	37,543	−126.0	15,950.2	49,170
−.1	13.5	42	−94.5	12,239.3	37,730	−126.5	16,007.2	49,346
−.2	26.9	83	−95.0	12,300.0	37,917	−127.0	16,064.2	49,521
−.3	40.4	124	−95.5	12,360.6	38,104	−127.5	16,121.0	49,697
−.4	53.8	166	−96.0	12,421.2	38,291	−128.0	16,177.8	49,872
−.5	67.3	207	−96.5	12,481.7	38,478	−128.5	16,234.6	50,047
−.6	80.7	249	−97.0	12,542.2	38,664	−129.0	16,291.3	50,222
−.7	94.2	290	−97.5	12,602.6	38,850	−129.5	16,347.9	50,396
−.8	107.6	332	−98.0	12,663.0	39,036	−130.0	16,404.5	50,570
−.9	121.1	373	−98.5	12,723.2	39,222			
−1.0	134.6	415	−99.0	12,783.5	39,408			
−1.5	201.8	622	−99.5	12,843.7	39,594			
−2.0	269.1	829	−100.0	12,903.8	39,779			
−2.5	336.3	1,037	−100.5	12,963.9	39,964			
−3.0	403.5	1,244	−101.0	13,023.9	40,149			
−3.5	470.8	1,451	−101.5	13,083.9	40,334			
−4.0	538.0	1,658	−102.0	13,143.8	40,519			
−4.5	605.2	1,866	−102.5	13,203.6	40,703			
−5.0	672.4	2,073	−103.0	13,263.4	40,887			
−5.5	739.6	2,280	−103.5	13,323.1	41,072			
−6.0	806.7	2,487	−104.0	13,382.8	41,256			
−6.5	873.9	2,694	−104.5	13,442.4	41,439			
−7.0	941.0	2,901	−105.0	13,502.0	41,623			
−7.5	1,008.2	3,108	−105.5	13,561.5	41,806			
−8.0	1,075.3	3,315	−106.0	13,620.9	41,990			
−8.5	1,142.4	3,522	−106.5	13,680.3	42,173			
−9.0	1,209.5	3,728	−107.0	13,739.6	42,356			
−9.5	1,276.6	3,935	−107.5	13,798.9	42,538			
−10.0	1,343.6	4,142	−108.0	13,858.1	42,721			
−10.5	1,410.7	4,349	−108.5	13,917.3	42,903			
−11.0	1,477.7	4,555	−109.0	13,976.4	43,085			
−11.5	1,544.7	4,762	−109.5	14,035.4	43,267			
−12.0	1,611.8	4,969	−110.0	14,094.4	43,449			
−12.5	1,678.7	5,175	−110.5	14,153.3	43,631			
−13.0	1,745.7	5,382	−111.0	14,212.2	43,812			
−13.5	1,812.7	5,588	−111.5	14,271.0	43,994			
−14.0	1,879.6	5,794	−112.0	14,329.7	44,175			
−14.5	1,946.6	6,001						
−15.0	2,013.5	6,207						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 15

[Inner radius, 2°11′53″; outer radius, 2°33′46″]

h	H	Δg	h	H	Δg	h	H	Δg
km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶
+10.0	1,732.0	5,339	−80.0	13,510.5	41,649	−112.0	18,590.9	57,311
+9.5	1,645.4	5,072	−80.5	13,591.7	41,899	−112.5	18,668.4	57,549
+9.0	1,558.7	4,805	−81.0	13,672.8	42,150	−113.0	18,745.7	57,788
+8.5	1,472.1	4,538	−81.5	13,753.9	42,399	−113.5	18,823.0	58,026
+8.0	1,385.4	4,271	−82.0	13,834.9	42,649	−114.0	18,900.2	58,264
+7.5	1,298.8	4,004	−82.5	13,915.8	42,899	−114.5	18,977.4	58,502
+7.0	1,212.1	3,737	−83.0	13,996.8	43,148	−115.0	19,054.5	58,740
+6.5	1,125.5	3,470	−83.5	14,077.6	43,397	−115.5	19,131.6	58,977
+6.0	1,038.9	3,203	−84.0	14,158.4	43,646	−116.0	19,208.5	59,215
+5.5	952.3	2,936	−84.5	14,239.2	43,895	−116.5	19,285.4	59,452
+5.0	865.7	2,669	−85.0	14,319.8	44,144	−117.0	19,362.3	59,689
+4.5	779.1	2,402	−85.5	14,400.5	44,393	−117.5	19,439.1	59,925
+4.0	692.5	2,135	−86.0	14,481.0	44,641	−118.0	19,515.8	60,162
+3.5	605.9	1,868	−86.5	14,561.6	44,889	−118.5	19,592.4	60,398
+3.0	519.3	1,601	−87.0	14,642.0	45,137	−119.0	19,669.0	60,634
+2.5	432.7	1,334	−87.5	14,722.4	45,385	−119.5	19,745.6	60,870
+2.0	346.2	1,067	−88.0	14,802.8	45,633	−120.0	19,822.0	61,106
+1.5	259.6	800	−88.5	14,883.1	45,880	−120.5	19,898.4	61,341
+1.0	173.1	534	−89.0	14,963.4	46,128	−121.0	19,974.7	61,577
+.9	155.8	480	−89.5	15,043.5	46,375	−121.5	20,051.0	61,812
+.8	138.4	427	−90.0	15,123.7	46,622	−122.0	20,127.2	62,047
+.7	121.1	373	−90.5	15,203.7	46,869	−122.5	20,203.3	62,281
+.6	103.8	320	−91.0	15,283.8	47,116	−123.0	20,279.4	62,516
+.5	86.5	267	−91.5	15,363.7	47,362	−123.5	20,355.4	62,750
+.4	69.2	213	−92.0	15,443.6	47,608	−124.0	20,431.3	62,984
+.3	51.9	160	−92.5	15,523.5	47,855	−124.5	20,507.2	63,218
+.2	34.6	107	−93.0	15,603.3	48,101	−125.0	20,583.0	63,452
+.1	17.3	53	−93.5	15,683.0	48,346	−125.5	20,658.8	63,685
.0	0.0	0	−94.0	15,762.7	48,592	−126.0	20,734.4	63,919
−.1	17.3	53	−94.5	15,842.3	48,837	−126.5	20,810.0	64,152
−.2	34.6	107	−95.0	15,921.8	49,083	−127.0	20,885.6	64,384
−.3	51.9	160	−95.5	16,001.3	49,328	−127.5	20,961.0	64,617
−.4	69.2	213	−96.0	16,080.8	49,573	−128.0	21,036.4	64,850
−.5	86.5	267	−96.5	16,160.1	49,817	−128.5	21,111.8	65,082
−.6	103.8	320	−97.0	16,239.5	50,062	−129.0	21,187.1	65,314
−.7	121.1	373	−97.5	16,318.7	50,306	−129.5	21,262.3	65,546
−.8	138.4	427	−98.0	16,397.9	50,550	−130.0	21,337.4	65,777
−.9	155.7	480	−98.5	16,477.1	50,794			
−1.0	173.0	533	−99.0	16,556.2	51,038			
−1.5	259.5	800	−99.5	16,635.2	51,282			
−2.0	346.0	1,067	−100.0	16,714.1	51,525			
−2.5	432.5	1,333	−100.5	16,793.0	51,768			
−3.0	518.9	1,600	−101.0	16,871.9	52,011			
−3.5	605.4	1,866	−101.5	16,950.7	52,254			
−4.0	691.8	2,133	−102.0	17,029.4	52,497			
−4.5	778.2	2,399	−102.5	17,108.0	52,740			
−5.0	864.6	2,665	−103.0	17,186.7	52,982			
−5.5	951.0	2,932	−103.5	17,265.2	53,224			
−6.0	1,037.4	3,198	−104.0	17,343.7	53,466			
−6.5	1,123.8	3,464	−104.5	17,422.1	53,708			
−7.0	1,210.1	3,730	−105.0	17,500.4	53,949			
−7.5	1,296.5	3,997	−105.5	17,578.8	54,190			
−8.0	1,382.8	4,263	−106.0	17,657.0	54,432			
−8.5	1,469.1	4,529	−106.5	17,735.2	54,673			
−9.0	1,555.4	4,795	−107.0	17,813.3	54,913			
−9.5	1,641.7	5,061	−107.5	17,891.3	55,154			
−10.0	1,728.0	5,327	−108.0	17,969.3	55,394			
−10.5	1,814.2	5,593	−108.5	18,047.2	55,635			
−11.0	1,900.4	5,858	−109.0	18,125.1	55,875			
−11.5	1,986.6	6,124	−109.5	18,202.9	56,114			
−12.0	2,072.8	6,390	−110.0	18,280.6	56,354			
−12.5	2,159.0	6,656	−110.5	18,358.3	56,594			
−13.0	2,245.2	6,921	−111.0	18,435.9	56,833			
−13.5	2,331.3	7,187	−111.5	18,513.5	57,072			
−14.0	2,417.4	7,452	−112.0	18,590.9	57,311			
−14.5	2,503.5	7,718						
−15.0	2,589.6	7,983						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 14

(Inner radius, 2°33′46″; outer radius 3°03′05″)

h	H	Δ2g	h	H	Δ2g	h	H	Δ2g
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	2,320.3	7,153	−80.0	18,171.9	56,019	−112.0	25,093.4	77,356
+9.5	2,204.2	6,795	−80.5	18,282.0	56,358	−112.5	25,199.4	77,683
+9.0	2,088.1	6,437	−81.0	18,392.0	56,698	−113.0	25,305.4	78,010
			−81.5	18,502.0	57,036	−113.5	25,411.3	78,336
+8.5	1,972.0	6,079	−82.0	18,611.8	57,375	−114.0	25,517.1	78,662
+8.0	1,855.9	5,721						
+7.5	1,739.9	5,364	−82.5	18,721.7	57,714	−114.5	25,622.9	78,988
+7.0	1,623.8	5,006	−83.0	18,831.5	58,052	−115.0	25,728.6	79,314
+6.5	1,507.7	4,648	−83.5	18,941.2	58,390	−115.5	25,834.2	79,640
			−84.0	19,050.8	58,729	−116.0	25,939.8	79,965
+6.0	1,391.7	4,290	−84.5	19,160.4	59,066	−116.5	26,045.2	80,290
+5.5	1,275.7	3,932						
+5.0	1,159.6	3,575	−85.0	19,270.0	59,404	−117.0	26,150.7	80,615
+4.5	1,043.6	3,217	−85.5	19,379.5	59,742	−117.5	26,256.0	80,940
+4.0	927.6	2,860	−86.0	19,488.9	60,079	−118.0	26,361.3	81,265
			−86.5	19,598.3	60,416	−118.5	26,466.5	81,589
+3.5	811.6	2,502	−87.0	19,707.6	60,753	−119.0	26,571.6	81,913
+3.0	695.6	2,144						
+2.5	579.7	1,787	−87.5	19,816.8	61,090	−119.5	26,676.7	82,237
+2.0	463.7	1,430	−88.0	19,926.0	61,427	−120.0	26,781.7	82,561
+1.5	347.8	1,072	−88.5	20,035.2	61,763	−120.5	26,886.6	82,884
			−89.0	20,144.2	62,099	−121.0	26,991.5	83,207
+1.0	231.8	715	−89.5	20,253.3	62,435	−121.5	27,096.3	83,530
+.9	208.6	643						
+.8	185.5	572	−90.0	20,362.2	62,771	−122.0	27,201.0	83,853
+.7	162.3	500	−90.5	20,471.1	63,107	−122.5	27,305.6	84,176
+.6	139.1	429	−91.0	20,579.9	63,442	−123.0	27,410.2	84,498
			−91.5	20,688.7	63,778	−123.5	27,514.7	84,820
+.5	115.9	357	−92.0	20,797.4	64,113	−124.0	27,619.1	85,142
+.4	92.7	286						
+.3	69.5	214	−92.5	20,906.1	64,448	−124.5	27,723.5	85,464
+.2	46.4	143	−93.0	21,014.6	64,782	−125.0	27,827.8	85,785
+.1	23.2	72	−93.5	21,123.2	65,117	−125.5	27,932.0	86,107
.0	0.0	0	−94.0	21,231.6	65,451	−126.0	28,036.1	86,428
			−94.5	21,340.0	65,785	−126.5	28,140.2	86,748
−.1	23.2	72						
−.2	46.4	143	−95.0	21,448.4	66,119	−127.0	28,244.2	87,069
−.3	69.5	214	−95.5	21,556.6	66,453	−127.5	28,348.1	87,390
−.4	92.7	286	−96.0	21,664.8	66,787	−128.0	28,452.0	87,710
−.5	115.9	357	−96.5	21,773.0	67,120	−128.5	28,555.7	88,030
			−97.0	21,881.1	67,453	−129.0	28,659.4	88,349
−.6	139.1	429						
−.7	162.2	500	−97.5	21,989.1	67,786	−129.5	28,763.1	88,669
−.8	185.4	572	−98.0	22,097.0	68,119	−130.0	28,866.6	88,988
−.9	208.6	643	−98.5	22,204.9	68,452			
−1.0	231.8	714	−99.0	22,312.8	68,784			
			−99.5	22,420.5	69,116			
−1.5	347.6	1,072						
−2.0	463.5	1,429	−100.0	22,528.2	69,448			
−2.5	579.3	1,786	−100.5	22,635.9	69,780			
−3.0	695.1	2,143	−101.0	22,743.4	70,112			
−3.5	810.9	2,500	−101.5	22,851.0	70,443			
			−102.0	22,958.4	70,774			
−4.0	926.7	2,857						
−4.5	1,042.5	3,214	−102.5	23,065.8	71,106			
−5.0	1,158.3	3,571	−103.0	23,173.1	71,436			
−5.5	1,274.0	3,927	−103.5	23,280.3	71,767			
−6.0	1,389.7	4,284	−104.0	23,387.5	72,097			
			−104.5	23,494.6	72,428			
−6.5	1,505.4	4,641						
−7.0	1,621.1	4,998	−105.0	23,601.7	72,758			
−7.5	1,736.8	5,354	−105.5	23,708.7	73,087			
−8.0	1,852.4	5,711	−106.0	23,815.6	73,417			
−8.5	1,968.1	6,067	−106.5	23,922.4	73,746			
			−107.0	24,029.2	74,076			
−9.0	2,083.7	6,423						
−9.5	2,199.3	6,780	−107.5	24,135.9	74,404			
−10.0	2,314.9	7,136	−108.0	24,242.6	74,733			
−10.5	2,430.4	7,492	−108.5	24,349.2	75,062			
−11.0	2,546.0	7,848	−109.0	24,455.7	75,390			
			−109.5	24,562.1	75,718			
−11.5	2,661.5	8,205						
−12.0	2,777.0	8,561	−110.0	24,668.5	76,046			
−12.5	2,892.4	8,917	−110.5	24,774.8	76,374			
−13.0	3,007.9	9,272	−111.0	24,881.1	76,702			
−13.5	3,123.3	9,628	−111.5	24,987.2	77,029			
			−112.0	25,093.4	77,356			
−14.0	3,238.7	9,984						
−14.5	3,354.1	10,340						
−15.0	3,469.5	10,696						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 13

(Inner radius, 3°03′05″; outer radius, 4°19′13″)

h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	6,024.8	18,573	−80.0	47,386.0	146,078	−112.0	65,689.8	202,504
+9.5	5,723.3	17,643	−80.5	47,675.6	146,971	−112.5	65,972.0	203,374
+9.0	5,421.8	16,714	−81.0	47,965.0	147,863	−113.0	66,254.0	204,243
			−81.5	48,254.3	148,755	−113.5	66,535.8	205,112
+8.5	5,120.3	15,784	−82.0	48,543.5	149,646	−114.0	66,817.6	205,980
+8.0	4,818.9	14,855						
+7.5	4,517.5	13,926	−82.5	48,832.6	150,538	−114.5	67,099.2	206,848
+7.0	4,216.1	12,997	−83.0	49,121.6	151,428	−115.0	67,380.7	207,716
+6.5	3,914.7	12,068	−83.5	49,410.4	152,319	−115.5	67,662.1	208,584
			−84.0	49,699.2	153,209	−116.0	67,943.3	209,451
+6.0	3,613.4	11,139	−84.5	49,987.9	154,099	−116.5	68,224.4	210,317
+5.5	3,312.1	10,210						
+5.0	3,010.8	9,282	−85.0	50,276.5	154,989	−117.0	68,505.4	211,184
+4.5	2,709.6	8,353	−85.5	50,564.9	155,878	−117.5	68,786.2	212,049
+4.0	2,408.4	7,424	−86.0	50,853.3	156,767	−118.0	69,067.0	212,915
			−86.5	51,141.5	157,655	−118.5	69,347.6	213,780
+3.5	2,107.2	6,496	−87.0	51,429.6	158,544	−119.0	69,628.0	214,644
+3.0	1,806.1	5,568						
+2.5	1,505.0	4,640	−87.5	51,717.7	159,432	−119.5	69,908.4	215,508
+2.0	1,203.9	3,711	−88.0	52,005.6	160,319	−120.0	70,188.6	216,372
+1.5	902.9	2,783	−88.5	52,293.4	161,206	−120.5	70,468.6	217,236
			−89.0	52,581.1	162,093	−121.0	70,748.6	218,099
+1.0	601.9	1,856	−89.5	52,868.7	162,980	−121.5	71,028.4	218,961
+.9	541.7	1,670						
+.8	481.5	1,484	−90.0	53,156.1	163,866	−122.0	71,308.1	219,823
+.7	421.3	1,299	−90.5	53,443.5	164,752	−122.5	71,587.6	220,685
+.6	361.1	1,113	−91.0	53,730.7	165,637	−123.0	71,867.1	221,547
			−91.5	54,017.9	166,522	−123.5	72,146.4	222,408
+.5	300.9	928	−92.0	54,304.9	167,407	−124.0	72,425.5	223,268
+.4	240.7	742						
+.3	180.6	557	−92.5	54,591.8	168,292	−124.5	72,704.5	224,128
+.2	120.4	371	−93.0	54,878.6	169,176	−125.0	72,983.4	224,988
+.1	60.2	186	−93.5	55,165.3	170,060	−125.5	73,262.2	225,847
.0	0.0	0	−94.0	55,451.9	170,943	−126.0	73,540.8	226,706
			−94.5	55,738.3	171,826	−126.5	73,819.3	227,565
−.1	60.2	186						
−.2	120.4	371	−95.0	56,024.7	172,709	−127.0	74,097.6	228,423
−.3	180.5	557	−95.5	56,310.9	173,591	−127.5	74,375.8	229,280
−.4	240.7	742	−96.0	56,597.0	174,473	−128.0	74,653.9	230,138
−.5	300.9	928	−96.5	56,883.0	175,355	−128.5	74,931.9	230,995
			−97.0	57,168.9	176,236	−129.0	75,209.7	231,851
−.6	361.1	1,113						
−.7	421.2	1,299	−97.5	57,454.6	177,117	−129.5	75,487.4	232,707
−.8	481.4	1,484	−98.0	57,740.3	177,998	−130.0	75,764.9	233,563
−.9	541.6	1,670	−98.5	58,025.8	178,878			
−1.0	601.8	1,855	−99.0	58,311.2	179,758			
			−99.5	58,596.5	180,637			
−1.5	902.6	2,782	−100.0	58,881.7	181,516			
−2.0	1,203.4	3,710	−100.5	59,166.8	182,395			
−2.5	1,504.1	4,637	−101.0	59,451.7	183,273			
−3.0	1,804.8	5,564	−101.5	59,736.5	184,151			
−3.5	2,105.5	6,491	−102.0	60,021.2	185,029			
−4.0	2,406.2	7,418	−102.5	60,305.8	185,906			
−4.5	2,706.8	8,344	−103.0	60,590.3	186,783			
−5.0	3,007.3	9,271	−103.5	60,874.6	187,660			
−5.5	3,307.8	10,197	−104.0	61,158.9	188,536			
−6.0	3,608.3	11,123	−104.5	61,443.0	189,412			
−6.5	3,908.8	12,050	−105.0	61,727.0	190,287			
−7.0	4,209.1	12,976	−105.5	62,010.8	191,162			
−7.5	4,509.5	13,902	−106.0	62,294.6	192,037			
−8.0	4,809.8	14,827	−106.5	62,578.2	192,911			
−8.5	5,110.1	15,753	−107.0	62,861.7	193,785			
−9.0	5,410.3	16,678	−107.5	63,145.0	194,659			
−9.5	5,710.5	17,604	−108.0	63,428.3	195,532			
−10.0	6,010.6	18,529	−108.5	63,711.4	196,405			
−10.5	6,310.7	19,454	−109.0	63,994.4	197,277			
−11.0	6,610.8	20,379	−109.5	64,277.3	198,149			
−11.5	6,910.8	21,304	−110.0	64,560.0	199,021			
−12.0	7,210.7	22,229	−110.5	64,842.7	199,892			
−12.5	7,510.6	23,153	−111.0	65,125.2	200,763			
−13.0	7,810.5	24,078	−111.5	65,407.6	201,634			
−13.5	8,110.3	25,002	−112.0	65,689.8	202,504			
−14.0	8,410.1	25,926						
−14.5	8,709.8	26,850						
−15.0	9,009.5	27,774						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 12

[Inner radius, 4°19′13″; outer radius, 5°46′34″]

h	*H*	$\Delta_2 g$	*h*	*H*	$\Delta_2 g$	*h*	*H*	$\Delta_2 g$
km	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶
+10.0	6,909.6	21,300	−80.0	54,507.6	168,032	−112.0	75,773.6	233,589
+9.5	6,563.8	20,234	−80.5	54,842.7	169,065	−112.5	76,102.8	234,604
+9.0	6,218.0	19,168	−81.0	55,177.6	170,098	−113.0	76,431.9	235,619
			−81.5	55,512.5	171,130	−113.5	76,761.0	236,633
+8.5	5,872.2	18,102	−82.0	55,847.4	172,162	−114.0	77,089.9	237,647
+8.0	5,526.5	17,037						
+7.5	5,180.8	15,971	−82.5	56,182.1	173,194	−114.5	77,418.8	238,661
+7.0	4,835.2	14,905	−83.0	56,516.7	174,226	−115.0	77,747.5	239,674
+6.5	4,489.5	13,840	−83.5	56,851.3	175,257	−115.5	78,076.2	240,688
			−84.0	57,185.8	176,288	−116.0	78,404.7	241,700
+6.0	4,144.0	12,775	−84.5	57,520.2	177,319	−116.5	78,733.2	242,713
+5.5	3,798.4	11,710						
+5.0	3,452.9	10,644	−85.0	57,854.5	178,350	−117.0	79,061.5	243,725
+4.5	3,107.4	9,579	−85.5	58,188.7	179,380	−117.5	79,389.7	244,737
+4.0	2,762.0	8,514	−86.0	58,522.8	180,410	−118.0	79,717.9	245,748
			−86.5	58,856.9	181,440	−118.5	80,045.9	246,760
+3.5	2,416.6	7,450	−87.0	59,190.9	182,469	−119.0	80,373.9	247,771
+3.0	2,071.3	6,385						
+2.5	1,726.0	5,321	−87.5	59,524.8	183,498	−119.5	80,701.7	248,781
+2.0	1,380.7	4,256	−88.0	59,858.5	184,528	−120.0	81,029.4	249,792
+1.5	1,035.5	3,192	−88.5	60,192.2	185,556	−120.5	81,357.1	250,802
			−89.0	60,525.9	186,585	−121.0	81,684.6	251,811
+1.0	690.3	2,128	−89.5	60,859.4	187,613	−121.5	82,012.1	252,821
+.9	621.2	1,915						
+.8	552.2	1,702	−90.0	61,192.8	188,641	−122.0	82,339.4	253,830
+.7	483.2	1,490	−90.5	61,526.2	189,668	−122.5	82,666.6	254,839
+.6	414.1	1,277	−91.0	61,859.4	190,696	−123.0	82,993.7	255,847
			−91.5	62,192.6	191,723	−123.5	83,320.8	256,855
+.5	345.1	1,064	−92.0	62,525.7	192,750	−124.0	83,647.7	257,863
+.4	276.1	851						
+.3	207.1	638	−92.5	62,858.7	193,776	−124.5	83,974.5	258,870
+.2	138.0	426	−93.0	63,191.6	194,802	−125.0	84,301.2	259,878
+.1	69.0	213	−93.5	63,524.4	195,828	−125.5	84,627.8	260,884
.0	0.0	0	−94.0	63,857.2	196,854	−126.0	84,954.3	261,891
			−94.5	64,189.8	197,880	−126.5	85,280.7	262,897
−.1	69.0	213						
−.2	138.0	426	−95.0	64,522.3	198,905	−127.0	85,607.0	263,903
−.3	207.0	638	−95.5	64,854.8	199,930	−127.5	85,933.2	264,909
−.4	276.1	851	−96.0	65,187.2	200,954	−128.0	86,259.3	265,914
−.5	345.1	1,064	−96.5	65,519.4	201,978	−128.5	86,585.3	266,919
			−97.0	65,851.6	203,003	−129.0	86,911.1	267,923
−.6	414.1	1,277						
−.7	483.1	1,489	−97.5	66,183.7	204,026	−129.5	87,236.9	268,928
−.8	552.1	1,702	−98.0	66,515.7	205,050	−130.0	87,562.6	269,932
−.9	621.1	1,915	−98.5	66,847.6	206,073			
−1.0	690.1	2,127	−99.0	67,179.4	207,096			
			−99.5	67,511.2	208,118			
−1.5	1,035.1	3,191						
−2.0	1,380.0	4,254	−100.0	67,842.8	209,141			
−2.5	1,725.0	5,318	−100.5	68,174.3	210,163			
−3.0	2,069.8	6,381	−101.0	68,505.8	211,185			
−3.5	2,414.6	7,444	−101.5	68,837.1	212,206			
			−102.0	69,168.4	213,227			
−4.0	2,759.4	8,506						
−4.5	3,104.2	9,569	−102.5	69,499.6	214,248			
−5.0	3,448.8	10,632	−103.0	69,830.6	215,269			
−5.5	3,793.5	11,694	−103.5	70,161.6	216,289			
−6.0	4,138.1	12,757	−104.0	70,492.5	217,309			
			−104.5	70,823.3	218,329			
−6.5	4,482.7	13,819						
−7.0	4,827.2	14,881	−105.0	71,154.0	219,348			
−7.5	5,171.6	15,943	−105.5	71,484.6	220,367			
−8.0	5,516.1	17,005	−106.0	71,815.1	221,386			
−8.5	5,860.5	18,066	−106.5	72,145.5	222,405			
			−107.0	72,475.8	223,423			
−9.0	6,204.8	19,128						
−9.5	6,549.1	20,189	−107.5	72,806.0	224,441			
−10.0	6,893.4	21,250	−108.0	73,136.1	225,459			
−10.5	7,237.6	22,311	−108.5	73,466.1	226,476			
−11.0	7,581.7	23,372	−109.0	73,796.0	227,493			
			−109.5	74,125.9	228,510			
−11.5	7,925.8	24,433						
−12.0	8,269.9	25,494	−110.0	74,455.6	229,526			
−12.5	8,613.9	26,554	−110.5	74,785.2	230,542			
−13.0	8,957.8	27,615	−111.0	75,114.8	231,558			
−13.5	9,301.8	28,675	−111.5	75,444.2	232,574			
			−112.0	75,773.6	233,589			
−14.0	9,645.6	29,735						
−14.5	9,989.5	30,795						
−15.0	10,333.2	31,854						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 11

[Inner radius, 5°46′34″; outer radius, 7°51′30″]

h	H	Δ2g	h	H	Δ2g	h	H	Δ2g
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	9,874.8	30,441	−80.0	78,017.6	240,507	−112.0	108,613.7	334,826
+9.5	9,380.5	28,918	−80.5	78,498.7	241,990	−112.5	109,088.5	336,290
+9.0	8,886.3	27,394	−81.0	78,979.7	243,473	−113.0	109,563.2	337,754
			−81.5	79,460.6	244,956	−113.5	110,037.8	339,217
+8.5	8,392.2	25,871	−82.0	79,941.5	246,438	−114.0	110,512.3	340,679
+8.0	7,898.1	24,348						
+7.5	7,404.0	22,825	−82.5	80,422.2	247,920	−114.5	110,986.7	342,142
+7.0	6,910.0	21,302	−83.0	80,902.8	249,401	−115.0	111,461.0	343,604
+6.5	6,416.1	19,779	−83.5	81,383.4	250,883	−115.5	111,935.1	345,065
			−84.0	81,863.8	252,364	−116.0	112,409.2	346,527
+6.0	5,922.2	18,256	−84.5	82,344.2	253,845	−116.5	112,883.2	347,988
+5.5	5,428.4	16,734						
+5.0	4,934.6	15,212	−85.0	82,824.4	255,325	−117.0	113,357.0	349,449
+4.5	4,440.9	13,690	−85.5	83,304.6	256,805	−117.5	113,830.7	350,909
+4.0	3,947.2	12,168	−86.0	83,784.7	258,285	−118.0	114,304.4	352,369
			−86.5	84,264.6	259,765	−118.5	114,777.9	353,829
+3.5	3,453.6	10,647	−87.0	84,744.5	261,244	−119.0	115,251.3	355,288
+3.0	2,960.1	9,125						
+2.5	2,466.6	7,604	−87.5	85,224.3	262,723	−119.5	115,724.6	356,748
+2.0	1,973.2	6,083	−88.0	85,704.0	264,202	−120.0	116,197.9	358,206
+1.5	1,479.8	4,562	−88.5	86,183.6	265,680	−120.5	116,671.0	359,665
			−89.0	86,663.1	267,159	−121.0	117,144.0	361,123
+1.0	986.5	3,041	−89.5	87,142.5	268,636	−121.5	117,616.8	362,581
+.9	887.8	2,737						
+.8	789.2	2,433	−90.0	87,621.8	270,114	−122.0	118,089.6	364,038
+.7	690.5	2,129	−90.5	88,101.0	271,591	−122.5	118,562.3	365,495
+.6	591.8	1,824	−91.0	88,580.2	273,068	−123.0	119,034.9	366,952
			−91.5	89,059.2	274,545	−123.5	119,507.3	368,408
+.5	493.2	1,520	−92.0	89,538.1	276,022	−124.0	119,979.7	369,864
+.4	394.6	1,216						
+.3	295.9	912	−92.5	90,016.9	277,498	−124.5	120,451.9	371,320
+.2	197.3	608	−93.0	90,495.7	278,973	−125.0	120,924.0	372,776
+.1	98.6	304	−93.5	90,974.3	280,449	−125.5	121,396.0	374,231
.0	0.0	0	−94.0	91,452.8	281,924	−126.0	121,868.0	375,686
			−94.5	91,931.3	283,399	−126.5	122,339.8	377,140
−.1	98.6	304						
−.2	197.3	608	−95.0	92,409.6	284,874	−127.0	122,811.4	378,594
−.3	295.9	912	−95.5	92,887.8	286,348	−127.5	123,283.0	380,048
−.4	394.5	1,216	−96.0	93,366.0	287,822	−128.0	123,754.5	381,501
−.5	493.1	1,520	−96.5	93,844.0	289,296	−128.5	124,225.8	382,954
			−97.0	94,322.0	290,769	−129.0	124,697.1	384,407
−.6	591.8	1,824						
−.7	690.4	2,128	−97.5	94,799.9	292,242	−129.5	125,168.2	385,860
−.8	789.0	2,432	−98.0	95,277.6	293,715	−130.0	125,639.2	387,312
−.9	887.6	2,736	−98.5	95,755.3	295,187			
−1.0	986.2	3,040	−99.0	96,232.8	296,660			
			−99.5	96,710.3	298,131			
−1.5	1,479.3	4,560						
−2.0	1,972.2	6,080	−100.0	97,187.6	299,603			
−2.5	2,465.1	7,599	−100.5	97,664.9	301,074			
−3.0	2,958.0	9,119	−101.0	98,142.0	302,545			
−3.5	3,450.8	10,638	−101.5	98,619.1	304,016			
			−102.0	99,096.0	305,486			
−4.0	3,943.5	12,157						
−4.5	4,436.2	13,676	−102.5	99,572.9	306,956			
−5.0	4,928.8	15,194	−103.0	100,049.6	308,426			
−5.5	5,421.4	16,712	−103.5	100,526.3	309,895			
−6.0	5,913.8	18,231	−104.0	101,002.8	311,364			
			−104.5	101,479.3	312,833			
−6.5	6,406.3	19,749						
−7.0	6,898.6	21,267	−105.0	101,955.6	314,301			
−7.5	7,391.0	22,784	−105.5	102,431.9	315,770			
−8.0	7,883.2	24,302	−106.0	102,908.0	317,237			
−8.5	8,375.4	25,819	−106.5	103,384.1	318,705			
			−107.0	103,860.0	320,172			
−9.0	8,867.5	27,336						
−9.5	9,359.6	28,853	−107.5	104,335.8	321,639			
−10.0	9,851.6	30,370	−108.0	104,811.6	323,106			
−10.5	10,343.5	31,886	−108.5	105,287.2	324,572			
−11.0	10,835.4	33,403	−109.0	105,762.7	326,038			
			−109.5	106,238.2	327,503			
−11.5	11,327.2	34,919						
−12.0	11,819.0	36,435	−110.0	106,713.5	328,969			
−12.5	12,310.6	37,950	−110.5	107,188.7	330,434			
−13.0	12,802.3	39,466	−111.0	107,663.8	331,898			
−13.5	13,293.8	40,981	−111.5	108,138.8	333,362			
			−112.0	108,613.7	334,826			
−14.0	13,785.3	42,496						
−14.5	14,276.8	44,011						
−15.0	14,768.1	45,526						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 10

[Inner radius, 7°51′30″; outer radius 10°44′]

h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	13,613.8	41,968	−80.0	107,650.7	331,858	−112.0	149,992.9	462,387
+9.5	12,932.3	39,867	−80.5	108,315.8	333,908	−112.5	150,650.9	464,416
+9.0	12,251.0	37,766	−81.0	108,980.7	335,958	−113.0	151,308.7	466,444
			−81.5	109,645.5	338,007	−113.5	151,966.5	468,471
+8.5	11,569.7	35,666	−82.0	110,310.2	340,056	−114.0	152,624.1	470,498
+8.0	10,888.5	33,566						
+7.5	10,207.4	31,467	−82.5	110,974.8	342,105	−114.5	153,281.6	472,525
+7.0	9,526.4	29,367	−83.0	111,639.2	344,153	−115.0	153,939.0	474,552
+6.5	8,845.4	27,268	−83.5	112,303.6	346,201	−115.5	154,596.3	476,578
			−84.0	112,967.9	348,249	−116.0	155,253.4	478,604
+6.0	8,164.5	25,169	−84.5	113,632.0	350,297	−116.5	155,910.5	480,630
+5.5	7,483.7	23,070						
+5.0	6,803.0	20,972	−85.0	114,296.1	352,344	−117.0	156,567.4	482,655
+4.5	6,122.3	18,873	−85.5	114,960.0	354,390	−117.5	157,224.2	484,679
+4.0	5,441.7	16,775	−86.0	115,623.9	356,437	−118.0	157,880.9	486,704
			−86.5	116,287.6	358,483	−118.5	158,537.5	488,728
+3.5	4,761.2	14,678	−87.0	116,951.3	360,529	−119.0	159,194.0	490,752
+3.0	4,080.8	12,580						
+2.5	3,400.5	10,483	−87.5	117,614.8	362,574	−119.5	159,850.3	492,775
+2.0	2,720.2	8,386	−88.0	118,278.2	364,620	−120.0	160,506.5	494,798
+1.5	2,040.1	6,289	−88.5	118,941.5	366,664	−120.5	161,162.6	496,820
			−89.0	119,604.7	368,709	−121.0	161,818.6	498,843
+1.0	1,360.0	4,192	−89.5	120,267.8	370,753	−121.5	162,474.5	500,865
+.9	1,224.0	3,773						
+.8	1,087.9	3,354	−90.0	120,930.8	372,797	−122.0	163,130.3	502,886
+.7	951.9	2,935	−90.5	121,593.7	374,840	−122.5	163,785.9	504,907
+.6	815.9	2,515	−91.0	122,256.4	376,883	−123.0	164,441.4	506,928
			−91.5	122,919.1	378,926	−123.5	165,096.9	508,948
+.5	679.9	2,096	−92.0	123,581.7	380,968	−124.0	165,752.2	510,969
+.4	544.0	1,677						
+.3	408.0	1,258	−92.5	124,244.1	383,011	−124.5	166,407.3	512,988
+.2	272.0	838	−93.0	124,906.4	385,052	−125.0	167,062.4	515,008
+.1	136.0	419	−93.5	125,568.7	387,094	−125.5	167,717.3	517,027
.0	0.0	0	−94.0	126,230.8	389,135	−126.0	168,372.1	519,045
			−94.5	126,892.8	391,176	−126.5	169,026.8	521,064
−.1	136.0	419						
−.2	272.0	838	−95.0	127,554.7	393,216	−127.0	169,681.4	523,081
−.3	407.9	1,258	−95.5	128,216.5	395,256	−127.5	170,335.8	525,099
−.4	543.9	1,677	−96.0	128,878.2	397,296	−128.0	170,990.2	527,116
−.5	679.9	2,096	−96.5	129,539.7	399,336	−128.5	171,644.4	529,133
			−97.0	130,201.2	401,375	−129.0	172,298.5	531,149
−.6	815.8	2,515						
−.7	951.8	2,934	−97.5	130,862.5	403,413	−129.5	172,952.5	533,165
−.8	1,087.7	3,353	−98.0	131,523.8	405,452	−130.0	173,606.4	535,181
−.9	1,223.7	3,772	−98.5	132,184.9	407,490			
−1.0	1,359.6	4,191	−99.0	132,845.9	409,528			
			−99.5	133,506.8	411,565			
−1.5	2,039.3	6,287						
−2.0	2,719.0	8,382	−100.0	134,167.6	413,602			
−2.5	3,398.5	10,477	−100.5	134,828.3	415,639			
−3.0	4,077.9	12,571	−101.0	135,488.8	417,675			
−3.5	4,757.3	14,666	−101.5	136,149.3	419,711			
			−102.0	136,809.6	421,747			
−4.0	5,436.6	16,760						
−4.5	6,115.8	18,853	−102.5	137,469.9	423,782			
−5.0	6,795.0	20,947	−103.0	138,130.0	425,817			
−5.5	7,474.0	23,040	−103.5	138,790.0	427,852			
−6.0	8,153.0	25,133	−104.0	139,449.9	429,886			
			−104.5	140,109.7	431,920			
−6.5	8,831.9	27,226						
−7.0	9,510.7	29,319	−105.0	140,769.4	433,954			
−7.5	10,189.4	31,411	−105.5	141,428.9	435,987			
−8.0	10,868.0	33,503	−106.0	142,088.4	438,020			
−8.5	11,546.6	35,595	−106.5	142,747.7	440,052			
			−107.0	143,407.0	442,084			
−9.0	12,225.0	37,686						
−9.5	12,903.4	39,778	−107.5	144,066.1	444,116			
−10.0	13,581.7	41,869	−108.0	144,725.0	446,148			
−10.5	14,260.0	43,960	−108.5	145,383.9	448,179			
−11.0	14,938.1	46,050	−109.0	146,042.7	450,210			
			−109.5	146,701.4	452,240			
−11.5	15,616.2	48,140						
−12.0	16,294.1	50,230	−110.0	147,359.9	454,270			
−12.5	16,972.0	52,320	−110.5	148,018.3	456,300			
−13.0	17,649.8	54,410	−111.0	148,676.6	458,330			
−13.5	18,327.6	56,499	−111.5	149,334.8	460,358			
			−112.0	149,992.9	462,387			
−14.0	19,005.2	58,588						
−14.5	19,682.7	60,676						
−15.0	20,360.2	62,765						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 9

[Inner radius, 10°44′; outer radius, 14°09′]

h	H	$\Delta_2 g$	h	H	$\Delta_2 g$	h	H	$\Delta_2 g$
km	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶	*km*	*cm*	*gals*×10⁶
+10.0	16,136.4	49,744	−80.0	127,655.8	393,528	−112.0	177,944.0	548,553
+9.5	15,328.7	47,254	−80.5	128,445.1	395,961	−112.5	178,726.0	550,964
+9.0	14,521.1	44,764	−81.0	129,234.3	398,394	−113.0	179,507.9	553,374
			−81.5	130,023.4	400,827	−113.5	180,289.6	555,784
+8.5	13,713.6	42,275	−82.0	130,812.4	403,259	−114.0	181,071.3	558,193
+8.0	12,906.1	39,786						
+7.5	12,098.8	37,297	−82.5	131,601.3	405,691	−114.5	181,852.8	560,603
+7.0	11,291.6	34,809	−83.0	132,390.1	408,122	−115.0	182,634.2	563,012
+6.5	10,484.4	32,321	−83.5	133,178.7	410,554	−115.5	183,415.5	565,420
			−84.0	133,967.3	412,984	−116.0	184,196.7	567,828
+6.0	9,677.3	29,833	−84.5	134,755.7	415,415	−116.5	184,977.8	570,236
+5.5	8,870.4	27,345						
+5.0	8,063.5	24,858	−85.0	135,544.0	417,845	−117.0	185,758.7	572,643
+4.5	7,256.7	22,371	−85.5	136,332.2	420,275	−117.5	186,539.5	575,050
+4.0	6,450.0	19,884	−86.0	137,120.3	422,704	−118.0	187,320.2	577,457
			−86.5	137,908.3	425,134	−118.5	188,100.8	579,863
+3.5	5,643.5	17,397	−87.0	138,696.2	427.562	−119.0	188,881.2	582,269
+3.0	4,837.0	14,911						
+2.5	4,030.6	12,425	−87.5	139,483.9	429,991	−119.5	189,661.6	584,675
+2.0	3,224.3	9,940	−88.0	140,271.6	432,419	−120.0	190,441.8	587,080
+1.5	2,418.1	7,454	−88.5	141,059.1	434,847	−120.5	191,221.9	589,485
			−89.0	141,846.5	437,274	−121.0	192,001.9	591,890
+1.0	1,612.0	4,969	−89.5	142,633.8	439,701	−121.5	192,781.8	594,294
+.9	1,450.7	4,472						
+.8	1,289.5	3,975	−90.0	143,421.0	442,128	−122.0	193,561.5	596,697
+.7	1,128.3	3,478	−90.5	144,208.1	444,554	−122.5	194,341.1	599,101
+.6	967.1	2,981	−91.0	144,995.1	446,980	−123.0	195,120.6	601,504
			−91.5	145,781.9	449,406	−123.5	195,900.0	603,906
+.5	805.9	2,484	−92.0	146,568.7	451,831	−124.0	196,679.3	606,309
+.4	644.7	1,988						
+.3	483.6	1,491	−92.5	147,355.3	454,256	−124.5	197,458.5	608,710
+.2	322.4	994	−93.0	148,141.8	456,681	−125.0	198,237.5	611,112
+.1	161.2	497	−93.5	148,928.2	459,105	−125.5	199,016.4	613,513
.0	0.0	0	−94.0	149,714.5	461,529	−126.0	199,795.2	615,914
			−94.5	150,500.7	463,952	−126.5	200,573.8	618,314
−.1	161.2	497						
−.2	322.4	994	−95.0	151,286.7	466,376	−127.0	201,352.4	620,714
−.3	483.5	1,490	−95.5	152,072.6	468,798	−127.5	202,130.8	623,114
−.4	644.7	1,987	−96.0	152,858.5	471,221	−128.0	202,909.1	625,514
−.5	805.8	2,484	−96.5	153,644.2	473,643	−128.5	203,687.3	627,912
			−97.0	154,429.8	476,065	−129.0	204,465.4	630,311
−.6	967.0	2,981						
−.7	1,128.1	3,478	−97.5	155,215.3	478,486	−129.5	205,243.3	632,709
−.8	1,289.3	3,974	−98.0	156,000.6	480,907	−130.0	206,021.1	635,107
−.9	1,450.4	4,471	−98.5	156,785.9	483,328			
−1.0	1,611.6	4,968	−99.0	157,571.0	485,748			
			−99.5	158,356.1	488,168			
−1.5	2,417.2	7,452						
−2.0	3,222.8	9,935	−100.0	159,141.0	490,588			
−2.5	4,028.2	12,418	−100.5	159,925.8	493,008			
−3.0	4,833.6	14,901	−101.0	160,710.4	495,426			
−3.5	5,638.8	17,383	−101.5	161,495.0	497,845			
			−102.0	162,279.5	500,263			
−4.0	6,444.0	19,865						
−4.5	7,249.0	22,347	−102.5	163,063.8	502,681			
−5.0	8,054.0	24,828	−103.0	163,848.0	505,099			
−5.5	8,858.9	27,310	−103.5	164,632.1	507,516			
−6.0	9,663.7	29,790	−104.0	165,416.1	509,933			
			−104.5	166,200.0	512,349			
−6.5	10,468.4	32,271						
−7.0	11,273.0	34,752	−105.0	166,983.7	514,765			
−7.5	12,077.4	37,232	−105.5	167,767.4	517,181			
−8.0	12,881.8	39,711	−106.0	168,550.9	519,596			
−8.5	13,686.2	42,191	−106.5	169,334.3	522,011			
			−107.0	170,117.6	524,426			
−9.0	14,490.4	44,670						
−9.5	15,294.4	47,149	−107.5	170,900.7	526,840			
−10.0	16,098.5	49,627	−108.0	171,683.8	529,254			
−10.5	16,902.4	52,106	−108.5	172,466.7	531,668			
−11.0	17,706.2	54,583	−109.0	173,249.6	534,081			
			−109.5	174,032.2	536,494			
−11.5	18,509.9	57,061						
−12.0	19,313.5	59,538	−110.0	174,814.8	538,906			
−12.5	20,117.0	62,015	−110.5	175,597.3	541,318			
−13.0	20,920.5	64,492	−111.0	176,379.7	543.730			
−13.5	21,723.8	66,969	−111.5	177,161.9	546,142			
			−112.0	177,944.0	548,553			
−14.0	22,527.0	69,445						
−14.5	23,330.2	71,921						
−15.0	24,133.2	74,396						

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 8

[Inner radius, 14°09′; outer radius, 20°41′]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	30,678.0	94,572	−80.0	242,760.5	748,364	−93.0	281,745.5	868,545	−106.0	320,596.3	988,311	−119.0	359,311.1	1,107,658
+9.5	29,142.4	89,838	−80.2	243,361.3	750,216	−93.2	282,344.2	870,390	−106.2	321,192.9	990,150	−119.2	359,905.7	1,109,491
+9.0	27,607.0	85,105	−80.4	243,962.0	752,068	−93.4	282,943.0	872,236	−106.4	321,789.6	991,989	−119.4	360,500.2	1,111,324
			−80.6	244,562.8	753,920	−93.6	283,541.6	874,081	−106.6	322,386.1	993,828	−119.6	361,094.7	1,113,156
+8.5	26,071.8	80,372	−80.8	245,163.4	755,772	−93.8	284,140.2	875,927	−106.8	322,982.7	995,668	−119.8	361,689.1	1,114,989
+8.0	24,536.7	75,640	−81.0	245,764.1	757,624	−94.0	284,738.8	877,772	−107.0	323,579.2	997,506	−120.0	362,283.5	1,116,821
+7.5	23,001.8	70,908												
+7.0	21,467.1	66,177	−81.2	246,364.7	759,475	−94.2	285,337.4	879,617	−107.2	324,175.7	999,345	−120.2	362,877.9	1,118,654
+6.5	19,932.6	61,447	−81.4	246,965.3	761,327	−94.4	285,935.9	881,462	−107.4	324,772.1	1,001,184	−120.4	363,472.2	1,120,486
			−81.6	247,565.9	763,178	−94.6	286,534.4	883,308	−107.6	325,368.6	1,003,022	−120.6	364,066.6	1,122,318
+6.0	18,398.2	56,717	−81.8	248,166.4	765,029	−94.8	287,132.9	885,152	−107.8	325,965.0	1,004,861	−120.8	364,660.8	1,124,150
+5.5	16,864.0	51,987	−82.0	248,766.9	766,880	−95.0	287,731.4	886,997	−108.0	326,561.3	1,006,699	−121.0	365,255.1	1,125,982
+5.0	15,330.0	47,258												
+4.5	13,796.2	42,530	−82.2	249,367.4	768,732	−95.2	288,329.8	888,842	−108.2	327,157.6	1,008,538	−121.2	365,849.3	1,127,814
+4.0	12,262.6	37,802	−82.4	249,967.8	770,582	−95.4	288,928.1	890,687	−108.4	327,753.9	1,010,376	−121.4	366,443.5	1,129,645
			−82.6	250,568.2	772,433	−95.6	289,526.5	892,531	−108.6	328,350.2	1,012,214	−121.6	367,037.6	1,131,477
+3.5	10,729.2	33,075	−82.8	251,168.6	774,284	−95.8	290,124.8	894,376	−108.8	328,946.4	1,014,052	−121.8	367,631.8	1,133,308
+3.0	9,195.9	28,348	−83.0	251,768.9	776,135	−96.0	290,723.1	896,220	−109.0	329,542.6	1,015,890	−122.0	368,225.8	1,135,140
+2.5	7,662.8	23,622												
+2.0	6,129.9	18,897	−83.2	252,369.2	777,985	−96.2	291,321.3	898,064	−109.2	330,138.8	1,017,728	−122.2	368,819.9	1,136,971
+1.5	4,597.1	14,172	−83.4	252,969.5	779,836	−96.4	291,919.5	899,908	−109.4	330,734.9	1,019,565	−122.4	369,413.9	1,138,802
			−83.6	253,569.7	781,686	−96.6	292,517.7	901,752	−109.6	331,331.0	1,021,403	−122.6	370,007.9	1,140,633
+1.0	3,064.6	9,447	−83.8	254,169.9	783,536	−96.8	293,115.9	903,596	−109.8	331,927.1	1,023,241	−122.8	370,601.9	1,142,464
+.9	2,758.1	8,502	−84.0	254,770.1	785,387	−97.0	293,714.0	905,440	−110.0	332,523.1	1,025,078	−123.0	371,195.8	1,144,295
+.8	2,451.6	7,558												
+.7	2,145.1	6,613	−84.2	255,370.3	787,237	−97.2	294,312.1	907,284	−110.2	333,119.1	1,026,915	−123.2	371,789.7	1,146,126
+.6	1,838.7	5,668	−84.4	255,970.4	789,087	−97.4	294,910.1	909,128	−110.4	333,715.1	1,028,752	−123.4	372,383.5	1,147,957
			−84.6	256,570.5	790,937	−97.6	295,508.2	910,971	−110.6	334,311.0	1,030,590	−123.6	372,977.4	1,149,787
+.5	1,532.2	4,723	−84.8	257,170.5	792,786	−97.8	296,106.2	912,814	−110.8	334,906.9	1,032,427	−123.8	373,571.2	1,151,618
+.4	1,225.7	3,779	−85.0	257,770.5	794,636	−98.0	296,704.1	914,658	−111.0	335,502.8	1,034,264	−124.0	374,164.9	1,153,448
+.3	919.3	2,834												
+.2	612.9	1,889	−85.2	258,370.5	796,486	−98.2	297,302.0	916,501	−111.2	336,098.6	1,036,100	−124.2	374,758.6	1,155,279
+.1	306.4	945	−85.4	258,970.5	798,335	−98.4	297,899.9	918,344	−111.4	336,694.4	1,037,937	−124.4	375,352.3	1,157,109
.0	0.0	0	−85.6	259,570.4	800,185	−98.6	298,497.8	920,187	−111.6	337,290.2	1,039,774	−124.6	375,946.0	1,158,939
			−85.8	260,170.3	802,034	−98.8	299,095.6	922,030	−111.8	337,886.0	1,041,610	−124.8	376,539.6	1,160,769
−.1	306.4	945	−86.0	260,770.2	803,883	−99.0	299,693.4	923,873	−112.0	338,481.7	1,043,447	−125.0	377,133.2	1,162,599
−.2	612.8	1,889												
−.3	919.2	2,834	−86.2	261,370.0	805,732	−99.2	300,291.2	925,716	−112.2	339,077.4	1,045,283	−125.2	377,726.8	1,164,429
−.4	1,225.6	3,778	−86.4	261,969.8	807,581	−99.4	300,888.9	927,558	−112.4	339,673.0	1,047,119	−125.4	378,320.3	1,166,258
−.5	1,532.0	4,723	−86.6	262,569.6	809,430	−99.6	301,486.6	929,401	−112.6	340,268.6	1,048,955	−125.6	378,913.8	1,168,088
			−86.8	263,169.3	811,279	−99.8	302,084.3	931,244	−112.8	340,864.2	1,050,791	−125.8	379,507.3	1,169,917
−.6	1,838.4	5,667	−87.0	263,769.0	813,128	−100.0	302,682.0	933,086	−113.0	341,459.7	1,052,627	−126.0	380,100.7	1,171,747
−.7	2,144.8	6,612												
−.8	2,451.1	7,556	−87.2	264,368.7	814,976	−100.2	303,279.6	934,928	−113.2	342,055.3	1,054,463	−126.2	380,694.1	1,173,576
−.9	2,757.5	8,501	−87.4	264,968.4	816,825	−100.4	303,877.1	936,770	−113.4	342,650.7	1,056,299	−126.4	381,287.5	1,175,405
−1.0	3,063.8	9,445	−87.6	265,568.0	818,674	−100.6	304,474.7	938,612	−113.6	343,246.2	1,058,134	−126.6	381,880.8	1,177,234
			−87.8	266,167.6	820,522	−100.8	305,072.2	940,454	−113.8	343,841.6	1,059,970	−126.8	382,474.1	1,179,063
−1.5	4,595.5	14,167	−88.0	266,767.1	822,370	−101.0	305,669.7	942,296	−114.0	344,437.0	1,061,805	−127.0	383,067.4	1,180,892
−2.0	6,127.0	18,888												
−2.5	7,658.3	23,608	−88.2	267,366.6	824,218	−101.2	306,267.1	944,138	−114.2	345,032.4	1,063,641	−127.2	383,660.6	1,182,721
−3.0	9,189.4	28,328	−88.4	267,966.1	826,066	−101.4	306,864.5	945,980	−114.4	345,627.7	1,065,476	−127.4	384,253.8	1,184,550
−3.5	10,720.3	33,048	−88.6	268,565.6	827,914	−101.6	307,461.9	947,821	−114.6	346,223.0	1,067,311	−127.6	384,847.0	1,186,378
			−88.8	269,165.0	829,762	−101.8	308,059.3	949,663	−114.8	346,818.2	1,069,146	−127.8	385,440.1	1,188,207
−4.0	12,251.0	37,767	−89.0	269,764.4	831,610	−102.0	308,656.6	951,504	−115.0	347,413.4	1,070,981	−128.0	386,033.2	1,190,035
−4.5	13,781.6	42,485												
−5.0	15,312.0	47,203	−89.2	270,363.7	833,458	−102.2	309,253.9	953,345	−115.2	348,008.6	1,072,816	−128.2	386,626.3	1,191,863
−5.5	16,842.2	51,920	−89.4	270,963.1	835,305	−102.4	309,851.2	955,186	−115.4	348,603.8	1,074,650	−128.4	387,219.3	1,193,692
−6.0	18,372.2	56,637	−89.6	271,562.4	837,153	−102.6	310,448.4	957,028	−115.6	349,198.9	1,076,485	−128.6	387,812.3	1,195,520
			−89.8	272,161.6	839,000	−102.8	311,045.6	958,869	−115.8	349,794.0	1,078,320	−128.8	388,405.3	1,197,348
−6.5	19,902.1	61,353	−90.0	272,760.8	840,847	−103.0	311,642.7	960,710	−116.0	350,389.1	1,080,154	−129.0	388,998.2	1,199,175
−7.0	21,431.7	66,068												
−7.5	22,961.2	70,783	−90.2	273,360.0	842,694	−103.2	312,239.9	962,550	−116.2	350,984.1	1,081,988	−129.2	389,591.2	1,201,003
−8.0	24,490.5	75,498	−90.4	273,959.2	844,542	−103.4	312,837.0	964,391	−116.4	351,579.1	1,083,822	−129.4	390,184.0	1,202,831
−8.5	26,019.6	80,211	−90.6	274,558.4	846,388	−103.6	313,434.0	966,232	−116.6	352,174.1	1,085,657	−129.6	390,776.9	1,204,658
			−90.8	275,157.5	848,235	−103.8	314,031.1	968,072	−116.8	352,769.0	1,087,491	−129.8	391,369.7	1,206,486
−9.0	27,548.6	84,925	−91.0	275,756.5	850,082	−104.0	314,628.1	969,912	−117.0	353,363.9	1,089,325	−130.0	391,962.4	1,208,313
−9.5	29,077.3	89,637												
−10.0	30,605.9	94,350	−91.2	276,355.6	851,929	−104.2	315,225.0	971,753	−117.2	353,958.8	1,091,158			
−10.5	32,134.3	99,061	−91.4	276,954.6	853,776	−104.4	315,822.0	973,593	−117.4	354,553.6	1,092,992			
−11.0	33,662.5	103,772	−91.6	277,553.6	855,622	−104.6	316,418.9	975,433	−117.6	355,148.4	1,094,826			
			−91.8	278,152.5	857,468	−104.8	317,015.7	977,273	−117.8	355,743.2	1,096,659			
−11.5	35,190.5	108,483	−92.0	278,751.4	859,315	−105.0	317,612.6	979,113	−118.0	356,337.9	1,098,493			
−12.0	36,718.3	113,193												
−12.5	38,246.0	117,902	−92.2	279,350.3	861,161	−105.2	318,209.4	980,953	−118.2	356,932.6	1,100,326			
−13.0	39,773.5	122,611	−92.4	279,949.2	863,007	−105.4	318,806.2	982,792	−118.4	357,527.3	1,102,159			
−13.5	41,300.8	127,319	−92.6	280,548.0	864,853	−105.6	319,402.9	984,632	−118.6	358,122.0	1,103,992			
			−92.8	281,146.8	865,699	−105.8	319,999.6	986,472	−118.8	358,716.6	1,105,825			
−14.0	42,827.8	132,027	−93.0	281,745.5	868,545	−106.0	320,596.3	988,311	−119.0	359,311.1	1,107,658			
−14.5	44,354.8	136,734												
−15.0	45,881.5	141,440												

