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Z-FUNCTION SOLUTIONS FOR THE MOTION AND HEATING DURING ATMOSPHERE ENTRY FROM EQUATORIAL ORBITS OF A ROTATING PLANET

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Z-FUNCTION SOLUTIONS FOR THE MOTION AND HEATING DURING ATMOSPHERE ENTRY FROM EQUATORIAL ORBITS OF A ROTATING PLANET

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SUMMARY

It is shown that the two-dimensional equations of motion for atmosphere entry can be transformed into a pair of first-order differential equations or a single second-order differential equation in generalized coordinates. The transformation is similar to that introduced by Chapman in NASA TR R-11 and is based on the assumption of an exponential atmosphere. However, whereas the final equations derived by Chapman are approximate in the sense that two terms in the initial equations are disregarded, the final equations derived in the present analysis depend on no such approximations. Moreover, effects of atmospheric rotation for entry from equatorial orbits are included in the present equations.

General machine-computed (IBM 704) solutions of the transformed equations are presented in graphical and tabular form for various conditions of entry (i.e., initial values of flight-path angle and velocity) from which solutions at other initial conditions may be obtained by interpolation and/or extrapolation. These solutions are primarily for ballistic vehicles and include entries at circular and supercircular velocity into the atmospheres of Earth, Mars, and Venus. Because effects of oblateness have not been considered, the solutions presented are strictly valid only for entry from equatorial orbits. However, since effects of atmospheric rotation have been included for this type of entry, the solutions presented are nearly exact (i.e., within the limitation of the assumption of an exponential atmosphere). Moreover, since in the nonlifting case the transformed equations are essentially independent of variations in atmospheric temperature with altitude, the ballistic solutions presented in generalized coordinates are applicable to nonexponential as well as exponential atmospheres when properly adjusted for variations in atmospheric scale height.

In addition to presenting intra-atmospheric solutions of motion and heating, a summary of analytic solutions for Keplerian (two-body, point-mass) motion outside the sensible planetary atmosphere is also presented. Since these extra-atmospheric solutions may be directly linked to the intra-atmospheric solutions, they are useful in extending the vehicle trajectory out into space for a specific case of entry.

INTRODUCTION

Among the many critical factors pertaining to the successful atmosphere entry of manned vehicles, those related to the aerodynamic heating of the vehicle, the deceleration forces, and the distance traversed over the surface of the planet are most prominent. The manner in which these and other factors are influenced by the vehicle characteristics and by the initial conditions of entry are indicated and discussed in references 1 through 8.

An approximate analytical method for studying the major motion and heating of entry vehicles during atmosphere entry has been developed by Chapman in reference 1. This method has a distinct advantage over most other approximate methods in that the solutions from the transformed equations of motion are applicable to ballistic or roll-modulated lifting vehicles of any size, shape, and weight and to any planetary atmosphere. Although Chapman's Z-function method provides reasonable accuracy in the calculation of the motion and heating during flight through most of the atmosphere, it cannot be used to accurately obtain such information during the initial phase of atmosphere entry and during the final descent prior to impact or landing. Moreover, it does not account for the effects of atmospheric rotation on the motion and heating during atmosphere entry.

The primary purpose of the present report is to show how the two-dimensional equations of motion may be transformed into dimensionless coordinates similar to those developed by Chapman without deleting any terms of the equations and including effects of atmospheric rotation for entry from equatorial orbits. It is also intended to indicate the improvement in accuracy of solution for the motion and heating during atmosphere entry that is obtained by using the transformed equations of the present report rather than those of reference 1. A possible use for the complete equations in transformed coordinates would be to eliminate the maximum operating altitude restriction of certain guidance systems for atmosphere entry, such as that proposed in reference 9.

The secondary purpose of the present report is to present numerical solutions of the transformed equations in both graphical and tabular form for various conditions of entry into the atmospheres of Earth, Mars, and Venus. Since, as is indicated in reference 2, ballistic solutions obtained in the generalized coordinates of reference 1 are applicable to nonexponential as well as exponential atmospheres, the tabulated solutions presented herein are primarily for ballistic or nonlifting entry. In the selection of initial conditions for which ballistic solutions would be presented, the objective was to develop a lattice of points in the plane of initial values of flight-path angle and velocity such that solutions at other initial conditions could easily be obtained by parabolic interpolation and/or extrapolation. This capability, however, was planned only for cases of ballistic entry at essentially circular values of velocity. For ballistic entry at supercircular velocities such a procedure was considered inadvisable, since the range of initial flight-path angles for single-pass entry (see appendix A) is very small in all cases. As a result, only a single tabulated solution for ballistic entry is presented at each of several initial supercircular velocities. While, at first, it would appear that the selection of initial conditions for these solutions was completely arbitrary, this is not really the case. The initial flight-path angles selected were determined by trial and error to be those for

which a unique single-pass trajectory results, namely, that where the vehicle levels out to horizontal flight just when circular velocity is attained and then, subsequently, continues its ballistic descent. Although certain of the initial values of supercircular velocity selected are arbitrary, there are other values included in the tabulated solutions which generally apply in returns to Earth from lunar, planetary, and deep-space missions. In addition to the tabulated cases of ballistic entry, some results of a large number of solutions for lifting entry at these supercircular velocities are presented in compact graphical form (see appendix B). Although these results were obtained using the equations of the present report, they are not presented in terms of quantities peculiar to the Z-function method.

Finally, it should be understood that the solutions presented in the present report are essentially supplementary to those given in references 1, 2, and 3. The extensive analysis of various aspects of atmosphere entry to be found in references 1 and 2 is generally appropriate to and descriptive of many results found in the present solutions. Thus, only those results obtained from the present solutions which are not already summarized in references 1 and 2 have been discussed in any detail.

NOTATION

a semimajor axis of elliptical orbit

A reference area for drag and lift, ft^2

a_r resultant gas-dynamic acceleration, ft/sec^2

a_t total acceleration, ft/sec^2

b semiminor axis of elliptical orbit

c distance from foci to center of elliptical orbit

C_D drag coefficient, $\frac{2D}{\rho V^2 A}$

C_L lift coefficient, $\frac{2L}{\rho V^2 A}$

d distance from focus to directrix of conic section

D drag force, lb

e eccentricity of orbit

E total energy per unit mass, ft^2/sec^2

f focus of conic section

g acceleration of gravity, ft/sec^2

G universal constant of gravitation

h angular momentum per unit mass, ft^2/sec

H atmospheric scale height, ft

K kinetic energy per unit mass, ft^2/sec^2

l characteristic dimension of vehicle, ft

L lift force, lb

m mass of vehicle, slugs

M mass of planet, slugs

$\overline{M}$ mean molecular weight of planetary atmosphere (consistent units with gas constant and g)

p semilatus rectum of conic section

P potential energy per unit mass, ft^2/sec^2

$\overline{q}$ dimensionless function proportional to laminar convective heating rate per unit area, given by equation (44)

$\overline{Q}$ dimensionless function proportional to total laminar convective heat absorbed per unit area, given by equation (45)

q_c laminar convective heating rate per unit area, $Btu/ft^2/sec$

Q_c total laminar convective heat absorbed per unit area, Btu/ft^2

r distance from center of planet, ft or statute miles

r_o mean radius of planet, ft or statute miles

R universal gas constant, or radius of curvature of vehicle surface, ft

Re Reynolds number, $\frac{\rho V l}{\mu}$

s great circle or horizontal distance on surface of planet, ft or statute miles

t time, sec

T absolute temperature, ^{o}R

u transverse or horizontal component of velocity, ft/sec

$\overline{u}$ dimensionless velocity ratio, $\frac{u}{u_c}$

u_a tangential velocity of planet at equator, ft/sec

$\bar{u}_a$ dimensionless velocity ratio, $\frac{u_a}{u_c}$

u_c circular orbital velocity, $\sqrt{gr}$, ft/sec

v radial or vertical component of velocity, ft/sec

$\bar{v}$ dimensionless velocity ratio, $\frac{v}{u_c}$

V resultant velocity relative to inertial coordinates, ft/sec

V_r resultant velocity relative to rotating atmosphere, ft/sec

$\bar{V}$ dimensionless velocity ratio, $\frac{V}{u_c}$

$\bar{V}_r$ dimensionless velocity ratio, $\frac{V_r}{u_c}$

W weight of vehicle, mg, lb

y altitude or radial distance from surface of planet, ft or statute miles

Z dimensionless function of $\bar{V}$ given by equation (19)

Z_c dimensionless function of $\bar{u}$ given by equation (30)

β atmospheric density decay parameter, 1/ft

γ flight-path angle relative to local horizontal direction, positive for ascent, negative for descent

δ angle between velocity vector relative to rotating atmosphere and velocity vector relative to inertial coordinates

θ angle in polar coordinates with the origin at center of planet

λ flight-path angle relative to rotating atmosphere

μ coefficient of viscosity, slug/ft/sec; also product of universal gravitational constant and mass of planet ($GM = 1.40764 \times 10^{16} ft^3/sec^2$ for Earth)

ρ atmospheric density, slug/ft^3

ρ_o atmospheric density at surface of planet, slug/ft^3

$\bar{\rho}_o$ nominal value of atmospheric density at surface of planet in exponential approximation, slug/ft^3

τ period of orbit, sec

Subscripts

a value at apogee

ex final value at exit from sensible atmosphere

i initial value at outer edge of sensible atmosphere (arbitrarily defined by $Z_i = \bar{V}_i \times 10^{-6}$)

o value at sea level or at surface of planet

p value at perigee

s value at stagnation point

$\oplus$ relative to average value for Earth

ANALYSIS

Assumptions and Restrictions

The solutions presented herein are strictly valid only insofar as the following assumptions and restrictions apply:

(i) Atmosphere density varies exponentially with altitude (see fig. 1).

(ii) Atmosphere of planet has constant tangential velocity parallel to surface at all altitudes.

(iii) Planet is sufficiently spherical so that tesseral and zonal harmonics of the nonspherical gravitational potential may be neglected in equatorial orbits.

(iv) Orbital motion and flight path during atmosphere entry are nearly in the plane of planet's equator, if rate of rotation of planet about its axis is not negligibly small.

Assumption (i) is based upon the equilibrium equation of an isothermal perfect gas in a uniform gravitational field (ref. 10) which may be written as

$$\frac{dp}{dy} = -g\rho \tag{1}$$

and, since $p = \rho RT/M$, where RT/M is considered constant, it follows that

$$\frac{1}{\rho}\frac{d\rho}{dy} = -\frac{Mg}{RT} = -\beta \text{ (a constant)} \tag{2}$$

or

$$\frac{\rho}{\bar{\rho}_o} = e^{-\beta y} \tag{3}$$

where $\bar{\rho}_o$ is a nominal value of sea-level density. From equations (2) and (3) alternate expressions are obtained for the so-called "scale height" of a given atmosphere

$$H = \beta^{-1} = \frac{R\bar{T}}{\bar{M}g} = -\frac{dy}{d(\ln \rho/\bar{\rho}_o)} \tag{4}$$

where $\bar{M}$ and $\bar{T}$ denote mean values of molecular weight and temperature, respectively. As is indicated in reference 1 and in figure 1 of the present report, a value of 23,500 ft for H and a nominal value of 0.0027 slug/ft^3 for $\bar{\rho}_o$ provide a reasonable exponential approximation up to 80 miles of the model of the Earth's atmosphere given by the ARDC (ref. 11). The following estimated values of atmospheric scale height and other physical properties of Mars and Venus were obtained from references 1, 2, and 12. (A more detailed summary of astronomical constants for the various planets is found in ref. 12.) The subscript $\oplus$ designates a value relative to that for Earth.

Planet	$GM\times10^{-16}$, ft^3/sec^2	$g_\oplus$	$r_\oplus$	Gases	$\bar{M}$, gm/mol	$\bar{T}$, K	$\mu_\oplus$	H, ft	βr	$\sqrt{(\beta r)_\oplus}$
Earth	1.40764	1.000	1.000	N_2, O_2	29	240	1.0	2.35×10^4	900	1.00
Mars	.1514	.376	.535	N_2, CO_2	28	210	1.0	5.6×10^4	200	.47
Venus	1.150	.891	.96	CO_2, N_2	40	270	.8	2.2×10^4	900	1.00

Further discussion of the approximations and restrictions involved in the use of an exponential atmosphere in entry calculations is given in reference 1.

Assumption (ii) is used for convenience in the case of a rotating atmosphere. It simply states that the atmosphere is fixed to the planet in such a way that the horizontal component of velocity u_a is constant at all altitudes. Since, for a given angular velocity, the actual tangential velocity will vary slightly with altitude, this assumption implies that a very small amount of relative motion or slippage between various layers of the atmosphere is taking place.

Assumption (iii) is reasonable for Earth, Mars, and Venus, since these planets have only small equatorial bulges. In the case of an essentially oblate spheroid such as Earth, the gravitational field consists of a part with spherical symmetry and a nonspherical part in which the dominant part of the gravitational attractive force varies inversely as the fourth power of the radial distance and is also a function of the geocentric latitude (ref. 6). As is indicated in reference 6, it is found that even in the plane of the equator there is a small deviation of the gravitational attractive force from the inverse-square (spherical planet) relationship with distance. Although this deviation is greater closer to Earth, it is relatively insignificant in comparison with other effects during atmosphere entry and so will be ignored in the following analysis.

Item (iv) is a restriction which should certainly be imposed for entry into the atmosphere of Earth and probably also for entry into the atmosphere of Mars. (For Earth, the peripheral velocity at the equator is $u_a = 0.06\ u_c$, and, for Mars, $u_a = 0.07\ u_c$.) This restriction would limit the angle of inclination of the orbital plane to the plane of the equator to small values. In the case of Venus, which is believed to have a very low rate of rotation,[1] if it is reasonable to assume that the atmosphere and planet are spherically symmetric, then the solutions given apply with equal accuracy to other planes of entry.

Differential Equations of Motion

Extra-atmospheric motion.- For so-called Keplerian (i.e., two-body, point-mass) motion outside the sensible atmosphere of a planet, a body is governed by its own inertia and by gravitational forces. Consider first the equations of motion in polar coordinates (r, θ), as illustrated in figure 2. The two-dimensional motion of a body of mass m moving in a Newtonian central force field where the force of attraction F varies inversely as the square of the distance r, so that

$$\frac{F}{m} = g = \frac{\mu}{r^2}$$

is given by the familiar equations (e.g., see ref. 14)

$$\frac{1}{r}\frac{dh}{dt} = \frac{1}{r}\frac{d}{dt}\left(r^2\frac{d\theta}{dt}\right) = 0 \tag{5}$$

$$\frac{d^2r}{dt^2} - r\left(\frac{d\theta}{dt}\right)^2 + g = 0 \tag{6}$$

Letting the transverse and radial components of velocity be denoted by u and v, respectively, so that

[1]The most recent estimates of the rotation rate of Venus (ref. 13) are based upon radar experiments performed in the United States for the NASA by the Jet Propulsion Laboratory and in Russia by the Soviet Academy of Sciences between March and May of 1961. In this period, Earth and Venus were passing close to one another with the nearest approach (inferior conjunction) occurring on April 10, 1961. Although the estimates in the two cases differ by a wide margin - JPL's results indicating an extremely large period of rotation, perhaps as large as the Venusian year of 225 days, and the Soviet Academy's results indicating a considerably smaller period of only 10 days ±1 day, depending on the orientation of the axis of rotation - it is fairly certain that the error involved in neglecting the rotation of the planet about its axis is small in comparison with the error due to the uncertainty in the scale height of the atmosphere.

$$u \equiv r \frac{d\theta}{dt}, \qquad v \equiv \frac{dr}{dt}$$

the equations of motion can be expressed more conveniently as

$$\frac{1}{r} \frac{d}{dt} (ru) = \frac{du}{dt} + \frac{uv}{r} = 0 \tag{7}$$

$$\frac{dv}{dt} - \frac{u^2}{r} + g = 0 \tag{8}$$

(It is to be noted that the independent variable can be changed from t to r by using the differential identity $d/dt \equiv v d/dr$.) If u and v are replaced by

$$u \equiv V \cos \gamma, \qquad v \equiv V \sin \gamma$$

equations (7) and (8) may be combined to obtain finally

$$\frac{dV}{dt} + g \sin \gamma = 0 \tag{9}$$

$$V \frac{d\gamma}{dt} - \left(\frac{V^2}{r} - g\right) \cos \gamma = 0 \tag{10}$$

where V is the resultant velocity and γ is the flight-path angle. (In these equations the independent variable can be changed from t to r by using the differential identity $d/dt \equiv V(\sin \gamma) d/dr$.) These equations may easily be combined and integrated to provide analytic solutions for the two-dimensional orbital motion at any instant. However, before proceeding into the matter of summarizing such solutions,[2] it is desirable to consider the effects of gas-dynamic forces for motion within a planetary atmosphere.

Intra-atmospheric motion.- For motion within the sensible atmosphere of a planet, there may be both drag and lift forces on a body. Since drag and lift forces are considered to act in directions along and perpendicular to the direction of motion, respectively, the equations of motion are

$$\frac{du}{dt} + \frac{uv}{r} = -\frac{D}{m} \cos \gamma - \frac{L}{m} \sin \gamma = -\frac{D}{m} \cos \gamma \left(1 + \frac{L}{D} \tan \gamma\right) \tag{11}$$

$$\frac{dv}{dt} - \frac{u^2}{r} + g = -\frac{D}{m} \sin \gamma + \frac{L}{m} \cos \gamma = -\frac{D}{m} \cos \gamma \left(\tan \gamma - \frac{L}{D}\right) \tag{12}$$

[2]Although solutions to the Keplerian equations of motion are well known and are readily available, they are included herein, in greater detail than is generally the case, for purposes of convenience and utility. Such extra-atmospheric solutions may be directly linked to the intra-atmospheric solutions presented herein.

These equations represent the balance of forces in the horizontal and vertical directions, respectively. The corresponding equations expressing the balance of forces in directions along and perpendicular to the direction of motion, respectively, are

$$\frac{dV}{dt} = -\frac{D}{m} - g \sin \gamma \tag{13}$$

$$V \frac{d\gamma}{dt} = \frac{L}{m} + \left(\frac{V^2}{r} - g\right) \cos \gamma \tag{14}$$

or, in terms of dimensionless quantities,

$$\frac{\overline{V}r}{r_o} \frac{d\overline{V}}{d(y/r_o)} = -\left(\frac{C_D A}{2m}\right) \frac{\rho r \overline{V}^2}{\sin \gamma} + \frac{\overline{V}^2}{2} - 1 \tag{15}$$

$$\frac{\overline{V}^2 r \tan \gamma}{r_o} \frac{d\gamma}{d(y/r_o)} = \frac{L}{D}\left(\frac{C_D A}{2m}\right) \frac{\rho r \overline{V}^2}{\cos \gamma} + \overline{V}^2 - 1 \tag{16}$$

where r_o is considered to be constant. Since $\tan \gamma = d(y/r_o)/d(s/r_o)$, equations (15) and (16) can also be expressed as

$$\frac{\overline{V}r}{r_o} \frac{d\overline{V}}{d(s/r_o)} = -\left(\frac{C_D A}{2m}\right) \frac{\rho r \overline{V}^2}{\cos \gamma} + \left(\frac{\overline{V}^2}{2} - 1\right) \tan \gamma \tag{17}$$

$$\frac{\overline{V}^2 r}{r_o} \frac{d\gamma}{d(s/r_o)} = \frac{L}{D}\left(\frac{C_D A}{2m}\right) \frac{\rho r \overline{V}^2}{\cos \gamma} + \overline{V}^2 - 1 \tag{18}$$

Transformation of Coordinates

<u>$\overline{V}$ as independent variable.</u>- If a transformation of coordinates is made similar to that introduced by Chapman in reference 1, with the dimensionless dependent variable Z defined as

$$Z \equiv \left(\frac{C_D A}{2m}\right) \sqrt{\frac{r}{\beta}}\, \overline{V} \bar{\rho}_o e^{-\beta y} \tag{19}$$

and with $\overline{V}$ as the independent variable, it is found that, assuming $C_D A/m$ to be constant,

$$Z' = \frac{Z}{\overline{V}} - \beta r_o Z \frac{d(y/r_o)}{d\overline{V}} \left(1 - \frac{1}{2\beta r}\right) \tag{20}$$

and, thus, that

$$\frac{d\overline{V}}{d\,\frac{y}{r_o}} = \frac{-\beta r_o Z}{Z' - \frac{Z}{\overline{V}}}\left(1 - \frac{1}{2\beta r}\right) \tag{20a}$$

where $Z' \equiv dZ/d\overline{V}$. Combining equations (15) and (20a) gives

$$Z' - \frac{Z}{\overline{V}} = \frac{\sqrt{\beta r}\left(1 - \frac{1}{2\beta r}\right)\sin\gamma}{1 + \frac{\sin\gamma}{\sqrt{\beta r}\,\overline{V}Z}\left(1 - \frac{\overline{V}^2}{2}\right)} \tag{21}$$

Dividing equation (16) by equation (15) gives

$$\overline{V}\gamma' = \frac{\left(1 - \overline{V}^2\right)\cos\gamma - \frac{L}{D}\sqrt{\beta r}\,\overline{V}Z}{\left(1 - \frac{\overline{V}^2}{2}\right)\sin\gamma + \sqrt{\beta r}\,\overline{V}Z} \tag{22}$$

where $\gamma' \equiv d\gamma/d\overline{V}$. Equations (21) and (22), together with the initial conditions, describe the motion completely in $\overline{V}$, Z, and γ coordinates and are equivalent to the original equations, (13) and (14), or (15) and (16), which describe the motion in V, t, and γ coordinates or in $\overline{V}$, y/r_o, and γ coordinates, respectively.

It is of interest at this point to see whether the pair of first-order differential equations, (21) and (22), can be reduced to a single, second-order differential equation with Z as the dependent variable and $\overline{V}$ as the independent variable. If equation (21) is differentiated with respect to $\overline{V}$ (assuming $\beta r = \text{const.} \gg 1$ so that $1 - 1/2\beta r$ may be considered unity), there is obtained

$$\frac{d}{d\overline{V}}\left(Z' - \frac{Z}{\overline{V}}\right) = \gamma'\left[\frac{(Z' - Z/\overline{V})}{\tan\gamma} - \frac{(Z' - Z/\overline{V})^2(1 - \overline{V}^2/2)}{\beta r\overline{V}Z\tan\gamma}\right]$$

$$+ \frac{(Z' - Z/\overline{V})^3(1 - \overline{V}^2/2)}{\beta r\overline{V}Z^2} - \frac{2(Z' - Z/\overline{V})^2}{\beta r\overline{V}^2 Z} \tag{23}$$

and, after substituting the expressions for $Z' - Z/\overline{V}$ and γ', as given by equations (21) and (22), respectively, there results for the final equation

$$\bar{V}\left[1 + \frac{\sin\gamma}{\sqrt{\beta r}\,\bar{V}Z}\left(1 - \frac{\bar{V}^2}{2}\right)\right]^3 \frac{d}{d\bar{V}}\left(Z' - \frac{Z}{\bar{V}}\right) + \frac{2\sin^2\gamma}{\bar{V}Z}\left[1 + \frac{\sin\gamma}{\sqrt{\beta r}\,\bar{V}Z}\left(1 - \frac{\bar{V}^2}{2}\right)\right]$$

$$- \frac{\sqrt{\beta r}\,\sin^3\gamma}{Z^2}\left(1 - \frac{\bar{V}^2}{2}\right) = \left(\frac{1 - \bar{V}^2}{\bar{V}Z}\right)\cos^2\gamma - \frac{L}{D}\sqrt{\beta r}\cos\gamma \tag{23a}$$

where, from equation (21), assuming here also that $1 - 1/2\beta r \cong 1$,

$$\sin\gamma = \frac{\sqrt{\beta r}\,\bar{V}Z}{\dfrac{\beta r\bar{V}Z}{Z' - Z/\bar{V}} - \left(1 - \dfrac{\bar{V}^2}{2}\right)} \tag{21a}$$

and

$$\cos\gamma = \sqrt{1 - \sin^2\gamma} \tag{24}$$

Thus, substituting equations (21a) and (24) into equation (23a) produces a single, second-order differential equation for Z as a function only of $\bar{V}$, βr, and L/D. As in the case of the pair of first-order equations, (21) and (22), it is necessary to specify two initial conditions, say $Z_i = Z(\bar{V}_i)$ and $Z_i' = Z'(\bar{V}_i)$, in addition to values of βr and L/D.

If, in correspondence to approximation (a) of reference 1 (see appendix C), it can be assumed that

$$\frac{\sin\gamma}{\sqrt{\beta r}\,\bar{V}Z}\left(1 - \frac{\bar{V}^2}{2}\right) \ll 1$$

equations (21) and (22) can be reduced to

$$Z' - \frac{Z}{\bar{V}} = \sqrt{\beta r}\sin\gamma \tag{25}$$

$$\bar{V}\gamma' = \frac{1 - \bar{V}^2}{\sqrt{\beta r}\,\bar{V}Z}\cos\gamma - \frac{L}{D} \tag{26}$$

which may readily be combined into the expression

$$\bar{V}\frac{d}{d\bar{V}}\left(Z - \frac{Z}{\bar{V}}\right) = \frac{1 - \bar{V}^2}{\bar{V}Z}\cos^2\gamma - \sqrt{\beta r}\,\frac{L}{D}\cos\gamma \tag{27}$$

Equation (27), which corresponds to the basic differential equation of reference 1, was derived without the necessity of imposing approximation (b) of reference 1, namely, that $|L/D \tan \gamma| \ll 1$.

$\bar{u}$ as independent variable.- In a similar manner of derivation, the pair of transformed first-order differential equations with $\bar{u}$ as the independent variable (as in the transformation of ref. 1) is found to be[3]

$$Z_c' - \frac{Z_c}{\bar{u}} = \frac{\sqrt{\beta r}\left(1 - \frac{1}{2\beta r}\right)\sin \gamma}{1 + \frac{\bar{u} \sin \gamma}{2\sqrt{\beta r}\, Z_c} + \frac{L}{D}\tan \gamma} \tag{28}$$

$$\bar{u}\gamma' = \frac{(\cos^2 \gamma - \bar{u}^2)\cos \gamma - \frac{L}{D}\sqrt{\beta r}\, \bar{u}Z_c}{\frac{\bar{u}^2}{2}\sin \gamma + \sqrt{\beta r}\, \bar{u}Z_c\left(1 + \frac{L}{D}\tan \gamma\right)} \tag{29}$$

where now

$$Z_c \equiv \left(\frac{C_D A}{2m}\right)\sqrt{\frac{r}{\beta}}\, \bar{u}\bar{\rho}_o e^{-\beta y} \tag{30}$$

and $Z_c' \equiv dZ_c/d\bar{u}$, $\gamma' \equiv d\gamma/d\bar{u}$, and $\bar{u} \equiv \bar{V} \cos \gamma$.

The second-order differential equation corresponding to equation (23a) with $\bar{u}$ as the independent variable is found to be

$$\bar{u}'\left(1 + \frac{\bar{u} \sin \gamma}{2\sqrt{\beta r}\, Z_c} + \frac{L}{D}\tan \gamma\right)^3 \frac{d}{d\bar{u}}\left(Z_c' - \frac{Z_c}{\bar{u}}\right) - \frac{\sqrt{\beta r}\, \bar{u}^2 \sin^3 \gamma}{2Z_c^2}$$

$$= \left(1 - \frac{L}{D}\tan^3 \gamma\right)\left(\frac{\cos^2 \gamma - \bar{u}^2}{\bar{u}Z_c}\cos^2 \gamma - \sqrt{\beta r}\,\frac{L}{D}\cos \gamma\right) \tag{31}$$

Since the trigonometric functions cannot be obtained explicitly in terms of Z, Z', $\bar{u}$, βr, and L/D from equation (28), it does not appear possible to eliminate (without a great deal of difficulty) the angle functions entirely from equation (31) and thereby reduce the two first-order equations to a single, second-order equation. Such a reduction may be easily obtained, however, if the following approximation is applied to equation (28), in addition to assuming that $1 - 1/2\beta r \cong 1$,

$$\sin \gamma \cong \tan \gamma$$

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[3]It is to be noted that the use of equations (28) and (29) will generally provide results equivalent to those given through the use of equations (21) and (22). However, the use of equations (21) and (22) avoids loss of accuracy in the computation of the nearly vertical flight at the end of a trajectory.

so that

$$\sin \gamma \cong \frac{\sqrt{\beta r}\ \bar{u}Z_c}{\dfrac{\beta r \bar{u} Z_c}{Z_c' - Z_c/\bar{u}} - \dfrac{\bar{u}^2}{2} - \dfrac{L}{D}\sqrt{\beta r}\ \bar{u}Z_c} \tag{32}$$

and

$$\cos \gamma = \sqrt{1 - \sin^2 \gamma} \tag{24}$$

It is of interest to compare the nearly exact expressions for the Z function given by equations (28) and (31) with the corresponding approximate expressions developed by Chapman in reference 1, which are

$$Z_c' - \frac{Z_c}{\bar{u}} = \sqrt{\beta r} \sin \gamma$$

and

$$\bar{u} \frac{d}{d\bar{u}}\left(Z_c' - \frac{Z_c}{\bar{u}}\right) = \frac{1 - \bar{u}^2}{\bar{u}Z_c} \cos^4 \gamma - \sqrt{\beta r}\ \frac{L}{D} \cos^3 \gamma$$

The first of these equations differs from equation (28) by just those terms (or equivalent terms) deleted initially in the approximations of reference 1. If these same approximations then are applied to both equations (28) and (29), there are obtained

$$Z_c' - \frac{Z_c}{\bar{u}} = \sqrt{\beta r} \sin \gamma \tag{33}$$

$$\bar{u}\gamma' = \frac{\cos^2 \gamma - \bar{u}^2}{\sqrt{\beta r}\ \bar{u}Z_c} \cos \gamma - \frac{L}{D} \tag{34}$$

and, consequently, the single, second-order equation is found to be

$$\bar{u} \frac{d}{d\bar{u}}\left(Z_c' - \frac{Z_c}{\bar{u}}\right) = \frac{\cos^2 \gamma - \bar{u}^2}{\bar{u}Z_c} \cos^2 \gamma - \sqrt{\beta r}\ \frac{L}{D} \cos \gamma \tag{35}$$

which differs from Chapman's second-order equation only in the powers of $\cos \gamma$. Further information concerning the basic approximations of reference 1 may be obtained from an analysis presented in appendix C.

Consideration of Atmospheric Rotation

If the atmosphere is considered to have a tangential velocity u_a at the equator, then, for entry along a flight path or orbit in the plane of the equator, the terms in the two-dimensional equations of motion accounting for the gas-dynamic drag and lift on the body must be modified. The modification consists of first determining the directions of gas-dynamic drag and lift (parallel and perpendicular, respectively, to the relative velocity vector $\bar{V}_r$) and then resolving these forces into components both parallel and perpendicular to the resultant velocity vector $\bar{V}$ in inertial coordinates, as illustrated in figure 3. Thus, it is found that the transformed equations, (21) and (22), can be expressed in this case as

$$Z' - \frac{Z}{\bar{V}} = \frac{\sqrt{\beta r}\left(1 - \frac{1}{2\beta r}\right)\sin\gamma}{\left(1 - \frac{\bar{V}^2}{2}\right)\frac{\sin\gamma}{\sqrt{\beta r}\,\bar{V}Z} + \left(\frac{\bar{V}_r}{\bar{V}}\right)^2\left(1 + \frac{L}{D}\tan\delta\right)\cos\delta} \tag{36}$$

$$\bar{V}\gamma' = \frac{(1 - \bar{V}^2)\cos\gamma - \sqrt{\beta r}\,\bar{V}Z\left(\frac{\bar{V}_r}{\bar{V}}\right)^2\left(\frac{L}{D} - \tan\delta\right)\cos\delta}{\left(1 - \frac{\bar{V}^2}{2}\right)\sin\gamma + \sqrt{\beta r}\,\bar{V}Z\left(\frac{\bar{V}_r}{\bar{V}}\right)^2\left(1 + \frac{L}{D}\tan\delta\right)\cos\delta} \tag{37}$$

where

$$\left(\frac{\bar{V}_r}{\bar{V}}\right)^2 = 1 + \left(\frac{\bar{u}_a}{\bar{V}}\right)^2 - 2\,\frac{\bar{u}_a}{\bar{V}}\cos\gamma \tag{38}$$

and $\lambda(= \gamma + \delta)$ is the flight-path angle relative to the rotating atmosphere with δ defined by

$$\sin\delta \equiv \frac{\bar{u}_a}{\bar{V}_r}\sin\gamma \tag{39}$$

or

$$\cos\delta \equiv \frac{\bar{V} - \bar{u}_a\cos\gamma}{\bar{V}_r} \tag{40}$$

The method used to obtain solutions of these equations is discussed in appendix D.

Useful Quantities Related to the Z Function

The use of the Z function in the calculation of a number of useful quantities is indicated in the following relationships:

(1) Unit acceleration in flight-path direction (relative to atmosphere)

$$\frac{1}{g}\frac{dV_r}{dt} = -\sqrt{\beta r}\ \bar{V}Z\left(\frac{\bar{V}_r}{\bar{V}}\right)^2 - \sin\lambda \tag{41}$$

(2) Resultant unit gas-dynamic deceleration

$$-\frac{a_r}{g} = \sqrt{\beta r}\ \bar{V}Z\left(\frac{\bar{V}_r}{\bar{V}}\right)^2\sqrt{1+\left(\frac{L}{D}\right)^2} \tag{42}$$

(3) Total unit acceleration (relative to inertial coordinates)

$$\frac{a_t}{g} = \pm\frac{1}{g}\sqrt{\left(\frac{dV}{dt}\right)^2 + \left(V\frac{d\gamma}{dt} - \frac{V^2}{r}\cos\gamma\right)^2}$$

$$= \pm\sqrt{\pm 1 \mp \frac{1}{(mg)^2}\left(D^2 + L^2\right) \mp \frac{2}{mg}\left(D\sin\gamma - L\cos\gamma\right)}$$

$$= \pm\sqrt{\pm 1 \mp \beta r\ \bar{V}^2Z^2\left(\frac{\bar{V}_r}{\bar{V}}\right)^4\left[1+\left(\frac{L}{D}\right)^2\right] \mp 2\sqrt{\beta r}\ \bar{V}Z\left(\frac{\bar{V}_r}{\bar{V}}\right)^2\cos\gamma\left(\tan\gamma - \frac{L}{D}\right)} \tag{43}$$

(4) Dimensionless function proportional to laminar convective-heating rate per unit area

$$\bar{q} = \bar{V}^{5/2}Z^{1/2}\left(\frac{\bar{V}_r}{\bar{V}}\right)^3 = \sqrt{\left(\frac{C_DA}{2m}\right)\rho r}\ \frac{\bar{V}_r^{\,3}}{(\beta r)^{1/4}} \tag{44}$$

(5) Dimensionless function proportional to total laminar convective heat absorbed per unit area

$$\bar{Q} = \int_{\bar{V}}^{\bar{V}_1}\frac{\bar{V}^{3/2}}{Z^{1/2}}\left(\frac{\bar{V}_r}{\bar{V}}\right)^3\frac{(Z' - Z/\bar{V})}{\sqrt{\beta r}\sin\gamma}\,d\bar{V} \tag{45}$$

$$= \int_{t_1}^{t}\sqrt{\beta g}\ \bar{q}\ dt \cong \frac{1}{27}\int_{t_1}^{t}\bar{q}\ dt\ , \qquad \text{for Earth}$$

(6) Elapsed time[4] in seconds

$$t = \int_{\overline{V}}^{\overline{V}_1} \frac{1}{\sqrt{\beta g}} \frac{(Z' - Z/\overline{V})}{\sqrt{\beta r}\ \overline{V}Z \sin \gamma} d\overline{V} \tag{46}$$

(7) Unit horizontal distance traveled

$$\frac{\Delta s}{r} = \int_{\overline{V}}^{\overline{V}_1} \frac{(Z' - Z/\overline{V})}{\beta r\ Z \tan \gamma} d\overline{V} \tag{47}$$

(8) Unit vertical distance traveled

$$\frac{\Delta y}{r} = \int_{\overline{V}}^{\overline{V}_1} \frac{(Z' - Z/\overline{V})}{\beta r\ Z} d\overline{V} \tag{48}$$

(9) Dimensionless density-loading parameter[5]

$$\sqrt{\beta r}\ \frac{Z}{\overline{V}} = \left(\frac{C_D A}{2m}\right) \rho r \tag{49}$$

(10) Density ratio

$$\frac{\rho}{\rho_o} = \sqrt{\beta r} \left(\frac{2m}{C_D A}\right) \frac{Z}{\overline{V} \rho_o r} \tag{50}$$

(11) Dynamic pressure

$$\frac{1}{2} \rho V^2 = \sqrt{\beta r} \left(\frac{mg}{C_D A}\right) \overline{V}Z \tag{51}$$

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[4]The values of time given in the tabulated solutions for Earth or Venus must be multiplied by the factor 0.98 for application to Venus.

[5]The reason for giving values of the density-loading parameter in the tabulated solutions presented later in the report is primarily for convenience in determining the place in the table corresponding to a given altitude for specified values of $C_D A/m$ and density. For example, if approximate values of $\overline{\rho}_o r_o$ are used for the three planets considered herein, the values of $\sqrt{\beta r}\ Z/\overline{V}$ corresponding to the planet surface in each case are given by

$$\left.\begin{aligned} \left(\sqrt{\beta r}\ \frac{Z}{\overline{V}}\right)_o &= 28{,}230 \left(\frac{C_D A}{m}\right), \quad \text{for Earth} \\ &= 1{,}100 \left(\frac{C_D A}{m}\right), \quad \text{for Mars} \\ &= 300{,}000 \left(\frac{C_D A}{m}\right), \quad \text{for Venus} \end{aligned}\right\} \text{where units of } \frac{C_D A}{m} \text{ are ft}^2\text{/slug}$$

(12) Reynolds number per unit length

$$\frac{Re}{d} = \frac{V\rho}{\mu} = \frac{\sqrt{\beta g}}{\mu}\left(\frac{2m}{C_D A}\right) Z \tag{52}$$

$$= 22{,}000\left(\frac{m}{C_D A}\right) Z \quad \text{for Earth, } \frac{m}{C_D A} \text{ in slugs/ft}^2$$

In general, these quantities differ from the equivalent or corresponding quantities given in reference 1 only in that the Z function, as defined previously, is proportional to $\bar{V}$ rather that to $\bar{u}$, and, also, that the restriction as to a minimum value of Z for a given value of $\bar{V}$ (or $\bar{u}$) does not apply.

Solution of Differential Equations

Extra-atmospheric motion.- In the case of zero density, the equations of motion can be integrated directly. Equations (15) and (16) reduce to

$$\left(\frac{r}{r_o}\right)\frac{d\bar{V}}{d(y/r_o)} = \frac{\bar{V}}{2} - \frac{1}{\bar{V}} \tag{53}$$

$$\left(\frac{r}{r_o}\right)\tan\gamma\,\frac{d\gamma}{d(y/r_o)} = \frac{\bar{V}^2 - 1}{\bar{V}^2} \tag{54}$$

and, dividing equation (54) by equation (53) gives

$$\tan\gamma\,\frac{d\gamma}{d\bar{V}} = \frac{1 - \bar{V}^2}{\bar{V}(1 - \bar{V}^2/2)} \tag{55}$$

From the integration of equations (53) and (55), it is found that

$$\frac{r}{r_1} = \frac{2 - \bar{V}^2}{2 - \bar{V}_1{}^2} \tag{56}$$

or

$$\frac{r}{2 - \bar{V}^2} = \text{const} = a \tag{56a}$$

and that

$$\frac{\cos\gamma}{\cos\gamma_1} = \frac{\bar{V}_1}{\bar{V}}\sqrt{\frac{2 - \bar{V}_1{}^2}{2 - \bar{V}^2}} \tag{57}$$

or

$$\bar{V}\sqrt{2 - \bar{V}^2}\cos\gamma = \text{const} = \sqrt{1 - e^2} \tag{57a}$$

Combining equations (56) and (57) gives

$$\frac{\cos\gamma}{\cos\gamma_1} = \frac{\bar{V}_1}{\bar{V}}\sqrt{\frac{r_1}{r}} \tag{58}$$

from which are obtained

$$\frac{r_a}{r} = \left(\frac{\bar{V}}{\bar{V}_a}\right)^2 \cos^2\gamma = \frac{\bar{V}^2\cos^2\gamma}{1 - e} \tag{59}$$

and

$$\frac{r_p}{r} = \left(\frac{\bar{V}}{\bar{V}_p}\right)^2 \cos^2\gamma = \frac{\bar{V}^2\cos^2\gamma}{1 + e} \tag{60}$$

Additional relationships between $\bar{V}$, a, b, c, d, e, p, r, r_a/r, r/r_p, γ, θ, and τ may be found in appendix E (see also figs. 4, 5, and 6).

Intra-atmospheric motion.- In the case of finite values of density, numerical integration is required in order to obtain solutions to the equations of motion. However, if, along with C_DA/m, the flight-path angle is also held constant by varying the lift-drag ratio so that the flight path is actually a logarithmic spiral, an approximate analytical solution in closed form is obtained.[6] In this case, equation (21) is approximated by

$$Z' - \frac{Z}{\bar{V}} = \sqrt{\beta r}\sin\gamma_c \tag{61}$$

to give the solution

$$\bar{V} = \bar{V}_1 \exp\frac{Z/\bar{V} - Z_1/\bar{V}_1}{\sqrt{\beta r}\sin\gamma_c} = \bar{V}_1 \exp\left[\left(\frac{C_DA}{2m}\right)\frac{\rho - \rho_1}{\beta\sin\gamma_c}\right] \tag{62}$$

or

$$Z = Z_1\frac{\bar{V}}{\bar{V}_1} + \sqrt{\beta r}\,\bar{V}(\sin\gamma_c)\ln\frac{\bar{V}}{\bar{V}_1} \tag{62a}$$

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[6]This solution is applicable only to roll-modulated lifting vehicles (e.g., see ref. 15) trimmed at constant angle of attack.

From equation (22) is obtained the necessary variation in lift-drag ratio to maintain the constant flight-path angle

$$\frac{L}{D} = \frac{1 - \bar{V}^2}{\sqrt{\beta r}\ \bar{V}Z} \cos \gamma_c \tag{63}$$

or

$$Z = \frac{1 - \bar{V}^2}{\sqrt{\beta r}\ \bar{V}(L/D)} \cos \gamma_c \tag{63a}$$

The expressions for Z given by equations (62a) and (63a) are essentially equal to the Z_I and Z_{II} solutions given in reference 1 for ballistic and glide vehicles, respectively.

In the case of horizontal flight, where $\gamma_c = 0$, a special solution is required, since equation (61) indicates only that $Z \sim \bar{V}$. From equation (17), the solution is found to be

$$\bar{V} = \bar{V}_1 \exp\left\{\sqrt{\beta r}\ \frac{Z_1}{\bar{V}_1}\left[\left(\frac{s}{r}\right)_1 - \left(\frac{s}{r}\right)\right]\right\}$$

$$= \bar{V}_1 \exp\left\{\left(\frac{C_D A}{2m}\right) \rho r \left[\left(\frac{s}{r}\right)_1 - \left(\frac{s}{r}\right)\right]\right\} \tag{64}$$

with the necessary variation in lift-drag ratio again given by equation (63).

In the case of low-speed ($\bar{V} \ll 1$) equilibrium (or close to equilibrium) flight near the end of the trajectory, where the flight path is nearly vertical, equation (21) can be approximated by

$$Z' - \frac{Z}{\bar{V}} = \frac{\sqrt{\beta r}}{\frac{1}{\sqrt{\beta r}\ \bar{V}Z} - 1} = \frac{\sqrt{\beta r}}{\frac{mg}{D} - 1} \tag{65}$$

which has the following solution for constant values of $\sqrt{\beta r}\ \bar{V}Z$ or D/mg

$$\bar{V} = \bar{V}_1 \exp\left[\frac{Z/\bar{V} - Z_1/\bar{V}_1}{\sqrt{\beta r}}\left(1 - \frac{1}{\sqrt{\beta r}\ \bar{V}Z}\right)\right] = \bar{V}_1 \exp\left[\left(\frac{C_D A}{2m}\right)\frac{\rho - \rho_1}{\beta}\left(1 - \frac{mg}{D}\right)\right] \tag{66}$$

As is shown in figure 7, a stepwise solution using equation (66) and successively corrected values of $\sqrt{\beta r}\ \bar{V}Z$ or D/mg provides good agreement with a numerical solution of equation (21) for relatively low-speed vertical flight. Details of the stepwise solution are to be found in appendix F.

RESULTS AND DISCUSSION

As stated in the foregoing, with the exception of certain special cases, solutions of the transformed equations of motion for atmosphere entry require the use of numerical integration. Information pertaining to the method of machine computation employed in obtaining the solutions presented herein may be found in appendix D. The final form of the equations actually programmed for the IBM 704 digital computer is that given by equations (36), (37), (38) and (39). However, as is explained in appendix D, it was also necessary to program an alternate form of this set of equations for the computer as given by equations (D1), (D2), (D3), and (D4).

To present the solutions in as compact and yet as complete a manner as possible, they have been tabulated in terms of values of $\bar{V}$, Z, and related quantities (see tables II - XX). Table I is an index of the various solutions presented for Earth, Mars, and Venus.[7] For all three planets, ballistic or nonlifting-vehicle solutions are presented for various flight-path angles of entry at circular orbital velocity ($\bar{V}_i = 1.0$), and for a single angle of entry at several supercircular velocities ($\bar{V}_i = 1.1, 1.2, 1.3, \sqrt{2}, \sqrt{3}$, and 2.0 for Earth and Venus; $\bar{V}_i = \sqrt{2}, \sqrt{3}$, and 2.0 for Mars). The single entry angle selected at each supercircular velocity is that for which $\bar{V}_{\gamma=0}$ is 1.0. (In this case, the initial flight-path angle can only be determined by trial and error.) This entry condition is nearly equal to that for which the maximum value of deceleration is a minimum in the case of ballistic single-pass entry. For Earth and Venus, solutions are also presented for entry at slightly supercircular velocities ($\bar{V}_i = 1.02$, 1.04). These solutions enable the parabolic interpolation or extrapolation of solutions at other nearly circular-orbital initial values of velocity which might result during entry from deflected circular or nearly circular orbits close to the planets (e.g., see fig. 4 for possible conditions of entry from various orbits). If solutions at other initial values of flight-path angle are required, they may also be obtained by interpolation or extrapolation. It is to be noted that the solutions given for Earth and Venus differ only in the atmospheric rate of rotation. Thus, the solutions given for Venus with zero atmospheric rotation also apply to the case of entry into Earth's atmosphere with the assumption of zero atmospheric rotation. The solutions given specifically for Earth and Mars are for entry from equational orbits both opposite to and in the direction of rotation of the planets.

In addition to the ballistic case, solutions are presented for lifting vehicles in essentially decaying orbit entering the atmosphere of Earth and Venus at lift-drag ratios of 0.5 and 1.0. These solutions are primarily intended to provide an indication of the effects of atmospheric rotation of lifting entry. Skip-type solutions (resulting from entry at initial absolute flight-path angles greater than about 1° at the chosen lift-drag ratio) are not presented, since they are adequately covered in reference 1 for most purposes. However, certain results obtained from skip-type solutions for supercircular ballistic and lifting entry are presented.

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[7]It is to be noted that, just as in the case of the Z-function solutions presented in references 1, 2, and 3, the present results and solutions given specifically for Earth or Venus, with no rotation of the atmosphere, apply approximately to any planet for the same initial values of $\sqrt{(\beta r)_\oplus}\,\gamma_i$ and $\sqrt{(\beta r)_\oplus}\,L/D$.

Comparison With Other Solutions

There is found to be little difference in the solutions obtained by means of the present method (for the case of zero atmospheric rotation) and those given by Chapman in references 1, 2, and 3, for the range of conditions in which his solutions are indicated to be valid. As a means of providing further information concerning the basic approximations of reference 1 and the limitations thereby imposed on the resulting solutions, an analysis is presented in appendix C. The general results of this analysis indicate that increasingly greater errors should arise in the approximate solutions of Chapman at lower values of $\bar{u}$ with more negative values of L/D. This trend is apparent in the data presented in figure 8 wherein several approximate solutions of reference 3 are compared with more accurate solutions obtained with the transformed equations of the present report. For the cases considered with positive values of L/D, the errors do not become serious until values of $\bar{u}$ less than about 0.1 are attained and the flight-path angle attains fairly large negative values. These trends are also indicated qualitatively in reference 1 and are illustrated quantitatively herein only to document the analysis of appendix C.

Effects of model atmosphere used.- The comparison in reference 1 of one of Chapman's solutions (decaying-orbit type of entry with $L/D = 0.1$) using an exponential atmosphere with that obtained using the complete equations of motion and the ARDC model Earth atmosphere of reference 11 is similar to that which would be obtained with the present method of solution. That is to say that, as noted in reference 1, the differences shown in this comparison are almost entirely due to the differences in the atmospheres used in the two solutions and are not primarily a result of any difference in accuracy of the equations used.

Further discussion of the accuracy of the Z-function method is to be found in reference 2. It is noted therein that in the case of nonlifting entry the basic differential equation for Z (corresponding to eq. (27) or eq. (35) in the present report) is independent of the parameter βr and, thus, is independent of any variations in atmospheric temperature with altitude. As a result, ballistic solutions obtained in generalized $(\bar{V}, Z)$ coordinates are applicable to nonexponential as well as exponential atmospheres. However, some explanation of the manner in which these solutions may be used to obtain adjusted motion and heating characteristics for any given nonexponential atmosphere may be necessary. With L/D equal to 0, the basic differential equation will yield solutions for Z' and Z as functions of Z and/or $\bar{V}$ for given initial values of $\bar{V}$, Z, and Z'. The corresponding values of $\bar{V}$, Z, and Z' in these solutions[8] are then essentially independent of the type of atmosphere considered and may be used to obtain nearly exact values of other quantities of interest in the case of a given atmosphere and a specific vehicle (i.e., given value of m/C_DA). This procedure, however, is only practical for noncumulative quantities such as gas-dynamic deceleration, heating rate, etc., where it is relatively easy to account for the local deviation in βr for the atmosphere considered

[8]Although values of Z' are not tabulated in the solutions presented herein, they may be easily obtained by using the approximate relationship

$$Z' = \frac{Z}{\bar{V}} + \sqrt{\beta r} \sin \gamma$$

where $\sqrt{\beta r} = 30$ for Earth and Venus.

(e.g., see ref. 1) from the value used in the exponential approximation. For integrated quantities such as total heat absorbed, distance, time, etc., it would be necessary to apply factors to the results obtained by means of the Z-function method to account for the variation in βr over the whole trajectory.

To evaluate further the degree of approximation involved in using an exponential atmosphere, a comparison has been made for $\overline{V}_i$ or 1.0 between the present solutions and solutions obtained with the complete equations of motion and the model Earth atmosphere of reference 11. These results are summarized in table XXI[9] wherein data for three representative values of m/C_DA are compared at several angles of entry for lift-drag ratios of 0, 0.5, and 1.0. It is seen that the effects of the approximation on integrated quantities, such as total laminar convective heat absorbed and longitudinal range, are very small, amounting to maximum errors of less than 5 percent in heat absorbed and less than 3 percent in range. However, the effects of the approximation on the maximum values of laminar convective heating rate and aerodynamic deceleration are generally somewhat larger, resulting in errors of up to about 10 percent in some cases (i.e., for certain values of m/C_DA) for ballistic entry. For lifting vehicles, the same trend exists in the heating results, but the maximum percent errors in the maximum values of deceleration are even larger as a result of these maximum deceleration values being lower. It is to be noted, finally, that these results may be used to provide correction factors for specific vehicles which may be applied to the values of maximum heating rate, maximum loading, total heat absorbed, and range indicated in the tabulated solutions herein.

Motion and heating during initial phase of entry.- As has been previously noted, one of the advantages of using the present equations in place of those given in reference 1 is that motion and heating are obtained from the effective beginning of entry rather than from some later point within the sensible atmosphere. This not only obviates the difficult matching of flight paths (i.e., determining the proper Keplerian ellipse to join to the atmospheric trajectory) but also permits the calculation of heating for this transition portion of the trajectory. As is shown in figure 9, for ballistic vehicles entering the atmosphere at circular orbital velocity, the contributions to the total laminar convective heat absorbed in this phase of the atmospheric trajectory are fairly significant, varying from about 18 percent of the total at the smaller angles of entry to about 14 percent at the larger angles.

As an indication of the problem encountered in attempting to join the proper Keplerian ellipse to an incomplete intra-atmospheric trajectory, two specific solutions for entry ($\overline{V}_i = 1.0$, $\gamma_i = -1^\circ$, -4°) as given in table I of reference 1 are considered. Portions of these approximate solutions are shown in figure 10 along with the extended solutions obtained by integrating the nearly exact equations of the present report in the reverse direction from the first tabulated values in reference 1. It is to be noted that, in each case, the extended solution departs significantly from that which is obtained by the approximate analytical method given in reference 1. As a result, an accurate matching of the incomplete intra-atmospheric trajectory to the proper extra-atmospheric ellipse would appear to be

[9]The values of total laminar convective heat absorbed per unit area, Q_c, and laminar convective heating rate per unit area, q_c, given in table XXI are based upon heating formulae given in reference 1 for the stagnation point with a 1-foot radius of curvature.

very difficult. It is suggested in appendix B of reference 1 that the matching be done in the velocity range of 0.995 $\bar{u}_i$ to 0.990 $\bar{u}_i$. If a value of, say, 0.995 $\bar{u}_i$ is selected, then, according to the solutions for Keplerian motion summarized in appendix C, it is possible to calculate the horizontal and vertical distances to the point of apogee (assuming also an altitude corresponding to 0.995 $\bar{u}_i$, say 60 mi.). When these distances are compared with those calculated using the accurate numerical extension of the solutions, they are found to be significantly in error. For example, the apogee altitude and range, for the case of $\gamma_i = -1^{\circ}$, are in error by about 27 and 2000 miles, respectively, and, for the case of $\gamma_i = -4^{\circ}$, by about 38 and 600 miles, respectively. However, there is a simple way of reducing these errors to negligible values or, equivalently, of determining the proper matching ellipse. From an inspection of the results presented in figure 10, it is found that, in both cases considered, a straight line joining the extreme points in the initial (analytical) step calculation of reference 1 intersects the Keplerian motion (vacuum-trajectory) curve at about 0.9991 $\bar{u}_i$. Thus, if this value of $\bar{u}$ and the corresponding values of Z are used as the connecting points in all cases where $\bar{V}_i$ or $\bar{u}_i$ is close to 1.0, it is possible to obtain fairly good matching of the approximate solutions of references 1 and 3 with Keplerian ellipses. (The value of flight-path angle may be considered constant, since it changes only slightly during ballistic entry between $\bar{u}$ values of $\bar{u}_i$ and 0.995 $\bar{u}_i$.)

Effects of Planet Rotation

Circular-velocity entry.- The effects of Earth's rotation on the deceleration, range, and heating of both lifting and nonlifting vehicles during atmosphere entry at circular velocity are to be found in the results presented in figures 11 through 14. Similar effects for nonlifting vehicles entering the atmosphere of Mars at circular velocity are to be found in the results presented in figures 15 and 16. In the case of Venus, the rate of rotation of the planet is considered to be too small (e.g., see ref. 12) to cause any appreciable effect during entry.

In figure 11(a) it is shown that, for small-angle ($\gamma_i = -0.5^{\circ}$) ballistic entries into the Earth's atmosphere, the maximum deceleration is increased or decreased about 8.5 percent from the zero-rotation value for entry opposite to or in the direction of the rotation, respectively. In figure 11(b) it is shown that there are corresponding changes of about 18 and 15 percent, respectively, in the maximum rate of laminar convective heating per unit area and in the total laminar convective heat absorbed per unit area due to atmospheric rotation. The effects of atmospheric rotation on these quantities at other initial values of flight-path angle for entry at circular velocity are summarized in figure 12. It is to be seen that the percentage changes in the maximum values of deceleration and heating rates and in the total heat absorbed as a result of atmospheric rotation are roughly the same at all angles of entry.

The effects of atmospheric rotation on the longitudinal range covered during entry are also shown in figure 11(a). It is seen that, for the case of small-angle ballistic entry at circular velocity, there is a slight increase in net range (i.e., actual distance traversed on the surface of the planet) when entering in the direction opposite to the rotation and a slight decrease in net range when

entering in the direction of the rotation. This result is due, of course, to the fact that the movement of the surface during flight through the atmosphere is slightly greater than the increment in absolute or gross range imparted to the vehicle by the rotation of the atmosphere.

To assess the effects of Earth's rotation on the motion and heating characteristics of lifting vehicles during atmosphere entry, results of solutions obtained with lift-drag ratios of 0.5 and 1.0 are presented in figures 13 and 14 for the same initial conditions as those for the data of figure 11. From a comparison of the results presented in figures 11, 13, and 14, it is seen that the effects of Earth's rotation on the motion and heating during atmospheric entry are generally quite similar in the lifting and nonlifting cases. The most notable influence of L/D is in reducing the effects of atmospheric rotation on the maximum value of deceleration. Thus, with this single exception, there appears to be no significant influence of L/D in either increasing or decreasing the effects of planet rotation on the entry characteristics.

For Mars, the effects of planet rotation on the motion and heating characteristics of nonlifting vehicles during atmospheric entry at circular velocity are seen in figures 15 and 16 to be similar both qualitatively and quantitatively (i.e., in terms of percentage changes of dimensionless quantities) to those for Earth. It is to be noted that the values of gas-dynamic deceleration in figures 15(a) and 16(a) are given in terms of local values of the acceleration of gravity in the atmosphere of Mars which are about 3/8 as large as local values of the acceleration of gravity in the atmosphere of Earth.

Supercircular velocity entry.- The effects of Earth's rotation on the deceleration, range, and heating of nonlifting vehicles during single-pass atmosphere entry at supercircular velocity are to be found in the results presented in figures 17, 18, and 19. Similar effects for nonlifting vehicles entering the atmosphere of Mars at supercircular velocity are to be found in the results presented in figures 20, 21, and 22. It is to be noted that the results shown in figures 17 through 22 are presented not only to illustrate the effects of planet rotation on the motion and heating characteristics of ballistic vehicles during atmosphere entry at various conditions but also to illustrate the motion and heating characteristics at these various conditions. It is to be further noted that the solutions presented in these figures for finite (positive and negative) values of atmosphere rotation are for the same initial values of flight-path angle as the corresponding solutions for zero rotation. Thus, these solutions for entry at supercircular velocity with finite planet rotation are slightly different from the tabulated solutions for which the initial value of flight-path angle was selected in each case to give $\overline{V}_{\gamma=0} = 1.0$.

In figures 17, 18, and 19 it is shown that the effects of Earth's rotation on the motion and heating characteristics of nonlifting vehicles during single-pass atmosphere entry at $\overline{V}_i$ values of $\sqrt{2}$, $\sqrt{3}$, and 2.0 are generally similar to those found in cases of ballistic entry at circular velocity. However, it is to be seen that the percentage changes in maximum deceleration, maximum heating rate, and total heat absorbed as a result of atmosphere rotation decrease slightly with increasing values of $\overline{V}_i$. Furthermore, it is shown that, for initial supercircular velocities considered, the effects of planet rotation on the net range traversed on the surface during entry, although small, are opposite in sign to those found

for small-angle entries at circular velocity. This reversal in sign of the effects is explained by a change in the relative magnitudes of the two separate effects operating simultaneously to produce the net range, namely, the effect of atmospheric rotation on the gross range and the effect of planet rotation resulting in movement of the surface.

For Mars, it is seen from a comparison of figures 20, 21, and 22 with figures 17, 18, and 19 that the effects of planet rotation on the motion and heating characteristics of nonlifting vehicles during single-pass atmosphere entry at supercircular velocity are similar both qualitatively and quantitatively (i.e., in terms of percentage changes of dimensionless quantities) to those for Earth. This is not surprising inasmuch as the dimensionless atmospheric rotation parameter, $\bar{u}_a$, is nearly the same for Mars as for Earth.

SUMMARY OF RESULTS

The two-dimensional equations of motion for atmosphere entry have been transformed into a pair of first-order differential equations or a single second-order differential equation in generalized coordinates. The transformation is similar to that introduced by Chapman in NASA TR R-11 and is based on the assumption of an exponential atmosphere. However, whereas the final equations derived by Chapman are approximate in the sense that two terms in the initial equations are disregarded, the final equations derived in the present analysis depend on no such approximations. While, in general, these approximations cause no serious deficiencies in the solutions to the major motion and heating of the vehicle, there are certain significant benefits to be derived from the inclusion of all terms in the equations. The primary advantages of using the transformed equations of the present report rather than those of reference 1 may be summarized as follows:

(1) The equations may be used without any mathematical restriction as to boundary values except that a finite density is required.

(2) Motion and heating are obtained from the effective beginning of entry rather than from some point where gas-dynamic drag has reduced the velocity a certain arbitrary amount.

(3) No special matching of flight paths is required between that in essentially free space (at any arbitrarily low value of density) and that within the sensible atmosphere (where gas-dynamic forces are significant).

(4) Motion and heating may be obtained for the terminal phase of entry even in cases where the absolute values of flight-path angles and lift-drag ratios are relatively large and/or the horizontal component of velocity is relatively very small.

(5) Effects of atmospheric rotation are included for entry from orbits having small angles of inclination with respect to the plane of the equator.

(6) The acceleration of gravity is properly treated as a variable function of radial distance from the planet center.

General machine-computed (IBM 704) solutions of the transformed equations are presented in graphical and tabular form for various conditions of entry (i.e., initial values of flight-path angle and velocity) from which solutions at other initial conditions may be obtained by interpolation or extrapolation or both. These solutions are primarily for ballistic vehicles and include entries at circular and supercircular velocities into the atmospheres of Earth, Mars, and Venus. Because effects of oblateness have not been considered, the solutions presented are strictly valid only for entry from equatorial orbits. However, since effects of atmospheric rotation have been included for this type of entry, the solutions presented are nearly exact (i.e., within the limitation of the assumption of an exponential atmosphere). Moreover, since in the nonlifting case the transformed equations are essentially independent of variations in atmospheric temperature with altitude, the ballistic solutions presented in generalized coordinates are applicable to nonexponential as well as exponential atmospheres when properly adjusted for variations in atmospheric scale height.

In addition to intra-atmospheric solutions of motion and heating, a summary is also presented of analytic solutions for Keplerian (two-body, point-mass) motion outside the sensible planetary atmospheres. Since these extra-atmospheric solutions may be directly linked to the intra-atmospheric solutions, they are useful in extending the vehicle trajectory out into space for a specific case of entry.

It has been found in an inspection of the results for laminar convective heating during entry at circular velocity that a significant amount (up to about 18 percent) of the total heat absorbed is absorbed between the point of maximum velocity during entry and the point where the velocity has been reduced about one half of 1 percent from this maximum value by gas-dynamic drag (i.e., the specified condition for applicability of Chapman's solutions). It has also been found that there are significant errors in the altitude and range to the apogee point of the extra-atmospheric trajectory due to joining a Keplerian ellipse to the intra-atmospheric trajectory at the point where the velocity has been reduced about one half of 1 percent by gas-dynamic drag rather than joining at the point of initial entry.

From a comparison of numerical solutions of the equations of motion (in conventional coordinates) obtained using both an exponential atmosphere and the ARDC (1956) model Earth atmosphere, an evaluation of the degree of approximation involved in the use of an exponential atmosphere has been obtained. As would be expected, the effects of the approximation on integrated quantities such as total laminar convective heat absorbed and longitudinal range are very small, amounting to less than 5-percent error in heat absorbed and to less than 3-percent error in range. However, the effect on the maximum values of laminar convective heating rate and gas-dynamic deceleration are generally somewhat larger, resulting in errors of up to about 10 percent in some cases (i.e., for certain values of m/C_DA and γ_i) of ballistic entry. In certain cases of lifting entry, where the maximum values of deceleration are lower than in the corresponding cases of ballistic entry, the percentage errors in maximum deceleration are even larger.

From solutions for entry into the atmosphere of Earth with and without rotation considered, it has been found that there are significant effects of planet rotation on various quantities of importance. In particular, it has been found that, for entry at circular velocity from equatorial orbits in the direction

opposite to the rotation, there are increases of up to about 8.5 and 18 percent, respectively, in the maximum values of deceleration and laminar convective heating rate. Effects of about the same magnitude but of opposite sign have been found for entry in the direction of the rotation. Corresponding changes in the total laminar convective heat absorbed have been found with increases or decreases, depending on the direction of entry relative to the rotation, of up to about 15 percent of the zero-rotation values for initial flight-path angles of from -0.5° to -10°. Because of the rotation of the planet along with the atmosphere, the effect of Earth's rotation for lifting and nonlifting entry at circular velocity and at small flight-path angles is to increase the net range (or actual distance traversed on the surface) slightly for vehicle motion opposite to the direction of rotation and to reduce the net range slightly for vehicle motion in the direction of rotation. For entry at supercircular velocity, similar effects of planet rotation have been found with respect to maximum values of deceleration and heating rate and to total heat absorbed. However, although small, the effects of planet rotation on net range were found to be opposite in sign to those for entry at circular velocity. For Mars, the effects of planet rotation have been found to be similar both qualitatively and quantitatively (i.e., in terms of percentage changes of dimensionless quantities) to those for Earth. (For Venus, the rate of rotation of the planet is apparently too low to be of any significance during atmospheric entry.)

Ames Research Center
National Aeronautics and Space Administration
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APPENDIX A

CONDITIONS FOR SINGLE-PASS BALLISTIC ENTRY

From ballistic solutions for $\overline{V}_i$ between 1.0 and 2.0, it has been possible to define initial conditions for single-pass entry[1] of nonlifting vehicles into an assumed nonrotating atmosphere of Earth (or Venus) as shown in figure 23. In the case of a rotating atmosphere, the initial conditions for single-pass ballistic entry are essentially the same as those shown for the nonrotating case with the initial values of flight-path angle differing by less than 0.05°. The dashed curve in figure 23 indicates the initial conditions for which $\overline{V}_{ex}$ is 1.0, and the solid curve indicates those for which $\overline{V}_{\gamma=0}$ is 1.0. According to the usual definition, the former specification is that which provides the boundary between single-pass and multiple-pass entry. However, it is seen that there is very little difference between the two curves, indicating the high degree of sensitivity to the initial flight-path angle at all supercircular velocities.

To illustrate the corresponding variations in gas-dynamic loading during single-pass ballistic entry, a set of comparisons is presented in figure 24 of the deceleration profiles for the conditions represented by the two curves of figure 23 at $\overline{V}_i = \sqrt{2}$, $\sqrt{3}$, and 2.0. An additional deceleration profile is presented for the case of $\overline{V}_i = \sqrt{2}$, for the condition of $(-a_r/g)_{max}$ being a minimum over the entire trajectory. It is seen that for $\overline{V}_i = \sqrt{3}$, this condition is essentially coincident with that where $\overline{V}_{ex}$ is 1.0. However, it appears that for $\overline{V}_i = 2.0$, the condition of $(-a_r/g)_{max}$ being a minimum occurs at an initial flight-path angle less (in the absolute sense) than that for which $\overline{V}_{ex}$ is 1.0, so that a multiple-pass entry is required. These results are in good agreement with those presented in reference 2 which indicate that the least possible maximum value of deceleration for single-pass ballistic entry occurs at a hyperbolic velocity of $\overline{V}_i = 1.48$. A discussion of physical reasons for this result and for the generally beneficial effect of supercircular velocity in reducing the maximum value of deceleration from that for entry at circular velocity is also to be found in reference 2. From a comparison of the present results with those of reference 2, it seems likely that the condition of entry at $\overline{V}_i = 1.48$ which produces the minimum value of $(-a_r/g)_{max}$ is essentially that for which $\overline{V}_{\gamma=0}$ is 1.0. It is to be noted finally, from the results presented in figure 24, that the exit values of flight-path angle for the condition of $\overline{V}_{ex} = 1.0$ increase slightly with increasing values of $\overline{V}_i$ but are less than 2° in all three cases considered.

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[1]Single-pass entry is defined as that for which the exit velocity, if it exists, is equal to or is less than the local circular orbital velocity.

APPENDIX B

LIFTING ENTRY AT SUPERCIRCULAR VELOCITY

As a means of presenting a large amount of data as compactly as possible, some results of many solutions obtained for lifting entry into an assumed nonrotating atmosphere of Earth (or Venus) at three supercircular velocities ($\overline{V}_i = \sqrt{2}$, $\sqrt{3}$, and 2.0) are presented in figure 25. In this figure the abscissa gives the initial flight-path angle at entry and the ordinate indicates the flight-path angle at which $\overline{V}$ is 1.0. Constant values of L/D are indicated ranging from -0.5 to 0.5 for $\overline{V}_i$ of $\sqrt{2}$, from -0.3 to 0.3 for $\overline{V}_i$ of $\sqrt{3}$, and from -0.3 to 0.2 for $\overline{V}_i$ of 2.0. Also indicated are lines of constant maximum gas-dynamic loading with $(-a_r/g)_{max}$ ranging from 3 to 40, from 6 to 60, and from 10 to 80 for $\overline{V}_i$ values of $\sqrt{2}$, $\sqrt{3}$, and 2.0, respectively. For negative values of L/D, these maximum deceleration values apply only for that portion of entry from $\overline{V}_i$ to $\overline{V}$ of 1.0. The dashed line in each part of the figure indicates the limiting initial and final conditions for single-pass entry (viz., those values of γ_i and γ_{ex} for which $\overline{V}_{ex}$ is 1.0).

Several interesting observations may be made with respect to the results presented in figure 25. First of all, there is a marked reduction in the depth of the entry corridor (i.e., range of permissible initial flight-path angles or vacuum perigee radii for single-pass entries) with increasing initial velocity. For lifting entry at parabolic velocity ($\overline{V}_i = \sqrt{2}$), a corridor depth of about 2° in initial flight-path angle is obtained when a constraint of 10g in maximum deceleration is imposed. For cases of lifting entry at $\overline{V}_i$ values of $\sqrt{3}$ and 2.0, the corresponding corridor depth (based on the 10g constraint) is reduced to γ_i ranges of about 0.75° and 0.5°, respectively. Second, it is to be noted that, in all three cases considered, the limiting conditions near the overshoot boundary for single-pass entry are not very well defined; extreme sensitivity to perturbations in initial conditions is characteristic of atmospheric entry under conditions of negative L/D. This sensitivity is indicated in the results presented in figure 25 by the nearly vertical slopes of the curves for negative L/D as the multiple-pass boundary (also single-pass boundary) is approached. Third, it is to be noted that, in all three cases considered, the exit flight-path angles within the 10g entry corridor are considerably smaller than the absolute initial flight-path angles. Moreover, the maximum exit flight-path angles (which correspond to conditions along the undershoot or 10g boundary) are considerably reduced as the initial velocity is increased. The importance of this effect is that, as may be seen from an inspection of the flight conditions for various Keplerian ranges in figure 5(b), at smaller exit flight-path angles the skip range is considerably more sensitive to perturbations in the exit conditions of flight-path angle and velocity as well as to perturbations in the flight conditions at any other point along the trajectory.

APPENDIX C

CHECK ON APPROXIMATIONS MADE IN CHAPMAN'S ANALYSIS

The basic approximation (a) of the analysis presented in reference 1 can be expressed as

$$\frac{\left|\frac{uv}{r}\right|}{\left|\frac{du}{dt}\right|} = \frac{\left|\frac{dr}{r}\right|}{\left|\frac{du}{u}\right|} \cong \frac{\bar{u}|\sin\gamma|}{\sqrt{\beta r}\ Z_c} = \frac{\bar{V}|\sin\gamma|}{\sqrt{\beta r}\ Z} \ll 1 \tag{C1}$$

which requires that the ratio of the fractional change in distance from the planet center to the fractional change in velocity be small compared to unity. However, a more rigorous expression of this ratio is found to be

$$\frac{\left|\frac{dr}{r}\right|}{\left|\frac{du}{u}\right|} = \frac{\frac{\bar{V}|\sin\gamma|}{\sqrt{\beta r}\ Z}}{\left|\frac{\bar{V}\sin\gamma}{\sqrt{\beta r}\ Z} + 1 + \frac{L}{D}\tan\gamma\right|} \tag{C2}$$

which approximately reduces to that given above when

$$\left|\frac{\bar{V}\sin\gamma}{\sqrt{\beta r}\ Z} + \frac{L}{D}\tan\gamma\right| \ll 1 \tag{C3}$$

or

$$\left|\frac{\bar{u}\sin\gamma}{\sqrt{\beta r}\ Z_c} + \frac{L}{D}\tan\gamma\right| \ll 1 \tag{C3a}$$

It is to be noted that this general specification, requiring the ratio given by equation (C2) to be much less than unity, incorporates both approximation (a) and approximation (b) of reference 1.

An alternate check on the accuracy of the approximate method of reference 1 is obtained by determining the ratio of the horizontal component of deceleration computed by the approximate method to that computed using the complete equation of motion. This ratio is found to be

$$\frac{\left(\frac{du}{dt}\right)_c}{\frac{du}{dt}} = \frac{1}{\frac{\bar{V}\sin\gamma}{\sqrt{\beta r}\ Z} + 1 + \frac{L}{D}\tan\gamma} \tag{C4}$$

and, for good accuracy at small to moderate flight-path angles,

$$\frac{\left(\frac{du}{dt}\right)_c}{\frac{du}{dt}} \cong 1 \tag{C5}$$

so that again

$$\left| \frac{\bar{V} \sin \gamma}{\sqrt{\beta r}\ Z} + \frac{L}{D} \tan \gamma \right| \ll 1 \tag{C3}$$

is a necessary condition. This latter specification, equation (C5), is more pertinent than the former one, that of requiring $\frac{|dr/r|}{|du/u|} \ll 1$, since it is possible to have expression (C3) satisfied and yet have ratio (C2) be the order of unity. However, this situation is more or less academic, since it occurs only when

$$\frac{\bar{V} \sin \gamma}{\sqrt{\beta r}\ Z} = - \frac{L}{D} \tan \gamma \sim \pm 1 \tag{C6}$$

so that negative values of L/D and relatively large absolute values of γ are required.

APPENDIX D

NUMERICAL INTEGRATION OF TRANSFORMED EQUATIONS OF MOTION

To obtain solutions to the transformed equations of motion given by equations (36) and (37), they were programmed on an IBM 704 digital computing machine using the floating-point Adams-Moulton, Runge-Kutta method of numerical integration (SHARE program RWDE2F). For each complete solution fixed increments were used in the independent variable $\bar{V}$ and were varied in size for different portions of the integration. The size of the increment for a given range of $\bar{V}$ was based roughly on the expected average value of deceleration and/or on the expected variation of flight-path angle as found in preliminary integrations. That is to say, larger values of $|\Delta\bar{V}|$, up to 0.05, were used in portions of high deceleration, and smaller values of $|\Delta\bar{V}|$, down to 0.000001, were used in portions of very low acceleration or deceleration where the flight-path angle changed noticeably. As many as 10 different increment sizes could be included in each integration, the various sizes required for no appreciable integration error being determined by trial and error. The initial values of Z for given initial values of $\bar{V}$ were taken as $Z_i = \bar{V}_i \times 10^{-6}$, so that

$$D_i = \left[\left(\frac{C_D A}{2m}\right) \rho V^2\right]_i = \sqrt{\beta r}\ \bar{V}_i Z_i g_i = \sqrt{\beta r}\ \bar{V}_i^2 g_i \times 10^{-6}$$

and, consequently, the initial values of gas-dynamic drag at given values of $\bar{V}_i$ are not equal for the solutions presented for entry into the atmospheres of Earth, Mars, and Venus.[1]

Inasmuch as a singularity develops for $\bar{V}_i < \sqrt{2}$ just after integration is begun (i.e., $\bar{V} \rightarrow \bar{V}_{max}$, $Z' \rightarrow \infty$), it was necessary to integrate over the initial portion of each such trajectory using an alternate set of equations having Z as the independent variable. These inverse equations were obtained from the original equations by simple inversion and combination and are given by

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[1]To have equal initial values of gas-dynamic drag at given initial values of $\bar{V}$, it would be necessary to assume initial values of Z given by

$$Z_i = \frac{\text{Const.} \times \bar{V}_i^{-1}}{\sqrt{(\beta r)_\oplus}\ g_\oplus}$$

so that

$$Z_i = \text{Const.}/\bar{V}_i \qquad \text{(for Earth)}$$

$$Z_i = 5.6\ \text{Const.}/\bar{V}_i \qquad \text{(for Mars)}$$

$$Z_i = 1.12\ \text{Const.}/\bar{V}_i \qquad \text{(for Venus)}$$

$$\frac{d\overline{V}}{dZ} = \frac{1}{dZ/d\overline{V}} = \frac{\frac{\overline{V}}{Z}\left(1 - \frac{\overline{V}^2}{2}\right)\sin\gamma + \sqrt{\beta r}\,\overline{V}_r{}^2\left(1 - \frac{L}{D}\tan\delta\right)\cos\delta}{\left[1 + \overline{V}^2\,(\beta r - 1)\right]\sin\gamma + \sqrt{\beta r}\,\frac{Z}{\overline{V}}\,\overline{V}_r{}^2\left(1 + \frac{L}{D}\tan\delta\right)\cos\delta} \tag{D1}$$

$$\overline{V}\,\frac{d\gamma}{dZ} = \overline{V}\,\frac{d\gamma}{d\overline{V}}\,\frac{d\overline{V}}{dZ} = \frac{\frac{\overline{V}}{Z}\,(1 - \overline{V}^2)\cos\gamma - \sqrt{\beta r}\,\overline{V}_r{}^2\left(\frac{L}{D} - \tan\delta\right)\cos\delta}{\left[1 + \overline{V}^2\,(\beta r - 1)\right]\sin\gamma + \sqrt{\beta r}\,\frac{Z}{\overline{V}}\,\overline{V}_r{}^2\left(1 + \frac{L}{D}\tan\delta\right)\cos\delta} \tag{D2}$$

where

$$\overline{V}_r{}^2 = \overline{V}^2 + \overline{u}_a{}^2 - 2\overline{V}\overline{u}_a\cos\gamma \tag{D3}$$

and

$$\sin\delta = \frac{\overline{u}_a}{\overline{V}_r}\sin\gamma \tag{D4}$$

In this case, the increment size of the independent variable Z was also variable and was determined by specifying a constant K and using

$$\Delta Z = KZ_1 \tag{D5}$$

$$Z_2 = Z_1 + \Delta Z \tag{D6}$$

where K was generally taken to be 0.1. Since it was desirable to obtain the solutions in terms of even values of $\overline{V}$ for purposes of convenience in tabulation, the inverse equations were only used to obtain values of $\overline{V}$, Z, and γ beyond the point of maximum $\overline{V}$ where the solution could be continued using the original equations. It is to be noted that for entry along parabolic or hyperbolic orbits the value of $\overline{V}$ does not increase initially, as in the case of elliptical orbits, and so use of the inverse equations is unnecessary.

APPENDIX E

SUMMARY OF USEFUL RELATIONSHIPS FOR TWO-DIMENSIONAL EXTRA-ATMOSPHERIC MOTION

GENERAL PROPERTIES OF ORBITS

Elements of an Orbit

A two-dimensional orbit is one for which the plane of the orbit is considered to be invariant. As was discovered by Kepler (e.g., see ref. 14), the orbit of a point mass moving in a central force field is a plane conic section with the particular kind of conic section (i.e., circle, ellipse, parabola, or hyperbola) being a function of the two dynamical parameters h and E, namely, the angular momentum per unit mass and the total energy per unit mass. In addition to these dynamical constants, the elements of an orbit consist of values of velocity, time, and orbit geometry. To define the actual size and shape of a particular orbit, it is only necessary to specify any two of its independent geometrical elements (e.g., a and b, a and e, c and d, or p and r_p). However, if local values of orbital motion or geometry (e.g., local velocity, flight-path angle, polar angle, or radial distance) are used solely or together with any one independent geometrical element, then the specification of three such elements is necessary to define the orbit.

Classification of Orbits

From the principle of conservation of angular momentum, it follows that

$$h = r^2 \frac{d\theta}{dt} = ru = r\overline{V} \cos \gamma = \text{const.} \tag{E1}$$

and

$$\overline{u}^2 = \overline{V}^2 \cos^2 \gamma = \frac{h^2}{\mu r} \tag{E2}$$

From the principle of conservation of energy, the sum of the kinetic and potential energy per unit mass of a body moving in a central force field is constant, so that

$$E = K + P = \frac{V^2}{2} - \frac{\mu}{r} = \frac{\mu}{r}\left(\frac{\overline{V}^2}{2} - 1\right) = \text{const.} \tag{E3}$$

and

$$\overline{V}^2 = 2\left(\frac{Er}{\mu} + 1\right) \tag{E4}$$

according to the convention of defining the zero level of potential at infinity.

From equation (57a), it is seen that the eccentricity of an orbit is given by

$$e = \sqrt{1 - \overline{V}^2(2 - \overline{V}^2)\cos^2\gamma} \tag{E5}$$

or, substituting equations (E2) and (E4) into equation (E5), by

$$e = \sqrt{1 + \frac{2Eh^2}{\mu^2}} \tag{E6}$$

Thus, the particular kind of orbit in any case of two-dimensional motion may be classified as follows into one of four types, depending on the value of total energy per unit mass. (The corresponding values of dimensionless velocity may also be obtained by using eqs. (E2) and (E4).)

Orbit type	Total energy per unit mass	Eccentricity	Dimensionless velocity
Circle	$E = -\frac{\mu^2}{2h^2}$	$e = 0$	$\overline{V} = 1$
Ellipse	$E < 0$	$e < 1$	$\overline{V} < \sqrt{2}$
Parabola	$E = 0$	$e = 1$	$\overline{V} = \sqrt{2}$
Hyperbola	$E > 0$	$e > 1$	$\overline{V} > \sqrt{2}$

In the case of closed and finite orbits (either circular or elliptical), an additional element is the period of orbit. From equation (E1), it follows that

$$\begin{aligned} \tau &= \frac{1}{h}\int_0^{2\pi} r^2 d\theta \\ &= \frac{2\pi ab}{h} \text{ (for general case of elliptical orbit)} \end{aligned} \tag{E7}$$

and, since

$$h = ru = r_p V_p = a(1 - e)\sqrt{\frac{\mu}{r_p}(1 + e)} = a\sqrt{1 - e^2}\sqrt{\frac{\mu}{r_p}(1 - e)} = b\sqrt{\frac{\mu}{a}}$$

$$\tau = 2\pi\sqrt{\frac{a^3}{\mu}} \tag{E8}$$

GEOMETRICAL PROPERTIES OF ORBITS

Circular Orbit

In the special case of a circular orbit ($\overline{V} = 1$), the following relationships and values are obtained:

$$a = r \qquad r_a = r$$

$$b = r \qquad r_p = r$$

$$c = 0 \qquad \gamma = 0$$

$$d = \infty \qquad \theta = 2\pi \frac{t}{\tau} = \frac{tu_c}{r}$$

$$e = 0 \qquad \tau = 2\pi \sqrt{\frac{r^3}{\mu}} = \frac{2\pi r}{u_c}$$

$$p = r$$

Elliptical Orbit

In the case of an elliptical orbit ($0 < \overline{V} < \sqrt{2}$), the following relationships are obtained:

$$\overline{V} = \sqrt{2 - \frac{r}{r_p}(1 - e)} \qquad r_a = a(1 + e)$$

$$a = \frac{r}{2 - \overline{V}^2} = r_{\overline{V}=1} \qquad r_p = a(1 - e)$$

$$b = a\sqrt{1 - e^2} \qquad r = \frac{p}{1 + e \cos \theta}$$

$$c = ae \qquad \cos \gamma = \frac{1}{\overline{V}}\sqrt{\frac{1 - e^2}{2 - \overline{V}^2}} = \sqrt{\frac{(1 + e)\frac{r_p}{r}}{2 - (1 - e)\frac{r}{r_p}}}$$

$$d = \frac{(1 + e)}{e} r_p \qquad \sin \theta = \frac{\overline{V}^2 \sin 2\gamma}{2e}$$

$$e = \sqrt{1 - \overline{V}^2(2 - \overline{V}^2) \cos^2 \gamma} \qquad \cos \theta = \frac{\overline{V}^2 \cos^2 \gamma - 1}{e}$$

$$p = a(1 - e^2) = (1 + e)r_p \qquad \tau = 2\pi \sqrt{\frac{a^3}{\mu}} = \frac{2\pi a}{u_{c_{r=a}}}$$

As is shown in figure 6, the relationships between dimensionless velocity, flight-path angle, polar angle (true anomaly), and eccentricity are especially simple at certain discrete points in the orbit. It is to be noted that there is symmetry about the major axis of the orbit so that all values of dimensionless velocity and angle are functions only of eccentricity and/or radial distance.

Parabolic Orbit

In the special case of a parabolic orbit ($\overline{V} = \sqrt{2}$), the following relationships and values are obtained:

$$a = \infty \qquad r_a = \infty$$

$$d = 2r_p \qquad r_p = \frac{r}{2}(1 + \cos\theta)$$

$$e = 1 \qquad \cos\gamma = \sqrt{\frac{r_p}{r}}$$

$$p = 2r_p \qquad \theta = 2\gamma$$

Hyperbolic Orbit

In the case of a hyperbolic orbit ($\overline{V} > \sqrt{2}$), the following relationships are obtained:

$$\overline{V} = \sqrt{2 + \frac{r}{r_p}(e - 1)} \qquad r_p = \frac{r(1 + e\cos\theta)}{1 + e}$$

$$d = \frac{(1 + e)}{e} r_p \qquad r = \frac{p}{1 + e\cos\theta}$$

$$e = \sqrt{1 + \overline{V}^2(\overline{V}^2 - 2)\cos^2\gamma} \qquad \cos\gamma = \frac{1}{\overline{V}}\sqrt{\frac{e^2 - 1}{\overline{V}^2 - 2}} = \sqrt{\frac{(1 + e)\frac{r_p}{r}}{2 + (e - 1)\frac{r}{r_p}}}$$

$$p = (1 + e)r_p$$

$$\sin\theta = \frac{\overline{V}^2 \sin 2\gamma}{2e}$$

$$\cos\theta = \frac{\overline{V}^2 \cos^2\gamma - 1}{e}$$

APPENDIX F

APPROXIMATE ANALYTICAL SOLUTIONS FOR VERTICAL BALLISTIC DESCENT

In the case of a nonlifting vehicle descending vertically in the atmosphere, the motion is described by equation (21) with $\gamma = -90^{\circ}$, so that, considering $\beta r = \text{const.} \gg 1$,

$$Z' - \frac{Z}{\overline{V}} = \frac{\sqrt{\beta r}}{\dfrac{1 - \overline{V}^2/2}{\sqrt{\beta r}\ \overline{V}Z} - 1} \tag{F1}$$

If $\sqrt{\beta r}\ \overline{V}Z \gg \left|1 - \frac{\overline{V}^2}{2}\right|$, equation (F1) reduces to

$$Z' - \frac{Z}{\overline{V}} = -\sqrt{\beta r} \tag{F2}$$

and the approximate solution is given by

$$Z = Z_1 \frac{\overline{V}}{\overline{V}_1} + \sqrt{\beta r}\ \overline{V}\ ln \frac{\overline{V}}{\overline{V}_1} \tag{F3}$$

or

$$\overline{V} = \overline{V}_1 \exp\left[\frac{1}{\sqrt{\beta r}}\left(\frac{Z_1}{\overline{V}_1} - \frac{Z}{\overline{V}}\right)\right] \tag{F4}$$

When $\sqrt{\beta r}\ \overline{V}Z \sim \left|1 - \frac{\overline{V}^2}{2}\right|$, it is possible to obtain an accurate stepwise solution for the motion by considering the term $\dfrac{1 - \overline{V}^2/2}{\sqrt{\beta r}\ \overline{V}Z}$ in equation (F1) as being constant for small ranges of $\overline{V}$ and Z. The solution of equation (F1) with this restriction is given by

$$Z = Z_1 \frac{\overline{V}}{\overline{V}_1} + \frac{\sqrt{\beta r}\ \overline{V}}{\dfrac{1 - \overline{V}_*^{\,2}/2}{\sqrt{\beta r}\ \overline{V}_* Z_*} - 1}\ ln \frac{\overline{V}}{\overline{V}_1} \tag{F5}$$

or

$$\bar{V} = \bar{V}_1 \exp\left[\frac{1}{\sqrt{\beta r}}\left(\frac{Z_1}{\bar{V}_1} - \frac{Z}{\bar{V}}\right)\left(\frac{1 - \bar{V}_*^{\,2}/2}{\sqrt{\beta r}\ \bar{V}_* Z_*} - 1\right)\right] \tag{F6}$$

where $\bar{V}_*$ and Z_* are intermediate values in the interval or step. The stepwise process of finding the solution consists of assuming a change in $\frac{Z}{\bar{V}}$ given by $C\frac{Z}{\bar{V}}$ (where $C \ll 1$), so that

$$\frac{Z}{\bar{V}} = \left(1 + C\right)\frac{Z_1}{\bar{V}_1} \tag{F7}$$

and, also, that $\bar{V}_*$ and Z_* are defined by

$$\bar{V}_* = \bar{V}_1 + \frac{\bar{V}_1 - \bar{V}_o}{2} = \frac{3\bar{V}_1 - \bar{V}_o}{2} \tag{F8}$$

$$\frac{Z_*}{\bar{V}_*} = \left(1 + \frac{C}{2}\right)\frac{Z_1}{\bar{V}_1} \tag{F9}$$

so that

$$\bar{V}_* Z_* = \left(1 + \frac{C}{2}\right)\frac{Z_1}{\bar{V}_1}\left(\frac{3\bar{V}_1 - \bar{V}_o}{2}\right)^2 \tag{F10}$$

where the subscript o refers to the value obtained in the previous step. Thus, from equation (F6) successive values of $\bar{V}$ and Z $\left(= \bar{V}\frac{Z}{\bar{V}}\right)$ are obtained with a high order of accuracy as illustrated by the results presented in figure 7 (for which $C = 0.2$). It is to be noted that the stepwise solution may be extended in the opposite direction by simply reversing the sign of C.

In figure 7 it is seen that the solution for the case considered first crosses and then merges with that for the vertical equilibrium-flight condition in which the drag of the vehicle is equal to the force of gravity, and so

$$\sqrt{\beta r}\ \bar{V}Z = 1$$

Thus, the curve for the vertical equilibrium-flight condition divides the $\bar{V}$-Z plane into two regions: those where the drag is greater than and less than the weight of the vehicle. It may be noted that, at or very close to the point of intersection of the equilibrium-condition curve and any solution, $\bar{V}$ attains a

maximum value and, consequently, Z' is infinite. This is the condition to which reference is made in appendix D and for which it is necessary to use the inverse equations of motion in obtaining numerical machine solutions.

For vertical descent in the absence of any appreciable atmosphere, the motion is described by equation (15) with $\rho = 0$, so that

$$\bar{V}r \frac{d\bar{V}}{dy} = \frac{\bar{V}^2}{2} - 1 \tag{F11}$$

Upon integration of equation (F11), the relationship between dimensionless velocity and radial distance for vacuum free fall in a central force field where the force of attraction varies inversely as the square of the distance is found to be

$$\frac{\bar{V}^2}{2} = 1 + \frac{r}{r_i}\left(\frac{\bar{V}_i^{\,2}}{2} - 1\right) \tag{F12}$$

and, when the initial value of velocity is 0,

$$\frac{\bar{V}^2}{2} = 1 - \frac{r}{r_i} \tag{F13}$$

It is to be noted that equation (F12) can also be expressed as

$$\frac{y}{r_i} = \frac{2 - \bar{V}^2}{2 - \bar{V}_i^{\,2}} - \frac{r_o}{r_i} \tag{F14}$$

where y is the altitude from the surface, and r_o is the radius of the planet.

To transform the vacuum free-fall solution given by equation (F12) into $\bar{V}$, Z coordinates, it is only necessary to substitute equation (F14) into

$$\frac{Z}{\bar{V}} \equiv \frac{Z_i}{\bar{V}_i} \exp\left[(\beta r_i)\left(\frac{y_i}{r_i} - \frac{y}{r_i}\right)\right] \tag{F15}$$

and, consequently,

$$\frac{Z}{\bar{V}} = \frac{Z_i}{\bar{V}_i} \exp\left[(\beta r_i)\left(\frac{\bar{V}^2 - \bar{V}_i^{\,2}}{2 - \bar{V}_i^{\,2}}\right)\right] \tag{F16}$$

This solution is also indicated in figure 7. In this case, the initial values of $\bar{V}$ and Z were obtained by extending the stepwise solution downward to a value of Z equal to 0.010, so that

$$\bar{V}_i = 0.0773$$

$$Z_i = 0.0100$$

and, consequently,

$$\frac{D_i}{mg_i} = \sqrt{\beta r}\ \overline{V}_i Z_i = 0.0232 \text{ (for } \sqrt{\beta r} = 30)$$

which are practically equivalent to zero-drag conditions.

It may be noted that the differential equation corresponding to equation (F16) is found by differentiation to be

$$Z' - \frac{Z}{\overline{V}} = \frac{\beta r_i \overline{V} Z}{1 - \frac{\overline{V}_i^{\,2}}{2}} \tag{F17}$$

which, for $\overline{V}_i \ll 1$, is essentially equal to that obtained by considering

$$1 - \frac{\overline{V}^2}{2} \gg \sqrt{\beta r}\ \overline{V} Z \cong 0 \tag{F18}$$

in equation (F1).

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TABLE I.- INDEX OF TABULATED SOLUTIONS

Table No.	Planet	$\bar{V}_i$	$\bar{u}_a$	$-\gamma_i$, deg	L/D	Page No.
II	Earth	1.00	-0.06	0.5, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0	0	46-54
III	Earth	1.00	.06		0	55-63
IV	Earth	1.00	-.06	0.5	0.5, 1.0	64,65
V	Earth	1.00	.06	0.5	0.5, 1.0	66,67
VI	Earth	1.02	-.06	2.0, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0	0	68-74
VII	Earth	1.02	.06		0	75-81
VIII	Earth	1.04	-.06	3.0, 4.0, 5.0, 6.0, 8.0, 10.0	0	82-87
IX	Earth	1.04	.06		0	88-93
X	Earth	1.10, 1.20, 1.30, 1.41, 1.73, 2.00	-.06	those for which $\bar{V}_{\gamma=0}=1$	0	94-99
XI	Earth		.06		0	100-105
XII	Mars	1.00	-.07	5.0, 10.0, 15.0, 20.0	0	106-109
XIII	Mars	1.00	.07		0	110-113
XIV	Mars	1.41, 1.73, 2.00	-.07	those for which $\bar{V}_{\gamma=0}=1$	0	114-116
XV	Mars		.07		0	117-119
XVI	Earth or Venus	1.00	0	0.5, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0	0	120-128
XVII	Earth or Venus	1.00	0	0.5	0.5, 1.0	129,130
XVIII	Earth or Venus	1.02	0	2.0, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0	0	131-137
XIX	Earth or Venus	1.04	0	3.0, 4.0, 5.0, 6.0, 8.0, 10.0	0	138-143
XX	Earth or Venus	1.10, 1.20, 1.30, 1.41, 1.73, 2.00	0	those for which $\bar{V}_{\gamma=0}=1$	0	144-149

TABLE II.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -0.5^{\circ}$, $e_i = -0.00873$

$\overline{V}$	$\overline{V}_p$	$\overline{u}$	$\overline{\gamma}$	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{\tau}$	$\overline{q}$	t sec	$\frac{\overline{\tau}_c}{\overline{\tau}}$	$\frac{\overline{\tau}_c}{\overline{\tau}}$	$\sqrt{\beta r}\,\frac{Z}{V}$
1.0000	1.0000	0.0000010	0.500	0.479	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0005	.0000025	.497	.469	.0001	.0019	.0053	95.2	.11641	.001010	.000
1.0010	1.0010	.0000043	.486	.459	.0002	.0030	.0140	193.8	.13703	.002022	.000
1.0015	1.0015	.0000171	.467	.441	.0006	.0049	.0294	401.8	.16914	.003120	.001
1.0020	1.0020	.0000459	.430	.405	.0021	.0095	.0681	852.6	.25388	.004594	.004
1.0020[illegible]	1.0020[illegible]	.0001059	.411	.388	.0036	.0123	.0937	917.0	.33272	.005173	.003
1.0020	1.0020	.0001638	.395	.373	.0055	.0153	.1222	973.3	.40167	.005667	.005
1.0015	1.0015	.0003181	.373	.352	.0107	.0213	.1822	963.3	.51194	.006410	.011
1.0010	1.0010	.0006331	.365	.344	.0146	.0248	.2191	906.9	.56534	.006754	.014
1.0005	1.0005	.0005378	.362	.341	.0198	.0276	.2490	838.0	.60339	.006995	.014
1.0000	1.0000	.0006375	.361	.340	.0215	.0301	.2750	762.7	.63348	.007164	.015
.9990	1.0000	.0008301	.363	.343	.0280	.0342	.3200	600.8	.68014	.007477	.018
.9980	1.0000	.0010194	.369	.348	.0343	.0378	.3588	430.3	.71605	.007706	.021
.9970	1.0000	.0012089	.378	.356	.0406	.0411	.3936	254.3	.74530	.007899	.024
.9960	1.0000	.0014007	.388	.366	.0471	.0442	.4252	074.5	.76997	.008063	.028
.9950	1.0000	.0015958	.399	.376	.0536	.0470	.4544	892.0	.79126	.008200	.034
.9940	1.0000	.0017952	.411	.387	.0602	.0498	.4817	707.4	.81094	.008341	.034
.9930	1.0000	.0019993	.423	.399	.0670	.0524	.5073	521.0	.82655	.008446	.040
.9920	1.0000	.002209	.436	.411	.0739	.0549	.5315	333.3	.84146	.008574	.047
.9910	1.0000	.002423	.449	.424	.0810	.0574	.5544	144.5	.85495	.008672	.054
.9900	1.0000	.002644	.463	.437	.0883	.0598	.5762	954.6	.86725	.008770	.060
.9880	1.0000	.003102	.491	.463	.1036	.0645	.6170	372.5	.88890	.008954	.074
.9860	1.0000	.003585	.519	.489	.1193	.0690	.6546	787.9	.90741	.009119	.089
.9840	1.0000	.004093	.547	.516	.1360	.0734	.6894	201.2	.93347	.009268	.104
.9820	1.0000	.004625	.575	.542	.1534	.0776	.7219	612.9	.93757	.009400	.141
.9800	1.0000	.005182	.603	.569	.1715	.0818	.7523	023.4	.95008	.009513	.194
.9750	1.0000	.006680	.672	.633	.2200	.0918	.8212	045.1	.97598	.009853	.259
.9700	1.0000	.008325	.739	.696	.2713	.1010	.8817	062.2	.99434	.010078	.291
.9650	1.0000	.010113	.804	.757	.3330	.1102	.9357	076.1	.01283	.010297	.324
.9600	1.0000	.012046	.866	.815	.391	.1188	.9845	087.7	.02651	.010494	.37[illegible]
.9550	1.0000	.014089	.927	.872	.456	.1270	1.0290	097.6	.03807	.010671	.44[illegible]
.9500	1.0000	.016266	.985	.926	.524	.1348	1.0699	106.2	.04800	.010842	.51[illegible]
.9400	1.0000	.02097	1.097	1.031	.669	.1494	1.1430	120.2	.06422	.011131	.67[illegible]
.9300	.9999	.02612	1.202	1.129	.826	.1626	1.2068	131.4	.07698	.011390	.84[illegible]
.9200	.9999	.03167	1.303	1.223	.992	.1746	1.2634	140.5	.08734	.011617	1.0[illegible]
.9100	.9999	.03761	1.400	1.313	1.166	.1855	1.3143	148.2	.09595	.011820	1.2[illegible]
.9000	.9999	.04390	1.493	1.400	1.348	.1954	1.3604	154.8	.10325	.012004	1.4[illegible]
.8800	.9999	.05747	1.671	1.565	1.731	.2122	1.4411	165.6	.11501	.012328	1.9[illegible]
.8600	.9999	.07224	1.842	1.721	2.13	.2257	1.5101	174.2	.12415	.012602	2.5[illegible]
.8400	.9999	.08809	2.01	1.872	2.55	.2360	1.5701	181.3	.13150	.012854	3.1[illegible]
.8200	.8500	.10493	2.17	2.02	2.97	.2437	1.6228	187.3	.13758	.013077	3.8[illegible]
.8000	.8000	.12267	2.32	2.16	3.40	.2490	1.6697	192.5	.14271	.013277	4.6[illegible]
.7800	.8100	.14123	2.48	2.30	3.83	.2522	1.7116	197.0	.14711	.013461	5.4[illegible]
.7600	.8199	.16054	2.64	2.44	4.26	.2534	1.7495	201.1	.15095	.013633	6.3[illegible]
.7400	.7999	.18054	2.79	2.58	4.68	.2528	1.7837	204.8	.15433	.013793	7.3[illegible]
.7200	.7999	.2012	2.95	2.72	5.10	.2508	1.8149	208.2	.15733	.013943	8.3[illegible]
.7000	.7999	.2223	3.11	2.86	5.50	.2473	1.8433	211.3	.16003	.014088	9.5[illegible]
.6800	.7999	.2440	3.27	3.00	5.89	.2427	1.8693	214.2	.16247	.014227	10.7[illegible]
.6600	.7999	.2662	3.43	3.15	6.27	.2369	1.8932	216.9	.16468	.014361	12.09[illegible]
.6400	.6999	.2887	3.60	3.29	6.63	.2303	1.9151	219.5	.16671	.014447	13.53[illegible]
.6200	.6999	.3116	3.77	3.44	6.97	.2228	1.9352	221.9	.16858	.014559	15.09[illegible]
.6000	.6999	.3348	3.95	3.59	7.29	.2146	1.9538	224.2	.17030	.014713	16.7[illegible]
.5800	.5999	.3582	4.13	3.75	7.58	.2059	1.9709	[illegible]	.17189	.014894	18.5[illegible]
.5600	.5999	.3817	4.33	3.91	7.86	.1966	1.9866	228.5	.17338	.015093	20.4[illegible]
.5400	.5999	.4053	4.52	4.07	8.10	.1870	2.0012	[illegible]	.17476	.015041	22.5[illegible]
.5200	.5999	.4290	4.73	4.24	8.32	.1770	2.0146	[illegible]	.17606	.015147	24.7[illegible]
.5000	.5999	.4526	4.95	4.42	8.51	.1669	2.0270	[illegible]	.17728	.015249	27.1[illegible]
.4800	.5999	.4761	5.18	4.61	8.67	.1566	2.0384	[illegible]	.17842	.015351	29.7[illegible]
.4600	.5999	.4994	5.43	4.80	8.80	.1463	2.0489	[illegible]	.17951	.015451	32.5[illegible]
.4400	.4999	.5224	5.69	5.00	8.90	.1360	2.0585	[illegible]	.18053	.015551	35.6[illegible]
.4200	.4999	.5450	5.96	5.22	8.96	.1258	2.0674	[illegible]	.18150	.015649	38.9[illegible]
.4000	.4999	.5671	6.26	5.45	8.99	.1157	2.0756	[illegible]	.18241	.015748	42.5[illegible]
.3800	.4999	.5885	6.59	5.69	8.98	.1058	2.0831	[illegible]	.18329	.015846	46.4[illegible]
.3600	.4999	.6092	6.94	5.95	8.94	.0961	2.0899	[illegible]	.18412	.015944	50.7[illegible]
.3400	.3999	.6288	7.32	6.23	8.86	.0868	2.0961	[illegible]	.18491	.016043	55.4[illegible]
.3200	.3999	.6474	7.75	6.53	8.74	.0778	2.1018	[illegible]	.18566	.016143	60.6[illegible]
.3000	.3999	.6646	8.22	6.85	8.59	.0691	2.1070	[illegible]	.18638	.016244	66.4[illegible]
.2800	.3999	.6802	8.75	7.21	8.40	.0610	2.1117	[illegible]	.18707	.016348	72.8[illegible]
.2600	.2999	.6938	9.35	7.60	8.16	.0532	2.1159	[illegible]	.18772	.016450	80.0[illegible]
.2400	.2999	.7052	10.05	8.04	7.89	.0459	2.1196	[illegible]	.18835	.016557	88.1[illegible]
.2200	.2999	.7138	10.85	8.53	7.59	.0392	2.1230	[illegible]	.18895	.016666	97.3[illegible]
.2000	.2999	.7191	11.81	9.09	7.24	.0330	2.1260	[illegible]	.18952	.016778	107.8[illegible]
.1800	.2999	.7205	12.96	9.73	6.85	.0273	2.1286	[illegible]	.19006	.016901	120.0[illegible]
.1600	.2999	.7169	14.40	10.48	6.42	.0221	2.1310	[illegible]	.19058	.017028	134.4[illegible]
.1400	.1999	.7073	16.23	11.38	5.96	.0175	2.1330	[illegible]	.19107	.017160	151.5[illegible]
.1200	.1999	.6901	18.66	12.47	5.46	.0135	2.1347	[illegible]	.19153	.017304	172.5[illegible]
.1000	.1999	.6639	22.10	13.84	4.92	.0100	2.1361	[illegible]	.19196	.017464	198.9[illegible]
.0900	.1999	.6452	24.41	14.68	4.63	.0085	2.1368	[illegible]	.19215	.017548	215.0[illegible]
.0800	.1999	.6237	27.34	15.66	4.33	.0070	2.1374	[illegible]	.19235	.017649	233.8[illegible]
.0700	.1999	.5981	31.20	16.93	4.02	.0057	2.1379	[illegible]	.19253	.017774	256.3[illegible]
.0600	.1999	.5683	36.56	18.28	3.69	.0046	2.1384	[illegible]	.19271	.017898	284.1[illegible]
.0500	.1999	.5349	44.66	20.19	3.33	.0035	2.1389	[illegible]	.19286	.017999	320.9[illegible]
.0450	.0999	.5181	50.66	21.46	3.13	.0029	2.13907	[illegible]	.19294	.018075	345.41
.0400	.0999	.5042	59.29	23.15	2.89	.0024	2.13930	[illegible]	.19301	.018178	378.18
.0380	.0999	.5013	64.11	24.05	2.78	.0021	2.13940	[illegible]	.19304	.018226	395.80
.0360	.0999	.5007	69.52	25.24	2.66	.0019	2.13951	[illegible]	.19306	.018289	418.95
.0350	.0999	.5071	74.82	26.03	2.58	.0017	2.13958	[illegible]	.19308	.018330	434.65
.0340	.0999	.5180	80.82	27.16	2.47	.0016	2.13966	[illegible]	.19309	.018384	457.03
.0333	.0999	.5413	88.56	28.69	2.35	.0013	2.13975	[illegible]	.19310	.018458	487.66