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 7

[Inner radius, 20°41′; outer radius 26°41′]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	27,896.4	85,997	−80.0	220,778.9	680,601	−93.0	256,246.4	789,938	−106.0	291,597.4	898,915	−119.0	326,831.2	1,007,531
+9.5	26,500.0	81,692	−80.2	221,325.4	682,286	−93.2	256,791.1	791,617	−106.2	292,140.4	900,589	−119.2	327,372.3	1,009,200
+9.0	25,103.8	77,388	−80.4	221,871.9	683,971	−93.4	257,335.8	793,296	−106.4	292,683.3	902,263	−119.4	327,913.4	1,010,868
			−80.6	222,418.4	685,655	−93.6	257,880.5	794,975	−106.6	293,226.2	903,936	−119.6	328,454.5	1,012,536
+8.5	23,707.7	73,084	−80.8	222,964.9	687,340	−93.8	258,425.2	796,654	−106.8	293,769.0	905,610	−119.8	328,995.6	1,014,204
+8.0	22,311.8	68,781	−81.0	223,511.3	689,024	−94.0	258,969.8	798,333	−107.0	294,311.9	907,283	−120.0	329,536.6	1,015,871
+7.5	20,916.1	64,479												
+7.0	19,520.6	60,177	−81.2	224,057.7	690,709	−94.2	259,514.4	800,012	−107.2	294,854.7	908,956	−120.2	330,077.6	1,017,539
+6.5	18,125.2	55,875	−81.4	224,604.0	692,393	−94.4	260,059.0	801,691	−107.4	295,397.5	910,630	−120.4	330,618.6	1,019,207
			−81.6	225,150.4	694,077	−94.6	260,603.6	803,370	−107.6	295,940.2	912,303	−120.6	331,159.5	1,020,874
+6.0	16,730.0	51,574	−81.8	225,696.7	695,761	−94.8	261,148.1	805,048	−107.8	296,482.9	913,976	−120.8	331,700.4	1,022,542
+5.5	15,334.9	47,273	−82.0	226,243.0	697,445	−95.0	261,692.6	806,727	−108.0	297,025.6	915,649	−121.0	332,241.3	1,024,209
+5.0	13,940.0	42,973												
+4.5	12,545.3	38,674	−82.2	226,789.2	699,129	−95.2	262,237.1	808,405	−108.2	297,568.3	917,322	−121.2	332,782.2	1,025,877
+4.0	11,150.7	34,374	−82.4	227,335.5	700,813	−95.4	262,781.5	810,084	−108.4	298,111.0	918,995	−121.4	333,323.0	1,027,544
			−82.6	227,881.7	702,497	−95.6	263,325.9	811,762	−108.6	298,653.6	920,668	−121.6	333,863.8	1,029,211
+3.5	9,756.3	30,076	−82.8	228,427.8	704,181	−95.8	263,870.3	813,440	−108.8	299,196.2	922,340	−121.8	334,404.6	1,030,878
+3.0	8,362.0	25,778	−83.0	228,974.0	705,864	−96.0	264,414.7	815,118	−109.0	299,738.7	924,013	−122.0	334,945.3	1,032,545
+2.5	6,968.0	21,480												
+2.0	5,574.0	17,183	−83.2	229,520.1	707,548	−96.2	264,959.0	816,796	−109.2	300,281.2	925,685	−122.2	335,486.0	1,034,212
+1.5	4,180.3	12,887	−83.4	230,066.2	709,231	−96.4	265,503.3	818,474	−109.4	300,823.8	927,358	−122.4	336,026.7	1,035,879
			−83.6	230,612.3	710,915	−96.6	266,047.6	820,152	−109.6	301,366.2	929,030	−122.6	336,567.4	1,037,545
+1.0	2,786.7	8,591	−83.8	231,158.3	712,598	−96.8	266,591.8	821,830	−109.8	301,908.7	930,702	−122.8	337,108.0	1,039,212
+.9	2,508.0	7,731	−84.0	231,704.3	714,281	−97.0	267,136.1	823,508	−110.0	302,451.1	932,374	−123.0	337,648.6	1,040,879
+.8	2,229.3	6,872												
+.7	1,950.6	6,013	−84.2	232,250.3	715,964	−97.2	267,680.2	825,185	−110.2	302,993.5	934,046	−123.2	338,189.2	1,042,545
+.6	1,671.9	5,154	−84.4	232,796.3	717,647	−97.4	268,224.4	826,863	−110.4	303,535.9	935,718	−123.4	338,729.8	1,044,211
			−84.6	233,342.2	719,330	−97.6	268,768.6	828,540	−110.6	304,078.2	937,390	−123.6	339,270.3	1,045,878
+.5	1,393.3	4,295	−84.8	233,888.1	721,013	−97.8	269,312.7	830,218	−110.8	304,620.5	939,062	−123.8	339,810.8	1,047,544
+.4	1,114.6	3,436	−85.0	234,434.0	722,696	−98.0	269,856.8	831,895	−111.0	305,162.8	940,734	−124.0	340,351.2	1,049,210
+.3	835.9	2,577												
+.2	557.3	1,718	−85.2	234,979.8	724,379	−98.2	270,400.8	833,572	−111.2	305,705.0	942,405	−124.2	340,891.7	1,050,876
+.1	278.6	859	−85.4	235,525.6	726,061	−98.4	270,944.8	835,249	−111.4	306,247.3	944,077	−124.4	341,432.1	1,052,542
0	0.0	0	−85.6	236,071.4	727,744	−98.6	271,488.8	836,926	−111.6	306,789.5	945,748	−124.6	341,972.5	1,054,208
			−85.8	236,617.2	729,426	−98.8	272,032.8	838,603	−111.8	307,331.6	947,420	−124.8	342,512.8	1,055,874
−.1	278.6	859	−86.0	237,162.9	731,109	−99.0	272,576.8	840,280	−112.0	307,873.8	949,091	−125.0	343,053.2	1,057,539
−.2	557.3	1,718												
−.3	835.9	2,577	−86.2	237,708.6	732,791	−99.2	273,120.7	841,956	−112.2	308,415.9	950,762	−125.2	343,593.5	1,059,205
−.4	1,114.5	3,436	−86.4	238,254.3	734,473	−99.4	273,664.6	843,633	−112.4	308,958.0	952,433	−125.4	344,133.7	1,060,870
−.5	1,393.1	4,295	−86.6	238,800.0	736,155	−99.6	274,208.4	845,310	−112.6	309,500.0	954,104	−125.6	344,674.0	1,062,536
			−86.8	239,345.6	737,837	−99.8	274,752.3	846,986	−112.8	310,042.1	955,775	−125.8	345,214.2	1,064,201
−.6	1,671.7	5,153	−87.0	239,891.2	739,519	−100.0	275,296.1	848,663	−113.0	310,584.1	957,446	−126.0	345,754.4	1,065,866
−.7	1,950.3	6,012												
−.8	2,228.9	6,871	−87.2	240,436.8	741,201	−100.2	275,839.9	850,339	−113.2	311,126.0	959,117	−126.2	346,294.5	1,067,532
−.9	2,507.5	7,730	−87.4	240,982.3	742,883	−100.4	276,383.6	852,015	−113.4	311,668.0	960,787	−126.4	346,834.7	1,069,197
−1.0	2,786.0	8,589	−87.6	241,527.8	744,564	−100.6	276,927.3	853,691	−113.6	312,209.9	962,458	−126.6	347,374.8	1,070,862
			−87.8	242,073.3	746,246	−100.8	277,471.0	855,368	−113.8	312,751.8	964,128	−126.8	347,914.8	1,072,527
−1.5	4,178.8	12,882	−88.0	242,618.8	747,928	−101.0	278,014.7	857,044	−114.0	313,293.7	965,799	−127.0	348,454.9	1,074,191
−2.0	5,571.4	17,175												
−2.5	6,963.8	21,468	−88.2	243,164.2	749,609	−101.2	278,558.3	858,719	−114.2	313,835.5	967,469	−127.2	348,994.9	1,075,856
−3.0	8,356.1	25,760	−88.4	243,709.6	751,290	−101.4	279,102.0	860,395	−114.4	314,377.3	969,140	−127.4	349,534.9	1,077,521
−3.5	9,748.2	30,051	−88.6	244,255.0	752,972	−101.6	279,645.5	862,071	−114.6	314,919.1	970,810	−127.6	350,074.9	1,079,185
			−88.8	244,800.4	754,653	−101.8	280,189.1	863,747	−114.8	315,460.8	972,480	−127.8	350,614.8	1,080,850
−4.0	11,140.2	34,342	−89.0	245,345.7	756,334	−102.0	280,732.6	865,422	−115.0	316,002.6	974,150	−128.0	351,154.7	1,082,514
−4.5	12,532.0	38,633												
−5.0	13,923.6	42,923	−89.2	245,891.0	758,015	−102.2	281,276.1	867,098	−115.2	316,544.3	975,820	−128.2	351,694.6	1,084,178
−5.5	15,315.0	47,212	−89.4	246,436.2	759,696	−102.4	281,819.6	868,773	−115.4	317,085.9	977,489	−128.4	352,234.4	1,085,843
−6.0	16,706.3	51,501	−89.6	246,981.5	761,377	−102.6	282,363.0	870,448	−115.6	317,627.6	979,159	−128.6	352,774.3	1,087,507
			−89.8	247,526.7	763,057	−102.8	282,906.5	872,124	−115.8	318,169.2	980,829	−128.8	353,314.0	1,089,171
−6.5	18,097.5	55,790	−90.0	248,071.9	764,738	−103.0	283,449.9	873,799	−116.0	318,710.8	982,498	−129.0	353,853.8	1,090,835
−7.0	19,488.4	60,078												
−7.5	20,879.2	64,365	−90.2	248,617.0	766,419	−103.2	283,993.2	875,474	−116.2	319,252.3	984,168	−129.2	354,393.6	1,092,499
−8.0	22,269.9	68,652	−90.4	249,162.2	768,099	−103.4	284,536.6	877,149	−116.4	319,793.8	985,837	−129.4	354,933.3	1,094,162
−8.5	23,660.3	72,938	−90.6	249,707.3	769,780	−103.6	285,079.9	878,823	−116.6	320,335.3	987,506	−129.6	355,473.0	1,095,826
			−90.8	250,252.4	771,460	−103.8	285,623.2	880,498	−116.8	320,876.8	989,176	−129.8	356,012.6	1,097,490
−9.0	25,050.6	77,224	−91.0	250,797.4	773,140	−104.0	286,166.4	882,173	−117.0	321,418.3	990,845	−130.0	356,552.2	1,099,153
−9.5	26,440.8	81,510												
−10.0	27,830.8	85,795	−91.2	251,342.4	774,820	−104.2	286,709.6	883,848	−117.2	321,959.7	992,514			
−10.5	29,220.6	90,079	−91.4	251,887.4	776,500	−104.4	287,252.8	885,522	−117.4	322,501.1	994,183			
−11.0	30,610.2	94,363	−91.6	252,432.4	778,180	−104.6	287,796.0	887,196	−117.6	323,042.4	995,852			
			−91.8	252,977.3	779,860	−104.8	288,339.1	888,871	−117.8	323,583.8	997,520			
−11.5	31,999.7	98,646	−92.0	253,522.2	781,540	−105.0	288,882.2	890,545	−118.0	324,125.1	999,189			
−12.0	33,389.0	102,929												
−12.5	34,778.2	107,212	−92.2	254,067.1	783,220	−105.2	289,425.3	892,219	−118.2	324,666.4	1,000,858			
−13.0	36,167.1	111,493	−92.4	254,612.0	784,899	−105.4	289,968.4	893,894	−118.4	325,207.6	1,002,526			
−13.5	37,556.0	115,775	−92.6	255,156.8	786,579	−105.6	290,511.4	895,568	−118.6	325,748.8	1,004,195			
			−92.8	255,701.6	788,258	−105.8	291,054.4	897,242	−118.8	326,290.0	1,005,863			
−14.0	38,944.6	120,056	−93.0	256,246.4	789,938	−106.0	291,597.4	898,915	−119.0	326,831.2	1,007,531			
−14.5	40,333.1	124,336												
−15.0	41,721.4	128,616												

[1] See explanation on pp. 3 and 15.

TABLE 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 6

[Inner radius, 26°41′; outer radius, 35°58′]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	42,456.2	130,881	−2.0	8,479.3	26,139	−80.0	336,031.0	1,035,892	−94.0	394,168.6	1,215,114	−108.0	452,105.3	1,393,717	−122.0	509,840.3	1,571,699
+9.8	41,606.0	128,260	−2.2	9,327.0	28,752	−80.2	336,862.9	1,038,456	−94.2	394,997.7	1,217,670	−108.2	452,931.5	1,396,264	−122.2	510,663.6	1,574,237
+9.6	40,756.0	125,640	−2.4	10,174.6	31,366	−80.4	337,694.8	1,041,021	−94.4	395,826.7	1,220,226	−108.4	453,757.7	1,398,811	−122.4	511,486.9	1,576,775
+9.4	39,906.0	123,019	−2.6	11,022.3	33,979	−80.6	338,526.7	1,043,585	−94.6	396,655.7	1,222,781	−108.6	454,583.8	1,401,358	−122.6	512,310.2	1,579,312
+9.2	39,056.0	120,399	−2.8	11,869.8	36,591	−80.8	339,358.5	1,046,150	−94.8	397,484.7	1,225,337	−108.8	455,409.9	1,403,904	−122.8	513,133.4	1,581,850
+9.0	38,206.0	117,779	−3.0	12,717.4	39,204	−81.0	340,190.3	1,048,714	−95.0	398,313.6	1,227,892	−109.0	456,235.9	1,406,451	−123.0	513,956.5	1,584,388
+8.8	37,356.2	115,159	−3.2	13,564.9	41,817	−81.2	341,022.0	1,051,278	−95.2	399,142.5	1,230,447	−109.2	457,061.9	1,408,997	−123.2	514,779.6	1,586,925
+8.6	36,506.3	112,539	−3.4	14,412.4	44,429	−81.4	341,853.8	1,053,842	−95.4	399,971.3	1,233,002	−109.4	457,887.9	1,411,543	−123.4	515,602.7	1,589,462
+8.4	35,656.5	109,919	−3.6	15,259.8	47,042	−81.6	342,685.4	1,056,406	−95.6	400,800.1	1,235,557	−109.6	458,713.8	1,414,089	−123.6	516,425.7	1,592,000
+8.2	34,806.7	107,300	−3.8	16,107.2	49,654	−81.8	343,517.0	1,058,969	−95.8	401,628.9	1,238,112	−109.8	459,539.7	1,416,635	−123.8	517,248.7	1,594,537
+8.0	33,957.0	104,680	−4.0	16,954.5	52,266	−82.0	344,348.6	1,061,533	−96.0	402,457.6	1,240,667	−110.0	460,365.5	1,419,181	−124.0	518,071.7	1,597,074
+7.8	33,107.2	102,061	−4.2	17,801.8	54,878	−82.2	345,180.2	1,064,096	−96.2	403,286.2	1,243,222	−110.2	461,191.3	1,421,727	−124.2	518,894.6	1,599,610
+7.6	32,257.6	99,441	−4.4	18,649.1	57,490	−82.4	346,011.7	1,066,660	−96.4	404,114.9	1,245,776	−110.4	462,017.1	1,424,272	−124.4	519,717.4	1,602,147
+7.4	31,408.0	96,822	−4.6	19,496.3	60,102	−82.6	346,843.1	1,069,223	−96.6	404,943.5	1,248,330	−110.6	462,842.8	1,426,818	−124.6	520,540.3	1,604,684
+7.2	30,558.4	94,203	−4.8	20,343.5	62,714	−82.8	347,674.5	1,071,786	−96.8	405,772.0	1,250,884	−110.8	463,668.4	1,429,363	−124.8	521,363.1	1,607,220
+7.0	29,708.8	91,584	−5.0	21,190.6	65,325	−83.0	348,505.9	1,074,349	−97.0	406,600.5	1,253,438	−111.0	464,494.1	1,431,908	−125.0	522,185.8	1,609,756
+6.8	28,859.3	88,966	−5.2	22,037.8	67,936	−83.2	349,337.2	1,076,911	−97.2	407,429.0	1,255,992	−111.2	465,319.7	1,434,454	−125.2	523,008.5	1,612,292
+6.6	28,009.9	86,347	−5.4	22,884.8	70,548	−83.4	350,168.5	1,079,474	−97.4	408,257.4	1,258,546	−111.4	466,145.2	1,436,998	−125.4	523,831.2	1,614,828
+6.4	27,160.4	83,728	−5.6	23,731.8	73,159	−83.6	350,999.8	1,082,037	−97.6	409,085.8	1,261,100	−111.6	466,970.7	1,439,543	−125.6	524,653.8	1,617,364
+6.2	26,311.1	81,116	−5.8	24,578.8	75,770	−83.8	351,831.0	1,084,599	−97.8	409,914.2	1,263,654	−111.8	467,796.2	1,442,088	−125.8	525,476.4	1,619,900
+6.0	25,461.7	78,492	−6.0	25,425.8	78,381	−84.0	352,662.2	1,087,161	−98.0	410,742.5	1,266,207	−112.0	468,621.6	1,444,633	−126.0	526,298.9	1,622,436
+5.8	24,612.4	75,873	−6.2	26,272.7	80,992	−84.2	353,943.3	1,089,724	−98.2	411,570.7	1,268,760	−112.2	469,447.0	1,447,177	−126.2	527,121.4	1,624,971
+5.6	23,763.2	73,255	−6.4	27,119.6	83,602	−84.4	354,324.4	1,092,286	−98.4	412,399.0	1,271,313	−112.4	470,272.4	1,449,721	−126.4	527,943.8	1,627,507
+5.4	22,913.9	70,638	−6.6	27,966.4	86,213	−84.6	355,155.4	1,094,847	−98.6	413,227.1	1,273,866	−112.6	471,097.6	1,452,266	−126.6	528,766.2	1,630,042
+5.2	22,064.8	68,020	−6.8	28,813.2	88,823	−84.8	355,986.5	1,097,409	−98.8	414,055.3	1,276,419	−112.8	471,922.9	1,454,810	−126.8	529,588.6	1,632,577
+5.0	21,215.6	65,402	−7.0	29,659.9	91,433	−85.0	356,817.4	1,099,971	−99.0	414,883.4	1,278,972	−113.0	472,748.1	1,457,354	−127.0	530,411.0	1,635,112
+4.8	20,366.5	62,784	−7.2	30,506.6	94,044	−85.2	357,648.4	1,102,532	−99.2	415,711.4	1,281,525	−113.2	473,573.3	1,459,897	−127.2	531,233.2	1,637,647
+4.6	19,517.4	60,167	−7.4	31,353.3	96,654	−85.4	358,479.2	1,105,094	−99.4	416,539.4	1,284,077	−113.4	474,398.4	1,462,441	−127.4	532,055.5	1,640,182
+4.4	18,668.4	57,550	−7.6	32,199.9	99,264	−85.6	359,310.1	1,107,655	−99.6	417,367.4	1,286,630	−113.6	475,223.5	1,464,984	−127.6	532,877.7	1,642,716
+4.2	17,819.4	54,932	−7.8	33,046.5	101,873	−85.8	360,140.9	1,110,216	−99.8	418,195.4	1,289,182	−113.8	476,048.6	1,467,528	−127.8	533,699.9	1,645,251
+4.0	16,970.5	52,315	−8.0	33,893.0	104,483	−86.0	360,971.6	1,112,777	−100.0	419,023.2	1,291,734	−114.0	476,873.6	1,470,071	−128.0	534,522.0	1,647,785
+3.8	16,121.6	49,698	−8.2	34,739.6	107,092	−86.2	361,802.4	1,115,338	−100.2	419,851.1	1,294,286	−114.2	477,698.6	1,472,614	−128.2	535,344.1	1,650,320
+3.6	15,272.7	47,082	−8.4	35,586.0	109,702	−86.4	362,633.0	1,117,899	−100.4	420,678.9	1,296,838	−114.4	478,523.5	1,475,157	−128.4	536,166.1	1,652,854
+3.4	14,423.9	44,465	−8.6	36,432.4	112,311	−86.6	363,463.7	1,120,459	−100.6	421,506.7	1,299,390	−114.6	479,348.4	1,477,700	−128.6	536,988.1	1,655,388
+3.2	13,575.1	41,848	−8.8	37,278.8	114,920	−86.8	364,294.3	1,123,020	−100.8	422,334.4	1,301,942	−114.8	480,173.2	1,480,243	−128.8	537,810.1	1,657,922
+3.0	12,726.4	39,232	−9.0	38,125.2	117,530	−87.0	365,124.8	1,125,580	−101.0	423,162.1	1,304,493	−115.0	480,998.0	1,482,786	−129.0	538,632.0	1,660,455
+2.8	11,877.7	36,616	−9.2	38,971.5	120,138	−87.2	365,955.4	1,128,141	−101.2	423,989.8	1,307,045	−115.2	481,822.8	1,485,328	−129.2	539,453.8	1,662,989
+2.6	11,029.0	33,999	−9.4	39,817.8	122,747	−87.4	366,785.8	1,130,701	−101.4	424,817.4	1,309,596	−115.4	482,647.5	1,487,871	−129.4	540,275.7	1,665,522
+2.4	10,180.4	31,383	−9.6	40,664.0	125,356	−87.6	367,616.3	1,133,261	−101.6	425,644.9	1,312,147	−115.6	483,472.2	1,490,413	−129.6	541,097.5	1,668,056
+2.2	9,331.8	28,767	−9.8	41,510.2	127,964	−87.8	368,446.7	1,135,821	−101.8	426,472.4	1,314,698	−115.8	484,296.9	1,492,955	−129.8	541,919.2	1,670,589
+2.0	8,483.2	26,152	−10.0	42,356.3	130,573	−88.0	369,277.0	1,138,380	−102.0	427,299.9	1,317,249	−116.0	485,121.5	1,495,497	−130.0	542,740.9	1,673,122
+1.8	7,634.8	23,536	−10.2	43,202.4	133,181	−88.2	370,107.3	1,140,940	−102.2	428,127.4	1,319,800	−116.2	485,946.0	1,498,039			
+1.6	6,786.3	20,920	−10.4	44,048.5	135,790	−88.4	370,937.6	1,143,499	−102.4	428,954.8	1,322,350	−116.4	486,770.6	1,500,581			
+1.4	5,937.9	18,305	−10.6	44,894.5	138,398	−88.6	371,767.8	1,146,059	−102.6	129,782.1	1,324,901	−116.6	487,595.0	1,503,122			
+1.2	5,089.5	15,689	−10.8	45,740.5	141,006	−88.8	372,598.0	1,148,618	−102.8	430,609.4	1,327,451	−116.8	488,419.5	1,505,664			
+1.0	4,241.1	13,074	−11.0	46,586.4	143,613	−89.0	373,428.2	1,151,177	−103.0	431,436.7	1,330,002	−117.0	489,243.9	1,508,205			
+.9	3,817.0	11,767	−11.2	47,432.4	146,221	−89.2	374,258.3	1,153,736	−103.2	432,264.0	1,332,552	−117.2	490,068.2	1,510,747			
+.8	3,392.8	10,459	−11.4	48,278.2	148,829	−89.4	375,088.4	1,156,295	−103.4	433,091.2	1,335,102	−117.4	490,892.5	1,513,288			
+.7	2,968.7	9,152	−11.6	49,124.0	151,436	−89.6	375,918.4	1,158,854	−103.6	433,918.3	1,337,652	−117.6	491,716.8	1,515,829			
+.6	2,544.6	7,844	−11.8	49,969.8	154,043	−89.8	376,748.4	1,161,412	−103.8	434,745.4	1,340,202	−117.8	492,541.0	1,518,370			
+.5	2,120.4	6,537	−12.0	50,815.6	156,650	−90.0	377,578.3	1,163,971	−104.0	435,572.5	1,342,751	−118.0	493,365.2	1,520,910			
+.4	1,696.3	5,229	−12.2	51,661.3	159,258	−90.2	378,408.2	1,166,529	−104.2	436,399.5	1,345,301	−118.2	494,189.4	1,523,451			
+.3	1,272.2	3,922	−12.4	52,506.9	161,865	−90.4	379,238.1	1,169,088	−104.4	437,226.5	1,347,850	−118.4	495,013.5	1,525,991			
+.2	848.2	2,615	−12.6	53,352.6	164,471	−90.6	380,067.9	1,171,646	−104.6	438,053.5	1,350,399	−118.6	495,837.5	1,528,532			
+.1	424.1	1,307	−12.8	54,198.2	167,078	−90.8	380,897.7	1,174,204	−104.8	438,880.4	1,352,948	−118.8	496,661.6	1,531,072			
.0	0.0	0	−13.0	55,043.7	169,685	−91.0	381,727.4	1,176,762	−105.0	439,707.2	1,355,497	−119.0	497,485.5	1,533,612			
−.1	424.1	1,307	−13.2	55,889.2	172,291	−91.2	382,557.1	1,179,319	−105.2	440,534.0	1,358,046	−119.2	498,309.5	1,536,152			
−.2	848.1	2,614	−13.4	56,734.7	174,898	−91.4	383,386.8	1,181,877	−105.4	441,360.8	1,360,595	−119.4	499,133.4	1,538,692			
−.3	1,272.1	3,922	−13.6	57,580.1	177,504	−91.6	384,216.4	1,184,434	−105.6	442,187.6	1,363,144	−119.6	499,957.2	1,541,232			
−.4	1,696.2	5,229	−13.8	58,425.5	180,110	−91.8	385,046.0	1,186,992	−105.8	443,014.3	1,365,692	−119.8	500,781.0	1,543,771			
−.5	2,120.2	6,536	−14.0	59,270.8	182,716	−92.0	385,875.5	1,189,549	−106.0	443,840.9	1,368,240	−120.0	501,604.8	1,546,311			
−.6	2,544.2	7,843	−14.2	60,116.1	185,322	−92.2	386,705.0	1,192,106	−106.2	444,667.6	1,370,789	−120.2	502,428.6	1,548,850			
−.7	2,968.2	9,150	−14.4	60,961.4	187,927	−92.4	387,534.4	1,194,663	−106.4	445,494.1	1,373,337	−120.4	503,252.3	1,551,389			
−.8	3,392.2	10,457	−14.6	61,806.6	190,533	−92.6	388,363.9	1,197,220	−106.6	446,320.7	1,375,885	−120.6	504,075.9	1,553,928			
−.9	3,816.2	11,764	−14.8	62,651.8	193,138	−92.8	389,193.2	1,199,776	−106.8	447,147.2	1,378,433	−120.8	504,899.5	1,556,468			
−1.0	4,240.1	13,071	−15.0	63,496.9	195,744	−93.0	390,022.6	1,202,333	−107.0	447,973.6	1,380,980	−121.0	505,723.1	1,559,006			
−1.2	5,088.0	15,685				−93.2	390,851.8	1,204,890	−107.2	448,800.0	1,383,528	−121.2	506,546.6	1,561,545			
−1.4	5,935.9	18,299				−93.4	391,681.1	1,207,446	−107.4	449,626.4	1,386,076	−121.4	507,370.1	1,564,084			
−1.6	6,783.7	20,912				−93.6	392,510.3	1,210,002	−107.6	450,452.7	1,388,623	−121.6	508,193.6	1,566.622			
−1.8	7,631.5	23,526				−93.8	393,339.5	1,212,558	−107.8	451,279.0	1,391,170	−121.8	509,017.0	1,569.160			
−2.0	8,479.3	26,139				−94.0	394,168.6	1,215,114	−108.0	452,105.3	1,393,717	−122.0	509,840.3	1,571,699			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 5

[Inner radius, 35°58′; outer radius, 51°04″]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	66,581.4	205,252	−2.0	13,297.5	40,993	−80.0	526,999.2	1,624,595	−94.0	618,186.8	1,905,701	−108.0	709,064.3	2,185,852	−122.0	799,631.1	2,465,044
+9.8	65,248.2	201,142	−2.2	14,626.9	45,091	−80.2	528,304.0	1,628,617	−94.2	619,487.3	1,909,710	−108.2	710,360.3	2,189,847	−122.2	800,922.6	2,469,026
+9.6	63,915.1	197,033	−2.4	15,956.2	49,189	−80.4	529,608.8	1,632,640	−94.4	620,787.7	1,913,719	−108.4	711,656.2	2,193,842	−122.4	802,214.1	2,473,007
+9.4	62,582.1	192,924	−2.6	17,285.5	53,287	−80.6	530,913.6	1,636,662	−94.6	622,088.0	1,917,728	−108.6	712,952.1	2,197,837	−122.6	803,505.6	2,476,988
+9.2	61,249.1	188,814	−2.8	18,614.7	57,384	−80.8	532,218.3	1,640,684	−94.8	623,388.2	1,921,736	−108.8	714,247.9	2,201,832	−122.8	804,796.9	2,480,969
+9.0	59,916.2	184,705	−3.0	19,943.9	61,482	−81.0	533,522.9	1,644,705	−95.0	624,688.4	1,925,744	−109.0	715,543.7	2,205,826	−123.0	806,088.2	2,484,950
+8.8	58,583.4	180,596	−3.2	21,273.0	65,579	−81.2	534,827.4	1,648,727	−95.2	625,988.5	1,929,752	−109.2	716,839.4	2,209,820	−123.2	807,379.5	2,488,931
+8.6	57,250.6	176,488	−3.4	22,602.0	69,676	−81.4	536,131.9	1,652,748	−95.4	627,288.6	1,933,760	−109.4	718,135.0	2,213,814	−123.4	808,670.6	2,492,911
+8.4	55,917.9	172,380	−3.6	23,931.0	73,773	−81.6	537,436.3	1,656,770	−95.6	628,588.6	1,937,767	−109.6	719,430.5	2,217,808	−123.6	809,961.8	2,496,891
+8.2	54,585.2	168,271	−3.8	25,259.9	77,869	−81.8	538,740.7	1,660,790	−95.8	629,888.5	1,941,774	−109.8	720,726.0	2,221,802	−123.8	811,252.8	2,500,871
+8.0	53,252.6	164,163	−4.0	26,588.7	81,966	−82.0	540,045.0	1,664,811	−96.0	631,188.4	1,945,782	−110.0	722,021.4	2,225,795	−124.0	812,543.8	2,504,851
+7.8	51,920.1	160,055	−4.2	27,917.5	86,062	−82.2	541,349.2	1,668,832	−96.2	632,488.2	1,949,788	−110.2	723,316.8	2,229,788	−124.2	813,834.7	2,508,830
+7.6	50,587.6	155,948	−4.4	29,246.2	90,158	−82.4	542,653.4	1,672,852	−96.4	633,787.9	1,953,795	−110.4	724,612.1	2,233,781	−124.4	815,125.6	2,512,810
+7.4	49,255.2	151,840	−4.6	30,574.9	94,254	−82.6	543,957.5	1,676,872	−96.6	635,087.6	1,957,802	−110.6	725,907.4	2,237,774	−124.6	816,416.4	2,516,789
+7.2	47,922.8	147,733	−4.8	31,903.5	98,350	−82.8	545,261.5	1,680,892	−96.8	636,387.2	1,961,808	−110.8	727,202.5	2,241,767	−124.8	817,707.1	2,520,768
+7.0	46,590.6	143,626	−5.0	33,232.0	102,445	−83.0	546,565.5	1,684,912	−97.0	637,686.7	1,965,814	−111.0	728,497.6	2,245,759	−125.0	818,997.8	2,524,747
+6.8	45,258.3	139,519	−5.2	34,560.4	106,540	−83.2	547,869.4	1,688,932	−97.2	638,986.2	1,969,820	−111.2	729,792.7	2,249,752	−125.2	820,288.4	2,528,725
+6.6	43,926.2	135,412	−5.4	35,888.8	110,636	−83.4	549,173.3	1,692,951	−97.4	640,285.6	1,973,826	−111.4	731,087.7	2,253,744	−125.4	821,578.9	2,532,704
+6.4	42,594.1	131,306	−5.6	37,217.2	114,730	−83.6	550,477.0	1,696,971	−97.6	641,585.0	1,977,832	−111.6	732,382.6	2,257,736	−125.6	822,869.4	2,536,682
+6.2	41,262.0	127,200	−5.8	38,545.5	118,825	−83.8	551,780.8	1,700,990	−97.8	642,884.3	1,981,837	−111.8	733,677.5	2,261,727	−125.8	824,159.8	2,540,660
+6.0	39,930.1	123,094	−6.0	39,873.7	122,920	−84.0	553,084.4	1,705,008	−98.0	644,183.5	1,985,842	−112.0	734,972.2	2,265,719	−126.0	825,450.2	2,544,638
+5.8	38,598.2	118,988	−6.2	41,201.8	127,014	−84.2	554,388.0	1,709,027	−98.2	645,482.7	1,989,847	−112.2	736,267.0	2,269,710	−126.2	826,740.4	2,548,615
+5.6	37,266.3	114,882	−6.4	42,529.9	131,108	−84.4	555,691.6	1,713,046	−98.4	646,781.8	1,993,852	−112.4	737,561.6	2,273,701	−126.4	828,030.7	2,552,593
+5.4	35,934.5	110,776	−6.6	43,858.0	135,202	−84.6	556,995.0	1,717,064	−98.6	648,080.8	1,997,856	−112.6	738,856.2	2,277,692	−126.6	829,320.8	2,556,570
+5.2	34,602.8	106,671	−6.8	45,185.9	139,296	−84.8	558,298.4	1,721,082	−98.8	649,379.8	2,001,861	−112.8	740,150.8	2,281,683	−126.8	830,610.9	2,560,547
+5.0	33,271.1	102,566	−7.0	46,513.8	143,389	−85.0	559,601.8	1,725,100	−99.0	650,678.7	2,005,865	−113.0	741,445.3	2,285,673	−127.0	831,901.0	2,564,524
+4.8	31,939.5	98,461	−7.2	47,841.7	147,483	−85.2	560,905.1	1,729,117	−99.2	651,977.6	2,009,869	−113.2	742,739.7	2,289,664	−127.2	833,190.9	2,568,500
+4.6	30,608.0	94,356	−7.4	49,169.4	151,576	−85.4	562,208.3	1,733,135	−99.4	653,276.4	2,013,873	−113.4	744,034.0	2,293,654	−127.4	834,480.8	2,572,477
+4.4	29,276.5	90,252	−7.6	50,497.2	155,669	−85.6	563,511.4	1,737,152	−99.6	654,575.1	2,017,876	−113.6	745,328.3	2,297,644	−127.6	835,770.7	2,576,453
+4.2	27,945.1	86,147	−7.8	51,824.8	159,762	−85.8	564,814.5	1,741,169	−99.8	655,873.8	2,021,880	−113.8	746,622.6	2,301,634	−127.8	837,060.5	2,580,429
+4.0	26,613.8	82,043	−8.0	53,152.4	163,854	−86.0	566,117.6	1,745,186	−100.0	657,172.4	2,025,883	−114.0	747,916.7	2,305,623	−128.0	838,350.2	2,584,405
+3.8	25,282.5	77,939	−8.2	54,479.9	167,947	−86.2	567,420.5	1,74,9203	−100.2	658,470.9	2,029,886	−114.2	749,210.8	2,309,612	−128.2	839,639.8	2,588,380
+3.6	23,951.3	73,835	−8.4	55,807.4	172,039	−86.4	568,723.4	1,75,3219	−100.4	659,769.4	2,033,889	−114.4	750,504.8	2,313,602	−128.4	840,929.4	2,592,356
+3.4	22,620.1	69,732	−8.6	57,134.8	176,131	−86.6	570,026.3	1,75,7236	−100.6	661,067.8	2,037,892	−114.6	751,798.8	2,317,591	−128.6	842,218.9	2,596,331
+3.2	21,289.0	65,628	−8.8	58,462.1	180,223	−86.8	571,329.1	1,761,252	−100.8	662,366.1	2,041,894	−114.8	753,092.7	2,321,579	−128.8	843,508.4	2,600,308
+3.0	19,958.0	61,525	−9.0	59,789.4	184,314	−87.0	572,631.8	1,765,268	−101.0	663,664.4	2,045,896	−115.0	754,386.6	2,325,568	−129.0	844,797.8	2,604,281
+2.8	18,627.0	57,422	−9.2	61,116.6	188,406	−87.2	573,934.4	1,769,283	−101.2	664,962.6	2,049,898	−115.2	755,680.3	2,329,556	−129.2	846,087.1	2,608,256
+2.6	17,296.1	53,319	−9.4	62,443.8	192,497	−87.4	575,237.0	1,773,299	−101.4	666,260.8	2,053,900	−115.4	756,974.0	2,333,544	−129.4	847,376.4	2,612,230
+2.4	15,965.3	49,217	−9.6	63,770.8	196,588	−87.6	576,539.5	1,777,314	−101.6	667,558.8	2,057,902	−115.6	758,267.7	2,337,532	−129.6	848,665.6	2,616,204
+2.2	14,634.5	45,114	−9.8	65,097.9	200,679	−87.8	577,842.0	1,781,329	−101.8	668,856.9	2,061,903	−115.8	759,561.3	2,341,520	−129.8	849,954.8	2,620,179
+2.0	13,303.8	41,012	−10.0	66,424.8	204,770	−88.0	579,144.4	1,785,344	−102.0	670,154.8	2,065,904	−116.0	760,854.8	2,345,508	−130.0	851,243.8	2,624,152
+1.8	11,973.1	36,910	−10.2	67,751.7	208,860	−88.2	580,446.7	1,789,359	−102.2	671,452.7	2,069,906	−116.2	762,148.3	2,349,495			
+1.6	10,642.5	32,808	−10.4	69,078.6	212,950	−88.4	581,749.0	1,793,373	−102.4	672,750.6	2,073,906	−116.4	763,441.7	2,353,482			
+1.4	9,312.0	28,706	−10.6	70,405.3	217,040	−88.6	583,051.2	1,797,388	−102.6	674,048.4	2,077,907	−116.6	764,735.0	2,357,469			
+1.2	7,981.5	24,605	−10.8	71,732.0	221,130	−88.8	584,353.3	1,801,402	−102.8	675,346.1	2,081,908	−116.8	766,028.3	2,361,456			
+1.0	6,651.1	20,504	−11.0	73,058.7	225,220	−89.0	585,655.4	1,805,416	−103.0	676,643.7	2,085,908	−117.0	767,321.5	2,365,443			
+.9	5,985.9	18,453	−11.2	74,385.3	229,310	−89.2	586,957.4	1,809,430	−103.2	677,941.3	2,089,908	−117.2	768,614.6	2,369,429			
+.8	5,320.8	16,402	−11.4	75,711.8	233,399	−89.4	588,259.4	1,813,443	−103.6	679,238.8	2,093,908	−117.4	769,907.7	2,373,415			
+.7	4,655.6	14,352	−11.6	77,038.2	237,488	−89.6	589,561.3	1,817,456	−103.6	680,536.3	2,097,908	−117.6	771,200.8	2,377,402			
+.6	3,990.5	12,302	−11.8	78,364.6	241,577	−89.8	590,863.1	1,821,470	−103.8	681,833.7	2,101,907	−117.8	772,493.7	2,381,387			
+.5	3,325.4	10,251	−12.0	79,691.0	245,666	−90.0	592,164.9	1,825,483	−104.0	683,131.0	2,105,906	−118.0	773,786.6	2,385,373			
+.4	2,660.3	8,201	−12.2	81,017.2	249,754	−90.2	593,466.6	1,829,496	−104.2	684,428.3	2,109,906	−118.2	775,079.4	2,389,358			
+.3	1,995.2	6,150	−12.4	82,343.5	253,842	−90.4	594,768.2	1,833,508	−104.4	685,725.5	2,113,904	−118.4	776,372.2	2,393,344			
+.2	1,330.1	4,100	−12.6	83,669.6	257,931	−90.6	596,069.8	1,837,520	−104.6	687,022.6	2,117,903	−118.6	777,664.9	2,397,329			
+.1	665.0	2,050	−12.8	84,995.7	262,018	−90.8	597,371.3	1,841,533	−104.8	688,319.7	2,121,902	−118.8	778,957.5	2,401,314			
.0	0.0	0	−13.0	86,321.7	266,106	−91.0	598,672.7	1,845,545	−105.0	689,616.7	2,125,900	−119.0	780,250.1	2,405,298			
−.1	665.0	2,050	−13.2	87,647.7	270,194	−91.2	599,974.1	1,849,556	−105.2	690,913.7	2,129,898	−119.2	781,542.6	2,409,283			
−.2	1,330.0	4,100	−13.4	88,973.6	274,281	−91.4	601,275.4	1,853,568	−105.4	692,210.6	2,133,896	−119.4	782,835.0	2,413,267			
−.3	1,995.0	6,150	−13.6	90,299.4	278,368	−91.6	602,576.7	1,857,580	−105.6	693,507.4	2,137,894	−119.6	784,127.4	2,417,251			
−.4	2,660.0	8,200	−13.8	91,625.2	282,455	−91.8	603,877.9	1,861,591	−105.8	694,804.1	2,141,892	−119.8	785,419.8	2,421,235			
−.5	3,325.0	10,250	−14.0	92,950.9	286,542	−92.0	605,179.0	1,865,602	−106.0	696,100.8	2,145,889	−120.0	786,712.0	2,425,218			
−.6	3,989.9	12,300	−14.2	94,276.5	290,629	−92.2	606,480.1	1,869,613	−106.2	697,397.5	2,149,886	−120.2	788,004.2	2,429,202			
−.7	4,654.8	14,350	−14.4	95,602.1	294,715	−92.4	607,781.1	1,873,623	−106.4	698,694.0	2,153,883	−120.4	789,296.3	2,433,185			
−.8	5,319.8	16,399	−14.6	96,927.6	298,801	−92.6	609,082.0	1,877,634	−106.6	699,990.5	2,157,880	−120.6	790,588.4	2,437,168			
−.9	5,984.6	18,449	−14.8	98,253.1	302,887	−92.8	610,382.9	1,881,644	−106.8	701,287.0	2,161,876	−120.8	791,880.4	2,441,151			
−1.0	6,649.5	20,499	−15.0	99,578.5	306,973	−93.0	611,683.7	1,885,654	−107.0	702,583.4	2,165,873	−121.0	793,172.3	2,445,134			
−1.2	7,979.2	24,598				−93.2	612,984.5	1,889,664	−107.2	703,879.7	2,169,869	−121.2	794,464.2	2,449,116			
−1.4	9,308.9	28,697				−93.4	614,285.2	1,893,674	−107.4	705,175.9	2,173,865	−121.4	795,756.0	2,453,099			
−1.6	10,638.5	32,796				−93.6	615,585.8	1,897,683	−107.6	706,472.1	2,177,861	−121.6	797,047.8	2,457,081			
−1.8	11,968.9	36,894				−93.8	616,886.4	1,901,692	−107.8	707,768.2	2,181,856	−121.8	798,339.5	2,461,063			
−2.0	13,297.5	40,993				−94.0	618,186.8	1,905,701	−108.0	709,064.3	2,185,852	−122.0	799,631.1	2,465,044			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY[1]—Continued