TABLE II.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -1.0^{\circ}$, $e_i = 0.01745$

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{s_r}{s}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.0000	1.0000	0.0000010	1.000	0.943	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0005	.0000025	.998	.942	.0001	.0015	.0026	47.2	.05773	.001007	.000
1.0010	1.0010	.0000062	.993	.937	.0002	.0030	.0068	95.1	.11630	.002025	.000
1.0015	1.0015	.0000159	.985	.929	.0005	.0048	.0137	144.6	.17687	.003071	.000
1.0020	1.0020	.0000439	.971	.916	.0015	.0079	.0260	198.6	.24298	.004200	.001
1.00250	1.00249	.0002420	.941	.888	.0082	.0187	.0687	291.2	.35845	.006941	.007
1.0020	1.0020	.0007157	.922	.870	.0242	.0320	.1236	351.7	.43063	.007307	.021
1.0015	1.0015	.0010114	.917	.865	.0341	.0380	.1487	371.3	.45461	.007694	.030
1.0010	1.0010	.0012799	.914	.863	.0430	.0427	.1685	384.7	.47102	.007974	.038
1.0005	1.0005	.0015352	.913	.862	.0517	.0467	.1856	395.1	.48372	.008156	.047
1.0000	1.0000	.0017826	.913	.861	.0601	.0503	.2008	403.7	.49417	.008333	.053
.9990	1.0060	.002263	.914	.862	.0762	.0565	.2275	417.3	.51087	.008589	.068
.9980	1.0080	.002732	.916	.864	.0919	.0620	.2509	428.1	.52404	.008800	.082
.9970	1.0070	.003194	.920	.867	.1073	.0668	.2720	437.1	.53495	.008974	.096
.9960	1.0060	.003652	.923	.871	.1227	.0713	.2914	444.7	.54428	.009126	.110
.9950	1.0050	.004109	.928	.875	.1379	.0754	.3095	451.4	.55244	.009260	.124
.9940	1.0040	.004563	.932	.879	.1529	.0793	.3264	457.4	.55969	.009376	.138
.9930	1.0030	.005017	.937	.884	.1680	.0830	.3424	462.8	.56622	.009481	.152
.9920	1.0020	.005471	.943	.888	.1831	.0865	.3576	467.7	.57216	.009578	.167
.9910	1.0010	.005926	.948	.894	.1982	.0898	.3721	472.2	.57760	.009668	.179
.9900	1.0000	.006381	.954	.899	.213	.0929	.3860	476.3	.58263	.009751	.193
.9880	1.0480	.007295	.965	.910	.243	.0989	.4123	483.8	.59164	.009900	.220
.9860	1.0460	.008215	.977	.921	.274	.1045	.4367	490.3	.59956	.010036	.250
.9840	1.0440	.009141	.990	.933	.304	.1097	.4597	496.2	.60661	.010157	.279
.9820	1.0420	.010075	1.003	.946	.334	.1146	.4814	501.5	.61295	.010268	.309
.9800	1.0400	.011017	1.018	.957	.365	.1193	.5021	506.3	.61872	.010369	.337
.9750	1.0350	.013411	1.049	.988	.442	.1300	.5496	516.7	.63117	.010593	.413
.9700	1.0300	.015863	1.083	1.020	.520	.1397	.5921	525.4	.64151	.010789	.491
.9650	1.0250	.018377	1.118	1.053	.600	.1486	.6320	532.9	.65032	.010955	.571
.9600	1.0200	.02095	1.153	1.086	.681	.1568	.6684	539.4	.65797	.011100	.654
.9550	1.0150	.02359	1.188	1.118	.764	.1644	.7023	545.1	.66470	.011244	.742
.9500	1.0100	.02630	1.224	1.151	.847	.1714	.7341	550.3	.67071	.011370	.830
.9400	1.0000	.03190	1.295	1.218	1.018	.1842	.7921	559.2	.68101	.011597	1.018
.9300	.9900	.03775	1.367	1.284	1.194	.1953	.8444	566.7	.68959	.011774	1.218
.9200	.9800	.04386	1.438	1.350	1.374	.2055	.8919	573.2	.69689	.011974	1.430
.9100	.9700	.05021	1.509	1.417	1.557	.2144	.9354	578.8	.70320	.012137	1.655
.9000	.9600	.05680	1.580	1.484	1.745	.2222	.9755	583.8	.70874	.012286	1.893
.8800	.9400	.07068	1.722	1.617	2.13	.2354	1.0473	592.4	.71805	.012564	2.410
.8600	.9200	.08546	1.864	1.742	2.52	.2454	1.1100	599.5	.72561	.012761	2.981
.8400	.9000	.10108	2.01	1.870	2.92	.2520	1.1651	605.5	.73192	.013003	3.610
.8200	.8800	.11750	2.15	2.00	3.33	.2579	1.2150	610.8	.73727	.013197	4.299
.8000	.8600	.13467	2.29	2.13	3.73	.2609	1.2599	615.5	.74190	.013376	5.050
.7800	.8400	.15254	2.43	2.26	4.14	.2621	1.2996	619.7	.74594	.013543	5.867
.7600	.8199	.17108	2.58	2.39	4.54	.2615	1.3362	623.5	.74951	.013699	6.753
.7400	.7999	.19023	2.73	2.52	4.94	.2595	1.3669	627.0	.75270	.013847	7.712
.7200	.7799	.2100	2.88	2.65	5.32	.2562	1.3968	630.2	.75556	.013987	8.748
.7000	.7599	.2309	3.03	2.79	5.70	.2517	1.4277	633.2	.75816	.014120	9.866
.6800	.7399	.2510	3.18	2.93	6.06	.2461	1.4533	636.0	.76052	.014248	11.071
.6600	.7199	.2721	3.34	3.07	6.41	.2396	1.4768	638.6	.76268	.014372	12.370
.6400	.6999	.2937	3.51	3.21	6.74	.2322	1.4985	641.1	.76467	.014491	13.767
.6200	.6799	.3156	3.69	3.35	7.06	.2242	1.5186	643.5	.76650	.014606	15.271
.6000	.6599	.3378	3.85	3.50	7.39	.2156	1.5370	645.8	.76820	.014718	16.891
.5800	.6399	.3603	4.04	3.66	7.63	.2065	1.5540	648.0	.76979	.014827	18.634
.5600	.6198	.3829	4.23	3.81	7.88	.1969	1.5697	650.1	.77127	.014934	20.512
.5400	.5998	.4056	4.42	3.98	8.11	.1871	1.5841	652.1	.77265	.015038	22.536
.5200	.5798	.4285	4.63	4.15	8.31	.1770	1.5977	654.2	.77395	.015141	24.719
.5000	.5598	.4513	4.85	4.33	8.49	.1667	1.6100	656.1	.77517	.015242	27.076
.4800	.5398	.4740	5.08	4.52	8.63	.1563	1.6210	658.1	.77632	.015342	29.625
.4600	.5198	.4966	5.33	4.71	8.75	.1459	1.6310	660.0	.77741	.015441	32.385
.4400	.4998	.5189	5.59	4.92	8.84	.1355	1.6417	661.9	.77843	.015539	35.378
.4200	.4797	.5409	5.87	5.14	8.89	.1253	1.6500	663.7	.77941	.015637	38.632
.4000	.4597	.5624	6.17	5.36	8.91	.1152	1.6586	665.6	.78034	.015735	42.177
.3800	.4397	.5833	6.49	5.61	8.90	.1053	1.6663	667.4	.78122	.015832	46.049
.3600	.4196	.6035	6.85	5.87	8.86	.0957	1.6732	669.3	.78205	.015930	50.291
.3400	.3996	.6228	7.23	6.15	8.77	.0864	1.6794	671.1	.78285	.016029	54.955
.3200	.3796	.6411	7.66	6.45	8.66	.0774	1.6852	673.1	.78361	.016128	60.100
.3000	.3595	.6580	8.14	6.78	8.50	.0688	1.6903	675.0	.78434	.016229	65.804
.2800	.3394	.6735	8.67	7.14	8.32	.0606	1.6950	677.0	.78503	.016331	72.157
.2600	.3194	.6871	9.28	7.54	8.09	.0530	1.6993	679.0	.78570	.016436	79.276
.2400	.2993	.6984	9.97	7.98	7.82	.0457	1.7032	681.1	.78633	.016543	87.305
.2200	.2792	.7072	10.79	8.48	7.49	.0390	1.7064	683.4	.78693	.016653	96.434
.2000	.2590	.7127	11.75	9.04	7.12	.0328	1.7095	685.8	.78751	.016768	106.908
.1800	.2389	.7143	12.91	9.69	6.69	.0272	1.7121	688.0	.78806	.016888	119.057
.1600	.2186	.7112	14.35	10.45	6.37	.0220	1.7144	690.1	.78858	.017014	133.350
.1400	.1983	.7021	16.19	11.35	5.92	.0175	1.7164	693.4	.78907	.017148	150.452
.1200	.1779	.6855	18.63	12.45	5.42	.0134	1.7182	696.5	.78953	.017292	171.376
.1000	.1572	.6593	22.06	13.83	4.89	.0100	1.7196	699.9	.78997	.017452	197.780
.0900	.1468	.6416	24.40	14.67	4.62	.0084	1.7203	701.8	.79017	.017539	213.88
.0800	.1361	.6205	27.34	15.66	4.31	.0070	1.7209	703.9	.79036	.017632	232.69
.0700	.1252	.5954	31.21	16.84	4.00	.0057	1.7214	706.0	.79055	.017735	255.17
.0600	.1139	.5661	36.59	18.29	3.67	.0045	1.7219	708.8	.79072	.017850	283.03
.0500	.1018	.5322	44.71	20.22	3.32	.0035	1.7223	711.9	.79088	.017986	319.91
.0450	.0951	.5167	50.73	21.49	3.12	.0029	1.7226	713.5	.79095	.018068	344.46
.0400	.0874	.5032	59.40	23.19	2.88	.0024	1.7228	716.2	.79103	.018169	377.39
.0380	.0838	.5005	64.25	24.10	2.77	.0021	1.7229	717.5	.79105	.018220	395.13
.0360	.0799	.5023	70.71	25.30	2.65	.0019	1.7230	719.0	.79108	.018284	418.51
.0350	.0769	.5069	75.07	26.10	2.57	.0017	1.7231	720.0	.79109	.018326	434.45
.0340	.0731	.5184	81.19	27.26	2.46	.0015	1.7232	721.4	.79110	.018383	457.42
.0333	.0688	.5451	89.61	28.94	2.33	.0013	1.7233	723.3	.79111	.018462	491.08

TABLE II.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -2.0^{\circ}$, $e_i = 0.03490$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\Delta\lambda}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\frac{Z}{\beta r \overline{V}}}$
1.0000	1.0600	0.0000010	0.000	1.887	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0605	.0000025	1.999	1.886	.0001	.0019	.0013	23.5	.02875	.001004	.000
1.0010	1.0610	.0000061	1.997	1.884	.0002	.0030	.0034	47.2	.05771	.002014	.000
1.0015	1.0615	.0000154	1.992	1.880	.0005	.0047	.0067	71.2	.08710	.003038	.000
1.0020	1.0620	.0000400	1.986	1.874	.0014	.0076	.0122	96.1	.11757	.004096	.001
1.0025	1.0625	.0001146	1.978	1.866	.0039	.0128	.0223	123.7	.15137	.005266	.003
1.00289	1.06299	.0005038	1.963	1.852	.0170	.0269	.0495	162.7	.19916	.006910	.015
1.0025	1.0625	.0013590	1.953	1.842	.0459	.0442	.0831	189.1	.23144	.008013	.041
1.0020	1.0620	.002009	1.949	1.839	.0678	.0536	.1018	199.5	.24421	.008446	.060
1.0015	1.0615	.002590	1.948	1.838	.0874	.0608	.1160	206.3	.25251	.008731	.078
1.0010	1.0610	.003139	1.947	1.837	.1059	.0669	.1280	211.4	.25881	.008945	.094
1.0005	1.0605	.003670	1.947	1.836	.1237	.0722	.1387	215.6	.26394	.009119	.110
1.0000	1.0600	.004188	1.947	1.836	.1411	.0771	.1484	219.2	.26827	.009267	.126
.9990	1.0590	.005200	1.947	1.837	.1752	.0857	.1658	225.0	.27538	.009508	.156
.9980	1.0580	.006190	1.948	1.838	.208	.0933	.1812	229.7	.28111	.009703	.184
.9970	1.0570	.007166	1.950	1.839	.241	.1001	.1952	233.6	.28592	.009867	.210
.9960	1.0560	.008138	1.951	1.841	.273	.1064	.2081	237.0	.29008	.010008	.246
.9950	1.0550	.009090	1.953	1.842	.305	.1122	.2202	240.1	.29374	.010133	.274
.9940	1.0540	.010042	1.956	1.844	.337	.1177	.2316	242.8	.29702	.010245	.303
.9930	1.0530	.010990	1.958	1.846	.368	.1228	.2423	245.2	.29998	.010346	.332
.9920	1.0520	.011934	1.960	1.849	.399	.1277	.2526	247.4	.30269	.010439	.361
.9910	1.0510	.012874	1.963	1.851	.430	.1323	.2624	249.5	.30519	.010525	.390
.9900	1.0500	.013812	1.966	1.853	.461	.1367	.2718	251.4	.30750	.010604	.419
.9880	1.0480	.015682	1.971	1.858	.523	.1450	.2896	254.9	.31167	.010747	.476
.9860	1.0460	.017546	1.977	1.864	.584	.1526	.3063	257.9	.31535	.010874	.534
.9840	1.0440	.019406	1.983	1.869	.645	.1598	.3220	260.7	.31866	.010988	.592
.9820	1.0420	.021261	1.989	1.875	.705	.1665	.3370	263.1	.32165	.011092	.650
.9800	1.0400	.02312	1.996	1.881	.765	.1727	.3512	265.4	.32438	.011187	.708
.9750	1.0350	.02775	2.012	1.896	.914	.1870	.3841	270.4	.33035	.011396	.854
.9700	1.0300	.03237	2.029	1.911	1.062	.1996	.4140	274.6	.33537	.011573	1.001
.9650	1.0250	.03700	2.047	1.927	1.206	.2109	.4416	278.3	.33970	.011727	1.150
.9600	1.0200	.04164	2.065	1.943	1.354	.2210	.4673	281.6	.34352	.011864	1.301
.9550	1.0150	.04629	2.085	1.960	1.498	.2302	.4914	284.5	.34692	.011987	1.454
.9500	1.0100	.05094	2.102	1.977	1.641	.2386	.5141	287.1	.35000	.012100	1.609
.9400	1.0000	.06028	2.140	2.012	1.924	.2532	.5560	291.8	.35537	.012299	1.924
.9300	.9900	.06967	2.179	2.047	2.20	.2656	.5942	295.8	.35995	.012471	2.248
.9200	.9800	.07912	2.219	2.083	2.48	.2760	.6293	299.3	.36394	.012625	2.580
.9100	.9700	.08862	2.260	2.120	2.75	.2848	.6618	302.5	.36748	.012763	2.921
.9000	.9600	.09817	2.301	2.158	3.02	.2922	.6921	305.3	.37064	.012889	3.272
.8800	.9400	.11745	2.387	2.235	3.54	.3034	.7472	310.4	.37612	.013113	4.004
.8600	.9200	.13696	2.476	2.314	4.04	.3107	.7962	314.7	.38075	.013309	4.778
.8400	.8999	.15668	2.567	2.396	4.53	.3148	.8403	318.6	.38474	.013485	5.596
.8200	.8799	.17662	2.662	2.481	5.00	.3162	.8803	322.0	.38824	.013645	6.462
.8000	.8599	.19676	2.760	2.568	5.46	.3154	.9168	325.1	.39135	.013792	7.379
.7800	.8399	.21711	2.862	2.657	5.89	.3126	.9502	328.1	.39415	.013930	8.350
.7600	.8199	.23776	2.967	2.750	6.31	.3082	.9810	330.8	.39669	.014059	9.379
.7400	.7999	.2583	3.08	2.846	6.70	.3024	1.0095	333.3	.39901	.014181	10.470
.7200	.7799	.2791	3.19	2.944	7.07	.2953	1.0355	335.7	.40114	.014297	11.628
.7000	.7599	.3000	3.31	3.05	7.42	.2873	1.0598	338.0	.40311	.014409	12.857
.6800	.7399	.3210	3.43	3.15	7.75	.2783	1.0823	340.1	.40493	.014517	14.162
.6600	.7199	.3421	3.56	3.26	8.06	.2686	1.1032	342.2	.40663	.014620	15.551
.6400	.6999	.3633	3.69	3.38	8.34	.2583	1.1224	344.2	.40823	.014721	17.028
.6200	.6799	.3844	3.83	3.50	8.60	.2475	1.1402	346.2	.40972	.014820	18.602
.6000	.6599	.4056	3.98	3.62	8.83	.2362	1.1574	348.1	.41113	.014916	20.280
.5800	.6399	.4267	4.14	3.75	9.04	.2247	1.1729	349.9	.41245	.015010	22.071
.5600	.6199	.4477	4.30	3.88	9.22	.2130	1.1874	351.7	.41371	.015102	23.986
.5400	.5998	.4687	4.47	4.02	9.37	.2011	1.2009	353.5	.41489	.015193	26.036
.5200	.5798	.4894	4.66	4.17	9.49	.1891	1.2134	355.2	.41602	.015283	28.234
.5000	.5598	.5099	4.85	4.33	9.59	.1772	1.2250	356.9	.41710	.015372	30.595
.4800	.5398	.5302	5.06	4.50	9.65	.1653	1.2358	358.7	.41812	.015461	33.135
.4600	.5198	.5501	5.28	4.67	9.69	.1536	1.2457	360.4	.41909	.015549	35.873
.4400	.4998	.5695	5.52	4.86	9.70	.1420	1.2549	362.1	.42003	.015637	38.832
.4200	.4797	.5885	5.78	5.06	9.67	.1307	1.2635	363.8	.42092	.015725	42.038
.4000	.4597	.6069	6.06	5.27	9.62	.1197	1.2713	365.5	.42177	.015814	45.520
.3800	.4397	.6246	6.36	5.49	9.53	.1090	1.2786	367.2	.42259	.015903	49.313
.3600	.4196	.6415	6.69	5.74	9.42	.0986	1.2852	369.0	.42337	.015993	53.461
.3400	.3996	.6575	7.06	6.00	9.26	.0887	1.2913	370.7	.42413	.016083	58.012
.3200	.3796	.6723	7.47	6.29	9.08	.0793	1.2969	372.5	.42485	.016175	63.026
.3000	.3595	.6858	7.93	6.61	8.86	.0703	1.3019	374.4	.42555	.016269	68.578
.2800	.3395	.6977	8.44	6.95	8.61	.0618	1.3065	376.3	.42621	.016365	74.757
.2600	.3194	.7079	9.03	7.34	8.33	.0538	1.3107	378.3	.42685	.016463	81.677
.2400	.2993	.7159	9.70	7.77	8.02	.0463	1.3144	380.3	.42747	.016565	89.481
.2200	.2792	.7213	10.50	8.25	7.67	.0394	1.3178	382.4	.42806	.016670	98.354
.2000	.2591	.7236	11.44	8.81	7.29	.0331	1.3208	384.7	.42863	.016779	108.538
.1800	.2389	.7221	12.58	9.44	6.87	.0273	1.3234	387.1	.42917	.016894	120.358
.1600	.2187	.7161	14.00	10.19	6.42	.0221	1.3257	389.6	.42968	.017016	134.276
.1400	.1984	.7044	15.82	11.09	5.94	.0175	1.3277	392.4	.43017	.017146	150.949
.1200	.1780	.6855	18.24	12.18	5.43	.0135	1.3294	395.4	.43064	.017287	171.378
.1000	.1573	.6573	21.65	13.56	4.88	.0100	1.3309	398.9	.43107	.017443	197.200
.0900	.1469	.6389	23.96	14.41	4.60	.0084	1.3315	400.8	.43127	.017528	212.97
.0800	.1363	.6171	26.88	15.40	4.30	.0070	1.3321	402.8	.43147	.017621	231.40
.0700	.1254	.5914	30.73	16.58	3.99	.0057	1.3326	405.1	.43165	.017722	253.45
.0600	.1141	.5616	36.07	18.04	3.66	.0046	1.3331	407.8	.43182	.017836	280.80
.0500	.1020	.5283	44.14	19.96	3.30	.0035	1.3336	410.9	.43199	.017970	317.00
.0450	.0953	.5116	50.11	21.23	3.10	.0029	1.3338	412.8	.43206	.018052	341.07
.0400	.0877	.4977	58.68	22.93	2.87	.0024	1.3341	415.2	.43213	.018152	373.26
.0380	.0842	.4947	63.46	23.83	2.77	.0022	1.3342	416.4	.43216	.018202	390.52
.0360	.0799	.4957	69.77	25.00	2.64	.0019	1.3343	417.9	.43219	.018264	413.09
.0350	.0774	.4996	73.99	25.78	2.57	.0018	1.3343	418.9	.43220	.018305	428.26
.0340	.0740	.5094	79.76	26.87	2.46	.0016	1.3344	420.2	.43221	.018358	449.50
.0332	.0694	.5345	88.33	28.56	2.33	.0013	1.3345	422.2	.43222	.018438	482.98

TABLE II.- VALUES OF $Z_{\bar{V}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -3.0^\circ$, $e_i = 0.05234$

$\bar{V}$	$\bar{V}_p$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a}{\kappa}$	$\bar{q}$	$\bar{q}$	t sec	$\frac{\dot{\gamma}}{\gamma}$	$\frac{-\Delta\gamma}{\gamma}$	$\sqrt{\beta r \frac{\gamma}{\dot{\gamma}}}$
1.0000	1.0599	0.0000010	3.000	2.830	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0604	.0000025	2.999	2.830	.0001	.0019	.0009	15.7	.01914	.0010[illegible]	.000
1.0010	1.0609	.0000061	2.998	2.828	.0002	.0030	.0022	31.4	.03837	.002010	.000
1.0015	1.0614	.0000153	2.995	2.826	.0005	.0047	.0044	47.3	.05780	.003[illegible]	.000
1.0020	1.0619	.0000389	2.991	2.822	.0013	.0075	.0080	63.6	.07767	.004[illegible]	.000
1.0025	1.0624	.0001015	2.986	2.817	.0034	.0123	.0141	80.8	.09879	.0051[illegible]	.003
1.0030	1.0629	.0003666	2.977	2.809	.0124	.0230	.0277	100.6	.12544	.006557	.011
1.00312	1.06304	.0007623	2.972	2.804	.0257	.0331	.0362	115.3	.14109	.007270	.0[illegible]
1.0030	1.0629	.0013725	2.967	2.800	.0463	.0444	.0552	125.7	.15368	.008[illegible]	.041
1.0025	1.0624	.002528	2.963	2.796	.0854	.0602	.0756	136.4	.16679	.008703	.0[illegible]
1.0020	1.0619	.003455	2.962	2.794	.1166	.0703	.0888	141.9	.17351	.009[illegible]	.1[illegible]
1.0015	1.0614	.004312	2.961	2.794	.1455	.0785	.0994	145.8	.17829	.009[illegible]	.1[illegible]
1.0010	1.0609	.005133	2.960	2.793	.1731	.0855	.1086	148.9	.18204	.009[illegible]	.154
1.0005	1.0604	.005931	2.960	2.793	.1999	.0918	.1169	151.4	.18515	.009[illegible]	.178
1.0000	1.0599	.006712	2.960	2.792	.226	.0976	.1245	153.6	.18782	.009[illegible]	.201
.9990	1.0589	.008242	2.961	2.793	.278	.1078	.1382	157.2	.19226	.010[illegible]	.24[illegible]
.9980	1.0579	.009742	2.962	2.794	.328	.1170	.1504	160.2	.19587	.010[illegible]	.2[illegible]
.9970	1.0569	.011221	2.963	2.794	.377	.1252	.1615	162.7	.19893	.010[illegible]	.3[illegible]
.9960	1.0559	.012684	2.964	2.795	.426	.1329	.1718	164.9	.20158	.010[illegible]	.4[illegible]
.9950	1.0549	.014136	2.965	2.795	.474	.1399	.1815	166.8	.20393	.010[illegible]	.4[illegible]
.9940	1.0539	.015579	2.967	2.796	.522	.1466	.1901	168.6	.20603	.010[illegible]	.470
.9930	1.0529	.017014	2.968	2.799	.570	.1528	.1990	170.1	.20794	.010[illegible]	.514
.9920	1.0519	.018442	2.970	2.800	.617	.1587	.2075	171.[illegible]	.20969	.010[illegible]	.558
.9910	1.0509	.019864	2.972	2.800	.664	.1643	.2154	172.9	.21130	.011[illegible]	.[illegible]
.9900	1.0499	.02128	2.974	2.804	.711	.1697	.2230	174.2	.21280	.011[illegible]	.[illegible]
.9880	1.0479	.02411	2.977	2.807	.804	.1798	.2373	176.4	.21551	.011[illegible]	.732
.9860	1.0459	.02692	2.981	2.811	.896	.1890	.2506	178.4	.21790	.011[illegible]	.819
.9840	1.0439	.02971	2.986	2.814	.987	.1977	.2631	180.2	.22005	.011[illegible]	.906
.9820	1.0419	.03250	2.990	2.818	1.078	.2058	.2755	181.8	.22201	.011[illegible]	.993
.9800	1.0399	.03529	2.994	2.822	1.168	.2134	.2877	183.3	.22380	.011[illegible]	1.080
.9750	1.0349	.04221	3.006	2.831	1.391	.2306	.3136	186.[illegible]	.22770	.011[illegible]	1.299
.9700	1.0299	.04910	3.017	2.842	1.611	.2458	.3379	189.[illegible]	.23101	.012[illegible]	1.740
.9650	1.0249	.05596	3.029	2.852	1.828	.2593	.3604	191.8	.23387	.012[illegible]	1.962
.9600	1.0199	.06279	3.042	2.863	2.04	.2714	.3812	193.9	.23639	.012[illegible]	2.187
.9550	1.0149	.06961	3.054	2.874	2.25	.2822	.4009	195.9	.23865	.012[illegible]	2.413
.9500	1.0099	.07640	3.067	2.885	2.46	.2921	.4194	197.[illegible]	.24069	.012[illegible]	
.9400	.9999	.08994	3.094	2.908	2.87	.3092	.4537	200.7	.24428	.012743	2.870
.9300	.9899	.10342	3.121	2.933	3.27	.3235	.4850	203.4	.24736	.012910	3.336
.9200	.9799	.11683	3.149	2.957	3.66	.3353	.5139	205.8	.25005	.013057	3.810
.9100	.9699	.13019	3.178	2.982	4.04	.3451	.5409	207.9	.25245	.013190	4.292
.9000	.9599	.14349	3.208	3.007	4.41	.3532	.5656	209.9	.25460	.013310	4.783
.8800	.9399	.16993	3.269	3.060	5.12	.3649	.6113	213.4	.25837	.013523	5.793
.8600	.9199	.19616	3.333	3.115	5.79	.3718	.6528	216.4	.26158	.013708	6.843
.8400	.8999	.2222	3.399	3.173	6.43	.3748	.6898	219.1	.26437	.013873	7.934
.8200	.8799	.2479	3.469	3.233	7.02	.3746	.7226	221.[illegible]	.26685	.014021	9.071
.8000	.8599	.2735	3.542	3.295	7.58	.3718	.7515	223.8	.26908	.014158	10.256
.7800	.8399	.2988	3.618	3.3[illegible]	8.11	.3667	.7819	225.9	.27110	.014284	11.492
.7600	.8199	.3238	3.698	3.427	8.59	.3598	.8085	227.8	.27295	.014403	12.783
.7400	.7999	.3486	3.781	3.498	9.04	.3512	.8325	229.7	.27466	.014514	14.132
.7200	.7799	.3731	3.869	3.571	9.45	.3414	.8543	231.5	.27624	.014620	15.545
.7000	.7599	.3972	3.961	3.648	9.83	.3305	.8740	233.[illegible]	.27772	.014721	17.025
.6800	.7399	.4211	4.06	3.728	10.17	.3187	.8957	234.8	.27910	.014818	18.577
.6600	.7199	.4446	4.16	3.812	10.47	.3062	.9140	236.4	.28041	.014911	20.208
.6400	.6999	.4677	4.27	3.901	10.74	.2930	.9310	238.0	.28164	.015002	21.923
.6200	.6798	.4904	4.38	3.993	10.97	.2794	.9469	239.5	.28280	.015090	23.729
.6000	.6598	.5127	4.50	4.09	11.16	.2656	.9618	241.0	.28391	.015176	25.634
.5800	.6398	.5345	4.63	4.19	11.32	.2514	.9757	242.5	.28496	.015260	27.647
.5600	.6196	.5558	4.76	4.30	11.44	.2372	.9886	243.9	.28596	.015342	29.776
.5400	.5998	.5766	4.91	4.42	11.52	.2230	1.0007	245.3	.28692	.015423	32.034
.5200	.5798	.5968	5.06	4.54	11.57	.2088	1.0120	246.[illegible]	.28784	.015504	34.432
.5000	.5598	.6164	5.23	4.47	11.59	.1948	1.0225	248.[illegible]	.28873	.015583	36.984
.4800	.5398	.6353	5.40	4.80	11.57	.1809	1.0323	249.[illegible]	.28957	.015662	39.706
.4600	.5198	.6535	5.60	4.95	11.51	.1673	1.0414	251.0	.29039	.015740	42.617
.4400	.4997	.6708	5.80	5.11	11.42	.1541	1.0499	252.5	.29118	.015819	45.737
.4200	.4797	.6873	6.03	5.28	11.30	.1412	1.0578	253.9	.29194	.015898	49.091
.4000	.4597	.7028	6.28	5.46	11.14	.1288	1.0650	255.4	.29267	.015977	52.707
.3800	.4397	.7172	6.55	5.65	10.94	.1168	1.0718	256.9	.29338	.016056	56.620
.3600	.4196	.7304	6.84	5.87	10.72	.1053	1.0780	258.4	.29406	.016137	60.869
.3400	.3996	.7424	7.18	6.10	10.46	.0943	1.0837	260.0	.29473	.016218	65.502
.3200	.3796	.7528	7.53	6.36	10.17	.0839	1.0889	261.6	.29537	.016301	70.577
.3000	.3595	.7616	7.96	6.64	9.84	.0740	1.0937	263.2	.29599	.016386	76.163
.2800	.3395	.7686	8.44	6.95	9.49	.0648	1.0981	265.0	.29659	.016472	82.348
.2600	.3194	.7734	8.98	7.30	9.10	.0562	1.1021	266.7	.29718	.016562	89.239
.2400	.2993	.7758	9.62	7.70	8.69	.0482	1.1056	268.6	.29774	.016654	96.974
.2200	.2792	.7754	10.36	8.14	8.24	.0409	1.1088	270.[illegible]	.29829	.016750	105.731
.2000	.2591	.7716	11.25	8.66	7.77	.0342	1.1117	272.7	.29881	.016851	115.744
.1800	.2390	.7639	12.34	9.26	7.27	.0281	1.1144	274.9	.29932	.016957	127.324
.1600	.2188	.7516	13.69	9.97	6.74	.0227	1.1165	277.3	.29981	.017069	140.919
.1400	.1985	.7334	15.44	10.82	6.19	.0179	1.1185	280.0	.30028	.017190	157.160
.1200	.1781	.7080	17.78	11.88	5.61	.0137	1.1202	283.[illegible]	.30073	.017323	177.014
.1000	.1575	.6735	21.09	13.21	4.99	.0101	1.1216	286.[illegible]	.30114	.017470	202.06
.0900	.1470	.6520	23.34	14.03	4.55	.0086	1.1220	288.1	.30134	.017551	217.33
.0800	.1364	.6271	26.18	14.99	4.08	.0071	1.1228	290.1	.30153	.017638	235.17
.0700	.1256	.5985	29.93	16.15	4.05	.0058	1.1234	292.3	.30172	.017735	256.48
.0600	.1144	.5657	35.14	17.57	3.70	.0046	1.1238	294.9	.30189	.017843	282.85
.0500	.1024	.5294	43.01	19.45	3.33	.0035	1.1243	298.0	.30205	.017972	317.61
.0450	.0958	.5109	48.79	20.69	3.13	.0030	1.1245	299.8	.30212	.018050	340.58
.0400	.0884	.4946	57.04	22.32	2.96	.0024	1.1247	302.1	.30220	.018145	370.94
.0380	.0849	.4902	61.59	23.17	2.79	.0022	1.1248	303.3	.30222	.018192	386.96
.0360	.0809	.4889	67.48	24.26	2.67	.0020	1.1249	304.7	.30225	.018249	407.42
.0350	.0787	.4908	71.29	24.96	2.60	.0018	1.1250	305.4	.30226	.018284	420.67
.0340	.0757	.4964	76.22	25.87	2.51	.0017	1.1251	307.7	.30228	.018329	438.00
.0330	.0714	.5132	84.00	27.35	2.38	.0014	1.1252	308.4	.30229	.018399	466.51
.0327	.0689	.5289	88.80	28.31	2.30	.0013	1.1252	309.5	.30229	.018443	485.24

TABLE II.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -4.0^{\circ}$, $e_i = 0.06976$

$\bar{V}$	$\bar{V}_r$	$\bar{Z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{u_r}{\bar{u}}$	$\bar{\gamma}$	$\bar{q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\Delta}{\bar{\gamma}}$
1.0000	1.0599	0.0000010	4.000	3.773	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0604	.0000025	4.000	3.773	.0001	.0019	.0006	11.8	.01433	.001002	.000
1.0010	1.0609	.0000061	3.998	3.772	.0002	.0030	.0017	[illegible]	.02873	.002008	.000
1.0015	1.0614	.0000152	3.996	3.771	.0005	.0047	.0033	[illegible]	.04323	.003022	.000
1.0020	1.0619	.0000384	3.993	3.768	.0013	.0074	.0059	[illegible]	.05799	.004052	.001
1.0025	1.0624	.0001012	3.989	3.764	.0034	.0120	.0103	60.1	.07339	.005127	.003
1.0030	1.0629	.0003066	3.984	3.759	.0104	.0210	.0189	74.6	.09105	.006358	.006
1.00328	1.06314	.0010193	3.977	3.753	.0344	.0383	.0354	90.9	.11023	.007693	.030
1.0030	1.0629	.0024407	3.972	3.748	.0814	.0648	.0551	101.5	.12397	.008648	.072
1.0025	1.0624	.003795	3.970	3.746	.1281	.0738	.0696	107.5	.13127	.009154	.114
1.0020	1.0619	.004999	3.969	3.745	.1688	.0846	.0801	111.1	.13569	.009461	.150
1.0015	1.0614	.006130	3.968	3.744	.207	.0935	.0888	113.6	.13896	.009688	.184
1.0010	1.0609	.007218	3.968	3.744	.244	.1014	.0965	115.9	.14159	.009870	.217
1.0005	1.0604	.008280	3.968	3.744	.279	.1085	.1034	117.7	.14379	.010023	.248
1.0000	1.0599	.009322	3.968	3.744	.314	.1150	.1098	119.4	.14570	.010156	.260
.9990	1.0589	.011364	3.969	3.744	.383	.1266	.1214	121.9	.14889	.010377	.341
.9980	1.0579	.013369	3.969	3.744	.450	.1370	.1318	124.0	.15151	.010558	.406
.9970	1.0569	.015346	3.970	3.745	.516	.1465	.1413	125.9	.15373	.010713	.462
.9960	1.0559	.017304	3.971	3.746	.581	.1552	.1501	127.5	.15567	.010847	.521
.9950	1.0549	.019247	3.972	3.747	.646	.1632	.1584	128.9	.15739	.010967	.580
.9940	1.0539	.02118	3.974	3.748	.710	.1708	.1662	130.2	.15893	.011074	.639
.9930	1.0529	.02310	3.975	3.749	.774	.1780	.1736	131.3	.16034	.011172	.698
.9920	1.0519	.02501	3.976	3.750	.837	.1848	.1807	132.4	.16162	.011261	.756
.9910	1.0509	.02691	3.978	3.751	.900	.1912	.1874	133.4	.16281	.011344	.815
.9900	1.0499	.02880	3.979	3.752	.962	.1974	.1940	134.3	.16392	.011420	.873
.9880	1.0479	.03258	3.982	3.754	1.086	.2089	.2063	135.9	.16592	.011559	.989
.9860	1.0459	.03633	3.985	3.757	1.209	.2196	.2179	137.4	.16769	.011683	1.106
.9840	1.0439	.04007	3.989	3.760	1.331	.2295	.2288	138.7	.16928	.011794	1.222
.9820	1.0419	.04379	3.992	3.762	1.452	.2388	.2392	139.8	.17073	.011895	1.338
.9800	1.0399	.04750	3.995	3.765	1.572	.2476	.2491	141.1	.17206	.011987	1.454
.9750	1.0349	.05673	4.004	3.772	1.869	.2673	.2720	143.5	.17496	.012190	1.746
.9700	1.0299	.06589	4.014	3.780	2.16	.2847	.2930	145.6	.17741	.012362	2.038
.9650	1.0249	.07500	4.023	3.788	2.45	.3001	.3124	147.4	.17954	.012512	2.332
.9600	1.0199	.08407	4.033	3.796	2.74	.3139	.3304	149.0	.18142	.012645	2.627
.9550	1.0149	.09309	4.043	3.804	3.01	.3263	.3474	150.4	.18311	.012764	2.924
.9500	1.0099	.10207	4.053	3.813	3.29	.3376	.3634	151.7	.18464	.012872	3.223
.9400	.9999	.11990	4.074	3.830	3.83	.3570	.3930	154.1	.18732	.013063	3.827
.9300	.9899	.13759	4.096	3.848	4.35	.3730	.4201	156.1	.18963	.013227	4.438
.9200	.9799	.15513	4.118	3.866	4.86	.3863	.4451	157.9	.19166	.013373	5.059
.9100	.9699	.17253	4.141	3.885	5.35	.3972	.4684	159.6	.19346	.013503	5.688
.9000	.9599	.18979	4.164	3.904	5.83	.4061	.4901	161.0	.19509	.013621	6.326
.8800	.9399	.2239	4.213	3.944	6.74	.4187	.5298	163.7	.19794	.013830	7.632
.8600	.9198	.2574	4.264	3.986	7.60	.4258	.5654	165.9	.20037	.014010	8.980
.8400	.8998	.2904	4.318	4.030	8.40	.4284	.5977	167.9	.20251	.014170	10.371
.8200	.8798	.3228	4.374	4.076	9.14	.4273	.6272	169.8	.20441	.014315	11.809
.8000	.8598	.3546	4.433	4.124	9.83	.4232	.6540	171.6	.20612	.014446	13.297
.7800	.8398	.3858	4.495	4.174	10.47	.4166	.6782	173.3	.20768	.014568	14.837
.7600	.8198	.4163	4.560	4.226	11.06	.4078	.7003	174.7	.20911	.014682	16.434
.7400	.7998	.4463	4.628	4.281	11.57	.3973	.7202	176.2	.21044	.014789	18.091
.7200	.7798	.4755	4.700	4.339	12.05	.3854	.7438	177.6	.21168	.014890	19.813
.7000	.7598	.5041	4.776	4.399	12.47	.3722	.7624	178.9	.21284	.014986	21.603
.6800	.7398	.5319	4.856	4.462	12.84	.3581	.7798	180.2	.21393	.015078	23.467
.6600	.7198	.5590	4.940	4.529	13.17	.3432	.7961	181.5	.21496	.015166	25.411
.6400	.6998	.5854	5.03	4.599	13.44	.3277	.8113	182.7	.21594	.015251	27.439
.6200	.6798	.6109	5.13	4.673	13.66	.3118	.8255	183.9	.21687	.015334	29.560
.6000	.6598	.6356	5.23	4.752	13.83	.2956	.8388	185.2	.21776	.015415	31.780
.5800	.6398	.6594	5.33	4.835	13.96	.2792	.8513	186.3	.21861	.015493	34.108
.5600	.6198	.6823	5.45	4.923	14.04	.2628	.8630	187.5	.21943	.015570	36.552
.5400	.5997	.7042	5.57	5.02	14.07	.2464	.8739	188.6	.22021	.015646	39.125
.5200	.5797	.7252	5.71	5.12	14.06	.2301	.8842	189.8	.22096	.015720	41.836
.5000	.5597	.7450	5.85	5.22	14.00	.2140	.8937	191.0	.22169	.015794	44.701
.4800	.5397	.7637	6.00	5.34	13.90	.1983	.9027	192.2	.22239	.015867	47.733
.4600	.5197	.7813	6.17	5.46	13.76	.1829	.9110	193.3	.22308	.015939	50.952
.4400	.4997	.7975	6.35	5.59	13.58	.1680	.9187	194.4	.22373	.016011	54.376
.4200	.4797	.8124	6.55	5.73	13.36	.1535	.9259	195.4	.22437	.016084	58.030
.4000	.4596	.8259	6.77	5.89	13.09	.1395	.9324	197.0	.22499	.016156	61.941
.3800	.4396	.8378	7.01	6.05	12.78	.1262	.9386	198.3	.22560	.016229	66.141
.3600	.4196	.8480	7.27	6.24	12.44	.1134	.9446	199.6	.22619	.016303	70.669
.3400	.3996	.8565	7.57	6.44	12.06	.1012	.9499	201.0	.22676	.016377	75.570
.3200	.3795	.8629	7.91	6.66	11.65	.0898	.9542	202.4	.22732	.016453	80.899
.3000	.3595	.8672	8.28	6.91	11.21	.0790	.9579	203.8	.22786	.016530	86.723
.2800	.3394	.8692	8.72	7.18	10.73	.0689	.9633	205.3	.22839	.016609	93.126
.2600	.3194	.8685	9.22	7.49	10.22	.0595	.9670	206.9	.22891	.016691	100.210
.2400	.2993	.8649	9.80	7.84	9.68	.0509	.9704	208.6	.22941	.016775	108.107
.2200	.2792	.8579	10.49	8.25	9.12	.0430	.9735	210.3	.22990	.016863	116.986
.2000	.2591	.8471	11.32	8.71	8.53	.0358	.9762	212.2	.23038	.016954	127.072
.1800	.2390	.8320	12.34	9.26	7.92	.0293	.9786	214.3	.23084	.017051	138.661
.1600	.2188	.8116	13.62	9.91	7.28	.0236	.9808	216.5	.23129	.017155	152.180
.1400	.1985	.7851	15.27	10.70	6.63	.0185	.9827	218.9	.23172	.017266	168.234
.1200	.1781	.7510	17.50	11.69	5.96	.0141	.9843	221.7	.23214	.017388	187.744
.1000	.1576	.7074	20.67	12.95	5.27	.0104	.9857	224.8	.23254	.017524	212.22
.0900	.1472	.6812	22.83	13.73	4.92	.0088	.9863	226.6	.23273	.017600	227.07
.0800	.1366	.6516	25.37	14.64	4.56	.0073	.9869	228.5	.23291	.017681	244.37
.0700	.1258	.6182	28.18	15.74	4.19	.0059	.9874	230.6	.23308	.017771	264.96
.0600	.1147	.5806	34.21	17.10	3.82	.0047	.9879	233.1	.23325	.017873	290.32
.0500	.1028	.5391	41.77	18.90	3.42	.0036	.9883	236.0	.23340	.017993	323.49
.0450	.0964	.5178	47.32	20.08	3.21	.0030	.9885	237.8	.23348	.018065	345.18
.0400	.0891	.4979	55.14	21.61	2.96	.0025	.9887	240.0	.23355	.018152	373.43
.0380	.0858	.4915	59.38	22.40	2.86	.0023	.9888	241.0	.23357	.018195	388.02
.0360	.0821	.4874	64.77	23.37	2.74	.0020	.9889	242.3	.23360	.018240	406.16
.0350	.0799	.4870	68.15	23.98	2.66	.0019	.9890	243.1	.23362	.018276	417.45
.0340	.0774	.4889	72.30	24.73	2.58	.0018	.9890	244.0	.23363	.018313	431.39
.0330	.0753	.4928	76.00	25.40	2.54	.0016	.9891	244.8	.23364	.018344	443.94
.0321	.0693	.5189	87.41	27.59	2.33	.0013	.9892	247.3	.23365	.018443	484.92

TABLE II.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(f) $\gamma_i = -5.0^{\circ}$, $e_i = 0.08716$