Zone 4

[Inner radius, 51°04′; outer radius, 72°13′]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶
+10.0	86, 171.0	265, 642	−2.0	17, 209.9	53, 053	−80.0	682, 069.3	2, 102, 634	−94.0	800, 096.3	2, 466, 478	−108.0	917, 725.2	2, 829, 096	−122.0	1, 034, 956.0	3, 190, 487
+9.8	84, 445.6	260, 323	−2.2	18, 930.4	58, 357	−80.2	683, 758.2	2, 107, 840	−94.2	801, 779.5	2, 471, 667	−108.2	919, 402.7	2, 834, 268	−122.2	1, 036, 627.8	3, 195, 641
+9.6	82, 720.3	255, 004	−2.4	20, 650.9	63, 661	−80.4	685, 447.0	2, 113, 046	−94.4	803, 462.6	2, 476, 856	−108.4	921, 080.2	2, 839, 439	−122.4	1, 038, 299.6	3, 200, 794
+9.4	80, 995.1	249, 686	−2.6	22, 371.3	68, 964	−80.6	687, 135.8	2, 118, 252	−94.6	805, 145.7	2, 482, 044	−108.6	922, 757.5	2, 844, 610	−122.6	1, 039, 971.3	3, 205, 948
+9.2	79, 269.9	244, 367	−2.8	24, 091.6	74, 268	−80.8	688, 824.4	2, 123, 458	−94.8	806, 828.6	2, 487, 233	−108.8	924, 434.8	2, 849, 780	−122.8	1, 041, 642.9	3, 211, 101
+9.0	77, 544.8	239, 050	−3.0	25, 811.8	79, 571	−81.0	690, 513.0	2, 128, 663	−95.0	808, 511.5	2, 492, 420	−109.0	926, 112.0	2, 854, 951	−123.0	1, 043, 314.4	3, 216, 254
+8.8	75, 819.8	233, 732	−3.2	27, 531.9	84, 873	−81.2	692, 201.5	2, 133, 868	−95.2	810, 194.4	2, 497, 608	−109.2	927, 789.2	2, 860, 121	−123.2	1, 044, 985.8	3, 221, 406
+8.6	74, 094.9	228, 414	−3.4	29, 252.0	90, 176	−81.4	693, 889.9	2, 139, 073	−95.4	811, 877.1	2, 502, 796	−109.4	929, 466.2	2, 865, 291	−123.4	1, 046, 657.2	3, 226, 558
+8.4	72, 370.1	223, 097	−3.6	30, 972.0	95, 478	−81.6	695, 578.2	2, 144, 278	−95.6	813, 559.7	2, 507, 983	−109.6	931, 143.2	2, 870, 460	−123.6	1, 048, 328.4	3, 231, 710
+8.2	70, 645.3	217, 780	−3.8	32, 691.9	100, 780	−81.8	697, 266.5	2, 149, 482	−95.8	815, 242.3	2, 513, 170	−109.8	932, 820.0	2, 875, 630	−123.8	1, 049, 999.6	3, 236, 862
+8.0	68, 920.6	212, 464	−4.0	34, 411.7	106, 082	−82.0	698, 954.7	2, 154, 687	−96.0	816, 924.8	2, 518, 356	−110.0	934, 496.8	2, 880, 799	−124.0	1, 051, 670.7	3, 242, 014
+7.8	67, 196.0	207, 147	−4.2	36, 131.4	111, 383	−82.2	700, 642.8	2, 159, 890	−96.2	818, 607.2	2, 523, 543	−110.2	936, 173.6	2, 885, 968	−124.2	1, 053, 341.8	3, 247, 165
+7.6	65, 471.5	201, 831	−4.4	37, 851.1	116, 684	−82.4	702, 330.8	2, 165, 094	−96.4	820, 289.5	2, 528, 729	−110.4	937, 850.2	2, 891, 136	−124.4	1, 055, 012.7	3, 252, 316
+7.4	63, 747.1	196, 515	−4.6	39, 570.6	121, 986	−82.6	704, 018.7	2, 170, 298	−96.6	821, 971.8	2, 533, 915	−110.6	939, 526.7	2, 896, 304	−124.6	1, 056, 683.6	3, 257, 467
+7.2	62, 022.7	191, 199	−4.8	41, 290.1	127, 286	−82.8	705, 706.5	2, 175, 501	−96.8	823, 653.9	2, 539, 100	−110.8	941, 203.2	2, 901, 473	−124.8	1, 058, 354.4	3, 262, 618
+7.0	60, 298.5	185, 884	−5.0	43, 009.5	132, 587	−83.0	707, 394.3	2, 180, 704	−97.0	825, 336.0	2, 544, 286	−111.0	942, 879.6	2, 906, 640	−125.0	1, 060, 025.0	3, 267, 768
+6.8	58, 574.3	180, 568	−5.2	44, 728.9	137, 887	−83.2	709, 082.0	2, 185, 906	−97.2	827, 018.0	2, 549, 471	−111.2	944, 555.9	2, 911, 808	−125.2	1, 061, 695.7	3, 272, 918
+6.6	56, 850.2	175, 254	−5.4	46, 448.1	143, 187	−83.4	710, 769.6	2, 191, 109	−97.4	828, 699.9	2, 554, 656	−111.4	946, 232.1	2, 916, 976	−125.4	1, 063, 366.2	3, 278, 068
+6.4	55, 126.1	169, 939	−5.6	48, 167.3	148, 487	−83.6	712, 457.1	2, 196, 311	−97.6	830, 381.7	2, 559, 840	−111.6	947, 908.3	2, 922, 143	−125.6	1, 065, 036.7	3, 283, 217
+6.2	53, 402.2	164, 624	−5.8	49, 886.4	153, 786	−83.8	714, 144.6	2, 201, 513	−97.8	832, 063.5	2, 565, 025	−111.8	949, 584.4	2, 927, 310	−125.8	1, 066, 707.0	3, 288, 367
+6.0	51, 678.3	159, 310	−6.0	51, 605.4	159, 085	−84.0	715, 831.9	2, 206, 714	−98.0	833, 745.2	2, 570, 209	−112.0	951, 260.3	2, 932, 476	−126.0	1, 068, 377.3	3, 293, 516
+5.8	49, 954.5	153, 996	−6.2	53, 324.3	164, 384	−84.2	717, 519.2	2, 211, 916	−98.2	835, 426.8	2, 575, 393	−112.2	952, 936.2	2, 937, 642	−126.2	1, 070, 047.6	3, 298, 665
+5.6	48, 230.8	148, 682	−6.4	55, 043.1	169, 683	−84.4	719, 206.4	2, 217, 117	−98.4	837, 108.3	2, 580, 576	−112.4	954, 612.1	2, 942, 808	−126.4	1, 071, 717.7	3, 303, 813
+5.4	46, 507.2	143, 369	−6.6	56, 761.9	174, 981	−84.6	720, 893.5	2, 222, 318	−98.6	838, 789.7	2, 585, 760	−112.6	956, 287.8	2, 947, 974	−126.6	1, 073, 387.7	3, 308, 962
+5.2	44, 783.6	138, 056	−6.8	58, 480.6	180, 280	−84.8	722, 580.5	2, 227, 519	−98.8	840, 471.0	2, 590, 943	−112.8	957, 463.5	2, 953, 140	−126.8	1, 075, 057.7	3, 314, 110
+5.0	43, 060.2	132, 743	−7.0	60, 199.2	185, 578	−85.0	724, 267.5	2, 232, 719	−99.0	842, 152.3	2, 596, 126	−113.0	959, 639.0	2, 958, 305	−127.0	1, 076, 727.6	3, 319, 257
+4.8	41, 336.8	127, 430	−7.2	61, 917.7	190, 875	−85.2	725, 954.4	2, 237, 919	−99.2	843, 833.5	2, 601, 308	−113.2	961, 314.6	2, 963, 470	−127.2	1, 078, 397.4	3, 324, 405
+4.6	39, 613.5	122, 118	−7.4	63, 636.1	196, 173	−85.4	727, 641.2	2, 243, 119	−99.4	845, 514.6	2, 606, 491	−113.4	962, 990.0	2, 968, 635	−127.4	1, 080, 067.1	3, 329, 552
+4.4	37, 890.3	116, 805	−7.6	65, 354.5	201, 470	−85.6	729, 327.9	2, 248, 319	−99.6	847, 195.6	2, 611, 673	−113.6	964, 665.3	2, 973, 800	−127.6	1, 081, 736.8	3, 334, 699
+4.2	36, 167.2	111, 494	−7.8	67, 072.8	206, 767	−85.8	731, 014.5	2, 253, 518	−99.8	848, 876.6	2, 616, 855	−113.8	966, 340.6	2, 978, 964	−127.8	1, 083, 406.4	3, 339, 846
+4.0	34, 444.1	106, 182	−8.0	68, 790.9	212, 064	−86.0	732, 701.0	2, 258, 717	−100.0	850, 557.4	2, 622, 036	−114.0	968, 015.7	2, 984, 128	−128.0	1, 085, 075.8	3, 344, 993
+3.8	32, 721.1	100, 870	−8.2	70, 509.0	217, 360	−86.2	734, 387.5	2, 263, 916	−100.2	852, 238.2	2, 627, 218	−114.2	969, 690.8	2, 989, 292	−128.2	1, 086, 745.2	3, 350, 139
+3.6	30, 998.2	95, 559	−8.4	72, 227.1	222, 656	−86.4	736, 073.9	2, 269, 115	−100.4	853, 918.9	2, 632, 399	−114.4	971, 365.8	2, 994, 456	−128.4	1, 088, 414.6	3, 355, 285
+3.4	29, 275.4	90, 248	−8.6	73, 945.0	227, 952	−86.6	737, 760.2	2, 274, 313	−100.6	855, 599.5	2, 637, 580	−114.6	973, 040.8	2, 999, 619	−128.6	1, 090, 083.8	3, 360, 431
+3.2	27, 552.7	84, 938	−8.8	75, 662.9	233, 248	−86.8	739, 446.4	2, 279, 512	−100.8	857, 280.0	2, 642, 760	−114.8	974, 715.6	3, 004, 782	−128.8	1, 091, 753.0	3, 365, 576
+3.0	25, 830.0	79, 627	−9.0	77, 380.7	238, 544	−87.0	741, 132.5	2, 284, 709	−101.0	858, 960.5	2, 647, 941	−115.0	976, 390.4	3, 009, 945	−129.0	1, 093, 422.0	3, 370, 722
+2.8	24, 107.5	74, 317	−9.2	79, 098.4	243, 839	−87.2	742, 818.6	2, 289, 907	−101.2	860, 640.9	2, 653, 121	−115.2	978, 065.0	3, 015, 108	−129.2	1, 095, 091.0	3, 375, 867
+2.6	22, 385.0	69, 007	−9.4	80, 816.0	249, 134	−87.4	744, 504.6	2, 295, 104	−101.4	862, 321.2	2, 658, 301	−115.4	979, 739.7	3, 020, 270	−129.4	1, 096, 759.9	3, 381, 012
+2.4	20, 662.6	63, 697	−9.6	82, 533.6	254, 428	−87.6	746, 190.5	2, 300, 302	−101.6	864, 001.4	2, 663, 481	−115.6	981, 414.2	3, 025, 432	−129.6	1, 098, 428.8	3, 386, 156
+2.2	18, 940.2	58, 388	−9.8	84, 251.0	259, 723	−87.8	747, 876.3	2, 305, 498	−101.8	865, 681.5	2, 668, 660	−115.8	983, 088.6	3, 030, 594	−129.8	1, 100, 097.5	3, 391, 300
+2.0	17, 218.0	53, 078	−10.0	85, 968.4	265, 017	−88.0	749, 562.0	2, 310, 695	−102.0	867, 361.6	2, 673, 839	−116.0	984, 763.0	3, 035, 756	−130.0	1, 101, 766.2	3, 396, 444
+1.8	15, 495.8	47, 769	−10.2	87, 685.7	270, 311	−88.2	751, 247.7	2, 315, 892	−102.2	869, 041.5	2, 679, 018	−116.2	986, 437.3	3, 040, 917			
+1.6	13, 773.8	42, 461	−10.4	89, 402.9	275, 605	−88.4	752, 933.2	2, 321, 088	−102.4	870, 721.4	2, 684, 197	−116.4	988, 111.5	3, 046, 078			
+1.4	12, 051.8	37, 152	−10.6	91, 120.1	280, 898	−88.6	754, 618.7	2, 326, 284	−102.6	872, 401.2	2, 689, 375	−116.6	989, 785.6	3, 051, 239			
+1.2	10, 329.8	31, 844	−10.8	92, 837.1	286, 192	−88.8	756, 304.1	2, 331, 479	−102.8	874, 080.9	2, 694, 553	−116.8	991, 459.6	3, 056, 400			
+1.0	8, 608.0	26, 536	−11.0	94, 554.1	291, 484	−89.0	757, 989.5	2, 336, 675	−103.0	875, 760.6	2, 699, 731	−117.0	993, 133.6	3, 061, 560			
+.9	7, 747.1	23, 882	−11.2	96, 271.0	296, 777	−89.2	759, 674.7	2, 341, 870	−103.2	877, 440.1	2, 704, 908	−117.2	994, 807.4	3, 066, 720			
+.8	6, 886.2	21, 228	−11.4	97, 987.8	302, 070	−89.4	761, 359.9	2, 347, 065	−103.4	879, 119.6	2, 710, 086	−117.4	996, 481.2	3, 071, 880			
+.7	6, 025.4	18, 575	−11.6	99, 704.6	307, 362	−89.6	763, 045.0	2, 352, 259	−103.6	880, 799.0	2, 715, 263	−117.6	998, 154.9	3, 077, 039			
+.6	5, 164.6	15, 921	−11.8	101, 421.2	312, 654	−89.8	764, 730.0	2, 357, 454	−103.8	882, 478.3	2, 720, 440	−117.8	999, 828.6	3, 082, 199			
+.5	4, 303.7	13, 267	−12.0	103, 137.8	317, 946	−90.0	766, 414.9	2, 362, 648	−104.0	884, 157.6	2, 725, 616	−118.0	1, 001, 502.1	3, 087, 358			
+.4	3, 443.0	10, 614	−12.2	104, 854.3	323, 237	−90.2	768, 099.7	2, 367, 842	−104.2	885, 836.7	2, 730, 793	−118.2	1, 003, 175.6	3, 092, 516			
+.3	2, 582.2	7, 960	−12.4	106, 570.7	328, 528	−90.4	769, 784.5	2, 373, 036	−104.4	887, 515.8	2, 735, 969	−118.4	1, 004, 849.0	3, 097, 675			
+.2	1, 721.4	5, 307	−12.6	108, 287.0	333, 819	−90.6	771, 469.2	2, 378, 229	−104.6	889, 194.8	2, 741, 145	−118.6	1, 006, 522.3	3, 102, 834			
+.1	860.7	2, 653	−12.8	110, 003.2	339, 110	−90.8	773, 153.8	2, 383, 422	−104.8	890, 873.7	2, 746, 320	−118.8	1, 008, 195.5	3, 107, 992			
.0	0.0	0	−13.0	111, 719.4	344, 400	−91.0	774, 838.3	2, 388, 615	−105.0	892, 552.5	2, 751, 496	−119.0	1, 009, 868.6	3, 113, 149			
−.1	860.7	2, 653	−13.2	113, 435.5	349, 691	−91.2	776, 522.7	2, 393, 808	−105.2	894, 231.3	2, 756, 671	−119.2	1, 011, 541.7	3, 118, 307			
−.2	1, 721.4	5, 306	−13.4	115, 151.5	354, 981	−91.4	778, 207.1	2, 399, 000	−105.4	895, 909.9	2, 761, 846	−119.4	1, 013, 214.7	3, 123, 464			
−.3	2, 582.0	7, 960	−13.6	116, 867.4	360, 270	−91.6	779, 891.3	2, 404, 192	−105.6	897, 588.5	2, 767, 020	−119.6	1, 014, 887.6	3, 128, 621			
−.4	3, 442.6	10, 613	−13.8	118, 583.3	365, 560	−91.8	781, 575.5	2, 409, 384	−105.8	899, 267.0	2, 772, 195	−119.8	1, 016, 560.4	3, 133, 778			
−.5	4, 303.2	13, 266	−14.0	120, 299.0	370, 849	−92.0	783, 259.6	2, 414, 576	−106.0	900, 945.4	2, 777, 369	−120.0	1, 018, 233.1	3, 138, 935			
−.6	5, 163.8	15, 919	−14.2	122, 014.7	376, 138	−92.2	784, 943.7	2, 419, 767	−106.2	902, 623.8	2, 782, 543	−120.2	1, 019, 905.8	3, 144, 091			
−.7	6, 024.4	18, 572	−14.4	123, 730.3	381, 427	−92.4	786, 627.6	2, 424, 958	−106.4	904, 302.0	2, 787, 716	−120.4	1, 021, 578.3	3, 149, 247			
−.8	6, 884.9	21, 224	−14.6	125, 445.8	386, 715	−92.6	788, 311.5	2, 430, 149	−106.6	905, 980.2	2, 792, 890	−120.6	1, 023, 250.8	3, 154, 403			
−.9	7, 745.5	23, 877	−14.8	127, 161.2	392, 003	−92.8	789, 995.3	2, 435, 340	−106.8	907, 658.3	2, 798, 063	−120.8	1, 024, 923.2	3, 159, 559			
−1.0	8, 606.0	26, 530	−15.0	128, 876.6	397, 291	−93.0	791, 679.0	2, 440, 530	−107.0	909, 336.3	2, 803, 236	−121.0	1, 026, 595.6	3, 164, 714			
−1.2	10, 326.9	31, 835				−93.2	793, 362.6	2, 445, 720	−107.2	911, 014.3	2, 808, 408	−121.2	1, 028, 267.8	3, 169, 869			
−1.4	12, 047.8	37, 140				−93.4	795, 046.1	2, 450, 910	−107.4	912, 692.1	2, 813, 581	−121.4	1, 029, 940.0	3, 175, 024			
−1.6	13, 768.6	42, 445				−93.6	796, 729.6	2, 456, 100	−107.6	914, 369.9	2, 818, 753	−121.6	1, 031, 612.1	3, 180, 178			
−1.8	15, 489.3	47, 749				−93.8	793, 413.0	2, 461, 289	−107.8	916, 047.6	2, 823, 925	−121.8	1, 033, 284.1	3, 185, 333			
−2.0	17, 209.9	53, 053				−94.0	800, 096.3	2, 466, 478	−108.0	917, 725.2	2, 829, 096	−122.0	1, 034, 956.0	3, 190, 487			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY[1]—Continued

Zone 3

[Inner radius, 72°13′; outer radius, 105°48′]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶
+10.0	113,388.4	349,545	−2.0	22,645.7	69,810	−80.0	897,512.9	2,766,757	−94.0	1,052,825.5	3,245,574	−108.0	1,207,616.7	3,722,753	−122.0	1,361,886.6	4,198,325
+9.8	111,118.0	342,546	−2.2	24,909.6	76,790	−80.2	899,735.3	2,773,638	−94.2	1,055,040.5	3,252,402	−108.2	1,209,824.3	3,729,558	−122.2	1,364,086.7	4,205,107
+9.6	108,847.7	335,548	−2.4	27,173.5	83,768	−80.4	901,957.6	2,780,489	−94.4	1,057,255.4	3,259,230	−108.4	1,212,031.7	3,736,363	−122.4	1,366,286.7	4,211,889
+9.4	106,577.5	328,549	−2.6	29,437.3	90,747	−80.6	904,179.8	2,787,340	−94.6	1,059,470.1	3,266,057	−108.6	1,214,239.0	3,743,168	−122.6	1,368,486.6	4,218,671
+9.2	104,307.5	321,551	−2.8	31,701.0	97,725	−80.8	906,401.9	2,794,190	−94.8	1,061,684.8	3,272,884	−108.8	1,216,446.2	3,749,972	−122.8	1,370,686.3	4,225,452
+9.0	102,037.5	314,554	−3.0	33,964.5	104,703	−81.0	908,623.9	2,801,040	−95.0	1,063,899.3	3,279,711	−109.0	1,218,653.3	3,756,776	−123.0	1,372,886.0	4,232,233
+8.8	99,767.7	307,556	−3.2	36,228.0	111,681	−81.2	910,845.8	2,807,889	−95.2	1,066,113.8	3,286,538	−109.2	1,220,860.3	3,763,579	−123.2	1,375,085.5	4,239,014
+8.6	97,497.9	300,560	−3.4	38,491.3	118,658	−81.4	913,067.6	2,814,738	−95.4	1,068,328.1	3,293,364	−109.4	1,223,067.2	3,770,382	−123.4	1,377,285.0	4,245,794
+8.4	95,228.3	293,563	−3.6	40,754.5	125,635	−81.6	915,289.3	2,821,587	−95.6	1,070,542.3	3,300,190	−109.6	1,225,274.0	3,777,185	−123.6	1,379,484.3	4,252,574
+8.2	92,958.8	286,566	−3.8	43,017.7	132,612	−81.8	917,510.9	2,828,436	−95.8	1,072,756.5	3,307,016	−109.8	1,227,480.6	3,783,988	−123.8	1,381,683.6	4,259,353
+8.0	90,689.3	279,570	−4.0	45,280.7	139,588	−82.0	919,732.3	2,835,284	−96.0	1,074,970.5	3,313,841	−110.0	1,229,687.2	3,790,790	−124.0	1,383,882.7	4,266,133
+7.8	88,420.0	272,575	−4.2	47,543.6	146,564	−82.2	921,953.7	2,842,132	−96.2	1,077,184.4	3,320,666	−110.2	1,231,893.7	3,797,592	−124.2	1,386,081.7	4,272,912
+7.6	86,150.8	265,580	−4.4	49,806.4	153,540	−82.4	924,175.0	2,848,979	−96.4	1,079,398.2	3,327,490	−110.4	1,234,100.0	3,804,394	−124.4	1,388,280.6	4,279,690
+7.4	83,881.7	258,584	−4.6	52,069.1	160,515	−82.6	926,396.1	2,855,826	−96.6	1,081,611.9	3,334,314	−110.6	1,236,306.3	3,811,195	−124.6	1,390,479.4	4,286,469
+7.2	81,612.7	251,590	−4.8	54,331.7	167,490	−82.8	928,617.2	2,862,673	−96.8	1,083,825.5	3,341,138	−110.8	1,238,512.4	3,817,996	−124.8	1,392,678.1	4,293,247
+7.0	79,343.8	244,595	−5.0	56,594.2	174,464	−83.0	930,838.1	2,869,520	−97.0	1,086,039.0	3,347,962	−111.0	1,240,718.4	3,824,796	−125.0	1,394,876.7	4,300,024
+6.8	77,075.1	237,601	−5.2	58,856.6	181,439	−83.2	933,058.9	2,876,366	−97.2	1,088,252.4	3,354,785	−111.2	1,242,924.4	3,831,597	−125.2	1,397,075.2	4,306,802
+6.6	74,806.4	230,608	−5.4	61,118.8	188,413	−83.4	935,279.6	2,883,212	−97.4	1,090,465.6	3,361,608	−111.4	1,245,130.2	3,838,397	−125.4	1,399,273.6	4,313,578
+6.4	72,537.8	223,614	−5.6	63,381.0	195,386	−83.6	937,500.2	2,890,057	−97.6	1,092,678.8	3,368,430	−111.6	1,247,335.9	3,845,196	−125.6	1,401,471.8	4,320,355
+6.2	70,269.4	216,621	−5.8	65,643.1	202,360	−83.8	939,720.8	2,896,903	−97.8	1,094,891.8	3,375,253	−111.8	1,249,541.5	3,851,996	−125.8	1,403,670.0	4,327,132
+6.0	68,001.0	209,629	−6.0	67,905.0	209,333	−84.0	941,941.2	2,903,748	−98.0	1,097,104.8	3,382,075	−112.0	1,251,747.0	3,858,794	−126.0	1,405,868.1	4,333,908
+5.8	65,732.8	202,636	−6.2	70,166.9	216,305	−84.2	944,161.4	2,910,592	−98.2	1,099,317.6	3,388,896	−112.2	1,253,952.4	3,865,593	−126.2	1,408,066.0	4,340,683
+5.6	63,464.6	195,644	−6.4	72,428.6	223,278	−84.4	946,381.6	2,917,436	−98.4	1,101,530.4	3,395,718	−112.4	1,256,157.7	3,872,392	−126.4	1,410,263.9	4,347,459
+5.4	61,196.6	188,652	−6.6	74,690.2	230,250	−84.6	948,601.7	2,924,280	−98.6	1,103,743.0	3,402,538	−112.6	1,258,362.9	3,879,190	−126.6	1,412,461.6	4,354,234
+5.2	58,928.7	181,661	−6.8	76,951.8	237,221	−84.8	950,821.7	2,931,124	−98.8	1,105,955.5	3,409,359	−112.8	1,260,568.0	3,885,987	−126.8	1,414,659.2	4,361,008
+5.0	56,660.8	174,670	−7.0	79,213.2	244,193	−85.0	953,041.6	2,937,967	−99.0	1,108,168.0	3,416,179	−113.0	1,262,773.0	3,892,784	−127.0	1,416,856.8	4,367,783
+4.8	54,393.1	167,679	−7.2	81,474.5	251,164	−85.2	955,261.3	2,944,810	−99.2	1,110,380.3	3,422,999	−113.2	1,264,977.8	3,899,582	−127.2	1,419,054.2	4,374,557
+4.6	52,125.5	160,689	−7.4	83,735.7	258,134	−85.4	957,481.0	2,951,653	−99.4	1,112,592.5	3,429,819	−113.4	1,267,182.6	3,906,378	−127.4	1,421,251.5	4,381,331
+4.4	49,858.0	153,699	−7.6	85,996.8	265,105	−85.6	959,700.5	2,958,495	−99.6	1,114,804.6	3,436,638	−113.6	1,269,387.2	3,913,174	−127.6	1,423,448.7	4,388,104
+4.2	47,590.6	146,709	−7.8	88,257.8	272,075	−85.8	961,920.0	2,965,337	−99.8	1,117,016.6	3,443,457	−113.8	1,271,591.8	3,919,970	−127.8	1,425,645.8	4,394,877
+4.0	45,323.3	139,720	−8.0	90,518.7	279,044	−86.0	964,139.3	2,972,178	−100.0	1,119,228.5	3,450,276	−114.0	1,273,796.2	3,926,766	−128.0	1,427,842.8	4,401,650
+3.8	43,056.2	132,730	−8.2	92,779.5	286,014	−86.2	966,358.6	2,979,020	−100.2	1,121,440.2	3,457,094	−114.2	1,276,000.6	3,933,562	−128.2	1,430,039.7	4,408,422
+3.6	40,789.1	125,742	−8.4	95,040.2	292,983	−86.4	968,577.7	2,985,861	−100.4	1,123,651.9	3,463,912	−114.4	1,278,204.8	3,940,357	−128.4	1,432,236.5	4,415,194
+3.4	38,522.1	118,753	−8.6	97,300.7	299,952	−86.6	970,796.7	2,992,701	−100.6	1,125,863.5	3,470,730	−114.6	1,280,408.9	3,947,151	−128.6	1,434,433.2	4,421,966
+3.2	36,255.2	111,765	−8.8	99,561.2	306,920	−86.8	973,015.6	2,999,542	−100.8	1,128,075.0	3,477,547	−114.8	1,282,612.9	3,953,946	−128.8	1,436,629.7	4,428,738
+3.0	33,988.5	104,777	−9.0	101,821.5	313,888	−87.0	975,234.4	3,006,382	−101.0	1,130,286.3	3,484,364	−115.0	1,284,816.8	3,960,740	−129.0	1,438,826.2	4,435,509
+2.8	31,721.8	97,790	−9.2	104,081.8	320,856	−87.2	977,453.1	3,013,221	−101.2	1,132,497.6	3,491,181	−115.2	1,287,020.6	3,967,534	−129.2	1,441,022.6	4,442,279
+2.6	29,455.3	90,803	−9.4	106,341.9	327,823	−87.4	979,671.7	3,020,060	−101.4	1,134,708.7	3,497,997	−115.4	1,289,224.3	3,974,327	−129.4	1,443,218.8	4,449,050
+2.4	27,188.9	83,816	−9.6	108,602.0	334,790	−87.6	981,890.2	3,026,900	−101.6	1,136,919.7	3,504,813	−115.6	1,291,427.9	3,981,120	−129.6	1,445,415.0	4,455,820
+2.2	24,922.6	76,829	−9.8	110,861.9	341,757	−87.8	984,108.6	3,033,738	−101.8	1,139,130.7	3,511,629	−115.8	1,293,631.4	3,987,913	−129.8	1,447,611.0	4,462,590
+2.0	22,656.3	69,843	−10.0	113,121.7	348,723	−88.0	986,326.8	3,040,576	−102.0	1,141,341.5	3,518,444	−116.0	1,295,834.8	3,994,705	−130.0	1,449,806.9	4,469,359
+1.8	20,390.2	62,858	−10.2	115,381.4	355,690	−88.2	988,545.0	3,047,414	−102.2	1,143,552.2	3,525,259	−116.2	1,298,038.1	4,001,497			
+1.6	18,124.2	55,872	−10.4	117,641.0	362,655	−88.4	990,763.1	3,054,252	−102.4	1,145,762.8	3,532,074	−116.4	1,300,241.2	4,008,289			
+1.4	15,858.3	48,887	−10.6	119,900.5	369,621	−88.6	992,981.0	3,061,090	−102.6	1,147,973.3	3,538,888	−116.6	1,302,444.3	4,015,080			
+1.2	13,592.5	41,902	−10.8	122,159.9	376,586	−88.8	995,198.9	3,067,927	−102.8	1,150,183.7	3,545,703	−116.8	1,304,647.2	4,021,871			
+1.0	11,326.8	34,918	−11.0	124,419.2	383,550	−89.0	997,416.6	3,074,763	−103.0	1,152,394.0	3,552,516	−117.0	1,306,850.1	4,028,662			
+.9	10,194.0	31,425	−11.2	126,678.4	390,515	−89.2	999,634.2	3,081,600	−103.2	1,154,604.2	3,559,330	−117.2	1,309,052.8	4,035,453			
+.8	9,061.3	27,933	−11.4	128,937.5	397,479	−89.4	1,001,851.8	3,088,436	−103.4	1,156,814.3	3,566,143	−117.4	1,311,255.4	4,042,243			
+.7	7,928.5	24,441	−11.6	131,196.4	404,443	−89.6	1,004,069.2	3,095,271	−103.6	1,159,024.2	3,572,956	−117.6	1,313,458.0	4,049,032			
+.6	6,795.8	20,950	−11.8	133,455.3	411,406	−89.8	1,006,286.5	3,102,107	−103.8	1,161,234.1	3,579,768	−117.8	1,315,660.4	4,055,822			
+.5	5,663.1	17,458	−12.0	135,714.0	418,369	−90.0	1,008,503.7	3,108,942	−104.0	1,163,443.9	3,586,580	−118.0	1,317,862.7	4,062,611			
+.4	4,530.4	13,966	−12.2	137,972.7	425,332	−90.2	1,010,720.8	3,115,776	−104.2	1,165,653.5	3,593,392	−118.2	1,320,064.9	4,069,400			
+.3	3,397.8	10,474	−12.4	140,231.2	432,295	−90.4	1,012,937.8	3,122,611	−104.4	1,167,863.1	3,600,203	−118.4	1,322,267.0	4,076,188			
+.2	2,265.2	6,983	−12.6	142,489.7	439,257	−90.6	1,015,154.7	3,129,445	−104.6	1,170,072.5	3,607,014	−118.6	1,324,469.0	4,082,976			
+.1	1,132.6	3,491	−12.8	144,748.0	446,219	−90.8	1,017,371.5	3,136,279	−104.8	1,172,281.8	3,613,825	−118.8	1,326,670.9	4,089,764			
.0	0.0	0	−13.0	147,006.2	453,180	−91.0	1,019,588.2	3,143,112	−105.0	1,174,491.1	3,620,636	−119.0	1,328,872.7	4,096,552			
−.1	1,132.5	3,491	−13.2	149,264.4	460,141	−91.2	1,021,804.7	3,149,945	−105.2	1,176,700.2	3,627,446	−119.2	1,331,074.4	4,103,339			
−.2	2,265.0	6,982	−13.4	151,522.4	467,102	−91.4	1,024,021.2	3,156,778	−105.4	1,178,909.2	3,634,255	−119.4	1,333,275.9	4,110,126			
−.3	3,397.5	10,474	−13.6	153,780.3	474,063	−91.6	1,026,237.6	3,163,610	−105.6	1,181,118.1	3,641,065	−119.6	1,335,477.4	4,116,912			
−.4	4,530.0	13,965	−13.8	156,038.0	481,023	−91.8	1,028,453.8	3,170,442	−105.8	1,183,326.9	3,647,874	−119.8	1,337,678.8	4,123,698			
−.5	5,662.4	17,456	−14.0	158,295.7	487,983	−92.0	1,030,669.9	3,177,274	−106.0	1,185,535.6	3,654,683	−120.0	1,339,880.0	4,130,484			
−.6	6,794.8	20,947	−14.2	160,553.3	494,942	−92.2	1,032,886.0	3,184,106	−106.2	1,187,744.2	3,661,491	−120.2	1,342,081.1	4,137,270			
−.7	7,927.2	24,437	−14.4	162,810.8	501,901	−92.4	1,035,101.9	3,190,937	−106.4	1,189,952.7	3,668,300	−120.4	1,344,282.2	4,144,055			
−.8	9,059.6	27,928	−14.6	165,068.2	508,860	−92.6	1,037,317.7	3,197,768	−106.6	1,192,161.1	3,675,107	−120.6	1,346,483.1	4,150,840			
−.9	10,191.9	31,419	−14.8	167,325.4	515,819	−92.8	1,039,533.5	3,204,598	−106.8	1,194,369.3	3,681,915	−120.8	1,348,683.9	4,157,625			
−1.0	11,324.2	34,909	−15.0	169,582.6	522,777	−93.0	1,041,749.1	3,211,428	−107.0	1,196,577.5	3,688,722	−121.0	1,350,884.6	4,164,409			
−1.2	13,588.7	41,890				−93.2	1,043,964.6	3,218,258	−107.2	1,198,785.6	3,695,529	−121.2	1,353,085.3	4,171,193			
−1.4	15,853.1	48,871				−93.4	1,046,180.0	3,225,087	−107.4	1,200,993.5	3,702,335	−121.4	1,355,285.8	4,177,976			
−1.6	18,117.4	55,851				−93.6	1,048,395.3	3,231,916	−107.6	1,203,201.4	3,709,142	−121.6	1,357,486.2	4,184,759			
−1.8	20,381.6	62,831				−93.8	1,050,610.5	3,238,745	−107.8	1,205,409.1	3,715,947	−121.8	1,359,686.5	4,191,542			
−2.0	22,645.7	69,810				−94.0	1,052,825.5	3,245,574	−108.0	1,207,616.7	3,722,753	−122.0	1,361,886.6	4,198,325			

[1] See explanation on pp. 3 and 15.

TABLE 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 2

[Inner radius, 105°48′; outer radius, 150°56′]

h	H	Δxg	h	H	Δxg	h	H	Δxg	h	H	Δxg	h	H	Δxg	h	H	Δxg
km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶	km	cm	gals×10⁶
+10.0	92,780.5	286,017	−2.0	18,529.9	57,123	−80.0	734,397.9	2,263,948	−94.0	861,485.6	2,655,725	−108.0	988,147.6	3,046,189	−122.0	1,114,384.0	3,435,342
+9.8	90,922.8	280,290	−2.2	20,382.4	62,834	−80.2	736,216.4	2,269,554	−94.2	863,298.1	2,661,312	−108.2	989,953.9	3,051,758	−122.2	1,116,184.2	3,440,891
+9.6	89,065.1	274,563	−2.4	22,234.8	68,544	−80.4	738,034.8	2,275,160	−94.4	865,110.4	2,666,899	−108.4	991,760.2	3,057,326	−122.4	1,117,984.4	3,446,441
+9.4	87,207.5	268,837	−2.6	24,087.2	74,254	−80.6	739,853.2	2,280,766	−94.6	866,922.7	2,672,486	−108.6	993,566.4	3,062,894	−122.6	1,119,784.6	3,451,990
+9.2	85,350.0	263,111	−2.8	25,939.4	79,964	−80.8	741,671.5	2,286,371	−94.8	868,734.9	2,678,073	−108.8	995,372.5	3,068,462	−122.8	1,121,584.6	3,457,539
+9.0	83,492.6	257,385	−3.0	27,791.6	85,674	−81.0	743,489.7	2,291,976	−95.0	870,547.0	2,683,659	−109.0	997,178.6	3,074,029	−123.0	1,123,384.6	3,463,088
+8.8	81,635.3	251,659	−3.2	29,643.7	91,383	−81.2	745,307.8	2,297,580	−95.2	872,359.0	2,689,245	−109.2	998,984.5	3,079,597	−123.2	1,125,184.4	3,468,636
+8.6	79,778.1	245,934	−3.4	31,495.7	97,092	−81.4	747,125.8	2,303,185	−95.4	874,171.0	2,694,830	−109.4	1,000,790.3	3,085,164	−123.4	1,126,984.2	3,474,185
+8.4	77,921.0	240,209	−3.6	33,347.6	102,802	−81.6	748,943.7	2,308,789	−95.6	875,982.8	2,700,416	−109.6	1,002,596.1	3,090,730	−123.6	1,128,783.9	3,479,733
+8.2	76,063.9	234,484	−3.8	35,199.4	108,510	−81.8	750,761.6	2,314,393	−95.8	877,794.6	2,706,001	−109.8	1,004,401.8	3,096,297	−123.8	1,130,583.5	3,485,280
+8.0	74,207.0	228,760	−4.0	37,051.1	114,218	−82.0	752,579.3	2,319,997	−96.0	879,606.2	2,711,586	−110.0	1,006,207.4	3,101,863	−124.0	1,132,383.0	3,490,828
+7.8	72,350.1	223,036	−4.2	38,902.8	119,927	−82.2	754,397.0	2,325,600	−96.2	881,417.8	2,717,171	−110.2	1,008,012.9	3,107,429	−124.2	1,134,182.4	3,496,375
+7.6	70,493.3	217,312	−4.4	40,754.3	125,634	−82.4	756,214.6	2,331,203	−96.4	883,229.3	2,722,755	−110.4	1,009,818.3	3,112,994	−124.4	1,135,981.8	3,501,922
+7.4	68,636.6	211,588	−4.6	42,605.8	131,342	−82.6	758,032.1	2,336,806	−96.6	885,040.7	2,728,339	−110.6	1,011,623.6	3,118,560	−124.6	1,137,781.0	3,507,468
+7.2	66,780.0	205,864	−4.8	44,457.1	137,049	−82.8	759,849.5	2,342,409	−96.8	886,852.0	2,733,923	−110.8	1,013,428.9	3,124,125	−124.8	1,139,580.2	3,513,015
+7.0	64,923.4	200,141	−5.0	46,308.4	142,756	−83.0	761,666.8	2,348,011	−97.0	888,663.3	2,739,506	−111.0	1,015,234.0	3,129,690	−125.0	1,141,379.3	3,518,561
+6.8	63,067.0	194,418	−5.2	48,159.6	148,463	−83.2	763,484.0	2,353,613	−97.2	890,474.4	2,745,090	−111.2	1,017,039.1	3,135,254	−125.2	1,143,178.3	3,524,107
+6.6	61,210.7	188,696	−5.4	50,010.8	154,170	−83.4	765,301.2	2,359,215	−97.4	892,285.5	2,750,673	−111.4	1,018,844.1	3,140,818	−125.4	1,144,977.2	3,529,652
+6.4	59,354.4	182,973	−5.6	51,861.8	159,876	−83.6	767,118.2	2,364,816	−97.6	894,096.5	2,756,256	−111.6	1,020,649.0	3,146,382	−125.6	1,146,776.0	3,535,197
+6.2	57,498.2	177,251	−5.8	53,712.7	165,582	−83.8	768,935.2	2,370,418	−97.8	895,907.4	2,761,838	−111.8	1,022,453.8	3,151,946	−125.8	1,148,574.7	3,540,742
+6.0	55,642.1	171,530	−6.0	55,563.6	171,287	−84.0	770,752.1	2,376,018	−98.0	897,718.2	2,767,420	−112.0	1,024,258.5	3,157,510	−126.0	1,150,373.4	3,546,287
+5.8	53,786.1	165,808	−6.2	57,414.4	176,993	−84.2	772,568.9	2,381,619	−98.2	899,528.9	2,773,002	−112.2	1,026,063.1	3,163,073	−126.2	1,152,171.9	3,551,832
+5.6	51,930.2	160,087	−6.4	59,265.0	182,698	−84.4	774,385.6	2,387,220	−98.4	901,339.5	2,778,584	−112.4	1,027,867.7	3,168,636	−126.4	1,153,970.4	3,557,376
+5.4	50,074.4	154,366	−6.6	61,115.6	188,403	−84.6	776,202.2	2,392,820	−98.6	903,150.1	2,784,165	−112.6	1,029,672.2	3,174,198	−126.6	1,155,768.8	3,562,920
+5.2	48,218.6	148,645	−6.8	62,966.1	194,107	−84.8	778,018.8	2,398,420	−98.8	904,960.5	2,789,746	−112.8	1,031,476.5	3,179,761	−126.8	1,157,567.1	3,568,464
+5.0	46,363.0	142,924	−7.0	64,816.5	199,812	−85.0	779,835.2	2,404,019	−99.0	906,770.9	2,795,327	−113.0	1,033,280.8	3,185,323	−127.0	1,159,365.3	3,574,007
+4.8	44,507.4	137,204	−7.2	66,666.9	205,516	−85.2	781,651.6	2,409,619	−99.2	908,581.2	2,800,908	−113.2	1,035,085.0	3,190,885	−127.2	1,161,163.4	3,579,550
+4.6	42,651.9	131,484	−7.4	68,517.1	211,220	−85.4	783,467.9	2,415,218	−99.4	910,391.4	2,806,488	−113.4	1,036,889.1	3,196,446	−127.4	1,162,961.5	3,585,093
+4.4	40,796.5	125,765	−7.6	70,367.3	216,923	−85.6	785,284.1	2,420,817	−99.6	912,201.5	2,812,068	−113.6	1,038,693.2	3,202,008	−127.6	1,164,759.4	3,590,636
+4.2	38,941.2	120,045	−7.8	72,217.3	222,626	−85.8	787,100.2	2,426,415	−99.8	914,011.5	2,817,648	−113.8	1,040,497.1	3,207,569	−127.8	1,166,557.3	3,596,178
+4.0	37,086.0	114,326	−8.0	74,067.3	228,329	−86.0	788,916.2	2,432,013	−100.0	915,821.4	2,823,228	−114.0	1,042,301.0	3,213,129	−128.0	1,168,355.1	3,601,720
+3.8	35,230.9	108,607	−8.2	75,917.2	234,032	−86.2	790,732.1	2,437,611	−100.2	917,631.3	2,828,807	−114.2	1,044,104.7	3,218,690	−128.2	1,170,152.8	3,607,262
+3.6	33,375.8	102,889	−8.4	77,767.0	239,734	−86.4	792,548.0	2,443,209	−100.4	919,441.0	2,834,386	−114.4	1,045,908.4	3,224,250	−128.4	1,171,950.4	3,612,803
+3.4	31,520.9	97,170	−8.6	79,616.7	245,437	−86.6	794,363.7	2,448,807	−100.6	921,250.7	2,839,965	−114.6	1,047,712.0	3,229,810	−128.6	1,173,747.9	3,618,344
+3.2	29,666.0	91,452	−8.8	81,466.4	251,139	−86.8	796,179.4	2,454,404	−100.8	923,060.3	2,845,543	−114.8	1,049,515.5	3,235,370	−128.8	1,175,545.3	3,623,886
+3.0	27,811.2	85,734	−9.0	83,315.9	256,840	−87.0	797,995.0	2,460,001	−101.0	924,869.8	2,851,121	−115.0	1,051,318.9	3,240,929	−129.0	1,177,342.6	3,629,426
+2.8	25,956.5	80,017	−9.2	85,165.4	262,542	−87.2	799,810.5	2,465,598	−101.2	926,679.2	2,856,699	−115.2	1,053,122.2	3,246,488	−129.2	1,179,139.9	3,634,967
+2.6	24,101.9	74,300	−9.4	87,014.8	268,243	−87.4	801,625.9	2,471,194	−101.4	928,488.5	2,862,277	−115.4	1,054,925.5	3,252,047	−129.4	1,180,937.1	3,640,507
+2.4	22,247.4	68,583	−9.6	88,864.0	273,944	−87.6	803,441.2	2,476,790	−101.6	930,297.8	2,867,854	−115.6	1,056,728.7	3,257,606	−129.6	1,182,734.2	3,646,047
+2.2	20,393.0	62,866	−9.8	90,713.2	279,644	−87.8	805,256.4	2,482,386	−101.8	932,106.9	2,873,431	−115.8	1,058,531.7	3,263,164	−129.8	1,184,531.2	3,651,586
+2.0	18,538.6	57,150	−10.0	92,562.3	285,344	−88.0	807,071.6	2,487,982	−102.0	933,916.0	2,879,008	−116.0	1,060,334.7	3,268,723	−130.0	1,186,328.1	3,657,126
+1.8	16,684.4	51,433	−10.2	94,411.4	291,044	−88.2	808,886.6	2,493,577	−102.2	935,725.0	2,884,585	−116.2	1,062,137.6	3,274,280			
+1.6	14,830.2	45,718	−10.4	96,260.3	296,744	−88.4	810,701.6	2,499,172	−102.4	937,533.8	2,890,161	−116.4	1,063,940.4	3,279,838			
+1.4	12,976.1	40,002	−10.6	98,109.1	302,444	−88.6	812,516.5	2,504,767	−102.6	939,342.7	2,895,737	−116.6	1,065,743.2	3,285,395			
+1.2	11,122.1	34,286	−10.8	99,957.9	308,143	−88.8	814,331.3	2,510,361	−102.8	941,151.4	2,901,313	−116.8	1,067,545.8	3,290,952			
+1.0	9,268.2	28,571	−11.0	101,806.6	313,842	−89.0	816,146.0	2,515,956	−103.0	942,960.0	2,906,888	−117.0	1,069,348.4	3,296,509			
+.9	8,341.3	25,714	−11.2	103,655.2	319,541	−89.2	817,960.7	2,521,550	−103.2	944,768.6	2,912,464	−117.2	1,071,150.8	3,302,066			
+.8	7,414.4	22,857	−11.4	105,503.6	325,239	−89.4	819,775.2	2,527,143	−103.4	946,577.0	2,918,039	−117.4	1,072,953.2	3,307,622			
+.7	6,487.5	19,999	−11.6	107,352.1	330,937	−89.6	821,589.6	2,532,737	−103.6	948,385.4	2,923,613	−117.6	1,074,755.5	3,313,178			
+.6	5,560.7	17,142	−11.8	109,200.4	336,635	−89.8	823,404.0	2,538,330	−103.8	950,193.7	2,929,188	−117.8	1,076,557.7	3,318,734			
+.5	4,633.8	14,285	−12.0	111,048.6	342,333	−90.0	825,218.3	2,543,923	−104.0	952,001.9	2,934,762	−118.0	1,078,359.8	3,324,289			
+.4	3,707.0	11,428	−12.2	112,896.8	348,030	−90.2	827,032.5	2,549,516	−104.2	953,810.0	2,940,336	−118.2	1,080,161.8	3,329,844			
+.3	2,780.2	8,571	−12.4	114,744.8	353,727	−90.4	828,846.6	2,555,108	−104.4	955,618.0	2,945,910	−118.4	1,081,963.8	3,335,399			
+.2	1,853.5	5,714	−12.6	116,592.8	359,424	−90.6	830,660.6	2,560,700	−104.6	957,425.9	2,951,483	−118.6	1,083,765.6	3,340,954			
+.1	926.7	2,857	−12.8	118,440.7	365,120	−90.8	832,474.5	2,566,292	−104.8	959,233.8	2,957,056	−118.8	1,085,567.4	3,346,508			
.0	0.0	0	−13.0	120,288.5	370,817	−91.0	834,288.4	2,571,883	−105.0	961,041.5	2,962,629	−119.0	1,087,369.1	3,352,062			
−.1	926.7	2,857	−13.2	122,136.2	376,513	−91.2	836,102.1	2,577,475	−105.2	962,849.2	2,968,201	−119.2	1,089,170.7	3,357,616			
−.2	1,853.4	5,714	−13.4	123,983.8	382,208	−91.4	837,915.8	2,583,066	−105.4	964,656.8	2,973,774	−119.4	1,090,972.2	3,363,170			
−.3	2,780.0	8,570	−13.6	125,831.4	387,904	−91.6	839,729.4	2,588,656	−105.6	966,464.3	2,979,346	−119.6	1,092,773.6	3,368,723			
−.4	3,706.7	11,427	−13.8	127,678.8	393,599	−91.8	841,542.9	2,594,247	−105.8	968,271.7	2,984,918	−119.8	1,094,575.0	3,374,276			
−.5	4,633.3	14,283	−14.0	129,526.2	399,294	−92.0	843,356.3	2,599,837	−106.0	970,079.0	2,990,489	−120.0	1,096,376.2	3,379,829			
−.6	5,559.9	17,140	−14.2	131,373.5	404,989	−92.2	845,169.6	2,605,427	−106.2	971,886.3	2,996,060	−120.2	1,098,177.4	3,385,381			
−.7	6,486.5	19,996	−14.4	133,220.7	410,683	−92.4	846,982.9	2,611,017	−106.4	973,693.4	3,001,631	−120.4	1,099,978.5	3,390,933			
−.8	7,413.0	22,852	−14.6	135,067.8	416,377	−92.6	848,796.0	2,616,606	−106.6	975,500.5	3,007,202	−120.6	1,101,779.4	3,396,485			
−.9	8,339.5	25,708	−14.8	136,914.8	422,071	−92.8	850,609.1	2,622,196	−106.8	977,307.5	3,012,772	−120.8	1,103,580.4	3,402,037			
−1.0	9,266.0	28,565	−15.0	138,761.7	427,764	−93.0	852,422.0	2,627,785	−107.0	979,114.4	3,018,342	−121.0	1,105,381.2	3,407,588			
−1.2	11,119.0	34,277				−93.2	854,234.9	2,633,373	−107.2	980,921.2	3,023,912	−121.2	1,107,181.9	3,413,140			
−1.4	12,971.9	39,989				−93.4	856,047.7	2,638,962	−107.4	982,727.9	3,029,482	−121.4	1,108,982.5	3,418,690			
−1.6	14,824.6	45,700				−93.6	857,860.4	2,644,550	−107.6	984,534.6	3,035,051	−121.6	1,110,783.1	3,424,241			
−1.8	16,677.3	51,412				−93.8	859,673.1	2,650,138	−107.8	986,341.1	3,040,620	−121.8	1,112,583.6	3,429,792			
−2.0	18,529.9	57,123				−94.0	861,485.6	2,655,725	−108.0	988,147.6	3,046,189	−122.0	1,114,384.0	3,435,342			

[1] See explanation on pp. 3 and 15.

Table 1.—FUNDAMENTAL TABLES. THE DEFORMATION OF THE GEOID AND ITS EFFECT ON GRAVITY [1]—Continued

Zone 1

[Inner radius, 150°56′; outer radius, 180°]

h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg	h	H	Δg
km	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*	*km*	*cm*	*gals×10⁶*
+10.0	17,420.8	53,703	−80.0	137,893.0	425,087	−93.0	160,053.8	493,402	−106.0	182,145.6	561,505	−119.0	204,168.6	629,396
+9.5	16,748.8	51,015	−80.2	138,234.5	426,139	−93.2	160,394.2	494,451	−106.2	182,484.9	562,551	−119.2	204,506.8	630,439
+9.0	15,676.8	48,327	−80.4	138,576.0	427,192	−93.4	160,734.6	495,501	−106.4	182,824.2	563,597	−119.4	204,845.1	631,482
			−80.6	138,917.4	428,244	−93.6	161,074.9	496,550	−106.6	183,163.6	564,643	−119.6	205,183.4	632,524
+8.5	14,805.0	45,640	−80.8	139,258.8	429,297	−93.8	161,415.3	497,599	−106.8	183,502.8	565,689	−119.8	205,521.6	633,567
+8.0	13,933.3	42,953	−81.0	139,600.2	430,349	−94.0	161,755.6	498,648	−107.0	183,842.1	566,735	−120.0	205,859.8	634,610
+7.5	13,061.7	40,266												
+7.0	12,190.2	37,579	−81.2	139,941.6	431,402	−94.2	162,095.9	499,697	−107.2	184,181.4	567,781	−120.2	206,198.0	635,652
+6.5	11,318.8	34,893	−81.4	140,282.9	432,454	−94.4	162,436.2	500,746	−107.4	184,520.6	568,827	−120.4	206,536.2	636,695
			−81.6	140,624.2	433,506	−94.6	162,776.5	501,795	−107.6	184,859.8	569,872	−120.6	206,874.3	637,737
+6.0	10,447.5	32,207	−81.8	140,965.6	434,558	−94.8	163,116.8	502,844	−107.8	185,199.0	570,918	−120.8	207,212.5	638,780
+5.5	9,576.4	29,521	−82.0	141,306.9	435,611	−95.0	163,457.0	503,893	−108.0	185,538.2	571,964	−121.0	207,550.6	639,822
+5.0	8,705.3	26,836												
+4.5	7,834.3	24,151	−82.2	141,648.2	436,663	−95.2	163,797.2	504,942	−108.2	185,877.4	573,009	−121.2	207,888.7	640,864
+4.0	6,963.4	21,466	−82.4	141,989.4	437,715	−95.4	164,137.4	505,991	−108.4	186,216.6	574,055	−121.4	208,226.8	641,907
			−82.6	142,330.7	438,767	−95.6	164,477.6	507,040	−108.6	186,555.7	575,100	−121.6	208,564.9	642,949
+3.5	6,092.6	18,782	−82.8	142,672.0	439,819	−95.8	164,817.8	508,088	−108.8	186,894.8	576,146	−121.8	208,903.0	643,991
+3.0	5,221.9	16,098	−83.0	143,013.2	440,871	−96.0	165,158.0	509,137	−109.0	187,233.9	577,191	−122.0	209,241.0	645,033
+2.5	4,351.3	13,414												
+2.0	3,480.9	10,731	−83.2	143,354.4	441,922	−96.2	165,498.2	510,186	−109.2	187,573.0	578,236	−122.2	209,579.0	646,075
+1.5	2,610.5	8,048	−83.4	143,695.6	442,974	−96.4	165,838.3	511,234	−109.4	187,912.1	579,282	−122.4	209,917.1	647,117
			−83.6	144,036.8	444,026	−96.6	166,178.4	512,283	−109.6	188,251.2	580,327	−122.6	210,255.1	648,159
+1.0	1,740.2	5,365	−83.8	144,377.9	445,078	−96.8	166,518.5	513,331	−109.8	188,590.2	581,372	−122.8	210,593.0	649,201
+.9	1,566.2	4,828	−84.0	144,719.1	446,129	−97.0	166,858.6	514,380	−110.0	188,929.2	582,417	−123.0	210,931.0	650,243
+.8	1,392.2	4,292												
+.7	1,218.1	3,755	−84.2	145,060.2	447,181	−97.2	167,198.7	515,428	−110.2	189,268.2	583,462	−123.2	211,269.0	651,285
+.6	1,044.1	3,219	−84.4	145,401.3	448,233	−97.4	167,538.7	516,476	−110.4	189,607.2	584,507	−123.4	211,606.9	652,326
			−84.6	145,742.4	449,284	−97.6	167,878.8	517,524	−110.6	189,946.2	585,552	−123.6	211,944.8	653,368
+.5	870.1	2,682	−84.8	146,083.5	450,336	−97.8	168,218.8	518,573	−110.8	190,285.2	586,597	−123.8	212,282.7	654,410
+.4	696.0	2,146	−85.0	146,424.6	451,387	−98.0	168,558.8	519,621	−111.0	190,624.1	587,642	−124.0	212,620.6	655,451
+.3	522.0	1,609												
+.2	348.0	1,073	−85.2	146,765.6	452,438	−98.2	168,898.8	520,669	−111.2	190,963.0	588,687	−124.2	212,958.5	656,493
+.1	174.0	536	−85.4	147,106.6	453,490	−98.4	169,238.7	521,717	−111.4	191,302.0	589,732	−124.4	213,296.4	657,534
.0	0.0	0	−85.6	147,447.7	454,541	−98.6	169,578.7	522,765	−111.6	191,640.9	590,776	−124.6	213,634.2	658,576
			−85.8	147,788.7	455,592	−98.8	169,918.6	523,813	−111.8	191,979.7	591,821	−124.8	213,972.0	659,617
−.1	174.0	536	−86.0	148,129.6	456,643	−99.0	170,258.6	524,861	−112.0	192,318.6	592,866	−125.0	214,309.8	660,659
−.2	348.0	1,073												
−.3	522.0	1,609	−86.2	148,470.6	457,694	−99.2	170,598.5	525,908	−112.2	192,657.4	593,910	−125.2	214,647.6	661,700
−.4	696.0	2,146	−86.4	148,811.6	458,746	−99.4	170,938.4	526,956	−112.4	192,996.3	594,955	−125.4	214,985.4	662,741
−.5	870.0	2,682	−86.6	149,152.5	459,796	−99.6	171,278.2	528,004	−112.6	193,335.1	595,999	−125.6	215,323.1	663,782
			−86.8	149,493.4	460,847	−99.8	171,618.1	529,052	−112.8	193,673.9	597,044	−125.8	215,660.9	664,824
−.6	1,043.9	3,218	−87.0	149,834.3	461,898	−100.0	171,957.9	530,099	−113.0	194,012.7	598,088	−126.0	215,998.6	665,865
−.7	1,217.9	3,754												
−.8	1,391.9	4,291	−87.2	150,175.2	462,949	−100.2	172,297.8	531,147	−113.2	194,351.4	599,132	−126.2	216,336.3	666,906
−.9	1,565.9	4,827	−87.4	150,516.1	464,000	−100.4	172,637.6	532,194	−113.4	194,690.2	600,177	−126.4	216,674.0	667,947
−1.0	1,739.8	5,363	−87.6	150,856.9	465,051	−100.6	172,977.4	533,242	−113.6	195,028.9	601,221	−126.6	217,011.7	668,988
			−87.8	151,197.8	466,101	−100.8	173,317.1	534,289	−113.8	195,367.6	602,265	−126.8	217,349.3	670,029
−1.5	2,609.6	8,045	−88.0	151,538.6	467,152	−101.0	173,656.9	535,337	−114.0	195,706.3	603,309	−127.0	217,687.0	671,070
−2.0	3,479.2	10,726												
−2.5	4,348.8	13,406	−88.2	151,879.4	468,203	−101.2	173,996.6	536,384	−114.2	196,045.0	604,353	−127.2	218,024.6	672,110
−3.0	5,218.2	16,086	−88.4	152,220.2	469,253	−101.4	174,336.4	537,431	−114.4	196,383.7	605,397	−127.4	218,362.2	673,151
−3.5	6,087.6	18,766	−88.6	152,560.9	470,304	−101.6	174,676.1	538,479	−114.6	196,722.4	606,441	−127.6	218,699.8	674,192
			−88.8	152,901.7	471,354	−101.8	175,015.8	539,526	−114.8	197,061.0	607,485	−127.8	219,037.4	675,232
−4.0	6,956.8	21,446	−89.0	153,242.4	472,405	−102.0	175,355.4	540,573	−115.0	197,399.6	608,529	−128.0	219,374.9	676,273
−4.5	7,826.0	24,125												
−5.0	8,695.0	26,804	−89.2	153,583.2	473,455	−102.2	175,695.1	541,620	−115.2	197,738.2	609,573	−128.2	219,712.5	677,314
−5.5	9,564.0	29,483	−89.4	153,923.9	474,505	−102.4	176,034.8	542,667	−115.4	198,076.8	610,617	−128.4	220,050.0	678,354
−6.0	10,432.8	32,161	−89.6	154,264.6	475,556	−102.6	176,374.4	543,714	−115.6	198,415.4	611,660	−128.6	220,387.5	679,395
			−89.8	154,605.2	476,606	−102.8	176,714.0	544,761	−115.8	198,753.9	612,704	−128.8	220,725.0	680,435
−6.5	11,301.5	34,840	−90.0	154,945.9	477,656	−103.0	177,053.6	545,808	−116.0	199,092.4	613,748	−129.0	221,062.5	681,475
−7.0	12,170.2	37,517												
−7.5	13,038.7	40,195	−90.2	155,286.5	478,706	−103.2	177,393.2	546,855	−116.2	199,431.0	614,791	−129.2	221,400.0	682,516
−8.0	13,907.1	42,872	−90.4	155,627.2	479,756	−103.4	177,732.8	547,902	−116.4	199,769.5	615,835	−129.4	221,737.4	683,556
−8.5	14,775.4	45,549	−90.6	155,967.8	480,806	−103.6	178,072.3	548,948	−116.6	200,108.0	616,878	−129.6	222,074.8	684,596
			−90.8	156,308.3	481,856	−103.8	178,411.8	549,995	−116.8	200,446.4	617,922	−129.8	222,412.2	685,636
−9.0	15,643.6	48,225	−91.0	156,648.9	482,906	−104.0	178,751.3	551,042	−117.0	200,784.9	618,965	−130.0	222,749.6	686,676
−9.5	16,511.8	50,901												
−10.0	17,379.8	53,577	−91.2	156,989.5	483,956	−104.2	179,090.8	552,088	−117.2	201,123.3	620,008			
−10.5	18,247.7	56,253	−91.4	157,330.0	485,006	−104.4	179,430.3	553,135	−117.4	201,461.8	621,052			
−11.0	19,115.5	58,928	−91.6	157,670.6	486,055	−104.6	179,769.8	554,181	−117.6	201,800.2	622,095			
			−91.8	158,011.1	487,105	−104.8	180,109.2	555,228	−117.8	202,138.6	623,138			
−11.5	19,983.2	61,603	−92.0	158,351.6	488,155	−105.0	180,448.7	556,274	−118.0	202,476.9	624,181			
−12.0	20,850.8	64,277												
−12.5	21,718.3	66,952	−92.2	158,692.0	489,204	−105.2	180,788.1	557,320	−118.2	202,815.3	625,224			
−13.0	22,585.7	69,626	−92.4	159,032.5	490,254	−105.4	181,127.5	558,367	−118.4	203,153.6	626,267			
−13.5	23,453.0	72,299	−92.6	159,372.9	491,303	−105.6	181,466.9	559,413	−118.6	203,492.0	627,310			
			−92.8	159,713.4	492,353	−105.8	181,806.2	560,459	−118.8	203,830.3	628,353			
−14.0	24,320.2	74,973	−93.0	160,053.8	493,402	−106.0	182,145.6	561,505	−119.0	204,168.6	629,396			
−14.5	25,187.3	77,646												
−15.0	26,054.3	80,318												

[1] See explanation on pp. 3 and 15.

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PART II.—DENSITY OF COMPENSATION FOR COMPUTING SPECIAL BOWIE TABLES

EXPLANATION OF FORMULAS

Hayford (see footnote on p. v) assumed that isostatic compensation begins at the surface of the lithosphere and extends downward a distance equal to the depth of compensation and, further, that there is complete isostasy in terms of mass, that is, that the mass of the topography is compensated by an equal mass of compensation. In what follows the same assumptions are made. If on the sphere of radius a, a cap of any outline is taken of height h and subtending a solid angle ω at the center of the sphere, the volume of this cap is

$$\frac{1}{3}\omega[(a+h)^3-a^3]$$

and if 2.67 g/cm^3 is taken as the density of the land, the mass of the cap is

$$\frac{1}{3}\omega[(a+h)^3-a^3]\times 2.67$$

The volume of the compensating column of length d (d essentially positive) will be

$$\frac{1}{3}\omega[(a+h)^3-(a+h-d)^3]$$

and its mass will be

$$\frac{1}{3}\omega[(a+h)^3-(a+h-d)^3]\times D$$

where D represents the density of compensation. Then equating masses we have

$$D=\frac{[(a+h)^3-a^3]}{[(a+h)^3-(a+h-d)^3]}\times 2.67 \tag{26}$$

Simplifying we have

$$D=\frac{h}{d}\left[\frac{(a+h)^2+a(a+h)+a^2}{(a+h)^2+(a+h)(a+h-d)+(a+h-d)^2}\right]\times 2.67$$

or

$$D=\frac{h}{d}\left(\frac{a}{a+h}\right)^2\left[\frac{1+\frac{h}{a}+\frac{1}{3}\left(\frac{h}{a}\right)^2}{1-\frac{d}{a+h}+\frac{1}{3}\left(\frac{d}{a+h}\right)^2}\right]\times 2.67 \tag{26a}$$

By making use in turn of division, the binomial theorem and multiplication, and ignoring the very small terms, we then obtain in powers of h for a *land compartment:*

$$D=\{F_1(d,a)h-F_2(d,a)h^2+F_3(d,a)h^3-F_4(d,a)h^4+\cdots\cdots\}\times 2.67 \quad (27)$$

where

$$\begin{aligned}
F_1(d,a)&=\frac{1}{d}\left[1+\frac{d}{a}+\frac{2}{3}\left(\frac{d}{a}\right)^2+\frac{1}{3}\left(\frac{d}{a}\right)^3+\frac{1}{9}\left(\frac{d}{a}\right)^4+\cdots\cdots\right]\\
F_2(d,a)&=\frac{1}{da}\left[1+2\frac{d}{a}+2\left(\frac{d}{a}\right)^2+\frac{4}{3}\left(\frac{d}{a}\right)^3+\cdots\cdots\right]\\
F_3(d,a)&=\frac{4}{3da^2}\left[1+\frac{5}{2}\frac{d}{a}+\frac{19}{6}\left(\frac{d}{a}\right)^2+\frac{31}{12}\left(\frac{d}{a}\right)^3+\cdots\cdots\right]\\
F_4(d,a)&=\frac{5}{3da^3}\left[1+3\frac{d}{a}+\cdots\cdots\right]
\end{aligned} \quad (27a)$$

For a *water compartment* where ω, a, and d have the same meaning as above, and h (itself essentially positive) represents the depth, and 1.027 g/cm^3 is assumed to be the density of sea water, the mass of the cap will be

$$\frac{1}{3}\omega[a^3-(a-h)^3]\times 1.643$$

while the mass of the compensating column will be

$$\frac{1}{3}\omega[(a-h)^3-(a-h-d)^3]\times D$$

where D represents the density of compensation as before. As a result of equating masses,

$$D=\frac{[a^3-(a-h)^3]}{[(a-h)^3-(a-h-d)^3]}\times 1.643 \quad (28)$$

After applying the same method as that used to simplify formulas (26, 26a) formula (28) becomes

$$D=\{F_1(d,a)h+F_2(d,a)h^2+F_3(d,a)h^3+F_4(d,a)h^4+\cdots\cdots\}\times 1.643 \quad (29)$$

in which $F_1(d, a)$, $F_2(d, a)$, etc., have the same meaning as in equations (27) and (27a).

FORMULAS

DEPTH OF COMPENSATION, 96 KILOMETERS

LAND AREAS

(D to be used with *negative* sign)

(a) When h is expressed in kilometers

$$\begin{aligned}D=\{&2823.58149h-0.449890h^2\\&+0.0000949h^3-0.00000002h^4\}\times 10^{-5}\end{aligned} \quad (30)$$

(b) When h is expressed in feet

$$D=\left\{860.62936\left(\frac{h}{1000}\right)-0.0417963\left(\frac{h}{1000}\right)^2 +0.00000269\left(\frac{h}{1000}\right)^3-0.0000000002\left(\frac{h}{1000}\right)^4\right\}\times10^{-5} \tag{31}$$

OCEAN AREAS

(D to be used with *positive* sign)

(c) When h is expressed in kilometers

$$D=\{1737.50726h+0.2768425h^2 +0.00005837h^3+0.000000012h^4\}\times10^{-5} \tag{32}$$

(d) When h is expressed in fathoms

$$D=\left\{3177.55963\left(\frac{h}{1000}\right)+0.925906\left(\frac{h}{1000}\right)^2 +0.0003570\left(\frac{h}{1000}\right)^3+0.00000013\left(\frac{h}{1000}\right)^4\right\}\times10^{-5} \tag{33}$$

DEPTH OF COMPENSATION, 113.7 KILOMETERS

LAND AREAS

(D to be used with *negative* sign)

(a) When h is expressed in kilometers

$$D=\{2390.69535h-0.381971h^2 +0.0000807h^3-0.00000002h^4\}\times10^{-5} \tag{34}$$

(b) When h is expressed in feet

$$D=\left\{728.68540\left(\frac{h}{1000}\right)-0.0354864\left(\frac{h}{1000}\right)^2 +0.00000228\left(\frac{h}{1000}\right)^3 -0.0000000001\left(\frac{h}{1000}\right)^4\right\}\times10^{-5} \tag{35}$$

OCEAN AREAS

(D to be used with *positive* sign)

(c) When h is expressed in kilometers

$$D=\{1471.12826h+0.2350480h^2 +0.00004963h^3+0.000000010h^4\}\times10^{-5} \tag{36}$$

(d) When h is expressed in fathoms

$$D=\left\{2690.40475\left(\frac{h}{1000}\right)+0.786123\left(\frac{h}{1000}\right)^2 +0.0003036\left(\frac{h}{1000}\right)^3 +0.00000011\left(\frac{h}{1000}\right)^4\right\}\times10^{-5} \tag{37}$$

The coefficients in the above formulas have been calculated to more significant figures than were necessary to attain the accuracy required by the tables which follow. This was done with the idea in mind that should at any time anyone desire greater accuracy, these formulas as presented would furnish the means for attaining that end.

Table 2.—DENSITY OF COMPENSATION, LAND COMPARTMENTS—DEPTH OF COMPENSATION, 96 KILOMETERS. ELEVATIONS IN KILOMETERS

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with negative sign]

Height of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0	28	56	85	113	141	169	198	226	254
0.1	282	311	339	367	395	424	452	480	508	536
0.2	565	593	621	649	678	706	734	762	791	819
0.3	847	875	903	932	960	988	1,016	1,045	1,073	1,101
0.4	1,129	1,158	1,186	1,214	1,242	1,271	1,299	1,327	1,355	1,383
0.5	1,412	1,440	1,468	1,496	1,525	1,553	1,581	1,609	1,638	1,666
0.6	1,694	1,722	1,750	1,779	1,807	1,835	1,863	1,892	1,920	1,948
0.7	1,976	2,005	2,033	2,061	2,089	2,117	2,146	2,174	2,202	2,230
0.8	2,259	2,287	2,315	2,343	2,371	2,400	2,428	2,456	2,484	2,513
0.9	2,541	2,569	2,597	2,626	2,654	2,682	2,710	2,738	2,767	2,795
1.0	2,823	2,851	2,880	2,908	2,936	2,964	2,992	3,021	3,049	3,077
1.1	3,105	3,134	3,162	3,190	3,218	3,247	3,275	3,303	3,331	3,359
1.2	3,388	3,416	3,444	3,472	3,501	3,529	3,557	3,585	3,613	3,642
1.3	3,670	3,698	3,726	3,755	3,783	3,811	3,839	3,867	3,896	3,924
1.4	3,952	3,980	4,009	4,037	4,065	4,093	4,121	4,150	4,178	4,206
1.5	4,234	4,263	4,291	4,319	4,347	4,375	4,404	4,432	4,460	4,488
1.6	4,517	4,545	4,573	4,601	4,629	4,658	4,686	4,714	4,742	4,771
1.7	4,799	4,827	4,855	4,883	4,912	4,940	4,968	4,996	5,025	5,053
1.8	5,081	5,109	5,137	5,166	5,194	5,222	5,250	5,279	5,307	5,335
1.9	5,363	5,391	5,420	5,448	5,476	5,504	5,532	5,561	5,589	5,617
2.0	5,645	5,674	5,702	5,730	5,758	5,786	5,815	5,843	5,871	5,899
2.1	5,928	5,956	5,984	6,012	6,040	6,069	6,097	6,125	6,153	6,181
2.2	6,210	6,238	6,266	6,294	6,323	6,351	6,379	6,407	6,435	6,464
2.3	6,492	6,520	6,548	6,577	6,605	6,633	6,661	6,689	6,718	6,746
2.4	6,774	6,802	6,830	6,859	6,887	6,915	6,943	6,972	7,000	7,028
2.5	7,056	7,084	7,113	7,141	7,169	7,197	7,225	7,254	7,282	7,310
2.6	7,338	7,366	7,395	7,423	7,451	7,479	7,508	7,536	7,564	7,592
2.7	7,620	7,649	7,677	7,705	7,733	7,761	7,790	7,818	7,846	7,874
2.8	7,902	7,931	7,959	7,987	8,015	8,044	8,072	8,100	8,128	8,156
2.9	8,185	8,213	8,241	8,269	8,297	8,326	8,354	8,382	8,410	8,438
3.0	8,467	8,495	8,523	8,551	8,580	8,608	8,636	8,664	8,692	8,721
3.1	8,749	8,777	8,805	8,833	8,862	8,890	8,918	8,946	8,974	9,003
3.2	9,031	9,059	9,087	9,115	9,144	9,172	9,200	9,228	9,257	9,285
3.3	9,313	9,341	9,369	9,398	9,426	9,454	9,482	9,510	9,539	9,567
3.4	9,595	9,623	9,651	9,680	9,708	9,736	9,764	9,792	9,821	9,849
3.5	9,877	9,905	9,933	9,962	9,990	10,018	10,046	10,074	10,103	10,131
3.6	10,159	10,187	10,215	10,244	10,272	10,300	10,328	10,356	10,385	10,413
3.7	10,441	10,469	10,498	10,526	10,554	10,582	10,610	10,639	10,667	10,695
3.8	10,723	10,751	10,780	10,808	10,836	10,864	10,892	10,921	10,949	10,977
3.9	11,005	11,033	11,062	11,090	11,118	11,146	11,174	11,203	11,231	11,259
4.0	11,287	11,315	11,344	11,372	11,400	11,428	11,456	11,485	11,513	11,541
4.1	11,569	11,597	11,626	11,654	11,682	11,710	11,738	11,767	11,795	11,823
4.2	11,851	11,879	11,908	11,936	11,964	11,992	12,020	12,048	12,077	12,105
4.3	12,133	12,161	12,189	12,218	12,246	12,274	12,302	12,330	12,359	12,387
4.4	12,415	12,443	12,471	12,500	12,528	12,556	12,584	12,612	12,641	12,669
4.5	12,697	12,725	12,753	12,782	12,810	12,838	12,866	12,894	12,923	12,951
4.6	12,979	13,007	13,035	13,064	13,092	13,120	13,148	13,176	13,205	13,233
4.7	13,261	13,289	13,317	13,345	13,374	13,402	13,430	13,458	13,486	13,515
4.8	13,543	13,571	13,599	13,627	13,656	13,684	13,712	13,740	13,768	13,797
4.9	13,825	13,853	13,881	13,909	13,938	13,966	13,994	14,022	14,050	14,078
5.0	14,107	14,135	14,163	14,191	14,219	14,248	14,276	14,304	14,332	14,360
5.1	14,389	14,417	14,445	14,473	14,501	14,530	14,558	14,586	14,614	14,642
5.2	14,670	14,699	14,727	14,755	14,783	14,811	14,840	14,868	14,896	14,924
5.3	14,952	14,981	15,009	15,037	15,065	15,093	15,121	15,150	15,178	15,206
5.4	15,234	15,262	15,291	15,319	15,347	15,375	15,403	15,432	15,460	15,488

Table 2.—DENSITY OF COMPENSATION, LAND COMPARTMENTS—DEPTH OF COMPENSATION. 96 KILOMETERS, ELEVATIONS IN KILOMETERS—Continued.

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with negative sign]

Height of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
5.5	15,516	15,544	15,572	15,601	15,629	15,657	15,685	15,713	15,742	15,770
5.6	15,798	15,826	15,854	15,883	15,911	15,939	15,967	15,995	16,023	16,052
5.7	16,080	16,108	16,136	16,164	16,193	16,221	16,249	16,277	16,305	16,333
5.8	16,362	16,390	16,418	16,446	16,474	16,503	16,531	16,559	16,587	16,615
5.9	16,643	16,672	16,700	16,728	16,756	16,784	16,813	16,841	16,869	16,897
6.0	16,925	16,953	16,982	17,010	17,038	17,066	17,094	17,123	17,151	17,179
6.1	17,207	17,235	17,263	17,292	17,320	17,348	17,376	17,404	17,433	17,461
6.2	17,489	17,517	17,545	17,573	17,602	17,630	17,658	17,686	17,714	17,743
6.3	17,771	17,799	17,827	17,855	17,883	17,912	17,940	17,968	17,996	18,024
6.4	18,053	18,081	18,109	18,137	18,165	18,193	18,222	18,250	18,278	18,306
6.5	18,334	18,362	18,391	18,419	18,447	18,475	18,503	18,532	18,560	18,588
6.6	18,616	18,644	18,672	18,701	18,729	18,757	18,785	18,813	18,841	18,870
6.7	18,898	18,926	18,954	18,982	19,011	19,039	19,067	19,095	19,123	19,151
6.8	19,180	19,208	19,236	19,264	19,292	19,320	19,349	19,377	19,405	19,433
6.9	19,461	19,489	19,518	19,546	19,574	19,602	19,630	19,659	19,687	19,715
7.0	19,743	19,771	19,799	19,828	19,856	19,884	19,912	19,940	19,968	19,997
7.1	20,025	20,053	20,081	20,109	20,137	20,166	20,194	20,222	20,250	20,278
7.2	20,306	20,335	20,363	20,391	20,419	20,447	20,476	20,504	20,532	20,560
7.3	20,588	20,616	20,645	20,673	20,701	20,729	20,757	20,785	20,814	20,842
7.4	20,870	20,898	20,926	20,954	20,983	21,011	21,039	21,067	21,095	21,123
7.5	21,152	21,180	21,208	21,236	21,264	21,292	21,321	21,349	21,377	21,405
7.6	21,433	21,461	21,490	21,518	21,546	21,574	21,602	21,630	21,659	21,687
7.7	21,715	21,743	21,771	21,799	21,828	21,856	21,884	21,912	21,940	21,968
7.8	21,997	22,025	22,053	22,081	22,109	22,137	22,166	22,194	22,222	22,250
7.9	22,278	22,306	22,335	22,363	22,391	22,419	22,447	22,475	22,504	22,532
8.0	22,560	22,588	22,616	22,644	22,673	22,701	22,729	22,757	22,785	22,813
8.1	22,842	22,870	22,898	22,926	22,954	22,982	23,011	23,039	23,067	23,095
8.2	23,123	23,151	23,179	23,208	23,236	23,264	23,292	23,320	23,348	23,377
8.3	23,405	23,433	23,461	23,489	23,517	23,546	23,574	23,602	23,630	23,658
8.4	23,686	23,715	23,743	23,771	23,799	23,827	23,855	23,884	23,912	23,940
8.5	23,968	23,996	24,024	24,052	24,081	24,109	24,137	24,165	24,193	24,221
8.6	24,250	24,278	24,306	24,334	24,362	24,390	24,419	24,447	24,475	24,503
8.7	24,531	24,559	24,587	24,616	24,644	24,672	24,700	24,728	24,756	24,785
8.8	24,813	24,841	24,869	24,897	24,925	24,954	24,982	25,010	25,038	25,066
8.9	25,094	25,122	25,151	25,179	25,207	25,235	25,263	25,291	25,320	25,348
9.0	25,376	25,404	25,432	25,460	25,488	25,517	25,545	25,573	25,601	25,629
9.1	25,657	25,686	25,714	25,742	25,770	25,798	25,826	25,854	25,883	25,911
9.2	25,939	25,967	25,995	26,023	26,052	26,080	26,108	26,136	26,164	26,192
9.3	26,220	26,249	26,277	26,305	26,333	26,361	26,389	26,418	26,446	26,474
9.4	26,502	26,530	26,558	26,586	26,615	26,643	26,671	26,699	26,727	26,755
9.5	26,784	26,812	26,840	26,868	26,896	26,924	26,952	26,981	27,009	27,037
9.6	27,065	27,093	27,121	27,149	27,178	27,206	27,234	27,262	27,290	27,318
9.7	27,346	27,375	27,403	27,431	27,459	27,487	27,515	27,544	27,572	27,600
9.8	27,628	27,656	27,684	27,712	27,741	27,769	27,797	27,825	27,853	27,881
9.9	27,909	27,938	27,966	27,994	28,022	28,050	28,078	28,106	28,135	28,163
10.0	28,191	-------	-------	-------	-------	-------	-------	-------	-------	-------

Compensation extends 96 kilometers downward from the mean surface of the lithosphere.

Table 3.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 96 KILOMETERS. DEPTHS IN KILOMETERS

Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0	17	35	52	70	87	104	122	139	156
0.1	174	191	209	226	243	261	278	295	313	330
0.2	348	365	382	400	417	434	452	469	487	504
0.3	521	539	556	573	591	608	626	643	660	678
0.4	695	712	730	747	765	782	799	817	834	851
0.5	869	886	904	921	938	956	973	990	1,008	1,025
0.6	1,043	1,060	1,077	1,095	1,112	1,129	1,147	1,164	1,182	1,199
0.7	1,216	1,234	1,251	1,269	1,286	1,303	1,321	1,338	1,355	1,373
0.8	1,390	1,408	1,425	1,442	1,460	1,477	1,494	1,512	1,529	1,547
0.9	1,564	1,581	1,599	1,616	1,634	1,651	1,668	1,686	1,703	1,720
1.0	1,738	1,755	1,773	1,790	1,807	1,825	1,842	1,859	1,877	1,894
1.1	1,912	1,929	1,946	1,964	1,981	1,998	2,016	2,033	2,051	2,068
1.2	2,085	2,103	2,120	2,138	2,155	2,172	2,190	2,207	2,224	2,242
1.3	2,259	2,277	2,294	2,311	2,329	2,346	2,364	2,381	2,398	2,416
1.4	2,433	2,450	2,468	2,485	2,503	2,520	2,537	2,555	2,572	2,589
1.5	2,607	2,624	2,642	2,659	2,676	2,694	2,711	2,729	2,746	2,763
1.6	2,781	2,798	2,815	2,833	2,850	2,868	2,885	2,902	2,920	2,937
1.7	2,955	2,972	2,989	3,007	3,024	3,041	3,059	3,076	3,094	3,111
1.8	3,128	3,146	3,163	3,181	3,198	3,215	3,233	3,250	3,267	3,285
1.9	3,302	3,320	3,337	3,354	3,372	3,389	3,407	3,424	3,441	3,459
2.0	3,476	3,494	3,511	3,528	3,546	3,563	3,580	3,598	3,615	3,633
2.1	3,650	3,667	3,685	3,702	3,720	3,737	3,754	3,772	3,789	3,806
2.2	3,824	3,841	3,859	3,876	3,893	3,911	3,928	3,946	3,963	3,980
2.3	3,998	4,015	4,033	4,050	4,067	4,085	4,102	4,119	4,137	4,154
2.4	4,172	4,189	4,206	4,224	4,241	4,259	4,276	4,293	4,311	4,328
2.5	4,345	4,363	4,380	4,398	4,415	4,432	4,450	4,467	4,485	4,502
2.6	4,519	4,537	4,554	4,572	4,589	4,606	4,624	4,641	4,659	4,676
2.7	4,693	4,711	4,728	4,745	4,763	4,780	4,798	4,815	4,832	4,850
2.8	4,867	4,885	4,902	4,919	4,937	4,954	4,972	4,989	5,006	5,024
2.9	5,041	5,058	5,076	5,093	5,111	5,128	5,145	5,163	5,180	5,198
3.0	5,215	5,232	5,250	5,267	5,285	5,302	5,319	5,337	5,354	5,372
3.1	5,389	5,406	5,424	5,441	5,459	5,476	5,493	5,511	5,528	5,545
3.2	5,563	5,580	5,598	5,615	5,632	5,650	5,667	5,685	5,702	5,719
3.3	5,737	5,754	5,772	5,789	5,806	5,824	5,841	5,859	5,876	5,893
3.4	5,911	5,928	5,946	5,963	5,980	5,998	6,015	6,032	6,050	6,067
3.5	6,085	6,102	6,119	6,137	6,154	6,172	6,189	6,206	6,224	6,241
3.6	6,259	6,276	6,293	6,311	6,328	6,346	6,363	6,380	6,398	6,415
3.7	6,433	6,450	6,467	6,485	6,502	6,520	6,537	6,554	6,572	6,589
3.8	6,607	6,624	6,641	6,659	6,676	6,694	6,711	6,728	6,746	6,763
3.9	6,780	6,798	6,815	6,833	6,850	6,867	6,885	6,902	6,920	6,937
4.0	6,954	6,972	6,989	7,007	7,024	7,041	7,059	7,076	7,094	7,111
4.1	7,128	7,146	7,163	7,181	7,198	7,215	7,233	7,250	7,268	7,285
4.2	7,302	7,320	7,337	7,355	7,372	7,389	7,407	7,424	7,442	7,459
4.3	7,476	7,494	7,511	7,529	7,546	7,563	7,581	7,598	7,616	7,633
4.4	7,650	7,668	7,685	7,703	7,720	7,737	7,755	7,772	7,790	7,807
4.5	7,824	7,842	7,859	7,877	7,894	7,911	7,929	7,946	7,964	7,981
4.6	7,998	8,016	8,033	8,051	8,068	8,085	8,103	8,120	8,138	8,155
4.7	8,172	8,190	8,207	8,225	8,242	8,259	8,277	8,294	8,312	8,329
4.8	8,346	8,364	8,381	8,399	8,416	8,433	8,451	8,468	8,486	8,503
4.9	8,520	8,538	8,555	8,573	8,590	8,607	8,625	8,642	8,660	8,677
5.0	8,694	8,712	8,729	8,747	8,764	8,781	8,799	8,816	8,834	8,851
5.1	8,868	8,886	8,903	8,921	8,938	8,956	8,973	8,990	9,008	9,025
5.2	9,043	9,060	9,077	9,095	9,112	9,130	9,147	9,164	9,182	9,199
5.3	9,217	9,234	9,251	9,269	9,286	9,304	9,321	9,338	9,356	9,373
5.4	9,391	9,408	9,425	9,443	9,460	9,478	9,495	9,512	9,530	9,547
5.5	9,565	9,582	9,599	9,617	9,634	9,652	9,669	9,687	9,704	9,721
5.6	9,739	9,756	9,774	9,791	9,808	9,826	9,843	9,861	9,878	9,895
5.7	9,913	9,930	9,948	9,965	9,982	10,000	10,017	10,035	10,052	10,069
5.8	10,087	10,104	10,122	10,139	10,156	10,174	10,191	10,209	10,226	10,244
5.9	10,261	10,278	10,296	10,313	10,331	10,348	10,365	10,383	10,400	10,418
6.0	10,435	10,452	10,470	10,487	10,505	10,522	10,539	10,557	10,574	10,592
6.1	10,609	10,627	10,644	10,661	10,679	10,696	10,714	10,731	10,748	10,766
6.2	10,783	10,801	10,818	10,835	10,853	10,870	10,888	10,905	10,922	10,940
6.3	10,957	10,975	10,992	11,010	11,027	11,044	11,062	11,079	11,097	11,114
6.4	11,131	11,149	11,166	11,184	11,201	11,218	11,236	11,253	11,271	11,288
6.5	11,306	11,323	11,340	11,358	11,375	11,393	11,410	11,427	11,445	11,462
6.6	11,480	11,497	11,514	11,532	11,549	11,567	11,584	11,602	11,619	11,636
6.7	11,654	11,671	11,689	11,706	11,723	11,741	11,758	11,776	11,793	11,810
6.8	11,828	11,845	11,863	11,880	11,898	11,915	11,932	11,950	11,967	11,985
6.9	12,002	12,019	12,037	12,054	12,072	12,089	12,106	12,124	12,141	12,159
7.0	12,176	12,194	12,211	12,228	12,246	12,263	12,281	12,298	12,315	12,333
7.1	12,350	12,368	12,385	12,403	12,420	12,437	12,455	12,472	12,490	12,507
7.2	12,524	12,542	12,559	12,577	12,594	12,612	12,629	12,646	12,664	12,681
7.3	12,699	12,716	12,733	12,751	12,768	12,786	12,803	12,820	12,838	12,855
7.4	12,873	12,890	12,908	12,925	12,942	12,960	12,977	12,995	13,012	13,029

Table 3.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 96 KILOMETERS. DEPTHS IN KILOMETERS—Continued

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
7.5	13,047	13,064	13,082	13,099	13,117	13,134	13,151	13,169	13,186	13,204
7.6	13,221	13,238	13,256	13,273	13,291	13,308	13,326	13,343	13,360	13,378
7.7	13,395	13,413	13,430	13,448	13,465	13,482	13,500	13,517	13,535	13,552
7.8	13,569	13,587	13,604	13,622	13,639	13,657	13,674	13,691	13,709	13,726
7.9	13,744	13,761	13,778	13,796	13,813	13,831	13,848	13,866	13,883	13,900
8.0	13,918	13,935	13,953	13,970	13,987	14,005	14,022	14,040	14,057	14,075
8.1	14,092	14,109	14,127	14,144	14,162	14,179	14,197	14,214	14,231	14,249
8.2	14,266	14,284	14,301	14,318	14,336	14,353	14,371	14,388	14,406	14,423
8.3	14,440	14,458	14,475	14,493	14,510	14,528	14,545	14,562	14,580	14,597
8.4	14,615	14,632	14,649	14,667	14,684	14,702	14,719	14,737	14,754	14,771
8.5	14,789	14,806	14,824	14,841	14,859	14,876	14,893	14,911	14,928	14,946
8.6	14,963	14,981	14,998	15,015	15,033	15,050	15,068	15,085	15,102	15,120
8.7	15,137	15,155	15,172	15,190	15,207	15,224	15,242	15,259	15,277	15,294
8.8	15,312	15,329	15,346	15,364	15,381	15,399	15,416	15,434	15,451	15,468
8.9	15,486	15,503	15,521	15,538	15,555	15,573	15,590	15,608	15,625	15,643
9.0	15,660	15,677	15,695	15,712	15,730	15,747	15,765	15,782	15,799	15,817
9.1	15,834	15,852	15,869	15,887	15,904	15,921	15,939	15,956	15,974	15,991
9.2	16,009	16,026	16,043	16,061	16,078	16,096	16,113	16,131	16,148	16,165
9.3	16,183	16,200	16,218	16,235	16,253	16,270	16,287	16,305	16,322	16,340
9.4	16,357	16,375	16,392	16,409	16,427	16,444	16,462	16,479	16,496	16,514
9.5	16,531	16,549	16,566	16,584	16,601	16,618	16,636	16,653	16,671	16,688
9.6	16,706	16,723	16,740	16,758	16,775	16,793	16,810	16,828	16,845	16,862
9.7	16,880	16,897	16,915	16,932	16,950	16,967	16,984	17,002	17,019	17,037
9.8	17,054	17,072	17,089	17,107	17,124	17,141	17,159	17,176	17,194	17,211
9.9	17,229	17,246	17,263	17,281	17,298	17,316	17,333	17,351	17,368	17,385
10.0	17,403	--------	--------	--------	--------	--------	--------	--------	--------	--------

Compensation extends 96 kilometers downward from the mean surface of the lithosphere.

Table 4.—DENSITY OF COMPENSATION, LAND COMPARTMENTS—DEPTH OF COMPENSATION, 96 KILOMETERS. ELEVATIONS IN FEET

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with negative sign]

Height of compartment (feet)	0	100	200	300	400	500	600	700	800	900
0	0	86	172	258	344	430	516	602	688	775
1,000	861	947	1,033	1,119	1,205	1,291	1,377	1,463	1,549	1,635
2,000	1,721	1,807	1,893	1,979	2,065	2,151	2,237	2,323	2,409	2,495
3,000	2,582	2,668	2,754	2,840	2,926	3,012	3,098	3,184	3,270	3,356
4,000	3,442	3,528	3,614	3,700	3,786	3,872	3,958	4,044	4,130	4,216
5,000	4,302	4,388	4,474	4,560	4,646	4,732	4,818	4,904	4,990	5,076
6,000	5,162	5,248	5,334	5,420	5,506	5,592	5,678	5,764	5,850	5,936
7,000	6,022	6,108	6,194	6,280	6,366	6,452	6,538	6,624	6,710	6,796
8,000	6,882	6,968	7,054	7,140	7,226	7,312	7,398	7,484	7,570	7,656
9,000	7,742	7,828	7,914	8,000	8,086	8,172	8,258	8,344	8,430	8,516
10,000	8,602	8,688	8,774	8,860	8,946	9,032	9,118	9,204	9,290	9,376
11,000	9,462	9,548	9,634	9,720	9,806	9,892	9,978	10,064	10,150	10,236
12,000	10,322	10,407	10,493	10,579	10,665	10,751	10,837	10,923	11,009	11,095
13,000	11,181	11,267	11,353	11,439	11,525	11,611	11,697	11,783	11,869	11,955
14,000	12,041	12,127	12,213	12,298	12,384	12,470	12,556	12,642	12,728	12,814
15,000	12,900	12,986	13,072	13,158	13,244	13,330	13,416	13,502	13,588	13,673
16,000	13,759	13,845	13,931	14,017	14,103	14,189	14,275	14,361	14,447	14,533
17,000	14,619	14,705	14,790	14,876	14,962	15,048	15,134	15,220	15,306	15,392
18,000	15,478	15,564	15,650	15,736	15,821	15,907	15,993	16,079	16,165	16,251
19,000	16,337	16,423	16,509	16,595	16,680	16,766	16,852	16,938	17,024	17,110
20,000	17,196	17,282	17,368	17,454	17,539	17,625	17,711	17,797	17,883	17,969
21,000	18,055	18,141	18,227	18,312	18,398	18,484	18,570	18,656	18,742	18,828
22,000	18,914	19,000	19,085	19,171	19,257	19,343	19,429	19,515	19,601	19,687
23,000	19,772	19,858	19,944	20,030	20,116	20,202	20,288	20,373	20,459	20,545
24,000	20,631	20,717	20,803	20,889	20,975	21,060	21,146	21,232	21,318	21,404
25,000	21,490	21,576	21,661	21,747	21,833	21,919	22,005	22,091	22,176	22,262
26,000	22,348	22,434	22,520	22,606	22,692	22,777	22,863	22,949	23,035	23,121
27,000	23,207	23,292	23,378	23,464	23,550	23,636	23,722	23,807	23,893	23,979
28,000	24,065	24,151	24,237	24,322	24,408	24,494	24,580	24,666	24,752	24,837
29,000	24,923	25,009	25,095	25,181	25,266	25,352	25,438	25,524	25,610	25,696
30,000	25,781	--------	--------	--------	--------	--------	--------	--------	--------	--------

Compensation extends 96 kilometers downward from the mean surface of the lithosphere.

Table 5.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 96 KILOMETERS. DEPTHS IN FATHOMS

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (fathoms)	0	10	20	30	40	50	60	70	80	90
0	0	32	64	95	127	159	191	222	254	286
100	318	350	381	413	445	477	508	540	572	604
200	636	667	699	731	763	794	826	858	890	922
300	953	985	1,017	1,049	1,080	1,112	1,144	1,176	1,208	1,239
400	1,271	1,303	1,335	1,367	1,398	1,430	1,462	1,494	1,525	1,557
500	1,589	1,621	1,653	1,684	1,716	1,748	1,780	1,812	1,843	1,875
600	1,907	1,939	1,970	2,002	2,034	2,066	2,098	2,129	2,161	2,193
700	2,225	2,257	2,288	2,320	2,352	2,384	2,415	2,447	2,479	2,511
800	2,543	2,574	2,606	2,638	2,670	2,702	2,733	2,765	2,797	2,829
900	2,861	2,892	2,924	2,956	2,988	3,020	3,051	3,083	3,115	3,147
1,000	3,178	3,210	3,242	3,274	3,306	3,337	3,369	3,401	3,433	3,465
1,100	3,496	3,528	3,560	3,592	3,624	3,655	3,687	3,719	3,751	3,783
1,200	3,814	3,846	3,878	3,910	3,942	3,973	4,005	4,037	4,069	4,101
1,300	4,132	4,164	4,196	4,228	4,260	4,291	4,323	4,355	4,387	4,419
1,400	4,450	4,482	4,514	4,546	4,578	4,609	4,641	4,673	4,705	4,737
1,500	4,768	4,800	4,832	4,864	4,896	4,927	4,959	4,991	5,023	5,055
1,600	5,086	5,118	5,150	5,182	5,214	5,246	5,277	5,309	5,341	5,373
1,700	5,405	5,436	5,468	5,500	5,532	5,564	5,595	5,627	5,659	5,691
1,800	5,723	5,754	5,786	5,818	5,850	5,882	5,913	5,945	5,977	6,009
1,900	6,041	6,073	6,104	6,136	6,168	6,200	6,232	6,263	6,295	6,327
2,000	6,359	6,391	6,422	6,454	6,486	6,518	6,550	6,582	6,613	6,645
2,100	6,677	6,709	6,741	6,772	6,804	6,836	6,868	6,900	6,931	6,963
2,200	6,995	7,027	7,059	7,091	7,122	7,154	7,186	7,218	7,250	7,281
2,300	7,313	7,345	7,377	7,409	7,441	7,472	7,504	7,536	7,568	7,600
2,400	7,631	7,663	7,695	7,727	7,759	7,791	7,822	7,854	7,886	7,918
2,500	7,950	7,982	8,013	8,045	8,077	8,109	8,141	8,172	8,204	8,236
2,600	8,268	8,300	8,332	8,363	8,395	8,427	8,459	8,491	8,523	8,554
2,700	8,586	8,618	8,650	8,682	8,713	8,745	8,777	8,809	8,841	8,873
2,800	8,904	8,936	8,968	9,000	9,032	9,064	9,095	9,127	9,159	9,191
2,900	9,223	9,255	9,286	9,318	9,350	9,382	9,414	9,446	9,477	9,509
3,000	9,541	9,573	9,605	9,637	9,668	9,700	9,732	9,764	9,796	9,828
3,100	9,859	9,891	9,923	9,955	9,987	10,019	10,050	10,082	10,114	10,146
3,200	10,178	10,210	10,241	10,273	10,305	10,337	10,369	10,401	10,432	10,464
3,300	10,496	10,528	10,560	10,592	10,623	10,655	10,687	10,719	10,751	10,783
3,400	10,814	10,846	10,878	10,910	10,942	10,974	11,005	11,037	11,069	11,101
3,500	11,133	11,165	11,197	11,228	11,260	11,292	11,324	11,356	11,388	11,419
3,600	11,451	11,483	11,515	11,547	11,579	11,610	11,642	11,674	11,706	11,738
3,700	11,770	11,802	11,833	11,865	11,897	11,929	11,961	11,993	12,024	12,056
3,800	12,088	12,120	12,152	12,184	12,216	12,247	12,279	12,311	12,343	12,375
3,900	12,407	12,438	12,470	12,502	12,534	12,566	12,598	12,630	12,661	12,693
4,000	12,725	12,757	12,789	12,821	12,852	12,884	12,916	12,948	12,980	13,012
4,100	13,044	13,075	13,107	13,139	13,171	13,203	13,235	13,267	13,298	13,330
4,200	13,362	13,394	13,426	13,458	13,490	13,521	13,553	13,585	13,617	13,649
4,300	13,680	13,713	13,744	13,776	13,808	13,840	13,872	13,904	13,936	13,967
4,400	13,999	14,031	14,063	14,095	14,127	14,159	14,190	14,222	14,254	14,286
4,500	14,318	14,350	14,382	14,413	14,445	14,477	14,509	14,541	14,573	14,605
4,600	14,636	14,668	14,700	14,732	14,764	14,796	14,828	14,859	14,891	14,923
4,700	14,955	14,987	15,019	15,051	15,082	15,114	15,146	15,178	15,210	15,242
4,800	15,274	15,306	15,337	15,369	15,401	15,433	15,465	15,497	15,529	15,560
4,900	15,592	15,624	15,656	15,688	15,720	15,752	15,784	15,815	15,847	15,879
5,000	15,911	15,943	15,975	16,007	16,038	16,070	16,102	16,134	16,166	16,198
5,100	16,230	16,262	16,293	16,325	16,357	16,389	16,421	16,453	16,485	16,517
5,200	16,548	16,580	16,612	16,644	16,676	16,708	16,740	16,772	16,803	16,835
5,300	16,867	16,899	16,931	16,963	16,995	17,027	17,058	17,090	17,122	17,154
5,400	17,186	17,218	17,250	17,282	17,313	17,345	17,377	17,409	17,441	17,473
5,500	17,505	17,537	17,568	17,600	17,632	17,664	17,696	17,728	17,760	17,792
5,600	17,823	17,855	17,887	17,919	17,951	17,983	18,015	18,047	18,078	18,110
5,700	18,142	18,174	18,206	18,238	18,270	18,302	18,334	18,365	18,397	18,429
5,800	18,461	18,493	18,525	18,557	18,589	18,620	18,652	18,684	18,716	18,748
5,900	18,780	18,812	18,844	18,876	18,907	18,939	18,971	19,003	19,035	19,067
6,000	19,099	-------	-------	-------	-------	-------	-------	-------	-------	-------

Table 6.—DENSITY OF COMPENSATION, LAND COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. ELEVATIONS IN KILOMETERS

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with negative sign]

Height of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0	24	48	72	96	120	143	167	191	215
0.1	239	263	287	311	335	359	383	406	430	454
0.2	478	502	526	550	574	598	622	645	669	693
0.3	717	741	765	789	813	837	861	885	908	932
0.4	956	980	1,004	1,028	1,052	1,076	1,100	1,124	1,147	1,171
0.5	1,195	1,219	1,243	1,267	1,291	1,315	1,339	1,363	1,386	1,410
0.6	1,434	1,458	1,482	1,506	1,530	1,554	1,578	1,602	1,625	1,649
0.7	1,673	1,697	1,721	1,745	1,769	1,793	1,817	1,841	1,865	1,888
0.8	1,912	1,936	1,960	1,984	2,008	2,032	2,056	2,080	2,104	2,127
0.9	2,151	2,175	2,199	2,223	2,247	2,271	2,295	2,319	2,343	2,366
1.0	2,390	2,414	2,438	2,462	2,486	2,510	2,534	2,558	2,582	2,605
1.1	2,629	2,653	2,677	2,701	2,725	2,749	2,773	2,797	2,820	2,844
1.2	2,868	2,892	2,916	2,940	2,964	2,988	3,012	3,036	3,059	3,083
1.3	3,107	3,131	3,155	3,179	3,203	3,227	3,251	3,275	3,298	3,322
1.4	3,346	3,370	3,394	3,418	3,442	3,466	3,490	3,513	3,537	3,561
1.5	3,585	3,609	3,633	3,657	3,681	3,705	3,729	3,752	3,776	3,800
1.6	3,824	3,848	3,872	3,896	3,920	3,944	3,968	3,991	4,015	4,039
1.7	4,063	4,087	4,111	4,135	4,159	4,183	4,206	4,230	4,254	4,278
1.8	4,302	4,326	4,350	4,374	4,398	4,421	4,445	4,469	4,493	4,517
1.9	4,541	4,565	4,589	4,613	4,637	4,660	4,684	4,708	4,732	4,756
2.0	4,780	4,804	4,828	4,852	4,875	4,899	4,923	4,947	4,971	4,995
2.1	5,019	5,043	5,067	5,090	5,114	5,138	5,162	5,186	5,210	5,234
2.2	5,258	5,282	5,305	5,329	5,353	5,377	5,401	5,425	5,449	5,473
2.3	5,497	5,520	5,544	5,568	5,592	5,616	5,640	5,664	5,688	5,712
2.4	5,735	5,759	5,783	5,807	5,831	5,855	5,879	5,903	5,927	5,950
2.5	5,974	5,998	6,022	6,046	6,070	6,094	6,118	6,142	6,165	6,189
2.6	6,213	6,237	6,261	6,285	6,309	6,333	6,357	6,380	6,404	6,428
2.7	6,452	6,476	6,500	6,524	6,548	6,572	6,595	6,619	6,643	6,667
2.8	6,691	6,715	6,739	6,763	6,786	6,810	6,834	6,858	6,882	6,906
2.9	6,930	6,954	6,978	7,001	7,025	7,049	7,073	7,097	7,121	7,145
3.0	7,169	7,193	7,216	7,240	7,264	7,288	7,312	7,336	7,360	7,384
3.1	7,407	7,431	7,455	7,479	7,503	7,527	7,551	7,575	7,599	7,622
3.2	7,646	7,670	7,694	7,718	7,742	7,766	7,790	7,813	7,837	7,861
3.3	7,885	7,909	7,933	7,957	7,981	8,005	8,028	8,052	8,076	8,100
3.4	8,124	8,148	8,172	8,196	8,219	8,243	8,267	8,291	8,315	8,339
3.5	8,363	8,387	8,411	8,434	8,458	8,482	8,506	8,530	8,554	8,578
3.6	8,602	8,625	8,649	8,673	8,697	8,721	8,745	8,769	8,793	8,816
3.7	8,840	8,864	8,888	8,912	8,936	8,960	8,984	9,007	9,031	9,055
3.8	9,079	9,103	9,127	9,151	9,175	9,199	9,222	9,246	9,270	9,294
3.9	9,318	9,342	9,366	9,390	9,413	9,437	9,461	9,485	9,509	9,533
4.0	9,557	9,581	9,604	9,628	9,652	9,676	9,700	9,724	9,748	9,772
4.1	9,795	9,819	9,843	9,867	9,891	9,915	9,939	9,963	9,986	10,010
4.2	10,034	10,058	10,082	10,106	10,130	10,154	10,177	10,201	10,225	10,249
4.3	10,273	10,297	10,321	10,345	10,368	10,392	10,416	10,440	10,464	10,488
4.4	10,512	10,535	10,559	10,583	10,607	10,631	10,655	10,679	10,703	10,727
4.5	10,750	10,774	10,798	10,822	10,846	10,870	10,894	10,918	10,941	10,965
4.6	10,989	11,013	11,037	11,061	11,085	11,108	11,132	11,156	11,180	11,204
4.7	11,228	11,252	11,276	11,299	11,323	11,347	11,371	11,395	11,419	11,443
4.8	11,467	11,490	11,514	11,538	11,562	11,586	11,610	11,634	11,658	11,681
4.9	11,705	11,729	11,753	11,777	11,801	11,825	11,848	11,872	11,896	11,920
5.0	11,944	11,968	11,992	12,016	12,039	12,063	12,087	12,111	12,135	12,159
5.1	12,183	12,206	12,230	12,254	12,278	12,302	12,326	12,350	12,374	12,397
5.2	12,421	12,445	12,469	12,493	12,517	12,541	12,565	12,588	12,612	12,636
5.3	12,660	12,684	12,708	12,732	12,755	12,779	12,803	12,827	12,851	12,875
5.4	12,899	12,922	12,946	12,970	12,994	13,018	13,042	13,066	13,090	13,113
5.5	13,137	13,161	13,185	13,209	13,233	13,257	13,280	13,304	13,328	13,352
5.6	13,376	13,400	13,424	13,448	13,471	13,495	13,519	13,543	13,567	13,591
5.7	13,615	13,638	13,662	13,686	13,710	13,734	13,758	13,782	13,805	13,829
5.8	13,853	13,877	13,901	13,925	13,949	13,973	13,996	14,020	14,044	14,068
5.9	14,092	14,116	14,140	14,163	14,187	14,211	14,235	14,259	14,283	14,307
6.0	14,330	14,354	14,378	14,402	14,426	14,450	14,474	14,497	14,521	14,545
6.1	14,569	14,593	14,617	14,641	14,664	14,688	14,712	14,736	14,760	14,784
6.2	14,808	14,832	14,855	14,879	14,903	14,927	14,951	14,975	14,999	15,022
6.3	15,046	15,070	15,094	15,118	15,142	15,166	15,189	15,213	15,237	15,261
6.4	15,285	15,309	15,333	15,356	15,380	15,404	15,428	15,452	15,476	15,500

Table 6. DENSITY OF COMPENSATION, LAND COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. ELEVATIONS IN KILOMETERS—Continued

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with negative sign]

Height of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
6.5	15,523	15,547	15,571	15,595	15,619	15,643	15,667	15,690	15,714	15,738
6.6	15,762	15,786	15,810	15,834	15,857	15,881	15,905	15,929	15,953	15,977
6.7	16,001	16,024	16,048	16,072	16,096	16,120	16,144	16,168	16,191	16,215
6.8	16,239	16,263	16,287	16,311	16,335	16,358	16,382	16,406	16,430	16,454
6.9	16,478	16,501	16,525	16,549	16,573	16,597	16,621	16,645	16,668	16,692
7.0	16,716	16,740	16,764	16,788	16,812	16,835	16,859	16,883	16,907	16,931
7.1	16,955	16,979	17,002	17,026	17,050	17,074	17,098	17,122	17,146	17,169
7.2	17,193	17,217	17,241	17,265	17,289	17,312	17,336	17,360	17,384	17,408
7.3	17,432	17,456	17,479	17,503	17,527	17,551	17,575	17,599	17,623	17,646
7.4	17,670	17,694	17,718	17,742	17,766	17,790	17,813	17,837	17,861	17,885
7.5	17,909	17,933	17,956	17,980	18,004	18,028	18,052	18,076	18,100	18,123
7.6	18,147	18,171	18,195	18,219	18,243	18,266	18,290	18,314	18,338	18,362
7.7	18,386	18,410	18,433	18,457	18,481	18,505	18,529	18,553	18,577	18,600
7.8	18,624	18,648	18,672	18,696	18,720	18,743	18,767	18,791	18,815	18,839
7.9	18,863	18,887	18,910	18,934	18,958	18,982	19,006	19,030	19,053	19,077
8.0	19,101	19,125	19,149	19,173	19,197	19,220	19,244	19,268	19,292	19,316
8.1	19,340	19,363	19,387	19,411	19,435	19,459	19,483	19,507	19,530	19,554
8.2	19,578	19,602	19,626	19,650	19,673	19,697	19,721	19,745	19,769	19,793
8.3	19,816	19,840	19,864	19,888	19,912	19,936	19,960	19,983	20,007	20,031
8.4	20,055	20,079	20,103	20,126	20,150	20,174	20,198	20,222	20,246	20,270
8.5	20,293	20,317	20,341	20,365	20,389	20,413	20,436	20,460	20,484	20,508
8.6	20,532	20,556	20,579	20,603	20,627	20,651	20,675	20,699	20,723	20,746
8.7	20,770	20,794	20,818	20,842	20,866	20,889	20,913	20,937	20,961	20,985
8.8	21,009	21,032	21,056	21,080	21,104	21,128	21,152	21,175	21,199	21,223
8.9	21,247	21,271	21,295	21,319	21,342	21,366	21,390	21,414	21,438	21,462
9.0	21,485	21,509	21,533	21,557	21,581	21,605	21,628	21,652	21,676	21,700
9.1	21,724	21,748	21,771	21,795	21,819	21,843	21,867	21,891	21,914	21,938
9.2	21,962	21,986	22,010	22,034	22,057	22,081	22,105	22,129	22,153	22,177
9.3	22,200	22,224	22,248	22,272	22,296	22,320	22,344	22,367	22,391	22,415
9.4	22,439	22,463	22,487	22,510	22,534	22,558	22,582	22,606	22,630	22,653
9.5	22,677	22,701	22,725	22,749	22,773	22,796	22,820	22,844	22,868	22,892
9.6	22,916	22,939	22,963	22,987	23,011	23,035	23,059	23,082	23,106	23,130
9.7	23,154	23,178	23,202	23,225	23,249	23,273	23,297	23,321	23,345	23,368
9.8	23,392	23,416	23,440	23,464	23,488	23,511	23,535	23,559	23,583	23,607
9.9	23,631	23,654	23,678	23,702	23,726	23,750	23,774	23,797	23,821	23,845
10.0	23,869	-------	-------	-------	-------	-------	-------	-------	-------	-------

Compensation extends 113.7 kilometers downward from the mean surface of the lithosphere.