$\bar{V}$	$\bar{\gamma}_r$	$\bar{u}$	$\bar{\gamma}$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{\eta}$	$\bar{q}$	t sec	$\frac{\dot{\lambda}}{\omega}$	$\frac{\Delta\lambda}{r}$	$\sqrt{\beta r}\,\bar{\eta}$
1.0000	1.0568	0.0000010	5.000	4.717	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0603	.0000025	5.000	4.717	.0001	.0019	.0005	9.4	.01145	.00100	.000
1.0010	1.0638	.0000061	4.999	4.716	.0002	.0030	.0013	18.8	.02295	.002007	.000
1.0015	1.0673	.0000152	4.997	4.715	.0005	.0046	.0026	28.3	.03451	.003019	.000
1.0020	1.0708	.0000382	4.995	4.713	.0013	.0074	.0047	37.9	.04624	.004044	.001
1.0025	1.0743	.0000991	4.992	4.710	.0033	.0119	.0082	47.9	.05837	.005104	.003
1.0030	1.0778	.0002837	4.987	4.706	.0096	.0202	.0145	58.8	.07175	.006271	.008
1.00340	1.0831	.0012757	4.980	4.700	.0431	.0428	.0318	74.5	.09090	.007940	.034
1.0030	1.0878	.003483	4.976	4.695	.1177	.0707	.0532	84.9	.10372	.009058	.104
1.0025	1.0913	.005136	4.975	4.694	.1734	.0858	.0648	89.0	.10868	.009491	.154
1.0020	1.0938	.006616	4.974	4.693	.223	.0973	.0737	91.7	.11192	.009772	.199
1.0015	1.0973	.008016	4.974	4.693	.271	.1070	.0813	93.7	.11438	.009986	.240
1.0010	1.0968	.009371	4.973	4.692	.316	.1155	.0880	95.3	.11638	.010160	.281
1.0005	1.0603	.010694	4.973	4.692	.361	.1232	.0940	96.7	.11807	.010307	.320
1.0000	1.0568	.011994	4.974	4.692	.404	.1304	.0996	97.9	.11954	.010432	.360
.9990	1.0528	.014546	4.974	4.692	.490	.1432	.1098	100.0	.12202	.010651	.437
.9980	1.0528	.017053	4.975	4.693	.574	.1547	.1190	101.6	.12406	.010829	.512
.9970	1.0528	.019527	4.975	4.693	.656	.1652	.1274	103.1	.12580	.010981	.588
.9960	1.0528	.02198	4.976	4.694	.738	.1748	.1352	104.3	.12732	.011113	.665
.9950	1.0528	.02441	4.977	4.695	.819	.1838	.1426	105.4	.12867	.011231	.739
.9940	1.0528	.02682	4.978	4.695	.899	.1922	.1495	106.4	.12989	.011337	.810
.9930	1.0528	.02923	4.980	4.696	.979	.2002	.1561	107.4	.13100	.011433	.883
.9920	1.0528	.03162	4.981	4.697	1.058	.2077	.1624	108.2	.13201	.011522	.955
.9910	1.0528	.03400	4.982	4.698	1.136	.2149	.1684	109.0	.13295	.011603	1.028
.9900	1.0528	.03637	4.983	4.699	1.215	.2218	.1742	109.7	.13383	.011680	1.100
.9880	1.0478	.04109	4.986	4.701	1.370	.2346	.1852	111.0	.13541	.011817	1.248
.9860	1.0428	.04579	4.989	4.703	1.524	.2465	.1955	112.2	.13681	.011940	1.396
.9840	1.0428	.05046	4.991	4.705	1.676	.2575	.2052	113.2	.13807	.012050	1.536
.9820	1.0428	.05512	4.994	4.707	1.828	.2679	.2144	114.2	.13922	.012150	1.684
.9800	1.0378	.05976	4.997	4.709	1.978	.2776	.2232	115.1	.14027	.012243	1.829
.9750	1.0328	.07128	5.005	4.715	2.35	.2996	.2437	117.0	.14258	.012444	2.192
.9700	1.0228	.08273	5.013	4.721	2.71	.3189	.2624	118.7	.14453	.012617	2.555
.9650	1.0228	.09410	5.021	4.727	3.07	.3361	.2797	120.1	.14623	.012764	2.927
.9600	1.0178	.10540	5.029	4.734	3.43	.3514	.2958	121.4	.14772	.012896	3.294
.9550	1.0128	.11663	5.038	4.740	3.77	.3652	.3110	122.5	.14907	.013014	3.664
.9500	1.0078	.12781	5.047	4.747	4.12	.3777	.3253	123.6	.15029	.013122	4.039
.9400	.9928	.14998	5.064	4.761	4.78	.3992	.3518	125.4	.15243	.013311	4.787
.9300	.9828	.17193	5.083	4.775	5.43	.4169	.3760	127.1	.15427	.013475	5.540
.9200	.9728	.19366	5.102	4.790	6.06	.4315	.3984	128.5	.15589	.013619	6.313
.9100	.9628	.2152	5.121	4.805	6.67	.4435	.4192	129.8	.15734	.013742	7.093
.9000	.9528	.2365	5.142	4.821	7.26	.4532	.4386	131.0	.15864	.013860	7.887
.8800	.9328	.2784	5.183	4.853	8.38	.4668	.4742	133.1	.16092	.014070	9.491
.8600	.9128	.3195	5.227	4.886	9.43	.4743	.5062	134.9	.16288	.014250	11.145
.8400	.8928	.3597	5.273	4.922	10.40	.4767	.5352	136.6	.16460	.014405	12.847
.8200	.8728	.3990	5.321	4.959	11.30	.4750	.5616	138.1	.16614	.014550	14.559
.8000	.8528	.4374	5.372	4.998	12.13	.4699	.5860	139.5	.16752	.014680	16.404
.7800	.8328	.4749	5.425	5.038	12.88	.4621	.6085	140.8	.16878	.014799	18.267
.7600	.8128	.5115	5.481	5.081	13.57	.4519	.6293	142.1	.16995	.014911	20.190
.7400	.7928	.5470	5.540	5.125	14.18	.4398	.6487	143.3	.17103	.015015	22.177
.7200	.7728	.5816	5.603	5.172	14.73	.4261	.6668	144.4	.17204	.015113	24.233
.7000	.7528	.6151	5.669	5.222	15.22	.4111	.6836	145.5	.17299	.015207	26.361
.6800	.7328	.6475	5.738	5.274	15.63	.3950	.6994	146.6	.17388	.015299	28.568
.6600	.7128	.6789	5.812	5.328	15.98	.3781	.7141	147.6	.17473	.015383	30.859
.6400	.6928	.7091	5.890	5.386	16.27	.3606	.7279	148.6	.17554	.015464	33.239
.6200	.6728	.7381	5.974	5.447	16.50	.3426	.7409	149.6	.17630	.015534	35.715
.6000	.6528	.7659	6.06	5.512	16.67	.3244	.7530	150.6	.17704	.015602	38.295
.5800	.6328	.7924	6.16	5.581	16.78	.3060	.7644	151.6	.17775	.015669	40.987
.5600	.6128	.8176	6.26	5.654	16.82	.2875	.7750	152.6	.17842	.015771	43.801
.5400	.5928	.8414	6.37	5.732	16.81	.2692	.7850	153.5	.17908	.015843	46.747
.5200	.5728	.8638	6.49	5.816	16.74	.2510	.7944	154.5	.17971	.015915	49.836
.5000	.5528	.8847	6.61	5.905	16.63	.2332	.8031	155.5	.18032	.015985	53.082
.4800	.5328	.9040	6.75	6.00	16.45	.2156	.8113	156.5	.18091	.016054	56.500
.4600	.5128	.9216	6.90	6.10	16.23	.1986	.8190	157.5	.18149	.016123	60.107
.4400	.4928	.9376	7.06	6.22	15.96	.1820	.8261	158.5	.18205	.016191	63.924
.4200	.4728	.9516	7.24	6.34	15.63	.1660	.8327	159.6	.18259	.016254	67.973
.4000	.4528	.9637	7.44	6.47	15.27	.1506	.8389	160.7	.18312	.016328	72.261
.3800	.4328	.9738	7.65	6.61	14.85	.1359	.8447	161.7	.18364	.016394	76.840
.3600	.4128	.9817	7.90	6.77	14.40	.1219	.8500	162.9	.18414	.016465	81.807
.3400	.3928	.9872	8.17	6.94	13.90	.1086	.8550	164.0	.18464	.016535	87.105
.3200	.3728	.9902	8.47	7.14	13.37	.0961	.8595	165.3	.18512	.016604	92.830
.3000	.3528	.9904	8.82	7.35	12.79	.0844	.8637	166.5	.18559	.016674	99.045
.2800	.3328	.9877	9.22	7.59	12.19	.0734	.8675	167.8	.18606	.016751	105.830
.2600	.3128	.9818	9.68	7.87	11.55	.0633	.8710	169.2	.18651	.016827	113.208
.2400	.2928	.9723	10.22	8.18	10.88	.0539	.8742	170.7	.18696	.016906	121.538
.2200	.2728	.9588	10.86	8.54	10.19	.0454	.8771	172.3	.18740	.016998	130.771
.2000	.2528	.9409	11.63	8.96	9.47	.0377	.8796	174.0	.18782	.017071	141.137
.1800	.2328	.9179	12.59	9.45	8.73	.0308	.8820	175.8	.18824	.017161	152.981
.1600	.2128	.8890	13.79	10.04	7.98	.0247	.8840	177.9	.18865	.017259	166.694
.1400	.1928	.8533	15.36	10.77	7.20	.0193	.8858	180.1	.18905	.017359	182.852
.1200	.1728	.8093	17.48	11.67	6.40	.0147	.8873	182.6	.18943	.017471	202.33
.1000	.1528	.7552	20.50	12.84	5.59	.0108	.8887	185.5	.18980	.017597	226.57
.0900	.1428	.7236	22.56	13.57	5.23	.0091	.8893	187.2	.18997	.017667	241.18
.0800	.1328	.6883	25.19	14.42	4.82	.0075	.8898	189.0	.19014	.017742	258.13
.0700	.1228	.6491	28.66	15.46	4.42	.0061	.8903	191.0	.19031	.017825	278.19
.0600	.1128	.6055	33.48	16.74	4.00	.0048	.8908	193.3	.19047	.017919	302.73
.0500	.1028	.5576	40.73	18.43	3.56	.0037	.8912	196.0	.19061	.018030	334.54
.0450	.0968	.5325	46.01	19.54	3.33	.0031	.8914	197.7	.19068	.018096	355.09
.0400	.0898	.5088	54.40	20.96	3.08	.0026	.8916	199.7	.19075	.018176	381.43
.0380	.0868	.5000	57.35	21.68	2.96	.0024	.8917	200.7	.19078	.018214	394.76
.0360	.0831	.4931	60.27	22.55	2.84	.0021	.8918	201.8	.19080	.018259	410.93
.0350	.0811	.4908	65.29	23.08	2.77	.0020	.8919	202.5	.19082	.018285	420.60
.0340	.0789	.4898	68.87	23.70	2.69	.0019	.8919	203.3	.19083	.018315	432.24
.0330	.0771	.4907	71.90	24.22	2.65	.0018	.8920	203.9	.19084	.018340	442.03
.0320	.0728	.4994	79.81	25.63	2.48	.0015	.8921	205.6	.19086	.018404	468.19
.0314	.0691	.5167	87.09	26.98	2.36	.0013	.8921	207.1	.19086	.018462	493.69

TABLE II.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(g) $\gamma_i = -6.0^{\circ}$, $e_i = 0.10453$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{a}_r}{g}$	$\bar{\eta}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r \frac{\rho}{\bar{V}}}$
1.0000	1.0597	0.0000010	6.000	5.661	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0602	.0000025	6.000	5.661	.0001	.0019	.0004	7.8	.00953	.001002	.000
1.0010	1.0607	.0000061	5.999	5.660	.0002	.0029	.0011	15.7	.01909	.002007	.000
1.0015	1.0612	.0000151	5.998	5.659	.0005	.0046	.0022	23.6	.02871	.003017	.000
1.0020	1.0617	.0000380	5.996	5.657	.0013	.0074	.0039	31.6	.03843	.004039	.001
1.0025	1.0622	.0000977	5.993	5.655	.0033	.0118	.0068	39.8	.04843	.005088	.003
1.0030	1.0627	.0002713	5.990	5.652	.0092	.0197	.0118	48.7	.05924	.006222	.008
1.00350	1.06319	.0015316	5.983	5.646	.0518	.0470	.0291	63.7	.07757	.008145	.046
1.0030	1.0627	.0046608	5.979	5.642	.1556	.0813	.0511	73.3	.08926	.009369	.138
1.0025	1.0622	.006533	5.978	5.641	.221	.0967	.0610	76.3	.09297	.009758	.196
1.0020	1.0617	.008887	5.977	5.640	.280	.1088	.0688	78.4	.09550	.010023	.248
1.0015	1.0612	.009956	5.977	5.640	.336	.1192	.0755	80.0	.09745	.010227	.298
1.0010	1.0607	.011575	5.977	5.640	.390	.1283	.0815	81.3	.09906	.010395	.347
1.0005	1.0602	.013158	5.977	5.640	.444	.1367	.0869	82.5	.10042	.010538	.395
1.0000	1.0597	.014716	5.977	5.640	.496	.1444	.0920	83.4	.10162	.010663	.441
.9990	1.0587	.017776	5.978	5.640	.598	.1583	.1012	85.1	.10363	.010874	.534
.9980	1.0577	.02078	5.979	5.640	.699	.1708	.1095	86.5	.10530	.011049	.625
.9970	1.0567	.02375	5.979	5.640	.798	.1821	.1171	87.6	.10673	.011198	.715
.9960	1.0557	.02669	5.980	5.641	.896	.1926	.1242	88.7	.10798	.011329	.804
.9950	1.0547	.02961	5.981	5.641	.993	.2024	.1308	89.6	.10909	.011445	.893
.9940	1.0537	.03251	5.982	5.642	1.089	.2116	.1371	90.4	.11009	.011550	.981
.9930	1.0527	.03539	5.983	5.643	1.185	.2202	.1431	91.2	.11100	.011646	1.069
.9920	1.0517	.03826	5.984	5.643	1.280	.2285	.1488	91.9	.11184	.011734	1.157
.9910	1.0507	.04112	5.985	5.644	1.374	.2363	.1543	92.5	.11261	.011815	1.245
.9900	1.0497	.04397	5.987	5.645	1.468	.2438	.1595	93.1	.11333	.011890	1.332
.9880	1.0477	.04964	5.989	5.647	1.654	.2578	.1695	94.2	.11464	.012027	1.507
.9860	1.0457	.05528	5.991	5.648	1.839	.2707	.1789	95.2	.11580	.012149	1.682
.9840	1.0437	.06089	5.994	5.650	2.02	.2828	.1877	96.0	.11684	.012259	1.856
.9820	1.0417	.06647	5.997	5.652	2.20	.2941	.1962	96.8	.11779	.012359	2.031
.9800	1.0397	.07204	5.999	5.654	2.38	.3047	.2042	97.6	.11867	.012450	2.205
.9750	1.0347	.08587	6.006	5.658	2.83	.3287	.2228	99.2	.12057	.012651	2.642
.9700	1.0297	.09959	6.013	5.664	3.27	.3498	.2399	100.5	.12219	.012821	3.080
.9650	1.0247	.11322	6.021	5.669	3.70	.3685	.2556	101.7	.12360	.012970	3.520
.9600	1.0197	.12675	6.028	5.674	4.12	.3852	.2703	102.8	.12484	.013101	3.961
.9550	1.0147	.14021	6.036	5.680	4.53	.4003	.2841	103.8	.12596	.013219	4.404
.9500	1.0097	.15359	6.044	5.685	4.94	.4139	.2972	104.6	.12697	.013328	4.850
.9400	.9997	.18011	6.060	5.697	5.74	.4373	.3214	106.2	.12875	.013515	5.748
.9300	.9897	.2063	6.076	5.709	6.52	.4566	.3435	107.5	.13029	.013678	6.656
.9200	.9797	.2323	6.093	5.721	7.27	.4725	.3639	108.7	.13163	.013821	7.574
.9100	.9697	.2579	6.111	5.733	8.00	.4854	.3829	109.8	.13283	.013950	8.503
.9000	.9597	.2833	6.129	5.746	8.70	.4959	.4007	110.8	.13392	.014066	9.444
.8800	.9397	.3332	6.166	5.773	10.03	.5106	.4332	112.6	.13583	.014271	11.359
.8600	.9197	.3819	6.205	5.801	11.27	.5184	.4624	114.1	.13746	.014449	13.324
.8400	.8997	.4295	6.247	5.831	12.42	.5207	.4889	115.5	.13890	.014605	15.341
.8200	.8797	.4760	6.290	5.862	13.47	.5186	.5131	116.8	.14018	.014746	17.413
.8000	.8597	.5212	6.336	5.894	14.44	.5128	.5354	117.9	.14134	.014874	19.544
.7800	.8397	.5652	6.384	5.928	15.33	.5039	.5560	119.1	.14240	.014993	21.738
.7600	.8197	.6079	6.434	5.964	16.12	.4925	.5751	120.1	.14338	.015102	23.997
.7400	.7997	.6494	6.487	6.002	16.83	.4790	.5929	121.1	.14429	.015205	26.326
.7200	.7797	.6895	6.544	6.041	17.46	.4637	.6095	122.1	.14514	.015302	28.729
.7000	.7597	.7282	6.603	6.083	18.01	.4471	.6250	123.0	.14594	.015394	31.211
.6800	.7397	.7656	6.666	6.127	18.48	.4293	.6395	123.9	.14669	.015482	33.777
.6600	.7197	.8015	6.733	6.173	18.87	.4107	.6530	124.8	.14741	.015566	36.433
.6400	.6997	.8359	6.804	6.222	19.18	.3914	.6657	125.6	.14809	.015647	39.185
.6200	.6797	.8688	6.880	6.274	19.42	.3716	.6776	126.5	.14874	.015725	42.040
.6000	.6597	.9001	6.961	6.329	19.58	.3515	.6888	127.3	.14936	.015801	45.00[illegible]
.5800	.6397	.9297	7.05	6.387	19.67	.3313	.6993	128.2	.14996	.015875	48.090
.5600	.6197	.9577	7.14	6.450	19.69	.3110	.7092	129.0	.15054	.015947	51.304
.5400	.5997	.9838	7.24	6.516	19.65	.2909	.7184	129.8	.15110	.016017	54.657
.5200	.5797	1.0081	7.35	6.588	19.54	.2710	.7270	130.7	.15164	.016086	58.160
.5000	.5597	1.0305	7.46	6.664	19.36	.2515	.7351	131.5	.15216	.016154	61.829
.4800	.5397	1.0508	7.59	6.747	19.12	.2324	.7427	132.4	.15267	.016221	65.677
.4600	.5197	1.0691	7.72	6.835	18.82	.2138	.7498	133.2	.15316	.016288	69.723
.4400	.4997	1.0851	7.87	6.932	18.46	.1957	.7564	134.1	.15365	.016353	73.986
.4200	.4797	1.0988	8.04	7.04	18.04	.1783	.7626	135.0	.15412	.016419	78.484
.4000	.4597	1.1101	8.22	7.15	17.58	.1616	.7684	135.9	.15457	.016485	83.254
.3800	.4397	1.1188	8.42	7.28	17.06	.1456	.7738	136.9	.15502	.016550	88.328
.3600	.4197	1.1248	8.64	7.41	16.49	.1304	.7787	137.9	.15546	.016616	93.737
.3400	.3997	1.1278	8.90	7.56	15.87	.1160	.7834	138.9	.15590	.016683	99.51[illegible]
.3200	.3797	1.1278	9.18	7.73	15.22	.1025	.7876	140.0	.15632	.016750	105.732
.3000	.3597	1.1244	9.50	7.92	14.52	.0898	.7915	141.1	.15673	.016819	112.44[illegible]
.2800	.3397	1.1175	9.87	8.14	13.78	.0780	.7951	142.3	.15714	.016888	119.727
.2600	.3197	1.1066	10.30	8.38	13.01	.0671	.7984	143.5	.15755	.016960	127.684
.2400	.2997	1.0915	10.81	8.65	12.21	.0571	.8014	144.8	.15794	.017033	136.435
.2200	.2797	1.0717	11.41	8.97	11.38	.0480	.8041	146.2	.15833	.017110	146.140
.2000	.2597	1.0467	12.14	9.35	10.53	.0397	.8066	147.7	.15871	.017189	157.00[illegible]
.1800	.2388	1.0158	13.04	9.79	9.50	.0324	.8087	149.4	.15909	.017273	169.308
.1600	.2187	.9784	14.18	10.33	8.77	.0258	.8107	151.2	.15946	.017362	183.441
.1400	.1984	.9331	15.67	10.99	7.87	.0202	.8124	153.3	.15982	.017458	199.960
.1200	.1781	.8788	17.69	11.82	6.97	.0153	.8139	155.6	.16017	.017563	219.71
.1000	.1576	.8135	20.59	12.89	6.06	.0112	.8152	158.2	.16051	.017680	244.05
.0900	.1472	.7759	22.56	13.57	5.60	.0094	.8157	159.7	.16067	.017744	258.63
.0800	.1367	.7345	25.08	14.36	5.15	.0077	.8163	161.4	.16083	.017814	275.43
.0700	.1261	.6888	28.42	15.32	4.69	.0063	.8167	163.3	.16098	.017891	295.20
.0600	.1150	.6384	33.05	16.53	4.22	.0050	.8172	165.5	.16113	.017978	319.22
.0500	.1034	.5834	40.00	18.11	3.74	.0038	.8176	168.0	.16127	.018080	350.03
.0450	.0972	.5546	45.04	19.13	3.49	.0032	.8178	169.6	.16133	.018141	369.71
.0400	.0903	.5261	52.04	20.44	3.22	.0027	.8180	171.5	.16140	.018213	394.55
.0380	.0872	.5154	55.74	21.10	3.09	.0025	.8181	172.3	.16142	.018248	406.91
.0360	.0839	.5059	60.29	21.88	2.97	.0022	.8182	173.4	.16145	.018287	421.60
.0350	.0820	.5020	63.02	22.35	2.89	.0021	.8182	174.0	.16146	.018310	430.27
.0340	.0800	.4990	66.21	22.88	2.82	.0020	.8183	174.6	.16147	.018335	440.27
.0330	.0784	.4977	68.81	23.32	2.78	.0019	.8183	175.2	.16148	.018355	448.40
.0320	.0745	.4991	75.02	24.36	2.62	.0017	.8184	176.4	.16150	.018403	467.94
.0310	.0709	.5098	82.86	25.72	2.48	.0014	.8185	178.0	.16151	.018462	493.40
.0307	.0686	.5215	87.57	26.58	2.40	.0013	.8185	178.9	.16151	.018498	509.59

TABLE II.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(h) $\gamma_i = -8.0^{\circ}$, $e_i = 0.13917$

$\bar{V}$	$\bar{V}_r$	Z	γ deg	$-\lambda$ deg	$-\frac{s}{r}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\phi}{r}$	$\sqrt{\beta r}\frac{Z}{V}$
1.0000	1.0595	0.0000010	8.000	7.548	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0600	.0000025	8.000	7.548	.0001	.0019	.0003	5.9	.00713	.001000	.000
1.0010	1.0604	.0000061	7.999	7.548	.0002	.0029	.0008	11.8	.01427	.002000	.000
1.0015	1.0610	.0000151	7.998	7.547	.0005	.0046	.0016	17.7	.02145	.003014	.000
1.0020	1.0614	.0000377	7.997	7.546	.0013	.0073	.0029	23.7	.02869	.004032	.001
1.0025	1.0620	.0000961	7.995	7.545	.0032	.0117	.0050	29.8	.03608	.005070	.003
1.0030	1.0624	.0002579	7.992	7.544	.0087	.0192	.0086	36.2	.04389	.006166	[illegible]
1.0035	1.0630	.0008594	7.989	7.539	.0290	.0352	.0162	44.0	.05341	.007504	[illegible]
1.00366	1.0633	.002042	7.986	7.537	.0690	.0542	.0253	49.7	.06026	.008464	[illegible]
1.0035	1.0630	.003997	7.984	7.535	.1350	.0758	.0356	54.1	.06558	.009210	[illegible]
1.0030	1.0624	.006997	7.983	7.534	.236	.1002	.0474	57.7	.07003	.009844	[illegible]
1.0025	1.0620	.009469	7.983	7.533	.320	.1164	.0552	59.7	.07243	.010170	[illegible]
1.0020	1.0614	.011766	7.982	7.533	.397	.1296	.0616	61.1	.07415	.010412	.352
1.0015	1.0610	.013969	7.982	7.533	.471	.1410	.0672	62.3	.07552	.010604	.418
1.0010	1.0604	.016112	7.982	7.534	.543	.1513	.0722	63.2	.07665	.010763	.484
1.0005	1.0600	.018213	7.983	7.534	.614	.1607	.0768	64.0	.07763	.010909	.546
1.0000	1.0594	.02028	7.983	7.534	.683	.1694	.0811	64.7	.07848	.011010	.608
.9990	1.0584	.02435	7.983	7.534	.819	.1851	.0889	65.9	.07994	.011224	.731
.9980	1.0574	.02835	7.984	7.534	.953	.1993	.0960	66.9	.08115	.011394	.856
.9970	1.0564	.03231	7.985	7.535	1.085	.2122	.1025	67.8	.08220	.011543	.979
.9960	1.0554	.03623	7.986	7.535	1.216	.2242	.1086	68.5	.08311	.011668	1.094
.9950	1.0544	.04011	7.987	7.534	1.345	.2354	.1142	69.2	.08393	.011774	1.239
.9940	1.0534	.04398	7.988	7.534	1.473	.2459	.1196	69.8	.08466	.011864	1.427
.9930	1.0524	.04782	7.989	7.535	1.600	.2558	.1248	70.4	.08533	.011950	1.645
.9920	1.0514	.05165	7.990	7.535	1.727	.2652	.1297	70.9	.08595	.012027	1.864
.9910	1.0504	.05546	7.991	7.536	1.852	.2742	.1344	71.4	.08652	.012147	1.674
.9900	1.0495	.05926	7.992	7.536	1.978	.2828	.1389	71.8	.08705	.012200	1.790
.9880	1.0474	.06681	7.994	7.537	2.23	.2988	.1475	72.6	.08802	.012358	2.024
.9860	1.0454	.07433	7.996	7.538	2.47	.3137	.1556	73.3	.08888	.012478	2.261
.9840	1.0434	.08180	7.998	7.540	2.72	.3276	.1632	74.0	.08965	.012587	2.444
.9820	1.0414	.08925	8.001	7.541	2.96	.3405	.1705	74.6	.09036	.012686	2.744
.9800	1.0394	.09666	8.003	7.543	3.20	.3527	.1774	75.1	.09101	.012777	2.956
.9750	1.0344	.11508	8.009	7.546	3.79	.3803	.1935	76.3	.09242	.012979	3.541
.9700	1.0294	.13335	8.016	7.550	4.37	.4045	.2082	77.3	.09363	.013146	4.124
.9650	1.0244	.15146	8.022	7.554	4.94	.4260	.2218	78.2	.09467	.013293	4.710
.9600	1.0194	.16951	8.029	7.558	5.50	.4452	.2346	79.0	.09560	.013424	5.297
.9550	1.0144	.18740	8.036	7.562	6.06	.4625	.2465	79.8	.09643	.013541	5.887
.9500	1.0094	.2052	8.043	7.566	6.60	.4780	.2578	80.4	.09719	.013645	6.476
.9400	.9994	.2404	8.057	7.575	7.66	.5049	.2787	81.6	.09851	.013836	7.678
.9300	.9894	.2752	8.072	7.584	8.69	.5270	.2978	82.6	.09966	.013998	8.882
.9200	.9794	.3096	8.087	7.594	9.69	.5451	.3155	83.5	.10067	.014143	10.096
.9100	.9694	.3436	8.102	7.604	10.65	.5598	.3320	84.3	.10156	.014268	11.328
.9000	.9594	.3772	8.118	7.614	11.57	.5717	.3474	85.0	.10238	.014394	12.574
.8800	.9394	.4431	8.151	7.634	13.33	.5883	.3756	86.4	.10380	.014585	15.100
.8600	.9194	.5073	8.186	7.653	14.96	.5970	.4009	87.5	.10503	.014764	17.697
.8400	.8994	.5699	8.222	7.676	16.46	.5993	.4239	88.6	.10611	.014920	20.352
.8200	.8794	.6307	8.261	7.699	17.85	.5965	.4449	89.5	.10707	.015064	23.074
.8000	.8594	.6898	8.301	7.723	19.11	.5894	.4643	90.4	.10794	.015192	25.867
.7800	.8394	.7471	8.343	7.749	20.25	.5788	.4822	91.3	.10874	.015304	28.735
.7600	.8194	.8026	8.388	7.776	21.27	.5654	.4988	92.0	.10948	.015411	31.681
.7400	.7994	.8562	8.435	7.804	22.18	.5495	.5143	92.8	.11016	.015513	34.710
.7200	.7794	.9079	8.485	7.834	22.98	.5316	.5287	93.5	.11081	.015606	37.827
.7000	.7594	.9576	8.538	7.866	23.67	.5122	.5422	94.2	.11141	.015699	41.038
.6800	.7394	1.0052	8.594	7.899	24.24	.4914	.5548	94.9	.11198	.015786	44.349
.6600	.7194	1.0508	8.653	7.934	24.72	.4697	.5667	95.6	.11253	.015847	47.764
.6400	.6994	1.0942	8.717	7.973	25.09	.4473	.5778	96.3	.11305	.015947	51.293
.6200	.6794	1.1354	8.784	8.011	25.36	.4243	.5882	96.9	.11354	.016024	54.941
.6000	.6594	1.1744	8.856	8.053	25.53	.4010	.5980	97.5	.11402	.016097	58.718
.5800	.6393	1.2109	8.933	8.098	25.60	.3776	.6072	98.2	.11448	.016168	62.632
.5600	.6193	1.2450	9.02	8.146	25.58	.3542	.6158	98.8	.11492	.016238	66.694
.5400	.5993	1.2765	9.10	8.197	25.47	.3310	.6239	99.5	.11535	.016307	70.916
.5200	.5793	1.3054	9.20	8.252	25.27	.3080	.6315	100.1	.11576	.016373	75.310
.5000	.5593	1.3315	9.30	8.311	24.99	.2855	.6386	100.8	.11616	.016484	79.891
.4800	.5393	1.3548	9.42	8.374	24.63	.2635	.6453	101.4	.11656	.016594	84.674
.4600	.5193	1.3751	9.54	8.441	24.18	.2421	.6515	102.1	.11694	.016697	89.679
.4400	.4992	1.3923	9.68	8.512	23.66	.2214	.6574	102.8	.11731	.016803	94.926
.4200	.4792	1.4062	9.82	8.600	23.07	.2014	.6628	103.5	.11768	.016899	100.440
.4000	.4592	1.4166	9.99	8.689	22.40	.1822	.6679	104.2	.11803	.016996	106.248
.3800	.4392	1.4235	10.17	8.786	21.68	.1640	.6727	105.0	.11839	.016828	112.382
.3600	.4192	1.4266	10.37	8.894	20.89	.1466	.6771	105.8	.11873	.016881	118.882
.3400	.3991	1.4256	10.60	9.01	20.04	.1302	.6812	106.6	.11907	.016943	125.790
.3200	.3791	1.4204	10.86	9.15	19.14	.1148	.6849	107.4	.11940	.017007	133.162
.3000	.3590	1.4106	11.15	9.30	18.19	.1004	.6884	108.3	.11973	.017071	141.061
.2800	.3390	1.3959	11.49	9.47	17.19	.0870	.6916	109.2	.12006	.017136	149.565
.2600	.3190	1.3760	11.88	9.66	16.15	.0746	.6946	110.2	.12038	.017202	158.773
.2400	.2989	1.3504	12.34	9.88	15.08	.0633	.6973	111.3	.12070	.017270	168.805
.2200	.2788	1.3187	12.90	10.14	13.98	.0531	.6997	112.4	.12101	.017340	179.816
.2000	.2587	1.2801	13.57	10.45	12.85	.0438	.7019	113.7	.12132	.017413	192.010
.1800	.2386	1.2339	14.40	10.81	11.71	.0356	.7039	115.0	.12163	.017490	205.65
.1600	.2184	1.1793	15.45	11.25	10.55	.0283	.7056	116.5	.12193	.017570	221.12
.1400	.1982	1.1151	16.83	11.80	9.39	.0220	.7072	118.2	.12223	.017656	238.94
.1200	.1779	1.0397	18.71	12.50	8.22	.0166	.7085	120.2	.12252	.017750	259.92
.1000	.1574	.9511	21.41	13.41	7.07	.0120	.7097	122.4	.12281	.017853	285.33
.0900	.1471	.9010	23.25	13.98	6.50	.0101	.7102	123.7	.12295	.017910	300.33
.0800	.1366	.8465	25.61	14.67	5.92	.0083	.7107	125.2	.12308	.017972	317.43
.0700	.1260	.7871	28.74	15.50	5.36	.0067	.7112	126.8	.12321	.018039	337.32
.0600	.1150	.7223	33.08	16.54	4.78	.0053	.7116	128.7	.12334	.018115	361.13
.0500	.1036	.6518	39.57	17.91	4.20	.0040	.7120	130.9	.12346	.018200	393.10
.0450	.0974	.6148	44.25	18.80	3.89	.0034	.7121	132.2	.12352	.018246	409.85
.0400	.0908	.5773	50.67	19.93	3.57	.0028	.7123	133.9	.12358	.018317	434.98
.0380	.0879	.5626	54.01	20.48	3.43	.0026	.7124	134.6	.12360	.018345	444.18
.0360	.0848	.5486	58.05	21.13	3.29	.0024	.7125	135.5	.12362	.018377	457.17
.0340	.0812	.5360	63.13	21.92	3.12	.0021	.7126	136.5	.12364	.018415	472.93
.0330	.0793	.5307	66.28	22.41	3.03	.0020	.7126	137.1	.12365	.018437	480.48
.0320	.0770	.5268	70.06	22.99	2.93	.0019	.7127	137.8	.12366	.018463	493.87
.0310	.0744	.5254	74.92	23.74	2.81	.0017	.7127	138.7	.12367	.018495	506.89
.0300	.0706	.5312	82.32	24.91	2.65	.0015	.7128	140.0	.12368	.018544	531.26
.0296	.0677	.5430	88.22	25.90	2.52	.0013	.7128	141.1	.12369	.018583	550.37

TABLE II.- VALUES OF $Z_{\bar{V}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(i) $\gamma_i = -10.0^{\circ}$, $e_i = 0.17365$

$\bar{V}$	$\bar{V}_c$	$\bar{u}$	γ deg	$-\lambda$ deg	$-\frac{\bar{u}}{\bar{V}}$	$\bar{q}$	$\bar{q}_a$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta W}{r}$	$\sqrt{\beta r \frac{\bar{u}}{\bar{V}}}$
1.0000	1.0591	0.0000010	10.000	9.436	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0596	.0000025	10.000	9.436	.0001	.0019	.0003	4.7	.00568	.001001	.000
1.0010	1.0601	.0000061	9.999	9.436	.0002	.0029	.0007	9.4	.01137	.002005	.000
1.0015	1.0606	.0000153	9.999	9.436	.0005	.0046	.0013	14.1	.01709	.003013	.000
1.0020	1.0611	.0000376	9.997	9.435	.0013	.0073	.0023	19.0	.02285	.004028	.001
1.0025	1.0616	.0000952	9.996	9.434	.0040	.0117	.0040	23.8	.02870	.005060	.003
1.0030	1.0621	.0002509	9.994	9.432	.0084	.0190	.0068	28.4	.03480	.006136	.008
1.0035	1.0626	.0007604	9.991	9.430	.0257	.0330	.0122	34.7	.04179	.007367	.023
1.00378	1.0629	.0025549	9.988	9.427	.0844	.0605	.0227	40.9	.04942	.008850	.076
1.0035	1.0626	.0060648	9.987	9.426	.1904	.0932	.0352	45.5	.05487	.009671	.181
1.0030	1.0621	.0095524	9.986	9.425	.2841	.1168	.0443	47.8	.05774	.010176	.285
1.0025	1.0616	.0125544	9.986	9.424	.3423	.1338	.0509	49.3	.05948	.010483	.375
1.0020	1.0611	.0153379	9.986	9.424	.3918	.1480	.0564	50.4	.06077	.010710	.460
1.0015	1.0606	.0181110	9.986	9.424	.4610	.1604	.0613	51.2	.06181	.010892	.542
1.0010	1.0601	.02077	9.986	9.424	.5709	.1716	.0657	51.9	.06268	.011045	.623
1.0005	1.0596	.02339	9.986	9.424	.7897	.1819	.0697	52.6	.06343	.011177	.701
1.0000	1.0591	.02596	9.987	9.424	.8974	.1914	.0735	53.1	.06409	.011294	.779
.9990	1.0581	.03104	9.987	9.424	1.0844	.2088	.0804	54.1	.06522	.011493	.932
.9980	1.0571	.03603	9.988	9.424	1.2710	.2245	.0866	54.8	.06617	.011660	1.083
.9970	1.0561	.04096	9.989	9.424	1.3775	.2388	.0924	55.5	.06699	.011804	1.233
.9960	1.0551	.04585	9.990	9.425	1.5338	.2520	.0978	56.1	.06770	.011930	1.381
.9950	1.0541	.05071	9.991	9.425	1.6699	.2644	.1029	56.7	.06834	.012043	1.529
.9940	1.0531	.05553	9.992	9.425	1.8169	.2761	.1077	57.1	.06892	.012145	1.676
.9930	1.0521	.06033	9.993	9.426	2.0[illegible]	.2871	.1122	57.6	.06945	.012238	1.823
.9920	1.0511	.06511	9.994	9.426	[illegible]	.2975	.1166	58.0	.06994	.012324	1.969
.9910	1.0501	.06987	9.995	9.427	[illegible].33	.3075	.1208	58.4	.07039	.012404	2.115
.9900	1.0491	.07461	9.996	9.427	[illegible].46	.3170	.1248	58.7	.07081	.012478	2.261
.9880	1.0471	.08404	9.998	9.428	[illegible].80	.3349	.1325	59.4	.07157	.012612	2.552
.9860	1.0451	.09343	10.000	9.429	3.10	.3514	.1397	59.9	.07223	.012732	2.843
.9840	1.0431	.10276	10.002	9.430	3.41	.3668	.1465	60.4	.07287	.012840	3.133
.9820	1.0411	.11206	10.005	9.431	3.71	.3812	.1530	60.9	.07343	.012939	3.423
.9800	1.0391	.12132	10.007	9.432	4.01	.3948	.1591	61.4	.07394	.013029	3.714
.9750	1.0341	.14431	10.013	9.435	4.75	.4255	.1735	62.3	.07506	.013228	4.440
.9700	1.0291	.16712	10.019	9.438	5.47	.4524	.1866	63.1	.07602	.013397	5.169
.9650	1.0241	.18976	10.026	9.441	6.19	.4763	.1988	63.8	.07686	.013543	5.899
.9600	1.0191	.21222	10.032	9.444	6.89	.4977	.2102	64.5	.07759	.013674	6.632
.9550	1.0141	.23446	10.039	9.448	7.58	.5169	.2208	65.0	.07825	.013791	7.368
.9500	1.0091	.25647	10.045	9.451	8.[illegible]	.5342	.2309	65.[illegible]	.07885	.013897	8.108
.9400	.9991	.30071	10.059	9.458	9.88	.5641	.2496	66.[illegible]	.07990	.014084	9.596
.9300	.9891	.34411	10.073	9.465	10.86	.5886	.2667	67.3	.08081	.014246	11.099
.9200	.9791	.38659	10.087	9.472	11.80	.6087	.2826	68.0	.08162	.014388	12.617
.9100	.9691	.42802	10.102	9.480	12.69	.6251	.2972	68.7	.08233	.014516	14.150
.9000	.9591	.47110	10.117	9.488	14.44	.6383	.3110	69.3	.08298	.014631	15.700
.8800	.9391	.5530	10.149	9.504	16.63	.6566	.3362	70.3	.08412	.014834	18.851
.8600	.9191	.6327	10.182	9.521	18.65	.6660	.3589	71.3	.08509	.015010	22.073
.8400	.8991	.7104	10.217	9.538	20.51	.6684	.3795	72.1	.08595	.015164	25.370
.8200	.8791	.7857	10.253	9.557	22.22	.6650	.3983	72.9	.08672	.015303	28.747
.8000	.8591	.8589	10.292	9.577	23.77	.6570	.4157	73.6	.08742	.015429	32.207
.7800	.8391	.9297	10.332	9.597	25.18	.6450	.4317	74.3	.08806	.015546	35.756
.7600	.8191	.9981	10.375	9.619	26.43	.6298	.4466	74.9	.08865	.015653	39.398
.7400	.7991	1.0641	10.420	9.642	27.55	.6118	.4605	75.5	.08920	.015754	43.138
.7200	.7791	1.1276	10.467	9.666	28.52	.5918	.4734	76.1	.08971	.015849	46.982
.7000	.7591	1.1885	10.518	9.691	29.35	.5699	.4855	76.7	.09020	.015939	50.936
.6800	.7391	1.2468	10.571	9.718	30.05	.5466	.4969	77.2	.09066	.016024	55.006
.6600	.7191	1.3024	10.628	9.746	30.61	.5223	.5075	77.8	.09109	.016106	59.200
.6400	.6990	1.3552	10.688	9.776	31.04	.4971	.5175	78.3	.09151	.016184	63.525
.6200	.6790	1.4051	10.752	9.808	31.25	.4714	.5268	78.8	.09191	.016260	67.990
.6000	.6590	1.4521	10.821	9.842	31.53	.4453	.5356	79.3	.09229	.016333	72.604
.5800	.6390	1.4960	10.895	9.878	31.60	.4191	.5439	79.9	.09266	.016403	77.378
.5600	.6190	1.5367	10.974	9.916	31.54	.3929	.5516	80.4	.09301	.016472	82.323
.5400	.5990	1.5741	11.06	9.958	31.38	.3669	.5589	80.9	.09336	.016539	87.451
.5200	.5790	1.6081	11.15	10.002	31.10	.3413	.5657	81.4	.09369	.016605	92.777
.5000	.5590	1.6386	11.[illegible]5	10.050	30.72	.3162	.5722	81.[illegible]	.09402	.016669	98.317
.4800	.5390	1.6654	11.36	10.102	30.23	.2916	.5782	82.5	.09434	.016733	104.088
.4600	.5189	1.6884	11.48	10.157	29.65	.2677	.5838	83.1	.09465	.016795	110.110
.4400	.4989	1.7073	11.[illegible]0	10.218	28.98	.2446	.5891	83.6	.09495	.016857	116.407
.4200	.4789	1.7221	11.75	10.284	28.21	.2224	.5940	84.2	.09525	.016918	123.004
.4000	.4589	1.7324	11.90	10.357	27.35	.2011	.5986	84.8	.09554	.016979	129.932
.3800	.4388	1.7382	12.08	10.437	26.43	.1808	.6029	85.4	.09582	.017040	137.224
.3600	.4188	1.7391	12.27	10.525	25.42	.1615	.6069	86.0	.09610	.017101	144.923
.3400	.3988	1.7348	12.49	10.623	24.34	.1433	.6106	86.7	.09638	.017161	153.074
.3200	.3788	1.7252	12.73	10.733	23.20	.1262	.6140	87.4	.09665	.017223	161.734
.3000	.3587	1.7097	13.02	10.856	22.00	.1102	.6172	88.1	.09692	.017284	170.972
.2800	.3387	1.6881	13.34	10.996	20.74	.0954	.6201	88.9	.09719	.017347	180.867
.2600	.3186	1.6599	13.72	11.16	19.44	.0817	.6228	89.7	.09746	.017410	191.522
.2400	.2985	1.6245	14.16	11.34	18.10	.0692	.6252	90.6	.09772	.017475	203.06
.2200	.2784	1.5814	14.69	11.56	16.73	.0579	.6274	91.6	.09798	.017542	215.64
.2000	.2584	1.5298	15.33	11.81	15.32	.0477	.6294	92.6	.09824	.017611	229.47
.1800	.2382	1.4689	16.13	12.12	13.89	.0386	.6312	93.7	.09849	.017683	244.81
.1600	.2180	1.3976	17.14	12.49	12.46	.0306	.6328	95.0	.09874	.017759	262.05
.1400	.1978	1.3146	18.46	12.95	11.02	.0237	.6343	96.5	.09899	.017839	281.70
.1200	.1775	1.2182	20.[illegible]7	13.54	9.60	.0178	.6355	98.1	.09924	.017926	304.54
.1000	.1570	1.1061	23.86	14.32	8.18	.0129	.6366	100.1	.09948	.018021	331.83
.0900	.1467	1.0433	24.84	14.82	7.48	.0108	.6371	101.2	.09960	.018073	347.76
.0800	.1362	.9753	26.81	15.41	6.78	.0088	.6375	102.4	.09972	.018129	365.75
.0700	.1256	.9017	29.91	16.13	6.10	.0071	.6379	103.8	.09983	.018190	386.46
.0600	.1147	.8219	34.08	17.04	5.41	.0056	.6383	105.5	.09994	.018259	410.97
.0500	.1033	.7356	40.31	18.25	4.71	.0042	.6387	107.4	.10005	.018338	441.35
.0450	.0973	.6901	44.79	19.03	4.36	.0036	.6388	108.6	.10010	.018384	460.08
.0400	.0907	.6438	50.89	20.01	4.02	.0030	.6390	110.0	.10015	.018438	482.84
.0380	.0879	.6253	54.04	20.49	3.81	.0028	.6391	110.7	.10017	.018462	493.69
.0360	.0848	.6073	57.81	21.05	3.71	.0025	.6391	111.4	.10018	.018490	506.10
.0340	.0815	.5903	62.50	21.72	3.46	.0023	.6392	112.3	.10020	.018522	520.83
.0320	.0776	.5756	68.69	22.60	3.25	.0020	.6393	113.3	.10022	.018561	539.59
.0310	.0753	.5702	72.79	23.17	3.13	.0018	.6393	114.0	.10023	.018586	551.80
.0305	.0723	.5681	77.25	23.96	2.97	.0017	.6394	114.9	.10024	.018618	568.10
.0295	.0704	.5700	82.07	24.52	2.87	.0015	.6394	115.5	.10024	.018641	579.69
.0290	.0674	.5793	88.31	25.47	2.72	.0014	.6395	116.6	.10025	.018678	599.24

TABLE III.- VALUES OF $\underline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(a) $\gamma_i = -0.5^{\circ}$, $e_i = 0.00873$

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	$-\Lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{Q}$	t sec	$\frac{\Delta s}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\beta r}\,\frac{\dot{\gamma}}{\dot{V}}$
1.0000	0.9400	0.0000018	0.500	0.532	0.0000	0.0008	0	0.	0	0	0.000
1.0005	.9405	.0000025	.497	.528	.0000	.0013	.0037	94.9	.11609	.001011	.000
1.0010	.9410	.0000063	.486	.517	.0001	.0021	.0097	192.8	.23582	.002019	.000
1.0015	.9415	.0000165	.468	.498	.0005	.0034	.0201	298.3	.36496	.003116	.000
1.0020	.9420	.0000521	.435	.463	.0014	.0060	.0429	430.1	.52629	.004530	.000
1.00219	.9421	.0001311	.401	.427	.0039	.0096	.0740	544.9	.66686	.005824	.004
1.0020	.9420	.0002612	.374	.397	.0069	.0135	.1134	637.2	.78006	.006[illegible]	.008
1.0015	.9415	.0004275	.356	.379	.0113	.0172	.1529	707.6	.86620	.006[illegible]	.013
1.0010	.9410	.0005631	.349	.371	.0150	.0198	.1806	748.4	.91621	.007045	.017
1.0005	.9405	.0006886	.346	.368	.0183	.0218	.2030	778.6	.95318	.007[illegible]	.021
1.0000	.9400	.0008090	.345	.367	.0214	.0236	.2230	803.0	.98293	.007[illegible]	.024
.9990	.9390	.0010418	.347	.369	.0275	.0267	.2590	841.3	1.02971	.007[illegible]	.031
.9980	.9380	.0012713	.353	.375	.0337	.0295	.2892	871.1	1.06610	.007[illegible]	.038
.9970	.9370	.0015017	.362	.385	.0397	.0319	.3170	895.6	1.09595	.008139	.045
.9960	.9360	.0017339	.372	.396	.0458	.0342	.3428	916.3	1.12123	.008[illegible]	.052
.9950	.9350	.0019734	.383	.408	.0520	.0364	.3659	934.3	1.14310	.008[illegible]	.060
.9940	.9340	.002218	.396	.421	.0583	.0385	.3870	950.1	1.16234	.008[illegible]	.067
.9930	.9330	.002468	.408	.433	.0649	.0405	.4080	964.2	1.17946	.008[illegible]	.075
.9920	.9320	.002726	.422	.446	.0716	.0424	.4273	976.9	1.19484	.008804	.082
.9910	.9310	.002991	.435	.463	.0775	.0443	.4465	988.4	1.20878	.008[illegible]	.091
.9900	.9300	.003263	.449	.476	.0855	.0462	.4630	998.9	1.22148	.009000	.099
.9880	.9280	.003832	.478	.509	.1002	.0498	.4955	1017.4	1.24383	.009[illegible]	.116
.9860	.9260	.004433	.507	.540	.1156	.0532	.5254	1033.2	1.26295	.009[illegible]	.135
.9840	.9240	.005066	.536	.571	.1319	.0566	.5533	1047.0	1.27953	.009[illegible]	.154
.9820	.9220	.005733	.565	.602	.1489	.0599	.5790	1059.1	1.29407	.009[illegible]	.175
.9800	.9200	.006432	.594	.632	.1666	.0631	.6031	1069.8	1.30695	.009[illegible]	.197
.9750	.9150	.008322	.664	.708	.214	.0708	.6578	1092.1	1.33360	.010[illegible]	.256
.9700	.9100	.010468	.732	.781	.266	.0781	.7057	1109.7	1.35449	.010[illegible]	.322
.9650	.9050	.012682	.798	.851	.323	.0850	.7484	1124.0	1.37138	.010[illegible]	.394
.9600	.9000	.015136	.861	.919	.383	.0915	.7868	1135.9	1.38537	.010[illegible]	.473
.9550	.8950	.017762	.922	.984	.447	.0978	.8218	1146.0	1.39718	.010[illegible]	.558
.9500	.8900	.02055	.981	1.047	.514	.1037	.8539	1154.7	1.40730	.011097	.649
.9400	.8800	.02661	1.093	1.168	.658	.1147	.9111	1169.0	1.42382	.011396	.849
.9300	.8700	.03325	1.199	1.280	.812	.1245	.9609	1180.3	1.43681	.011655	1.073
.9200	.8600	.04044	1.300	1.390	.995	.1334	1.0049	1189.6	1.44735	.011885	1.319
.9100	.8500	.04815	1.396	1.499	1.147	.1413	1.0444	1197.5	1.45611	.012091	1.587
.9000	.8400	.05634	1.489	1.599	1.325	.1483	1.0800	1204.2	1.46353	.012278	1.878
.8800	.8200	.07409	1.666	1.788	1.698	.1600	1.1423	1215.2	1.47551	.012607	2.594
.8600	.8000	.09352	1.834	1.971	2.09	.1689	1.1925	1224.0	1.48483	.012891	3.262
.8400	.7800	.11450	1.995	2.15	2.49	.1752	1.2368	1231.2	1.49235	.013142	4.089
.8200	.7600	.13693	2.15	2.31	2.89	.1794	1.2808	1237.4	1.49859	.013368	5.010
.8000	.7400	.16071	2.31	2.49	3.30	.1818	1.3162	1242.7	1.50387	.013573	6.027
.7800	.7201	.18577	2.46	2.66	3.70	.1822	1.3477	1247.4	1.50842	.013762	7.145
.7600	.7001	.2120	2.61	2.83	4.10	.1812	1.3770	1251.6	1.51239	.013938	8.370
.7400	.6801	.2395	2.76	3.00	4.49	.1789	1.4014	1255.5	1.51591	.014103	9.708
.7200	.6601	.2680	2.91	3.17	4.87	.1755	1.4242	1259.0	1.51906	.014258	11.167
.7000	.6401	.2976	3.06	3.33	5.23	.1710	1.4449	1262.3	1.52189	.014406	12.755
.6800	.6201	.3282	3.22	3.53	5.57	.1657	1.4635	1265.3	1.52446	.014547	14.481
.6600	.6001	.3599	3.37	3.71	5.89	.1596	1.4810	1268.2	1.52682	.014683	16.357
.6400	.5801	.3924	3.53	3.89	6.19	.1529	1.4970	1270.9	1.52898	.014813	18.396
.6200	.5601	.4260	3.69	4.09	6.47	.1457	1.5109	1273.5	1.53098	.014939	20.611
.6000	.5402	.4604	3.86	4.29	6.72	.1380	1.5230	1276.0	1.53285	.015062	23.019
.5800	.5202	.4957	4.03	4.49	6.94	.1301	1.5334	1278.4	1.53458	.015182	25.640
.5600	.5002	.5319	4.21	4.71	7.13	.1220	1.5420	1280.8	1.53621	.015299	28.496
.5400	.4802	.5690	4.39	4.94	7.29	.1137	1.5500	1283.1	1.53775	.015415	31.612
.5200	.4602	.6070	4.58	5.18	7.42	.1053	1.5560	1285.3	1.53920	.015528	35.018
.5000	.4402	.6458	4.78	5.43	7.51	.0970	1.5618	1287.5	1.54057	.015641	38.750
.4800	.4203	.6856	4.99	5.70	7.57	.0887	1.5812	1289.7	1.54188	.015753	42.849
.4600	.4003	.7263	5.21	5.99	7.59	.0806	1.5880	1291.9	1.54313	.015864	47.365
.4400	.3803	.7679	5.44	6.30	7.57	.0727	1.5941	1294.1	1.54432	.015975	52.357
.4200	.3603	.8106	5.69	6.64	7.52	.0650	1.5997	1296.3	1.54547	.016087	57.898
.4000	.3404	.8544	5.95	7.00	7.42	.0576	1.6046	1298.5	1.54658	.016200	64.076
.3800	.3204	.8994	6.24	7.40	7.29	.0506	1.6091	1300.8	1.54765	.016314	71.002
.3600	.3005	.9457	6.54	7.84	7.12	.0440	1.6131	1303.1	1.54868	.016430	78.812
.3400	.2805	.9937	6.88	8.34	6.90	.0377	1.6170	1305.4	1.54969	.016548	87.682
.3200	.2606	1.0436	7.24	8.93	6.64	.0320	1.6198	1307.6	1.55067	.016670	97.840
.3000	.2407	1.0959	7.65	9.55	6.35	.0266	1.6225	1310.5	1.55164	.016796	109.590
.2800	.2208	1.1511	8.10	10.29	6.01	.0218	1.6249	1313.2	1.55259	.016927	123.332
.2600	.2009	1.2101	8.60	11.16	5.63	.0175	1.6270	1316.0	1.55353	.017065	139.627
.2400	.1810	1.2744	9.18	12.21	5.22	.0137	1.6288	1319.2	1.55446	.017212	159.300
.2200	.1612	1.3458	9.84	13.49	4.77	.0104	1.6303	1322.5	1.55540	.017369	183.518
.2000	.1415	1.4278	10.63	15.11	4.29	.0076	1.6315	1326.3	1.55636	.017540	214.17
.1800	.1218	1.5259	11.56	17.15	3.77	.0053	1.6325	1330.[illegible]	1.55733	.017731	254.32
.1600	.1023	1.6502	12.71	20.12	3.24	.0034	1.6333	1335.6	1.55834	.017947	309.92
.1400	.0831	1.8206	14.14	24.30	2.69	.0021	1.6339	1341.7	1.55943	.018207	390.13
.1200	.0645	2.0813	15.97	30.81	2.16	.0011	1.6343	1349.[illegible]	1.56062	.018527	520.32
.1000	.0470	2.5491	18.27	41.88	1.68	.0005	1.6346	1360.[illegible]	1.56200	.018955	764.74
.0900	.0390	2.9591	19.47	50.[illegible]	1.49	.0003	1.6347	1367.[illegible]	1.56283	.019237	896.37
.0800	.0316	3.6327	20.30	61.[illegible]	1.35	.0002	1.6348	1378.0	1.56382	.019596	1062.26
.0750	.0280	4.1680	20.29	68.30	1.30	.0002	1.6349	1384.8	1.56442	.019821	1167.20
.0700	.0242	5.0008	19.60	75.80	1.25	.0001	1.6349	1394.1	1.56519	.020100	1143.2
.0680	.0226	5.5063	19.00	79.[illegible]	1.23	.0001	1.6350	1399.1	1.56559	.020239	2429.2
.0660	.0207	6.2233	18.07	82.[illegible]	1.20	.0001	1.6350	1405.[illegible]	1.56609	.020408	2838.6
.0640	.0183	7.4101	16.60	85.[illegible]	1.16	.0001	1.6350	1415.3	1.56683	.020638	3477.7
.0620	.0147	10.5302	13.74	89.[illegible]	1.10	.0000	1.6350	1436.[illegible]	1.56840	.021062	5095.3
.0610	.0110	17.3361	10.38	89.[illegible]	1.02	.0000	1.6351	1473.0	1.57108	.021630	8526.0