Table 7.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. DEPTHS IN KILOMETERS

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0	15	29	44	59	74	88	103	118	132
0.1	147	162	177	191	206	221	235	250	265	280
0.2	294	309	324	338	353	368	383	397	412	427
0.3	441	456	471	485	500	515	530	544	559	574
0.4	588	603	618	633	647	662	677	691	706	721
0.5	736	750	765	780	794	809	824	839	853	868
0.6	883	897	912	927	942	956	971	986	1,000	1,015
0.7	1,030	1,045	1,059	1,074	1,089	1,103	1,118	1,133	1,148	1,162
0.8	1,177	1,192	1,206	1,221	1,236	1,251	1,265	1,280	1,295	1,309
0.9	1,324	1,339	1,354	1,368	1,383	1,398	1,412	1,427	1,442	1,457
1.0	1,471	1,486	1,501	1,516	1,530	1,545	1,560	1,574	1,589	1,604
1.1	1,619	1,633	1,648	1,663	1,677	1,692	1,707	1,722	1,736	1,751
1.2	1,766	1,780	1,795	1,810	1,825	1,839	1,854	1,869	1,883	1,898
1.3	1,913	1,928	1,942	1,957	1,972	1,986	2,001	2,016	2,031	2,045
1.4	2,060	2,075	2,089	2,104	2,119	2,134	2,148	2,163	2,178	2,193

Table 7.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. DEPTHS IN KILOMETERS—Continued.

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
1.5	2,207	2,222	2,237	2,251	2,266	2,281	2,296	2,310	2,325	2,340
1.6	2,354	2,369	2,384	2,399	2,413	2,428	2,443	2,457	2,472	2,487
1.7	2,502	2,516	2,531	2,546	2,560	2,575	2,590	2,605	2,619	2,634
1.8	2,649	2,664	2,678	2,693	2,708	2,722	2,737	2,752	2,767	2,781
1.9	2,796	2,811	2,825	2,840	2,855	2,870	2,884	2,899	2,914	2,928
2.0	2,943	2,958	2,973	2,987	3,002	3,017	3,032	3,046	3,061	3,076
2.1	3,090	3,105	3,120	3,135	3,149	3,164	3,179	3,193	3,208	3,223
2.2	3,238	3,252	3,267	3,282	3,297	3,311	3,326	3,341	3,355	3,370
2.3	3,385	3,400	3,414	3,429	3,444	3,458	3,473	3,488	3,503	3,517
2.4	3,532	3,547	3,562	3,576	3,591	3,606	3,620	3,635	3,650	3,665
2.5	3,679	3,694	3,709	3,723	3,738	3,753	3,768	3,782	3,797	3,812
2.6	3,827	3,841	3,856	3,871	3,885	3,900	3,915	3,930	3,944	3,959
2.7	3,974	3,988	4,003	4,018	4,033	4,047	4,062	4,077	4,092	4,106
2.8	4,121	4,136	4,150	4,165	4,180	4,195	4,209	4,224	4,239	4,254
2.9	4,268	4,283	4,298	4,312	4,327	4,342	4,357	4,371	4,386	4,401
3.0	4,416	4,430	4,445	4,460	4,474	4,489	4,504	4,519	4,533	4,548
3.1	4,563	4,577	4,592	4,607	4,622	4,636	4,651	4,666	4,681	4,695
3.2	4,710	4,725	4,739	4,754	4,769	4,784	4,798	4,813	4,828	4,843
3.3	4,857	4,872	4,887	4,901	4,916	4,931	4,946	4,960	4,975	4,990
3.4	5,005	5,019	5,034	5,049	5,063	5,078	5,093	5,108	5,122	5,137
3.5	5,152	5,167	5,181	5,196	5,211	5,225	5,240	5,255	5,270	5,284
3.6	5,299	5,314	5,329	5,343	5,358	5,373	5,387	5,402	5,417	5,432
3.7	5,446	5,461	5,476	5,491	5,505	5,520	5,535	5,549	5,564	5,579
3.8	5,594	5,608	5,623	5,638	5,653	5,667	5,682	5,697	5,712	5,726
3.9	5,741	5,756	5,770	5,785	5,800	5,815	5,829	5,844	5,859	5,874
4.0	5,888	5,903	5,918	5,932	5,947	5,962	5,977	5,991	6,006	6,021
4.1	6,036	6,050	6,065	6,080	6,095	6,109	6,124	6,139	6,153	6,168
4.2	6,183	6,198	6,212	6,227	6,242	6,257	6,271	6,286	6,301	6,315
4.3	6,330	6,345	6,360	6,374	6,389	6,404	6,419	6,433	6,448	6,463
4.4	6,478	6,492	6,507	6,522	6,536	6,551	6,566	6,581	6,595	6,610
4.5	6,625	6,640	6,654	6,669	6,684	6,699	6,713	6,728	6,743	6,757
4.6	6,772	6,787	6,802	6,816	6,831	6,846	6,861	6,875	6,890	6,905
4.7	6,920	6,934	6,949	6,964	6,978	6,993	7,008	7,023	7,037	7,052
4.8	7,067	7,082	7,096	7,111	7,126	7,141	7,155	7,170	7,185	7,199
4.9	7,214	7,229	7,244	7,258	7,273	7,288	7,303	7,317	7,332	7,347
5.0	7,362	7,376	7,391	7,406	7,420	7,435	7,450	7,465	7,479	7,494
5.1	7,509	7,524	7,538	7,553	7,568	7,583	7,597	7,612	7,627	7,641
5.2	7,656	7,671	7,686	7,700	7,715	7,730	7,745	7,759	7,774	7,789
5.3	7,804	7,818	7,833	7,848	7,863	7,877	7,892	7,907	7,921	7,936
5.4	7,951	7,966	7,980	7,995	8,010	8,025	8,039	8,054	8,069	8,084
5.5	8,098	8,113	8,128	8,143	8,157	8,172	8,187	8,201	8,216	8,231
5.6	8,246	8,260	8,275	8,290	8,305	8,319	8,334	8,349	8,364	8,378
5.7	8,393	8,408	8,423	8,437	8,452	8,467	8,482	8,496	8,511	8,526
5.8	8,540	8,555	8,570	8,585	8,599	8,614	8,629	8,644	8,658	8,673
5.9	8,688	8,703	8,717	8,732	8,747	8,762	8,776	8,791	8,806	8,821
6.0	8,835	8,850	8,865	8,879	8,894	8,909	8,924	8,938	8,953	8,968
6.1	8,983	8,997	9,012	9,027	9,042	9,056	9,071	9,086	9,101	9,115
6.2	9,130	9,145	9,160	9,174	9,189	9,204	9,218	9,233	9,248	9,263
6.3	9,277	9,292	9,307	9,322	9,336	9,351	9,366	9,381	9,395	9,410
6.4	9,425	9,440	9,454	9,469	9,484	9,499	9,513	9,528	9,543	9,558
6.5	9,572	9,587	9,602	9,617	9,631	9,646	9,661	9,675	9,690	9,705
6.6	9,720	9,734	9,749	9,764	9,779	9,793	9,808	9,823	9,838	9,852
6.7	9,867	9,882	9,897	9,911	9,926	9,941	9,956	9,970	9,985	10,000
6.8	10,015	10,029	10,044	10,059	10,074	10,088	10,103	10,118	10,133	10,147
6.9	10,162	10,177	10,191	10,206	10,221	10,236	10,250	10,265	10,280	10,295
7.0	10,309	10,324	10,339	10,354	10,368	10,383	10,398	10,413	10,427	10,442
7.1	10,457	10,472	10,486	10,501	10,516	10,531	10,545	10,560	10,575	10,590
7.2	10,604	10,619	10,634	10,649	10,663	10,678	10,693	10,708	10,722	10,737
7.3	10,752	10,767	10,781	10,796	10,811	10,826	10,840	10,855	10,870	10,884
7.4	10,899	10,914	10,929	10,943	10,958	10,973	10,988	11,002	11,017	11,032
7.5	11,047	11,061	11,076	11,091	11,106	11,120	11,135	11,150	11,165	11,179
7.6	11,194	11,209	11,224	11,238	11,253	11,268	11,283	11,297	11,312	11,327
7.7	11,342	11,356	11,371	11,386	11,401	11,415	11,430	11,445	11,460	11,474
7.8	11,489	11,504	11,519	11,533	11,548	11,563	11,578	11,592	11,607	11,622
7.9	11,637	11,651	11,666	11,681	11,696	11,710	11,725	11,740	11,755	11,769

Table 7.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. DEPTHS IN KILOMETERS—Continued.

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (kilometers)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
8.0	11,784	11,799	11,814	11,828	11,843	11,858	11,873	11,887	11,902	11,917
8.1	11,932	11,946	11,961	11,976	11,991	12,005	12,020	12,035	12,050	12,064
8.2	12,079	12,094	12,109	12,123	12,138	12,153	12,168	12,182	12,197	12,212
8.3	12,227	12,241	12,256	12,271	12,286	12,300	12,315	12,330	12,345	12,359
8.4	12,374	12,389	12,404	12,418	12,433	12,448	12,463	12,477	12,492	12,507
8.5	12,522	12,536	12,551	12,566	12,581	12,595	12,610	12,625	12,640	12,654
8.6	12,669	12,684	12,699	12,713	12,728	12,743	12,758	12,772	12,787	12,802
8.7	12,817	12,831	12,846	12,861	12,876	12,890	12,905	12,920	12,935	12,949
8.8	12,964	12,979	12,994	13,008	13,023	13,038	13,053	13,067	13,082	13,097
8.9	13,112	13,126	13,141	13,156	13,171	13,185	13,200	13,215	13,230	13,244
9.0	13,259	13,274	13,289	13,303	13,318	13,333	13,348	13,363	13,377	13,392
9.1	13,407	13,422	13,436	13,451	13,466	13,481	13,495	13,510	13,525	13,540
9.2	13,554	13,569	13,584	13,599	13,613	13,628	13,643	13,658	13,672	13,687
9.3	13,702	13,717	13,731	13,746	13,761	13,776	13,790	13,805	13,820	13,835
9.4	13,849	13,864	13,879	13,894	13,908	13,923	13,938	13,953	13,967	13,982
9.5	13,997	14,012	14,026	14,041	14,056	14,071	14,086	14,100	14,115	14,130
9.6	14,145	14,159	14,174	14,189	14,204	14,218	14,233	14,248	14,263	14,277
9.7	14,292	14,307	14,322	14,336	14,351	14,366	14,381	14,395	14,410	14,425
9.8	14,440	14,454	14,469	14,484	14,499	14,513	14,528	14,543	14,558	14,573
9.9	14,587	14,602	14,617	14,632	14,646	14,661	14,676	14,691	14,705	14,720
10.0	14,735									

Compensation extends 113.7 kilometers downward from the mean surface of the lithosphere.

Table 8.—DENSITY OF COMPENSATION, LAND COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. ELEVATIONS IN FEET

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with negative sign

Height of compartment (feet)	0	100	200	300	400	500	600	700	800	900
0	0	73	146	219	291	364	437	510	583	656
1,000	729	802	874	947	1,020	1,093	1,166	1,239	1,312	1,384
2,000	1,457	1,530	1,603	1,676	1,749	1,821	1,894	1,967	2,040	2,113
3,000	2,186	2,259	2,331	2,404	2,477	2,550	2,623	2,696	2,768	2,841
4,000	2,914	2,987	3,060	3,133	3,206	3,278	3,351	3,424	3,497	3,570
5,000	3,643	3,715	3,788	3,861	3,934	4,007	4,080	4,152	4,225	4,298
6,000	4,371	4,444	4,516	4,589	4,662	4,735	4,808	4,881	4,953	5,026
7,000	5,099	5,172	5,245	5,318	5,390	5,463	5,536	5,609	5,682	5,754
8,000	5,827	5,900	5,973	6,046	6,118	6,191	6,264	6,337	6,410	6,482
9,000	6,555	6,628	6,701	6,774	6,846	6,919	6,992	7,065	7,138	7,211
10,000	7,283	7,356	7,429	7,502	7,574	7,647	7,720	7,793	7,866	7,938
11,000	8,011	8,084	8,157	8,230	8,302	8,375	8,448	8,521	8,594	8,666
12,000	8,739	8,812	8,885	8,957	9,030	9,103	9,176	9,249	9,321	9,394
13,000	9,467	9,540	9,612	9,685	9,758	9,831	9,904	9,976	10,049	10,122
14,000	10,195	10,267	1,0340	10,413	10,486	10,558	10,631	10,704	10,777	10,850
15,000	10,922	10,995	11,068	11,141	11,213	11,286	11,359	11,432	11,504	11,577
16,000	11,650	11,723	11,795	11,868	11,941	12,014	12,086	12,159	12,232	12,305
17,000	12,377	12,450	12,523	12,596	12,668	12,741	12,814	12,887	12,959	13,032
18,000	13,105	13,178	13,250	13,323	13,396	13,469	13,541	13,614	13,687	13,759
19,000	13,832	13,905	13,978	14,050	14,123	14,196	14,269	14,341	14,414	14,487
20,000	14,560	14,632	14,705	14,778	14,850	14,923	14,996	15,069	15,141	15,214
21,000	15,287	15,359	15,432	15,505	15,578	15,650	15,723	15,796	15,868	15,941
22,000	16,014	16,087	16,159	16,232	16,305	16,377	16,450	16,523	16,596	16,668
23,000	16,741	16,814	16,886	16,959	17,032	17,105	17,177	17,250	17,323	17,395
24,000	17,468	17,541	17,613	17,686	17,759	17,832	17,904	17,977	18,050	18,122
25,000	18,195	18,268	18,340	18,413	18,486	18,558	18,631	18,704	18,776	18,849
26,000	18,922	18,995	19,067	19,140	19,213	19,285	19,358	19,431	19,503	19,576
27,000	19,649	19,721	19,794	19,867	19,939	20,012	20,085	20,157	20,230	20,303
28,000	20,375	20,448	20,521	20,593	20,666	20,739	20,811	20,884	20,957	21,029
29,000	21,102	21,175	21,247	21,320	21,393	21,465	21,538	21,611	21,683	21,756
30,000	21,829									

Compensation extends 113.7 kilometers downward from the mean surface of the lithosphere.

Table 9.—DENSITY OF COMPENSATION, OCEAN COMPARTMENTS—DEPTH OF COMPENSATION, 113.7 KILOMETERS. DEPTHS IN FATHOMS

[Density in grams per cubic centimeter in units of the fifth decimal place. To be used with positive sign]

Depth of compartment (fathoms)	0	10	20	30	40	50	60	70	80	90
0	0	27	54	81	108	135	161	188	215	242
100	269	296	323	350	377	404	430	457	484	511
200	538	565	592	619	646	673	700	726	753	780
300	807	834	861	888	915	942	969	996	1,022	1,049
400	1,076	1,103	1,130	1,157	1,184	1,211	1,238	1,265	1,292	1,318
500	1,345	1,372	1,399	1,426	1,453	1,480	1,507	1,534	1,561	1,588
600	1,615	1,641	1,668	1,695	1,722	1,749	1,776	1,803	1,830	1,857
700	1,884	1,911	1,937	1,964	1,991	2,018	2,045	2,072	2,099	2,126
800	2,153	2,180	2,207	2,234	2,260	2,287	2,314	2,341	2,368	2,395
900	2,422	2,449	2,476	2,503	2,530	2,557	2,584	2,610	2,637	2,664
1,000	2,691	2,718	2,745	2,772	2,799	2,826	2,853	2,880	2,907	2,933
1,100	2,960	2,987	3,014	3,041	3,068	3,095	3,122	3,149	3,176	3,203
1,200	3,230	3,257	3,283	3,310	3,337	3,364	3,391	3,418	3,445	3,472
1,300	3,499	3,526	3,553	3,580	3,607	3,633	3,660	3,687	3,714	3,741
1,400	3,768	3,795	3,822	3,849	3,876	3,903	3,930	3,957	3,984	4,010
1,500	4,037	4,064	4,091	4,118	4,145	4,172	4,199	4,226	4,253	4,280
1,600	4,307	4,334	4,361	4,387	4,414	4,441	4,468	4,495	4,522	4,549
1,700	4,576	4,603	4,630	4,657	4,684	4,711	4,738	4,764	4,791	4,818
1,800	4,845	4,872	4,899	4,926	4,953	4,980	5,007	5,034	5,061	5,088
1,900	5,115	5,142	5,168	5,195	5,222	5,249	5,276	5,303	5,330	5,357
2,000	5,384	5,411	5,438	5,465	5,492	5,519	5,546	5,573	5,599	5,626
2,100	5,653	5,680	5,707	5,734	5,761	5,788	5,815	5,842	5,869	5,896
2,200	5,923	5,950	5,977	6,004	6,030	6,057	6,084	6,111	6,138	6,165
2,300	6,192	6,219	6,246	6,273	6,300	6,327	6,354	6,381	6,408	6,435
2,400	6,461	6,488	6,515	6,542	6,569	6,596	6,623	6,650	6,677	6,704
2,500	6,731	6,758	6,785	6,812	6,839	6,866	6,893	6,920	6,946	6,973
2,600	7,000	7,027	7,054	7,081	7,108	7,135	7,162	7,189	7,216	7,243
2,700	7,270	7,297	7,324	7,351	7,378	7,405	7,432	7,458	7,485	7,512
2,800	7,539	7,566	7,593	7,620	7,647	7,674	7,701	7,728	7,755	7,782
2,900	7,809	7,836	7,863	7,890	7,917	7,944	7,970	7,997	8,024	8,051
3,000	8,078	8,105	8,132	8,159	8,186	8,213	8,240	8,267	8,294	8,321
3,100	8,348	8,375	8,402	8,429	8,456	8,483	8,510	8,536	8,563	8,590
3,200	8,617	8,644	8,671	8,698	8,725	8,752	8,779	8,806	8,833	8,860
3,300	8,887	8,914	8,941	8,968	8,995	9,022	9,049	9,076	9,103	9,130
3,400	9,156	9,183	9,210	9,237	9,264	9,291	9,318	9,345	9,372	9,399
3,500	9,426	9,453	9,480	9,507	9,534	9,561	9,588	9,615	9,642	9,669
3,600	9,696	9,723	9,750	9,777	9,803	9,830	9,857	9,884	9,911	9,938
3,700	9,965	9,992	10,019	10,046	10,073	10,100	10,127	10,154	10,181	10,208
3,800	10,235	10,262	10,289	10,316	10,343	10,370	10,397	10,424	10,451	10,478
3,900	10,505	10,532	10,558	10,585	10,612	10,639	10,666	10,693	10,720	10,747
4,000	10,774	10,801	10,828	10,855	10,882	10,909	10,936	10,963	10,990	11,017
4,100	11,044	11,071	11,098	11,125	11,152	11,179	11,206	11,233	11,260	11,287
4,200	11,314	11,341	11,368	11,394	11,421	11,448	11,475	11,502	11,529	11,556
4,300	11,583	11,610	11,637	11,664	11,691	11,718	11,745	11,772	11,799	11,826
4,400	11,853	11,880	11,907	11,934	11,961	11,988	12,015	12,042	12,069	12,096
4,500	12,123	12,150	12,177	12,204	12,231	12,258	12,285	12,312	12,339	12,366
4,600	12,392	12,419	12,446	12,473	12,500	12,527	12,554	12,581	12,608	12,635
4,700	12,662	12,689	12,716	12,743	12,770	12,797	12,824	12,851	12,878	12,905
4,800	12,932	12,959	12,986	13,013	13,040	13,067	13,094	13,121	13,148	13,175
4,900	13,202	13,229	13,256	13,283	13,310	13,337	13,364	13,391	13,418	13,445
5,000	13,472	13,499	13,526	13,553	13,580	13,607	13,634	13,661	13,688	13,715
5,100	13,742	13,769	13,795	13,822	13,849	13,876	13,903	13,930	13,957	13,984
5,200	14,011	14,038	14,065	14,092	14,119	14,146	14,173	14,200	14,227	14,254
5,300	14,281	14,308	14,335	14,362	14,389	14,416	14,443	14,470	14,497	14,524
5,400	14,551	14,578	14,605	14,632	14,659	14,686	14,713	14,740	14,767	14,794
5,500	14,821	14,848	14,875	14,902	14,929	14,956	14,983	15,010	15,037	15,064
5,600	15,091	15,118	15,145	15,172	15,199	15,226	15,253	15,280	15,307	15,334
5,700	15,361	15,388	15,415	15,442	15,469	15,496	15,523	15,550	15,577	15,604
5,800	15,631	15,658	15,685	15,712	15,739	15,766	15,793	15,820	15,847	15,874
5,900	15,901	15,928	15,955	15,982	16,009	16,036	16,063	16,090	16,117	16,144
6,000	16,171	-------	-------	-------	-------	-------	-------	-------	-------	-------

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PART III.—BOWIE ISOSTATIC REDUCTION TABLES

EXPLANATION OF TABLES

The following Bowie isostatic reduction tables for the effect of the deformation of the geoid are in the Hayford form (see footnote on p. v) and are computed for a depth of compensation equal to 96 kilometers. Compensation is assumed to begin at the surface of the lithosphere and extend downward 96 kilometers. This is the type of compensation assumed by Hayford; it was, therefore, followed here for the sake of consistency with work already done, in spite of the fact that it seems more logical to assume the lower limit of Pratt compensation at a fixed depth below sea level. The tables are based on the data of the fundamental tables, part I, and the following densities for topography, namely, 2.67 g/cm^3 for land and 1.027 g/cm^3 for water. For compensation the densities in tables 4 and 5 were used.

In computing columns 2 and 3 of the Hayford form of table, the compartment and station are assumed to be at the same level. Case III of part I (see p. 11) applies in the computation of both columns with $h_2=0$. For column 2, h_1 is numerically equal to the height or depth of the compartment. For column 3, in the case of land, $h_1=-96$ kilometers; in the case of water, h_1 equals the negative sum of the depth of compensation and the depth of the compartment in kilometers. It is to be understood that the values of columns 2 and 3 have been obtained for a compartment; that is, the values just obtained from the fundamental tables have been divided by the number of compartments in the zone in question.

Columns 2 and 3 were computed from the fundamental tables for every 1,000 feet of elevation and for every 100 fathoms of depth down to 1,000 fathoms, from that point by 200-fathom intervals to 3,000 fathoms; after that by 500-fathom intervals to 6,000 fathoms. Intermediate values were found by interpolation, taking into account second differences when necessary.

The quantities in column 4 are the algebraic sums of corresponding quantities in columns 2 and 3. The quantities were first computed to the sixth place of gals and then, holding the values of the combined effects of topography and compensation fixed, the values were rounded out to the fifth decimal place of gals. In a few cases a little forcing was necessary to make the sum of the effects of the topography and compensation agree with the combined effect when rounded off.

In the columns headed "Correction for elevation of station above compartment", the values were found by first getting the resultant effect of topography and compensation, case III applying, then taking the difference between this resultant and the corresponding value of column 4. This is the correction to apply to the value of column 4 to obtain the complete effect of the topography and compensation.

This correction was found for every 1,000 fathoms of depth down to 6,000 fathoms, and for elevations of the compartment which were multiples of 5,000 feet, for the elevation of station above compartment of 5,000, 10,000, 15,000, and 20,000 feet, respectively. Intermediate values of the corrections were found by interpolation with due regard to second differences.

For the columns headed "Correction for elevation of station below compartment", the procedure was similar to the above but by means of the application of case II in the introduction to the fundamental tables, part I. The computation was made as before at 5,000-foot intervals for differences of elevation between station and compartment of 5,000, 10,000, 15,0000, 20,000, and 25,000 feet. Intermediate values of the corrections were found by interpolation in the same way as above with the same precautions as to the second differences.

SPECIMEN COMPUTATION OF THE BOWIE ISOSTATIC REDUCTION TABLES FROM THE FUNDAMENTAL TABLES

ZONE 16, ONE COMPARTMENT

A. For $h=10{,}000$ feet$=3.048$ kilometers (land compartment).

1. Topographic component, *column 2*.—Station and compartment assumed to be at same level. This is either case II or case III of part I with $h_2=0$, $h_1=-3.048$ kilometers.

$$[f(-3.048)]\times 2.67\times 10^{-6}=1264\times 2.67\times 10^{-6}=+3375\times 10^{-6}$$

2. Compensation component, *column 3*.—Station and compartment assumed to be at same level. This is also either case II or case III with $h_2=0$, $h_1=-96$ kilometers.

$$[f(-96)]\times(-.08602)\times 10^{-6}=38291\times(-.08602)\times 10^{-6}=-3294\times 10^{-6}$$

where -0.08602 is the density of compensation for 10,000 feet taken from table 4, page 59.

3. Total of topographic and compensation components, *column 4*.—This is $(+3375-3294)\times 10^{-6}=+81\times 10^{-6}$.

Hence expressed in units of the fifth decimal place of gals the quantities in columns 2, 3, and 4, respectively, corresponding to $h=10{,}000$ feet, become $+337$, -329, and $+8$.

(a) Station 5,000 feet above compartment, *column 5*.—Complete topographic component. This is case III with $h_1=-15{,}000$ feet (-4.572 kilometers) and $h_2=-5{,}000$ feet (-1.524 kilometers).

$$f(-4.572)-f(-1.524)\times 2.67\times 10^{-6}=$$
$$(1896-632)\times 2.67\times 10^{-6}=+3375\times 10^{-6}.$$

Complete compensation component. This is case III, with $h_1=(-96-1.524)$ kilometers, $h_2=-1.524$ kilometers.

$$[f(-97.524)-f(-1.524)]\times(-.08602)\times 10^{-6}=$$
$$(38859-632)\times(-.08602)\times 10^{-6}=-3288\times 10^{-6}$$

Resultant effect of topography and compensation $(+3375-3288)\times 10^{-6}=+87\times 10^{-6}$.

The correction to column 4 for effect of elevation of station 5,000 feet above compartment is then $(+87-81)\times10^{-6}=+6\times10^{-6}$. This is +1 in units of the fifth decimal place of gals.

(b) Station 10,000 feet below level of compartment, *column 10.*—Complete topographic component. This is case II with $h_2=10{,}000$ feet and $h_1=0$. Then

$$[f(3.048)]\times2.67\times10^{-6}=1265\times2.67\times10^{-6}=+3378\times10^{-6}.$$

Complete compensation component. This is also case II with $h_2=+3.048$ kilometers and $h_1=-96+3.048$ kilometers $=-92.952$ kilometers. Then

$$[f(+3.048)+f(-92.952)]\times(-.08602)\times10^{-6}=$$
$$(1265+37150)\times(-.08602)\times10^{-6}=-3304\times10^{-6}$$

Resultant effect of topography and compensation is $(+3378-3304)\times10^{-6}=+74\times10^{-6}$.

Hence correction to column 4 for elevation of station 10,000 feet below level of compartment is $(+74-81)\times10^{-6}=-7\times10^{-6}$. In units of the fifth decimal place of gals the correction to be placed in column 10 of the table is −1.

B. For $h=-6{,}000$ fathoms$=-10.9728$ kilometers (water compartment).

1. Topographic component, *column 2.*—Station assumed to be at sea level. This is case II or case III with $h_2=0$ and $h_1=-6{,}000$ fathoms. Hence

$$[f(-10.9728)]\times(-1.643)\times10^{-6}=4544\times(-1.643)\times10^{-6}=-7466\times10^{-6}$$

2. Compensation component, *column 3.*—Station assumed to be at sea level. This is case III with $h_1=-106.9728$ kilometers and $h_2=0$. Hence

$$[f(-106.9728)-f(-10.9728)]\times(+.19099)\times10^{-6}=(42346-4544)$$
$$\times(+.19099)\times10^{-6}=+7220\times10^{-6}$$

where +.19099 is the density of compensation for 6,000 fathoms. See table 5, page 60.

3. Total of topographic and compensation components, *column 4.*—This is $(-7466+7220)\times10^{-6}=-246\times10^{-6}$.

Hence expressed in units of the fifth decimal place of gals, the quantities to be placed in columns 2, 3, and 4, respectively, corresponding to $h=-6{,}000$ fathoms, are −747, +722, and −25.

(a) Station 10,000 feet above compartment, *column 6.*—Complete topographic component. This is case II with $h_2=-3.048$ kilometers and $h_1=-(3.048+10.9728)$ kilometers$=-14.0208$ kilometers.

$$[f(-14.0208)-f(-3.048)]\times(-1.643)\times10^{-6}=(5803-1264)\times$$
$$(-1.643)\times10^{-6}=-7458\times10^{-6}$$

Complete compensation component. This is also case III where $h_1=-(96+14.0208)$ kilometers$=-110.0208$ kilometers and $h_2=-14.0208$ kilometers. Then

$$[f(-110.0208)-f(-14.0208)]\times(+.19099)\times10^{-6}=(43457-5803)$$
$$\times(+.19099)\times10^{-6}=+7192\times10^{-6}$$

Resultant effect of topography and compensation is $(-7458+7192)\times10^{-6}=-266\times10^{-6}$. The correction to column 4 for elevation of station 10,000 feet above station is then $[-266-(-246)]\times10^{-6}=-20\times10^{-6}$. This is -2 in units of the fifth decimal place of gals and goes in *column 6* of the table on the line with $h=-6{,}000$ fathoms.

Below is a portion of the table for zone 16 showing how the values just computed appear.

Partial tabulation of zone 16[1]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
−6,000 fathoms	−747	+722	−25		−2							
10,000 feet	+337	−329	+8	+1					−1			

[1] If, instead of zone 16, a zone had been chosen which contained more than one compartment, then the results obtained in the manner illustrated by the specimen computation would have to be divided by the number of compartments in the zone, since the quantities in the tables apply to a single compartment only.

ILLUSTRATION OF THE USE OF THE BOWIE ISOSTATIC REDUCTION TABLES

Let the station be at 15,000 feet elevation and the mean elevation of a land compartment in zone 17 estimated to be 5,000 feet.

In the table for zone 17, on the line opposite 5,000 feet in the first column, there is found the topographic correction in the second column equal to $+135$, in the third column is the effect of compensation equal to -131, and in the fourth column the total effect of compensation and topography which is $+4$. Now the station is 10,000 feet above the level of the compartment, and going to column 6, the effect of this difference of elevation is found to be $+1$.

Hence the complete effect of topography and compensation is $+4+1=+5$. This is expressed in units of the fifth decimal place of gals.

Let the elevation of station be 15,000 feet, but the mean depth of the compartment be $-3{,}500$ fathoms. Then on a line with $-3{,}500$ fathoms in column 1 are found the corrections for

Topography	(column 2) $=-349$
Compensation	(column 3) $=+336$
Total	(column 4) $=-\ 13$

Elevation of station 15,000 feet above compartment (column 7) $=-2$.

Hence the complete effect of topography and compensation is $-13-2=-15$. This is in units of the fifth decimal place of gals.

In the case where a compartment of a zone is part land and part water, before going to the tables, the mean elevation of the land, and the mean depth of the water are found assuming each to be spread over the whole compartment. For example if $\frac{3}{5}$ of the compartment

is land at a mean elevation of 3,000 feet, the mean elevation of the land if spread over the whole compartment would be 1,800 feet. Likewise the remaining $\frac{2}{5}$ of water, say at a mean depth of 1,800 fathoms, would have a mean depth when spread over the whole compartment of 720 fathoms. The tables are then entered for $h=1{,}800$ feet and $h=720$ fathoms and the results combined to give the total correction for the compartment which in this case includes the entire zone.

A rapid but approximate method of obtaining the indirect effect of topography and complete isostatic compensation on gravity is explained in Bulletin Géodésique, No. 26 (1930), pages 91–106. A test of the method by comparison of the results obtained by it with the theoretically more accurate results obtained from the Special Tables (pp. 74–100 of this publication) is given in Bulletin Géodésique No. 44 (1934), pages 266, 273. The comparison shows that the average error of $\Delta_2 g$ is of the order of one milligal, but sometimes exceeds that amount.

The approximate rule may also be used to determine the deformation (H) of the geoid due to topography and complete isostatic compensation, but it should be remembered that neither the approximate rule nor the special tables take care of the displacement of the center of gravity (p. 8) involved in the displacements of matter assumed in applying the theory of isostasy.

For the amounts by which the center of gravity is displaced in the cases of complete isostasy and of no isostasy see the following articles.

A. Prey, Gerlands Beiträge zur Geophysik, vol. 29 (1931) p. 201 and vol. 36 (1932) p. 242.

W. D. Lambert, Bulletin Géodésique, No. 26, p. 167–169 and Gerlands Beiträge zur Geophysik, vol. 30 (1931) p. 239. (On p. 169, first line, of the Bulletin Géodésique, No. 26, for $\frac{d}{a}$ read $\frac{d}{2a}$.)

ELEVATION OF THE STATION

If, in using the special tables for the indirect effect, we treat the elevation of the station as we do in computing the direct effect; that is, if we take the station as having its actual elevation, we are, in effect, computing the small deformation of the level surface passing through the station. This must be nearly the same as the deformation of the geoid directly below the station, which is what we are aiming at, theoretically at least. But the two deformations are not quite the same, as the special tables themselves show, especially for the inmost zones, where the effect of the elevation of the station is not inconsiderable. For this reason, it would be better, since we desire the deformation of the *geoid* in computing the direct effect, to treat the elevation of the station as zero. The form of the special tables offers no obstacle to this procedure.

It might be objected that, if we wish to determine the figure of the earth, we must treat the problem as involving the potential only of points external to attracting matter and that if we follow the procedure suggested above, we may be dealing with an internal point. By the isostatic reduction, however, we displace in imagination all masses above sea level to the space lying between sea level, or some lower level, and the lower limit of compensation. The point at sea level

thus becomes an external point, or nearly so. Even if it is not quite outside of attracting matter, the theoretical error is not nearly so serious for the potential, which is the quantity involved, as it is for the direct effect on gravity, for the gradient of the potential does not change discontinuously when we pass from empty space into attracting matter; whereas, the gradient of gravity is discontinuous in this case.

If we take a point outside of all attracting matter and take the mass of the compensation exactly equal to the mass of the corresponding topography, there is no need to be particularly careful as to the level from which topography is reckoned. For instance, we do not need the conception of "mean load level"[7], for the effect of changing the level from which topography is reckoned is merely to add to or to subtract from our topography a complete spherical shell. The effect of this shell of topography is exactly neutralized by the equal mass in the shell of compensation. This neutralization is not absolutely exact if the point is within the attracting matter, but the neutralization is practically complete if the point is only a short distance below the surface.

The equation $H=V/g$ applies strictly only to infinitesimal deformations; in practice it applies to small ones. One way of obtaining a closer approximation to the warping of a level surface at elevation h_1 would be first to compute the deformation $H_1=V_1/g_1$, for the station at the elevation h_1 (the subscripts 1 indicating that V_1 and g_1 apply to this level); then compute $H_2=V_2/g_2$, where the values V_2 and g_2 apply, not to the elevation h_1, but to elevation $h_2=h_1+\frac{1}{2}H_1$. This refinement will ordinarily be quite unnecessary, especially where the resultant deformation is small, as when isostatic compensation is assumed.

MEAN ELEVATION OF THE ZONE (CAP) A–G

The indirect effect will generally be computed after the direct effect, for which the map readings for the separate zones from A to G have been obtained. To make the elevations used in the computation of the indirect (Bowie) effect consistent with the data on which the direct effect was based, the following table may be used. Column 2 of this table shows the ratio of the area of the zone in question to the area of the whole zone (cap) which includes all the zones from the station out to and including zone G. These ratios should be applied as weights to the elevations of the separate zones in order to obtain the average elevation of the zone (cap) A–G.

Relative areas of zones and cap A–G

Zone	Weight	
A	0.0000	
B	.0004	
C_1	.0010	=0.0039 for zone C (undivided)
C_2	.0029	
D_1	.0074	=0.0238 for zone D (undivided)
D_2	.0164	
E_1	.0330	=0.1041 for zone E (undivided)
E_2	.0711	
F_1	.0956	=0.2910 for zone F (undivided)
F_2	.1954	
G	.5768	
Sum of weights	1.0000	

[7] Bulletin Géodésique No. 26, p. 91 and No. 44, p. 266.

Since the inner zones do not vary greatly in elevation and the total effect is not large, it will usually suffice to take the weight 0.6 for G; 0.3 for F; 0.1 for E; and neglect the zones closer to the station than E in forming the average elevation.

There is given below a computation showing the full rigor of the process of taking the mean elevation, an artificial example having been chosen, in which the zones vary in elevation far more than they would in nature.

Example:

To find the mean elevation of zone (cap) A–G, when the mean elevations of the zones from A to G, inclusive, are given.

Computation of mean elevation of cap A–G

Zone	Mean elevation	Weight	Proportional part of mean elevation of cap (A–G)
	Feet		*Feet*
A	10,000	0.0000	0
B	9,000	.0004	4
C_1	8,000	.0010	8
C_2	7,000	.0029	20
D_1	6,000	.0074	44
D_2	4,000	.0164	66
E_1	2,000	.0330	66
E_2	5,000	.0711	356
F_1	3,000	.0956	287
F_2	9,000	.1954	1,759
G	8,000	.5768	4,614
Mean elevation of zone (cap) A–G			7,224

If the zone A–G is part land and part water, treat the two parts separately, getting the average elevation of the land portion and the average depth of the water portion. Apply to the average elevation of the land a weight equal to the ratio of its area to the whole area of zone A–G, and to the average depth of the water a weight similarly derived. Then enter the special table for zone A–G for land and water separately.

EXPLANATION OF TABLE 10

The following table has been explained in detail in the preceding pages but it may be of help to the user of the table to repeat here some of the essential facts.

This table has been derived from the fundamental table, table 1. It is in the same form as the tables for the direct effect as published in United States Coast and Geodetic Survey Special Publication No. 10. As explained on page 1 the zones from A to G have been combined into a single zone or cap. Factors for deriving the mean elevation of this combined zone from the mean elevations of individual zones are given on page 72.

The values given in the table are in units of the fifth decimal place of gals. The signs given in the table are those to be used when the corrections are to be applied to the observed values of gravity. If the corrections are to be applied to the theoretical values of gravity the signs should be reversed.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]

Zone A–G

[Inner radius, 0 meters; outer radius, 3,520 meters. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−31	+3	−28	+8	+13							
−5,500	−30	+3	−27	+8	+12							
−5,000	−29	+3	−26	+7	+12	+14						
−4,500	−28	+3	−25	+7	+11	+14						
−4,000	−26	+3	−23	+7	+11	+14	+15					
−3,500	−24	+2	−22	+6	+10	+13	+15					
−3,000	−22	+2	−20	+6	+10	+12	+14					
−2,800	−22	+2	−20	+6	+10	+12	+13					
−2,600	−21	+2	−19	+6	+9	+11	+13					
−2,400	−20	+2	−18	+6	+9	+11	+12					
−2,200	−19	+2	−17	+5	+8	+10	+12					
−2,000	−18	+2	−16	+5	+8	+10	+11					
−1,800	−17	+2	−15	+5	+8	+9	+10					
−1,600	−15	+1	−14	+4	+7	+9	+10					
−1,400	−14	+1	−13	+4	+6	+8	+9					
−1,200	−12	+1	−11	+4	+6	+7	+8					
−1,000	−11	+1	−10	+3	+5	+6	+7					
−900	−10	+1	−9	+3	+5	+6	+6					
−800	−9	+1	−8	+3	+4	+5	+6					
−700	−8	+1	−7	+2	+4	+4	+5					
−600	−7	+1	−6	+2	+3	+4	+4					
−500	−6	0	−6	+2	+3	+3	+4					
−400	−5	0	−5	+1	+2	+3	+3					
−300	−4	0	−4	+1	+2	+2	+2					
−200	−3	0	−3	+1	+1	+1	+1					
−100	−1	0	−1	0	+1	+1	+1					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	+1	0	+1	0	0	0	0					
300	+1	0	+1	0	−1	−1	−1					
400	+1	0	+1	−1	−1	−1	−1					
500	+2	0	+2	−1	−1	−1	−1					
600	+2	0	+2	−1	−1	−1	−1					
700	+2	0	+2	−1	−1	−2	−2					
800	+3	0	+3	−1	−1	−2	−2					
900	+3	0	+3	−1	−2	−2	−2					
1,000	+3	0	+3	−1	−2	−2	−2					
2,000	+7	−1	+6	−2	−3	−4	−4					
3,000	+10	−1	+9	−3	−5	−6	−6					
4,000	+13	−1	+12	−4	−6	−8	−8					
5,000	+16	−2	+14	−5	−8	−9	−10	0				
6,000	+18	−2	+16	−6	−8	−10	−12	+1				
7,000	+20	−2	+18	−6	−9	−11	−13	+2				
8,000	+22	−3	+19	−6	−10	−12	−14	+3				
9,000	+24	−3	+21	−7	−11	−14	−15	+4				
10,000	+26	−3	+23	−7	−12	−15	−16	+4	−1			
11,000	+27	−3	+24	−8	−12	−15	−17	+5	+1			
12,000	+29	−4	+25	−8	−13	−16	−18	+6	+2			
13,000	+30	−4	+26	−8	−13	−16	−18	+6	+4			
14,000	+32	−5	+27	−9	−14	−17	−19	+7	+5			
15,000	+33	−5	+28	−9	−14	−17	−20	+7	+7	−2		
17,500	+36	−6	+30	−10	−15	−18	−21	+8	+9	+3		
20,000	+39	−6	+33	−10	−16	−19	−22	+9	+11	+7	−3	
25,000	+43	−8	+35	−11	−17	−21	−23	+10	+13	+13	+8	−4
30,000	+47	−9	+38	−11	−17	−21		+10	+15	+16	+13	+7

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone H

[Inner radius, 3,520 meters; outer radius, 5,240 meters. 16 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−1	0	−1	0	0							
−5,500	−1	0	−1	0	0							
−5,000	−1	0	−1	0	0	0						
−4,500	−1	0	−1	0	0	0						
−4,000	−1	0	−1	0	0	0	+1					
−3,500	−1	0	−1	0	0	0	+1					
−3,000	−1	0	−1	0	0	0	0					
−2,800	−1	0	−1	0	0	0	0					
−2,600	−1	0	−1	0	0	0	0					
−2,400	−1	0	−1	0	0	0	0					
−2,200	−1	0	−1	0	0	0	0					
−2,000	−1	0	−1	0	0	0	0					
−1,800	−1	0	−1	0	0	0	0					
−1,600	−1	0	−1	0	0	0	0					
−1,400	−1	0	−1	0	0	0	0					
−1,200	0	0	0	0	0	0	0					
−1,000	0	0	0	0	0	0	0					
−900	0	0	0	0	0	0	0					
−800	0	0	0	0	0	0	0					
−700	0	0	0	0	0	0	0					
−600	0	0	0	0	0	0	0					
−500	0	0	0	0	0	0	0					
−400	0	0	0	0	0	0	0					
−300	0	0	0	0	0	0	0					
−200	0	0	0	0	0	0	0					
−100	0	0	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	0	0	0	0	0	0	0					
400	0	0	0	0	0	0	0					
500	0	0	0	0	0	0	0					
600	0	0	0	0	0	0	0					
700	0	0	0	0	0	0	0					
800	0	0	0	0	0	0	0					
900	0	0	0	0	0	0	0					
1,000	0	0	0	0	0	0	0					
2,000	0	0	0	0	0	0	0					
3,000	0	0	0	0	0	0	0					
4,000	0	0	0	0	0	0	0					
5,000	+1	0	+1	0	0	0	0	0				
6,000	+1	0	+1	0	0	0	0	0				
7,000	+1	0	+1	0	0	0	0	0				
8,000	+1	0	+1	0	0	0	0	0				
9,000	+1	0	+1	0	0	0	0	0				
10,000	+1	0	+1	0	0	0	0	0	0			
11,000	+1	0	+1	0	0	0	0	0	0			
12,000	+1	0	+1	0	0	0	0	0	0			
13,000	+1	0	+1	0	0	0	−1	0	0			
14,000	+1	0	+1	0	0	0	−1	0	0			
15,000	+1	0	+1	0	0	0	−1	0	0	0		
17,500	+1	0	+1	0	0	−1	−1	0	0	0		
20,000	+2	0	+2	0	0	−1	−1	0	0	0	0	
25,000	+2	0	+2	0	0	−1	−1	0	0	0	0	
30,000	+3	−1	+2	0	−1	−1		0	0	0	0	

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone I

[Inner radius, 5,240 meters; outer radius, 8,440 meters. 20 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−3	+1	−2	0	0							
−5,500	−3	+1	−2	0	0							
−5,000	−3	+1	−2	0	0	+1						
−4,500	−2	0	−2	0	0	+1						
−4,000	−2	0	−2	0	0	0	+1					
−3,500	−2	0	−2	0	0	0	+1					
−3,000	−1	0	−1	0	0	0	0					
−2,800	−1	0	−1	0	0	0	0					
−2,600	−1	0	−1	0	0	0	0					
−2,400	−1	0	−1	0	0	0	0					
−2,200	−1	0	−1	0	0	0	0					
−2,000	−1	0	−1	0	0	0	0					
−1,800	−1	0	−1	0	0	0	0					
−1,600	−1	0	−1	0	0	0	0					
−1,400	−1	0	−1	0	0	0	0					
−1,200	−1	0	−1	0	0	0	0					
−1,000	−1	0	−1	0	0	0	0					
−900	−1	0	−1	0	0	0	0					
−800	0	0	0	0	0	0	0					
−700	0	0	0	0	0	0	0					
−600	0	0	0	0	0	0	0					
−500	0	0	0	0	0	0	0					
−400	0	0	0	0	0	0	0					
−300	0	0	0	0	0	0	0					
−200	0	0	0	0	0	0	0					
−100	0	0	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	0	0	0	0	0	0	0					
400	0	0	0	0	0	0	0					
500	0	0	0	0	0	0	0					
600	0	0	0	0	0	0	0					
700	0	0	0	0	0	0	0					
800	0	0	0	0	0	0	0					
900	0	0	0	0	0	0	0					
1,000	0	0	0	0	0	0	0					
2,000	0	0	0	0	0	0	0					
3,000	0	0	0	0	0	0	0					
4,000	+1	0	+1	0	0	0	0					
5,000	+1	0	+1	0	0	0	0	0				
6,000	+1	0	+1	0	0	0	0	0				
7,000	+1	0	+1	0	0	0	0	0				
8,000	+1	0	+1	0	0	0	0	0				
9,000	+1	0	+1	0	0	0	0	0				
10,000	+1	0	+1	0	0	0	0	0	0			
11,000	+2	0	+2	0	0	0	0	0	0			
12,000	+2	0	+2	0	0	0	0	0	0			
13,000	+2	0	+2	0	0	0	0	0	0			
14,000	+2	0	+2	0	0	0	−1	0	0			
15,000	+2	0	+2	0	0	0	−1	0	0	0		
17,500	+3	−1	+2	0	0	−1	−1	0	0	0		
20,000	+3	−1	+2	0	0	−1	−1	0	0	0	0	
25,000	+4	−1	+3	0	0	−1	−1	0	0	0	0	
30,000	+4	−1	+3	0	−1	−1		0	0	0	0	

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone J

[Inner radius, 8,440 meters; outer radius, 12,400 meters. 16 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−5	+1	−4	0	0							
−5,500	−5	+1	−4	0	0							
−5,000	−4	+1	−3	0	0	+1						
−4,500	−4	+1	−3	0	0	+1						
−4,000	−4	+1	−3	0	0	0	+1					
−3,500	−3	+1	−2	0	0	0	0					
−3,000	−3	+1	−2	0	0	0	0					
−2,800	−3	+1	−2	0	0	0	0					
−2,600	−3	+1	−2	0	0	0	0					
−2,400	−2	+1	−1	0	0	0	0					
−2,200	−2	+1	−1	0	0	0	0					
−2,000	−2	+1	−1	0	0	0	0					
−1,800	−2	+1	−1	0	0	0	0					
−1,600	−1	0	−1	0	0	0	0					
−1,400	−1	0	−1	0	0	0	0					
−1,200	−1	0	−1	0	0	0	0					
−1,000	−1	0	−1	0	0	0	0					
−900	−1	0	−1	0	0	0	0					
−800	−1	0	−1	0	0	0	0					
−700	−1	0	−1	0	0	0	0					
−600	0	0	0	0	0	0	0					
−500	0	0	0	0	0	0	0					
−400	0	0	0	0	0	0	0					
−300	0	0	0	0	0	0	0					
−200	0	0	0	0	0	0	0					
−100	0	0	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	0	0	0	0	0	0	0					
400	0	0	0	0	0	0	0					
500	0	0	0	0	0	0	0					
600	0	0	0	0	0	0	0					
700	0	0	0	0	0	0	0					
800	0	0	0	0	0	0	0					
900	0	0	0	0	0	0	0					
1,000	0	0	0	0	0	0	0					
2,000	0	0	0	0	0	0	0					
3,000	+1	0	+1	0	0	0	0					
4,000	+1	0	+1	0	0	0	0					
5,000	+1	0	+1	0	0	0	0	0				
6,000	+2	−1	+1	0	0	0	0	0				
7,000	+2	−1	+1	0	0	0	0	0				
8,000	+2	−1	+1	0	0	0	0	0				
9,000	+3	−1	+2	0	0	0	0	0				
10,000	+3	−1	+2	0	0	0	0	0	0			
11,000	+3	−1	+2	0	0	0	0	0	0			
12,000	+3	−1	+2	0	0	0	0	0	0			
13,000	+3	−1	+2	0	0	0	0	0	0			
14,000	+3	−1	+2	0	0	0	−1	0	0			
15,000	+4	−1	+3	0	0	0	−1	0	0	0		
17,500	+5	−2	+3	0	0	0	−1	0	0	0		
20,000	+5	−2	+3	0	0	−1	−1	0	0	0	0	
25,000	+6	−2	+4	0	0	−1	−1	0	0	0	0	0
30,000	+7	−2	+5	0	0	−1		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone K

[Inner radius, 12,400 meters; outer radius, 18,800 meters. 20 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−7	+2	−5	0	0							
−5,500	−6	+2	−4	0	0	0						
−5,000	−6	+2	−4	0	0	0						
−4,500	−5	+2	−3	0	0	0	0					
−4,000	−5	+2	−3	0	0	0	0					
−3,500	−4	+1	−3	0	0	0	0					
−3,000	−3	+1	−2	0	0	0	0					
−2,800	−3	+1	−2	0	0	0	0					
−2,600	−3	+1	−2	0	0	0	0					
−2,400	−3	+1	−2	0	0	0	0					
−2,200	−3	+1	−2	0	0	0	0					
−2,000	−3	+1	−2	0	0	0	0					
−1,800	−2	+1	−1	0	0	0	0					
−1,600	−2	+1	−1	0	0	0	0					
−1,400	−2	+1	−1	0	0	0	0					
−1,200	−2	+1	−1	0	0	0	0					
−1,000	−1	0	−1	0	0	0	0					
−900	−1	0	−1	0	0	0	0					
−800	−1	0	−1	0	0	0	0					
−700	−1	0	−1	0	0	0	0					
−600	−1	0	−1	0	0	0	0					
−500	0	0	0	0	0	0	0					
−400	0	0	0	0	0	0	0					
−300	0	0	0	0	0	0	0					
−200	0	0	0	0	0	0	0					
−100	0	0	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	0	0	0	0	0	0	0					
400	0	0	0	0	0	0	0					
500	0	0	0	0	0	0	0					
600	0	0	0	0	0	0	0					
700	0	0	0	0	0	0	0					
800	0	0	0	0	0	0	0					
900	0	0	0	0	0	0	0					
1,000	0	0	0	0	0	0	0					
2,000	0	0	0	0	0	0	0					
3,000	+1	0	+1	0	0	0	0					
4,000	+1	0	+1	0	0	0	0					
5,000	+2	−1	+1	0	0	0	0	0				
6,000	+2	−1	+1	0	0	0	0	0				
7,000	+2	−1	+1	0	0	0	0	0				
8,000	+3	−1	+2	0	0	0	0	0				
9,000	+3	−1	+2	0	0	0	0	0				
10,000	+3	−1	+2	0	0	0	0	0	0			
11,000	+4	−2	+2	0	0	0	0	0	0			
12,000	+4	−2	+2	0	0	0	0	0	0			
13,000	+5	−2	+3	0	0	0	0	0	0			
14,000	+5	−2	+3	0	0	0	0	0	0			
15,000	+5	−2	+3	0	0	0	0	0	0	0		
17,500	+6	−3	+3	0	0	0	0	0	0	0		
20,000	+7	−3	+4	0	0	0	0	0	0	0	0	
25,000	+8	−3	+5	0	0	0	−1	0	0	0	0	0
30,000	+10	−4	+6	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone L

[Inner radius, 18,800 meters; outer radius, 28,800 meters. 24 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−9	+4	−5	0	0							
−5,500	−9	+4	−5	0	0							
−5,000	−8	+4	−4	0	0	0						
−4,500	−7	+3	−4	0	0	0						
−4,000	−6	+3	−3	0	0	0	0					
−3,500	−6	+3	−3	0	0	0	0					
−3,000	−5	+2	−3	0	0	0	0					
−2,800	−4	+2	−2	0	0	0	0					
−2,600	−4	+2	−2	0	0	0	0					
−2,400	−4	+2	−2	0	0	0	0					
−2,200	−4	+2	−2	0	0	0	0					
−2,000	−3	+1	−2	0	0	0	0					
−1,800	−3	+1	−2	0	0	0	0					
−1,600	−2	+1	−1	0	0	0	0					
−1,400	−2	+1	−1	0	0	0	0					
−1,200	−2	+1	−1	0	0	0	0					
−1,000	−2	+1	−1	0	0	0	0					
−900	−2	+1	−1	0	0	0	0					
−800	−1	0	−1	0	0	0	0					
−700	−1	0	−1	0	0	0	0					
−600	−1	0	−1	0	0	0	0					
−500	0	0	0	0	0	0	0					
−400	0	0	0	0	0	0	0					
−300	0	0	0	0	0	0	0					
−200	0	0	0	0	0	0	0					
−100	0	0	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	0	0	0	0	0	0	0					
400	0	0	0	0	0	0	0					
500	0	0	0	0	0	0	0					
600	0	0	0	0	0	0	0					
700	0	0	0	0	0	0	0					
800	0	0	0	0	0	0	0					
900	0	0	0	0	0	0	0					
1,000	0	0	0	0	0	0	0					
2,000	+1	−1	0	0	0	0	0					
3,000	+2	−1	+1	0	0	0	0					
4,000	+2	−1	+1	0	0	0	0					
5,000	+2	−1	+1	0	0	0	0	0				
6,000	+3	−2	+1	0	0	0	0	0				
7,000	+3	−2	+1	0	0	0	0	0				
8,000	+4	−2	+2	0	0	0	0	0				
9,000	+4	−2	+2	0	0	0	0	0				
10,000	+4	−2	+2	0	0	0	0	0	0			
11,000	+5	−3	+2	0	0	0	0	0	0			
12,000	+5	−3	+2	0	0	0	0	0	0			
13,000	+6	−3	+3	0	0	0	0	0	0			
14,000	+6	−3	+3	0	0	0	0	0	0			
15,000	+7	−4	+3	0	0	0	0	0	0	0		
17,500	+8	−4	+4	0	0	0	0	0	0	0		
20,000	+9	−5	+4	0	0	0	0	0	0	0	0	
25,000	+11	−6	+5	0	0	0	0	0	0	0	0	−1
30,000	+13	−7	+6	0	0	0		0	0	0	0	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone M

[Inner radius, 28,800 meters; outer radius, 58,800 meters. 14 compartments].