TABLE III.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -1.0^\circ$, $e_i = 0.01745$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{u}_r}{g}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\frac{Z}{\bar{V}}$
1.0000	0.9400	0.0000010	1.000	1.064	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9405	.0000025	.998	1.062	.0000	.0013	.0018	47.2	.05765	.001006	.000
1.0010	.9410	.0000062	.993	1.057	.0001	.0021	.0047	94.9	.11602	.002020	.000
1.0015	.9415	.0000157	.985	1.047	.0004	.0033	.0085	143.9	.17603	.003057	.000
1.0020	.9420	.0000421	.972	1.034	.0011	.0054	.0177	196.4	.24025	.004154	.001
1.0025	.9425	.0001446	.951	1.011	.0038	.0100	.0360	263.0	.32185	.005524	.004
1.00262	.94263	.0003555	.936	.995	.0081	.0146	.0545	304.2	.37233	.006361	.009
1.0025	.9425	.0005553	.924	.983	.0145	.0197	.0753	337.6	.41326	.007025	.017
1.0020	.9420	.0010047	.913	.971	.0209	.0265	.1026	371.2	.45440	.007684	.030
1.0015	.9415	.0013654	.909	.966	.0263	.0308	.1220	388.7	.47588	.008026	.041
1.0010	.9410	.0018984	.906	.964	.0459	.0343	.1369	401.3	.49123	.008269	.051
1.0005	.9405	.002017	.905	.963	.0549	.0374	.1509	411.2	.50335	.008460	.060
1.0000	.9400	.002387	.905	.963	.0617	.0401	.1647	419.4	.51344	.008619	.070
.9990	.9390	.002930	.906	.964	.0776	.0448	.1904	432.7	.52971	.008876	.088
.9980	.9380	.003519	.908	.966	.0931	.0490	.2008	443.3	.54265	.009081	.106
.9970	.9370	.004100	.911	.969	.1084	.0528	.2271	452.2	.55343	.009252	.123
.9960	.9360	.004677	.914	.973	.1234	.0562	.2423	459.8	.56268	.009400	.141
.9950	.9350	.005250	.919	.978	.1384	.0594	.2464	466.4	.57079	.009530	.158
.9940	.9340	.005824	.923	.982	.1533	.0624	.2597	472.4	.57801	.009646	.176
.9930	.9330	.006394	.928	.988	.1682	.0652	.2722	477.8	.58453	.009751	.193
.9920	.9320	.006960	.933	.993	.1830	.0678	.2841	482.8	.59046	.009847	.211
.9910	.9310	.007540	.938	.999	.1979	.0704	.2955	487.1	.59591	.009936	.228
.9900	.9300	.008120	.944	1.005	.2129	.0728	.3064	491.3	.60094	.010019	.246
.9880	.9280	.009269	.955	1.017	.2429	.0774	.3270	498.8	.60998	.010169	.281
.9860	.9260	.010420	.967	1.030	.2728	.0817	.3462	505.4	.61793	.010302	.317
.9840	.9240	.011599	.980	1.043	.3027	.0856	.3643	511.2	.62501	.010422	.354
.9820	.9220	.012799	.992	1.057	.3327	.0894	.3814	516.6	.63140	.010532	.390
.9800	.9200	.013970	1.005	1.071	.3627	.0930	.3976	521.4	.63721	.010633	.428
.9750	.9150	.016968	1.038	1.106	.4378	.1012	.4456	531.9	.64976	.010857	.523
.9700	.9100	.020110	1.072	1.143	.5129	.1085	.4887	540.7	.66021	.011049	.622
.9650	.9050	.023329	1.106	1.180	.5879	.1152	.5296	548.2	.66912	.011219	.724
.9600	.9000	.026657	1.141	1.217	.6629	.1213	.5681	554.8	.67686	.011371	.830
.9550	.8950	.029992	1.176	1.255	.7379	.1269	.6047	560.7	.68369	.011509	.940
.9500	.8900	.033337	1.211	1.293	.8129	.1321	.6395	565.9	.68978	.011635	1.054
.9400	.8800	.040028	1.282	1.370	1.0000	.1415	.6850	574.9	.70025	.011863	1.293
.9300	.8700	.046828	1.353	1.446	1.1872	.1496	.7257	582.6	.70897	.012063	1.549
.9200	.8600	.053586	1.424	1.523	1.3744	.1567	.7647	589.2	.71641	.012244	1.822
.9100	.8500	.060404	1.494	1.600	1.5616	.1629	.7969	594.9	.72285	.012408	2.111
.9000	.8400	.07259	1.565	1.676	1.7487	.1683	.8176	600.0	.72851	.012559	2.419
.8800	.8200	.09059	1.705	1.829	2.08	.1769	.8830	608.8	.73804	.012830	3.088
.8600	.8000	.10999	1.844	1.982	2.45	.1831	.8713	616.1	.74581	.013070	3.834
.8400	.7800	.13047	1.983	2.14	3.18	.1870	.9137	622.3	.75230	.013287	4.659
.8200	.7600	.15223	2.12	2.29	3.22	.1892	.9314	627.8	.75783	.013485	5.569
.8000	.7400	.17515	2.26	2.44	3.60	.1896	.9850	632.6	.76262	.013669	6.568
.7800	.7201	.19921	2.40	2.60	3.97	.1887	1.0154	637.0	.76683	.013840	7.662
.7600	.7001	.2244	2.54	2.76	4.34	.1864	1.0426	641.0	.77066	.014001	8.857
.7400	.6801	.2506	2.69	2.92	4.70	.1830	1.0673	644.6	.77390	.014153	10.160
.7200	.6601	.2779	2.83	3.09	5.04	.1787	1.0897	648.0	.77692	.014299	11.579
.7000	.6401	.3062	2.98	3.26	5.38	.1734	1.1102	651.0	.77966	.014438	13.122
.6800	.6201	.3355	3.13	3.43	5.69	.1675	1.1288	654.1	.78217	.014571	14.800
.6600	.6001	.3657	3.28	3.61	5.99	.1609	1.1458	657.0	.78448	.014700	16.625
.6400	.5801	.3970	3.44	3.79	6.26	.1538	1.1613	659.7	.78661	.014826	18.608
.6200	.5601	.4291	3.60	3.98	6.51	.1462	1.1755	662.2	.78860	.014948	20.765
.6000	.5401	.4622	3.76	4.18	6.74	.1383	1.1886	664.7	.79045	.015067	23.112
.5800	.5202	.4963	3.93	4.39	6.95	.1302	1.2004	667.1	.79218	.015183	25.670
.5600	.5002	.5312	4.11	4.60	7.14	.1219	1.2110	669.5	.79381	.015298	28.459
.5400	.4802	.5671	4.30	4.83	7.30	.1135	1.2201	671.8	.79535	.015411	31.506
.5200	.4602	.6039	4.49	5.07	7.38	.1050	1.2302	674.0	.79681	.015523	34.841
.5000	.4402	.6417	4.69	5.32	7.46	.0966	1.2384	676.3	.79819	.015634	38.500
.4800	.4202	.6804	4.90	5.58	7.51	.0884	1.2459	678.5	.79951	.015744	42.523
.4600	.4003	.7201	5.12	5.89	7.52	.0802	1.2527	680.7	.80077	.015854	46.962
.4400	.3803	.7608	5.36	6.20	7.50	.0723	1.2588	682.9	.80197	.015965	51.875
.4200	.3603	.8027	5.61	6.54	7.44	.0647	1.2644	685.1	.80313	.016076	57.335
.4000	.3404	.8458	5.88	6.91	7.35	.0573	1.2694	687.3	.80425	.016188	63.431
.3800	.3204	.8901	6.17	7.32	7.21	.0504	1.2739	689.6	.80533	.016302	70.274
.3600	.3005	.9360	6.48	7.77	7.04	.0437	1.2779	691.9	.80637	.016418	78.000
.3400	.2805	.9836	6.82	8.27	6.83	.0375	1.2815	694.3	.80739	.016537	86.787
.3200	.2606	1.0332	7.19	8.84	6.57	.0318	1.2846	696.8	.80838	.016659	96.862
.3000	.2407	1.0853	7.60	9.48	6.29	.0265	1.2874	699.4	.80936	.016785	108.527
.2800	.2208	1.1404	8.05	10.23	5.95	.0217	1.2898	702.1	.81032	.016917	122.190
.2600	.2009	1.1996	8.57	11.12	5.58	.0174	1.2919	705.0	.81127	.017055	138.417
.2400	.1810	1.2641	9.15	12.17	5.18	.0136	1.2936	708.2	.81221	.017208	158.015
.2200	.1612	1.3360	9.82	13.47	4.73	.0103	1.2951	711.6	.81316	.017361	182.186
.2000	.1415	1.4187	10.62	15.10	4.26	.0075	1.2964	715.4	.81412	.017533	212.80
.1800	.1218	1.5177	11.56	17.28	3.75	.0052	1.2974	719.7	.81510	.017725	252.94
.1600	.1023	1.6430	12.72	20.13	3.23	.0034	1.2982	724.7	.81612	.017944	308.07
.1400	.0831	1.8148	14.16	24.33	2.69	.0021	1.2988	730.8	.81720	.018203	388.88
.1200	.0645	2.0772	16.00	30.89	2.16	.0011	1.2992	738.6	.81840	.018524	519.29
.1000	.0470	2.5469	18.29	41.93	1.686	.0005	1.2995	749.5	.81979	.018954	744.56
.0900	.0390	2.9577	19.49	50.40	1.497	.0003	1.2996	757.0	.82061	.019237	935.89
.0800	.0316	3.6318	20.32	61.59	1.358	.0002	1.2997	767.2	.82160	.019596	1261.93
.0750	.0280	4.1673	20.30	68.32	1.307	.0002	1.2998	774.0	.82221	.019820	1666.91
.0700	.0242	5.0000	19.61	75.81	1.258	.0001	1.2998	783.2	.82297	.020099	2142.9
.0680	.0226	5.5055	19.00	79.02	1.236	.0001	1.2998	788.2	.82337	.020239	2428.9
.0660	.0207	6.2225	18.07	82.37	1.207	.0001	1.2999	794.7	.82387	.020408	2828.4
.0640	.0183	7.4184	16.60	85.83	1.168	.0001	1.2999	804.4	.82461	.020637	3477.4
.0620	.0147	10.5296	13.74	89.12	1.109	.0000	1.2999	825.6	.82618	.021062	5695.0
.0610	.0110	17.3345	10.38	89.99	1.029	.0000	1.3000	862.0	.82886	.021630	8525.2

TABLE III.- VALUES OF $\overline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -2.0^\circ$, $e_i = 0.03490$

$\overline{V}$	$\overline{V}_r$	$\overline{Z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\dot{\overline{q}}$	τ sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\frac{\dot{\overline{q}}}{\overline{q}}$
1.0000	0.9400	0.0000010	2.000	2.128	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9405	.0000025	1.999	2.127	.0001	.0013	.0009	23.9	.02873	.001003	.000
1.0010	.9410	.0000061	1.997	2.124	.0002	.0021	.0023	47.8	.05764	.002016	.000
1.0015	.9415	.0000153	1.993	2.119	.0004	.0033	.0046	71.1	.08691	.003033	.000
1.0020	.9420	.0000393	1.986	2.113	.0011	.0052	.0084	95.7	.11702	.004077	.001
1.0025	.9425	.0001083	1.978	2.104	.0029	.0087	.0150	122.2	.14953	.005202	.003
1.0030	.9430	.0004750	1.963	2.088	.0126	.0182	.0335	161.2	.19706	.006845	.014
1.00302	.9430	.0006388	1.960	2.084	.0170	.0212	.0391	169.1	.20687	.007174	.019
1.0030	.9430	.0008390	1.956	2.081	.0223	.0243	.0452	176.3	.21578	.007478	.025
1.0025	.9425	.0019540	1.947	2.071	.0519	.0370	.0701	198.8	.24333	.008417	.058
1.0020	.9420	.002746	1.945	2.068	.0730	.0438	.0835	207.9	.25447	.008786	.080
1.0015	.9415	.003469	1.943	2.067	.0921	.0491	.0942	214.1	.26214	.009044	.104
1.0010	.9410	.004158	1.942	2.066	.1104	.0537	.1033	219.0	.26810	.009258	.125
1.0005	.9405	.004826	1.941	2.065	.1280	.0578	.1115	223.0	.27300	.009434	.145
1.0000	.9400	.005480	1.941	2.065	.1452	.0615	.1190	226.4	.27718	.009566	.174
.9990	.9390	.006759	1.942	2.066	.1790	.0681	.1324	232.1	.28409	.009800	.203
.9980	.9380	.008012	1.942	2.067	.212	.0740	.1444	236.7	.28969	.009940	.241
.9970	.9370	.009248	1.944	2.068	.244	.0792	.1553	240.6	.29443	.010151	.278
.9960	.9360	.010471	1.945	2.070	.276	.0841	.1654	243.9	.29853	.010290	.315
.9950	.9350	.011685	1.947	2.072	.308	.0886	.1748	246.9	.30215	.010413	.352
.9940	.9340	.012892	1.949	2.074	.340	.0928	.1837	249.6	.30539	.010523	.389
.9930	.9330	.014094	1.951	2.076	.371	.0968	.1921	252.0	.30833	.010623	.426
.9920	.9320	.015291	1.953	2.079	.402	.1005	.2002	254.2	.31102	.010715	.462
.9910	.9310	.016484	1.955	2.081	.433	.1041	.2078	256.3	.31350	.010800	.499
.9900	.9300	.017674	1.958	2.084	.463	.1075	.2152	258.2	.31580	.010878	.536
.9880	.9280	.02005	1.963	2.090	.524	.1138	.2292	261.6	.31996	.011020	.609
.9860	.9260	.02241	1.968	2.096	.585	.1197	.2422	264.7	.32364	.011147	.682
.9840	.9240	.02477	1.974	2.102	.645	.1252	.2545	267.4	.32694	.011260	.755
.9820	.9220	.02713	1.979	2.109	.705	.1303	.2662	269.9	.32993	.011363	.829
.9800	.9200	.02949	1.985	2.115	.764	.1351	.2773	272.2	.33267	.011458	.903
.9750	.9150	.03537	2.000	2.132	.911	.1459	.3031	277.2	.33864	.011667	1.088
.9700	.9100	.04126	2.016	2.149	1.057	.1554	.3265	281.4	.34368	.011845	1.272
.9650	.9050	.04716	2.033	2.167	1.201	.1639	.3482	285.1	.34805	.011997	1.455
.9600	.9000	.05306	2.049	2.184	1.343	.1714	.3682	288.4	.35189	.012134	1.636
.9550	.8950	.05899	2.066	2.202	1.484	.1782	.3870	291.3	.35532	.012257	1.853
.9500	.8900	.06493	2.084	2.224	1.624	.1843	.4048	294.0	.35843	.012370	2.050
.9400	.8800	.07687	2.120	2.264	1.900	.1949	.4375	298.7	.36386	.012569	2.453
.9300	.8700	.08889	2.156	2.305	2.17	.2036	.4672	302.8	.36850	.012742	2.847
.9200	.8600	.10100	2.194	2.347	2.44	.2108	.4945	306.3	.37256	.012890	3.234
.9100	.8500	.11322	2.232	2.389	2.70	.2166	.5197	309.6	.37616	.013035	3.732
.9000	.8400	.12553	2.271	2.434	2.95	.2214	.5432	312.5	.37939	.013160	4.184
.8800	.8200	.15045	2.351	2.523	3.45	.2280	.5858	317.6	.38499	.013389	5.129
.8600	.8001	.17580	2.435	2.617	3.93	.2315	.6235	322.1	.38975	.013587	6.133
.8400	.7801	.2016	2.521	2.712	4.38	.2325	.6572	326.1	.39387	.013775	7.199
.8200	.7601	.2278	2.610	2.816	4.81	.2314	.6878	329.7	.39750	.013928	8.344
.8000	.7401	.2545	2.702	2.921	5.23	.2286	.7154	332.9	.40074	.014078	9.543
.7800	.7201	.2816	2.797	3.03	5.62	.2243	.7407	336.0	.40367	.014214	10.830
.7600	.7001	.3092	2.896	3.14	5.98	.2188	.7638	338.8	.40634	.014352	12.204
.7400	.6801	.3372	3.00	3.26	6.32	.2123	.7849	341.5	.40879	.014478	13.670
.7200	.6601	.3657	3.10	3.39	6.64	.2050	.8044	344.0	.41106	.014598	15.237
.7000	.6401	.3947	3.21	3.52	6.93	.1969	.8222	346.5	.41316	.014714	16.914
.6800	.6201	.4241	3.33	3.65	7.19	.1883	.8387	348.8	.41512	.014827	18.710
.6600	.6001	.4540	3.45	3.79	7.43	.1793	.8539	351.0	.41696	.014935	20.628
.6400	.5801	.4844	3.57	3.94	7.64	.1699	.8679	353.2	.41869	.015040	22.706
.6200	.5601	.5154	3.70	4.10	7.82	.1602	.8808	355.4	.42033	.015144	24.937
.6000	.5402	.5468	3.84	4.27	7.98	.1504	.8926	357.4	.42188	.015248	27.340
.5800	.5202	.5788	3.98	4.44	8.10	.1406	.9036	359.5	.42336	.015350	29.936
.5600	.5002	.6113	4.13	4.63	8.19	.1307	.9136	361.5	.42476	.015448	32.746
.5400	.4802	.6443	4.29	4.83	8.25	.1210	.9229	363.5	.42611	.015547	35.797
.5200	.4602	.6780	4.46	5.04	8.28	.1113	.9314	365.5	.42739	.015644	39.116
.5000	.4402	.7123	4.64	5.27	8.28	.1018	.9393	367.5	.42863	.015744	42.738
.4800	.4202	.7473	4.83	5.52	8.25	.0926	.9463	369.5	.42982	.015843	46.705
.4600	.4003	.7830	5.03	5.78	8.18	.0837	.9528	371.5	.43097	.015942	51.064
.4400	.3803	.8195	5.24	6.07	8.08	.0751	.9587	373.5	.43209	.016042	55.874
.4200	.3603	.8569	5.48	6.39	7.95	.0668	.9640	375.6	.43317	.016144	61.205
.4000	.3404	.8952	5.73	6.74	7.78	.0590	.9689	377.7	.43422	.016246	67.144
.3800	.3204	.9348	6.00	7.13	7.58	.0516	.9733	379.9	.43524	.016351	73.798
.3600	.3004	.9756	6.29	7.56	7.34	.0446	.9772	382.1	.43624	.016459	81.303
.3400	.2805	1.0181	6.62	8.03	7.07	.0382	.9807	384.4	.43722	.016570	89.832
.3200	.2606	1.0625	6.98	8.54	6.76	.0322	.9838	386.8	.43818	.016684	99.609
.3000	.2406	1.1093	7.38	9.21	6.42	.0268	.9865	389.3	.43913	.016804	110.930
.2800	.2207	1.1592	7.83	9.98	6.04	.0219	.9889	392.0	.44007	.016930	124.200
.2600	.2008	1.2131	8.34	10.88	5.65	.0175	.9910	394.9	.44101	.017062	139.973
.2400	.1810	1.2724	8.92	11.87	5.21	.0136	.9927	398.0	.44195	.017204	159.050
.2200	.1612	1.3394	9.60	13.16	4.74	.0103	.9942	401.4	.44289	.017358	182.645
.2000	.1414	1.4172	10.40	14.79	4.25	.0075	.9954	405.2	.44385	.017527	212.59
.1800	.1218	1.5118	11.36	16.94	3.74	.0052	.9964	409.5	.44483	.017716	251.97
.1600	.1023	1.6334	12.54	19.86	3.15	.0034	.9972	414.5	.44586	.017933	306.27
.1400	.0831	1.8082	14.02	24.09	2.66	.0021	.9978	420.7	.44695	.018190	386.19
.1200	.0644	2.0632	15.91	30.69	2.14	.0011	.9983	428.6	.44816	.018512	515.79
.1000	.0470	2.5340	18.26	41.87	1.676	.0005	.9986	439.5	.44956	.018943	770.19
.0900	.0390	2.9466	19.49	50.49	1.492	.0003	.9987	447.1	.45039	.019227	962.21
.0800	.0316	3.6234	20.33	61.63	1.357	.0002	.9988	457.3	.45138	.019588	1358.78
.0750	.0280	4.1602	20.32	68.36	1.306	.0002	.9988	464.1	.45199	.019813	1664.08
.0700	.0242	4.9941	19.62	75.86	1.258	.0001	.9989	473.4	.45275	.020093	2140.3
.0680	.0226	5.5000	19.02	79.04	1.236	.0001	.9989	478.4	.45315	.020232	2436.5
.0660	.0207	6.2175	18.08	82.38	1.208	.0001	.9989	484.9	.45366	.020402	2846.1
.0640	.0183	7.4139	16.60	85.84	1.168	.0001	.9990	494.6	.45439	.020631	3475.3
.0620	.0147	10.5267	13.74	89.52	1.105	.0000	.9990	515.8	.45596	.021056	5093.6
.0610	.0110	17.3337	10.38	89.99	1.065	.0000	.9990	552.3	.45865	.021625	8524.7

TABLE III.- VALUES OF $\overline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -3.0^{\circ}$, $e_i = 0.05234$

$\overline{V}$	$\overline{V}_r$	α	γ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{T}$	$\overline{Q}$	γ deg	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\frac{Z}{V}$
1.0000	0.9400	0.0000010	.000	3.191	0.0000	0.0008	0	[illegible]	0	0	0.000
1.0005	.9406	.0000025	.999	3.191	.0001	.0013	.0001	[illegible]	.01913	.001002	.000
1.0010	.9411	.0000061	.998	3.189	.0001	.0021	.0016	[illegible]	.03834	.002004	.000
1.0015	.9416	.0000152	.995	3.186	.0004	.0032	.0031	[illegible]	.05771	.003005	.000
1.0020	.9421	.0000385	.991	3.181	.0010	.0052	.0055	[illegible]	.07744	.004054	.001
1.0025	.9424	.0001017	.986	3.176	.0027	.0084	.0097	[illegible]	.09810	.005133	.00[illegible]
1.0030	.9431	.0003136	.978	3.168	.0084	.0148	.0178	[illegible]	.12211	.006381	.00[illegible]
1.00305	.9434	.0009671	.969	3.158	.0257	.0261	.0322	[illegible]	.14619	.007634	.02[illegible]
1.0030	.9431	.002196	.963	3.151	.0584	.0392	.0492	[illegible]	.16378	.008548	.06[illegible]
1.0025	.9424	.003530	.960	3.148	.0938	.0497	.0627	[illegible]	.17399	.009074	.10[illegible]
1.0020	.9421	.004676	.958	3.146	.1243	.0571	.0724	[illegible]	.18004	.009387	.14[illegible]
1.0015	.9416	.005749	.957	3.145	.1527	.0632	.0804	[illegible]	.18450	.009617	.17[illegible]
1.0010	.9411	.006782	.956	3.145	.1800	.0686	.0874	[illegible]	.18806	.009801	.203
1.0005	.9406	.007788	.956	3.144	.206[illegible]	.0734	.0938	[illegible]	.19105	.009955	.234
1.0000	.9401	.008776	.956	3.144	.233	.0778	.0997	[illegible]	.19363	.010089	.263
.9990	.9391	.010711	.956	3.144	.284	.0858	.1103	[illegible]	.19794	.010311	.32[illegible]
.9980	.9381	.012611	.956	3.145	.334	.0928	.1197	[illegible]	.20147	.010494	.379
.9970	.9371	.014486	.957	3.146	.383	.0992	.1284	[illegible]	.20448	.010649	.43[illegible]
.9960	.9361	.016340	.958	3.147	.431	.1051	.1365	[illegible]	.20709	.010784	.49[illegible]
.9950	.9351	.018184	.959	3.148	.479	.1105	.1440	[illegible]	.20941	.010904	.54[illegible]
.9940	.9341	.02001	.960	3.150	.527	.1156	.1511	[illegible]	.21149	.011011	.60[illegible]
.9930	.9331	.02184	.961	3.151	.574	.1205	.1579	[illegible]	.21339	.011109	.66[illegible]
.9920	.9321	.02365	.962	3.153	.621	.1250	.1643	[illegible]	.21512	.011199	.71[illegible]
.9910	.9311	.02545	.964	3.155	.668	.1294	.1705	[illegible]	.21672	.011282	.77[illegible]
.9900	.9301	.02726	.965	3.156	.714	.1335	.1764	[illegible]	.21821	.011359	.82[illegible]
.9880	.9281	.03084	.968	3.160	.807	.1412	.1877	[illegible]	.22091	.011499	.93[illegible]
.9860	.9261	.03441	.971	3.164	.898	.1484	.1982	[illegible]	.22330	.011623	1.04[illegible]
.9840	.9241	.03797	.975	3.168	.989	.1550	.2081	[illegible]	.22544	.011734	1.158
.9820	.9221	.04152	.978	3.172	1.078	.1612	.2176	[illegible]	.22739	.011836	1.266
.9800	.9201	.04505	.982	3.176	1.168	.1670	.2266	[illegible]	.22918	.011929	1.375
.9750	.9151	.05386	.991	3.187	1.388	.1801	.2474	[illegible]	.23310	.012133	1.657
.9700	.9101	.06263	.001	3.199	1.604	.1915	.2664	[illegible]	.23641	.012306	1.937
.9650	.9051	.07138	.011	3.211	1.818	.2016	.2840	[illegible]	.23928	.012457	2.219
.9600	.9001	.08009	.022	3.223	2.05[illegible]	.2106	.3003	[illegible]	.24182	.012591	2.503
.9550	.8951	.08879	.032	3.236	2.23[illegible]	.2187	.3156	[illegible]	.24410	.012711	2.789
.9500	.8901	.09746	.043	3.248	[illegible]	.2259	.3301	[illegible]	.24616	.012821	3.078
.9400	.8801	.11477	.066	3.275	[illegible]	.2382	.3568	[illegible]	.24978	.013014	3.66[illegible]
.9300	.8701	.13202	.089	3.302	[illegible]	.2482	.3812	[illegible]	.25290	.013181	4.256
.9200	.8601	.14923	.113	3.331	[illegible]	.2563	.4036	[illegible]	.25563	.013330	4.866
.9100	.8501	.16639	.138	3.360	[illegible]	.2627	.4243	[illegible]	.25807	.013463	5.48[illegible]
.9000	.8401	.18352	.163	3.389	[illegible]	.2677	.4437	[illegible]	.26027	.013584	6.117
.8800	.8201	.2177	.216	3.451	[illegible]	.2743	.4790	[illegible]	.26412	.013798	7.42[illegible]
.8600	.8001	.2517	.271	3.516	[illegible]	.2771	.5104	[illegible]	.26742	.013985	8.780
.8400	.7801	.2856	.329	3.585	[illegible]	.2768	.5387	[illegible]	.27031	.014152	10.199
.8200	.7601	.3194	.389	3.656	[illegible]	.2741	.5644	[illegible]	.27288	.014303	11.684
.8000	.7401	.3530	.452	3.731	[illegible]	.2693	.5878	[illegible]	.27521	.014442	13.239
.7800	.7201	.3866	.518	3.810	[illegible]	.2629	.6093	[illegible]	.27733	.014571	14.869
.7600	.7001	.4201	.586	3.894	[illegible]	.2552	.6290	[illegible]	.27928	.014692	16.582
.7400	.6801	.4534	.659	3.981	[illegible]	.2463	.6472	[illegible]	.28109	.014806	18.383
.7200	.6601	.4867	.734	4.07	[illegible]	.2365	.6640	[illegible]	.28278	.014915	20.280
.7000	.6401	.5199	.814	4.17	[illegible]	.2261	.6796	[illegible]	.28436	.015020	22.281
.6800	.6201	.5530	.897	4.27	[illegible]	.2151	.6940	[illegible]	.28586	.015121	24.396
.6600	.6001	.5860	.985	4.38	[illegible]	.2037	.7073	[illegible]	.28727	.015218	26.636
.6400	.5801	.6189	[illegible]	4.50	[illegible]	.1920	.7196	[illegible]	.28862	.015313	29.011
.6200	.5601	.6518	[illegible]	4.62	[illegible]	.1802	.7310	[illegible]	.28991	.015406	31.537
.6000	.5401	.6846	[illegible]	4.76	[illegible]	.1684	.7416	[illegible]	.29114	.015497	34.228
.5800	.5201	.7173	[illegible]	4.90	[illegible]	.1566	.7514	[illegible]	.29232	.015587	37.102
.5600	.5001	.7500	[illegible]	5.05	[illegible]	.1448	.7604	[illegible]	.29346	.015675	40.180
.5400	.4801	.7826	[illegible]	5.21	[illegible]	.1333	.7688	[illegible]	.29456	.015763	43.485
.5200	.4601	.8151	[illegible]	5.39	[illegible]	.1221	.7765	[illegible]	.29562	.015850	47.045
.5000	.4401	.8476	[illegible]	5.58	[illegible]	.1111	.7836	[illegible]	.29665	.015938	50.893
.4800	.4201	.8811	[illegible]	5.78	[illegible]	.1006	[illegible]	[illegible]	.29766	.016025	55.066
.4600	.4001	.9141	[illegible]	6.01	[illegible]	.0904	[illegible]	[illegible]	.29864	.016114	59.612
.4400	.3801	.9477	[illegible]	6.26	[illegible]	.0807	[illegible]	[illegible]	.29959	.016203	64.585
.4200	.3601	.9807	[illegible]	6.53	[illegible]	.0715	[illegible]	[illegible]	.30053	.016293	70.053
.4000	.3401	1.0140	[illegible]	6.84	[illegible]	.0628	[illegible]	[illegible]	.30145	.016385	76.097
.3800	.3201	1.0491	6.05	7.18	[illegible]	.0546	[illegible]	[illegible]	.30236	.016479	82.821
.3600	.3001	1.0842	[illegible]	7.56	[illegible]	.0471	[illegible]	[illegible]	.30325	.016576	90.354
.3400	.2801	1.1204	[illegible]	8.00	[illegible]	.0401	[illegible]	[illegible]	.30414	.016676	98.861
.3200	.2601	1.1579	[illegible]	8.50	[illegible]	.0336	[illegible]	[illegible]	.30501	.016780	108.553
.3000	.2401	1.1973	[illegible]	9.08	[illegible]	.0278	[illegible]	[illegible]	.30589	.016888	119.730
.2800	.2201	1.2391	[illegible]	9.77	[illegible]	.0226	[illegible]	[illegible]	.30676	.017003	132.761
.2600	.2001	1.2843	8.15	10.56	[illegible]	.0180	[illegible]	[illegible]	.30764	.017125	148.188
.2400	.1801	1.3345	8.70	11.58	[illegible]	.0140	[illegible]	[illegible]	.30853	.017257	166.813
.2200	.1611	1.3916	9.35	12.81	[illegible]	.0105	[illegible]	[illegible]	.30943	.017400	189.764
.2000	.1413	1.4591	10.12	14.39	[illegible]	.0076	[illegible]	[illegible]	.31036	.017559	218.87
.1800	.1217	1.5430	11.06	16.48	[illegible]	.0053	[illegible]	[illegible]	.31132	.017738	257.16
.1600	.1022	1.6535	12.23	19.37	[illegible]	.0034	[illegible]	[illegible]	.31233	.017946	310.03
.1400	.0829	1.8112	13.72	23.59	[illegible]	.0020	[illegible]	[illegible]	.31341	.018195	388.11
.1200	.0643	2.0618	15.65	30.23	[illegible]	.0011	[illegible]	[illegible]	.31462	.018510	515.44
.1000	.0468	2.5251	18.10	41.54	1.662	.0005	[illegible]	[illegible]	.31603	.018938	757.53
.0900	.0389	2.9366	19.39	50.19	[illegible]	.0003	[illegible]	331.7	.31687	.019223	978.85
.0800	.0316	3.6146	20.30	61.55	[illegible]	.0002	[illegible]	341.9	.31787	.019585	1355.48
.0750	.0280	4.1530	20.30	68.33	[illegible]	.0002	[illegible]	348.8	.31847	.019811	1661.20
.0700	.0242	4.9887	19.63	75.84	[illegible]	.0001	[illegible]	358.0	.31924	.020091	2138.0
.0680	.0226	5.4953	19.02	79.05	[illegible]	.0001	[illegible]	363.0	.31964	.020231	2424.4
.0660	.0207	6.2134	18.09	82.39	[illegible]	.0001	[illegible]	369.[illegible]	.32015	.020400	2824.3
.0640	.0183	7.4107	16.61	85.84	[illegible]	.0001	[illegible]	379.[illegible]	.32088	.020630	3473.7
.0620	.0147	10.5248	13.74	89.13	[illegible]	.0000	[illegible]	400.5	.32246	.021055	5092.6
.0610	.0110	17.3334	10.38	89.99	[illegible]	.0000	[illegible]	437.0	.32514	.021624	8524.6

TABLE III.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -4.0^{\circ}$, $e_i = 0.06976$

$\overline{V}$	$\overline{V}_r$	Z	γ deg	γ_A deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{\dot{\theta}}{V}$
1.0000	0.9400	0.0000010	4.000	4.255	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9407	.0000025	4.000	4.254	.0000	.0013	.0004	11.7	.01433	.001032	.000
1.0010	.9412	.0000061	3.998	4.253	.0002	.0021	.0012	23.5	.02871	.002007	.000
1.0015	.9416	.0000152	3.996	4.251	.0004	.0032	.0023	35.4	.04318	.003019	.000
1.0020	.9422	.0000381	3.993	4.247	.0010	.0052	.0041	47.4	.05786	.004044	.001
1.0025	.9426	.0000989	3.989	4.243	.0026	.0083	.0071	59.8	.07303	.005102	.003
1.0030	.9432	.0002825	3.984	4.237	.0079	.0141	.0126	73.5	.08975	.006267	.008
1.00341	.9435	.0012932	3.975	4.228	.0344	.0302	.0280	93.3	.11404	.007957	.039
1.0030	.9432	.003558	3.969	4.221	.0947	.0500	.0470	106.6	.13023	.009082	.106
1.0025	.9426	.005228	3.967	4.219	.1390	.0605	.0577	111.7	.13641	.009510	.156
1.0020	.9422	.006725	3.965	4.218	.1788	.0685	.0651	115.0	.14045	.009791	.201
1.0015	.9416	.008143	3.965	4.217	.216	.0753	.0717	117.5	.14353	.010004	.244
1.0010	.9412	.009515	3.964	4.217	.253	.0813	.0776	119.6	.14603	.010177	.285
1.0005	.9406	.010855	3.964	4.216	.288	.0867	.0829	121.3	.14815	.010324	.325
1.0000	.9402	.012172	3.964	4.216	.323	.0917	.0879	122.8	.15000	.010452	.365
.9990	.9392	.014757	3.963	4.216	.391	.1007	.0968	125.4	.15310	.010677	.443
.9980	.9382	.017297	3.964	4.217	.458	.1087	.1046	127.5	.15566	.010845	.520
.9970	.9372	.019804	3.964	4.218	.523	.1160	.1123	129.3	.15785	.010990	.597
.9960	.9362	.022289	3.964	4.218	.588	.1227	.1198	130.8	.15976	.011129	.671
.9950	.9352	.02475	3.965	4.219	.653	.1290	.1257	132.2	.16146	.011246	.746
.9940	.9342	.02720	3.966	4.220	.716	.1348	.1318	133.5	.16299	.011356	.821
.9930	.9332	.02964	3.967	4.221	.780	.1404	.1374	134.6	.16438	.011449	.895
.9920	.9322	.03206	3.967	4.222	.842	.1456	.1431	135.7	.16565	.011537	.970
.9910	.9312	.03448	3.968	4.224	.905	.1506	.1484	136.7	.16683	.011619	1.044
.9900	.9302	.03689	3.969	4.225	.967	.1553	.1535	137.6	.16793	.011695	1.118
.9880	.9282	.04168	3.971	4.228	1.090	.1642	.1631	139.2	.16992	.011844	1.266
.9860	.9262	.04645	3.973	4.231	1.212	.1724	.1722	140.7	.17169	.011980	1.413
.9840	.9242	.05121	3.976	4.234	1.333	.1800	.1808	142.0	.17328	.012107	1.563
.9820	.9222	.05594	3.978	4.237	1.453	.1872	.1889	143.2	.17472	.012217	1.709
.9800	.9202	.06066	3.980	4.240	1.572	.1938	.1967	144.3	.17605	.012319	1.857
.9750	.9152	.07240	3.987	4.245	1.866	.2088	.2146	146.8	.17895	.012461	2.228
.9700	.9102	.08407	3.993	4.257	2.15	.2220	.2310	148.8	.18141	.012633	2.600
.9650	.9052	.09568	4.000	4.265	2.44	.2335	.2467	150.7	.18355	.012783	2.974
.9600	.9002	.10724	4.008	4.275	2.72	.2438	.2603	152.3	.18545	.012915	3.351
.9550	.8952	.11875	4.015	4.284	2.99	.2529	.2734	153.7	.18715	.013034	3.730
.9500	.8902	.13021	4.023	4.294	3.26	.2611	.2860	155.0	.18869	.013142	4.112
.9400	.8802	.15301	4.038	4.313	3.78	.2751	.3098	157.4	.19140	.013333	4.883
.9300	.8702	.17566	4.055	4.334	4.29	.2864	.3302	159.4	.19373	.013499	5.666
.9200	.8602	.19815	4.071	4.355	4.78	.2954	.3497	161.3	.19579	.013645	6.462
.9100	.8502	.2205	4.089	4.377	5.25	.3025	.3677	162.9	.19762	.013775	7.269
.9000	.8402	.2427	4.106	4.399	5.71	.3080	.3846	164.4	.19928	.013894	8.090
.8800	.8202	.2867	4.143	4.446	6.58	.3149	.4152	167.1	.20220	.014104	9.774
.8600	.8002	.3302	4.182	4.496	7.37	.3174	.4427	169.5	.20470	.014287	11.518
.8400	.7802	.3731	4.223	4.548	8.11	.3165	.4674	171.6	.20691	.014449	13.325
.8200	.7602	.4155	4.266	4.602	8.78	.3127	.4899	173.5	.20888	.014595	15.200
.8000	.7402	.4573	4.311	4.660	9.39	.3066	.5104	175.3	.21066	.014729	17.148
.7800	.7202	.4985	4.359	4.721	9.95	.2986	.5293	177.0	.21230	.014853	19.175
.7600	.7002	.5393	4.409	4.786	10.44	.2892	.5467	178.7	.21382	.014969	21.286
.7400	.6802	.5794	4.461	4.854	10.87	.2785	.5628	180.2	.21523	.015079	23.489
.7200	.6602	.6190	4.516	4.926	11.24	.2668	.5777	181.7	.21655	.015183	25.791
.7000	.6402	.6580	4.575	5.00	11.56	.2544	.5915	183.1	.21780	.015282	28.200
.6800	.6202	.6964	4.637	5.08	11.82	.2414	.6043	184.5	.21898	.015377	30.724
.6600	.6002	.7343	4.702	5.17	12.02	.2281	.6163	185.9	.22011	.015469	33.375
.6400	.5802	.7715	4.772	5.26	12.18	.2145	.6273	187.3	.22118	.015558	36.164
.6200	.5602	.8081	4.845	5.36	12.27	.2008	.6374	188.6	.22222	.015645	39.104
.6000	.5402	.8442	4.924	5.47	12.32	.1870	.6469	190.0	.22321	.015730	42.210
.5800	.5203	.8796	5.01	5.58	12.31	.1734	.6558	191.3	.22417	.015813	45.499
.5600	.5003	.9145	5.10	5.71	12.26	.1600	.6639	192.6	.22510	.015895	48.991
.5400	.4803	.9488	5.19	5.84	12.16	.1468	.6715	194.0	.22600	.015977	52.708
.5200	.4603	.9824	5.30	5.99	12.01	.1340	.6785	195.3	.22688	.016057	56.679
.5000	.4403	1.0155	5.41	6.14	11.81	.1216	.6850	196.7	.22774	.016135	60.932
.4800	.4203	1.0481	5.53	6.31	11.57	.1097	.6910	198.1	.22858	.016218	65.506
.4600	.4003	1.0802	5.66	6.51	11.29	.0983	.6965	199.6	.22940	.016299	70.445
.4400	.3804	1.1117	5.81	6.72	10.97	.0875	.7015	201.1	.23022	.016380	75.801
.4200	.3604	1.1429	5.96	6.95	10.60	.0772	.7062	202.6	.23102	.016463	81.638
.4000	.3404	1.1738	6.14	7.20	10.20	.0676	.7104	204.2	.23181	.016547	88.035
.3800	.3204	1.2045	6.33	7.51	9.76	.0586	.7142	205.8	.23259	.016632	95.090
.3600	.3005	1.2351	6.54	7.85	9.29	.0502	.7176	207.6	.23337	.016720	102.985
.3400	.2805	1.2659	6.78	8.23	8.79	.0426	.7208	209.4	.23415	.016811	111.697
.3200	.2606	1.2973	7.05	8.68	8.26	.0356	.7235	211.4	.23493	.016906	121.622
.3000	.2406	1.3295	7.36	9.20	7.70	.0293	.7260	213.4	.23571	.017005	132.950
.2800	.2207	1.3633	7.72	9.81	7.11	.0237	.7282	215.7	.23650	.017109	146.068
.2600	.2008	1.3996	8.13	10.54	6.51	.0188	.7301	218.1	.23730	.017221	161.492
.2400	.1809	1.4397	8.62	11.47	5.89	.0145	.7317	220.8	.23812	.017341	179.963
.2200	.1611	1.4856	9.21	12.62	5.26	.0109	.7333	223.9	.23896	.017473	202.58
.2000	.1413	1.5408	9.92	14.11	4.61	.0078	.7343	227.3	.23983	.017619	231.12
.1800	.1216	1.6110	10.80	16.10	3.97	.0054	.7353	231.3	.24074	.017786	264.50
.1600	.1020	1.7065	11.92	18.89	3.33	.0035	.7360	236.1	.24171	.017981	319.96
.1400	.0828	1.8478	13.37	23.02	2.71	.0021	.7365	242.0	.24277	.018217	395.96
.1200	.0641	2.0811	15.31	29.61	2.14	.0011	.7370	249.8	.24396	.018521	520.27
.1000	.0466	2.5285	17.83	41.02	1.651	.0005	.7374	260.8	.24537	.018940	758.55
.0900	.0387	2.9346	19.19	49.81	1.468	.0003	.7375	268.4	.24621	.019222	978.21
.0800	.0315	3.6111	20.20	61.36	1.341	.0002	.7376	278.7	.24722	.019584	1354.15
.0750	.0280	4.1509	20.25	68.23	1.297	.0002	.7376	285.7	.24783	.019810	1660.08
.0700	.0242	4.9875	19.60	75.80	1.254	.0001	.7377	294.9	.24860	.020091	2137.5
.0680	.0226	5.4948	19.00	79.03	1.233	.0001	.7377	300.0	.24900	.020231	2424.2
.0660	.0207	6.2137	18.08	82.38	1.206	.0001	.7377	306.5	.24951	.020400	2824.4
.0640	.0183	7.4116	16.60	85.84	1.168	.0001	.7377	316.2	.25024	.020630	3474.2
.0620	.0147	10.5266	13.74	89.13	1.105	.0000	.7378	337.4	.25182	.021055	5093.6
.0610	.0110	17.3372	10.37	89.99	1.029	.0000	.7378	374.0	.25450	.021624	8526.6

TABLE III.- VALUES OF $\bar{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(f) $\gamma_i = -5.0^{\circ}$, $e_i = 0.08716$

$\bar{V}$	$\bar{V}_r$	$\bar{Z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{\gamma}_a}{\dot{\gamma}}$	$\bar{q}$	$\bar{\dot{q}}$	$\frac{t}{sec}$	$\frac{\Delta s}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{\bar{Z}}{\bar{V}}$
1.0000	0.940	0.0000010	5.000	5.319	[illegible]	0.0008	0	0	0	0	0.000
1.0005	.940	.0000025	4.999	5.318	[illegible]	.0013	.0004	[illegible]	.01145	.001002	.000
1.0010	.941	.0000061	4.999	5.317	[illegible]	.0021	.0009	[illegible]	.02294	.002006	.000
1.0015	.941	.0000151	4.997	5.315	[illegible]	.0032	.0018	[illegible]	.03448	.003016	.000
1.0020	.942	.0000379	4.995	5.312	[illegible]	.0052	.0033	[illegible]	.04616	.004037	.001
1.0025	.942	.0000974	4.992	5.309	[illegible]	.0083	.0057	[illegible]	.05815	.005084	.00
1.0030	.943	.0002682	4.988	5.304	[illegible]	.0137	.0098	[illegible]	.07103	.006209	.00
1.00353	.943	.0016181	4.979	5.295	[illegible]	.0338	.0251	[illegible]	.09393	.008206	.04
1.0030	.943	.005001	4.973	5.289	[illegible]	.0593	.0447	[illegible]	.10834	.009460	.15
1.0025	.942	.007018	4.971	5.287	[illegible]	.0701	.0531	[illegible]	.11267	.009837	.210
1.0020	.942	.008863	4.970	5.286	[illegible]	.0787	.0598	[illegible]	.11566	.010097	.26
1.0015	.941	.010623	4.970	5.286	[illegible]	.0860	.0655	[illegible]	.11798	.010299	.318
1.0010	.941	.012330	4.969	5.285	[illegible]	.0926	.0707	[illegible]	.11989	.010465	.370
1.0005	.940	.014000	4.969	5.285	[illegible]	.0985	.0753	[illegible]	.12152	.010607	.420
1.0000	.940	.015645	4.969	5.285	[illegible]	.1040	.0797	[illegible]	.12295	.010731	.469
.9990	.939	.018875	4.968	5.285	[illegible]	.1139	.0876	[illegible]	.12536	.010941	.567
.9980	.938	.02205	4.968	5.286	[illegible]	.1228	.0947	[illegible]	.12736	.011114	.663
.9970	.937	.02519	4.969	5.286	[illegible]	.1309	.1013	[illegible]	.12907	.011263	.758
.9960	.936	.02830	4.969	5.287	[illegible]	.1383	.1074	[illegible]	.13057	.011394	.852
.9950	.935	.03138	4.969	5.288	[illegible]	.1453	.1131	[illegible]	.13191	.011510	.946
.9940	.934	.03444	4.970	5.288	[illegible]	.1518	.1185	[illegible]	.13311	.011614	1.040
.9930	.933	.03749	4.970	5.289	[illegible]	.1579	.1237	[illegible]	.13421	.011710	1.133
.9920	.932	.04053	4.971	5.290	[illegible]	.1638	.1286	[illegible]	.13522	.011797	1.226
.9910	.931	.04355	4.971	5.291	[illegible]	.1693	.1333	[illegible]	.13615	.011879	1.318
.9900	.930	.04657	4.972	5.292	[illegible]	.1746	.1378	[illegible]	.13702	.011954	1.411
.9880	.928	.05256	4.973	5.294	[illegible]	.1845	.1464	[illegible]	.13859	.012091	1.596
.9860	.926	.05853	4.975	5.296	[illegible]	.1936	.1545	[illegible]	.13999	.012213	1.781
.9840	.924	.06447	4.976	5.299	[illegible]	.2021	.1621	[illegible]	.14125	.012322	1.966
.9820	.922	.07038	4.978	5.301	[illegible]	.2100	.1694	[illegible]	.14240	.012422	2.150
.9800	.920	.07629	4.979	5.304	[illegible]	.2174	.1763	[illegible]	.14345	.012514	2.335
.9750	.915	.09046	4.984	5.310	[illegible]	.2342	.1923	[illegible]	.14575	.012715	2.799
.9700	.910	.10563	4.989	5.317	[illegible]	.2488	.2069	[illegible]	.14771	.012886	3.264
.9650	.905	.12081	4.993	5.324	[illegible]	.2616	.2205	[illegible]	.14941	.013034	3.731
.9600	.900	.13445	4.999	5.331	[illegible]	.2730	.2331	[illegible]	.15092	.013166	4.201
.9550	.895	.14875	5.004	5.339	[illegible]	.2832	.2449	[illegible]	.15227	.013284	4.673
.9500	.890	.16337	5.009	5.346	[illegible]	.2923	.2561	[illegible]	.15350	.013392	5.148
.9400	.880	.19149	5.020	5.362	[illegible]	.3077	.2768	[illegible]	.15567	.013582	6.107
.9300	.870	.2190	5.032	5.379	[illegible]	.3202	.2956	[illegible]	.15753	.013746	7.079
.9200	.860	.2473	5.044	5.395	[illegible]	.3301	.3130	[illegible]	.15917	.013891	8.064
.9100	.850	.2749	5.057	5.413	[illegible]	.3379	.3292	[illegible]	.16064	.014021	9.061
.9000	.840	.3024	5.069	5.431	[illegible]	.3438	.3442	[illegible]	.16197	.014138	10.078
.8800	.820	.3564	5.096	5.468	[illegible]	.3512	.3718	[illegible]	.16431	.014346	12.151
.8600	.800	.4094	5.124	5.508	[illegible]	.3537	.3964	[illegible]	.16633	.014526	14.290
.8400	.780	.4612	5.154	5.550	[illegible]	.3523	.4186	[illegible]	.16810	.014686	16.498
.8200	.760	.5134	5.186	5.594	[illegible]	.3477	.4388	[illegible]	.16969	.014830	18.780
.8000	.740	.5635	5.219	5.641	[illegible]	.3405	.4573	[illegible]	.17114	.014962	21.141
.7800	.720	.6134	5.254	5.691	[illegible]	.3313	.4743	[illegible]	.17246	.015083	23.588
.7600	.700	.6624	5.290	5.743	[illegible]	.3206	.4900	[illegible]	.17370	.015197	26.125
.7400	.680	.7094	5.329	5.799	[illegible]	.3082	.5046	[illegible]	.17484	.015304	28.761
.7200	.660	.7560	5.370	5.858	[illegible]	.2950	.5180	[illegible]	.17592	.015405	31.502
.7000	.640	.8016	5.414	5.920	[illegible]	.2809	.5305	[illegible]	.17695	.015501	34.356
.6800	.620	.8462	5.460	5.987	[illegible]	.2662	.5421	[illegible]	.17792	.015594	37.334
.6600	.600	.8898	5.509	6.06	[illegible]	.2512	.5529	[illegible]	.17884	.015682	40.445
.6400	.580	.9325	5.561	6.14	[illegible]	.2359	.5629	[illegible]	.17973	.015768	43.701
.6200	.560	.9737	5.617	6.22	[illegible]	.2205	.5722	[illegible]	.18058	.015852	47.115
.6000	.540	1.0140	5.676	6.30	[illegible]	.2051	.5809	[illegible]	.18141	.015934	50.702
.5800	.520	1.0533	5.740	6.40	[illegible]	.1898	.5890	[illegible]	.18221	.016013	54.479
.5600	.500	1.0914	5.808	6.50	[illegible]	.1749	.5964	[illegible]	.18298	.016092	58.466
.5400	.480	1.1284	5.882	6.62	[illegible]	.1602	.6034	[illegible]	.18374	.016169	62.685
.5200	.460	1.1642	5.962	6.74	[illegible]	.1460	.6098	[illegible]	.18448	.016246	67.163
.5000	.440	1.1988	6.05	6.87	[illegible]	.1322	.6158	[illegible]	.18520	.016322	71.930
.4800	.420	1.2323	6.14	7.02	[illegible]	.1190	.6213	[illegible]	.18592	.016398	77.022
.4600	.400	1.2647	6.25	7.18	[illegible]	.1064	.6264	[illegible]	.18662	.016474	82.482
.4400	.380	1.2960	6.36	7.36	[illegible]	.0945	.6310	[illegible]	.18731	.016551	88.363
.4200	.360	1.3261	6.48	7.56	[illegible]	.0832	.6353	[illegible]	.18800	.016628	94.725
.4000	.340	1.3553	6.62	7.79	[illegible]	.0726	.6392	[illegible]	.18868	.016706	101.648
.3800	.320	1.3834	6.78	8.04	[illegible]	.0628	.6428	[illegible]	.18936	.016786	109.216
.3600	.300	1.4104	6.95	8.33	[illegible]	.0537	.6460	[illegible]	.19004	.016868	117.567
.3400	.280	1.4374	7.15	8.67	[illegible]	.0454	.6489	[illegible]	.19072	.016952	126.829
.3200	.260	1.4637	7.37	9.06	[illegible]	.0378	.6515	[illegible]	.19141	.017040	137.222
.3000	.240	1.4899	7.63	9.52	[illegible]	.0311	.6539	[illegible]	.19210	.017131	148.990
.2800	.220	1.5166	7.93	10.08	[illegible]	.0250	.6559	[illegible]	.19281	.017228	162.493
.2600	.200	1.5446	8.28	10.75	[illegible]	.0197	.6577	[illegible]	.19353	.017330	178.223
.2400	.180	1.5752	8.70	11.58	[illegible]	.0152	.6593	[illegible]	.19427	.017441	196.700
.2200	.161	1.6102	9.21	12.63	[illegible]	.0113	.6606	[illegible]	.19504	.017562	219.58
.2000	.141	1.6529	9.84	14.01	[illegible]	.0081	.6618	[illegible]	.19585	.017697	247.94
.1800	.121	1.7088	10.64	15.87	[illegible]	.0055	.6627	[illegible]	.19670	.017851	284.80
.1600	.102	1.7879	11.67	18.51	[illegible]	.0035	.6634	[illegible]	.19762	.018032	335.23
.1400	.082	1.9103	13.05	22.59	[illegible]	.0021	.6640	[illegible]	.19863	.018254	409.35
.1200	.063	2.1221	14.94	28.95	[illegible]	.0011	.6644	[illegible]	.19979	.018542	530.52
.1000	.046	2.5469	17.50	40.36	[illegible]	.0005	.6647	[illegible]	.20119	.018948	764.08
.0900	.038	2.9438	18.93	49.29	[illegible]	.0003	.6648	[illegible]	.20203	.019226	981.25
.0800	.031	3.6151	20.04	61.07	[illegible]	.0002	.6649	[illegible]	.20304	.019585	1355.66
.0750	.028	4.1538	20.15	68.05	[illegible]	.0002	.6650	[illegible]	.20366	.019811	1661.52
.0700	.024	4.9916	19.95	75.72	[illegible]	.0001	.6650	[illegible]	.20443	.020092	2139.4
.0680	.023	5.4996	19.77	78.98	[illegible]	.0001	.6650	[illegible]	.20483	.020232	2426.3
.0660	.020	6.2184	19.06	82.35	[illegible]	.0001	.6650	[illegible]	.20534	.020401	2826.8
.0640	.018	7.4168	16.59	85.82	[illegible]	.0001	.6651	[illegible]	.20607	.020631	3476.7
.0620	.017	10.5302	13.74	89.12	[illegible]	.0000	.6651	[illegible]	.20765	.021056	5095.3
.0610	.011	17.3384	10.37	89.99	[illegible]	.0000	.6652	[illegible]	.21033	.021624	8527.1

TABLE III.- VALUES OF $\bar{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(g) $\gamma_i = -6.0^{\circ}$, $e_i = 0.10453$

$\bar{V}$	$\bar{V}_r$	$\bar{z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{\eta}$	$\bar{q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\phi}{V}$
1.0000	0.9444	.0000010	6.000	6.382	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9442	.0000025	6.000	6.382	.0001	.0013	.0003	7.8	.00953	.001002	.000
1.0010	.9414	.0000061	5.999	6.381	.0001	.0021	.0008	15.7	.01909	.002006	.000
1.0015	.9418	.0000151	5.998	6.379	.0004	.0032	.0015	23.6	.02869	.003015	.000
1.0020	.9424	.0000378	5.996	6.377	.0010	.0051	.0027	31.5	.03838	.004033	.001
1.0025	.9428	.0000984	5.993	6.374	.0026	.0082	.0047	39.7	.04828	.005073	.003
1.0030	.9434	.0002598	5.990	6.370	.0069	.0135	.0080	48.3	.05878	.006174	.006
1.0035	.9438	.0008932	5.985	6.365	.0238	.0251	.0154	59.0	.07185	.007546	.027
1.00363	.9439[illegible]	.0019420	5.981	6.361	.0517	.0370	.0230	65.8	.08008	.008409	.058
1.0035	.9438	.003606	5.978	6.358	.0960	.0504	.0316	71.1	.08667	.009098	.108
1.0030	.9434	.006521	5.976	6.355	.1736	.0677	.0426	76.3	.09296	.009756	.196
1.0025	.9428	.008885	5.974	6.354	.236	.0789	.0499	79.0	.09625	.010106	.266
1.0020	.9414	.011075	5.974	6.353	.293	.0880	.0558	80.9	.09860	.010346	.332
1.0015	.9418	.013174	5.973	6.353	.346	.0958	.0609	82.4	.10044	.010539	.395
1.0010	.9414	.015214	5.973	6.353	.404	.1028	.0655	83.7	.10198	.010700	.456
1.0005	.9408	.017213	5.972	6.352	.457	.1092	.0697	84.7	.10330	.010838	.516
1.0000	.9404	.019182	5.972	6.352	.509	.1152	.0736	85.7	.10445	.010954	.576
.9990	.9344	.02305	5.972	6.352	.611	.1259	.0807	87.3	.10641	.011164	.692
.9980	.9384	.02686	5.972	6.353	.711	.1356	.0872	88.7	.10805	.011337	.807
.9970	.9374	.03063	5.972	6.353	.810	.1443	.0931	89.8	.10945	.011487	.920
.9960	.9364	.03435	5.972	6.354	.907	.1525	.0986	90.8	.11068	.011610	1.036
.9950	.9354	.03805	5.972	6.354	1.004	.1600	.1038	91.7	.11178	.011725	1.147
.9940	.9344	.04173	5.972	6.355	1.100	.1671	.1088	92.6	.11277	.011829	1.260
.9930	.9334	.04539	5.972	6.356	1.195	.1738	.1134	93.3	.11368	.011925	1.373
.9920	.9324	.04904	5.973	6.356	1.289	.1800	.1179	94.0	.11451	.012010	1.483
.9910	.9314	.05266	5.973	6.357	1.383	.1862	.1222	94.6	.11527	.012093	1.594
.9900	.9304	.05628	5.973	6.358	1.476	.1920	.1263	95.2	.11599	.012164	1.706
.9880	.9284	.06348	5.974	6.360	1.661	.2028	.1341	96.3	.11729	.012300	1.928
.9860	.9264	.07064	5.975	6.361	1.844	.2128	.1415	97.3	.11845	.012423	2.149
.9840	.9244	.07777	5.976	6.363	2.03	.2220	.1484	98.1	.11949	.012530	2.372
.9820	.9224	.08487	5.977	6.365	2.21	.2307	.1550	98.9	.12044	.012631	2.593
.9800	.9204	.09194	5.978	6.367	2.38	.2388	.1613	99.7	.12131	.012727	2.814
.9750	.9154	.10953	5.981	6.373	2.82	.2571	.1759	101.3	.12322	.012928	3.370
.9700	.9104	.12700	5.985	6.378	3.26	.2730	.1892	102.6	.12484	.013093	3.928
.9650	.9054	.14435	5.988	6.384	3.68	.2870	.2016	103.8	.12626	.013241	4.488
.9600	.9004	.16161	5.992	6.390	4.09	.2994	.2131	104.9	.12751	.013370	5.050
.9550	.8954	.17877	5.995	6.397	4.50	.3106	.2238	105.9	.12863	.013490	5.616
.9500	.8904	.19584	5.999	6.403	4.90	.3205	.2340	106.8	.12965	.013597	6.185
.9400	.8804	.2297	6.007	6.416	5.68	.3373	.2529	108.3	.13145	.013784	7.330
.9300	.8704	.2633	6.016	6.430	6.43	.3508	.2702	109.7	.13300	.013950	8.493
.9200	.8604	.2965	6.024	6.444	7.16	.3616	.2860	110.9	.13437	.014094	9.670
.9100	.8504	.3295	6.033	6.458	7.85	.3700	.3008	112.0	.13559	.014223	10.862
.9000	.8404	.3621	6.042	6.473	8.52	.3764	.3146	113.0	.13670	.014340	12.070
.8800	.8204	.4264	6.062	6.504	9.78	.3843	.3397	114.8	.13865	.014547	14.537
.8600	.8004	.4895	6.082	6.537	10.94	.3868	.3622	116.4	.14033	.014725	17.076
.8400	.7804	.5513	6.104	6.572	11.99	.3850	.3826	117.8	.14181	.014884	19.692
.8200	.7604	.6119	6.127	6.609	12.94	.3798	.4011	119.2	.14314	.015026	22.388
.8000	.7404	.6713	6.151	6.649	13.80	.3718	.4180	120.4	.14435	.015157	25.173
.7800	.7204	.7293	6.177	6.690	14.56	.3615	.4336	121.5	.14547	.015277	28.050
.7600	.7004	.7860	6.204	6.734	15.22	.3494	.4480	122.6	.14650	.015389	31.027
.7400	.6804	.8414	6.232	6.781	15.79	.3358	.4614	123.7	.14747	.015494	34.111
.7200	.6604	.8954	6.263	6.830	16.27	.3212	.4737	124.7	.14838	.015594	37.303
.7000	.6404	.9480	6.295	6.883	16.66	.3056	.4852	125.7	.14924	.015689	40.630
.6800	.6204	.9992	6.329	6.940	16.97	.2895	.4959	126.7	.15006	.015779	44.093
.6600	.6004	1.0490	6.365	7.00	17.19	.2729	.5058	127.7	.15084	.015866	47.680
.6400	.5804	1.0972	6.404	7.06	17.33	.2560	.5150	128.6	.15159	.015951	51.438
.6200	.5604	1.1440	6.446	7.14	17.38	.2391	.5236	129.6	.15232	.016032	55.353
.6000	.5404	1.1892	6.490	7.21	17.37	.2222	.5316	130.5	.15302	.016112	59.459
.5800	.5204	1.2328	6.538	7.29	17.27	.2055	.5391	131.5	.15370	.016189	63.765
.5600	.5004	1.2748	6.590	7.38	17.10	.1891	.5460	132.4	.15436	.016266	68.243
.5400	.4804	1.3152	6.646	7.47	16.87	.1731	.5524	133.4	.15501	.016341	73.005
.5200	.4604	1.3539	6.707	7.58	16.56	.1575	.5584	134.4	.15564	.016415	78.108
.5000	.4404	1.3909	6.773	7.69	16.19	.1425	.5639	135.4	.15626	.016488	83.466
.4800	.4204	1.4261	6.845	7.82	15.76	.1282	.5690	136.4	.15688	.016562	89.134
.4600	.4004	1.4597	6.924	7.96	15.27	.1144	.5738	137.5	.15748	.016635	95.106
.4400	.3804	1.4914	7.01	8.12	14.72	.1014	.5781	138.6	.15808	.016708	101.688
.4200	.3604	1.5215	7.11	8.29	14.13	.0892	.5821	139.7	.15868	.016784	108.679
.4000	.3404	1.5498	7.22	8.49	13.48	.0778	.5858	140.9	.15927	.016856	116.235
.3800	.3204	1.5764	7.34	8.71	12.79	.0671	.5891	142.2	.15987	.016932	124.403
.3600	.3004	1.6013	7.48	8.96	12.06	.0573	.5921	143.5	.16046	.017010	133.440
.3400	.2804	1.6248	7.63	9.26	11.29	.0483	.5948	144.9	.16106	.017090	143.369
.3200	.2604	1.6469	7.81	9.61	10.49	.0402	.5973	146.4	.16167	.017172	154.397
.3000	.2404	1.6681	8.02	10.02	9.67	.0329	.5995	148.1	.16229	.017258	166.810
.2800	.2204	1.6887	8.27	10.51	8.82	.0264	.6015	149.9	.16292	.017348	180.932
.2600	.2004	1.7094	8.56	11.11	7.96	.0208	.6032	151.9	.16357	.017444	197.238
.2400	.1804	1.7313	8.92	11.86	7.09	.0159	.6046	154.1	.16424	.017547	216.41
.2200	.1604	1.7563	9.35	12.88	6.22	.0118	.6059	156.6	.16494	.017660	239.44
.2000	.1404	1.7872	9.90	14.09	5.35	.0084	.6070	159.5	.16568	.017785	268.08
.1800	.1204	1.8292	10.60	15.81	4.50	.0057	.6079	163.0	.16647	.017928	304.86
.1600	.1004	1.8918	11.53	18.29	3.68	.0036	.6086	167.2	.16733	.018096	354.72
.1400	.0804	1.9947	12.81	22.07	2.91	.0021	.6092	172.6	.16830	.018303	427.43
.1200	.0604	2.1829	14.60	28.33	2.22	.0011	.6096	179.9	.16941	.018575	545.74
.1000	.0404	2.5808	17.14	39.66	1.652	.0005	.6099	190.5	.17078	.018963	774.24
.0900	.0304	2.9649	18.63	48.68	1.449	.0003	.6100	198.1	.17162	.019235	988.31
.0800	.0204	3.6277	19.84	60.69	1.320	.0002	.6101	208.5	.17263	.019590	1360.39
.0750	.0154	4.1645	20.01	67.81	1.280	.0002	.6101	215.5	.17325	.019815	1665.80
.0700	.0104	5.0022	19.48	75.60	1.245	.0001	.6102	224.8	.17403	.020095	2143.8
.0680	.0084	5.5102	18.92	78.90	1.227	.0001	.6102	229.9	.17443	.020235	2431.0
.0660	.0064	6.2295	18.03	82.31	1.203	.0001	.6102	236.4	.17494	.020404	2811.6
.0640	.0184	7.4270	16.58	85.80	1.167	.0001	.6102	246.1	.17567	.020634	3481.4
.0620	.0147	10.5369	13.73	89.12	1.105	.0000	.6103	267.3	.17724	.021058	5098.5
.0610	.0110	17.3406	10.37	89.99	1.029	.0000	.6103	303.8	.17992	.021626	8528.2

TABLE III.- VALUES OF $\frac{Z}{\overline{V}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(h) $\gamma_i = -8.0^{\circ}$, $e_i = 0.13917$

$\overline{V}$	$\overline{V}_a$	$\overline{z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{Q}$	$\frac{\lambda}{\beta r}$	$\frac{\Delta\gamma}{r}$	$\frac{-\Delta\lambda}{r}$	$\sqrt{\beta r}\,\frac{\overline{q}}{\overline{V}}$
1.0000	0.9407	0.0000010	8.000	8.509	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9411	.0000025	8.000	8.508	.0000	.0013	.0002	[illegible]	.00713	.001081	.000
1.0010	.9414	.0000061	7.999	8.507	.0001	.0021	.0006	11.5	.01427	.002005	.000
1.0015	.9421	.0000151	7.998	8.506	.0004	.0032	.0012	17.7	.02144	.003013	.000
1.0020	.9425	.0000376	7.997	8.504	.0010	.0051	.0020	23.7	.02866	.004028	.001
1.0025	.9431	.0000952	7.995	8.502	.0025	.0082	.0035	29.7	.03600	.005059	.00[illegible]
1.0030	.943[illegible]	.0002505	7.992	8.499	.0067	.0133	.0059	36.6	.04366	.006134	.00[illegible]
1.0035	.9441	.0007557	7.989	8.495	.0201	.0231	.0105	44.3	.05239	.007360	.00[illegible]
1.00379	.9444[illegible]	.002586	7.985	8.490	.0689	.0428	.0200	51.2	.06213	.008727	.07[illegible]
1.0035	.9443	.006196	7.982	8.487	.1651	.0661	.0312	57.0	.06905	.009698	.18[illegible]
1.0030	.9439	.009710	7.980	8.486	.259	.0827	.0392	[illegible]	.07262	.010198	.29[illegible]
1.0025	.9431	.012768	7.979	8.485	.340	.0947	.0450	[illegible]	.07479	.010502	.38[illegible]
1.0020	.9424	.015642	7.978	8.484	.416	.1046	.0498	[illegible]	.07641	.010729	.4[illegible]
1.0015	.9421	.018411	7.977	8.484	.490	.1134	.0541	[illegible]	.07770	.010910	.55[illegible]
1.0010	.9411	.02111	7.977	8.484	.561	.1212	.0580	[illegible]	.07879	.011065	.63[illegible]
1.0005	.9411	.02376	7.977	8.484	.631	.1289	.0615	65.5	.07974	.011195	.71[illegible]
1.0000	.9406	.02638	7.976	8.484	.700	.1352	.0649	[illegible]	.08057	.011311	.79[illegible]
.9990	.9395	.03152	7.976	8.484	.836	.1474	.0709	[illegible]	.08199	.011510	.94[illegible]
.9980	.9385	.03659	7.976	8.484	.969	.1583	.0764	68.0	.08318	.011677	1.100
.9970	.9371	.04160	7.975	8.484	1.100	.1684	.0815	[illegible]	.08420	.011821	1.252
.9960	.9369	.04656	7.975	8.484	1.230	.1776	.0863	[illegible]	.08511	.011947	1.40[illegible]
.9950	.9359	.05149	7.975	8.485	1.359	.1863	.0907	70.3	.08591	.012066	1.55[illegible]
.9940	.9349	.05638	7.975	8.485	1.487	.1944	.0950	71.3	.08664	.012168	1.70[illegible]
.9930	.9339	.06126	7.975	8.486	1.613	.2021	.0990	[illegible]	.08731	.012255	1.85[illegible]
.9920	.9329	.06611	7.975	8.486	1.739	.2094	.1028	[illegible]	.08792	.012341	1.99[illegible]
.9910	.9319	.07094	7.975	8.487	1.864	.2163	.1065	[illegible]	.08849	.012421	2.14[illegible]
.9900	.9309	.07576	7.975	8.487	1.988	.2230	.1101	[illegible]	.08901	.012495	2.29[illegible]
.9880	.9289	.08534	7.975	8.489	2.23	.2354	.1168	[illegible]	.08998	.012629	2.59[illegible]
.9860	.9269	.09488	7.975	8.490	2.48	.2468	.1232	[illegible]	.09083	.012749	2.88[illegible]
.9840	.9249	.10437	7.976	8.491	2.72	.2574	.1292	[illegible]	.09160	.012858	3.18[illegible]
.9820	.9229	.11382	7.976	8.493	2.96	.2674	.1348	[illegible]	.09231	.012959	3.47[illegible]
.9800	.9209	.12324	7.976	8.494	3.20	.2767	.1403	[illegible]	.09295	.013047	3.77[illegible]
.9750	.9159	.14665	7.977	8.498	3.78	.2977	.1529	[illegible]	.09437	.013246	4.51[illegible]
.9700	.9109	.16988	7.979	8.503	4.36	.3160	.1644	[illegible]	.09558	.013415	5.25[illegible]
.9650	.9059	.19296	7.980	8.507	4.92	.3321	.1751	[illegible]	.09663	.013562	5.99[illegible]
.9600	.9009	.21591	7.981	8.511	5.47	.3464	.1850	[illegible]	.09756	.013693	6.74[illegible]
.9550	.8959	.23871	7.983	8.516	6.01	.3592	.1944	[illegible]	.09840	.013810	7.49[illegible]
.9500	.8909	.2614	7.985	8.521	6.55	.3706	.2032	[illegible]	.09916	.013917	8.25[illegible]
.9400	.8809	.3064	7.988	8.530	7.58	.3899	.2196	[illegible]	.10050	.014105	9.77[illegible]
.9300	.8709	.3509	7.992	8.541	8.58	.4053	.2345	84.3	.10166	.014267	11.31[illegible]
.9200	.8609	.3943	7.995	8.551	9.54	.4176	.2482	[illegible]	.10268	.014411	12.87[illegible]
.9100	.8509	.4385	7.999	8.562	10.49	.4272	.2610	[illegible]	.10359	.014539	14.45[illegible]
.9000	.8409	.4816	8.004	8.573	11.34	.4345	.2730	[illegible]	.10442	.014656	16.05[illegible]
.8800	.8209	.5664	8.012	8.596	13.00	.4434	.2948	88.1	.10588	.014861	19.31[illegible]
.8600	.8009	.6494	8.022	8.621	14.52	.4460	.3143	[illegible]	.10714	.015039	22.65[illegible]
.8400	.7809	.7306	8.032	8.647	15.90	.4436	.3320	[illegible]	.10826	.015198	26.05[illegible]
.8200	.7609	.8099	8.043	8.675	17.14	.4374	.3481	[illegible]	.10926	.015337	29.65[illegible]
.8000	.7409	.8873	8.054	8.705	18.25	.4279	.3628	[illegible]	.11017	.015466	33.27[illegible]
.7800	.7209	.9627	8.066	8.736	19.23	.4158	.3764	[illegible]	.11101	.015584	37.06[illegible]
.7600	.7009	1.0362	8.079	8.769	20.08	.4016	.3890	[illegible]	.11179	.015695	40.90[illegible]
.7400	.6809	1.1076	8.093	8.804	20.80	.3858	.4006	[illegible]	.11252	.015796	44.90[illegible]
.7200	.6609	1.1770	8.108	8.842	21.40	.3687	.4114	[illegible]	.11320	.015897	49.04[illegible]
.7000	.6409	1.2442	8.123	8.882	21.89	.3506	.4214	[illegible]	.11386	.015990	53.32[illegible]
.6800	.6209	1.3093	8.140	8.924	22.25	.3318	.4307	[illegible]	.11448	.016079	57.76[illegible]
.6600	.6009	1.3722	8.158	8.970	22.50	.3125	.4394	[illegible]	.11507	.016164	62.37[illegible]
.6400	.5809	1.4328	8.177	9.02	22.65	.2930	.4475	[illegible]	.11565	.016244	67.16[illegible]
.6200	.5609	1.4910	8.198	9.07	22.68	.2733	.4550	[illegible]	.11620	.016320	72.14[illegible]
.6000	.5409	1.5469	8.220	9.13	22.61	.2538	.4620	[illegible]	.11674	.016403	77.34[illegible]
.5800	.5209	1.6003	8.245	9.19	22.44	.2345	.4686	[illegible]	.11726	.016478	82.77[illegible]
.5600	.5009	1.6512	8.271	9.26	22.18	.2155	.4746	[illegible]	.11776	.016552	88.45[illegible]
.5400	.4809	1.6995	8.300	9.33	21.82	.1971	.4803	[illegible]	.11826	.016624	94.41[illegible]
.5200	.4609	1.7451	8.332	9.41	21.37	.1792	.4855	[illegible]	.11875	.016696	100.67[illegible]
.5000	.4409	1.7881	8.366	9.50	20.84	.1619	.4904	[illegible]	.11923	.016766	107.28[illegible]
.4800	.4209	1.8282	8.405	9.60	20.23	.1454	.4949	[illegible]	.11971	.016836	114.26[illegible]
.4600	.4009	1.8655	8.447	9.71	19.54	.1296	.4991	[illegible]	.12018	.016906	121.66[illegible]
.4400	.3809	1.8999	8.495	9.83	18.78	.1147	.5030	[illegible]	.12065	.016978	129.53[illegible]
.4200	.3609	1.9312	8.548	9.96	17.96	.1007	.5065	[illegible]	.12111	.017046	137.94[illegible]
.4000	.3409	1.9595	8.609	10.12	17.07	.0876	.5097	[illegible]	.12158	.017118	146.97[illegible]
.3800	.3209	1.9848	8.678	10.30	16.13	.0755	.5127	[illegible]	.12205	.017187	156.69[illegible]
.3600	.3009	2.0070	8.757	10.50	15.14	.0643	.5154	[illegible]	.12252	.017260	167.25[illegible]
.3400	.2809	2.0261	8.849	10.73	14.10	.0541	.5179	[illegible]	.12300	.017334	178.77[illegible]
.3200	.2609	2.0421	8.956	11.01	13.03	.0449	.5201	[illegible]	.12348	.017410	191.44[illegible]
.3000	.2409	2.0553	9.08	11.34	11.93	.0366	.5220	[illegible]	.12398	.017489	205.53
.2800	.2210	2.0659	9.24	11.74	10.81	.0293	.5238	[illegible]	.12449	.017573	221.35
.2600	.2010	2.0744	9.42	12.22	9.68	.0230	.5254	[illegible]	.12502	.017658	239.36
.2400	.1811	2.0816	9.66	12.84	8.54	.0175	.5267	[illegible]	.12557	.017753	260.20
.2200	.1612	2.0869	9.95	13.64	7.41	.0129	.5279	[illegible]	.12616	.017859	284.85
.2000	.1414	2.0987	10.33	14.70	6.28	.0092	.5288	[illegible]	.12678	.017983	314.81
.1800	.1216	2.1155	10.84	16.17	5.21	.0062	.5297	26.3	.12745	.018088	352.58
.1600	.1019	2.1476	11.55	18.31	4.18	.0039	.5303	[illegible]	.12820	.018238	402.68
.1400	.0825	2.2128	12.56	21.67	3.23	.0022	.5308	134.7	.12905	.018418	474.18
.1200	.0635	2.3535	14.10	27.40	2.37	.0011	.5312	141.3	.13006	.018667	588.37
.1000	.0457	2.6910	16.46	38.28	1.689	.0005	.5315	151.9	.13135	.019004	807.30
.0900	.0373	3.0425	17.98	47.34	1.448	.0003	.5316	158.7	.13217	.019262	1014.17
.0800	.0307	3.6787	19.37	59.75	1.301	.0002	.5317	[illegible]	.13318	.019604	1379.51
.0750	.0274	4.2075	20.67	67.18	1.253	.0002	.5318	[illegible]	.13380	.019829	1683.00
.0700	.0239	5.0410	22.28	75.28	1.234	.0001	.5318	[illegible]	.13458	.020103	2160.5
.0680	.0223	5.5480	23.77	78.68	1.219	.0001	.5318	190.4	.13498	.020241	2447.6
.0660	.0205	6.2661	25.93	82.17	1.198	.0001	.5318	[illegible]	.13549	.020410	2848.3
.0640	.0182	7.4609	28.52	85.73	1.164	.0001	.5319	[illegible]	.13622	.020638	3497.3
.0620	.0147	10.5587	31.72	89.10	1.105	.0000	.5319	[illegible]	.13779	.021099	5139.1
.0610	.0110	17.3449	35.37	89.99	1.029	.0000	.5320	[illegible]	.14046	.021625	8530.3

TABLE III.- VALUES OF $\overline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(i) $\gamma_i = -10.0^\circ$, $e_i = 0.17365$

$\overline{V}$	$\overline{V}_a$	Z	γ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{\eta}$	$\overline{q}$	t sec	$\frac{\Delta\gamma}{\gamma}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\overline{q}}{\overline{\eta}}$
1.0000	0.9410	0.0000010	10.000	10.634	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9415	.0000025	10.000	10.634	.0000	.0013	.0002	4.7	.00568	.001001	.000
1.0010	.9420	.0000061	9.999	10.633	.0001	.0021	.0005	9.4	.01137	.002005	.000
1.0015	.9425	.0000151	9.999	10.633	.0004	.0032	.0009	14.2	.01708	.003012	.000
1.0020	.9430	.0000375	9.997	10.630	.0010	.0051	.0016	18.9	.02283	.004024	.001
1.0025	.9435	.0000945	9.996	10.628	.0025	.0082	.0028	23.8	.02865	.005061	.003
1.0030	.9440	.0002454	9.994	10.626	.0065	.0132	.0047	28.8	.03466	.006111	.007
1.0035	.9445	.0007015	9.991	10.623	.0187	.0223	.0082	34.2	.04128	.007277	.021
1.00391	.94487	.003285	9.987	10.619	.0860	.0478	.0180	42.2	.05090	.008977	.096
1.0035	.9445	.008894	9.984	10.615	.237	.0793	.0300	47.5	.05731	.010099	.266
1.0030	.9440	.013069	9.982	10.614	.348	.0960	.0365	49.5	.05975	.010535	.392
1.0025	.9435	.016814	9.981	10.613	.448	.1088	.0415	50.8	.06134	.010808	.503
1.0020	.9430	.02036	9.981	10.613	.542	.1195	.0457	51.8	.06255	.011020	.610
1.0015	.9425	.02379	9.980	10.613	.633	.1290	.0494	52.6	.06359	.011204	.715
1.0010	.9420	.02715	9.980	10.613	.722	.1376	.0528	53.3	.06437	.011342	.814
1.0005	.9415	.03044	9.979	10.613	.809	.1456	.0559	53.9	.06510	.011478	.913
1.0000	.9410	.03370	9.979	10.613	.895	.1529	.0588	54.5	.06575	.011583	1.011
.9990	.9400	.04010	9.978	10.612	1.064	.1664	.0642	55.4	.06685	.011785	1.204
.9980	.9390	.04641	9.978	10.612	1.230	.1785	.0691	56.2	.06778	.011941	1.395
.9970	.9380	.05265	9.977	10.612	1.394	.1896	.0736	56.8	.06858	.012083	1.584
.9960	.9370	.05884	9.977	10.613	1.556	.1999	.0778	57.4	.06929	.012207	1.770
.9950	.9360	.06498	9.977	10.613	1.716	.2095	.0818	58.0	.06993	.012319	1.953
.9940	.9350	.07109	9.976	10.613	1.876	.2186	.0856	58.4	.07050	.012420	2.134
.9930	.9340	.07717	9.976	10.614	2.04	.2271	.0891	58.9	.07102	.012520	2.311
.9920	.9330	.08322	9.976	10.614	2.19	.2352	.0926	59.3	.07151	.012617	2.487
.9910	.9320	.08924	9.975	10.614	2.35	.2429	.0958	59.7	.07195	.012706	2.660
.9900	.9310	.09525	9.975	10.615	2.50	.2502	.0990	60.0	.07237	.012795	2.832
.9880	.9290	.10721	9.975	10.616	2.81	.2641	.1050	60.6	.07313	.012955	3.175
.9860	.9270	.11910	9.975	10.617	3.11	.2768	.1107	61.2	.07381	.013098	3.514
.9840	.9250	.13094	9.974	10.618	3.42	.2887	.1160	61.7	.07442	.013238	3.850
.9820	.9230	.14272	9.974	10.619	3.71	.2997	.1211	62.2	.07498	.013368	4.182
.9800	.9210	.15447	9.974	10.620	4.01	.3101	.1260	62.6	.07549	.013488	4.512
.9750	.9160	.18365	9.974	10.624	4.74	.3335	.1373	63.6	.07662	.013768	5.333
.9700	.9110	.21261	9.973	10.628	5.46	.3539	.1476	64.4	.07757	.013994	6.136
.9650	.9060	.24114	9.973	10.633	6.16	.3719	.1571	65.1	.07841	.014212	7.924
.9600	.9010	.27000	9.973	10.639	6.85	.3878	.1660	65.8	.07915	.014392	8.699
.9550	.8960	.29841	9.973	10.637	7.52	.4020	.1744	66.3	.07981	.014568	9.373
.9500	.8910	.32666	9.973	10.641	8.19	.4147	.1823	66.9	.08042	.014714	10.315
.9400	.8810	.38266	9.973	10.649	9.48	.4362	.1969	67.8	.08149	.014952	12.212
.9300	.8710	.43800	9.973	10.657	10.72	.4534	.2108	68.6	.08241	.014524	14.110
.9200	.8610	.49288	9.974	10.666	11.91	.4671	.2226	69.4	.08322	.014457	16.000
.9100	.8510	.54770	9.974	10.674	13.06	.4778	.2340	70.0	.08395	.014786	18.032
.9000	.8410	.60005	9.975	10.683	14.16	.4858	.2447	70.6	.08461	.014901	20.024
.8800	.8210	.7059	9.976	10.701	16.22	.4956	.2643	71.7	.08577	.015[illegible]	24.066
.8600	.8010	.8089	9.977	10.721	18.10	.4984	.2818	72.7	.08678	.015[illegible]	28.217
.8400	.7810	.9094	9.979	10.743	19.81	.4956	.2976	73.5	.08767	.015[illegible]	32.480
.8200	.7610	1.0075	9.981	10.766	21.35	.4885	.3121	74.3	.08847	.015[illegible]	36.[illegible]
.8000	.7410	1.1031	9.983	10.789	22.71	.4777	.3253	75.1	.08919	.015708	41.[illegible]
.7800	.7210	1.1961	9.985	10.812	23.91	.4641	.3375	75.8	.08986	.015[illegible]	46.000
.7600	.7010	1.2865	9.988	10.839	24.95	.4482	.3488	76.5	.09049	.015[illegible]	50.785
.7400	.6810	1.3743	9.991	10.867	25.84	.4304	.3592	77.1	.09107	.016038	55.[illegible]
.7200	.6610	1.4593	9.994	10.897	26.57	.4112	.3689	77.7	.09162	.016135	60.[illegible]
.7000	.6410	1.5415	9.998	10.929	27.14	.3908	.3779	78.3	.09215	.016218	66.0[illegible]
.6800	.6210	1.6209	10.002	10.963	27.58	.3697	.3862	78.9	.09265	.016310	71.510
.6600	.6010	1.6973	10.006	11.00	27.87	.3481	.3940	79.5	.09312	.016400	77.150
.6400	.5810	1.7707	10.011	11.04	28.02	.3262	.4013	80.1	.09358	.016481	83.002
.6200	.5610	1.8410	10.016	11.08	28.04	.3043	.4081	80.7	.09403	.016560	89.001
.6000	.5410	1.9081	10.022	11.13	27.93	.2824	.4144	81.3	.09446	.016638	95.407
.5800	.5210	1.9720	10.029	11.18	27.69	.2608	.4203	81.9	.09488	.016710	102.000
.5600	.5010	2.0325	10.036	11.23	27.33	.2396	.4258	82.5	.09529	.016783	108.884
.5400	.4810	2.0895	10.045	11.29	26.86	.2190	.4309	83.1	.09569	.016854	116.083
.5200	.4610	2.1429	10.054	11.36	26.28	.1989	.4356	83.7	.09609	.016924	123.629
.5000	.4410	2.1927	10.065	11.43	25.59	.1797	.4400	84.4	.09648	.016993	131.562
.4800	.4211	2.2387	10.078	11.51	24.81	.1612	.4441	85.0	.09686	.017062	139.919
.4600	.4011	2.2808	10.092	11.59	23.93	.1436	.4479	85.7	.09724	.017129	148.748
.4400	.3811	2.3189	10.109	11.69	22.96	.1270	.4514	86.4	.09762	.017197	158.107
.4200	.3611	2.3528	10.129	11.80	21.91	.1114	.4546	87.1	.09801	.017265	168.057
.4000	.3411	2.3825	10.152	11.93	20.79	.0969	.4575	87.9	.09839	.017333	178.688
.3800	.3211	2.4078	10.180	12.07	19.60	.0834	.4602	88.7	.09877	.017402	190.089
.3600	.3011	2.4287	10.213	12.24	18.35	.0709	.4627	89.6	.09916	.017472	202.39[illegible]
.3400	.2812	2.4450	10.253	12.43	17.05	.0596	.4649	90.5	.09955	.017543	215.73[illegible]
.3200	.2612	2.4567	10.303	12.66	15.71	.0494	.4669	91.5	.09995	.017615	230.[illegible]
.3000	.2412	2.4639	10.364	12.93	14.34	.0402	.4687	92.6	.10036	.017690	246.[illegible]
.2800	.2213	2.4666	10.441	13.26	12.94	.0322	.4704	93.8	.10079	.017768	264.27
.2600	.2013	2.4651	10.540	13.66	11.53	.0251	.4718	95.2	.10123	.017850	284.43
.2400	.1814	2.4600	10.669	14.18	10.12	.0191	.4730	96.7	.10169	.017940	307.50
.2200	.1615	2.4523	10.840	14.85	8.72	.0140	.4741	98.5	.10218	.018040	334.42
.2000	.1416	2.4440	11.08	15.74	7.35	.0099	.4750	100.6	.10271	.018152	366.60
.1800	.1218	2.4388	11.41	17.00	6.03	.0066	.4758	103.2	.10329	.018280	406.47
.1600	.1020	2.4440	11.89	18.85	4.77	.0042	.4764	106.3	.10393	.018430	458.25
.1400	.0825	2.4754	12.64	21.80	3.61	.0024	.4769	110.5	.10468	.018626	530.44
.1200	.0634	2.5717	13.85	26.95	2.58	.0012	.4772	116.4	.10559	.018874	642.92
.1000	.0454	2.8481	15.91	37.15	1.760	.0005	.4775	125.7	.10678	.019272	854.44
.0900	.0373	3.1621	17.36	46.04	1.467	.0003	.4776	132.7	.10756	.019305	1054.04
.0800	.0302	3.7622	18.85	58.70	1.290	.0002	.4777	142.8	.10855	.019629	1410.84
.0750	.0270	4.2774	19.27	66.43	1.248	.0002	.4777	149.7	.10917	.019843	1710.94
.0700	.0236	5.1018	19.02	74.85	1.222	.0001	.4778	159.0	.10995	.020146	2186.5
.0680	.0221	5.6060	18.58	78.38	1.210	.0001	.4778	164.1	.11035	.020293	2473.2
.0660	.0204	6.3212	17.79	81.98	1.192	.0001	.4778	170.6	.11086	.020419	2873.3
.0640	.0182	7.5109	16.44	85.63	1.162	.0001	.4778	180.3	.11159	.020645	3520.8
.0620	.0147	10.5906	13.69	89.07	1.104	.0000	.4779	201.2	.11315	.021062	5124.5
.0610	.0110	17.3534	10.37	89.96	1.029	.0000	.4779	237.5	.11581	.021625	8534.5

TABLE IV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR LIFTING ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$, $\gamma_i = -0.5^{\circ}$, $e_i = 0.00873$

(a) L/D = 0.5

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\zeta}$	t sec	$\frac{\Delta\omega}{r}$	$\frac{\Delta\psi}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.0000	1.0600	0.0000000	0.500	0.472	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0605	.0000029	.496	.468	.0001	.0019	.0003	95.2	.11643	.001014	.000
1.0010	1.0610	.0000063	.486	.458	.0002	.0030	.0140	193.9	.23715	.002050	.000
1.0015	1.0615	.0000171	.465	.439	.0006	.0049	.0292	302.2	.36967	.003151	.001
1.00206	1.06206	.0001073	.397	.375	.0035	.0121	.0979	516.4	.63192	.005139	.003
1.0015	1.0615	.0002913	.325	.307	.0110	.0204	.1811	666.2	.81556	.006303	.009
1.0010	1.0610	.0003864	.298	.281	.0147	.0235	.2190	713.4	.87330	.006618	.012
1.0005	1.0605	.0004673	.277	.261	.0178	.0258	.2502	747.9	.91547	.006829	.014
1.0000	1.0600	.0005595	.260	.245	.0203	.0277	.2770	776.0	.94968	.006990	.016
.9990	1.0590	.0006663	.231	.217	.0251	.0307	.3358	821.0	1.00477	.007225	.020
.9980	1.0580	.0007761	.207	.195	.0292	.0330	.3848	857.6	1.04944	.007396	.023
.9970	1.0570	.0008731	.187	.177	.0328	.0350	.4078	889.1	1.08780	.007528	.026
.9960	1.0560	.0009600	.171	.161	.0361	.0366	.4465	917.1	1.12189	.007634	.029
.9950	1.0550	.0010387	.157	.148	.0390	.0379	.4793	942.6	1.15289	.007723	.031
.9940	1.0540	.0011105	.145	.137	.0416	.0391	.5126	966.1	1.18153	.007798	.034
.9930	1.0530	.0011768	.135	.128	.0441	.0402	.5447	988.5	1.20831	.007864	.036
.9920	1.0520	.0012386	.126	.120	.0463	.0411	.5758	1009.0	1.23358	.007922	.037
.9910	1.0510	.0012969	.122	.115	.0485	.0420	.6059	1028.8	1.25758	.007974	.039
.9900	1.0500	.0013525	.117	.111	.0505	.0428	.6354	1047.7	1.28050	.008022	.041
.9880	1.0480	.0014590	.113	.107	.0544	.0442	.6923	1083.4	1.32361	.008108	.044
.9860	1.0460	.0015539	.115	.108	.0582	.0456	.7469	1116.6	1.36363	.008188	.048
.9840	1.0440	.0016723	.121	.114	.0621	.0469	.7995	1147.6	1.40099	.008265	.051
.9820	1.0420	.0017885	.132	.124	.0663	.0483	.8502	1176.7	1.43593	.008341	.055
.9800	1.0400	.0019158	.145	.137	.0709	.0497	.8992	1203.9	1.46859	.008420	.059
.9750	1.0350	.0022899	.188	.177	.0847	.0538	1.0137	1264.3	1.54083	.008628	.071
.9700	1.0300	.0027756	.233	.220	.1000	.0586	1.1174	1314.5	1.60077	.008847	.086
.9650	1.0250	.0033370	.275	.258	.1158	.0637	1.2108	1356.6	1.6502	.009066	.105
.9600	1.0200	.0040448	.308	.290	.1322	.0689	1.2952	1391.3	1.69105	.009274	.127
.9550	1.0150	.0047956	.333	.313	.1492	.0740	1.3719	1420.6	1.72531	.009466	.150
.9500	1.0100	.0055842	.350	.329	.1661	.0789	1.4426	1445.5	1.75442	.009640	.176
.9400	1.0000	.0071194	.365	.343	.2057	.0875	1.5667	1486.5	1.80170	.009936	.229
.9300	.9900	.0088119	.362	.340	.2512	.0945	1.6759	1519.2	1.83910	.010175	.284
.9200	.9800	.0103378	.349	.327	.2963	.1000	1.7738	1546.6	1.87013	.010368	.338
.9100	.9700	.0118837	.330	.309	.3411	.1041	1.8615	1570.5	1.89684	.010526	.390
.9000	.9600	.0131861	.310	.290	.3853	.1071	1.9459	1591.9	1.92047	.010658	.439
.8800	.9400	.0155568	.277	.259	.4724	.1105	2.0945	1629.5	1.96147	.010867	.531
.8600	.9200	.0176655	.264	.247	.5583	.1116	2.2419	1662.2	1.99682	.011033	.616
.8400	.9000	.0196812	.276	.258	.6437	.1116	2.3854	1692.9	2.02818	.011180	.703
.8200	.8800	.0218556	.310	.289	.7292	.1113	2.4887	1720.7	2.05630	.011323	.799
.8000	.8600	.0243232	.356	.331	.8154	.1109	2.5725	1746.1	2.08154	.011469	.912
.7800	.8400	.0271133	.405	.376	.9033	.1105	2.6474	1769.5	2.10411	.011619	1.044
.7600	.8200	.0301827	.449	.417	.9928	.1100	2.7140	1790.9	2.12427	.011769	1.195
.7400	.8000	.0336365	.484	.448	.9876	.1092	2.8331	1810.6	2.14230	.011916	1.364
.7200	.7800	.0371615	.508	.469	1.0853	.1078	2.9054	1828.7	2.15851	.012057	1.548
.7000	.7600	.0406969	.523	.482	1.1826	.1058	2.9716	1845.6	2.17318	.012189	1.744
.6800	.7400	.0441417	.533	.490	1.2793	.1033	3.0325	1861.5	2.18657	.012313	1.949
.6600	.7200	.0475256	.540	.495	1.2753	.1002	3.0887	1876.6	2.19889	.012428	2.162
.6400	.7000	.0508646	.549	.502	1.3706	.0967	3.1406	1890.9	2.21032	.012537	2.384
.6200	.6800	.0540808	.564	.514	1.4653	.0929	3.1887	1904.8	2.22098	.012640	2.617
.6000	.6600	.0572626	.586	.533	1.5594	.0888	3.2334	1918.2	2.23097	.012740	2.863
.5800	.6400	.0604949	.618	.560	1.6433	.0847	3.2748	1931.0	2.24036	.012839	3.129
.5600	.6200	.0638889	.661	.597	1.7469	.0805	3.3132	1943.9	2.24921	.012937	3.419
.5400	.6000	.0673232	.714	.643	1.8505	.0763	3.3488	1956.3	2.25753	.013037	3.740
.5200	.5800	.0710006	.777	.697	1.9542	.0721	3.3818	1968.4	2.26537	.013139	4.099
.5000	.5600	.0750606	.849	.758	1.5579	.0680	3.4121	1980.2	2.27274	.013243	4.504
.4800	.5400	.0793935	.928	.825	1.6617	.0640	3.4401	1991.8	2.27966	.013351	4.940
.4600	.5200	.0839393	1.012	.895	1.6656	.0601	3.4658	2003.0	2.28614	.013460	5.474
.4400	.5000	.0888880	1.102	.969	1.6692	.0562	3.4893	2014.1	2.29222	.013572	6.054
.4200	.4800	.0939	1.197	1.047	1.7728	.0523	3.5108	2024.9	2.29790	.013686	6.708
.4000	.4600	.0992	1.298	1.128	1.7761	.0485	3.5304	2035.5	2.30321	.013802	7.443
.3800	.4400	.1047	1.41	1.22	1.7790	.0447	3.5482	2045.9	2.30818	.013919	8.271
.3600	.4200	.1104	1.53	1.310	1.8816	.0410	3.5644	2056.2	2.31283	.014038	9.206
.3400	.4000	.11633	1.66	1.42	1.8836	.0374	3.5790	2066.4	2.31718	.014159	10.265
.3200	.3800	.12235	1.82	1.54	1.8852	.0339	3.5922	2076.4	2.32124	.014282	11.470
.3000	.3600	.12854	2.01	1.67	1.8862	.0305	3.6040	2086.5	2.32503	.014409	12.854
.2800	.3400	.13493	2.23	1.84	1.8868	.0273	3.6146	2096.4	2.32857	.014539	14.456
.2600	.3200	.14154	2.50	2.03	1.8869	.0242	3.6240	2106.4	2.33186	.014675	16.332
.2400	.2999	.14841	2.82	2.26	1.8866	.0212	3.6323	2116.4	2.33492	.014816	18.551
.2200	.2799	.15556	3.22	2.53	1.8858	.0184	3.6397	2126.5	2.33775	.014965	21.212
.2000	.2599	.16298	3.73	2.87	1.8847	.0159	3.6461	2136.7	2.34035	.015123	24.446
.1800	.2399	.17062	4.36	3.27	1.8829	.0134	3.6516	2147.0	2.34274	.015291	28.436
.1600	.2198	.17837	5.19	3.77	1.8807	.0112	3.6563	2157.5	2.34491	.015471	33.444
.1400	.1998	.18596	6.27	4.39	1.8778	.0092	3.6603	2168.2	2.34686	.015666	39.852
.1200	.1796	.19301	7.77	5.18	1.8741	.0074	3.6636	2179.2	2.34860	.015879	48.252
.1000	.1594	.19867	9.92	6.20	1.8694	.0057	3.6664	2190.7	2.35013	.016113	59.602
.0900	.1493	.2006	11.38	6.83	1.8666	.0050	3.6675	2196.7	2.35081	.016241	66.863
.0800	.1391	.2016	13.25	7.58	1.8635	.0043	3.6686	2202.8	2.35144	.016377	75.591
.0700	.1288	.2013	15.70	8.46	1.8600	.0036	3.6696	2209.3	2.35201	.016524	86.264
.0600	.1184	.19925	19.05	9.53	1.8560	.0030	3.6704	2216.1	2.35252	.016684	99.625
.0500	.1076	.19492	23.92	10.86	1.8515	.0025	3.6711	2223.4	2.35298	.016862	116.952
.0450	.1021	.19172	27.31	11.67	1.8490	.0022	3.6714	2227.3	2.35319	.016961	127.815
.0400	.0963	.18781	31.74	12.61	1.8462	.0019	3.6717	2231.6	2.35338	.017069	140.860
.0350	.0902	.18338	37.83	13.76	1.8431	.0017	3.6721	2236.3	2.35355	.017191	157.185
.0300	.0834	.17935	47.02	15.26	1.8395	.0014	3.6724	2241.8	2.35372	.017337	179.353

TABLE IV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR LIFTING ENTRY INTO ATMSOPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$, $\gamma_i = -0.5^\circ$, $e_i = 0.00873$ - Concluded