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−50	+32	−18	0	0							
−5,500	−46	+29	−17	0	0							
−5,000	−42	+27	−15	0	0	0						
−4,500	−38	+24	−14	0	0	0						
−4,000	−34	+22	−12	0	0	0	0					
−3,500	−29	+19	−10	0	0	0	0					
−3,000	−25	+17	−8	0	0	0	0					
−2,800	−24	+16	−8	0	0	0	0					
−2,600	−22	+15	−7	0	0	0	0					
−2,400	−20	+13	−7	0	0	0	0					
−2,200	−18	+12	−6	0	0	0	0					
−2,000	−17	+11	−6	0	0	0	0					
−1,800	−15	+10	−5	0	0	0	0					
−1,600	−13	+9	−4	0	0	0	0					
−1,400	−12	+8	−4	0	0	0	0					
−1,200	−10	+7	−3	0	0	0	0					
−1,000	−9	+6	−3	0	0	0	0					
−900	−7	+5	−2	0	0	0	0					
−800	−7	+5	−2	0	0	0	0					
−700	−6	+4	−2	0	0	0	0					
−600	−5	+3	−2	0	0	0	0					
−500	−4	+3	−1	0	0	0	0					
−400	−3	+2	−1	0	0	0	0					
−300	−3	+2	−1	0	0	0	0					
−200	−2	+1	−1	0	0	0	0					
−100	−1	+1	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	+1	−1	0	0	0	0	0					
400	+1	−1	0	0	0	0	0					
500	+1	−1	0	0	0	0	0					
600	+1	−1	0	0	0	0	0					
700	+2	−1	+1	0	0	0	0					
800	+2	−1	+1	0	0	0	0					
900	+2	−1	+1	0	0	0	0					
1,000	+2	−1	+1	0	0	0	0					
2,000	+4	−3	+1	0	0	0	0					
3,000	+7	−5	+2	0	0	0	0					
4,000	+9	−6	+3	0	0	0	0					
5,000	+12	−8	+4	0	0	0	0	0				
6,000	+14	−10	+4	0	0	0	0	0				
7,000	+16	−11	+5	0	0	0	0	0				
8,000	+18	−12	+6	0	0	0	0	0				
9,000	+20	−14	+6	0	0	0	0	0				
10,000	+23	−16	+7	0	0	0	0	0	0			
11,000	+25	−17	+8	0	0	0	+1	0	0			
12,000	+27	−19	+8	0	0	0	+1	0	0			
13,000	+30	−21	+9	0	0	+1	+1	0	−1			
14,000	+32	−22	+10	0	0	+1	+1	0	−1			
15,000	+34	−24	+10	0	0	+1	+1	0	−1	−1		
17,500	+40	−28	+12	0	0	+1	+1	0	−1	−1		
20,000	+46	−32	+14	0	0	+1	+1	0	−1	−1	−2	
25,000	+57	−40	+17	0	+1	+1	+1	0	−1	−1	−2	−3
30,000	+68	−48	+20	0	+1	+1		0	−1	−2	−2	−3

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone N

[Inner radius, 58,800 meters; outer radius, 99,000 meters. 16 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−59	+47	−12	0	0							
−5,500	−55	+44	−11	0	0							
−5,000	−50	+40	−10	0	0	−1						
−4,500	−45	+36	−9	0	0	−1						
−4,000	−40	+33	−7	0	0	−1	−1					
−3,500	−35	+29	−6	0	0	0	−1					
−3,000	−30	+25	−5	0	0	0	−1					
−2,800	−28	+23	−5	0	0	0	−1					
−2,600	−26	+21	−5	0	0	0	−1					
−2,400	−24	+20	−4		0	0	0					
−2,200	−22	+18	−4	0	0	0	0					
−2,000	−20	+17	−3	0	0	0	0					
−1,800	−18	+15	−3	0	0	0	0					
−1,600	−16	+13	−3	0	0	0	0					
−1,400	−14	+12	−2	0	0	0	0					
−1,200	−12	+10	−2	0	0	0	0					
−1,000	−10	+8	−2	0	0	0	0					
−900	−9	+8	−1	0	0	0	0					
−800	−8	+7	−1	0	0	0	0					
−700	−7	+6	−1	0	0	0	0					
−600	−6	+5	−1	0	0	0	0					
−500	−5	+4	−1	0	0	0	0					
−400	−4	+3	−1	0	0	0	0					
−300	−3	+3	0	0	0	0	0					
−200	−2	+2	0	0	0	0	0					
−100	−1	+1	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	+1	−1	0	0	0	0	0					
400	+1	−1	0	0	0	0	0					
500	+1	−1	0	0	0	0	0					
600	+1	−1	0	0	0	0	0					
700	+2	−2	0	0	0	0	0					
800	+2	−2	0	0	0	0	0					
900	+2	−2	0	0	0	0	0					
1,000	+3	−3	0	0	0	0	0					
2,000	+5	−4	+1	0	0	0	0					
3,000	+8	−7	+1	0	0	0	0					
4,000	+11	−9	+2	0	0	0	0					
5,000	+13	−11	+2	0	0	0	0	0				
6,000	+16	−14	+2	0	0	0	0	0				
7,000	+19	−16	+3	0	0	0	0	0				
8,000	+21	−18	+3	0	0	0	0	0				
9,000	+24	−20	+4	0	0	0	0	0				
10,000	+27	−23	+4	0	0	0	0	0	0			
11,000	+30	−25	+5	0	0	0	+1	0	0			
12,000	+32	−27	+5	0	0	0	+1	0	0			
13,000	+35	−29	+6	0	0	+1	+1	0	0			
14,000	+38	−32	+6	0	0	+1	+1	0	0			
15,000	+40	−34	+6	0	0	+1	+1	0	0	−1		
17,500	+47	−40	+7	0	0	+1	+1	0	0	−1		
20,000	+53	−45	+8	0	0	+1	+1	0	−1	−1	−1	
25,000	+67	−57	+10	0	+1	+1	+1	0	−1	−1	−2	−2
30,000	+80	−68	+12	0	+1	+1		0	−1	−1	−2	−2

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 0

[Inner radius, 99,000 meters; outer radius, 166,700 meters = 1°29′58″. 28 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−57	+52	−5	0	0							
−5,500	−52	+47	−5	0	0							
−5,000	−47	+43	−4	0	0	0						
−4,500	−43	+39	−4	0	0	0						
−4,000	−38	+35	−3	0	0	0	0					
−3,500	−34	+31	−3	0	0	0	0					
−3,000	−28	+26	−2	0	0	0	0					
−2,800	−27	+25	−2	0	0	0	0					
−2,600	−25	+23	−2	0	0	0	0					
−2,400	−23	+21	−2	0	0	0	0					
−2,200	−21	+19	−2	0	0	0	0					
−2,000	−19	+17	−2	0	0	0	0					
−1,800	−17	+16	−1	0	0	0	0					
−1,600	−15	+14	−1	0	0	0	0					
−1,400	−13	+12	−1	0	0	0	0					
−1,200	−12	+11	−1	0	0	0	0					
−1,000	−10	+9	−1	0	0	0	0					
−900	−9	+8	−1	0	0	0	0					
−800	−8	+7	−1	0	0	0	0					
−700	−7	+6	−1	0	0	0	0					
−600	−6	+6	0	0	0	0	0					
−500	−4	+4	0	0	0	0	0					
−400	−4	+4	0	0	0	0	0					
−300	−3	+3	0	0	0	0	0					
−200	−2	+2	0	0	0	0	0					
−100	−1	+1	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	0	0	0	0	0	0	0					
200	0	0	0	0	0	0	0					
300	+1	−1	0	0	0	0	0					
400	+1	−1	0	0	0	0	0					
500	+1	−1	0	0	0	0	0					
600	+1	−1	0	0	0	0	0					
700	+2	−2	0	0	0	0	0					
800	+2	−2	0	0	0	0	0					
900	+2	−2	0	0	0	0	0					
1,000	+2	−2	0	0	0	0	0					
2,000	+5	−5	0	0	0	0	0					
3,000	+8	−7	+1	0	0	0	0					
4,000	+10	−9	+1	0	0	0	0					
5,000	+13	−12	+1	0	0	0	0	0				
6,000	+15	−14	+1	0	0	0	0	0				
7,000	+18	−17	+1	0	0	0	0	0				
8,000	+21	−19	+2	0	0	0	0	0				
9,000	+23	−21	+2	0	0	0	0	0				
10,000	+26	−24	+2	0	0	0	0	0	0			
11,000	+28	−26	+2	0	0	0	0	0	0			
12,000	+31	−29	+2	0	0	0	0	0	0			
13,000	+34	−32	+2	0	0	0	0	0	0			
14,000	+36	−34	+2	0	0	0	0	0	0			
15,000	+39	−36	+3	0	0	0	0	0	0	0		
17,500	+45	−42	+3	0	0	0	0	0	0	0		
20,000	+52	−48	+4	0	0	0	+1	0	0	0	−1	
25,000	+65	−60	+5	0	0	0	+1	0	0	−1	−1	−1
30,000	+78	−72	+6	0	0	+1		0	0	−1	−1	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 18

[Inner radius, 1°29′58″=166,700 meters; outer radius, 1°41′13″. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−494	+467	−27	−1	−2							
−5,500	−452	+429	−24	−1	−2							
−5,000	−411	+390	−21	−1	−2	−2						
−4,500	−370	+351	−19	−1	−1	−2						
−4,000	−329	+313	−16	−1	−1	−2	−2					
−3,500	−288	+274	−14	−1	−1	−2	−2					
−3,000	−247	+235	−12	0	−1	−2	−2					
−2,800	−231	+220	−11	0	−1	−1	−2					
−2,600	−214	+204	−10	0	−1	−1	−2					
−2,400	−198	+189	−9	0	−1	−1	−1					
−2,200	−181	+173	−8	0	−1	−1	−1					
−2,000	−165	+158	−7	0	0	−1	−1					
−1,800	−149	+142	−7	0	0	−1	−1					
−1,600	−132	+126	−6	0	0	−1	−1					
−1,400	−115	+110	−5	0	0	−1	−1					
−1,200	−99	+95	−4	0	0	−1	−1					
−1,000	−83	+79	−4	0	0	0	0					
−900	−74	+71	−3	0	0	0	0					
−800	−66	+63	−3	0	0	0	0					
−700	−58	+55	−3	0	0	0	0					
−600	−49	+47	−2	0	0	0	0					
−500	−41	+39	−2	0	0	0	0					
−400	−33	+32	−1	0	0	0	0					
−300	−25	+24	−1	0	0	0	0					
−200	−17	+16	−1	0	0	0	0					
−100	−8	+8	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+2	−2	0	0	0	0	0					
200	+4	−4	0	0	0	0	0					
300	+7	−7	0	0	0	0	0					
400	+9	−9	0	0	0	0	0					
500	+11	−11	0	0	0	0	0					
600	+13	−13	0	0	0	0	0					
700	+15	−15	0	0	0	0	0					
800	+18	−17	+1	0	0	0	0					
900	+20	−19	+1	0	0	0	0					
1,000	+22	−21	+1	0	0	0	0					
2,000	+45	−43	+2	0	0	0	0					
3,000	+67	−64	+3	0	0	0	0					
4,000	+89	−86	+3	0	0	+1	+1					
5,000	+112	−107	+5	0	0	+1	+1	0				
6,000	+134	−128	+6	0	0	+1	+1	0				
7,000	+156	−150	+6	0	0	+1	+1	0				
8,000	+178	−171	+7	0	0	+1	+1	0				
9,000	+201	−193	+8	0	+1	+1	+1	0				
10,000	+223	−214	+9	0	+1	+1	+1	0	−1			
11,000	+245	−235	+10	0	+1	+1	+1	−1	−1			
12,000	+268	−257	+11	0	+1	+1	+1	−1	−1			
13,000	+290	−278	+12	0	+1	+1	+2	−1	−1			
14,000	+312	−300	+12	+1	+1	+2	+2	−1	−1			
15,000	+335	−321	+14	+1	+1	+2	+2	−1	−1	−2		
17,500	+391	−375	+16	+1	+1	+2	+2	−1	−2	−2		
20,000	+446	−428	+18	+1	+1	+2	+3	−1	−2	−2	−3	
25,000	+557	−535	+22	+1	+2	+3	+4	−1	−2	−3	−4	−5
30,000	+669	−642	+27	+1	+2	+3		−1	−2	−4	−5	−6

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 17

[Inner radius, 1°41′13″; outer radius, 1°54′52″. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−599	+573	−26	−1	−2							
−5,500	−549	+526	−23	−1	−2							
−5,000	−499	+479	−20	−1	−2	−2						
−4,500	−449	+431	−18	−1	−2	−2						
−4,000	−400	+384	−16	−1	−1	−2	−2					
−3,500	−349	+336	−13	0	−1	−2	−2					
−3,000	−300	+289	−11	0	−1	−1	−2					
−2,800	−280	+270	−10	0	−1	−1	−2					
−2,600	−260	+250	−10	0	−1	−1	−2					
−2,400	−240	+231	−9	0	−1	−1	−2					
−2,200	−220	+212	−8	0	−1	−1	−1					
−2,000	−200	+193	−7	0	−1	−1	−1					
−1,800	−180	+174	−6	0	−1	−1	−1					
−1,600	−160	+154	−6	0	−1	−1	−1					
−1,400	−140	+135	−5	0	−1	0	−1					
−1,200	−120	+116	−4	0	0	0	−1					
−1,000	−100	+97	−3	0	0	0	0					
−900	−90	+87	−3	0	0	0	0					
−800	−80	+77	−3	0	0	0	0					
−700	−70	+68	−2	0	0	0	0					
−600	−60	+58	−2	0	0	0	0					
−500	−50	+48	−2	0	0	0	0					
−400	−40	+39	−1	0	0	0	0					
−300	−30	+29	−1	0	0	0	0					
−200	−20	+19	−1	0	0	0	0					
−100	−10	+10	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+3	−3	0	0	0	0	0					
200	+5	−5	0	0	0	0	0					
300	+8	−8	0	0	0	0	0					
400	+11	−11	0	0	0	0	0					
500	+13	−13	0	0	0	0	0					
600	+16	−16	0	0	0	0	0					
700	+19	−18	+1	0	0	0	0					
800	+22	−21	+1	0	0	0	0					
900	+24	−23	+1	0	0	0	0					
1,000	+27	−26	+1	0	0	0	0					
2,000	+54	−52	+2	0	0	0	0					
3,000	+81	−79	+2	0	0	0	0					
4,000	+108	−105	+3	0	+1	0	+1					
5,000	+135	−131	+4	0	+1	0	+1	0				
6,000	+162	−157	+5	0	+1	+1	+1	0				
7,000	+190	−184	+6	0	+1	+1	+1	0				
8,000	+217	−210	+7	0	+1	+1	+1	0				
9,000	+244	−236	+8	0	+1	+1	+1	0				
10,000	+270	−262	+8	0	+1	+1	+2	0	−1			
11,000	+298	−289	+9	0	+1	+1	+2	0	−1			
12,000	+325	−315	+10	0	+1	+1	+2	0	−1			
13,000	+352	−341	+11	0	+1	+1	+2	0	−1			
14,000	+379	−367	+12	0	+1	+1	+2	0	−1			
15,000	+406	−393	+13	0	+1	+1	+2	−1	−2	−2		
17,500	+474	−459	+15	+1	+1	+2	+3	−1	−2	−2		
20,000	+541	−524	+17	+1	+2	+2	+3	−1	−2	−2	−3	
25,000	+676	−655	+21	+1	+2	+3	+4	−1	−2	−3	−4	−5
30,000	+811	−786	+25	+1	+3	+3		−1	−2	−3	−5	−6

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 16

[Inner radius, 1°54′52″; outer radius, 2°11′53″. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−747	+722	−25	−1	−2							
−5,500	−684	+662	−22	−1	−2							
−5,000	−622	+602	−20	−1	−2	−2						
−4,500	−560	+543	−17	−1	−1	−2						
−4,000	−498	+483	−15	−1	−1	−2	−3					
−3,500	−436	+423	−13	−1	−1	−2	−2					
−3,000	−374	+363	−11	0	−1	−1	−2					
−2,800	−349	+339	−10	0	−1	−1	−2					
−2,600	−324	+315	−9	0	−1	−1	−2					
−2,400	−299	+291	−8	0	−1	−1	−2					
−2,200	−274	+267	−7	0	−1	−1	−2					
−2,000	−249	+242	−7	0	−1	−1	−1					
−1,800	−224	+218	−6	0	0	−1	−1					
−1,600	−199	+194	−5	0	0	−1	−1					
−1,400	−175	+170	−5	0	0	0	−1					
−1,200	−150	+146	−4	0	0	0	−1					
−1,000	−125	+122	−3	0	0	0	−1					
−900	−112	+109	−3	0	0	0	−1					
−800	−100	+97	−3	0	0	0	0					
−700	−87	+85	−2	0	0	0	0					
−600	−75	+73	−2	0	0	0	0					
−500	−62	+61	−1	0	0	0	0					
−400	−50	+49	−1	0	0	0	0					
−300	−37	+36	−1	0	0	0	0					
−200	−25	+24	−1	0	0	0	0					
−100	−12	+12	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+3	−3	0	0	0	0	0					
200	+7	−7	0	0	0	0	0					
300	+10	−10	0	0	0	0	0					
400	+13	−13	0	0	0	0	0					
500	+17	−17	0	0	0	0	0					
600	+20	−20	0	0	0	0	0					
700	+23	−23	0	0	0	0	0					
800	+27	−26	+1	0	0	0	0					
900	+30	−29	+1	0	0	0	0					
1,000	+34	−33	+1	0	0	0	0					
2,000	+68	−66	+2	0	0	0	0					
3,000	+101	−99	+2	0	0	0	+1					
4,000	+135	−132	+3	0	0	0	+1					
5,000	+169	−165	+4	0	0	0	+1	0				
6,000	+203	−198	+5	0	+1	0	+1	0				
7,000	+236	−230	+6	0	+1	+1	+1	0				
8,000	+270	−264	+6	0	+1	+1	+2	0				
9,000	+303	−296	+7	+1	+1	+1	+2	0				
10,000	+337	−329	+8	+1	+1	+1	+2	0	−1			
11,000	+371	−362	+9	+1	+1	+1	+2	0	−1			
12,000	+405	−395	+10	+1	+1	+1	+2	0	−1			
13,000	+439	−428	+11	+1	+1	+1	+2	0	−1			
14,000	+472	−461	+11	+1	+1	+2	+2	0	−1			
15,000	+506	−494	+12	+1	+1	+2	+2	0	−1	−2		
17,500	+590	−576	+14	+1	+2	+2	+3	0	−1	−2		
20,000	+674	−658	+16	+1	+2	+2	+4	0	−1	−2	−3	
25,000	+843	−823	+20	+1	+2	+3	+4	−1	−2	−3	−4	−5
30,000	+1,011	−987	+24	+1	+2	+3		−1	−2	−3	−5	−6

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 15

[Inner radius, 2°11′53″; outer radius, 2°33′46″. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−960	+937	−23	−1	−2							
−5,500	−880	+859	−21	−1	−2							
−5,000	−800	+782	−18	−1	−2	−3						
−4,500	−720	+704	−16	−1	−2	−2						
−4,000	−641	+627	−14	−1	−1	−2	−2					
−3,500	−560	+548	−12	−1	−1	−2	−2					
−3,000	−480	+470	−10	0	−1	−2	−2					
−2,800	−448	+439	−9	0	−1	−1	−2					
−2,600	−416	+408	−8	0	−1	−1	−2					
−2,400	−384	+377	−7	0	−1	−1	−2					
−2,200	−352	+345	−7	0	−1	−1	−1					
−2,000	−320	+314	−6	0	−1	−1	−1					
−1,800	−288	+283	−5	0	−1	−1	−1					
−1,600	−256	+251	−5	0	−1	−1	−1					
−1,400	−224	+220	−4	0	−1	−1	−1					
−1,200	−192	+189	−3	0	0	−1	−1					
−1,000	−160	+157	−3	0	0	0	−1					
−900	−144	+141	−3	0	0	0	−1					
−800	−128	+126	−2	0	0	0	−1					
−700	−112	+110	−2	0	0	0	0					
−600	−96	+94	−2	0	0	0	0					
−500	−80	+79	−1	0	0	0	0					
−400	−64	+63	−1	0	0	0	0					
−300	−48	+47	−1	0	0	0	0					
−200	−32	+32	0	0	0	0	0					
−100	−16	+16	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+4	−4	0	0	0	0	0					
200	+9	−9	0	0	0	0	0					
300	+13	−13	0	0	0	0	0					
400	+17	−17	0	0	0	0	0					
500	+21	−21	0	0	0	0	0					
600	+26	−26	0	0	0	0	0					
700	+30	−30	0	0	0	0	0					
800	+35	−34	+1	0	0	0	0					
900	+39	−38	+1	0	0	0	0					
1,000	+43	−42	+1	0	0	0	0					
2,000	+87	−85	+2	0	0	0	0					
3,000	+130	−128	+2	0	0	0	0					
4,000	+174	−171	+3	0	0	+1	0					
5,000	+217	−213	+4	0	0	+1	+1	0				
6,000	+260	−256	+4	0	0	+1	+1	0				
7,000	+304	−299	+5	0	0	+1	+1	0				
8,000	+347	−341	+6	0	+1	+1	+1	0				
9,000	+391	−384	+7	0	+1	+1	+1	0				
10,000	+434	−426	+8	0	+1	+1	+2	0	−1			
11,000	+477	−469	+8	0	+1	+1	+2	0	−1			
12,000	+521	−512	+9	0	+1	+1	+2	0	−1			
13,000	+564	−554	+10	0	+1	+2	+2	−1	−1			
14,000	+607	−597	+10	+1	+1	+2	+2	−1	−1			
15,000	+651	−640	+11	+1	+1	+2	+2	−1	−1	−2		
17,500	+759	−746	+13	+1	+1	+2	+3	−1	−1	−2		
20,000	+867	−852	+15	+1	+2	+2	+3	−1	−1	−2	−3	
25,000	+1,084	−1,065	+19	+1	+2	+3	+4	−1	−2	−3	−4	−5
30,000	+1,301	−1,278	+23	+1	+2	+4		−1	−2	−3	−4	−6

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 14

[Inner radius, 2°33′46″; outer radius, 3°03′05″. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−1,286	+1,265	−21	−1	−2							
−5,500	−1,179	+1,160	−19	−1	−2							
−5,000	−1,072	+1,055	−17	−1	−2	−2						
−4,500	−965	+950	−15	0	−1	−2						
−4,000	−858	+845	−13	0	−1	−2	−2					
−3,500	−751	+740	−11	0	−1	−2	−2					
−3,000	−644	+635	−9	0	−1	−2	−2					
−2,800	−601	+593	−8	0	−1	−1	−2					
−2,600	−558	+550	−8	0	−1	−1	−2					
−2,400	−515	+508	−7	0	−1	−1	−2					
−2,200	−472	+466	−6	0	−1	−1	−2					
−2,000	−429	+423	−6	0	−1	−1	−2					
−1,800	−386	+381	−5	0	−1	−1	−1					
−1,600	−343	+339	−4	0	−1	−1	−1					
−1,400	−301	+297	−4	0	0	−1	−1					
−1,200	−257	+254	−3	0	0	−1	−1					
−1,000	−215	+212	−3	0	0	−1	−1					
−900	−193	+191	−2	0	0	−1	−1					
−800	−172	+170	−2	0	0	−1	−1					
−700	−150	+148	−2	0	0	−1	−1					
−600	−129	+127	−2	0	0	0	0					
−500	−107	+106	−1	0	0	0	0					
−400	−86	+85	−1	0	0	0	0					
−300	−64	+63	−1	0	0	0	0					
−200	−43	+43	0	0	0	0	0					
−100	−21	+21	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+6	−6	0	0	0	0	0					
200	+12	−12	0	0	0	0	0					
300	+17	−17	0	0	0	0	0					
400	+23	−23	0	0	0	0	0					
500	+29	−29	0	0	0	0	0					
600	+35	−35	0	0	0	0	0					
700	+41	−40	+1	0	0	0	0					
800	+47	−46	+1	0	0	0	0					
900	+53	−52	+1	0	0	0	+1					
1,000	+58	−57	+1	0	0	0	+1					
2,000	+116	−115	+1	0	0	0	+1					
3,000	+174	−172	+2	0	0	0	+1					
4,000	+233	−230	+3	0	0	0	+1					
5,000	+291	−287	+4	0	0	0	+1	0				
6,000	+349	−345	+4	0	0	0	+1	0				
7,000	+407	−402	+5	0	0	+1	+1	0				
8,000	+465	−460	+5	0	0	+1	+1	0				
9,000	+523	−517	+6	0	0	+1	+1	−1				
10,000	+581	−574	+7	0	0	+1	+2	−1	−1			
11,000	+640	−632	+8	0	0	+1	+2	−1	−1			
12,000	+697	−689	+8	0	+1	+1	+2	−1	−1			
13,000	+756	−747	+9	0	+1	+2	+2	−1	−1			
14,000	+814	−804	+10	0	+1	+2	+2	−1	−1			
15,000	+872	−862	+10	0	+1	+2	+2	−1	−1			
17,500	+1,017	−1,005	+12	0	+1	+2	+3	−1	−1	−2		
20,000	+1,162	−1,148	+14	+1	+2	+2	+3	−1	−1	−2	−3	
25,000	+1,452	−1,435	+17	+1	+2	+3	+4	−1	−2	−3	−4	−5
30,000	+1,743	−1,722	+21	+1	+2	+3		−1	−2	−4	−4	−6

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 13

[Inner radius, 3°03′05″; outer radius, 4°19′13″. 16 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−209	+207	−2	0	0							
−5,500	−192	+190	−2	0	0							
−5,000	−174	+173	−1	0	0	0						
−4,500	−156	+155	−1	0	0	0						
−4,000	−139	+138	−1	0	0	0	0					
−3,500	−122	+121	−1	0	0	0	0					
−3,000	−105	+104	−1	0	0	0	0					
−2,800	−98	+97	−1	0	0	0	0					
−2,600	−91	+90	−1	0	0	0	0					
−2,400	−84	+83	−1	0	0	0	0					
−2,200	−77	+76	−1	0	0	0	0					
−2,000	−69	+69	0	0	0	0	0					
−1,800	−62	+62	0	0	0	0	0					
−1,600	−56	+56	0	0	0	0	0					
−1,400	−49	+49	0	0	0	0	0					
−1,200	−42	+42	0	0	0	0	0					
−1,000	−35	+35	0	0	0	0	0					
−900	−31	+31	0	0	0	0	0					
−800	−28	+28	0	0	0	0	0					
−700	−24	+24	0	0	0	0	0					
−600	−21	+21	0	0	0	0	0					
−500	−17	+17	0	0	0	0	0					
−400	−14	+14	0	0	0	0	0					
−300	−10	+10	0	0	0	0	0					
−200	−7	+7	0	0	0	0	0					
−100	−4	+4	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+1	−1	0	0	0	0	0					
200	+2	−2	0	0	0	0	0					
300	+3	−3	0	0	0	0	0					
400	+4	−4	0	0	0	0	0					
500	+5	−5	0	0	0	0	0					
600	+6	−6	0	0	0	0	0					
700	+7	−7	0	0	0	0	0					
800	+8	−8	0	0	0	0	0					
900	+8	−8	0	0	0	0	0					
1,000	+9	−9	0	0	0	0	0					
2,000	+19	−19	0	0	0	0	0					
3,000	+28	−28	0	0	0	0	0					
4,000	+38	−38	0	0	0	0	0					
5,000	+47	−47	0	0	0	0	0	0				
6,000	+56	−56	0	0	0	0	0	0				
7,000	+66	−66	0	0	0	0	0	0				
8,000	+75	−75	0	0	0	0	0	0				
9,000	+85	−85	0	0	0	0	0	0				
10,000	+94	−94	0	0	0	0	0	0	0			
11,000	+104	−103	+1	0	0	0	0	0	0			
12,000	+113	−112	+1	0	0	0	0	0	0			
13,000	+123	−122	+1	0	0	0	0	0	0			
14,000	+132	−131	+1	0	0	0	0	0	0			
15,000	+142	−141	+1	0	0	0	0	0	0	0		
17,500	+165	−164	+1	0	0	0	0	0	0	0		
20,000	+189	−188	+1	0	0	0	0	0	0	0	0	
25,000	+235	−234	+1	0	0	0	0	0	0	0	0	0
30,000	+283	−281	+2	0	0	0		0	0	0	0	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 12

[Inner radius, 4°19′13″; outer radius, 5°46′34″. 10 compartments

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−383	+382	−1	0	0							
−5,500	−351	+350	−1	0	0	0						
−5,000	−319	+318	−1	0	0	0						
−4,500	−288	+287	−1	0	0	0						
−4,000	−256	+255	−1	0	0	0	0					
−3,500	−223	+223	0	0	0	0	0					
−3,000	−191	+191	0	0	0	0	0					
−2,800	−179	+179	0	0	0	0	0					
−2,600	−166	+166	0	0	0	0	0					
−2,400	−153	+153	0	0	0	0	0					
−2,200	−140	+140	0	0	0	0	0					
−2,000	−128	+128	0	0	0	0	0					
−1,800	−115	+115	0	0	0	0	0					
−1,600	−102	+102	0	0	0	0	0					
−1,400	−89	+89	0	0	0	0	0					
−1,200	−77	+77	0	0	0	0	0					
−1,000	−64	+64	0	0	0	0	0					
−900	−58	+58	0	0	0	0	0					
−800	−51	+51	0	0	0	0	0					
−700	−45	+45	0	0	0	0	0					
−600	−38	+38	0	0	0	0	0					
−500	−32	+32	0	0	0	0	0					
−400	−26	+26	0	0	0	0	0					
−300	−19	+19	0	0	0	0	0					
−200	−13	+13	0	0	0	0	0					
−100	−6	+6	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+2	−2	0	0	0	0	0					
200	+4	−4	0	0	0	0	0					
300	+5	−5	0	0	0	0	0					
400	+7	−7	0	0	0	0	0					
500	+9	−9	0	0	0	0	0					
600	+10	−1	0	0	0	0	0					
700	+12	−12	0	0	0	0	0					
800	+14	−14	0	0	0	0	0					
900	+16	−16	0	0	0	0	0					
1,000	+17	−17	0	0	0	0	0					
2,000	+35	−35	0	0	0	0	0					
3,000	+52	−52	0	0	0	0	0					
4,000	+69	−69	0	0	0	0	0					
5,000	+86	−86	0	0	0	0	0	0				
6,000	+104	−104	0	0	0	0	0	0				
7,000	+121	−121	0	0	0	0	0	0				
8,000	+138	−138	0	0	0	0	0	0				
9,000	+156	−156	0	0	0	0	0	0				
10,000	+173	−173	0	0	0	0	0	0	0			
11,000	+190	−190	0	0	0	0	0	0	0			
12,000	+208	−208	0	0	0	0	0	0	0			
13,000	+225	−225	0	0	0	0	0	0	0			
14,000	+242	−242	0	0	0	0	0	0	0			
15,000	+259	−259	0	0	0	0	0	0	0	0		
17,500	+303	−302	+1	0	0	0	0	0	0	0		
20,000	+346	−345	+1	0	0	0	0	0	0	0	0	
25,000	+433	−432	+1	0	0	0	0	0	0	0	0	0
30,000	+519	−518	+1	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 11

[Inner radius, 5°46′34″; outer radius, 7°51′30″. 8 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−684	+684	0	0	0							
−5,500	−627	+627	0	0	0							
−5,000	−570	+570	0	0	0	0						
−4,500	−513	+513	0	0	0	0						
−4,000	−456	+456	0	0	0	0	0					
−3,500	−399	+399	0	0	0	0	0					
−3,000	−342	+342	0	0	0	0	0					
−2,800	−320	+320	0	0	0	0	0					
−2,600	−297	+297	0	0	0	0	0					
−2,400	−274	+274	0	0	0	0	0					
−2,200	−251	+251	0	0	0	0	0					
−2,000	−228	+228	0	0	0	0	0					
−1,800	−206	+206	0	0	0	0	0					
−1,600	−183	+183	0	0	0	0	0					
−1,400	−160	+160	0	0	0	0	0					
−1,200	−137	+137	0	0	0	0	0					
−1,000	−114	+114	0	0	0	0	0					
−900	−103	+103	0	0	0	0	0					
−800	−91	+91	0	0	0	0	0					
−700	−80	+80	0	0	0	0	0					
−600	−69	+69	0	0	0	0	0					
−500	−57	+57	0	0	0	0	0					
−400	−46	+46	0	0	0	0	0					
−300	−34	+34	0	0	0	0	0					
−200	−23	+23	0	0	0	0	0					
−100	−11	+11	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+3	−3	0	0	0	0	0					
200	+6	−6	0	0	0	0	0					
300	+9	−9	0	0	0	0	0					
400	+12	−12	0	0	0	0	0					
500	+15	−15	0	0	0	0	0					
600	+19	−19	0	0	0	0	0					
700	+22	−22	0	0	0	0	0					
800	+25	−25	0	0	0	0	0					
900	+28	−28	0	0	0	0	0					
1,000	+31	−31	0	0	0	0	0					
2,000	+62	−62	0	0	0	0	0					
3,000	+93	−93	0	0	0	0	0					
4,000	+124	−124	0	0	0	0	0					
5,000	+155	−155	0	0	0	0	0	0				
6,000	+186	−186	0	0	0	0	0	0				
7,000	+217	−217	0	0	0	0	0	0				
8,000	+248	−248	0	0	0	0	0	0				
9,000	+278	−278	0	0	0	0	0	0				
10,000	+309	−309	0	0	0	0	0	0	0			
11,000	+340	−340	0	0	0	0	0	0	0			
12,000	+371	−371	0	0	0	0	0	0	0			
13,000	+402	−402	0	0	0	0	0	0	0			
14,000	+433	−433	0	0	0	0	0	0	0			
15,000	+464	−464	0	0	0	0	0	0	0	0		
17,500	+541	−541	0	0	0	0	0	0	0	0		
20,000	+618	−619	−1	0	0	0	0	0	0	0	0	
25,000	+772	−773	−1	0	0	0	0	0	0	0	0	0
30,000	+927	−928	−1	0	0	0		0	0	0	0	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 10

[Inner radius, 7°51′30″; outer radius, 10°44′. 6 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−1,258	+1,261	+3	0	0							
−5,500	−1,153	+1,156	+3	0	0							
−5,000	−1,049	+1,051	+2	0	0	0						
−4,500	−944	+946	+2	0	0	0						
−4,000	−839	+841	+2	0	0	0	0					
−3,500	−734	+736	+2	0	0	0	0					
−3,000	−630	+631	+1	0	0	0	0					
−2,800	−588	+589	+1	0	0	0	0					
−2,600	−546	+547	+1	0	0	0	0					
−2,400	−504	+505	+1	0	0	0	0					
−2,200	−462	+463	+1	0	0	0	0					
−2,000	−420	+421	+1	0	0	0	0					
−1,800	−378	+379	+1	0	0	0	0					
−1,600	−336	+337	+1	0	0	0	0					
−1,400	−294	+295	+1	0	0	0	0					
−1,200	−252	+252	0	0	0	0	0					
−1,000	−210	+210	0	0	0	0	0					
−900	−189	+189	0	0	0	0	0					
−800	−168	+168	0	0	0	0	0					
−700	−147	+147	0	0	0	0	0					
−600	−126	+126	0	0	0	0	0					
−500	−105	+105	0	0	0	0	0					
−400	−84	+84	0	0	0	0	0					
−300	−63	+63	0	0	0	0	0					
−200	−42	+42	0	0	0	0	0					
−100	−21	+21	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+6	−6	0	0	0	0	0					
200	+11	−11	0	0	0	0	0					
300	+17	−17	0	0	0	0	0					
400	+23	−23	0	0	0	0	0					
500	+28	−28	0	0	0	0	0					
600	+34	−34	0	0	0	0	0					
700	+40	−40	0	0	0	0	0					
800	+46	−46	0	0	0	0	0					
900	+51	−51	0	0	0	0	0					
1,000	+57	−57	0	0	0	0	0					
2,000	+114	−114	0	0	0	0	0					
3,000	+171	−171	0	0	0	0	0					
4,000	+227	−228	−1	0	0	0	0					
5,000	+284	−285	−1	0	0	0	0	0				
6,000	+341	−342	−1	0	0	0	0	0				
7,000	+398	−399	−1	0	0	0	0	0				
8,000	+455	−456	−1	0	0	0	0	0				
9,000	+512	−513	−1	0	0	0	0	0				
10,000	+568	−569	−1	0	0	0	0	0	0			
11,000	+625	−626	−1	0	0	0	0	0	0			
12,000	+682	−684	−2	0	0	0	0	0	0			
13,000	+739	−741	−2	0	0	0	0	0	0			
14,000	+795	−797	−2	0	0	0	0	0	0			
15,000	+852	−854	−2	0	0	0	0	0	0	0		
17,500	+994	−996	−2	0	0	0	0	0	0	0		
20,000	+1,136	−1,138	−2	0	0	0	0	0	0	0	0	
25,000	+1,420	−1,423	−3	0	0	0	0	0	0	0	0	0
30,000	+1,704	−1,707	−3	0	0	0		0	0	0	0	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 9

[Inner radius, 10°44′; outer radius, 14°09′. 4 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−2,236	+2,243	+7	0	0							
−5,500	−2,050	+2,056	+6	0	0							
−5,000	−1,864	+1,870	+6	0	0	0						
−4,500	−1,678	+1,683	+5	0	0	0						
−4,000	−1,491	+1,496	+5	0	0	0	0					
−3,500	−1,305	+1,309	+4	0	0	0	0					
−3,000	−1,119	+1,122	+3	0	0	0	0					
−2,800	−1,044	+1,047	+3	0	0	0	0					
−2,600	−970	+973	+3	0	0	0	0					
−2,400	−895	+898	+3	0	0	0	0					
−2,200	−821	+823	+2	0	0	0	0					
−2,000	−746	+748	+2	0	0	0	0					
−1,800	−672	+674	+2	0	0	0	0					
−1,600	−597	+599	+2	0	0	0	0					
−1,400	−522	+524	+2	0	0	0	0					
−1,200	−448	+449	+1	0	0	0	0					
−1,000	−373	+374	+1	0	0	0	0					
−900	−336	+337	+1	0	0	0	0					
−800	−298	+299	+1	0	0	0	0					
−700	−261	+262	+1	0	0	0	0					
−600	−224	+225	+1	0	0	0	0					
−500	−186	+187	+1	0	0	0	0					
−400	−149	+149	0	0	0	0	0					
−300	−112	+112	0	0	0	0	0					
−200	−75	+75	0	0	0	0	0					
−100	−37	+37	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+10	−10	0	0	0	0	0					
200	+20	−20	0	0	0	0	0					
300	+30	−30	0	0	0	0	0					
400	+40	−40	0	0	0	0	0					
500	+50	−50	0	0	0	0	0					
600	+61	−61	0	0	0	0	0					
700	+71	−71	0	0	0	0	0					
800	+81	−81	0	0	0	0	0					
900	+91	−91	0	0	0	0	0					
1,000	+101	−101	0	0	0	0	0					
2,000	+202	−203	−1	0	0	0	0					
3,000	+303	−304	−1	0	0	0	0					
4,000	+404	−405	−1	0	0	0	0					
5,000	+506	−507	−1	0	0	0	0	0				
6,000	+606	−608	−2	0	0	0	0	0				
7,000	+707	−709	−2	0	0	0	0	0				
8,000	+808	−810	−2	0	0	0	0	0				
9,000	+910	−912	−2	0	0	0	0	0				
10,000	+1,010	−1,013	−3	0	0	0	0	0	0			
11,000	+1,112	−1,115	−3	0	0	0	0	0	0			
12,000	+1,212	−1,216	−4	0	0	0	0	0	0			
13,000	+1,313	−1,317	−4	0	0	0	0	0	0			
14,000	+1,414	−1,418	−4	0	0	0	0	0	0			
15,000	+1,516	−1,520	−4	0	0	0	0	0	0	0		
17,500	+1,768	−1,773	−5	0	0	0	0	0	0	0		
20,000	+2,020	−2,026	−6	0	0	0	0	0	0	0	0	
25,000	+2,525	−2,532	−7	0	0	0	0	0	0	0	0	0
30,000	+3,029	−3,037	−8	0	0	0		0	0	0	0	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 8

[Inner radius, 14°09′; outer radius, 20°41′. 4 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−4,252	+4,267	+15	0	0							
−5,500	−3,898	+3,912	+14	0	0							
−5,000	−3,544	+3,557	+13	0	0	0						
−4,500	−3,190	+3,201	+11	0	0	0						
−4,000	−2,836	+2,846	+10	0	0	0	0					
−3,500	−2,482	+2,491	+9	0	0	0	0					
−3,000	−2,128	+2,135	+7	0	0	0	0					
−2,800	−1,985	+1,992	+7	0	0	0	0					
−2,600	−1,844	+1,850	+6	0	0	0	0					
−2,400	−1,702	+1,708	+6	0	0	0	0					
−2,200	−1,561	+1,566	+5	0	0	0	0					
−2,000	−1,418	+1,423	+5	0	0	0	0					
−1,800	−1,277	+1,281	+4	0	0	0	0					
−1,600	−1,135	+1,139	+4	0	0	0	0					
−1,400	−993	+996	+3	0	0	0	0					
−1,200	−851	+854	+3	0	0	0	0					
−1,000	−710	+712	+2	0	0	0	0					
−900	−639	+641	+	0	0	0	0					
−800	−568	+570	+2	0	0	0	0					
−700	−496	+498	+2	0	0	0	0					
−600	−426	+427	+1	0	0	0	0					
−500	−355	+356	+1	0	0	0	0					
−400	−284	+285	+1	0	0	0	0					
−300	−213	+214	+1	0	0	0	0					
−200	−142	+143	+1	0	0	0	0					
−100	−71	+71	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+19	−19	0	0	0	0	0					
200	+38	−38	0	0	0	0	0					
300	+58	−58	0	0	0	0	0					
400	+77	−77	0	0	0	0	0					
500	+96	−96	0	0	0	0	0					
600	+115	−115	0	0	0	0	0					
700	+135	−135	0	0	0	0	0					
800	+154	−154	0	0	0	0	0					
900	+173	−174	−1	0	0	0	0					
1,000	+192	−193	−1	0	0	0	0					
2,000	+385	−386	−1	0	0	0	0					
3,000	+576	−578	−2	0	0	0	0					
4,000	+768	−771	−3	0	0	0	0					
5,000	+961	−964	−3	0	0	0	0	0				
6,000	+1,153	−1,157	−4	0	0	0	0	0				
7,000	+1,345	−1,349	−4	0	0	0	0	0				
8,000	+1,537	−1,542	−5	0	0	0	0	0				
9,000	+1,729	−1,735	−6	0	0	0	0	0				
10,000	+1,921	−1,927	−6	0	0	0	0	0	0			
11,000	+2,113	−2,120	−7	0	0	0	0	0	0			
12,000	+2,305	−2,313	−8	0	0	0	0	0	0			
13,000	+2,497	−2,505	−8	0	0	0	0	0	0			
14,000	+2,689	−2,698	−9	0	0	0	0	0	0			
15,000	+2,881	−2,890	−9	0	0	0	0	0	0	0		
17,500	+3,361	−3,372	−11	0	0	0	0	0	0	0		
20,000	+3,841	−3,853	−12	0	0	0	0	0	0	0	0	
25,000	+4,800	−4,815	−15	0	0	0	0	0	0	0	0	−1
30,000	+5,759	−5,776	−17	0	0	0		0	0	0	−1	−1

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 7

[Inner radius, 20°41′; outer radius, 26°41′. 2 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−7,733	+7,763	+30	0	0							
−5,500	−7,089	+7,117	+28	0	0							
−5,000	−6,445	+6,470	+25	0	0	0						
−4,500	−5,802	+5,824	+22	0	0	0						
−4,000	−5,157	+5,177	+20	0	0	0	0					
−3,500	−4,513	+4,530	+17	0	0	0	0					
−3,000	−3,869	+3,883	+14	0	0	0	0					
−2,800	−3,611	+3,624	+13	0	0	0	0					
−2,600	−3,354	+3,366	+12	0	0	0	0					
−2,400	−3,096	+3,107	+11	0	0	0	0					
−2,200	−2,838	+2,848	+10	0	0	0	0					
−2,000	−2,580	+2,590	+10	0	0	0	0					
−1,800	−2,322	+2,331	+9	0	0	0	0					
−1,600	−2,064	+2,071	+7	0	0	0	0					
−1,400	−1,806	+1,812	+6	0	0	0	0					
−1,200	−1,548	+1,553	+5	0	0	0	0					
−1,000	−1,290	+1,294	+4	0	0	0	0					
−900	−1,161	+1,165	+4	0	0	0	0					
−800	−1,032	+1,036	+4	0	0	0	0					
−700	−903	+906	+3	0	0	0	0					
−600	−774	+777	+3	0	0	0	0					
−500	−645	+647	+2	0	0	0	0					
−400	−516	+518	+2	0	0	0	0					
−300	−387	+388	+1	0	0	0	0					
−200	−258	+259	+1	0	0	0	0					
−100	−129	+130	+1	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+35	−35	0	0	0	0	0					
200	+70	−70	0	0	0	0	0					
300	+105	−105	0	0	0	0	0					
400	+140	−140	0	0	0	0	0					
500	+175	−175	0	0	0	0	0					
600	+209	−210	−1	0	0	0	0					
700	+244	−245	−1	0	0	0	0					
800	+279	−280	−1	0	0	0	0					
900	+315	−316	−1	0	0	0	0					
1,000	+350	−351	−1	0	0	0	0					
2,000	+699	−701	−2	0	0	0	0					
3,000	+1,048	−1,052	−4	0	0	0	0					
4,000	+1,398	−1,403	−5	0	0	0	0					
5,000	+1,747	−1,753	−6	0	0	0	0	0				
6,000	+2,097	−2,104	−7	0	0	0	0	0				
7,000	+2,446	−2,454	−8	0	0	0	0	0				
8,000	+2,795	−2,805	−10	0	0	0	0	0				
9,000	+3,145	−3,155	−10	0	0	0	0	0				
10,000	+3,494	−3,506	−12	0	0	0	0	0	0			
11,000	+3,843	−3,856	−13	0	0	0	0	0	0			
12,000	+4,192	−4,207	−15	0	0	0	0	0	0			
13,000	+4,542	−4,557	−15	0	0	0	0	0	0			
14,000	+4,891	−4,908	−17	0	0	0	0	0	0			
15,000	+5,240	−5,258	−18	0	0	0	0	0	0	0		
17,500	+6,113	−6,133	−20	0	0	0	0	0	0	0		
20,000	+6,985	−7,008	−23	0	0	0	0	0	0	0	0	
25,000	+8,730	−8,758	−28	0	0	0	0	0	0	0	0	−1
30,000	+10,474	−10,507	−33	0	0	+1		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 6