(b) L/D = 1.0

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{\eta}$	$\bar{\xi}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta V}{c}$	$\sqrt{\beta r}\,\frac{z}{V}$
1.0000	1.0600	0.0000010	0.500	0.472	0.0000	0.0012	0	0	0	0	0.000
1.0005	1.0605	.0000025	.496	.464	.0001	.0019	.0053	95.2	.11645	.001014	.000
1.0010	1.0610	.0000069	.485	.456	.0003	.0030	.0140	194.0	.23727	.002050	.000
1.0015	1.0615	.0000171	.463	.437	.0008	.0049	.0295	302.6	.37019	.003151	.001
1.00205	1.06205	.0000986	.384	.362	.0033	.0119	.0922	515.6	.63108	.005101	.003
1.0015	1.0615	.0002660	.281	.265	.0127	.0195	.1799	669.1	.81903	.006205	.008
1.0010	1.0610	.0003433	.235	.222	.0164	.0221	.2189	720.0	.88140	.006486	.010
1.0005	1.0605	.0004023	.197	.186	.0192	.0239	.2512	758.3	.92819	.006663	.012
1.0000	1.0600	.0004494	.164	.155	.0214	.0253	.2800	790.3	.96726	.006787	.013
.9990	1.0590	.0005169	.106	.100	.0246	.0270	.3318	844.2	1.03321	.006943	.016
.9980	1.0580	.0005551	.056	.053	.0264	.0279	.3793	891.3	1.09064	.007024	.017
.9970	1.0570	.0005707	.013	.012	.0271	.0283	.4245	935.0	1.14401	.007056	.017
.9960	1.0560	.0005671	-.023	-.022	.0270	.0281	.4685	977.6	1.19585	.007051	.017
.9950	1.0550	.0005494	-.053	-.050	.0261	.0276	.5122	1020.4	1.24790	.007016	.017
.9940	1.0540	.0005196	-.074	-.070	.0246	.0268	.5563	1064.5	1.30159	.006956	.016
.9930	1.0530	.0004829	-.087	-.082	.0229	.0258	.6014	1111.2	1.35826	.006875	.015
.9920	1.0520	.0004430	-.089	-.084	.0210	.0246	.6476	1161.4	1.41922	.006780	.013
.9910	1.0510	.0004051	-.078	-.074	.0192	.0235	.6959	1216.3	1.48570	.006682	.012
.9900	1.0500	.0003750	-.053	-.050	.0177	.0225	.7461	1276.5	1.55858	.006597	.011
.9880	1.0480	.0003650	.040	.038	.0172	.0221	.8554	1410.7	1.72077	.006569	.011
.9860	1.0460	.0004627	.155	.147	.0218	.0248	.9662	1541.1	1.87819	.006835	.014
.9840	1.0440	.0006658	.234	.221	.0313	.0296	1.0638	1639.8	1.99704	.007242	.020
.9820	1.0420	.0009244	.271	.255	.0434	.0347	1.1444	1708.6	2.07975	.007609	.028
.9800	1.0400	.0012005	.280	.264	.0562	.0394	1.2129	1759.0	2.14013	.007901	.037
.9750	1.0350	.0018460	.245	.231	.0861	.0482	1.3516	1845.3	2.24330	.008385	.057
.9700	1.0300	.0023345	.179	.169	.1088	.0537	1.4659	1906.3	2.31580	.008657	.073
.9650	1.0250	.0026674	.111	.105	.1235	.0567	1.5668	1956.7	2.37542	.008808	.083
.9600	1.0200	.0028852	.056	.052	.1311	.0578	1.6643	2002.4	2.42915	.008885	.089
.9550	1.0150	.0029921	.021	.020	.1337	.0578	1.7571	2046.1	2.48034	.008918	.092
.9500	1.0100	.0029943	.015	.014	.1341	.0573	1.8485	2089.4	2.53072	.008932	.093
.9400	1.0000	.0031064	.084	.079	.1402	.0575	2.0277	2174.9	2.62949	.009004	.099
.9300	.9900	.0037724	.192	.181	.1665	.0614	2.1957	2252.4	2.71813	.009217	.120
.9200	.9800	.0047446	.250	.235	.210	.0676	2.3645	2315.5	2.78946	.009499	.155
.9100	.9700	.0059860	.241	.226	.257	.0732	2.4747	2365.9	2.84583	.009745	.193
.9000	.9600	.0068808	.192	.180	.296	.0770	2.5912	2408.1	2.89258	.009924	.227
.8900	.9400	.0078891	.087	.082	.336	.0787	2.8000	2481.1	2.97193	.010113	.269
.8800	.9200	.0096403	.088	.082	.351	.0770	2.9933	2548.6	3.04379	.010208	.293
.8400	.9000	.0098425	.188	.176	.386	.0772	3.1751	2612.4	3.11004	.010362	.337
.8200	.8900	.0113118	.264	.246	.454	.0801	3.3343	2668.4	3.16688	.010592	.414
.8000	.8600	.0134331	.251	.234	.527	.0824	3.4764	2716.0	3.21405	.010810	.504
.7800	.8400	.0150084	.190	.176	.579	.0824	3.6037	2758.0	3.25461	.010967	.580
.7600	.8200	.0161555	.143	.133	.606	.0804	3.7206	2797.1	3.29143	.011072	.638
.7400	.8000	.0170006	.153	.141	.624	.0776	3.8301	2834.9	3.32606	.011158	.689
.7200	.7800	.0181343	.215	.198	.650	.0753	3.9325	2871.5	3.35871	.011261	.756
.7000	.7600	.0198669	.287	.265	.696	.0740	4.0275	2906.2	3.38883	.011393	.852
.6800	.7400	.02204	.328	.301	.753	.0730	4.1143	2938.4	3.41602	.011541	.972
.6600	.7200	.02427	.323	.296	.809	.0716	4.1936	2968.2	3.44046	.011681	1.103
.6400	.7000	.02622	.292	.267	.852	.0694	4.2662	2996.3	3.46273	.011801	1.229
.6200	.6800	.02779	.263	.240	.879	.0666	4.3330	3023.1	3.48341	.011901	1.345
.6000	.6600	.02913	.263	.239	.897	.0634	4.3954	3049.3	3.50293	.011990	1.456
.5800	.6400	.03053	.299	.271	.915	.0601	4.4539	3075.0	3.52147	.012079	1.579
.5600	.6200	.03226	.362	.327	.940	.0572	4.5076	3100.1	3.53900	.012180	1.728
.5400	.6000	.03445	.429	.386	.974	.0546	4.5576	3124.5	3.55540	.012293	1.914
.5200	.5800	.03700	.480	.430	1.015	.0520	4.6039	3148.0	3.57061	.012414	2.134
.5000	.5600	.03967	.505	.450	1.056	.0495	4.6455	3170.6	3.58467	.012536	2.380
.4800	.5400	.04227	.510	.453	1.089	.0467	4.6839	3192.3	3.59771	.012651	2.642
.4600	.5200	.04465	.511	.452	1.114	.0438	4.7191	3213.5	3.60988	.012760	2.912
.4400	.5000	.04687	.526	.463	1.130	.0408	4.7514	3234.3	3.62132	.012863	3.196
.4200	.4800	.04908	.569	.498	1.142	.0378	4.7810	3254.9	3.63213	.012966	3.506
.4000	.4600	.05148	.641	.557	1.155	.0349	4.8082	3275.2	3.64234	.013073	3.861
.3800	.4400	.05424	.74	.64	1.172	.0322	4.8329	3295.4	3.65193	.013188	4.282
.3600	.4200	.05743	.84	.72	1.194	.0296	4.8554	3315.2	3.66090	.013311	4.785
.3400	.4000	.06098	.95	.81	1.217	.0271	4.8756	3334.7	3.66924	.013442	5.381
.3200	.3800	.06477	1.05	.88	1.240	.0247	4.8938	3353.8	3.67696	.013576	6.072
.3000	.3600	.06865	1.14	.95	1.258	.0223	4.9100	3372.7	3.68410	.013712	6.865
.2800	.3400	.07255	1.25	1.03	1.271	.0200	4.9245	3391.3	3.69071	.013850	7.773
.2600	.3200	.07648	1.40	1.13	1.278	.0178	4.9373	3409.8	3.69682	.013991	8.824
.2400	.3000	.08054	1.59	1.27	1.281	.0156	4.9487	3428.3	3.70247	.014138	10.068
.2200	.2800	.08490	1.84	1.45	1.283	.0136	4.9586	3446.9	3.70768	.014293	11.577
.2000	.2600	.08966	2.18	1.68	1.285	.0118	4.9672	3465.4	3.71244	.014460	13.449
.1800	.2400	.09488	2.61	1.96	1.288	.0100	4.9747	3484.1	3.71677	.014639	15.813
.1600	.2199	.10049	3.16	2.30	1.289	.0084	4.9810	3502.8	3.72066	.014834	18.842
.1400	.1999	.10630	3.87	2.71	1.287	.0070	4.9863	3521.7	3.72411	.015045	22.778
.1200	.1799	.11197	4.84	3.23	1.281	.0056	4.9907	3540.8	3.72714	.015274	27.992
.1000	.1598	.11702	6.27	3.90	1.267	.0044	4.9943	3560.4	3.72976	.015526	35.106
.0900	.1497	.11908	7.25	4.35	1.258	.0039	4.9955	3570.4	3.73092	.015662	39.698
.0800	.1396	.12062	8.51	4.87	1.247	.0033	4.9972	3580.7	3.73197	.015807	45.234
.0700	.1295	.12143	10.19	5.49	1.234	.0029	4.9984	3591.2	3.73292	.015963	52.043
.0600	.1193	.12117	12.49	6.24	1.219	.0024	4.9994	3602.1	3.73377	.016132	60.596
.0500	.1090	.11934	15.81	7.15	1.202	.0020	5.0004	3613.5	3.73452	.016318	71.603
.0450	.1037	.11762	18.10	7.74	1.193	.0018	5.0008	3619.5	3.73485	.016418	78.411
.0400	.0984	.11521	21.02	8.49	1.183	.0016	5.0012	3625.7	3.73516	.016526	86.407
.0350	.0929	.11199	24.91	9.43	1.172	.0014	5.0015	3632.3	3.73543	.016643	95.995
.0300	.0872	.10787	30.37	10.62	1.160	.0013	5.0019	3639.4	3.73568	.016773	107.875

TABLE V.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR LIFTING ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$, $\gamma_i = -0.5^{\circ}$, $e_i = 0.00873$

(a) L/D = 0.5

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\xi}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta\psi}{r}$	$\sqrt{\beta r}\,\frac{\dot{\xi}}{\overline{V}}$
1.0000	0.9400	0.0000010	0.500	0.542	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9405	.0000025	.497	.528	.0001	.0013	.0037	95.0	.11610	.001011	.000
1.0010	.9410	.0000063	.486	.517	.0002	.0021	.0097	192.9	.23591	.002039	.000
1.0015	.9415	.0000165	.466	.496	.0009	.0034	.0201	298.7	.36535	.003116	.000
1.00218	.94218	.0001267	.387	.412	.0034	.0094	.0740	544.1	.66603	.005376	.004
1.0015	.9415	.0003881	.304	.323	.0115	.0164	.1523	711.7	.87122	.006622	.012
1.0010	.9410	.0004977	.278	.296	.0146	.0186	.1889	756.2	.92573	.006899	.015
1.0005	.9405	.0005914	.257	.274	.0176	.0202	.2249	790.0	.96708	.007092	.018
1.0000	.9400	.0006760	.240	.255	.0200	.0216	.2264	818.0	1.00127	.007240	.020
.9990	.9390	.0008232	.211	.224	.0244	.0238	.2645	863.8	1.05721	.007460	.025
.9980	.9380	.0009498	.188	.200	.0281	.0255	.2939	901.5	1.10321	.007620	.029
.9970	.9370	.0010608	.169	.179	.0313	.0268	.3299	934.2	1.14309	.007744	.032
.9960	.9360	.0011597	.153	.163	.0342	.0280	.3593	963.5	1.17881	.007844	.035
.9950	.9350	.0012487	.140	.149	.0368	.0290	.3874	990.3	1.21148	.007928	.038
.9940	.9340	.0013299	.129	.137	.0391	.0298	.4143	1015.3	1.24181	.007999	.040
.9930	.9330	.0014049	.121	.129	.0413	.0306	.4402	1038.8	1.27030	.008061	.042
.9920	.9320	.0014751	.115	.122	.0433	.0312	.4654	1061.0	1.29726	.008116	.045
.9910	.9310	.0015418	.110	.117	.0452	.0318	.4899	1082.2	1.32295	.008166	.047
.9900	.9300	.0016063	.108	.115	.0471	.0324	.5138	1102.5	1.34752	.008213	.049
.9880	.9280	.0017330	.108	.115	.0507	.0335	.5600	1140.8	1.39381	.008300	.053
.9860	.9260	.0018639	.114	.121	.0543	.0345	.6044	1176.4	1.43678	.008382	.057
.9840	.9240	.002003	.124	.133	.0582	.0356	.6471	1209.6	1.47678	.008465	.061
.9820	.9220	.002159	.139	.148	.0627	.0368	.6882	1240.5	1.51398	.008550	.066
.9800	.9200	.002334	.157	.167	.0676	.0380	.7276	1269.3	1.54849	.008639	.071
.9750	.9150	.002872	.206	.220	.0827	.0416	.8191	1332.2	1.62364	.008876	.088
.9700	.9100	.003559	.254	.271	.1019	.0457	.9008	1383.4	1.68454	.009120	.110
.9650	.9050	.004379	.295	.314	.1247	.0499	.9737	1425.1	1.73381	.009356	.136
.9600	.9000	.005301	.325	.347	.1500	.0542	1.0390	1459.3	1.77410	.009574	.166
.9550	.8950	.006296	.346	.369	.1771	.0582	1.0981	1488.0	1.80767	.009771	.198
.9500	.8900	.007335	.359	.383	.205	.0619	1.1520	1512.5	1.83616	.009946	.232
.9400	.8800	.009462	.367	.392	.261	.0684	1.2477	1552.6	1.88246	.010241	.302
.9300	.8700	.011556	.359	.384	.316	.0734	1.3315	1584.8	1.91930	.010475	.373
.9200	.8600	.013546	.342	.366	.365	.0772	1.4067	1612.0	1.95007	.010664	.442
.9100	.8500	.015400	.322	.345	.410	.0799	1.4754	1635.8	1.97672	.010818	.508
.9000	.8400	.017112	.303	.324	.450	.0817	1.5390	1657.3	2.00045	.010948	.570
.8800	.8200	.02018	.275	.294	.517	.0835	1.6545	1695.3	2.04188	.011156	.688
.8600	.8000	.02298	.272	.292	.574	.0837	1.7581	1729.1	2.07778	.011326	.802
.8400	.7800	.02583	.294	.316	.628	.0832	1.8520	1759.8	2.10965	.011482	.923
.8200	.7600	.02901	.335	.361	.685	.0826	1.9374	1787.8	2.13815	.011637	1.061
.8000	.7400	.03267	.386	.417	.750	.0819	2.0149	1813.5	2.16360	.011797	1.225
.7800	.7200	.03688	.436	.472	.822	.0812	2.0850	1837.0	2.18626	.011960	1.418
.7600	.7000	.04154	.479	.520	.898	.0802	2.1485	1858.5	2.20646	.012121	1.640
.7400	.6800	.04655	.511	.556	.976	.0789	2.2060	1878.1	2.22451	.012277	1.887
.7200	.6600	.05177	.534	.583	1.051	.0771	2.2581	1996.3	2.24075	.012425	2.157
.7000	.6400	.05707	.550	.602	1.120	.0749	2.3054	1913.3	2.25550	.012565	2.446
.6800	.6200	.06238	.563	.617	1.183	.0722	2.3486	1929.3	2.26900	.012696	2.752
.6600	.6000	.06768	.576	.633	1.238	.0692	2.3881	1944.6	2.28147	.012820	3.076
.6400	.5800	.07300	.594	.655	1.287	.0659	2.4242	1959.2	2.29306	.012938	3.422
.6200	.5600	.07841	.619	.686	1.330	.0625	2.4574	1973.2	2.30391	.013053	3.794
.6000	.5400	.08401	.655	.728	1.369	.0589	2.4876	1986.9	2.31410	.013166	4.200
.5800	.5200	.08992	.701	.782	1.406	.0554	2.5157	2000.2	2.32369	.013279	4.651
.5600	.5000	.09628	.759	.850	1.442	.0518	2.5411	2013.2	2.33272	.013394	5.158
.5400	.4800	.10322	.828	.931	1.477	.0484	2.5644	2025.8	2.34123	.013512	5.734
.5200	.4600	.11084	.906	1.024	1.513	.0449	2.5855	2038.2	2.34924	.013633	6.394
.5000	.4400	.11924	.992	1.125	1.549	.0416	2.6047	2050.3	2.35678	.013758	7.154
.4800	.4200	.12849	1.087	1.242	1.584	.0383	2.6221	2062.1	2.36386	.013886	8.031
.4600	.4000	.13867	1.188	1.366	1.618	.0351	2.6377	2073.7	2.37052	.014018	9.044
.4400	.3800	.14984	1.297	1.502	1.650	.0320	2.6517	2085.1	2.37677	.014154	10.216
.4200	.3600	.16208	1.415	1.651	1.678	.0290	2.6642	2096.2	2.38264	.014293	11.577
.4000	.3400	.17550	1.546	1.818	1.701	.0260	2.6753	2107.3	2.38817	.014435	13.162
.3800	.3200	.19025	1.69	2.01	1.720	.0232	2.6851	2118.2	2.39336	.014582	15.020
.3600	.3000	.2066	1.86	2.23	1.733	.0205	2.6939	2129.0	2.39826	.014733	17.213
.3400	.2801	.2248	2.05	2.49	1.739	.0179	2.7014	2139.8	2.40288	.014891	19.831
.3200	.2601	.2453	2.28	2.81	1.739	.0154	2.7080	2150.6	2.40723	.015055	22.996
.3000	.2401	.2688	2.55	3.19	1.732	.0131	2.7136	2161.5	2.41135	.015228	26.880
.2800	.2201	.2961	2.88	3.67	1.719	.0110	2.7185	2172.5	2.41524	.015413	31.729
.2600	.2001	.3286	3.28	4.27	1.698	.0090	2.7226	2183.6	2.41892	.015611	37.911
.2400	.1802	.3678	3.78	5.03	1.669	.0072	2.7260	2195.1	2.42241	.015825	45.979
.2200	.1602	.4166	4.39	6.02	1.631	.0057	2.7288	2206.8	2.42571	.016060	56.809
.2000	.1403	.4791	5.15	7.35	1.583	.0043	2.7310	2219.1	2.42885	.016321	71.858
.1800	.1205	.5622	6.12	9.17	1.522	.0031	2.7327	2232.1	2.43185	.016616	93.706
.1600	.1008	.6791	7.38	11.77	1.446	.0021	2.7341	2246.1	2.43475	.016957	127.330
.1400	.0813	.8564	9.03	15.68	1.356	.0013	2.7350	2261.8	2.43758	.017363	183.518
.1200	.0622	1.1593	11.19	21.97	1.255	.0008	2.7357	2280.1	2.44044	.017871	289.83
.1000	.0441	1.7990	13.78	32.69	1.167	.0004	2.7362	2303.7	2.44352	.018555	536.69
.0900	.0355	2.4348	14.86	40.54	1.145	.0002	2.7363	2319.7	2.44532	.019015	811.60
.0800	.0269	3.7417	14.92	49.96	1.135	.0001	2.7365	2342.4	2.44758	.019623	1403.15
.0750	.0222	5.0928	14.00	54.85	1.121	.0001	2.7366	2359.8	2.44918	.020037	2037.1
.0700	.0167	8.1249	11.81	59.27	1.082	.0001	2.7366	2390.0	2.45177	.020633	3482.1
.0680	.0141	10.8620	10.42	60.78	1.064	.0000	2.7367	2411.8	2.45358	.020988	4792.1
.0660	.0112	16.3890	8.59	61.91	1.040	.0000	2.7367	2448.3	2.45652	.021476	7449.5
.0650	.0096	21.7164	7.49	62.33	1.027	.0000	2.7367	2477.8	2.45886	.021808	10022.9
.0640	.0078	33.3079	6.24	62.50	1.009	.0000	2.7367	2522.8	2.46238	.022231	14675.6

TABLE V.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR LIFTING ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.00$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$, $\gamma_i = -0.5^\circ$, $e_i = 0.00873$ - Concluded

(b) L/D = 1.0

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{m}_r}{g}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\frac{\theta}{\bar{V}}$
1.0000	0.9400	0.0000010	0.500	0.532	0.0000	0.0008	0	0	0	0	0.000
1.0005	.9400	.0000025	.496	.528	.0001	.0013	.0037	95.0	.11612	.001011	.000
1.0010	.9410	.0000063	.485	.516	.0002	.0021	.0097	193.0	.23600	.002039	.000
1.0015	.9410	.0000165	.465	.494	.0006	.0034	.0201	299.0	.36572	.003116	.000
1.00217	.9421	.0001223	.374	.398	.0092	.0092	.0734	543.9	.66519	.004572	.004
1.0015	.9410	.0003518	.255	.271	.0132	.0156	.1514	715.6	.87595	.006513	.011
1.0010	.9410	.0004371	.211	.224	.0164	.0174	.1809	764.1	.93532	.006755	.013
1.0005	.9400	.0005026	.174	.185	.0199	.0186	.2060	800.0	.98167	.006910	.015
1.0000	.9400	.0005541	.141	.150	.0208	.0196	.2286	834.4	1.02127	.007019	.017
.9990	.9390	.0006240	.084	.089	.0234	.0207	.2698	890.1	1.08933	.007152	.019
.9980	.9380	.0006592	.035	.037	.0247	.0212	.3079	949.6	1.14975	.007214	.020
.9970	.9370	.0006666	-.007	-.007	.0249	.0213	.3445	986.4	1.20689	.007228	.020
.9960	.9360	.0006517	-.041	-.043	.0243	.0210	.3804	1038.7	1.26331	.007204	.020
.9950	.9350	.0006196	-.067	-.071	.0231	.0204	.4164	1090.1	1.32094	.007145	.019
.9940	.9340	.0005758	-.084	-.089	.0214	.0196	.4529	1129.9	1.38146	.007069	.017
.9930	.9330	.0005261	-.089	-.095	.0196	.0187	.4906	1183.5	1.44652	.006966	.016
.9920	.9320	.0004770	-.082	-.087	.0177	.0178	.5298	1242.2	1.51777	.006861	.014
.9910	.9310	.0004361	-.059	-.063	.0162	.0169	.5711	1307.2	1.59655	.006763	.013
.9900	.9300	.0004125	-.019	-.020	.0153	.0164	.6147	1378.7	1.68320	.006702	.013
.9880	.9280	.0004578	.097	.104	.0169	.0172	.7073	1531.0	1.86733	.006820	.014
.9860	.9260	.0006593	.203	.216	.0243	.0205	.7948	1659.2	2.02193	.007228	.020
.9840	.9240	.0009671	.258	.275	.0356	.0247	.8670	1740.8	2.12741	.007656	.029
.9820	.9220	.0013138	.276	.294	.0483	.0287	.9263	1807.5	2.20040	.007999	.040
.9800	.9200	.0016619	.273	.291	.0609	.0321	.9770	1863.1	2.25504	.008262	.051
.9750	.9150	.002435	.224	.239	.0887	.0383	1.0820	1934.4	2.35280	.008696	.075
.9700	.9100	.003000	.155	.165	.1087	.0419	1.1704	1984.3	2.42346	.008930	.093
.9650	.9050	.003351	.090	.096	.1207	.0437	1.2506	2045.2	2.48371	.009058	.104
.9600	.9000	.003526	.042	.045	.1262	.0442	1.3265	2098.3	2.53905	.009121	.110
.9550	.8950	.003592	.019	.021	.1278	.0440	1.4002	2137.9	2.59241	.009147	.113
.9500	.8900	.003635	.027	.028	.1286	.0436	1.4729	2183.1	2.64508	.009164	.115
.9400	.8800	.003981	.114	.121	.1392	.0444	1.6141	2271.2	2.74680	.009279	.127
.9300	.8700	.004949	.214	.229	.1709	.0480	1.7436	2346.1	2.83471	.009533	.160
.9200	.8600	.006342	.251	.269	.216	.0528	1.8567	2409.4	2.90403	.009826	.207
.9100	.8500	.007746	.228	.244	.261	.0567	1.9557	2458.6	2.95913	.010055	.259
.9000	.8400	.008882	.174	.187	.295	.0589	2.0448	2500.6	3.00554	.010219	.296
.8800	.8200	.010157	.085	.091	.329	.0592	2.2056	2574.4	3.08587	.010393	.346
.8600	.8000	.010969	.110	.119	.346	.0578	2.3534	2643.3	3.15919	.010508	.383
.8400	.7800	.012560	.213	.230	.389	.0583	2.4891	2707.3	3.22568	.010689	.452
.8200	.7600	.015381	.269	.291	.460	.0601	2.6092	2762.7	3.28187	.010932	.563
.8000	.7400	.018192	.243	.263	.528	.0611	2.7144	2809.9	3.32864	.011146	.682
.7800	.7200	.02035	.186	.202	.574	.0603	2.8084	2852.0	3.36935	.011299	.783
.7600	.7000	.02187	.156	.170	.598	.0582	2.8946	2891.7	3.40664	.011406	.863
.7400	.6800	.02332	.184	.200	.618	.0558	2.9746	2929.9	3.44173	.011509	.946
.7200	.6600	.02536	.251	.274	.651	.0540	3.0486	2966.7	3.47456	.011632	1.057
.7000	.6400	.02820	.315	.345	.700	.0526	3.1162	3001.3	3.50461	.011782	1.209
.6800	.6200	.03156	.343	.376	.757	.0514	3.1773	3033.4	3.53166	.011939	1.392
.6600	.6000	.03491	.333	.367	.808	.0497	3.2326	3063.2	3.55609	.012084	1.587
.6400	.5800	.03790	.308	.340	.845	.0475	3.2829	3091.4	3.57848	.012210	1.777
.6200	.5600	.04053	.296	.327	.870	.0449	3.3289	3118.6	3.59940	.012319	1.961
.6000	.5400	.04307	.314	.349	.888	.0422	3.3713	3145.1	3.61918	.012424	2.154
.5800	.5200	.04597	.364	.406	.909	.0396	3.4102	3171.1	3.63792	.012534	2.378
.5600	.5000	.04955	.432	.483	.939	.0372	3.4458	3196.4	3.65555	.012654	2.654
.5400	.4800	.05387	.496	.557	.975	.0349	3.4782	3220.8	3.67201	.012786	2.993
.5200	.4600	.05877	.541	.612	1.015	.0327	3.5074	3244.4	3.68727	.012928	3.390
.5000	.4400	.06394	.568	.645	1.050	.0305	3.5337	3267.1	3.70141	.013065	3.838
.4800	.4200	.06917	.585	.669	1.079	.0281	3.5574	3289.1	3.71460	.013196	4.325
.4600	.4000	.07444	.610	.702	1.099	.0258	3.5787	3310.6	3.72698	.013327	4.855
.4400	.3800	.07994	.657	.760	1.113	.0234	3.5978	3331.9	3.73865	.013455	5.453
.4200	.3600	.08603	.731	.853	1.126	.0211	3.6147	3352.9	3.74969	.013589	6.149
.4000	.3400	.09308	.832	.979	1.141	.0190	3.6302	3373.6	3.76010	.013730	6.981
.3800	.3200	.10140	.95	1.13	1.159	.0169	3.6437	3394.2	3.76990	.013882	8.009
.3600	.3000	.11117	1.08	1.30	1.179	.0150	3.6555	3414.4	3.77906	.014045	9.264
.3400	.2800	.12245	1.21	1.47	1.198	.0132	3.6659	3434.4	3.78761	.014216	10.804
.3200	.2600	.13532	1.35	1.67	1.213	.0114	3.6748	3454.2	3.79559	.014394	12.686
.3000	.2400	.15003	1.52	1.90	1.222	.0098	3.6824	3473.9	3.80304	.014580	15.003
.2800	.2200	.16712	1.73	2.19	1.226	.0082	3.6889	3493.5	3.81000	.014777	17.900
.2600	.2000	.18759	1.99	2.59	1.225	.0068	3.6944	3513.4	3.81652	.014988	21.645
.2400	.1800	.2130	2.34	3.12	1.221	.0055	3.6989	3533.3	3.82263	.015217	26.618
.2200	.1600	.2455	2.79	3.83	1.213	.0043	3.7025	3553.7	3.82835	.015472	33.475
.2000	.1400	.2886	3.36	4.79	1.202	.0033	3.7054	3574.5	3.83370	.015756	43.288
.1800	.1200	.3480	4.10	6.14	1.186	.0024	3.7077	3596.2	3.83872	.016083	58.002
.1600	.1004	.4345	5.07	8.09	1.161	.0017	3.7094	3619.1	3.84346	.016460	81.466
.1400	.0800	.5715	6.37	11.11	1.126	.0011	3.7106	3644.1	3.84801	.016913	122.467
.1200	.0612	.8212	8.14	16.11	1.087	.0006	3.7115	3672.9	3.85254	.017487	205.30
.1000	.0423	1.4015	10.18	24.70	1.064	.0003	3.7121	3710.1	3.85746	.018284	420.46
.0900	.0330	2.0755	10.80	30.69	1.068	.0002	3.7123	3736.2	3.86043	.018837	691.83
.0800	.0233	3.6380	10.19	37.07	1.064	.0001	3.7125	3775.8	3.86445	.019592	1364.26
.0750	.0184	5.4879	9.07	40.07	1.048	.0001	3.7125	3809.1	3.86755	.020120	2195.2
.0700	.0128	10.2554	7.02	42.06	1.012	.0000	3.7126	3871.1	3.87297	.020891	4395.2
.0680	.0100	14.8134	6.10	43.48	1.018	.0000	3.7126	3916.7	3.87679	.021332	6535.3
.0660	.0080	24.3749	4.85	44.05	1.008	.0000	3.7127	3992.4	3.88295	.021915	11079.5
.0650	.0060	33.7769	4.16	44.29	1.003	.0000	3.7127	4052.9	3.88777	.022298	15589.3

TABLE VI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -2.0^{\circ}$, $e_i = 0.05337$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{u_a}{r}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta x}{r}$	$\sqrt{\beta r \frac{Z}{\bar{V}}}$
1.0200	1.0800	0.0000[illegible]	2.000	1.989	0.0000	0.0013	0	0	0	0	0.000
1.0205	1.0805	.0000[illegible]	1.930	1.823	.0001	.0020	.0015	25.0	.03111	.001068	.000
1.0210	1.0810	.0000[illegible]	1.855	1.752	.0002	.0033	.0040	51.1	.06367	.002143	.000
1.0215	1.0815	.0000[illegible]	1.773	1.675	.0006	.0054	.0[illegible]	78.8	.09829	.003240	.001
1.0220	1.0820	.0000[illegible]	1.680	1.587	.0018	.0091	.0[illegible]	109.6	.13674	.004399	.001
1.0225	1.0825	.0002[illegible]	1.549	1.463	.0070	.0179	.0[illegible]	152.2	.18997	.005900	.006
1.02258	1.08256	.0003[illegible]	1.484	1.406	.0129	.0238	.0[illegible]	171.5	.21408	.006539	.011
1.0225	1.0825	.0005[illegible]	1.437	1.357	.0200	.0302	.0[illegible]	188.1	.23480	.007068	.017
1.0220	1.0820	.0011[illegible]	1.362	1.286	.0389	.0422	.0[illegible]	212.4	.26521	.007811	.033
1.0210	1.0810	.0019[illegible]	1.301	1.229	.0660	.0548	.1[illegible]	232.8	.29057	.008400	.056
1.0200	1.0800	.0026[illegible]	1.266	1.196	.0897	.0638	.1[illegible]	245.0	.30590	.008744	.077
1.0150	1.0750	.0056[illegible]	1.186	1.120	.1938	.0929	.2[illegible]	277.1	.34642	.009610	.168
1.0100	1.0700	.0084[illegible]	1.155	1.090	.284	.1123	.3[illegible]	295.5	.36858	.010062	.252
1.0050	1.0650	.0111[illegible]	1.148	1.077	.379	.1275	.3[illegible]	308.5	.38423	.010375	.334
1.000	1.0600	.0138[illegible]	1.138	1.074	.457	.1402	.4[illegible]	318.[illegible]	.39640	.010617	.415
.9950	1.0550	.0164[illegible]	1.141	1.076	.553	.1511	.4[illegible]	326.[illegible]	.40640	.010816	.497
.9900	1.0500	.0191[illegible]	1.149	1.083	.638	.1608	.5[illegible]	333.[illegible]	.41489	.010986	.579
.9800	1.0400	.0243[illegible]	1.174	1.106	.807	.1773	.5[illegible]	344.[illegible]	.42879	.011267	.746
.9700	1.0300	.0296[illegible]	1.207	1.137	.974	.1911	.6[illegible]	354.2	.43991	.011468	.917
.9600	1.0200	.0351[illegible]	1.247	1.174	1.141	.2029	.7020	362.[illegible]	.44916	.011696	1.097
.9500	1.0100	.0406[illegible]	1.291	1.215	1.309	.2131	.7535	368.[illegible]	.45704	.011871	1.283
.9400	1.0000	.0463[illegible]	1.339	1.259	1.479	.2220	.8006	374.8	.46389	.012028	1.479
.9300	.9900	.0523[illegible]	1.390	1.306	1.649	.2298	.8444	380.0	.46993	.012172	1.683
.9200	.9800	.0581[illegible]	1.443	1.354	1.821	.2366	.8[illegible]	384.8	.47531	.012305	1.896
.9100	.9700	.0643[illegible]	1.497	1.405	1.995	.2426	.9[illegible]	389.1	.48014	.012429	2.120
.9000	.9600	.0706[illegible]	1.554	1.457	2.17	.2479	.9[illegible]	393.1	.48452	.012545	2.355
.8800	.9400	.0838[illegible]	1.671	1.564	2.53	.2564	1.0[illegible]	400.1	.49217	.012760	2.858
.8600	.9200	.0977[illegible]	1.793	1.676	2.89	.2625	1.0[illegible]	406.2	.49866	.012956	3.409
.8400	.9000	.1125[illegible]	1.918	1.790	3.25	.2666	1.1[illegible]	411.6	.50424	.013137	4.012
.8200	.8800	.1276[illegible]	2.047	1.908	3.62	.2688	1.1[illegible]	416.4	.50912	.013306	4.669
.8000	.8600	.1435[illegible]	2.180	2.028	3.98	.2694	1.2[illegible]	420.7	.51341	.013464	5.384
.7800	.8400	.1601[illegible]	2.316	2.150	4.35	.2686	1.2[illegible]	424.7	.51723	.013614	6.161
.7600	.8200	.1774[illegible]	2.455	2.275	4.71	.2664	1.2[illegible]	428.[illegible]	.52065	.013756	7.004
.7400	.7999	.1952[illegible]	2.597	2.403	5.07	.2630	1.3[illegible]	431.7	.52374	.013892	7.917
.7200	.7799	.2137	2.744	2.533	5.42	.2585	1.3[illegible]	434.8	.52654	.014023	8.904
.7000	.7599	.2327	2.894	2.665	5.76	.2530	1.3[illegible]	437.8	.52910	.014149	9.971
.6800	.7399	.2521	3.05	2.801	6.09	.2467	1.4[illegible]	440.[illegible]	.53144	.014270	11.124
.6600	.7199	.2721	3.21	2.940	6.41	.2396	1.4[illegible]	443.[illegible]	.53360	.014388	12.367
.6400	.6999	.2925	3.37	3.08	6.72	.2318	1.4[illegible]	445.7	.53559	.014502	13.709
.6200	.6799	.3135	3.54	3.23	7.01	.2234	1.4[illegible]	448.1	.53743	.014614	15.156
.6000	.6599	.3343	3.72	3.38	7.28	.2145	1.4[illegible]	450.[illegible]	.53915	.014723	16.717
.5800	.6399	.3557	3.90	3.54	7.53	.2052	1.5[illegible]	452.7	.54075	.014829	18.401
.5600	.6199	.3774	4.09	3.70	7.77	.1955	1.5[illegible]	454.8	.54225	.014934	20.218
.5400	.5999	.3992	4.30	3.87	7.98	.1856	1.5[illegible]	456.[illegible]	.54366	.015037	22.181
.5200	.5798	.4212	4.51	4.04	8.17	.1755	1.5[illegible]	458.7	.54497	.015139	24.302
.5000	.5598	.4433	4.73	4.22	8.34	.1652	1.5[illegible]	460.[illegible]	.54622	.015239	26.597
.4800	.5398	.4653	4.96	4.41	8.47	.1549	1.5[illegible]	462.[illegible]	.54739	.015338	29.084
.4600	.5198	.4873	5.21	4.61	8.59	.1445	1.5[illegible]	464.8	.54850	.015437	31.781
.4400	.4998	.5091	5.48	4.82	8.69	.1343	1.6[illegible]	466.8	.54954	.015535	34.712
.4200	.4797	.5304	5.76	5.04	8.78	.1241	1.6[illegible]	468.7	.55054	.015632	37.903
.4000	.4597	.5518	6.06	5.27	8.85	.1141	1.6[illegible]	470.[illegible]	.55148	.015730	41.386
.3800	.4397	.5725	6.39	5.52	8.74	.1043	1.6[illegible]	472.[illegible]	.55238	.015828	45.196
.3600	.4196	.5925	6.75	5.79	8.78	.0948	1.6[illegible]	474.5	.55323	.015926	49.376
.3400	.3996	.6118	7.14	6.08	8.69	.0856	1.6[illegible]	476.[illegible]	.55405	.016025	53.969
.3200	.3796	.6300	7.58	6.38	8.41	.0767	1.6[illegible]	478.2	.55482	.016125	59.066
.3000	.3595	.6471	8.06	6.72	8.[illegible]	.0682	1.6[illegible]	480.[illegible]	.55556	.016227	64.712
.2800	.3394	.6628	8.60	7.09	8.18	.0602	1.6[illegible]	482.[illegible]	.55627	.016330	70.999
.2600	.3194	.6766	9.21	7.49	7.96	.0526	1.6[illegible]	484.[illegible]	.55694	.016435	78.075
.2400	.2993	.6884	9.92	7.94	7.71	.0454	1.6[illegible]	486.4	.55758	.016543	86.055
.2200	.2792	.6977	10.74	8.44	7.41	.0388	1.6[illegible]	488.[illegible]	.55820	.016655	95.138
.2000	.2590	.7038	11.71	9.01	7.08	.0326	1.6[illegible]	490.[illegible]	.55878	.016771	105.573
.1800	.2389	.7062	12.88	9.67	6.72	.0270	1.6[illegible]	493.4	.55933	.016891	117.693
.1600	.2186	.7036	14.32	10.43	6.31	.0219	1.6770	496.[illegible]	.55986	.017015	131.964
.1400	.1983	.6956	16.18	11.34	5.86	.0174	1.6797	498.5	.55986	.017154	149.057
.1200	.1779	.6800	18.64	12.45	5.38	.0134	1.6814	501.[illegible]	.56083	.017300	169.990
.1000	.1572	.6348	22.10	13.85	4.86	.0099	1.6829	505.[illegible]	.56126	.017461	196.429
.0900	.1467	.6377	24.43	14.70	4.58	.0084	1.6845	507.[illegible]	.56147	.017548	212.57
.0800	.1361	.6171	27.39	15.69	4.29	.0070	1.6841	509.[illegible]	.56166	.017643	231.43
.0700	.1252	.5926	31.28	16.87	3.98	.0057	1.6847	511.7	.56185	.017746	253.98
.0600	.1139	.5639	36.68	18.34	3.66	.0045	1.6851	514.[illegible]	.56202	.017862	281.96
.0500	.1018	.5317	44.84	20.27	3.30	.0034	1.6856	517.[illegible]	.56218	.017999	319.02
.0450	.0950	.5156	50.89	21.56	3.10	.0029	1.6858	519.[illegible]	.56226	.018082	343.73
.0400	.0873	.5086	59.61	23.27	2.88	.0024	1.6860	521.8	.56233	.018185	376.93
.0380	.0837	.5002	64.51	24.19	2.77	.0021	1.6861	523.[illegible]	.56235	.018236	394.89
.0360	.0794	.5024	71.05	25.40	2.64	.0019	1.6863	524.[illegible]	.56238	.018301	418.66
.0350	.0767	.5075	75.49	26.23	2.56	.0017	1.6863	525.[illegible]	.56239	.018344	434.58
.0340	.0731	.5201	81.83	27.44	2.45	.0015	1.6864	527.[illegible]	.56241	.018403	458.93
.0334	.0692	.5432	89.05	28.88	2.33	.0013	1.6865	528.[illegible]	.56242	.018471	487.71

TABLE VI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -3.0^{\circ}$, $e_i = 0.06608$

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.0200	1.0799	0.0000010	3.000	2.833	0.0000	0.0013	0	0	0	0	0.000
1.0205	1.0804	.0000026	2.954	2.790	.0001	.0020	.0010	16.5	.00050	.001068	.000
1.0210	1.0809	.0000069	2.906	2.744	.0002	.0033	.0026	33.3	.04145	.002138	.000
1.0215	1.0814	.0000182	2.855	2.696	.0006	.0053	.0053	50.6	.06302	.003224	.001
1.0220	1.0819	.0000500	2.800	2.645	.0017	.0089	.0099	68.8	.08570	.004344	.002
1.0225	1.0824	.0001527	2.737	2.585	.0052	.0155	.0189	89.3	.11136	.005585	.004
1.02285	1.0829	.0006414	2.651	2.504	.0223	.0318	.0415	116.4	.14525	.007179	.019
1.0225	1.0824	.0016859	2.592	2.449	.0580	.0515	.0696	135.2	.16869	.008253	.049
1.0220	1.0819	.0005545	2.567	2.425	.0874	.0632	.0867	143.3	.17886	.008711	.07[illegible]
1.0210	1.0809	.004017	2.540	2.399	.1379	.0792	.1105	154.[illegible]	.19026	.009219	.116
1.0200	1.0799	.005375	2.524	2.383	.1844	.0914	.1289	158.4	.19760	.009544	.158
1.0150	1.0750	.011648	2.485	2.346	.398	.1331	.1937	174.[illegible]	.21738	.010409	.344
1.0100	1.0700	.017612	2.470	2.332	.599	.1617	.2406	183.6	.22813	.010873	.521
1.0050	1.0650	.02344	2.465	2.326	.794	.1845	.2792	189.1	.23563	.011197	.700
1.0000	1.0600	.02920	2.464	2.324	.984	.2035	.3129	193.5	.24143	.011446	.876
.9950	1.0550	.03489	2.466	2.325	1.171	.2199	.3430	197.7	.24616	.011650	1.052
.9900	1.0500	.04055	2.470	2.329	1.355	.2342	.3705	204.6	.25016	.011822	1.226
.9800	1.0400	.05176	2.483	2.339	1.714	.2585	.4196	206.4	.25670	.012105	1.585
.9700	1.0300	.06289	2.500	2.354	2.06	.2782	.4629	210.8	.26193	.012333	1.944
.9600	1.0200	.07395	2.520	2.371	2.40	.2945	.5018	214.5	.26630	.012524	2.311
.9500	1.0099	.08495	2.542	2.391	2.74	.3081	.5373	217.7	.27005	.012690	2.683
.9400	.9999	.09592	2.566	2.412	3.06	.3194	.5701	220.6	.27334	.012836	3.061
.9300	.9899	.10685	2.592	2.435	3.38	.3288	.6006	223.3	.27627	.012968	3.447
.9200	.9799	.11775	2.619	2.459	3.69	.3367	.6291	225.5	.27891	.013088	3.840
.9100	.9699	.12863	2.647	2.484	3.99	.3431	.6558	227.7	.28130	.013199	4.240
.9000	.9599	.13948	2.677	2.510	4.28	.3482	.6811	229.6	.28351	.013301	4.649
.8800	.9399	.16114	2.740	2.565	4.85	.3554	.7276	233.0	.28743	.013486	5.494
.8600	.9199	.18275	2.807	2.624	5.39	.3589	.7698	236.4	.29084	.013652	6.375
.8400	.8999	.2043	2.878	2.686	5.91	.3594	.8081	239.2	.29386	.013802	7.296
.8200	.8799	.2258	2.952	2.751	6.40	.3575	.8433	242.0	.29657	.013939	8.261
.8000	.8599	.2472	3.031	2.820	6.86	.3535	.8757	244.6	.29903	.014068	9.272
.7800	.8399	.2686	3.114	2.892	7.29	.3477	.9056	246.8	.30127	.014188	10.332
.7600	.8199	.2900	3.201	2.967	7.70	.3405	.9333	249.0	.30333	.014302	11.446
.7400	.7999	.3112	3.293	3.046	8.07	.3319	.9590	251.1	.30524	.014410	12.618
.7200	.7799	.3324	3.389	3.128	8.41	.3223	.9830	253.1	.30702	.014514	13.852
.7000	.7599	.3535	3.490	3.215	8.75	.3119	1.0052	255.0	.30868	.014613	15.152
.6800	.7399	.3745	3.596	3.305	9.05	.3006	1.0260	256.9	.31023	.014710	16.524
.6600	.7199	.3954	3.708	3.399	9.31	.2888	1.0454	258.7	.31170	.014803	17.974
.6400	.6999	.4162	3.826	3.499	9.56	.2765	1.0634	260.4	.31308	.014894	19.508
.6200	.6799	.4367	3.951	3.603	9.77	.2638	1.0803	262.1	.31439	.014983	21.133
.6000	.6599	.4571	4.08	3.712	9.96	.2508	1.0961	263.8	.31563	.015070	22.857
.5800	.6399	.4773	4.22	3.827	10.11	.2377	1.1108	265.4	.31681	.015156	24.689
.5600	.6198	.4973	4.37	3.948	10.25	.2244	1.1245	267.0	.31793	.015240	26.639
.5400	.5998	.5169	4.53	4.08	10.33	.2112	1.1372	268.6	.31901	.015324	28.717
.5200	.5798	.5363	4.70	4.21	10.40	.1980	1.1492	270.2	.32003	.015407	30.938
.5000	.5598	.5552	4.88	4.36	10.44	.1849	1.1605	271.8	.32102	.015489	33.314
.4800	.5398	.5738	5.07	4.51	10.45	.1720	1.1712	273.4	.32196	.015571	35.862
.4600	.5198	.5919	5.28	4.67	10.43	.1593	1.1812	275.0	.32286	.015653	38.601
.4400	.4998	.6094	5.50	4.84	10.38	.1469	1.1891	276.5	.32373	.015734	41.553
.4200	.4797	.6264	5.75	5.03	10.30	.1348	1.1973	278.1	.32456	.015817	44.743
.4000	.4597	.6427	6.01	5.23	10.19	.1232	1.2046	279.8	.32537	.015899	48.200
.3800	.4397	.6581	6.30	5.44	10.04	.1119	1.2120	281.4	.32614	.015983	51.959
.3600	.4197	.6727	6.62	5.68	9.87	.1010	1.2184	283.0	.32689	.016067	56.060
.3400	.3996	.6863	6.97	5.93	9.67	.0907	1.2244	284.7	.32761	.016153	60.554
.3200	.3796	.6986	7.36	6.20	9.44	.0808	1.2298	286.3	.32830	.016240	65.498
.3000	.3595	.7097	7.81	6.51	9.17	.0715	1.2348	288.3	.32897	.016329	70.966
.2800	.3395	.7191	8.31	6.84	8.88	.0627	1.2393	290.1	.32962	.016420	77.044
.2600	.3194	.7267	8.88	7.22	8.55	.0545	1.2434	292.0	.33024	.016514	83.847
.2400	.2993	.7321	9.54	7.64	8.20	.0468	1.2472	294.0	.33084	.016612	91.513
.2200	.2792	.7350	10.32	8.11	7.85	.0398	1.2504	296.1	.33142	.016713	100.226
.2000	.2591	.7348	11.24	8.65	7.40	.0334	1.2534	298.3	.33197	.016818	110.225
.1800	.2390	.7310	12.37	9.28	6.96	.0275	1.2560	300.6	.33251	.016930	121.833
.1600	.2187	.7227	13.77	10.02	6.48	.0222	1.2583	303.2	.33302	.017048	135.502
.1400	.1985	.7088	15.56	10.91	5.98	.0176	1.2604	305.9	.33350	.017175	151.883
.1200	.1780	.6879	17.96	12.[illegible]	5.45	.0135	1.2620	308.9	.33396	.017313	171.965
.1000	.1574	.6579	21.35	13.[illegible]	4.89	.0100	1.2635	312.3	.33439	.017466	197.367
.0900	.1470	.6387	23.64	14.[illegible]	4.60	.0085	1.2641	314.2	.33460	.017550	212.90
.0800	.1363	.6161	26.54	15.[illegible]	4.29	.0070	1.2647	316.3	.33479	.017641	231.05
.0700	.1255	.5898	30.37	16.38	3.98	.0057	1.2652	318.6	.33498	.017741	252.78
.0600	.1142	.5595	35.67	17.84	3.65	.0046	1.2657	321.2	.33515	.017853	279.73
.0500	.1022	.5256	43.69	19.76	3.29	.0035	1.2662	324.4	.33531	.017986	315.38
.0450	.0955	.5086	49.61	21.03	3.09	.0029	1.2664	326.3	.33539	.018067	339.07
.0400	.0880	.4942	58.09	22.71	2.87	.0024	1.2666	328.6	.33546	.018166	370.64
.0380	.0844	.4908	62.80	23.[illegible]	2.76	.0022	1.2667	329.8	.33549	.018215	387.50
.0360	.0803	.4913	68.99	24.75	2.64	.0019	1.2668	331.3	.33552	.018276	409.39
.0350	.0778	.4946	73.09	25.51	2.56	.0018	1.2669	332.3	.33553	.018315	423.94
.0340	.0746	.5030	78.58	26.54	2.47	.0016	1.2670	333.5	.33555	.018366	443.84
.0335	.0724	.5120	82.51	27.[illegible]	2.41	.0015	1.2671	334.4	.33556	.018402	458.53
.0330	.0686	.5364	89.84	28.77	2.29	.0013	1.2671	336.1	.33556	.018470	487.59

TABLE VI.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -4.0^{\circ}$, $e_i = 0.08056$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{\theta}_r}{r}$	$\bar{q}$	$\bar{\gamma}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\dot{\psi}$
1.0200	1.0799	0.0000010	4.000	3.780	0.0000	0.0013	0	0	0	0	0.000
1.0205	1.0804	.0000026	3.966	3.745	.0001	.0020	.0007	12.4	.01530	.001066	.000
1.0210	1.0809	.0000078	3.930	3.712	.0002	.0033	.0015	24.7	.03081	.002136	.000
1.0215	1.0814	.0000193	3.892	3.677	.0006	.0053	.0024	37.4	.04661	.003216	.001
1.0220	1.0819	.0000440	3.853	3.640	.0017	.0088	.0036	[illegible]	.06294	.004321	.001
1.0225	1.0824	.0001419	3.810	3.599	.0044	.0149	.0058	[illegible]	.08059	.005503	.004
1.02302	1.0829	.0006071	3.731	3.524	.0166	.0377	.0358	89.7	.11177	.007558	.026
1.0225	1.0824	.0009234	3.681	3.477	.0277	.0658	.0658	105.5	.13143	.008831	.083
.0220	1.0819	.0031947	3.667	3.463	.1373	.0792	.0779	110.2	.13739	.009214	.117
.0210	1.0809	.0064777	3.649	3.447	.2087	.0974	.0968	117.1	.14467	.009680	.178
1.0200	1.0799	.0088014	3.639	3.437	.2[illegible]	.1116	.1117	120.0	.14953	.009989	.236
1.0150	1.0749	.0170682	3.613	3.412	.5[illegible]	.1611	.1650	134.8	.16289	.010836	.505
1.0100	1.0699	.0257[illegible]	3.604	3.402	.8[illegible]	.1956	.2037	139.7	.17022	.011298	.765
1.0050	1.0649	.0343[illegible]	3.600	3.398	1.270	.2230	.2357	140.9	.17535	.011620	1.023
1.0000	1.0599	.0428[illegible]	3.600	3.396	1.4[illegible]	.2460	.2635	141.1	.17931	.011869	1.280
.9950	1.0549	.0510[illegible]	3.602	3.397	1.631	.2658	.2884	140.6	.18254	.012072	1.538
.9900	1.0499	.0590[illegible]	3.606	3.400	1.7[illegible]	.2831	.3112	139.0	.18528	.012245	1.796
.9800	1.0399	.0751[illegible]	3.615	3.407	2.[illegible]	.3123	.3518	132.7	.18975	.012527	2.314
.9700	1.0299	.0917[illegible]	3.628	3.417	3.01	.3360	.3876	125.[illegible]	.19333	.012754	2.838
.9600	1.0199	.1077[illegible]	3.643	3.429	3.[illegible]	.3555	.4198	[illegible]	.19632	.012944	3.368
.9500	1.0099	.1234[illegible]	3.659	3.442	4.[illegible]	.3716	.4493	[illegible]	.19890	.013108	3.905
.9400	.9999	.1393[illegible]	3.677	3.457	[illegible]	.3849	.4765	102.4	.20115	.013253	4.448
.9300	.9899	.1549[illegible]	3.696	3.472	[illegible]	.3959	.5017	94.2	.20317	.013383	4.999
.9200	.9799	.1704[illegible]	3.716	3.489	[illegible]	.4050	.5254	[illegible]	.20499	.013501	5.55[illegible]
.9100	.9699	.1857[illegible]	3.737	3.506	[illegible]	.4122	.5476	67.3	.20664	.013608	6.125
.9000	.9599	.2010	3.759	3.524	[illegible]	.4180	.5687	58.7	.20817	.013708	6.700
.8800	.9399	.2311	3.805	3.563	[illegible]	.4255	.6075	171.2	.21089	.013888	7.879
.8600	.9199	.2601	3.855	3.604	7.70	.4286	.6427	173.4	.21387	.014048	9.09[illegible]
.8400	.8999	.2869	3.908	3.647	[illegible].38	.4281	.6748	[illegible]	.21540	.014192	10.35[illegible]
.8200	.8799	.3116	3.963	3.693	9.02	.4246	.7044	177.4	.21731	.014323	11.65[illegible]
.8000	.8599	.3448	4.023	3.742	9.61	.4186	.7317	179.2	.21905	.014445	13.00[illegible]
.7800	.8399	.3745	4.085	3.794	[illegible].16	.4105	.7570	180.0	.22065	.014559	14.40[illegible]
.7600	.8199	.4016	4.151	3.848	[illegible].66	.4006	.7805	182.4	.22214	.014665	15.85[illegible]
.7400	.7999	.4263	4.221	3.905	11.11	.3893	.8024	183.9	.22352	.014766	17.36[illegible]
.7200	.7799	.4[illegible]	4.295	3.965	[illegible].52	.3768	.8228	185.3	.22481	.014863	18.93[illegible]
.7000	.7599	.4800	4.373	4.028	11.88	.3633	.8419	186.6	.22603	.014955	20.57[illegible]
.6800	.7399	.5001	4.456	4.095	[illegible].20	.3490	.8597	187.1	.22718	.015043	22.282
.6600	.7199	.5299	4.543	4.165	[illegible].47	.3341	.8764	189.5	.22826	.015129	24.06[illegible]
.6400	.6999	.5533	4.636	4.239	12.70	.3187	.8920	190.8	.22930	.015212	25.93[illegible]
.6200	.6799	.5744	4.735	4.318	[illegible].89	.3029	.9067	192.0	.23028	.015293	27.89[illegible]
.6000	.6599	.5934	4.840	4.401	[illegible].04	.2870	.9204	193.3	.23123	.015377	29.94[illegible]
.5800	.6399	.6207	4.953	4.489	[illegible].14	.2709	.9333	194.6	.23213	.015449	32.104
.5600	.6199	.6417	5.07	4.582	13.21	.2549	.9453	195.8	.23300	.015525	34.37[illegible]
.5400	.5999	.6611	5.20	4.682	13.23	.2389	.9566	[illegible]	.23383	.015600	36.77[illegible]
.5200	.5799	.6814	5.34	4.788	13.21	.2231	.9671	[illegible]	.23463	.015674	39.30[illegible]
.5000	.5599	.6990	5.49	4.901	13.16	.2075	.9770	199.6	.23541	.015748	41.99[illegible]
.4800	.5399	.7175	5.65	5.02	13.06	.1922	.9862	200.8	.23616	.015821	44.84[illegible]
.4600	.5199	.7347	5.82	5.15	[illegible].93	.1774	.9948	202.1	.23688	.015893	47.87[illegible]
.4400	.4999	.7497	6.01	5.29	[illegible].76	.1629	1.0028	203.4	.23758	.015964	51.11[illegible]
.4200	.4799	.7641	6.22	5.44	[illegible].56	.1489	1.0102	204.7	.23826	.016034	54.52[illegible]
.4000	.4599	.7779	6.45	5.61	[illegible].32	.1354	1.0171	206.0	.23892	.016112	58.303
.3800	.4399	.7[illegible]	6.70	5.79	[illegible].04	.1225	1.0235	207.3	.23957	.016189	62.31[illegible]
.3600	.4199	.7[illegible]	6.97	5.98	[illegible].74	.1101	1.0294	208.7	.24019	.016261	66.6[illegible]
.3400	.3999	.8[illegible]	7.28	6.19	11.39	.0984	1.0349	210.2	.24080	.016337	71.354
.3200	.3799	.8159	[illegible]	6.43	11.02	.0873	1.0399	211.6	.24139	.016414	76.461
.3000	.3599	.8[illegible]	[illegible]	6.69	10.61	.0769	1.0445	213.2	.24196	.016493	82.12[illegible]
.2800	.3399	.8245	[illegible]	6.98	[illegible].18	.0671	1.0487	214.8	.24252	.016574	88.35[illegible]
.2600	.3199	.8254	[illegible]	7.31	9.72	.0581	1.0525	216.4	.24306	.016655	95.23[illegible]
.2400	.2999	.8236	[illegible]	7.68	9.22	.0497	1.0560	218.2	.24359	.016744	102.9[illegible]
.2200	.2799	.8189	[illegible]	8.10	8.71	.0420	1.0591	220.1	.24411	.016834	111.6[illegible]
.2000	.2599	.8106	[illegible]	8.59	8.16	.0350	1.0619	222.0	.24461	.016929	121.593
.1800	.2399	.7983	[illegible]	9.16	7.60	.0287	1.0644	224.2	.24509	.017029	133.047
.1600	.2199	.7811	[illegible]	9.84	7.01	.0231	1.0666	226.5	.24556	.017133	146.45[illegible]
.1400	.1999	.7580	[illegible]	10.66	[illegible].40	.0182	1.0685	229.0	.24601	.017253	162.4[illegible]
.1200	.1799	.7277	[illegible]	11.68	[illegible].77	.0139	1.0702	231.9	.24644	.017377	181.9[illegible]
.1000	.1599	.6882	[illegible]	12.98	[illegible].13	.0103	1.0716	235.1	.24685	.017517	206.4[illegible]
.0900	.1499	.6642	[illegible]	13.78	4.79	.0087	1.0722	236.9	.24705	.017595	221.4[illegible]
.0800	.1399	.6369	[illegible]	14.72	4.45	.0072	1.0728	238.9	.24723	.017679	238.84
.0700	.1299	.6058	[illegible]	15.85	4.11	.0059	1.0733	241.1	.24741	.017772	259.64
.0600	.1199	.5707	[illegible]	17.25	3.75	.0046	1.0738	243.6	.24758	.017877	285.33
.0500	.1099	.5318	[illegible]	19.09	3.36	.0035	1.0742	246.6	.24774	.018001	319.07
.0450	.0949	.5119	[illegible]	20.30	3.16	.0030	1.0745	248.4	.24782	.018075	341.2[illegible]
.0400	.0899	.4938	[illegible]	21.88	2.92	.0025	1.0747	250.6	.24789	.018177	370.33
.0380	.0879	.4883	[illegible]	22.70	2.82	.0022	1.0748	251.7	.24792	.018211	388.44
.0360	.0859	.4855	[illegible]	23.72	2.70	.0020	1.0749	253.1	.24794	.018265	408.5[illegible]
.0350	.0849	.4861	[illegible]	24.37	2.63	.0019	1.0749	253.9	.24796	.018297	416.62
.0340	.0839	.4894	[illegible]	25.18	2.54	.0017	1.0750	254.9	.24797	.018337	431.8[illegible]
.0330	.0829	.4994	[illegible]	26.36	2.44	.0015	1.0751	256.3	.24798	.018393	454.04
.0323	.0822	.5282	[illegible]	28.27	2.28	.0013	1.0752	258.5	.24799	.018479	490.55