[Inner radius, 26°41′; outer radius, 35°58′. 18 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−1,308	+1,313	+5	0	0							
−5,500	−1,199	+1,204	+5	0	0	0						
−5,000	−1,090	+1,094	+4	0	0	0						
−4,500	−981	+985	+4	0	0	0	0					
−4,000	−872	+875	+3	0	0	0	0					
−3,500	−763	+766	+3	0	0	0	0					
−3,000	−654	+657	+3	0	0	0	0					
−2,800	−611	+613	+2	0	0	0	0					
−2,600	−567	+569	+2	0	0	0	0					
−2,400	−523	+525	+2	0	0	0	0					
−2,200	−480	+482	+2	0	0	0	0					
−2,000	−436	+438	+2	0	0	0	0					
−1,800	−392	+394	+2	0	0	0	0					
−1,600	−349	+350	+1	0	0	0	0					
−1,400	−305	+306	+1	0	0	0	0					
−1,200	−262	+263	+1	0	0	0	0					
−1,000	−218	+219	+1	0	0	0	0					
−900	−196	+197	+1	0	0	0	0					
−800	−174	+175	+1	0	0	0	0					
−700	−153	+153	0	0	0	0	0					
−600	−131	+131	0	0	0	0	0					
−500	−109	+109	0	0	0	0	0					
−400	−87	+87	0	0	0	0	0					
−300	−66	+66	0	0	0	0	0					
−200	−44	+44	0	0	0	0	0					
−100	−22	+22	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+6	−6	0	0	0	0	0					
200	+12	−12	0	0	0	0	0					
300	+18	−18	0	0	0	0	0					
400	+24	−24	0	0	0	0	0					
500	+30	−30	0	0	0	0	0					
600	+36	−36	0	0	0	0	0					
700	+41	−41	0	0	0	0	0					
800	+47	−47	0	0	0	0	0					
900	+53	−53	0	0	0	0	0					
1,000	+59	−59	0	0	0	0	0					
2,000	+118	−118	0	0	0	0	0					
3,000	+177	−178	−1	0	0	0	0					
4,000	+236	−237	−1	0	0	0	0					
5,000	+295	−296	−1	0	0	0	0	0				
6,000	+355	−356	−1	0	0	0	0	0				
7,000	+413	−415	−2	0	0	0	0	0				
8,000	+472	−474	−2	0	0	0	0	0				
9,000	+532	−534	−2	0	0	0	0	0				
10,000	+591	−593	−2	0	0	0	0	0	0			
11,000	+650	−652	−2	0	0	0	0	0	0			
12,000	+709	−711	−2	0	0	0	0	0	0			
13,000	+768	−771	−3	0	0	0	0	0	0			
14,000	+827	−830	−3	0	0	0	0	0	0			
15,000	+886	−889	−3	0	0	0	0	0	0	0		
17,500	+1,034	−1,037	−3	0	0	0	0	0	0	0		
20,000	+1,181	−1,185	−4	0	0	0	0	0	0	0	0	
25,000	+1,476	−1,481	−5	0	0	0	0	0	0	0	0	0
30,000	+1,771	−1,777	−6	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 5

[Inner radius, 35°58′; outer radius, 51°04′. 16 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−2,307	+2,317	+10	0	0							
−5,500	−2,115	+2,124	+9	0	0	0						
−5,000	−1,923	+1,931	+8	0	0	0						
−4,500	−1,731	+1,738	+7	0	0	0	0					
−4,000	−1,539	+1,545	+6	0	0	0	0					
−3,500	−1,347	+1,352	+5	0	0	0	0					
−3,000	−1,154	+1,159	+5	0	0	0	0					
−2,800	−1,077	+1,081	+4	0	0	0	0					
−2,600	−1,000	+1,004	+4	0	0	0	0					
−2,400	−924	+927	+3	0	0	0	0					
−2,200	−847	+850	+3	0	0	0	0					
−2,000	−770	+773	+3	0	0	0	0					
−1,800	−693	+696	+3	0	0	0	0					
−1,600	−616	+618	+2	0	0	0	0					
−1,400	−539	+541	+2	0	0	0	0					
−1,200	−462	+464	+2	0	0	0	0					
−1,000	−385	+386	+1	0	0	0	0					
−900	−347	+348	+1	0	0	0	0					
−800	−308	+309	+1	0	0	0	0					
−700	−269	+270	+1	0	0	0	0					
−600	−231	+232	+1	0	0	0	0					
−500	−192	+193	+1	0	0	0	0					
−400	−154	+154	0	0	0	0	0					
−300	−116	+116	0	0	0	0	0					
−200	−77	+77	0	0	0	0	0					
−100	−39	+39	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+10	−10	0	0	0	0	0					
200	+21	−21	0	0	0	0	0					
300	+31	−31	0	0	0	0	0					
400	+42	−42	0	0	0	0	0					
500	+52	−52	0	0	0	0	0					
600	+63	−63	0	0	0	0	0					
700	+73	−73	0	0	0	0	0					
800	+84	−84	0	0	0	0	0					
900	+94	−94	0	0	0	0	0					
1,000	+104	−104	0	0	0	0	0					
2,000	+208	−209	−1	0	0	0	0					
3,000	+313	−314	−1	0	0	0	0					
4,000	+417	−419	−2	0	0	0	0					
5,000	+521	−523	−2	0	0	0	0	0				
6,000	+626	−628	−2	0	0	0	0	0				
7,000	+730	−732	−2	0	0	0	0	0				
8,000	+834	−837	−3	0	0	0	0	0				
9,000	+938	−941	−3	0	0	0	0	0				
10,000	+1,042	−1,046	−4	0	0	0	0	0	0			
11,000	+1,147	−1,151	−4	0	0	0	0	0	0			
12,000	+1,251	−1,255	−4	0	0	0	0	0	0			
13,000	+1,355	−1,360	−5	0	0	0	0	0	0			
14,000	+1,459	−1,464	−5	0	0	0	0	0	0			
15,000	+1,563	−1,569	−6	0	0	0	0	0	0	0		
17,500	+1,824	−1,830	−6	0	0	0	0	0	0	0		
20,000	+2,084	−2,091	−7	0	0	0	0	0	0	0	0	
25,000	+2,604	−2,613	−9	0	0	0	0	0	0	0	0	0
30,000	+3,125	−3,135	−10	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 4

[Inner radius, 51°04′; outer radius, 72°13′. 12 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−3,981	+3,998	+17	0	0							
−5,500	−3,650	+3,665	+15	0	0							
−5,000	−3,318	+3,332	+14	0	0	0						
−4,500	−2,987	+2,999	+12	0	0	0						
−4,000	−2,655	+2,666	+11	0	0	0	0					
−3,500	−2,324	+2,333	+9	0	0	0	0					
−3,000	−1,992	+2,000	+8	0	0	0	0					
−2,800	−1,859	+1,866	+7	0	0	0	0					
−2,600	−1,726	+1,733	+7	0	0	0	0					
−2,400	−1,594	+1,600	+6	0	0	0	0					
−2,200	−1,461	+1,467	+6	0	0	0	0					
−2,000	−1,328	+1,333	+5	0	0	0	0					
−1,800	−1,195	+1,200	+5	0	0	0	0					
−1,600	−1,063	+1,067	+4	0	0	0	0					
−1,400	−930	+933	+3	0	0	0	0					
−1,200	−797	+800	+3	0	0	0	0					
−1,000	−664	+666	+2	0	0	0	0					
−900	−598	+600	+2	0	0	0	0					
−800	−531	+533	+2	0	0	0	0					
−700	−465	+467	+2	0	0	0	0					
−600	−399	+400	+1	0	0	0	0					
−500	−332	+333	+1	0	0	0	0					
−400	−266	+267	+1	0	0	0	0					
−300	−199	+200	+1	0	0	0	0					
−200	−133	+134	+1	0	0	0	0					
−100	−66	+66	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+18	−18	0	0	0	0	0					
200	+36	−36	0	0	0	0	0					
300	+54	−54	0	0	0	0	0					
400	+72	−72	0	0	0	0	0					
500	+90	−90	0	0	0	0	0					
600	+108	−108	0	0	0	0	0					
700	+126	−126	0	0	0	0	0					
800	+144	−144	0	0	0	0	0					
900	+162	−163	−1	0	0	0	0					
1,000	+180	−181	−1	0	0	0	0					
2,000	+360	−361	−1	0	0	0	0					
3,000	+540	−542	−2	0	0	0	0					
4,000	+720	−723	−3	0	0	0	0					
5,000	+900	−903	−3	0	0	0	0	0				
6,000	+1,079	−1,083	−4	0	0	0	0	0				
7,000	+1,259	−1,264	−5	0	0	0	0	0				
8,000	+1,439	−1,444	−5	0	0	0	0	0				
9,000	+1,619	−1,625	−6	0	0	0	0	0				
10,000	+1,799	−1,805	−6	0	0	0	0	0	0			
11,000	+1,979	−1,986	−7	0	0	0	0	0	0			
12,000	+2,158	−2,166	−8	0	0	0	0	0	0			
13,000	+2,338	−2,346	−8	0	0	0	0	0	0			
14,000	+2,518	−2,527	−9	0	0	0	0	0	0			
15,000	+2,698	−2,707	−9	0	0	0	0	0	0	0		
17,500	+3,147	−3,158	−11	0	0	0	0	0	0	0		
20,000	+3,596	−3,609	−13	0	0	0	0	0	0	0	0	
25,000	+4,494	−4,510	−16	0	0	0	0	0	0	0	0	0
30,000	+5,392	−5,410	−18	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 3

[Inner radius, 72°13′; outer radius, 105°48′. 10 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−6,286	+6,312	+26	0	0							
−5,500	−5,763	+5,787	+24	0	0							
−5,000	−5,239	+5,261	+22	0	0	0						
−4,500	−4,716	+4,735	+19	0	0	0						
−4,000	−4,193	+4,210	+17	0	0	0	0					
−3,500	−3,669	+3,684	+15	0	0	0	0					
−3,000	−3,145	+3,158	+13	0	0	0	0					
−2,800	−2,936	+2,947	+11	0	0	0	0					
−2,600	−2,726	+2,737	+11	0	0	0	0					
−2,400	−2,516	+2,526	+10	0	0	0	0					
−2,200	−2,307	+2,316	+9	0	0	0	0					
−2,000	−2,097	+2,105	+8	0	0	0	0					
−1,800	−1,888	+1,895	+7	0	0	0	0					
−1,600	−1,678	+1,684	+6	0	0	0	0					
−1,400	−1,468	+1,474	+6	0	0	0	0					
−1,200	−1,258	+1,263	+5	0	0	0	0					
−1,000	−1,049	+1,053	+4	0	0	0	0					
−900	−944	+948	+4	0	0	0	0					
−800	−839	+842	+3	0	0	0	0					
−700	−734	+737	+3	0	0	0	0					
−600	−629	+631	+2	0	0	0	0					
−500	−524	+526	+2	0	0	0	0					
−400	−420	+421	+1	0	0	0	0					
−300	−315	+316	+1	0	0	0	0					
−200	−210	+211	+1	0	0	0	0					
−100	−105	+105	0	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+28	−28	0	0	0	0	0					
200	+57	−57	0	0	0	0	0					
300	+85	−85	0	0	0	0	0					
400	+114	−114	0	0	0	0	0					
500	+142	−142	0	0	0	0	0					
600	+170	−171	−1	0	0	0	0					
700	+199	−200	−1	0	0	0	0					
800	+227	−228	−1	0	0	0	0					
900	+256	−257	−1	0	0	0	0					
1,000	+284	−285	−1	0	0	0	0					
2,000	+568	−570	−2	0	0	0	0					
3,000	+852	−855	−3	0	0	0	0					
4,000	+1,136	−1,140	−4	0	0	0	0					
5,000	+1,420	−1,425	−5	0	0	0	0	0				
6,000	+1,704	−1,710	−6	0	0	0	0	0				
7,000	+1,988	−1,995	−7	0	0	0	0	0				
8,000	+2,272	−2,280	−8	0	0	0	0	0				
9,000	+2,556	−2,565	−9	0	0	0	0	0				
10,000	+2,840	−2,850	−10	0	0	0	0	0	0			
11,000	+3,124	−3,135	−11	0	0	0	0	0	0			
12,000	+3,408	−3,420	−12	0	0	0	0	0	0			
13,000	+3,692	−3,705	−13	0	0	0	0	0	0			
14,000	+3,976	−3,990	−14	0	0	0	0	0	0			
15,000	+4,260	−4,275	−15	0	0	0	0	0	0	0		
17,500	+4,969	−4,987	−18	0	0	0	0	0	0	0		
20,000	+5,678	−5,698	−20	0	0	0	0	0	0	0	0	
25,000	+7,097	−7,121	−24	0	0	0	0	0	0	0	0	0
30,000	+8,515	−8,544	−29	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 2

[Inner radius, 105°48′; outer radius, 150°56′. 6 compartments]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−8,573	+8,609	+36	0	0							
−5,500	−7,859	+7,892	+33	0	0							
−5,000	−7,146	+7,175	+29	0	0	0						
−4,500	−6,432	+6,458	+26	0	0	0						
−4,000	−5,718	+5,741	+23	0	0	0	0					
−3,500	−5,004	+5,024	+20	0	0	0	0					
−3,000	−4,289	+4,306	+17	0	0	0	0					
−2,800	−4,003	+4,019	+16	0	0	0	0					
−2,600	−3,717	+3,732	+15	0	0	0	0					
−2,400	−3,432	+3,445	+13	0	0	0	0					
−2,200	−3,146	+3,158	+12	0	0	0	0					
−2,000	−2,860	+2,871	+11	0	0	0	0					
−1,800	−2,574	+2,584	+10	0	0	0	0					
−1,600	−2,288	+2,297	+9	0	0	0	0					
−1,400	−2,002	+2,010	+8	0	0	0	0					
−1,200	−1,717	+1,723	+6	0	0	0	0					
−1,000	−1,430	+1,435	+5	0	0	0	0					
−900	−1,287	+1,292	+5	0	0	0	0					
−800	−1,144	+1,149	+5	0	0	0	0					
−700	−1,001	+1,005	+4	0	0	0	0					
−600	−858	+861	+3	0	0	0	0					
−500	−715	+718	+3	0	0	0	0					
−400	−572	+574	+2	0	0	0	0					
−300	−429	+431	+2	0	0	0	0					
−200	−286	+287	+1	0	0	0	0					
−100	−143	+144	+1	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+39	−39	0	0	0	0	0					
200	+78	−78	0	0	0	0	0					
300	+116	−116	0	0	0	0	0					
400	+166	−156	0	0	0	0	0					
500	+194	−194	0	0	0	0	0					
600	+232	−233	−1	0	0	0	0					
700	+271	−272	−1	0	0	0	0					
800	+310	−311	−1	0	0	0	0					
900	+349	−350	−1	0	0	0	0					
1,000	+387	−389	−2	0	0	0	0					
2,000	+775	−778	−3	0	0	0	0					
3,000	+1,162	−1,167	−5	0	0	0	0					
4,000	+1,550	−1,556	−6	0	0	0	0					
5,000	+1,937	−1,944	−7	0	0	0	0	0				
6,000	+2,324	−2,333	−9	0	0	0	0	0				
7,000	+2,712	−2,722	−10	0	0	0	0	0				
8,000	+3,099	−3,110	−11	0	0	0	0	0				
9,000	+3,486	−3,499	−13	0	0	0	0	0				
10,000	+3,873	−3,887	−14	0	0	0	0	0	0			
11,000	+4,260	−4,276	−16	0	0	0	0	0	0			
12,000	+4,648	−4,665	−17	0	0	0	0	0	0			
13,000	+5,035	−5,053	−18	0	0	0	0	0	0			
14,000	+5,422	−5,442	−20	0	0	0	0	0	0			
15,000	+5,809	−5,830	−21	0	0	0	0	0	0	0		
17,500	+6,777	−6,801	−24	0	0	0	0	0	0	0		
20,000	+7,744	−7,771	−27	0	0	0	0	0	0	0	0	
25,000	+9,678	−9,712	−34	0	0	0	0	0	0	0	0	0
30,000	+11,612	−11,651	−39	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

Table 10.—SPECIAL BOWIE ISOSTATIC REDUCTION TABLES—DEPTH OF COMPENSATION, 96 KILOMETERS [1]—Continued

Zone 1

[Inner radius, 150°56′; outer radius, 180°. 1 compartment]

Mean elevation of compartment	Correction for—			Correction for elevation of station								
				Above compartment				Below compartment				
	Topography	Compensation	Topography and compensation	5,000 feet	10,000 feet	15,000 feet	20,000 feet	5,000 feet	10,000 feet	15,000 feet	20,000 feet	25,000 feet
Fathoms:												
−6,000	−9,658	+9,699	+41	0	0							
−5,500	−8,854	+8,891	+37	0	0	0						
−5,000	−8,050	+8,083	+33	0	0	0						
−4,500	−7,246	+7,276	+30	0	0	0	0					
−4,000	−6,441	+6,467	+26	0	0	0	0					
−3,500	−5,637	+5,660	+23	0	0	0	0					
−3,000	−4,832	+4,851	+19	0	0	0	0					
−2,800	−4,510	+4,528	+18	0	0	0	0					
−2,600	−4,188	+4,205	+17	0	0	0	0					
−2,400	−3,866	+3,881	+15	0	0	0	0					
−2,200	−3,544	+3,558	+14	0	0	0	0					
−2,000	−3,222	+3,235	+13	0	0	0	0					
−1,800	−2,900	+2,911	+11	0	0	0	0					
−1,600	−2,578	+2,588	+10	0	0	0	0					
−1,400	−2,256	+2,264	+8	0	0	0	0					
−1,200	−1,934	+1,941	+7	0	0	0	0					
−1,000	−1,611	+1,617	+6	0	0	0	0					
−900	−1,450	+1,456	+6	0	0	0	0					
−800	−1,289	+1,294	+5	0	0	0	0					
−700	−1,128	+1,132	+4	0	0	0	0					
−600	−967	+971	+4	0	0	0	0					
−500	−806	+809	+3	0	0	0	0					
−400	−645	+647	+2	0	0	0	0					
−300	−483	+485	+2	0	0	0	0					
−200	−323	+324	+1	0	0	0	0					
−100	−161	+162	+1	0	0	0	0					
0	0	0	0	0	0	0	0					
Feet:												
0	0	0	0	0	0	0	0					
100	+44	−44	0	0	0	0	0					
200	+87	−87	0	0	0	0	0					
300	+131	−131	0	0	0	0	0					
400	+175	−175	0	0	0	0	0					
500	+218	−219	−1	0	0	0	0					
600	+262	−263	−1	0	0	0	0					
700	+306	−307	−1	0	0	0	0					
800	+349	−350	−1	0	0	0	0					
900	+393	−395	−2	0	0	0	0					
1,000	+436	−438	−2	0	0	0	0					
2,000	+873	−876	−3	0	0	0	0					
3,000	+1,309	−1,314	−5	0	0	0	0					
4,000	+1,746	−1,752	−6	0	0	0	0					
5,000	+2,182	−2,190	−8	0	0	0	0	0				
6,000	+2,618	−2,628	−10	0	0	0	0	0				
7,000	+3,055	−3,066	−11	0	0	0	0	0				
8,000	+3,491	−3,504	−13	0	0	0	0	0				
9,000	+3,928	−3,942	−14	0	0	0	0	0				
10,000	+4,364	−4,380	−16	0	0	0	0	0	0			
11,000	+4,800	−4,818	−18	0	0	0	0	0	0			
12,000	+5,236	−5,255	−19	0	0	0	0	0	0			
13,000	+5,673	−5,693	−20	0	0	0	0	0	0			
14,000	+6,108	−6,130	−22	0	0	0	0	0	0			
15,000	+6,544	−6,568	−24	0	0	0	0	0	0	0		
17,500	+7,635	−7,662	−27	0	0	0	0	0	0	0		
20,000	+8,724	−8,755	−31	0	0	0	0	0	0	0	0	
25,000	+10,903	−10,941	−38	0	0	0	0	0	0	0	0	0
30,000	+13,082	−13,126	−44	0	0	0		0	0	0	0	0

[1] See explanation on pp. 67 and 73.

PART IV.—DETERMINATION OF THE GEOID FROM GRAVITY ANOMALIES

STOKES' FUNCTIONS

The process for determining the form of the geoid from a knowledge of gravity anomalies was given in 1849 by Stokes.[1] The process required a knowledge of gravity over the earth. When Stokes wrote, such knowledge was almost entirely lacking, but now we may look forward to the time when knowledge sufficient to be of real value will be available in the comparatively near future. In the meantime it is of some interest to supply the gaps in our knowledge by hypothesis and conjecture, as Hirvonen has done.[2]

Stokes' proof was based on the assumption that the variation in gravity over the surface of the earth could be expressed in terms of spherical harmonics with sufficient accuracy, either by a finite number of terms or by a convergent series. The connection between the elevation (or depression) of the geoid and the anomalies was obtained by a transformation of the series concerned into a definite integral that could be evaluated by mechanical quadrature. Doubts as to the convergence of the series affected the validity of the methods. It has since been shown by various writers [3] that the proof can be given without resort to spherical harmonics. Some of these writers have investigated the effect of the simplifying assumptions adopted by Stokes and have shown that their effect is not such as to impair the usefulness of the theorem under present conditions. If and when our knowledge of gravity becomes more complete and more precise, it will doubtless be possible to derive a more accurate—and more complicated—form of the theorem.

In Stokes' treatment the same flattening is in effect subtracted both from the geoid and the spheroid of reference, leaving the latter a sphere, if the spheroid is one of revolution. The radius of the sphere is taken as a, which is the mean radius of the spheroid, and the mean value of gravity over the sphere is taken as G. The inherent accuracy of the process is not such as requires precise definition of the kind of mean values meant by a and G.

Let the gravity anomaly reduced to the geoid be denoted by Δg. Assume that Δg may be expressed in the form

$$\Delta g = G\,(v_2 + v_3 + v_4 + v_5 + \ldots) \tag{38}$$

where the v's are surface spherical harmonics of the most general sort, the degree being indicated by the subscript. This means that

[1] G. G. Stokes. On the Variation of Gravity at the Surface of the Earth. Transactions of the Cambridge Philosophical Society, Vol. VIII, p. 672; or Mathematical and Physical Papers, Cambridge (England) vol. II, 1883, p. 131.

[2] R. A. Hirvonen. The Continental Undulations of the Geoid. Veröffentlichung des Finnischen Geodätischen Institutes. No. 19, Helsinki, 1934.

[3] 1. Poincaré. *Les mesures de gravité et la géodésie. Bulletin Astronomique (1901), p. 5.*

2. Pizetti. Sopra il calcolo teorico delle deviazione del geoide dall' ellissoide. Atti della R. Accademia della Scienze di Torino, Vol. 46 (1911), p. 331.

3. Mineo. Sulla formolo di Stokes che serve a determinare la forma della terra. Rendiconti del Circolo Matematico di Palermo. Vol. 51 (1927), p. 1.

4. Idelson and Malkin. Die Stokessche Formel in der Geodäsie als Lösung einer Randwertaufgabe. Gerlands Beiträge zur Geophysik. Vol. 29 (1931), p. 156.

the v's are functions of the required kind of the latitude and longitude of a point on the geoid; the v's increase in complexity with the degree, and a v of high degree may be a highly complicated affair. Stokes showed that, regardless of the complexity of the v's, the geoid elevation, H, at the given latitude and longitude for which the v's are taken is given by

$$H=a\left(\frac{v_2}{1}+\frac{v_3}{2}+\frac{v_4}{3}+\frac{v_5}{4}+\ldots\right) \tag{39}$$

The harmonic terms of degree zero and unity are missing from both (38) and (39). The term of order zero is made to disappear by adding a constant correction to the Δg's, if necessary. The term of order unity should vanish of itself, as Stokes proved. This term represents merely a displacement of the origin with respect to the center of gravity. Equations (38) and (39) are convenient in theoretical investigations, but would be impossible to apply in practice, because of the enormous number of terms needed to represent gravity on the geoid, even in a very generalized fashion. Stokes transformed equation (39) into

$$H=\frac{a}{2\pi G}\int_\omega \Delta g f(\psi)d\omega \tag{40}$$

The subscript ω indicates integration over the entire solid angle 4π of the unit sphere and $d\omega$ is an element of solid angle on that sphere. The value of Δg is the value corresponding to the particular position of the element $d\omega$; ψ is the angular distance of this element from the point for which H is to be calculated, and

$$f(\psi)=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi\right. \tag{41}$$
$$\left.-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

The individual terms of $f(\psi)$ have no special geometrical or mechanical meaning. They must be thought of simply as the results of integration and other mathematical transformations. The sphere may be divided into elements $d\omega$ in whatever manner may be most convenient. The integration indicated by $\int_\omega$ is intrinsically a double or surface integration. In practice this integration becomes a finite summation of small elements.

Even if harmonic terms of degree zero and unity had somehow crept into the expression for Δg, the resulting values of H obtained from (40) will be the same as if these terms were missing. Illustrations of this fact will be found in the numerical examples that follow. The H's obtained from (40) refer to the spheroid of the shape implied by the formula for theoretical gravity from which the Δg's were obtained.

It is chiefly the ellipticity that is involved, for the assumed value of the linear dimensions hardly affects the formula for theoretical gravity and Stokes' formula does not in any practical way serve to determine the absolute linear dimensions of the geoid. If the formula for theoretical gravity has a longitude term, so that the ellipsoid has three unequal axes; that is, if the coefficient of $\sin^2 2\phi$ in the formula for the theoretical gravity implies a spheroid that is not an exact ellipsoid, still in all cases the values of H refer to the spheroid of the gravity formula.

If the free-air reduction is used, it is assumed that this reduction adequately reduces the values of gravity from the place of observation to the corresponding point on the *actual* geoid; the values of H therefore correspond to the elevations of the *actual* geoid above the spheroid of reference implied by the gravity formula.

If the complete isostatic reduction, including both $\Delta_1 g$ and $\Delta_2 g$ is applied, the values of H therefore correspond to the elevations of the compensated geoid above the spheroid.

If the direct effect $\Delta_1 g$ alone were used, it is not clear what, if anything, the values of H would correspond to.

Furthermore the fact that harmonic terms of order unity do not affect the H's means that the H's are referred to this spheroid so placed that its center coincides with the center of gravity of the earth. Stokes' formula will not give H's referred to a spheroid in any other position.

If we write for the element of solid angle $d\omega$

$$d\omega = \sin\psi\, d\psi\, d\alpha$$

where α is an azimuthal angle at the station for which H is to be calculated, then we get explicitly from (40)

$$H = \frac{a}{2\pi G}\int_0^{2\pi} d\alpha \int_0^{\pi} \Delta g f(\psi) \sin\psi\, d\psi \tag{42}$$

The expression $f(\psi)\sin\psi$ may be denoted by $F(\psi)$, so that after obvious transformations

$$F(\psi) = \cos\frac{\psi}{2} - \frac{1}{2}\sin\psi\left\{6\sin\frac{\psi}{2} - 1 + \cos\psi\left[5 + 3\log_e\left(\sin\frac{\psi}{2} + \sin^2\frac{\psi}{2}\right)\right]\right\} \tag{43}$$

In practice the indicated integrations would be made as summations and in such cases, particularly where ideal cases are considered or the gaps in observation are filled by hypothesis or conjecture, it is convenient to have the mean value of $F(\psi) = f(\psi)\sin\psi$ over a given zone bounded by the circles of radii ψ_1 and ψ_2. For computing this mean value it is convenient to have the value of $\Phi(\psi)$ which is defined by

$$\Phi(\psi) = \int F(\psi) d\psi$$

The additive constant of the indefinite integral on the right may be taken so that $\Phi(\psi) = 0$, when $\psi = 0$. With this stipulation it is readily found that

$$\begin{aligned}\Phi(\psi) = \frac{1}{2}\Big\{1 + 4\sin\frac{\psi}{2} - \cos\psi - 6\sin^3\frac{\psi}{2} - \frac{7}{4}\sin^2\psi \\ - \frac{3}{2}\sin^2\psi\log_e\left(\sin\frac{\psi}{2} + \sin^2\frac{\psi}{2}\right)\Big\}\end{aligned} \tag{44}$$

If we substitute summation for integration and denote by $\Delta_k g$ the mean value of the gravity anomaly Δg for the zone between ψ_k and ψ_{k+1} we have for H the value

$$H = \frac{a}{G}\Sigma\Delta_k g[\Phi(\psi_{k+1}) - \Phi(\psi_k)] \tag{45}$$

Here the summation extends from $k=0$ (i. e., $\psi_k = 0$) to $\psi_{k+1} = \pi$.

The functions $f(\psi)$, $F(\psi)$ and $\Phi(\psi)$ are given on pages 114–117 for every degree between $\psi=10°$ and $\psi=180°$ and at closer intervals for $\psi<10°$. The tables are based on those of Schumann,[4] who tabulated these functions for every 4°. The interval was narrowed to one degree or less by interpolation between Schumann's values and by original computation. The inevitable errors in interpolation make the last figure of the interpolated values uncertain by a unit of the final figure. Schumann's Φ-function differs from the Φ used here by an additive constant of integration equal to 0.5. Since only differences of the values of the Φ's are used, the same result is obtained whether this table or Schumann's original table is used. It seemed better, however, to make Φ and ψ vanish together.

The quantities G and Δg must be in the same unit, but the unit of length used for them need not be the same as the unit of length for a and H, which must obviously be expressed in terms of the same unit. Examples of the use of Stokes' formula may be found in the works of Schumann and Hirvonen previously cited, but the precautions taken by these authors require so much space to explain that it does not seem desirable to reproduce their work here. Instead, three simple and purely hypothetical examples are given. For simplicity, the first two distributions of the gravity anomaly are zonal, that is, symmetrical about a diameter of the terrestrial sphere passing through the station on its surface.

EXAMPLES OF USE OF STOKES' FUNCTIONS

EXAMPLE 1

Suppose the average value of $\Delta_m g$ for zones 15° wide to be as given in the second column below. The values of the Φ's, their differences and the products of the differences by the corresponding $\Delta_m g$'s are given in the columns to the right.

Computations by Stokes' formula, example 1a

ψ	$\Delta_m g$	$\Phi(\psi_{k+1})$	$\Phi(\psi_k)$	$\Delta_m g[\Phi(\psi_{k+1})-\Phi(\psi_k)]$
° °	*Milligals*			
0– 15	+25	+0.3089	0.0000	+7.72
15– 30	+10	+.5241	+.3089	+2.15
30– 45	+5	+.5449	+.5241	+.10
45– 60	+5	+.3806	+.5449	−.82
60– 75	−5	+.1096	+.3806	+1.36
75– 90	−3	−.1626	+.1096	+.82
90–105	−3	−.3451	−.1626	+.55
105–120	−5	−.3928	−.3451	+.24
120–135	+5	−.3177	−.3928	+.38
135–150	+5	−.1778	−.3177	+.70
150–165	+10	−.0506	−.1778	+1.27
165–180	+25	.0000	−.0506	+1.26
Sum				+15.73

With $a=6.37\times10^6$ meters, $G=9.81\times10^5$ milligals we get from (45)

[4] Geoidabstände nach der Formel von Stokes bei schematischen Schwerebelegungen. Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien. Mathem.-naturw. Klasse, Vol. 120, Pt. IIa, Dec. 1911, p. 1655.

$H=\frac{6.37\times10^6}{9.81\times10^5}\times15.73=+102$ meters=elevation of geoid above spheroid at station ($\psi=0$).

Gravity anomalies are subject to two conditions:

(*1a*) The mean value over the earth should be zero. If this condition is not fulfilled, the value of theoretical gravity should be corrected accordingly by the proper constant amount. However, failure to apply such a correction does not alter the values of H derived from the uncorrected anomalies, as may be proved in general and as will be verified with the present set of figures.

(*1b*) If we think of the anomalies as loads of surface material, each proportional to the amount of the anomaly and applicable to the proper element of area, then the center of mass of these surface loads should coincide with the center of the terrestrial sphere. A set of anomalies that fails to satisfy this condition (within the limits of accuracy where Stokes' formula applies) is simply a mechanical impossibility. In more mathematical terms the expansion of the gravity anomaly reduced to the geoid in terms of spherical harmonics cannot contain harmonics of degree unity. If, however, a set of values is assumed, the expansion of which does contain harmonic terms of degree unity, and if Stokes' formula is applied to such a set of values, the results obtained will be the same as if the formula had been applied to values corrected by dropping the terms of degree unity.

In the present example the absence of terms of degree unity is insured by the assumed zonal distribution (symmetry with respect to the axis) and by the symmetry with respect to the equator, the points $\psi=0°$ and $\psi=180°$ being the poles. Let us see how much constant correction is needed to satisfy condition (*a*) and let us further compute with the corrected values and note that the value of H is unaltered.

Removal of harmonic term of degree zero from values of $\Delta_m g$, example 1b

ψ	$\Delta_m g$	$\cos\psi_{k+1}$	$\cos\psi_k$	$\Delta_m g\ (\cos\psi_k-\cos\psi_{k+1})$
° °	*Milligals*			
0–15	+25	0.966	1.000	+0.850
15–30	+10	.866	.966	+1.000
30–45	+5	.707	.866	+.795
45–60	+5	.500	.707	+1.035
60–75	−5	.259	.500	−1.205
75–90	−3	.000	.259	−.777
Sum				+1.698

Because of the assumed symmetry it is not necessary to consider values of ψ beyond 90°. To obtain the mean we divide the sum by ($\cos 0°-\cos 90°$), or 1, which is the sum of the weights applied to the $\Delta_m g$'s, giving 1.70 milligals as the correction to be subtracted from each value of $\Delta_m g$. We get the following results:

Computation by Stokes' formula after the removal of harmonic term of degree zero, example 1b

ψ	$\Delta_m g$	$\Delta_m g\ (\cos\psi_k - \cos\psi_{k+1})$	$\Delta_m g\ [\Phi(\psi_{k+1}) - \Phi(\psi_k)]$
° °	*Milligals*		
0–15	+23.30	+0.792	+7.20
15–30	+8.30	+.830	+1.79
30–45	+3.30	+.525	+.07
45–60	+3.30	+.683	−.54
60–75	−6.70	−1.615	+1.82
75–90	−4.70	−1.217	+1.28
90–105	−4.70	−1.217	+.86
105–120	−6.70	−1.615	+.32
120–135	+3.30	+.683	+.25
135–150	+3.30	+.525	+.46
150–165	+8.30	+.830	+1.06
165–180	+23.30	+.792	+1.18
Sum		−.004	+15.75

The differences between −0.004 and zero and between +15.75 and +15.73 are due to omitted decimals. In the second version the value of H is

$$H=\frac{6.37\times10^6}{9.81\times10^5}\times15.75=+102 \text{ meters},$$

agreeing with the previous result to the nearest meter.

EXAMPLE 2

(*2a*) Suppose the average value of $\Delta_m g$ for zone 10° wide to be as given in the second column below. The values of the Φ's, their differences and the products of the differences by the corresponding $\Delta_m g$'s are given in the columns to the right, that is, the arrangement is the same as in the previous example.

Computation by Stokes' formula with the ψ function, example 2a

ψ	$\Delta_m g$	$\Phi\ (\psi_{k+1})$	$\Phi\ (\psi_k)$	$\Delta_m g[\Phi(\psi_{k+1}) - \Phi(\psi_k)]$
° °	*Milligals*			
0– 10	+28	+0.2068	0.0000	+5.790
10– 20	+21	+.3989	+.2068	+4.034
20– 30	+10	+.5241	+.3989	+1.252
30– 40	−2	+.5608	+.5241	−.073
40– 50	−9	+.5078	+.5608	+.477
50– 60	−11	+.3806	+.5078	+1.399
60– 70	−7	+.2053	+.3806	+1.227
70– 80	−1	+.0138	+.2053	+.192
80– 90	+5	−.1626	+.0138	−.882
90–100	+8	−.2981	−.1626	−1.084
100–110	+6	−.3764	−.2981	−.470
110–120	+1	−.3928	−.3764	−.016
120–130	−4	−.3534	−.3928	−.158
130–140	−6	−.2745	−.3534	−.473
140–150	−5	−.1778	−.2745	−.484
150–160	0	−.0870	−.1778	.000
160–170	+6	−.0230	−.0870	+.384
170–180	+9	.0000	−.0230	+.207
Sum				+11.322

With the same values of a and G as in example 1, we find from (45)

$$H=\frac{a}{G}\times\text{Sum}=73.5 \text{ meters.}$$

This example differs from the last in that there is no symmetry about $\psi=90°$. It will be further found that the mean value of $\Delta_m g$, each zone being weighted in proportion to its area, is practically zero. This was known in advance, because the example was constructed from the formula

$$\Delta g=10\ P_3(x)+20P_4(x)$$

where $x=\cos\psi$, Δg is in milligals and the P's are zonal harmonics. The mean values of Δg over the ten-degree zones were taken to the nearest milligal in order to obtain the values of $\Delta_m g$ as set down. This form insures a mean value of zero approximately for $\Delta_m g$ and it further enables us to check the value of H. By the relation which Stokes found between geoid elevations and gravity anomalies, both being expressed as spherical harmonics, we should have at $\psi=0°$

$$H=\frac{a}{G}\left[\frac{10\ P_3(1)}{2}+\frac{20\ P_4(1)}{3}\right]$$

$$=\frac{a}{G}\times 11.67=74.0 \text{ meters.}$$

The difference of half a meter between this result and the one previously found is explained by the process of rounding off in taking mean values.

(*2b*) So far the second example is not very different from the first, except that it was constructed to order, so to speak, and that the values of $\Delta_m g$ lacked symmetry. We shall now illustrate the use of the F function with the same values of $\Delta_m g$. For this purpose it is necessary to have a mean value of $F(\psi)$ for each zone. The values of F are taken for five-degree intervals; the first few of them are as follows:

Functions of ψ

ψ	$F(\psi)$
°	
0	1.0000
5	1.2165
10	1.2146
15	1.1120
20	.9410
25	.7224
30	.4736

There are many ways of deriving a mean value over the zone; the following is an easy and, in most cases, a fairly accurate way. Take the mean of the values at the inner boundary, middle point, and outer boundary, giving the extreme values (those at the boundaries) only half weight. Thus for the zone 0°–10° we have

$$\text{mean value}=\tfrac{1}{2}[\tfrac{1}{2}(1.0000+1.2146)+1.2165]=1.16190.$$

For the zone 10°–20°

$$\text{mean value}=\tfrac{1}{2}[\tfrac{1}{2}(1.2146+0.9410)+1.1120]=1.0949.$$

In this way we get the following:

Computation by Stokes' formula with the F function, example 2b

ψ	Mean $F(\psi)$	$\Delta_m g$	$\Delta_m g \times$ Mean $F(\psi)$
° °		*Milligals*	
0- 10	+1.1619	+28	+32.53
10- 20	+1.0949	+21	+22.99
20- 30	+.7148	+10	+7.15
30- 40	+.2098	−2	−.42
40- 50	−.3014	−9	+2.71
50- 60	−.7261	−11	+7.99
60- 70	−1.0005	−7	+7.00
70- 80	−1.0934	−1	+1.09
80- 90	−1.0076	+5	−5.04
90-100	−.7745	+8	−6.20
100-110	−.4482	+6	−2.69
110-120	−.0940	+1	−.09
120-130	+.2234	−4	−.89
130-140	+.4498	−6	−2.70
140-150	+.5510	−5	−2.76
150-160	+.5175	0	.00
160-170	+.3650	+6	+2.19
170-180	+.1313	+9	+1.18
Sum			+64.04

The width of the zone being $10°=\frac{\pi}{18}$, we have for H

$$H=\frac{\pi}{18}\times\frac{a}{G}\times\text{Sum}=72.6 \text{ meters.}$$

The difference between this result and the preceding is due mainly to the approximate nature of the process of finding the mean value of $F(\psi)$. The mean value of $F(\psi)$ happens to be particularly erroneous in the zone 0°–10°, which has the largest influence of all the zones on the final result.

(*2c*) The set of values of $\Delta_m g$ has a mean value of zero and it is also "centered" so to speak, about the center of the sphere; that is, if we consider the gravity anomalies as surface densities on the sphere proportional to their magnitudes, the center of gravity of this ideal

surface layer will coincide with the center of the sphere. Let us deliberately make the mean value different from zero and throw the set of anomalies off center by adding the terms $-5 \; -10 \cos \psi$. We take the mean value of this distorting term for the various zones, add it to the original value of $\Delta_m g$ to obtain new values of $\Delta_m g$, and treat these new values in the same way as the original values of $\Delta_m g$ were treated in order to obtain the value of H.

Computation by Stokes' formula after introduction of fictitious terms into Δg, example 2c

	Original $\Delta_m g$	Mean $-10\cos\psi-5$	$\Delta'_m g$ new $\Delta_m g$	$\Delta'_m g[\Phi(\psi_{k+1})-\Phi(\psi_k)]$
° °	*Milligals*			
0- 10	+28	−14.94	+13.06	+2.70
10- 20	+21	−14.64	+6.36	+1.22
20- 30	+10	−14.04	−4.04	−.51
30- 40	−2	−13.18	−15.18	−.56
40- 50	−9	−12.06	−21.06	+1.12
50- 60	−11	−10.73	−21.73	+2.76
60- 70	−7	−9.22	−16.22	+2.84
70- 80	−1	−7.58	−8.58	+1.64
80- 90	+5	−5.87	−.87	+.15
90-100	+8	−4.13	+3.87	−.52
100-110	+6	−2.42	+3.58	−.28
110-120	+1	−.78	+.22	.00
120-130	−4	+.73	−3.27	−.13
130-140	−6	+2.06	−3.94	−.31
140-150	−5	+3.18	−1.82	−.18
150-160	0	+4.04	+4.04	+.37
160-170	+6	+4.64	+10.64	+.68
170-180	+9	+4.94	+13.94	+.32
Sum				+11.31

The sum differs only in the last figure from 11.32, the sum previously obtained. This illustrates numerically the fact that a distorting term of this particular type composed of a constant -5 and a displacement of the center of gravity $-10 \cos \psi$ has no effect on the value of H.

EXAMPLE 3

(*3a*) Gravity anomaly (in milligals) represented by $100 \sin \psi$. The mean value for the zone between $\psi=\alpha$ and $\psi=\beta$ is

$$\frac{100\int_\alpha^\beta \sin \psi d\psi}{\beta-\alpha}=\frac{100(\cos \alpha-\cos \beta)}{\beta-\alpha}=\frac{100 \sin \frac{1}{2}(\beta+\alpha) \sin \frac{1}{2}(\beta-\alpha)}{\frac{1}{2}(\beta-\alpha)}$$

If the width of the zone $(=\beta-\alpha)$ is 10°, we may take $100 \sin \psi$ for the middle of the zone and afterwards apply the constant factor

$$\frac{\sin \frac{1}{2}(\beta-\alpha)}{\frac{1}{2}(\beta-\alpha)}=\frac{\sin 5^\circ}{5^\circ \text{ in radians}},$$ which is nearly unity, to the final result.

Computation by Stokes' formula for "pole" with $\Delta g = 100 \sin \psi$ milligals, example 3a

ψ	$100 \sin \frac{\psi_1+\psi_2}{2}$	$100 \sin \frac{\psi_1+\psi_2}{2}[\Phi(\psi_{k+1})-\Phi(\psi_k)]$
° °		
0- 10	+8.7	+1.80
10- 20	+25.9	+4.98
20- 30	+42.3	+5.30
30- 40	+57.4	+2.11
40- 50	+70.7	−3.75
50- 60	+81.9	−10.42
60- 70	+90.6	−15.88
70- 80	+96.6	−18.50
80- 90	+99.6	−17.57
90-100	+99.6	−13.50
100-110	+96.6	−7.56
110-120	+90.6	−1.49
120-130	+81.9	+3.23
130-140	+70.7	+5.58
140-150	+57.4	+5.55
150-160	+42.3	+3.84
160-170	+25.9	+1.66
170-180	+8.7	+.20
Sum		−54.42

With the values of a and G previously used, we have

$$H=\frac{a}{G}\times\frac{\sin 5^\circ}{\pi/36}\times(-54.42)=-352.9 \text{ meters.}$$

This result can be checked from Stokes' relation between the gravity anomaly and the geoid elevation, both being expanded into series of spherical harmonic terms. Byerly (Fourier's Series, etc., p. 184), gives the expansion of $\sqrt{1-x^2}=\sin\psi$, where $x=\cos\psi$, as follows:

$$\begin{aligned}\sin\psi=\sqrt{1-x^2}=\frac{\pi}{2}\Big[&\frac{1}{2}-5\left(\frac{1}{4}\right)\left(\frac{1}{2}\right)^2P_2(x)-9\left(\frac{3}{6}\right)\left(\frac{1}{2\cdot4}\right)^2P_4(x)\\&-13\left(\frac{5}{8}\right)\left(\frac{1\cdot3}{2\cdot4\cdot6}\right)^2P_6(x)-17\left(\frac{7}{10}\right)\left(\frac{1\cdot3\cdot5}{2\cdot4\cdot6\cdot8}\right)^2P_8(x)\\&-21\left(\frac{9}{12}\right)\left(\frac{1\cdot3\cdot5\cdot7}{2\cdot4\cdot6\cdot8\cdot10}\right)^2P_{10}(x)-\ldots\ldots\Big]\end{aligned}\tag{46}$$

According to Stokes' relation the constant term $\frac{1}{2}$ contributes nothing to H. We have seen this illustrated in a previous example. There is no term in $P_1(x)$; even if it were there, it would not contribute anything to H. The other harmonic terms must be divided by a number one less than their degree in order to form the series for H. This becomes

$$\begin{aligned}H=50\pi\frac{a}{G}\Big[&-\frac{5}{16}P_2(x)-\frac{9}{6}\left(\frac{1}{2\cdot4}\right)^2P_4(x)-\frac{13}{8}\left(\frac{1\cdot3}{2\cdot4\cdot6}\right)^2P_6(x)\\&-\frac{17}{10}\left(\frac{1\cdot3\cdot5}{2\cdot4\cdot6\cdot8}\right)^2P_8(x)-\frac{21}{12}\left(\frac{1\cdot3\cdot5\cdot7}{2\cdot4\cdot6\cdot8\cdot10}\right)^2P_{10}(x)-\cdots\Big]\end{aligned}\tag{47}$$

The value of H calculated by Stokes' functions refers to $\psi=0$ or $x=1$, for which all the values of the P's are unity. For this point

$$H=\frac{-50\pi a}{G}\left[\frac{5}{16}+\frac{3}{128}+\frac{13}{2048}+\frac{17}{10}\left(\frac{5}{128}\right)^2+\frac{7}{4}\left(\frac{7}{256}\right)^2+\cdots\right]$$

By calculating the terms to P_{14} inclusive to four decimals we get $H=-354.4$ meters. The slight difference from the previous result is presumably due to omitted decimals and to the finite width of the zones.

(*3b*) Expression (47) holds good for all values of x, not merely for $x=1$, i. e., $\psi=0°$. It is interesting to apply it to the case where $x=0$, $\psi=90°$, that is, to a point E on the "equator", if $\psi=0°$ be considered as the pole (see figure). We have for E

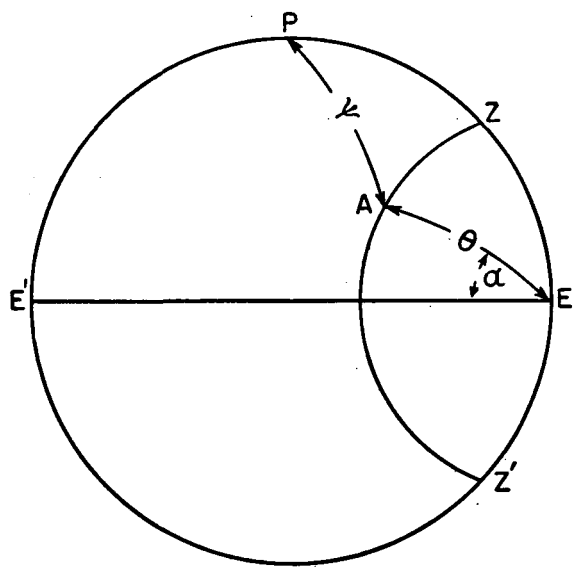
$$P_2(0)=-\frac{1}{2} \qquad P_6(0)=-\frac{5}{16} \qquad P_{10}(0)=-\frac{63}{256}$$

$$P_4(0)=+\frac{3}{8} \qquad P_8(0)=+\frac{35}{128} \qquad P_{12}(0)=+\frac{231}{1024}, \text{ etc.}$$

Then (47) gives

$$H=\frac{50\pi a}{G}\left[\frac{5}{32}-\frac{9}{1024}+\frac{65}{32768}\cdots\cdots\right]=\frac{50\pi a}{G}\times 0.1489=151.8 \text{ meters.}$$

The value of Δg for a point on the "equator" may be obtained in two



ways. In the figure let P be the "pole" from which the original values of ψ were reckoned, EE' the "equator", A any point on the sphere, $\theta=EA$ the quantity bearing the same relation to E as $\psi=PA$ bears to P and $\alpha=\angle E'EA$. From the figure $PE=\frac{\pi}{2}$ and $\cos\psi=\sin\theta\sin\alpha$. Hence

$$\Delta g=100\sin\psi=100\sqrt{1-\sin^2\theta\sin^2\alpha}$$

To apply Stokes' method to calculating H for the point E by the use of the f function or the F function, both of which require a knowledge of the mean value of Δg for a zone of which E is a pole, that is, over values of α ranging from 0 to 2π, we must calculate this mean value

$$\frac{1}{2\pi}\int_0^{2\pi}\Delta g d\alpha=\frac{50}{\pi}\int_0^{2\pi}\sqrt{1-\sin^2\theta\sin^2\alpha}\cdot d\alpha=\frac{200E}{\pi}$$

where E is the complete elliptic integral of the second kind with modulus $\sin\theta$. It is easily seen that each quadrant between 0 and 2π gives the value E; hence the multiplication of $\frac{50}{\pi}$ by 4. Tables giving values of E for various values of the modulus are readily accessible. We find the following mean values of E for zones 10° wide, using the same approximate method of obtaining the mean. The factor $\frac{200}{\pi}$ is constant and may be introduced at the final stage of the calculation.

Computation by Stokes' formula for "equator" with $\Delta g=100 \sin\psi$ milligals

	Mean $\left[E=\frac{\pi}{200}\Delta g\right]$	$\Phi(\theta_{k+1})-\Phi(\theta_k)$	$\frac{\pi}{200}\Delta g[\Phi(\theta_{k+1})-\Phi(\theta_k)]$
° °			
0–10	1.566	+0.2068	+0.3238
10–20	1.543	+.1921	+.2966
20–30	1.497	+.1252	+.1874
30–40	1.431	+.0367	+.0525
40–50	1.350	−.0530	−.0716
50–60	1.258	−.1272	−.1600
60–70	1.164	−.1753	−.2040
70–80	1.078	−.1915	−.2064
80–90	1.016	−.1764	−.1792
90–100	1.016	−.1355	−.1377
100–110	1.078	−.0783	−.0844
110–120	1.164	−.0164	−.0191
120–130	1.258	+.0394	+.0496
130–140	1.350	+.0789	+.1065
140–150	1.431	+.0967	+.1384
150–160	1.497	+.0908	+.1359
160–170	1.543	+.0640	+.0988
170–180	1.566	+.0230	+.0360
Sum			+.3631

$$H=\frac{a}{G}\times\frac{200}{\pi}\times(+0.3631)=+150.1 \text{ meters.}$$

The mean values of Δg for a zone having E as its pole can be found in another way. The zonal harmonic with P as pole can be expressed as a more general (but not the most general) spherical harmonic with E as pole; the more general spherical harmonic is known as a Laplacian. The formulas for the transformation are given in Byerly, p. 211 (see reference p. 110), or in other similar treatises; since PE is 90° there is considerable simplification and since only the mean value is wanted the presence of certain terms that ultimately vanish may be merely indicated.

We have in Byerly's notation $\mu=\cos 90°=0$, so that we may write

$$P_n(\cos\psi)=P_n(\cos\theta)\ P_n(0)+T(\theta,0,\alpha)$$

where $T(\theta, 0, \alpha)$ represents the terms of the summation in Byerly's equation (1) p. 211. This quantity contains as a factor of every term the sine or cosine of α or a multiple of α. Hence the mean value of $T(\theta, 0, \alpha)$ over the range 0 to 2π is zero and by substitution in (46) and using the values of $P_n(0)$ we may write for the mean value of the gravity anomaly at a distance θ from pole E

$$\Delta_m g = 50\pi\left[\frac{1}{2}+\frac{5}{2}\left(\frac{1}{4}\right)\left(\frac{1}{2}\right)^2 P_2(\cos\theta) - 9\left(\frac{3}{6}\right)\left(\frac{3}{8}\right)\left(\frac{1}{2\cdot 4}\right)^2 P_4(\cos\theta)\right.$$
$$\left. + 13\left(\frac{5}{8}\right)\left(\frac{5}{16}\right)\left(\frac{1\cdot 3}{2\cdot 4\cdot 6}\right)^2 P_6(\cos\theta) - 17\left(\frac{7}{10}\right)\left(\frac{35}{128}\right)\left(\frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6\cdot 8}\right)^2 P_8(\cos\theta)\cdots\right]$$

or

$$\Delta_m g = 50\pi\left[\frac{1}{2}+\frac{5}{1\cdot 4}\left(\frac{1}{2}\right)^3 P_2(\cos\theta) - \frac{9}{3\cdot 6}\left(\frac{1\cdot 3}{2\cdot 4}\right)^3 P_4(\cos\theta)\right.$$
$$\left. + \frac{13}{5\cdot 8}\left(\frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6}\right)^3 P_6(\cos\theta) - \frac{17}{7\cdot 10}\left(\frac{1\cdot 3\cdot 5\cdot 7}{2\cdot 4\cdot 6\cdot 8}\right)^3 P_8(\cos)\,\theta\cdots\cdots\right] \quad (48)$$

The series (48) although too slowly convergent for convenient numerical computation, can be made to give the same results for $\Delta_m g$ as were found from tables of elliptic integrals of the second kind. The transformation [4a] is equivalent to deriving a series for these integrals, modulo $\sin\theta$, in terms of the zonal harmonics of $\cos\theta$.

The preceding examples have shown the use of the $F(\psi)$ and $\Phi(\psi)$. These functions are convenient in ideal cases where symmetry about an axis is assumed, or in cases where the computation of H is made for only a few points and the mean values of $\Delta_m g$ for zones having these points as poles can be readily calculated. When the computation of H is made for many points it is more convenient to follow the example of Hirvonen [5] and to divide the earth into small compartments bounded by meridians and parallels and to assign once for all to each compartment a mean value of Δg. Then the f function is most convenient to use and H is obtained by the formula

$$H = \frac{a}{2\pi G}\Sigma f_m(\psi)\Delta_m g \Delta\omega \quad (49)$$

Formula (49) is merely (40) with the integration replaced by a summation. In (49) $\Delta\omega$ is the solid angle of a compartment, $\Delta_m g$ the mean gravity anomaly of the compartment, $f_m(\psi)$ the mean value of $f(\psi)$ for the compartment, ψ being the angular distance of the compartment from the point for which H is sought. The summation covers the entire sphere of solid angle 4π. The dimensions of the compartments must be small in comparison with ψ; otherwise it will be impracticable to obtain a satisfactory mean value $f_m(\psi)$. For small values of ψ, $f(\psi)$ is very large; it should therefore be taken only in connection with a very small element of area $\Delta\omega$.

In practice this will mean that within a circle of radius depending on the size of the compartment the use of the f function and of preassigned compartments must be abandoned and the $F(\psi)$ or the

[4a] According to Adams, Smithsonian Mathematical Formulea and Tables of Elliptic Functions (formula 9.064), the transformation is due to Hargreaves, Messenger of Mathematics, Vol. 26 (1897), p. 89.
[5] See reference on p. 101.

$\Phi(\psi)$ used instead for this part of the summation. The circle will cut across the compartments bounded by meridians and parallels, leaving compartments of irregular shape; these must be specially treated. For details of the precautions to be taken reference may be made to Hirvonen's work. It may be remarked, however, that the region in the immediate vicinity of the point for which H is sought should be treated with especial care in order that the summation (49) may be a reasonably good approximation to the value of the surface integral required by the strict application of Stokes' formula. The small discrepancies noted in the examples previously given between different ways of treating the same data are due mainly to the finite width of the zones and the rapid variation even of $F(\psi)$ for small values of ψ.

In reading Hirvonen [6] note that his $S(\psi)$ is twice the $f(\psi)$ here used.

Table 11.—FUNCTIONS USED IN CONNECTION WITH STOKES' FORMULAS

$$F(\psi)=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}\sin\psi$$

$$f(\psi)=\frac{F(\psi)}{\sin\psi}=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

$$\Phi(\psi)=\int_0^\psi F(\psi)d\psi=\frac{1}{2}\left\{1+4\sin\frac{\psi}{2}-\cos\psi-6\sin^3\frac{\psi}{2}-\frac{7}{4}\sin^2\psi-\frac{3}{2}\sin^2\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

ψ	$F(\psi)$	d	$f(\psi)$	d	$\Phi(\psi)$	d
°						
0.0	+1.0000	+149	∞		0.0000	+18
.1	+1.0149	+113	+581.52	−28752	+.0018	+17
.2	+1.0262	+100	+294.00	−9611	+.0035	+18
.3	+1.0362	+90	+197.89	−4818	+.0053	+18
.4	+1.0452	+83	+149.71	−2899	+.0071	+19
.5	+1.0535	+78	+120.72	−1937	+.0090	+18
.6	+1.0613	+73	+101.35	−1388	+.0108	+19
.7	+1.0686	+70	+87.47	−1043	+.0127	+19
.8	+1.0756	+66	+77.04	−814	+.0146	+18
.9	+1.0822	+63	+68.90	−653	+.0164	+19
1.0	+1.0885	+60	+62.37	−536	+.0183	+19
1.1	+1.0945	+58	+57.01	−447	+.0202	+19
1.2	+1.1003	+55	+52.54	−380	+.0221	+19
1.3	+1.1058	+53	+48.74	−326	+.0240	+20
1.4	+1.1111	+51	+45.48	−284	+.0260	+19
1.5	+1.1162	+50	+42.64	−249	+.0279	+20
1.6	+1.1212	+47	+40.15	−220	+.0299	+19
1.7	+1.1259	+46	+37.95	−196	+.0318	+20
1.8	+1.1305	+44	+35.99	−176	+.0338	+20
1.9	+1.1349	+43	+34.23	−159	+.0358	+20
2.0	+1.1392	+192	+32.64	−608	+.0378	+100
2.5	+1.1584	+162	+26.56	−412	+.0478	+102
3.0	+1.1746	+137	+22.44	−298	+.0580	+103
3.5	+1.1883	+113	+19.46	−226	+.0683	+104
4.0	+1.1996	+94	+17.20	−179	+.0787	+105
4.5	+1.2090	+75	+15.41	−145	+.0892	+106
5.0	+1.2165	+59	+13.96	−121	+.0998	+107
5.5	+1.2224	+43	+12.75	−101	+.1105	+107
6.0	+1.2267	+27	+11.74	−88	+.1212	+107
6.5	+1.2294	+15	+10.86	−76	+.1319	+107
7.0	+1.2309	+2	+10.100	−668	+.1426	+108
7.5	+1.2311	−11	+9.432	−594	+.1534	+107
8.0	+1.2300	−23	+8.838	−532	+.1641	+107
8.5	+1.2277	−33	+8.306	−479	+.1748	+107
9.0	+1.2244	−44	+7.827	−435	+.1855	+107
9.5	+1.2200	−54	+7.392	−398	+.1962	+106
10.0	+1.2146	−138	+6.994	−701	+.2068	+212

[6] See footnote p. 101.

Table 11.—FUNCTIONS USED IN CONNECTION WITH STOKES' FORMULAS—Continued

$$F(\psi)=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}\sin\psi$$

$$f(\psi)=\frac{F(\psi)}{\sin\psi}=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

$$\Phi(\psi)=\int_0^\psi F(\psi)d\psi=\frac{1}{2}\left\{1+4\sin\frac{\psi}{2}-\cos\psi-6\sin^2\frac{\psi}{2}-\frac{7}{4}\sin^2\psi-\frac{3}{2}\sin^2\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

ψ	$F(\psi)$	d	$f(\psi)$	d	$\Phi(\psi)$	d
°						
11	+1.2008	−174	+6.293	−601	+0.2280	+207
12	+1.1834	−207	+5.692	−523	+.2487	+205
13	+1.1627	−239	+5.169	−462	+.2692	+201
14	+1.1388	−268	+4.707	−410	+.2893	+196
15	+1.1120	−294	+4.297	−369	+.3089	+192
16	+1.0826	−320	+3.928	−335	+.3281	+186
17	+1.0506	−344	+3.593	−305	+.3467	+180
18	+1.0162	−366	+3.288	−279	+.3647	+174
19	+.9796	−386	+3.009	−258	+.3821	+168
20	+.9410	−405	+2.751	−238	+.3989	+161
21	+.9005	−423	+2.513	−222	+.4150	+154
22	+.8582	−439	+2.291	−207	+.4304	+146
23	+.8143	−453	+2.084	−193	+.4450	+138
24	+.7690	−466	+1.891	−182	+.4588	+130
25	+.7224	−479	+1.709	−170	+.4718	+122
26	+.6745	−489	+1.539	−161	+.4840	+113
27	+.6256	−499	+1.378	−152	+.4953	+105
28	+.5757	−507	+1.226	−143	+.5058	+96
29	+.5250	−514	+1.083	−136	+.5154	+87
30	+.4736	−520	+.947	−128	+.5241	+78
31	+.4216	−525	+.819	−122	+.5319	+69
32	+.3691	−528	+.697	−116	+.5388	+60
33	+.3163	−531	+.581	−110	+.5448	+50
34	+.2632	−532	+.471	−105	+.5498	+42
35	+.2100	−532	+.366	−99	+.5540	+32
36	+.1568	−531	+.267	−94	+.5572	+23
37	+.1037	−530	+.173	−90	+.5595	+13
38	+.0507	−527	+.083	−86	+.5608	+5
39	−.0020	−523	−.003	−81	+.5613	−5
40	−.0543	−518	−.084	−77	+.5608	−14
41	−.1061	−513	−.161	−73	+.5594	−23
42	−.1574	−506	−.234	−70	+.5571	−32
43	−.2080	−499	−.304	−67	+.5539	−41
44	−.2579	−491	−.371	−63	+.5498	−49
45	−.3070	−481	−.434	−59	+.5449	−58
46	−.3551	−472	−.493	−57	+.5391	−66
47	−.4023	−461	−.550	−53	+.5325	−74
48	−.4484	−450	−.603	−51	+.5251	−82
49	−.4934	−437	−.654	−47	+.5169	−91
50	−.5371	−425	−.701	−45	+.5078	−97
51	−.5796	−412	−.746	−42	+.4981	−105
52	−.6208	−398	−.788	−39	+.4876	−112
53	−.6606	−383	−.827	−37	+.4764	−118
54	−.6989	−368	−.864	−34	+.4646	−126
55	−.7357	−353	−.898	−32	+.4520	−131
56	−.7710	−337	−.930	−29	+.4389	−137
57	−.8047	−320	−.959	−27	+.4252	−144
58	−.8367	−304	−.986	−25	+.4108	−148
59	−.8671	−286	−1.011	−23	+.3960	−154
60	−.8957	−269	−1.034	−21	+.3806	−159
61	−.9226	−251	−1.055	−18	+.3647	−163
62	−.9477	−232	−1.073	−16	+.3484	−168
63	−.9709	−215	−1.089	−15	+.3316	−171
64	−.9924	−196	−1.104	−13	+.3145	−175
65	−1.0120	−178	−1.117	−10	+.2970	−178
66	−1.0298	−159	−1.127	−9	+.2792	−181
67	−1.0457	−140	−1.136	−7	+.2611	−184
68	−1.0597	−121	−1.143	−5	+.2427	−186
69	−1.0718	−102	−1.148	−3	+.2241	−188
70	−1.0820	−84	−1.151	−2	+.2053	−190

Table 11.—FUNCTIONS USED IN CONNECTION WITH STOKES' FORMULAS—Continued

$$F(\psi)=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}\sin\psi$$

$$f(\psi)=\frac{F(\psi)}{\sin\psi}=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

$$\Phi(\psi)=\int_0^\psi F(\psi)d\psi=\frac{1}{2}\left\{1+4\sin\frac{\psi}{2}-\cos\psi-6\sin^2\frac{\psi}{2}-\frac{7}{4}\sin^2\psi-\frac{3}{2}\sin^2\psi\log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

ψ	$F(\psi)$	d	$f(\psi)$	d	$\Phi(\psi)$	d
°						
71	−1.0904	−64	−1.153	0	+0.1663	−191
72	−1.0968	−46	−1.153	+1	+.1672	−192
73	−1.1014	−26	−1.152	+3	+.1480	−192
74	−1.1040	−9	−1.149	+5	+.1288	−192
75	−1.1049	+10	−1.144	+6	+.1096	−193
76	−1.1039	+28	−1.138	+8	+.0903	−192
77	−1.1011	+46	−1.130	+9	+.0711	−192
78	−1.0965	+63	−1.121	+10	+.0519	−191
79	−1.0902	+81	−1.111	+12	+.0328	−190
80	−1.0821	+98	−1.099	+13	+.0138	−188
81	−1.0723	+114	−1.086	+14	−.0050	−186
82	−1.0609	+131	−1.072	+16	−.0236	−184
83	−1.0478	+147	−1.056	+17	−.0420	−182
84	−1.0331	+162	−1.039	+18	−.0602	−179
85	−1.0169	+177	−1.021	+19	−.0781	−176
86	−.9992	+192	−1.002	+21	−.0957	−173
87	−.9800	+206	−.981	+21	−.1130	−169
88	−.9594	+220	−.960	+22	−.1299	−166
89	−.9374	+232	−.938	+24	−.1465	−161
90	−.9142	+245	−.914	+24	−.1626	−158
91	−.8897	+257	−.890	+25	−.1784	−153
92	−.8640	+268	−.865	+26	−.1937	−148
93	−.8372	+279	−.839	+27	−.2085	−144
94	−.8093	+289	−.812	+28	−.2229	−139
95	−.7804	+298	−.784	+29	−.2368	−133
96	−.7506	+307	−.755	+29	−.2501	−128
97	−.7199	+316	−.726	+31	−.2629	−123
98	−.6883	+323	−.695	+30	−.2752	−117
99	−.6560	+330	−.665	+32	−.2869	−112
100	−.6230	+336	−.633	+32	−.2981	−106
101	−.5894	+342	−.601	+33	−.3087	−100
102	−.5552	+347	−.568	+34	−.3187	−94
103	−.5205	+351	−.534	+34	−.3281	−88
104	−.4854	+354	−.500	+34	−.3369	−82
105	−.4500	+357	−.466	+35	−.3451	−75
106	−.4143	+359	−.431	+35	−.3526	−69
107	−.3784	+361	−.396	+36	−.3595	−63
108	−.3423	+361	−.360	+36	−.3658	−56
109	−.3062	+362	−.324	+36	−.3714	−50
110	−.2700	+360	−.288	+37	−.3764	−44
111	−.2340	+360	−.251	+37	−.3808	−38
112	−.1980	+358	−.214	+37	−.3846	−31
113	−.1622	+354	−.177	+38	−.3877	−26
114	−.1268	+352	−.139	+38	−.3903	−19
115	−.0916	+348	−.101	+38	−.3922	−13
116	−.0568	+343	−.063	+38	−.3935	−7
117	−.0225	+339	−.025	+38	−.3942	−1
118	+.0114	+332	+.013	+38	−.3943	+5
119	+.0446	+327	+.051	+38	−.3938	+10
120	+.0773	+320	+.089	+38	−.3928	+17
121	+.1093	+312	+.127	+39	−.3911	+22
122	+.1405	+304	+.166	+38	−.3889	+27
123	+.1709	+296	+.204	+38	−.3862	+33
124	+.2005	+287	+.242	+38	−.3829	+37
125	+.2292	+277	+.280	+38	−.3792	+43
126	+.2569	+268	+.318	+38	−.3749	+47
127	+.2837	+257	+.356	+37	−.3702	+51
128	+.3094	+247	+.393	+37	−.3651	+56
129	+.3341	+236	+.430	+37	−.3595	+61
130	+.3577	+224	+.467	+37	−.3534	+64

Table 11.—FUNCTIONS USED IN CONNECTION WITH STOKES' FORMULAS—Continued

$$F(\psi)=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\ \log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}\sin\psi$$

$$f(\psi)=\frac{F(\psi)}{\sin\psi}=\frac{1}{2}\left\{\operatorname{cosec}\frac{\psi}{2}+1-6\sin\frac{\psi}{2}-5\cos\psi-3\cos\psi\ \log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

$$\Phi(\psi)=\int_0^\psi F(\psi)d\psi=\frac{1}{2}\left\{1+4\sin\frac{\psi}{2}-\cos\psi-6\sin^2\frac{\psi}{2}-\frac{7}{4}\sin^2\psi-\frac{3}{2}\sin^2\psi\ \log_e\left(\sin\frac{\psi}{2}+\sin^2\frac{\psi}{2}\right)\right\}$$

ψ	$F(\psi)$	d	$f(\psi)$	d	$\Phi(\psi)$	d
°						
131	+0.3801	+213	+0.504	+36	−0.3470	+68
132	+.4014	+200	+.540	+36	−.3402	+72
133	+.4214	+188	+.576	+36	−.3330	+75
134	+.4402	+176	+.612	+35	−.3255	+78
135	+.4578	+162	+.647	+35	−.3177	+81
136	+.4740	+150	+.682	+35	−.3096	+84
137	+.4890	+136	+.717	+34	−.3012	+87
138	+.5026	+123	+.751	+34	−.2925	+89
139	+.5149	+109	+.785	+33	−.2836	+91
140	+.5258	+95	+.818	+33	−.2745	+93
141	+.5353	+82	+.851	+32	−.2652	+94
142	+.5435	+67	+.883	+31	−.2558	+95
143	+.5502	+54	+.914	+31	−.2463	+97
144	+.5556	+40	+.945	+30	−.2366	+97
145	+.5596	+26	+.975	+30	−.2269	+98
146	+.5622	+12	+1.005	+29	−.2171	+99
147	+.5634	−1	+1.034	+29	−.2072	+98
148	+.5633	−15	+1.063	+28	−.1974	+98
149	+.5618	−28	+1.091	+27	−.1876	+98
150	+.5590	−42	+1.118	+26	−.1778	+98
151	+.5548	−55	+1.144	+26	−.1680	+96
152	+.5493	−68	+1.170	+25	−.1584	+95
153	+.5425	−81	+1.195	+24	−.1489	+95
154	+.5344	−93	+1.219	+23	−.1394	+92
155	+.5251	−105	+1.242	+23	−.1302	+91
156	+.5146	−117	+1.265	+22	−.1211	+89
157	+.5029	−129	+1.287	+21	−.1122	+86
158	+.4900	−141	+1.308	+20	−.1036	+84
159	+.4759	−151	+1.328	+19	−.0952	+82
160	+.4608	−162	+1.347	+19	−.0870	+79
161	+.4446	−172	+1.366	+17	−.0791	+76
162	+.4274	−181	+1.383	+17	−.0715	+73
163	+.4093	−191	+1.400	+16	−.0642	+70
164	+.3902	−200	+1.416	+15	−.0572	+66
165	+.3702	−208	+1.431	+13	−.0506	+63
166	+.3494	−216	+1.444	+13	−.0443	+60
167	+.3278	−223	+1.457	+12	−.0383	+55
168	+.3055	−230	+1.469	+11	−.0328	+51
169	+.2825	−237	+1.480	+10	−.0277	+47
170	+.2588	−242	+1.490	+10	−.0230	+43
171	+.2346	−247	+1.500	+8	−.0187	+39
172	+.2099	−252	+1.508	+7	−.0148	+34
173	+.1847	−256	+1.515	+7	−.0114	+30
174	+.1591	−259	+1.522	+6	−.0084	+25
175	+.1332	−263	+1.528	+4	−.0059	+21
176	+.1069	−265	+1.532	+3	−.0038	+16
177	+.0804	−267	+1.535	+3	−.0022	+12
178	+.0537	−268	+1.538	+2	−.0010	+7
179	+.0269	−269	+1.540	0	−.0003	+3
180	.0000	----------	+1.540	----------	.0000	----------

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APPENDIX.—MISCELLANEOUS TABLES

Table 12.—DATA TO BE USED IN COMPUTING THE POTENTIAL OF THE HAYFORD ZONES

[Angular radii of zones based on radius of sphere=6,371.2 km]

Zone	Outer radius of zone θ and $\frac{\theta}{2}$	Sine		Cosine		Tangent		Outer radius in kilometers
		Logarithm	Natural	Logarithm	Natural	Logarithm	Natural	
	″							
A	0.06474 91230 1	3.49680 87574	0.00000 03139 12606 8	10.00000 00000	1.00000 00000	3.49680 87574	0.00000 03139 12606 8	0.002
	0.03237 45615 0	3.19577 87616	.00000 01569 56303 4	10.00000 00000	1.00000 00000	3.19577 87616	.00000 01569 56303 4	
B	2.20147 0182	5.02828 76743	.00001 06730 2863	10.00000 00000	1.00000 00000	5.02828 76743	.00001 06730 2863	.068
	1.10073 5091	4.72725 76787	.00000 53365 14314	10.00000 00000	1.00000 00000	4.72725 76787	.00000 53365 14314	
C_1	4.20869 2995	5.30972 21139	.00002 04043 1943	9.99999 99999	.99999 99998	5.30972 21140	.00002 04043 1944	.130
	2.10434 6498	5.00869 21183	.00001 02021 5972	10.00000 00000	1.00000 00000	5.00869 21183	.00001 02021 5972	
C_2	7.44614 9146	5.55750 65975	.00003 60999 4976	9.99999 99997	.99999 99993	5.55750 65978	.00003 60999 4979	.230
	3.72307 4573	5.25647 66020	.00001 80499 7489	9.99999 99999	.99999 99998	5.25647 66021	.00001 80499 7489	
D_1	12.30233 337	5.77556 23579	.00005 96433 9523	9.99999 99991	.99999 99980	5.77556 23588	.00005 96433 9536	.380
	6.15116 669	5.47453 23625	.00002 98216 9763	9.99999 99997	.99999 99993	5.47453 23628	.00002 98216 9765	
D_2	19.10099 129	5.96663 07727	.00009 26042 1886	9.99999 99981	.99999 99956	5.96663 07746	.00009 26042 1926	.590
	9.55049 5643	5.66560 07774	.00004 63021 0947	9.99999 99995	.99999 99988	5.66560 07779	.00004 63021 0953	
E_1	28.16586 851	6.13529 80129	.00013 65519 835	9.99999 99960	.99999 99908	6.13529 80169	.00013 65519 848	.870
	14.08293 425	5.83426 80183	.00006 82759 9192	9.99999 99990	.99999 99977	5.83426 80193	.00006 82759 9208	
E_2	41.43943 872	6.30298 87283	.00020 09040 669	9.99999 99912	.99999 99797	6.30298 87371	.00020 09040 710	1.280
	20.71971 936	6.00195 87348	.00010 04520 340	9.99999 99978	.99999 99949	6.00195 87370	.00010 04520 345	
F_1	54.38926 332	6.42108 80383	.00026 36865 866	9.99999 99849	.99999 99652	6.42108 80534	.00026 36865 957	1.680
	27.19463 166	6.12005 80464	.00013 18432 944	9.99999 99962	.99999 99913	6.12005 80502	.00013 18432 956	
	′ ″							
F_2	1 14.13774 584	6.55561 42346	.00035 94299 269	9.99999 99719	.99999 99353	6.55561 42627	.00035 94299 502	2.290
	0 37.06887 292	6.25458 42460	.00017 97149 664	9.99999 99930	.99999 99839	6.25458 42530	.00017 97149 693	
G	1 53.95845 65	6.74232 14030	.00055 24861 597	9.99999 99337	.99999 98473	6.74232 14693	.00055 24862 440	3.520
	0 56.97922 82	6.44129 14240	.00027 62430 905	9.99999 99834	.99999 99618	6.44129 14406	.00027 62431 010	

Table 12.—DATA TO BE USED IN COMPUTING THE POTENTIAL OF THE HAYFORD ZONES—Continued

Angular radii of zones based on radius of sphere=6,371.2 km]

Zone	Outer radius of zone θ and $\frac{\theta}{2}$	Sine		Cosine		Tangent		Outer radius in kilometers
		Logarithm	Natural	Logarithm	Natural	Logarithm	Natural	
	′ ″							
H	2 49.64270 23	6.91510 99996	0.00082 24509 368	9.99999 98531	0.99999 96618	6.91511 01465	0.00082 24512 150	5.240
	1 24.82135 114	6.61408 00408	.00041 12255 033	9.99999 99632	.99999 99153	6.61408 00775	.00041 12255 381	
I	4 33.24129 91	7.12212 10813	.00132 47108 13	9.99999 96189	.99999 91225	7.12212 14624	.00132 47119 76	8.440
	2 16.62064 95	6.82109 11808	.00066 23555 517	9.99999 99047	.99999 97806	6.82109 12761	.00066 23556 970	
J	6 41.44456 26	7.28920 01727	.00194 62569 33	9.99999 91775	.99999 81061	7.28920 09952	.00194 62606 19	12.400
	3 20.72228 13	6.98817 03826	.00097 31289 274	9.99999 97943	.99999 95264	6.98817 05883	.00097 31293 883	
K	10 08.64175 63	7.46993 59807	.00295 07742 21	9.99999 81093	.99999 56466	7.46993 78714	.00295 07870 67	18.800
	5 04.32087 81	7.16890 64577	.00147 53887 16	9.99999 95273	.99999 89116	7.16890 69304	.00147 53903 22	
L	15 32.38737 13	7.65516 97704	.00452 03261 43	9.99999 55629	.99998 97833	7.65517 42075	.00452 03723 26	28.800
	7 46.19368 56	7.35414 08840	.00226 01688 44	9.99999 88907	.99999 74458	7.35414 19933	.00226 01746 17	
M	31 43.62421 64	7.96514 99225	.00922 88996 24	9.99998 15042	.99996 74127	7.96516 84183	.00922 92926 75	58.800
	15 51.81210 82	7.66412 45507	.00461 44989 42	9.99999 53761	.99998 93532	7.66412 91746	.00461 45480 72	
N	53 25.08158 9	8.19139 64794	.01553 80487 4	9.99994 75676	.99987 92773	8.19144 89118	.01553 99247 6	99.000
	26 42.54079 4	7.89037 95914	.00776 92588 54	9.99998 68923	.99996 98188	7.89039 26991	.00776 94933 47	
	° ′ ″							
O_1, C. & G. S.	1 13 59	8.33282 64875	.02151 92181 1	9.99989 94209	.99976 84349	8.33292 70666	.02152 42023 7	137.100
	0 36 59.5	8.03182 16352	.01076 02320 0	9.99997 48567	.99994 21072	8.03184 67785	.01076 08549 8	
O_1, Cassinis	1 11 40.96049 6	8.31910 88487	.02085 01339 2	9.99990 55795	.99978 26124	8.31920 32693	.02085 46674 7	132.850
	0 35 50.48024 8	8.01810 24569	.01042 56335 7	9.99997 63962	.99994 56518	8.01812 60607	.01042 62002 2	
	1 29 58	8.41775 81725	.02616 72553 5	9.99985 12628	99965 75785	8.41790 69097	.02617 62186 5	166.700
O_2	0 44 59	8.11676 53580	.01308 47478 5	9.99996 28189	.99991 43910	8.11680 25391	.01303 58631 2	
18	1 41 13	8.46891 53996	.02943 84811 7	9.99981 17333	.99956 65939	8.46910 36663	.02945 12455 2	188
	0 50 36.5	8.16793 24656	.01472 08357 0	9.99995 29383	.99989 16423	8.16797 95272	.01472 24309 8	
17	1 54 52	8.52383 93211	.03340 71418 5	9.99975 75202	.99944 18254	8.52408 18009	.03342 57992 8	213
	0 57 26	8.22286 99368	.01670 59022 8	9.99993 93885	.99986 04467	8.22293 05483	.01670 82339 8	
16	2 11 53	8.58380 94989	.03835 38971 2	9.99968 03365	.99926 42184	8.58412 91625	.03838 21379 9	244
	1 05 56.5	8.28285 94045	.01918 04770 5	9.99992 00987	.99981 60373	8.28293 93057	.01918 40061 8	
15	2 33 46	8.65044 34937	.04471 39970 4	9.99956 54138	.99899 98289	8.65087 80799	.04475 87634 7	285
	1 16 53	8.34952 21174	.02236 25908 2	9.99989 13806	.99974 99259	8.34963 07368	.02236 81845 3	
14	3 03 05	8.72616 96115	.05323 16112 0	9.99938 38172	.99858 21927	8.72678 57943	.05330 71905 3	339
	1 31 32.5	8.42529 36069	.02662 52446 4	9.99984 60088	.99964 54851	8.42544 75980	.02663 46870 3	
13	4 19 13	8.87697 74217	.07533 16399 0	9.99876 42109	.99715 85351	8.87821 32108	.07554 63020 6	480
	2 09 36.5	8.57625 61535	.03769 26050 2	9.99969 12725	.99928 93813	8.57656 48810	.03771 94091 3	
12	5 46 34	9.00277 70280	.10064 14831	9.99778 93645	.99492 27567	9.00498 76635	.10115 50720	642
	2 53 17	8.70229 89880	.05038 47360 7	9.99944 80444	.99872 98825	8.70285 09436	.05044 88119 9	
11	7 51 30	9.13584 53622	.13672 41909	9.99590 23368	.99060 91538	9.13994 30254	.13802 03185	874
	3 55 45	8.83583 73659	.06852 31573 7	9.99897 80006	.99764 95261	8.83685 93653	.06868 45987 3	
10	10 44	9.27006 88702	.18623 82449	9.99233 45985	.98250 46138	9.27773 42717	.18955 45754	1,194
	5 22	8.97094 67690	.09352 91029 5	9.99809 21055	.99561 65461	8.97285 46635	.09394 08885 0	
9	14 09	9.38821 01026	.24446 12919	9.98661 90560	.96965 90518	9.40159 10466	.25211 05655	1,573
	7 04 30	9.09049 95766	.12316 84785	9.99668 05303	.99238 57747	9.09381 90463	.12411 35067	
8	20 41	9.54802 40384	.35320 27192	9.97106 55236	.93554 68129	9 57695 85148	.37753 61257	2,300
	10 20 30	9.25410 72008	.17951 76692	9.99288 68420	.98375 47491	9.26122 03588	.18248 21373	
7	26 41	9.65230 35097	.44905 91084	9.95109 55543	.89350 20521	9.70120 79554	.50258 31864	2,967
	13 20 30	9.36315 56218	.23075 73919	9.98811 78922	.97301 13186	9.37503 77296	.23715 79729	
6	35 58	9.76887 07126	.58731 44858	9.90814 11022	.80935 88170	9.86072 96104	.72565 40282	3,999
	17 59	9.48959 33643	.30874 03302	9.97824 73527	.95114 63655	9.51134 60116	.32459 81285	
5	51 04	9.89091 13118	.77787 76827	9.79824 70370	.62841 57149	10.09266 42748	1.23783 93225	5,679
	25 32	9.63451 36715	.43103 61268	9.95536 76446	.90233 46704	9.67914 60269	.47768 98648	
4	72 13	9.97873 65125	.95221 82756	9.48489 50965	.30541 83288	10.49384 14160	3.11775 09198	8,030
	36 06 30	9.77034 66616	.58931 38685	9.90735 98552	.80790 41802	9.86298 68063	.72943 53500	
3	105 48	9.98327 34740	.96221 79935	9.43501 61360 n	−.27228 02470	10.54825 73380 n	−3.53392 50790	11,765
	52 54	9.90177 63944	.79758 39288	9.78046 70839	.60320 79877	10.12130 93106	1.32223 70145	
2	150 56	9.68648 16097	.48582 69581	9.94153 87683 n	−.87405 50136	9.74494 28414 n	−.55583 10982	16,784
	75 28	9.98587 61700	.96800 18114	9.39957 54441	.25094 32071	10.58630 07259	3.85745 37342	
1	180	−∞	.00000 00000	10.00000 00000 n	−1.00000 00000	−∞	.00000 00000	20,016
	90	10.00000 00000	1.00000 00000	−∞	.00000 00000	+∞	±∞	

Log 6,371.2=3.80422 12383 47316.
The characteristics of all logarithms in the above table have been increased by 10.

Table 13.—LOGARITHMS OF COEFFICIENTS OF POWER SERIES FOR POTENTIAL OF HAYFORD ZONES

	Outer radius Zone K	Outer radius Zone L	Outer radius Zone M	Outer radius Zone N
Log B_1	7.16890 64577-10	7.35414 08840-10	7.66412 45507-10	7.89037 95914-10
Log B_2	7.04396 772-10	7.22920 214-10	7.53918 581-10	7.76544 085-10
Log B_3	1.45088 513	1.26565 455	.95569 196	.72948 781
Log B_4	1.02491 262	.83967 693	.52968 623	.30341 422
Log B_5	5.68710 25 n	5.13140 17 n	4.20146 48 n	3.52273 36 n
Log B_6	5.30689 13	4.75119 05	3.82125 36	3.14252 24
Log B_7	10.30006 7	9.37389 1	7.82395 1	6.69262 5
Log B_8	10.41816 8 n	9.49199 3 n	7.94206 3 n	6.81076 0 n
Log B_9	15.04692 n	13.75027 n	11.58030 n	9.99630 n
Log B_{10}	15.39911	14.10246	11.93254	10.34865
Log B_{11}	19.86499	18.19784	15.40782	13.37109

	Outer radius Zone O_1 (Cassinis)	Outer radius Zone O_1 (C. & G. S.)	Outer radius Zone O_2	Outer radius Zone 18
Log B_1	8.01810 24569-10	8.03182 16352-10	8.11676 53580-10	8.16793 24656-10
Log B_2	7.89316 372-10	7.90688 290-10	7.99182 662-10	8.04299 37256-10
Log B_3	.60182 789	.58811 795	.50324 641	.45213 854
Log B_4	.17567 036	.16194 810	.07698 031	.02579 344
Log B_5	3.13960 70 n	3.09845 57 n	2.84367 25 n	2.69021 06 n
Log B_6	2.75939 58	2.71824 45	2.46346 13	2.30999 94
Log B_7	6.05394 8	5.98534 2	5.56055 2	5.30465 7
Log B_8	6.17211 0 n	6.10350 9 n	5.67875 1 n	5.42288 2 n
Log B_9	9.10200 n	9.00593 n	8.41103 n	8.05262 n
Log B_{10}	9.45448	9.35843	8.76369	8.40541
Log B_{11}	12.22106	12.09752	11.33242	10.87141

	Outer radius Zone 17	Outer radius Zone 16	Outer radius Zone 15	Outer radius Zone 14
Log B_1	8.22286 99368-10	8.28285 94045-10	8.34952 21174-10	8.42529 36069-10
Log B_2	8.09793 120-10	8.15792 066-10	8.22458 338-10	8.30035 487-10
Log B_3	.39728 228	.33740 841	.27091 770	.19541 779
Log B_4	9.97082 887-10	9.91080 083-10	9.84408 067-10	9.76821 844-10
Log B_5	2.52545 25 n	2.34556 10 n	2.14568 75 n	1.91855 38 n
Log B_6	2.14524 13	1.96534 98	1.76547 63	1.53834 26
Log B_7	5.02988 8	4.72982 5	4.39634 0	4.01720 8
Log B_8	5.14814 9 n	4.84813 8 n	4.51472 9 n	4.13571 9 n
Log B_9	7.66773 n	7.24734 n	6.78001 n	6.24852 n
Log B_{10}	8.02069	7.60054	7.13359	6.60268
Log B_{11}	10.37630	9.83542	9.23395	8.54978

	Outer radius Zone 13	Outer radius Zone 12	Outer radius Zone 11	Outer radius Zone 10
Log B_1	8.57625 61535-10	8.70229 89880-10	8.83583 73659-10	8.97094 67690-10
Log B_2	8.45131 741-10	8.57736 025-10	8.71089 86259-10	8.84600 80290-10
Log B_3	.04537 972	9.92078 477-10	9.79002 629-10	9.66009 223-10
Log B_4	9.61694 642-10	9.49041 713-10	9.35593 866-10	9.21905 747-10
Log B_5	1.46628 11 n	1.08911 41 n	.69033 88 n	.28841 41 n
Log B_6	1.08606 99	.70890 29	.31012 76	9.90820 29-10
Log B_7	3.26146 1	2.62977 3	1.95920 7	1.27815 0
Log B_8	3.38038 8 n	2.74935 8 n	2.08008 1 n	1.40151 1 n
Log B_9	5.18803 n	4.29980 n	3.35338 n	2.38502 n
Log B_{10}	5.54420	4.65917	3.71908	2.76320
Log B_{11}	7.18324	6.03627	4.80938	3.54326

	Outer radius Zone 9	Outer radius Zone 8	Outer radius Zone 7	Outer radius Zone 6
Log B_1	9.09049 95766-10	9.25410 72008-10	9.36315 56218-10	9.48959 33643-10
Log B_2	8.96556 08366-10	9.12916 846-10	9.23821 688-10	9.36465 462-10
Log B_3	9.54861 796-10	9.40576 139-10	9.32099 637-10	9.23942 346-10
Log B_4	9.09668 151-10	8.92548 651-10	8.80690 019-10	8.66072 137-10
Log B_5	9.93501 11-10 n	9.45735 19-10 n	9.14495 22-10 n	8.79076 27-10 n

Table 13.—LOGARITHMS OF COEFFICIENTS OF POWER SERIES FOR POTENTIAL OF HAYFORD ZONES—Continued

	Outer radius Zone 9—Contd.	Outer radius Zone 8—Contd.	Outer radius Zone 7—Contd.	Outer radius Zone 6—Contd.
Log B_1	9.55479 99-10	9.07714 07-10	8.76474 10-10	8.41055 15-10
Log B_2	.67136 3	9.82751 8-10	9.24640 0-10	8.52572 7-10
Log B_3	.79884 8 n	9.96712 2-10 n	9.40361 5-10 n	8.72988 6-10 n
Log B_8	1.51025 n	.24875 n	9.29260-10 n	6.37373-10 n
Log B_{10}	1.90996	.71914	9.89480-10	8.86703-10
Log B_{11}	2.37767	.55387	9.05361-10 n	8.77612-10 n

	Outer radius Zone 5	Outer radius Zone 4	Outer radius Zone 3	Outer radius Zone 2
Log B_1	9.63451 36715-10	9.77034 66616-10	9.90177 63944-10	9.98587 61700-10
Log B_2	9.50957 493-10	9.64540 792-10	9.77683 765-10	9.86093 743-10
Log B_3	9.17766 868-10	9.15947 072-10	9.18166 955-10	9.21496 093-10
Log B_4	8.47004 165-10	8.23819 308-10	7.85297 781-10	7.00709 475-10
Log B_5	8.39340 78-10 n	8.00752 83-10 n	7.51308 217-10 n	6.61639 07-10 n
Log B_6	8.01319 66-10	7.62731 713-10	7.13287 097-10	6.23617 95-10
Log B_7	7.47023 9-10	6.83906 2-10 n	6.68871 6-10	5.86072 2-10 n
Log B_8	7.88881 3-10 n	6.83489 7-10 n	6.11965 5-10	5.48634 0-10 n
Log B_9	7.60860-10	6.86347-10	4.97438-10 n	5.11034-10 n
Log B_{10}	7.34555-10	6.48786-10 n	5.27034-10 n	4.73040-10
Log B_{11}	7.68353-10 n	5.69182-10 n	5.21125-10	4.34432-10 n

For zone 1, $B_1=+1$, $B_2=\frac{3}{4}$, $B_3=\frac{1}{6}$, and the remaining coefficients, B_4, etc., are zero.

Table 14.—LOGARITHMS OF $\frac{h}{a}$ AND $R=1+\frac{2}{3}\frac{h}{a}$, AND NUMERICAL VALUES OF $4a^2|B_0|=h^2R$

h	Log $\frac{h}{a}$	Log R $\left(R=1+\frac{2h}{3a}\right)$	$4a^2\|B_0\|$ (h^2R)
km			
10.0	7.19577 87617-10	0.00045 42	100.10464
9.5	7.17350 23669-10	0.00043 15	90.33971
9.0	7.15002 12711-10	0.00040 88	81.07628
8.5	7.12519 76874-10	0.00038 61	72.31426
8.0	7.09886 87486-10	0.00036 34	64.05357
7.5	7.07084 00250-10	0.00034 07	56.29414
7.0	7.04087 68017-10	0.00031 80	49.03589
6.5	7.00869 21183-10	0.00029 53	42.27874
6.0	6.97393 00120-10	0.00027 26	36.02260
5.5	6.93614 14511-10	0.00024 99	30.25741
5.0	6.89474 87660-10	0.00022 72	25.01308
4.5	6.84899 12754-10	0.00020 44	20.25954
4.0	6.79783 87530-10	0.00018 17	16.00670
3.5	6.73984 68060-10	0.00015 90	12.25449
3.0	6.67290 00164-10	0.00013 63	9.00283
2.5	6.59371 87703-10	0.00011 36	6.25163
2.0	6.49680 87573-10	0.00009 09	4.00084
1.5	6.37187 00207-10	0.00006 82	2.25035
1.0	6.19577 87617-10	0.00004 54	1.00010
.9	6.15002 12711-10	0.00004 09	.81008
.8	6.09886 87486-10	0.00003 64	.64005
.7	6.04087 68017-10	0.00003 18	.49004
.6	5.97393 00120-10	0.00002 73	.36002
.5	5.89474 87660-10	0.00002 27	.25001
.4	5.79783 87530-10	0.00001 82	.16001
.3	5.67290 00164-10	0.00001 36	.09000
.2	5.49680 87573-10	0.00000 91	.04000
.1	5.19577 87617-10	0.00000 45	.01000
−.1	5.19577 87617-10 n	9.99999 55	.01000
−.2	5.49680 87573-10 n	9.99999 09	.04000
−.3	5.67290 00164-10 n	9.99998 64	.09000
−.4	5.79783 87530-10 n	9.99998 18	.15999
−.5	5.89474 87660-10 n	9.99997 73	.24999

Table 14.—LOGARITHMS OF $\frac{h}{a}$ AND $R=1+\frac{2}{3}\frac{h}{a}$, AND NUMERICAL VALUES OF $4a^2|B_0|=h^2R$—Continued

h	Log $\frac{h}{a}$	Log R $\left(R=1+\frac{2h}{3a}\right)$	$4a^2\|B_0\|$ (h^2R)
km			
−0.6	5.97393 00120−10 *n*	9.99997 27	0.35998
−.7	6.04087 68017−10 *n*	9.99996 82	.48996
−.8	6.09886 87486−10 *n*	9.99996 36	.63995
−.9	6.15002 12711−10 *n*	9.99995 91	.80992
−1.0	6.19577 87617−10 *n*	9.99995 46	.99990
−1.5	6.37187 00207−10 *n*	9.99993 18	2.24965
−2.0	6.49680 87573−10 *n*	9.99990 91	3.99916
−2.5	6.59371 87703−10 *n*	9.99988 64	6.24837
−3.0	6.67290 00164−10 *n*	9.99986 36	8.99717
−3.5	6.73984 68060−10 *n*	9.99984 09	12.24551
−4.0	6.79783 87530−10 *n*	9.99981 82	15.99330
−4.5	6.84899 12754−10 *n*	9.99979 55	20.24046
−5.0	6.89474 87660−10 *n*	9.99977 27	24.98692
−5.5	6.93614 14511−10 *n*	9.99975 00	30.23259
−6.0	6.97393 00120−10 *n*	9.99972 73	35.97740
−6.5	7.00869 21183−10 *n*	9.99970 45	42.22126
−7.0	7.04087 68017−10 *n*	9.99968 18	48.96411
−7.5	7.07084 00250−10 *n*	9.99965 90	56.20586
−8.0	7.09886 87486−10 *n*	9.99963 63	63.94643
−8.5	7.12519 76874−10 *n*	9.99961 36	72.18574
−9.0	7.15002 12711−10 *n*	9.99959 08	80.92372
−9.5	7.17350 23669−10 *n*	9.99956 81	90.16029
−10.0	7.19577 87617−10 *n*	9.99954 53	99.89536
−10.5	7.21696 80607−10 *n*	9.99952 26	110.12887
−11.0	7.23717 14468−10 *n*	9.99949 98	120.86073
−11.5	7.25647 66020−10 *n*	9.99947 71	132.09086
−12.0	7.27496 00077−10 *n*	9.99945 43	143.81919
−12.5	7.29268 87747−10 *n*	9.99943 16	156.04563
−13.0	7.30972 21140−10 *n*	9.99940 88	168.77011
−13.5	7.32611 25301−10 *n*	9.99938 61	181.99255
−14.0	7.34190 67973−10 *n*	9.99936 33	195.71287
−14.5	7.35714 67639−10 *n*	9.99934 06	209.93100
−15.0	7.37187 00207−10 *n*	9.99931 78	224.64685
−80	8.09886 87486−10 *n*	9.99634 92	6,346.4256
−82	8.10959 26140−10 *n*	9.99625 76	6,666.3062
−84	8.12005 80477−10 *n*	9.99616 59	6,993.9809
−86	8.13027 72129−10 *n*	9.99607 42	7,329.4447
−88	8.14026 14338−10 *n*	9.99598 24	7,672.6925
−90	8.15002 12711−10 *n*	9.99589 07	8,023.7192
−92	8.15956 65890−10 *n*	9.99579 90	8,382.5200
−94	8.16890 66153−10 *n*	9.99570 72	8,749.0897
−96	8.17804 99947−10 *n*	9.99561 54	9,123.4234
−98	8.18700 48373−10 *n*	9.99552 36	9,505.5160
−100	8.19577 87617−10 *n*	9.99543 17	9,895.3625
−102	8.20437 89334−10 *n*	9.99533 98	10,292.9578
−104	8.21281 21010−10 *n*	9.99524 80	10,698.2970
−106	8.22108 46269−10 *n*	9.99515 61	11,111.3750
−108	8.22920 25171−10 *n*	9.99506 42	11,532.1868
−110	8.23717 14468−10 *n*	9.99497 22	11,960.7274
−112	8.24499 67843−10 *n*	9.99488 03	12,396.9918
−114	8.25268 36130−10 *n*	9.99478 83	12,840.9749
−116	8.26023 67509−10 *n*	9.99469 63	13,292.6717
−118	8.26766 07690−10 *n*	9.99460 43	13,752.0772
−120	8.27496 00077−10 *n*	9.99451 23	14,219.1863
−122	8.28213 85923−10 *n*	9.99442 02	14,693.9941
−124	8.28920 04468−10 *n*	9.99432 81	15,176.4956
−126	8.29614 93068−10 *n*	9.99423 60	15,666.6856
−128	8.30298 87313−10 *n*	9.99414 39	16,164.5592
−130	8.30972 21140−10 *n*	9.99405 18	16,670.1113

a=6,371.2 kilometers. Log a=3.80422 12333 47316. Colog a=6.19577 87616 52684−10.

The results obtained by the approximate formula (10), p. 7, must be increased by the appropriate values of $4a^2|B_0|$ in the fourth column of the table on this page, in order to make the results of that formula comparable with those obtained by means of the other more exact formulas (2, 8, and 9, pp. 4, 6, and 7).

The characteristics of Log R for negative values of h have been increased by 10.

Table 15.—POWERS OF $\frac{h}{a}$

$$\left[\frac{1}{a}=\frac{1}{6371.2}=0.00015\ 69563\ 03365\ 14314\ 4\right]$$

h	$\frac{h}{a}\times10^{3}$	$\left(\frac{h}{a}\right)^{2}\times10^{6}$	$\left(\frac{h}{a}\right)^{3}\times10^{9}$	$\left(\frac{h}{a}\right)^{4}\times10^{12}$	$\left(\frac{h}{a}\right)^{5}\times10^{15}$	$\left(\frac{h}{a}\right)^{6}\times10^{21}$
km						
1	0.15695 63033 65	0.02463 52811 6605	0.00386 66626 64	0.60689 70781 30	0.09525 6322	0.01495 1080
2	.31391 26067 30	.09854 11246 64	.03093 3301	9.71035 3250	3.04820 2	.95686 9
3	.47086 89100 95	.22171 75304 94	.10439 9892	49.15866 3329	23.147	10.90
4	.62782 52134 61	.39416 44986 57	.24746 6411	155.36565 2001	97.542	61.24
5	.78478 15168 26	.61588 20291 51	.48333 2833	379.31067 3831	297.676	233.61
6	.94173 78201 91	.88687 01219 78	.83519 9135	786.53361 3257	740.713	697.56

From the values of the powers of $\frac{h}{a}$ when $h=1$, in line 1, the values of the corresponding powers of $\frac{h}{a}$ for any value of h may be easily found. For example, if $h=-12$ to find $\left(\frac{h}{a}\right)^{3}$. In this case $\left(\frac{h}{a}\right)^{3}=(-12)^{3}\left(\frac{1}{a}\right)^{3}$ or $-1728\times0.00386\ 66626\ 64\times10^{-9}=-6.68159\ 308\times10^{-9}$. Observe also that $(-12)^{3}\left(\frac{1}{a}\right)^{3}=-8\left(\frac{6}{a}\right)^{3}=-8\times0.83519\ 9135\times10^{-9}=-6.68159\ 308\times10^{-9}$.

Table 16.—CONVERSION TABLES, FATHOMS AND FEET TO KILOMETERS

Fathoms in terms of kilometers

Fathoms	0	100	200	300	400	500	600	700	800	900
	km	*km*	*km*	*km*	*km*	*km*	*km*	*km*	*km*	*km*
0	0	0.1829	0.3658	0.5486	0.7315	0.9144	1.0973	1.2802	1.4630	1.6459
1,000	1.8288	2.0117	2.1946	2.3774	2.5603	2.7432	2.9261	3.1090	3.2918	3.4747
2,000	3.6576	3.8405	4.0234	4.2062	4.3891	4.5720	4.7549	4.9378	5.1207	5.3035
3,000	5.4864	5.6693	5.8522	6.0351	6.2179	6.4008	6.5837	6.7666	6.9495	7.1323
4,000	7.3152	7.4981	7.6810	7.8639	8.0467	8.2296	8.4125	8.5954	8.7783	8.9611
5,000	9.1440	9.3269	9.5098	9.6927	9.8755	10.0584	10.2413	10.4242	10.6071	10.7899
6,000	10.9728	--------	--------	--------	--------	--------	--------	--------	--------	--------

Feet in terms of kilometers

Feet	0	100	200	300	400	500	600	700	800	900
	km	*km*	*km*	*km*	*km*	*km*	*km*	*km*	*km*	*km*
0	0	0.0305	0.0610	0.0914	0.1219	0.1524	0.1829	0.2134	0.2438	0.2743
1,000	.3048	.3353	.3658	.3962	.4267	.4572	.4877	.5182	.5486	.5791
2,000	.6096	.6401	.6706	.7010	.7315	.7620	.7925	.8230	.8534	.8839
3,000	.9144	.9449	.9754	1.0058	1.0363	1.0668	1.0973	1.1278	1.1582	1.1887
4,000	1.2192	1.2497	1.2802	1.3106	1.3411	1.3716	1.4021	1.4326	1.4630	1.4935
5,000	1.5240	1.5545	1.5850	1.6154	1.6459	1.6764	1.7069	1.7374	1.7678	1.7983
6,000	1.8288	1.8593	1.8898	1.9202	1.9507	1.9812	2.0117	2.0422	2.0726	2.1031
7,000	2.1336	2.1641	2.1946	2.2250	2.2555	2.2860	2.3165	2.3470	2.3774	2.4079
8,000	2.4384	2.4689	2.4994	2.5298	2.5603	2.5908	2.6213	2.6518	2.6822	2.7127
9,000	2.7432	2.7737	2.8042	2.8346	2.8651	2.8956	2.9261	2.9566	2.9870	3.0175
10,000	3.0480	3.0785	3.1090	3.1394	3.1699	3.2004	3.2309	3.2614	3.2918	3.3223
11,000	3.3528	3.3833	3.4138	3.4442	3.4747	3.5052	3.5357	3.5662	3.5966	3.6271
12,000	3.6576	3.6881	3.7186	3.7490	3.7795	3.8100	3.8405	3.8710	3.9014	3.9319
13,000	3.9624	3.9929	4.0234	4.0538	4.0843	4.1148	4.1453	4.1758	4.2062	4.2367
14,000	4.2672	4.2977	4.3282	4.3586	4.3891	4.4196	4.4501	4.4806	4.5110	4.5415
15,000	4.5720	4.6025	4.6330	4.6634	4.6939	4.7244	4.7549	4.7854	4.8158	4.8463
16,000	4.8768	4.9073	4.9378	4.9682	4.9987	5.0292	5.0597	5.0902	5.1207	5.1511
17,000	5.1816	5.2121	5.2426	5.2731	5.3035	5.3340	5.3645	5.3950	5.4255	5.4559
18,000	5.4864	5.5169	5.5474	5.5779	5.6083	5.6388	5.6693	5.6998	5.7303	5.7607
19,000	5.7912	5.8217	5.8522	5.8827	5.9131	5.9436	5.9741	6.0046	6.0351	6.0655
20,000	6.0960	6.1265	6.1570	6.1875	6.2179	6.2484	6.2789	6.3094	6.3399	6.3703
21,000	6.4008	6.4313	6.4618	6.4923	6.5227	6.5532	6.5837	6.6142	6.6447	6.6751
22,000	6.7056	6.7361	6.7666	6.7971	6.8275	6.8580	6.8885	6.9190	6.9495	6.9799
23,000	7.0104	7.0409	7.0714	7.1019	7.1323	7.1628	7.1933	7.2238	7.2543	7.2847
24,000	7.3152	7.3457	7.3762	7.4067	7.4371	7.4676	7.4981	7.5286	7.5591	7.5895
25,000	7.6200	7.6505	7.6810	7.7115	7.7419	7.7724	7.8029	7.8334	7.8639	7.8943
26,000	7.9248	7.9553	7.9858	8.0163	8.0467	8.0772	8.1077	8.1382	8.1687	8.1991
27,000	8.2296	8.2601	8.2906	8.3211	8.3515	8.3820	8.4125	8.4430	8.4735	8.5039
28,000	8.5344	8.5649	8.5954	8.6259	8.6563	8.6868	8.7173	8.7478	8.7783	8.8087
29,000	8.8392	8.8697	8.9002	8.9307	8.9611	8.9916	9.0221	9.0526	9.0831	9.1135
30,000	9.1440	9.1745	9.2050	9.2355	9.2659	9.2964	9.3269	9.3574	9.3879	9.4183

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