TABLE VI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -5.0^{\circ}$, $e_i = 0.09600$

$\bar{V}$	$\bar{V}_r$	$\bar{u}$	γ deg	$-\gamma$ deg	$-\frac{a_x}{g}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{x}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\beta r}\,\frac{\dot{y}}{V}$
1.0200	1.0798	0.0000010	5.000	4.72[illegible]	0.0000	0.0013	0	0	0	0	0.000
1.0205	1.0803	.0000026	4.973	4.697	.0001	.0020	.0006	9.8	.01221	.0010[illegible]	.000
1.0210	1.0808	.0000068	4.944	4.670	.0002	.0033	.0015	19.7	.02453	.0021[illegible]	.000
1.0215	1.0813	.0000180	4.915	4.642	.0006	.0053	.0031	29.8	.03703	.0036[illegible]	.001
1.0220	1.0818	.0000484	4.884	4.613	.0017	.0087	.0057	40.1	.04983	.0045[illegible]	.001
1.0225	1.0823	.0001369	4.850	4.580	.0047	.0147	.0102	51.0	.06338	.0054[illegible]	.004
1.0230	1.0828	.004838	4.808	4.54[illegible]	.0166	.0276	.0202	64.3	.07998	.0068[illegible]	.014
1.02315	1.08296	.011547	4.779	4.51[illegible]	.0399	.0427	.0320	73.5	.09150	.0078[illegible]	.034
1.0230	1.0828	.022863	4.756	4.49[illegible]	.0778	.0597	.0453	80.7	.10046	.0085[illegible]	.06[illegible]
1.0225	1.0823	.004033	4.737	4.475	.1386	.0796	.0611	86.9	.10820	.0092[illegible]	.118
1.0220	1.0818	.005489	4.727	4.46[illegible]	.1886	.0928	.0716	90.2	.11234	.009565	.161
1.0210	1.0808	.008138	4.714	4.45[illegible]	.279	.1127	.0876	94.5	.11765	.010004	.24[illegible]
1.0200	1.0798	.010635	4.707	4.44[illegible]	.365	.1286	.1005	97.4	.12128	.010[illegible]	[illegible]
1.0150	1.0748	.02237	4.688	4.42[illegible]	.764	.1843	.1469	105.6	.13140	.0111[illegible]	[illegible]
1.0100	1.0698	.03363	4.681	4.41[illegible]	1.143	.2234	.1807	110.1	.13700	.0115[illegible]	[illegible]
1.0050	1.0648	.04469	4.679	4.41[illegible]	1.512	.2546	.2087	113.3	.14092	.0119[illegible]	1.5[illegible]
1.0000	1.0598	.05560	4.680	4.41[illegible]	1.874	.2807	.2331	115.8	.14396	.0121[illegible]	1.[illegible]
.9950	1.0548	.06641	4.682	4.41[illegible]	2.23	.3032	.2546	117.8	.14644	.012[illegible]	2.00[illegible]
.9900	1.0498	.07714	4.685	4.41[illegible]	2.58	.3230	.2746	119.5	.14853	.0125[illegible]	2.3[illegible]
.9800	1.0398	.09836	4.693	4.42[illegible]	3.26	.3562	.3104	122.4	.15196	.0128[illegible]	3.011
.9700	1.0298	.11933	4.704	4.431	3.91	.3831	.3418	124.7	.15472	.0130[illegible]	3.601
.9600	1.0198	.14006	4.717	4.440	4.55	.4051	.3701	126.7	.15702	.0132[illegible]	4.[illegible]
.9500	1.0098	.16057	4.731	4.45[illegible]	5.17	.4233	.3955	128.4	.15899	.0133[illegible]	5.071
.9400	.9998	.18086	4.746	4.461	5.77	.4384	.4198	129.9	.16073	.013541	5.77[illegible]
.9300	.9898	.2010	4.762	4.47[illegible]	6.35	.4508	.4420	131.2	.16228	.0136[illegible]	6.4[illegible]
.9200	.9798	.2208	4.778	4.48[illegible]	6.91	.4609	.4628	132.5	.16368	.0137[illegible]	7.2[illegible]
.9100	.9698	.2405	4.796	4.49[illegible]	7.46	.4689	.4828	133.6	.16496	.0138[illegible]	7.[illegible]
.9000	.9598	.2600	4.814	4.51[illegible]	7.98	.4753	.5008	134.7	.16614	.0139[illegible]	8.[illegible]
.8800	.9398	.2984	4.852	4.543	8.98	.4834	.5349	136.6	.16824	.0141[illegible]	10.170
.8600	.9198	.3360	4.894	4.57[illegible]	9.92	.4864	.5655	138.4	.17009	.0143[illegible]	11.720
.8400	.8998	.3727	4.938	4.60[illegible]	10.78	.4853	.5943	140.0	.17173	.0144[illegible]	13.[illegible]
.8200	.8798	.4087	4.984	4.64[illegible]	11.57	.4808	.6203	141.4	.17322	.0146[illegible]	14.062
.8000	.8598	.4438	5.033	4.68[illegible]	12.30	.4734	.6444	142.8	.17458	.0147[illegible]	16.643
.7800	.8398	.4781	5.086	4.72[illegible]	12.97	.4637	.6668	144.1	.17583	.0148[illegible]	18.388
.7600	.8198	.5115	5.141	4.77[illegible]	13.57	.4520	.6876	145.4	.17699	.0149[illegible]	20.[illegible]
.7400	.7998	.5440	5.200	4.82[illegible]	14.11	.4386	.7070	146.5	.17808	.0150[illegible]	22.[illegible]
.7200	.7798	.5756	5.262	4.88[illegible]	14.58	.4239	.7251	147.7	.17909	.0151[illegible]	23.[illegible]
.7000	.7598	.6063	5.327	4.90[illegible]	15.00	.4082	.7421	148.8	.18005	.0152[illegible]	25.988
.6800	.7398	.6360	5.397	4.90[illegible]	15.35	.3915	.7580	149.9	.18096	.015298	28.059
.6600	.7198	.6647	5.471	5.00[illegible]	15.65	.3742	.7729	150.9	.18183	.0153[illegible]	30.214
.6400	.6997	.6924	5.550	5.07[illegible]	15.89	.3564	.7868	152.0	.18265	.0154[illegible]	32.455
.6200	.6797	.7190	5.634	5.136	16.07	.3382	.7999	153.0	.18344	.0155[illegible]	34.789
.6000	.6597	.7445	5.724	5.204	16.20	.3199	.8121	154.0	.18420	.0156[illegible]	37.224
.5800	.6397	.7688	5.820	5.275	16.27	.3014	.8238	155.0	.18492	.0157[illegible]	[illegible].768
.5600	.6197	.7920	5.923	5.351	16.29	.2830	.8348	156.1	.18562	.0157[illegible]	[illegible].429
.5400	.5997	.8139	6.03[illegible]	5.432	16.26	.2648	.8447	157.1	.18630	.0158[illegible]	[illegible].218
.5200	.5797	.8345	6.15	5.518	16.18	.2468	.854[illegible]	158.1	.18695	.0158[illegible]	48.147
.5000	.5597	.8538	6.28	5.61[illegible]	16.05	.2291	.863[illegible]	159.1	.18758	.0159[illegible]	51.229
.4800	.5397	.8717	6.42	5.73[illegible]	15.87	.2118	.871[illegible]	160.1	.18820	.016035	54.479
.4600	.5197	.8880	6.57	5.81[illegible]	15.64	.1950	.879[illegible]	161.2	.18879	.016103	57.914
.4400	.4996	.9028	6.74	5.91[illegible]	15.37	.1787	.886[illegible]	162.2	.18938	.016171	61.554
.4200	.4796	.9159	6.92	6.0[illegible]	15.05	.1629	.893[illegible]	163.3	.18994	.016239	65.422
.4000	.4596	.9273	7.12	6.20	14.69	.1478	.8996	164.4	.19049	.016307	[illegible].545
.3800	.4396	.9367	7.34	6.35	14.29	.1334	.9050	165.6	.19103	.016375	73.954
.3600	.4196	.9442	7.59	6.51	13.85	.1196	.9100	166.7	.19156	.016444	[illegible].686
.3400	.3995	.9496	7.87	6.64	13.37	.1066	.9160	168.0	.19207	.016514	[illegible].786
.3200	.3795	.9526	8.18	6.84	12.86	.0943	.9206	169.2	.19257	.016585	[illegible].308
.3000	.3595	.9532	8.53	7.11	12.31	.0828	.9249	170.5	.19307	.016657	95.316
.2800	.3394	.9510	8.94	7.37	11.74	.0721	.9288	171.9	.19355	.016731	101.889
.2600	.3193	.9458	9.41	7.69	11.13	.0621	.9323	173.4	.19402	.016807	109.130
.2400	.2993	.9373	9.96	7.97	10.49	.0530	.9356	174.9	.19448	.016886	117.166
.2200	.2792	.9252	10.61	8.35	9.83	.0446	.9386	176.5	.19494	.016968	126.159
.2000	.2591	.9088	11.40	8.79	9.15	.0371	.9413	178.3	.19538	.017055	136.327
.1800	.2390	.8878	12.37	9.29	8.45	.0303	.9439	180.2	.19581	.017146	147.961
.1600	.2188	.8612	13.60	9.93	7.73	.0243	.9456	182.3	.19624	.017243	161.467
.1400	.1985	.8280	15.19	10.6[illegible]	6.99	.0190	.9474	184.6	.19665	.017347	177.431
.1200	.1782	.7870	17.34	11.58	6.25	.0145	.9490	187.2	.19704	.017462	196.744
.1000	.1576	.7362	20.41	12.78	5.49	.0106	.9503	190.2	.19742	.017591	220.85
.0900	.1472	.7063	22.50	13.5[illegible]	5.10	.0089	.9509	191.8	.19760	.017662	235.45
.0800	.1367	.6730	25.16	14.41	4.72	.0074	.9515	193.7	.19778	.017739	252.39
.0700	.1260	.6358	28.67	15.46	4.32	.0060	.9520	195.8	.19794	.017824	272.49
.0600	.1149	.5943	33.56	16.78	3.92	.0048	.9524	198.1	.19810	.017920	297.15
.0500	.1031	.5487	40.90	18.51	3.50	.0036	.9529	200.9	.19826	.018034	329.22
.0450	.0967	.5250	46.26	19.6[illegible]	3.28	.0031	.9533	202.6	.19833	.018102	350.03
.0400	.0897	.5024	53.78	21.10	3.03	.0026	.9535	204.7	.19840	.018184	376.84
.0380	.0865	.4946	57.81	21.8[illegible]	2.92	.0023	.9535	205.7	.19842	.018224	390.48
.0360	.0829	.4886	62.87	22.75	2.80	.0021	.9535	206.9	.19845	.018270	407.15
.0350	.0808	.4869	65.98	23.[illegible]	2.73	.0020	.9535	207.6	.19846	.018298	417.30
.0340	.0786	.4867	69.71	23.95	2.65	.0018	.9534	208.4	.19848	.018329	429.45
.0330	.0758	.4896	74.49	24.80	2.56	.0017	.9537	209.4	.19849	.018369	445.10
.0320	.0720	.5007	81.69	26.10	2.43	.0015	.9537	210.9	.19851	.018428	469.44
.0316	.0692	.5153	87.22	27.16	2.34	.0013	.9538	212.1	.19851	.018474	489.25

TABLE VI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -6.0^\circ$, $e_i = 0.11198$

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{u}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.0400	1.0797	0.000000[illegible]	6.000	5.6[illegible]	0.000[illegible]	0.0013	0	0	0	0	0.000
1.0205	1.0802	.000004[illegible]	5.977	5.6[illegible]	.0001	.0020	.00[illegible]	8.[illegible]	.01015	.001065	.000
1.0210	1.0807	.000006[illegible]	5.954	5.6[illegible]	.0002	.0033	.001[illegible]	16.4	.02038	.002134	.000
1.0215	1.0812	.000016	5.929	5.601	.0006	.0053	.00[illegible]	24.8	.03072	.003209	.001
1.0220	1.0817	.000048	5.904	5.577	.0017	.0087	.00[illegible]	33.2	.04125	.004301	.001
1.0225	1.0822	.000139[illegible]	5.877	5.5[illegible]	.0048	.0145	.00[illegible]	42.1	.05228	.005439	.004
1.0230	1.0827	.000434[illegible]	5.844	5.521	.0146	.0262	.01[illegible]	52.3	.06502	.006747	.013
1.02325	1.08296	.001403[illegible]	5.819	5.4[illegible]	.0481	.0471	.00[illegible]	62.6	.07777	.008048	.041
1.0230	1.0827	.003258	5.788	5.4[illegible]	.1120	.0716	.0451	70.0	.08699	.008984	.096
1.0225	1.0822	.005281	5.775	5.4[illegible]	.1814	.0911	.0577	74.3	.09229	.009521	.155
1.0220	1.0817	.007023	5.768	5.4[illegible]	.241	.1049	.0663	76.8	.09543	.009835	.206
1.0210	1.0807	.010231	5.758	5.4[illegible]	.351	.1264	.0805	80.2	.09959	.010259	.301
1.0200	1.0797	.013270	5.752	5.433	.455	.1436	.09[illegible]	82.5	.10246	.010[illegible]	.390
1.0150	1.0747	.02760	5.737	5.41[illegible]	.942	.2047	.13[illegible]	85.1	.11061	.011[illegible]	.816
1.0100	1.0697	.04138	5.733	5.4[illegible]	1.407	.2478	.1645	94.7	.11514	.011824	1.229
1.0050	1.0647	.05493	5.732	5.409	1.859	.2822	.1897	95.3	.11833	.012143	1.640
1.0000	1.0597	.06829	5.732	5.4[illegible]	2.30	.3110	.2117	97.4	.12080	.012390	2.049
.9950	1.0547	.08153	5.735	5.40[illegible]	2.73	.3358	.2314	99.1	.12282	.012590	2.458
.9900	1.0497	.09466	5.738	5.41[illegible]	3.16	.3577	.2495	100.4	.12452	.012764	2.868
.9800	1.0397	.12064	5.746	5.42[illegible]	3.99	.3943	.2811	102.8	.12731	.013045	3.693
.9700	1.0297	.14628	5.756	5.42[illegible]	4.80	.4240	.3095	104.7	.12955	.013271	4.524
.9600	1.0197	.17162	5.768	5.429	5.58	.4483	.3355	106.3	.13143	.013[illegible]	5.363
.9500	1.0097	.19668	5.780	5.43[illegible]	6.33	.4684	.3587	107.6	.13304	.013663	6.211
.9400	.9997	.2214	5.793	5.44[illegible]	7.06	.4850	.3803	108.9	.13446	.013806	7.068
.9300	.9897	.2459	5.808	5.456	7.77	.4985	.4005	110.0	.13572	.013935	7.934
.9200	.9797	.2702	5.823	5.467	8.46	.5096	.4193	111.0	.13686	.014011	8.8[illegible]
.9100	.9697	.2941	5.838	5.477	9.12	.5184	.4368	111.9	.13791	.014119	9.[illegible]
.9000	.9597	.3178	5.854	5.489	9.76	.5253	.4531	112.8	.13887	.014215	10.5[illegible]
.8800	.9397	.3644	5.888	5.51[illegible]	10.97	.5340	.4844	114.4	.14059	.014[illegible]	12.[illegible]
.8600	.9197	.4098	5.925	5.539	12.09	.5370	.5124	115.8	.14210	.014[illegible]	14.[illegible]
.8400	.8997	.4542	5.964	5.567	13.13	.5355	.5381	117.1	.14345	.014689	16.221
.8200	.8797	.4974	6.005	5.59[illegible]	14.08	.5302	.5617	118.3	.14466	.014817	18.139
.8000	.8597	.5395	6.049	5.62[illegible]	14.95	.5218	.5836	119.5	.14578	.014935	20.[illegible]
.7800	.8397	.5805	6.095	5.661	15.74	.5107	.6036	120.5	.14681	.015044	22.326
.7600	.8197	.6208	6.144	5.69[illegible]	16.45	.4975	.6227	121.6	.14776	.015147	24.[illegible]
.7400	.7997	.6588	6.196	5.73[illegible]	17.08	.4825	.6403	122.5	.14866	.015245	26.[illegible]
.7200	.7797	.6960	6.252	5.77[illegible]	17.63	.4660	.6568	123.5	.14950	.015335	29.[illegible]
.7000	.7597	.7320	6.310	5.81[illegible]	18.11	.4483	.6722	124.4	.15029	.015420	31.[illegible]
.6800	.7397	.7667	6.372	5.857	18.51	.4297	.6867	125.3	.15104	.015500	33.[illegible]
.6600	.7197	.8000	6.439	5.903	18.83	.4104	.7003	126.2	.15176	.015576	36.[illegible]
.6400	.6997	.8319	6.509	5.952	19.09	.3905	.7130	127.1	.15244	.015647	38.997
.6200	.6796	.8624	6.584	6.004	19.27	.3703	.7249	127.9	.15310	.015739	41.7[illegible]
.6000	.6596	.8913	6.665	6.060	19.39	.3498	.7362	128.8	.15373	.015810	44.567
.5800	.6396	.9187	6.751	6.11[illegible]	19.44	.3294	.7467	129.6	.15434	.015880	47.[illegible]
.5600	.6196	.9445	6.843	6.18[illegible]	19.43	.3089	.7566	130.5	.15492	.015945	50.[illegible]
.5400	.5996	.9687	6.943	6.25[illegible]	19.35	.2887	.7659	131.3	.15549	.016022	53.815
.5200	.5796	.9911	7.05	6.32[illegible]	19.21	.2688	.7746	132.2	.15604	.016092	57.1[illegible]
.5000	.5596	1.0116	7.17	6.400	19.01	.2492	.7828	133.0	.15657	.016155	60.[illegible]
.4800	.5396	1.0303	7.29	6.484	18.75	.2302	.7905	133.9	.15709	.016221	64.29[illegible]
.4600	.5196	1.0470	7.43	6.57[illegible]	18.43	.2116	.7976	134.8	.15759	.016280	68.2[illegible]
.4400	.4996	1.0617	7.58	6.67[illegible]	18.06	.1936	.8043	135.7	.15808	.016351	72.2[illegible]
.4200	.4796	1.0741	7.75	6.780	17.64	.1763	.8106	136.6	.15856	.016416	76.7[illegible]
.4000	.4595	1.0843	7.93	6.897	17.17	.1597	.8164	137.6	.15903	.016480	81.3[illegible]
.3800	.4395	1.0921	8.13	7.03	16.65	.1439	.8218	138.5	.15949	.016545	86.215
.3600	.4195	1.0972	8.36	7.17	16.09	.1288	.8269	139.5	.15995	.016611	91.4[illegible]
.3400	.3[illegible]	1.0997	8.61	7.32	15.48	.1146	.8315	140.6	.16039	.016677	97.030
.3200	.3[illegible]	1.0992	8.90	7.50	14.83	.1012	.8359	141.7	.16082	.016744	103.049
.3000	.3[illegible]	1.0956	9.22	7.69	14.15	.0887	.8398	142.8	.16125	.016812	109.558
.2800	.3[illegible]	1.0886	9.60	7.91	13.43	.0770	.8435	144.0	.16167	.016861	116.6[illegible]
.2600	.3[illegible]	1.0779	10.03	8.16	12.68	.0663	.8468	145.3	.16208	.016953	124.37[illegible]
.2400	.2[illegible]	1.0632	10.54	8.44	11.90	.0564	.8498	146.6	.16249	.017026	132.7[illegible]
.2200	.2[illegible]	1.0441	11.15	8.77	11.09	.0474	.8526	148.1	.16289	.017103	142.373
.2000	.2[illegible]	1.0200	11.89	9.15	10.26	.0392	.8551	149.6	.16328	.017183	153.000
.1800	.2[illegible]	.9904	12.80	9.61	9.42	.0320	.8573	151.3	.16367	.017267	165.0[illegible]
.1600	.2[illegible]	.9544	13.95	10.16	8.56	.0256	.8592	153.2	.16405	.017357	178.947
.1400	.1[illegible]	.9110	15.45	10.83	7.69	.0199	.8610	155.3	.16441	.017454	195.21[illegible]
.1200	.17[illegible]	.8589	17.49	11.68	6.81	.0151	.8625	157.7	.16477	.017553	215.7[illegible]
.1000	.15[illegible]	.7961	20.41	12.78	5.93	.0111	.8638	160.4	.16512	.017677	238.8[illegible]
.0900	.1473	.7599	22.40	13.47	5.49	.0093	.8643	161.9	.16529	.017743	253.30
.0800	.13[illegible]	.7200	24.95	14.28	5.05	.0077	.8649	163.6	.16545	.017814	270.0[illegible]
.0700	.12[illegible]	.6760	28.31	15.27	4.61	.0062	.8654	165.6	.16561	.017894	289.7[illegible]
.0600	.1151	.6274	32.98	16.49	4.15	.0049	.8658	167.8	.16576	.017981	313.71
.0500	.1034	.5743	39.99	18.10	3.69	.0038	.8662	170.4	.16590	.018088	344.56
.0450	.0972	.5465	45.08	19.15	3.44	.0032	.8664	172.0	.16597	.018147	364.3[illegible]
.0400	.0911	.5191	52.15	20.49	3.17	.0027	.8666	173.9	.16603	.018222	389.36
.0380	.0887	.5090	55.90	21.16	3.05	.0024	.8667	174.8	.16606	.018259	401.8[illegible]
.0360	.0863	.5001	60.52	21.96	2.93	.0022	.8668	175.8	.16608	.018296	416.76
.0350	.0851	.4965	63.30	22.44	2.86	.0021	.8668	176.5	.16609	.018319	425.61
.0340	.0839	.4940	66.56	22.99	2.78	.0019	.8669	177.1	.16611	.018346	435.85
.0330	.0775	.4931	70.51	23.66	2.69	.0018	.8670	177.9	.16612	.018377	448.26
.0320	.0774	.4957	75.70	24.54	2.59	.0016	.8670	179.0	.16613	.018417	464.68
.0310	.0768	.5098	84.40	26.08	2.43	.0014	.8671	180.7	.16615	.018484	493.39
.0308	.0684	.5209	88.29	26.81	2.36	.0013	.8672	181.5	.16615	.018514	506.99

TABLE VI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.02$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(f) $\gamma_i = -8.0^{\circ}$, $e_i = 0.14481$

$\overline{V}$	$\overline{\gamma}$	z	γ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{\eta}$	$\overline{\xi}$	t sec	—	$\frac{-\Delta V}{V}$	$\sqrt{\beta}\,\overline{V}$
1.0800	1.07	0.0000010	3.000	7.557	0.0000	0.0013	0	0	[illegible]	0	0.00
1.0805	1.06	.0000026	7.983	7.541	.0001	.0020	.0004	6.1	.00758	.0010	.00
1.0810	1.06	.0000068	7.965	7.524	.0002	.0033	.0010	12.3	.01521	.0021	.00
1.0815	1.06	.0000179	7.947	7.508	.0006	.0053	.0019	18.5	.02286	.0032	.00
1.0820	1.06	.0000477	7.928	7.490	.0016	.0086	.0035	24.8	.03068	.0048	.00
1.0825	1.06	.0001306	7.909	7.471	.0045	.0143	.0062	31.3	.03872	.0054	.00
1.0830	1.06	.0003535	7.886	7.451	.0135	.0249	.0112	38.4	.04755	.0066	.01
1.08340	1.06	.0018937	7.854	7.420	.0651	.0546	.0253	48.6	.06017	.0083	.05
1.0830	1.06	.005324	7.833	7.400	.1830	.0915	.0425	55.3	.06850	.0095	.15
1.0825	1.06	.007891	7.825	7.393	.271	.1113	.0525	57.9	.07170	.0099	.24
1.0820	1.06	.010196	7.820	7.388	.350	.1263	.0598	59.6	.07378	.0102	.29
1.0810	1.06	.014496	7.814	7.381	.497	.1503	.0714	61.9	.07663	.0106	.42
1.0800	1.07	.018596	7.810	7.377	.637	.1698	.0811	63.5	.07866	.0109	.547
1.0150	1.07	.03802	7.801	7.366	1.297	.2401	.1163	68.3	.08449	.0117	1.12
1.0100	1.06	.05673	7.798	7.362	1.987	.2899	.1423	70.5	.08778	.0121	1.68
1.0050	1.06	.07511	7.798	7.360	2.54	.3297	.1639	72.8	.09010	.0124	2.24
1.000	1.05	.09327	7.800	7.360	3.14	.3638	.1827	74.3	.09190	.0127	2.79
.9950	1.05	.11126	7.803	7.360	.73	.3921	.1995	75.5	.09337	.0129	3.35
.9900	1.04	.12910	7.806	7.361	.31	.4174	.2149	76.6	.09461	.0131	3.91
.9800	1.03	.16440	7.814	7.365	[illegible]	.4600	.2424	78.3	.09665	.0133	5.03
.9700	1.02	.19923	7.824	7.369	.53	.4945	.2667	79.7	.09829	.0136	6.14
.9600	1.01	.2336	7.834	7.375	.95	.5227	.2886	80.8	.09966	.0138	7.30
.9500	1.00	.2676	7.846	7.381	[illegible]	.5460	.3086	81.9	.10084	.0139	8.45
.9400	.99	.3012	7.858	7.388	.60	.5651	.3271	82.8	.10188	.0141	9.61
.9300	.98	.3343	7.871	7.395	10.56	.5808	.3443	83.6	.10281	.0142	10.78
.9200	.97	.3671	7.884	7.402	11.48	.5936	.3604	84.3	.10364	.0143	11.97
.9100	.96	.3995	7.898	7.410	12.38	.6037	.3755	85.0	.10441	.0144	13.16
.9000	.95	.4314	7.912	7.419	13.24	.6115	.3898	85.7	.10511	.01455	14.381
.8800	.93	.4948	7.942	7.437	15.87	.6214	.4164	86.8	.10638	.01473	16.84
.8600	.91	.5553	7.975	7.456	16.38	.6246	.4404	87.6	.10749	.01488	19.371
.8400	.89	.6148	8.009	7.476	17.76	.6225	.4625	88.9	.10848	.01502	21.95
.8200	.87	.6726	8.045	7.498	19.03	.6160	.4828	89.8	.10938	.01515	24.60
.8000	.85	.7287	8.083	7.521	20.18	.6059	.5016	90.6	.11020	.01526	27.32
.7800	.83	.7830	8.124	7.545	21.22	.5927	.5190	91.4	.11096	.01537	30.11
.7600	.81	.8356	8.167	7.571	22.15	.5770	.5353	92.1	.11166	.01547	32.98
.7400	.79	.8864	8.213	7.599	22.96	.5592	.5505	92.7	.11232	.01557	35.93
.7200	.77	.9352	8.261	7.628	23.67	.5397	.5647	[illegible]	.11295	.01566	38.96
.7000	.75	.9822	8.313	7.658	24.28	.5188	.5780	[illegible]	.11354	.01574	42.09
.6800	.73	1.0272	8.367	7.691	24.78	.4965	.5905	[illegible]	.11409	.01583	45.317
.6600	.71	1.0701	8.426	7.725	25.17	.4741	.6022	95.6	.11463	.01591	48.642
.6400	.69	1.1110	8.488	7.762	25.47	.4508	.6132	96.2	.11514	.01598	52.077
.6200	.67	1.1497	8.554	7.801	25.68	.4270	.6235	[illegible]	.11563	.01605	55.62
.6000	.65	1.1861	8.625	7.843	25.79	.4031	.6333	97.5	.11610	.01613	59.307
.5800	.63	1.2203	8.700	7.887	25.80	.3791	.6424	98.2	.11655	.01619	63.11
.5600	.61	1.2521	8.782	7.935	25.74	.3553	.6510	98.8	.11699	.01626	67.07
.5400	.59	1.2814	8.870	7.986	25.57	.3317	.6591	99.4	.11742	.01633	71.18
.5200	.57	1.3081	8.965	8.040	25.33	.3084	.6666	100.1	.11783	.01639	75.46
.5000	.55	1.3322	9.07	8.059	25.01	.2856	.6738	100.7	.11823	.01646	79.93
.4800	.53	1.3535	9.18	8.163	24.61	.2634	.6804	101.4	.11863	.01652	84.56
.4600	.51	1.3719	9.30	8.232	24.13	.2419	.6867	102.1	.11904	.01658	89.47
.4400	.49	1.3873	9.44	8.307	23.58	.2210	.6925	102.8	.11938	.01664	94.58
.4200	.47	1.3995	9.58	8.388	22.96	.2010	.6980	103.5	.11975	.01671	99.96
.4000	.45	1.4084	9.75	8.478	22.28	.1818	.7031	104.2	.12011	.01677	105.63
.3800	.43	1.4138	9.93	8.576	21.53	.1634	.7079	104.9	.12046	.01683	111.61
.3600	.41	1.4156	10.13	8.685	20.73	.1461	.7123	105.7	.12081	.01689	117.96
.3400	.39	1.4134	10.35	8.806	19.87	.1297	.7164	106.5	.12115	.01695	124.71
.3200	.37	1.4071	10.61	8.941	18.96	.1143	.7202	107.4	.12149	.01701	131.91
.3000	.35	1.3963	10.90	9.09	18.01	.0999	.7237	108.3	.12182	.01708	139.63
.2800	.33	1.3809	11.24	9.26	17.01	.0866	.7269	109.2	.12215	.01714	147.92
.2600	.31	1.3603	11.63	9.46	15.97	.0743	.7299	110.2	.12248	.01721	156.96
.2400	.29	1.3343	12.10	9.69	14.90	.0630	.7326	111.4	.12280	.01727	166.78
.2200	.27	1.3023	12.65	9.95	13.81	.0528	.7350	112.5	.12312	.01734	177.58
.2000	.25	1.2636	13.32	10.26	12.69	.0436	.7373	113.7	.12343	.01742	189.54
.1800	.23	1.2177	14.15	10.63	11.56	.0353	.7392	115.1	.12374	.01749	202.94
.1600	.21	1.1635	15.20	11.07	10.41	.0281	.7410	116.5	.12405	.01757	218.15
.1400	.19	1.0999	16.58	11.63	9.26	.0218	.7426	118.1	.12435	.01766	235.70
.1200	.17	1.0255	18.46	12.33	8.12	.0165	.7440	120.1	.12465	.01775	256.37
.1000	.15	.9382	21.17	13.26	6.98	.0120	.7451	122.9	.12494	.01786	281.46
.0900	.14	.8889	23.01	13.84	6.41	.0100	.7457	124.6	.12508	.01791	296.30
.0800	.13	.8353	25.38	14.53	5.85	.0083	.7461	126.4	.12522	.01797	313.23
.0700	.12	.7769	28.50	15.37	5.29	.0067	.7466	128.3	.12535	.01804	332.94
.0600	.11	.7131	32.85	16.43	4.72	.0053	.7470	130.9	.12548	.01812	356.56
.0500	.10	.6439	39.35	17.81	4.15	.0040	.7474	134.2	.12560	.01821	386.34
.0450	.09	.6075	44.04	18.71	3.85	.0034	.7476	136.5	.12566	.01826	404.99
.0400	.09	.5707	50.47	19.85	3.53	.0028	.7478	139.2	.12572	.01832	428.02
.0380	.08	.5563	53.81	20.41	3.40	.0026	.7478	140.4	.12574	.01834	439.18
.0360	.08	.5426	57.86	21.06	3.25	.0024	.7479	141.8	.12576	.01837	452.13
.0340	.08	.5302	62.95	21.86	3.09	.0021	.7480	143.8	.12578	.01842	467.86
.0330	.07	.5251	66.10	22.35	3.00	.0020	.7480	144.7	.12579	.01844	477.39
.0320	.07	.5214	69.50	22.94	2.93	.0019	.7481	145.5	.12580	.01847	488.77
.0310	.07	.5202	73.78	23.70	2.85	.0017	.7481	146.8	.12581	.01850	503.41
.0300	.07	.5263	79.24	24.90	2.72	.0015	.7482	148.4	.12582	.01856	526.31
.0296	.06	.5388	82.35	25.93	2.50	.0013	.7483	150.5	.12583	.01859	546.09

TABLE VI.- VALUES OF $Z_{\bar{V}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(g) $\gamma_i = -10.0^{\circ}$, $e_i = 0.17815$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\xi}$	$\frac{t}{\text{sec}}$	$\frac{\Delta s}{r}$	$\frac{-\Delta V}{r}$	$\frac{Z}{\sqrt{\beta r}\,\bar{V}}$
1.0200	1.0791	0.0000020	10.000	9.447	0.0000	0.0013	0	0	0	0	0.000
1.0205	1.0796	.0000020	9.986	9.434	.0001	.0020	.0003	4.9	.00604	.001065	.000
1.0210	1.0801	.0000040	9.972	9.421	.0002	.0033	.0006	9.9	.01211	.002132	.000
1.0215	1.0807	.0000170	9.958	9.410	.0006	.0053	.0015	14.8	.01821	.003204	.001
1.0220	1.0812	.0000475	9.943	9.394	.0016	.0086	.0038	19.8	.02438	.004286	.001
1.0225	1.0817	.0001287	9.928	9.381	.0044	.0142	.0095	25.0	.03070	.005394	.004
1.0230	1.0822	.0003749	9.910	9.364	.0127	.0243	.0227	30.5	.03749	.006581	.011
1.02352	1.08268	.0003737	9.880	9.335	.0821	.0612	.0227	40.1	.04925	.008634	.070
1.0230	1.0822	.0075031	9.862	9.319	.258	.1085	.0407	46.0	.05660	.009911	.220
1.0225	1.0817	.0106289	9.857	9.315	.365	.1290	.0475	47.8	.05882	.010298	.312
1.0220	1.0812	.0194772	9.853	9.309	.462	.1451	.0538	49.1	.06035	.010563	.396
1.0210	1.0802	.0188551	9.849	9.304	.646	.1712	.0654	50.8	.06250	.010937	.554
1.0200	1.0792	.02399	9.846	9.301	.822	.1928	.0755	52.1	.06405	.011206	.706
1.0150	1.0742	.04842	9.840	9.297	1.651	.2707	.1044	55.8	.06858	.011992	1.431
1.0100	1.0692	.07198	9.839	9.296	2.44	.3263	.1270	57.9	.07115	.012438	2.138
1.0050	1.0642	.09514	9.840	9.298	3.22	.3708	.1466	59.4	.07297	.012753	2.840
1.0000	1.0592	.11803	9.842	9.299	3.97	.4082	.1635	60.5	.07439	.012998	3.541
.9950	1.0542	.14076	9.846	9.304	4.71	.4405	.1783	61.4	.07555	.013199	4.242
.9900	1.0492	.16318	9.849	9.309	5.44	.4689	.1920	62.3	.07652	.013369	4.945
.9800	1.0392	.2076	9.858	9.319	6.86	.5165	.2164	63.7	.07813	.013648	6.357
.9700	1.0292	.2515	9.868	9.329	8.24	.5551	.2366	64.8	.07942	.013873	7.778
.9600	1.0192	.2948	9.878	9.339	9.57	.5867	.2537	65.7	.08050	.014061	9.214
.9500	1.0092	.3376	9.890	9.354	10.86	.6127	.2713	66.5	.08143	.014223	10.661
.9400	.9992	.3799	9.901	9.369	12.10	.6341	.2897	67.2	.08225	.014366	12.123
.9300	.9892	.4216	9.914	9.386	13.31	.6516	.3071	67.9	.08298	.014493	13.599
.9200	.9792	.4628	9.927	9.402	14.47	.6658	.3234	68.5	.08364	.014609	15.091
.9100	.9692	.5035	9.940	9.418	15.59	.6771	.3380	69.0	.08425	.014715	16.598
.9000	.9592	.5436	9.954	9.435	16.67	.6858	.3477	69.5	.08480	.014812	18.121
.8800	.9392	.6224	9.983	9.469	18.71	.6966	.3700	70.	.08580	.014988	21.217
.8600	.9192	.6990	10.014	9.504	20.60	.7001	.3917	71.4	.08668	.015142	24.385
.8400	.8991	.7735	10.047	9.540	22.33	.6976	.4124	72.1	.08746	.015281	27.626
.8200	.8791	.8458	10.082	9.577	23.90	.6901	.4320	72.8	.08817	.015407	30.945
.8000	.8591	.9159	10.118	9.615	25.32	.6785	.4502	73.4	.08882	.015523	34.347
.7800	.8391	.9837	10.157	9.435	26.64	.6635	.4628	74.1	.08942	.015630	37.835
.7600	.8191	1.0492	10.198	9.455	27.79	.6457	.4773	74.7	.08998	.015731	41.414
.7400	.7991	1.1122	10.242	9.477	28.78	.6256	.4906	75.3	.09051	.015825	45.090
.7200	.7791	1.1728	10.288	9.500	29.66	.6036	.5026	75.8	.09100	.015915	48.868
.7000	.7591	1.2309	10.337	9.524	30.50	.5801	.5134	76.4	.09147	.016000	52.753
.6800	.7391	1.2864	10.389	9.550	31.00	.5553	.5230	76.9	.09191	.016081	56.753
.6600	.7191	1.3392	10.445	9.578	31.48	.5297	.5316	77.4	.09234	.016159	60.874
.6400	.6991	1.3893	10.504	9.607	31.83	.5034	.5468	78.0	.09274	.016234	65.125
.6200	.6791	1.4366	10.567	9.638	32.09	.4767	.5561	78.5	.09313	.016306	69.512
.6000	.6591	1.4809	10.634	9.671	32.16	.4498	.5648	79.0	.09351	.016376	74.046
.5800	.6391	1.5222	10.706	9.707	32.16	.4228	.5729	79.5	.09387	.016445	78.737
.5600	.6190	1.5605	10.784	9.745	32.04	.3960	.5806	80.0	.09422	.016511	83.596
.5400	.5990	1.5954	10.868	9.786	31.81	.3695	.5879	80.5	.09456	.016576	88.635
.5200	.5790	1.6271	10.958	9.829	31.47	.3434	.5947	81.0	.09489	.016640	93.869
.5000	.5590	1.6552	11.06	9.877	31.03	.3178	.6010	81.5	.09521	.016703	99.312
.4800	.5390	1.6797	11.16	9.928	30.50	.2929	.6070	82.1	.09553	.016764	104.984
.4600	.5190	1.7005	11.28	9.983	29.87	.2688	.6126	82.6	.09583	.016825	110.903
.4400	.4990	1.7173	11.41	10.044	29.10	.2454	.6179	83.2	.09613	.016886	117.091
.4200	.4789	1.7301	11.55	10.110	28.35	.2230	.6228	83.8	.09643	.016945	123.576
.4000	.4589	1.7385	11.70	10.182	27.47	.2015	.6274	84.4	.09672	.017005	130.386
.3800	.4389	1.7424	11.87	10.261	26.50	.1810	.6317	85.0	.09700	.017065	137.555
.3600	.4189	1.7415	12.07	10.350	25.46	.1616	.6357	85.6	.09728	.017124	145.124
.3400	.3988	1.7356	12.28	10.448	24.36	.1433	.6394	86.3	.09756	.017184	153.140
.3200	.3788	1.7243	12.53	10.557	23.20	.1262	.6428	86.9	.09784	.017244	161.657
.3000	.3588	1.7074	12.81	10.681	21.98	.1102	.6460	87.7	.09811	.017305	170.743
.2800	.3387	1.6845	13.13	10.821	20.70	.0953	.6489	88.4	.09837	.017366	180.478
.2600	.3187	1.6550	13.50	10.982	19.39	.0816	.6515	89.1	.09864	.017429	190.963
.2400	.2986	1.6186	13.94	11.17	18.04	.0692	.6540	90.0	.09890	.017493	202.32
.2200	.2785	1.5745	14.47	11.38	16.67	.0578	.6562	91.1	.09916	.017559	214.71
.2000	.2584	1.5222	15.11	11.64	15.29	.0476	.6582	92.5	.09942	.017628	228.33
.1800	.2383	1.4607	15.90	11.95	13.82	.0385	.6600	94.3	.09968	.017699	243.45
.1600	.2181	1.3890	16.91	12.32	12.39	.0306	.6617	96.6	.09993	.017774	260.44
.1400	.1979	1.3059	18.23	12.79	10.96	.0237	.6631	99.1	.10019	.017854	279.83
.1200	.1776	1.2095	20.02	13.38	9.53	.0178	.6643	97.7	.10044	.017940	302.38
.1000	.1571	1.0978	22.61	14.17	8.13	.0128	.6654	99.7	.10068	.018035	329.34
.0900	.1468	1.0353	24.38	14.67	7.44	.0107	.6659	100.8	.10080	.018086	345.09
.0800	.1363	.9677	26.65	15.26	6.74	.0088	.6664	102.1	.10092	.018142	362.89
.0700	.1257	.8946	29.64	15.99	6.06	.0071	.6668	103.5	.10103	.018203	383.39
.0600	.1148	.8153	33.80	16.90	5.37	.0056	.6671	105.1	.10114	.018272	407.65
.0500	.1034	.7296	40.02	18.11	4.68	.0042	.6675	107.1	.10125	.018351	437.75
.0450	.0974	.6845	44.48	18.90	4.34	.0036	.6677	108.3	.10130	.018397	456.30
.0400	.0908	.6385	50.55	19.88	3.99	.0030	.6678	109.7	.10135	.018450	478.84
.0380	.0880	.6201	53.69	20.36	3.79	.0028	.6679	110.3	.10137	.018475	489.59
.0360	.0850	.6022	57.45	20.92	3.62	.0025	.6680	111.1	.10139	.018503	501.86
.0340	.0816	.5853	62.10	21.60	3.44	.0023	.6680	111.9	.10140	.018534	516.41
.0320	.0778	.5706	68.24	22.47	3.24	.0020	.6681	113.0	.10142	.018573	534.89
.0310	.0755	.5651	72.28	23.04	3.11	.0018	.6682	113.6	.10143	.018598	546.87
.0300	.0726	.5627	77.64	23.81	2.97	.0017	.6682	114.5	.10144	.018629	562.74
.0295	.0707	.5643	82.43	24.35	2.87	.0016	.6683	115.1	.10144	.018651	573.83
.0290	.0680	.5718	88.03	25.22	2.73	.0014	.6683	116.1	.10144	.018685	591.47

TABLE VII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = 2.0^\circ$, $e_i = 0.05337$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	[illegible]	$-\frac{\dot{u}_r}{g}$	$\bar{\zeta}$	$\bar{Q}$	t sec	[illegible]	$\frac{-\Delta\zeta}{r}$	$\sqrt{\beta r}\,\frac{[illegible]}{\zeta}$
1.0200	0.9600	0.0000010	2.000	2.12[illegible]	0.0000	-0.0009	0	0	[illegible]	0	0.[illegible]
1.0205	.9605	.0000028	1.930	2.05[illegible]	.0001	.0014	.0010	24.9	.03109	.0010[illegible]	[illegible]
1.0210	.9610	.0000065	1.855	1.97[illegible]	.0002	.0023	.0026	51.0	.06358	.0021[illegible]	[illegible]
1.0215	.9615	.0000183	1.774	1.88[illegible]	.0005	.0038	.0058	78.6	.09798	.0032[illegible]	[illegible]
1.0220	.9620	.0000511	1.683	1.78[illegible]	.0014	.0063	.0113	108.8	.13568	.0043[illegible]	[illegible]
1.0225	.9625	.0001704	1.566	1.66[illegible]	.0046	.0115	.0233	146.5	.18285	.0057[illegible]	[illegible]
1.02270	.9627[illegible]	.0004485	1.465	1.55[illegible]	.0120	.0187	.0410	179.0	.22349	.0069[illegible]	[illegible]
1.0225	.9625	.0009187	1.384	1.47[illegible]	.0250	.0267	.0620	204.7	.25555	.0077[illegible]	[illegible]
1.0220	.9620	.001529	1.325	1.40[illegible]	.0415	.0344	.0836	223.8	.27950	.0081[illegible]	[illegible]
1.0210	.9610	.002485	1.268	1.34[illegible]	.0674	.0438	.1109	243.0	.30341	.0086[illegible]	[illegible]
1.0200	.9600	.003334	1.233	1.31[illegible]	.0904	.0506	.1317	255.0	.31843	.0090[illegible]	[illegible]
1.0150	.9550	.007093	1.152	1.22[illegible]	.1912	.0728	.2051	287.7	.35905	.0098[illegible]	[illegible]
1.0100	.9500	.010547	1.119	1.19[illegible]	.283	.0876	.2585	305.9	.38158	.0103[illegible]	[illegible]
1.0050	.9450	.013875	1.105	1.17[illegible]	.370	.0992	.3030	318.9	.39757	.0108[illegible]	[illegible]
1.0000	.9400	.017141	1.101	1.17[illegible]	.454	.1088	.3418	329.1	.41006	.0108[illegible]	[illegible]
.9950	.9350	.02038	1.104	1.17[illegible]	.537	.1170	.3767	337.5	.42034	.0110[illegible]	[illegible]
.9900	.9300	.02361	1.111	1.18[illegible]	.619	.1242	.4086	344.7	.42909	.0112[illegible]	[illegible]
.9800	.9200	.03009	1.135	1.20[illegible]	.780	.1365	.4656	356.6	.44344	.0115[illegible]	[illegible]
.9700	.9100	.03668	1.168	1.24[illegible]	.939	.1465	.5157	366.3	.45496	.0117[illegible]	1.[illegible]
.9600	.9000	.04341	1.208	1.28[illegible]	1.099	.1550	.5607	374.4	.46455	.0119[illegible]	1.[illegible]
.9500	.8900	.05033	1.252	1.337	1.259	.1623	.6015	381.4	.47275	.0121[illegible]	1.[illegible]
.9400	.8800	.05744	1.300	1.389	1.420	.1685	.6389	387.6	.47988	.0122[illegible]	1.[illegible]
.9300	.8700	.06478	1.351	1.444	1.582	.1738	.6735	393.1	.48617	.0124[illegible]	2.[illegible]
.9200	.8600	.07236	1.404	1.50[illegible]	1.745	.1784	.7056	398.1	.49178	.0125[illegible]	2.[illegible]
.9100	.8500	.08017	1.459	1.56[illegible]	1.910	.1823	.7354	402.6	.49683	.0126[illegible]	2.[illegible]
.9000	.8400	.08825	1.516	1.624	2.08	.1856	.7634	406.7	.50140	.0127[illegible]	2.[illegible]
.8800	.8200	.10517	1.634	1.75[illegible]	2.41	.1906	.8142	414.1	.50941	.0130[illegible]	3.585
.8600	.8000	.12315	1.756	1.887	2.75	.1938	.8593	420.5	.51622	.0131[illegible]	4.[illegible]
.8400	.7800	.14222	1.881	2.02[illegible]	3.09	.1953	.8996	426.1	.52208	.0133[illegible]	5.[illegible]
.8200	.7600	.16238	2.010	2.16[illegible]	3.43	.1954	.9358	431.2	.52721	.0135[illegible]	5.[illegible]
.8000	.7401	.18363	2.142	2.31[illegible]	3.77	.1942	.9686	435.8	.53174	.0137[illegible]	6.[illegible]
.7800	.7201	.2060	2.276	2.46[illegible]	4.11	.1918	.9982	440.0	.53578	.0138[illegible]	7.[illegible]
.7600	.7001	.2294	2.414	2.62[illegible]	4.44	.1885	1.0251	443.8	.53941	.0140[illegible]	9.[illegible]
.7400	.6801	.2539	2.554	2.780	4.76	.1842	1.0496	447.4	.54269	.0141[illegible]	10.[illegible]
.7200	.6601	.2794	2.698	2.94[illegible]	5.07	.1792	1.0719	450.8	.54568	.0143[illegible]	11.[illegible]
.7000	.6401	.3060	2.845	3.11	5.37	.1734	1.0923	453.9	.54841	.0144[illegible]	13.[illegible]
.6800	.6201	.3336	2.995	3.29	5.66	.1670	1.1110	456.9	.55093	.0145[illegible]	14.[illegible]
.6600	.6001	.3623	3.15	3.46	5.93	.1601	1.1281	459.7	.55325	.0147[illegible]	16.[illegible]
.6400	.5801	.3920	3.31	3.65	6.18	.1528	1.1437	462.5	.55541	.0148[illegible]	18.[illegible]
.6200	.5601	.4227	3.47	3.84	6.42	.1451	1.1580	465.1	.55742	.0149[illegible]	20.[illegible]
.6000	.5401	.4545	3.64	4.05	6.63	.1372	1.1710	467.6	.55931	.0150[illegible]	22.[illegible]
.5800	.5202	.4872	3.82	4.26	6.82	.1290	1.1830	470.1	.56107	.0151[illegible]	25.[illegible]
.5600	.5002	.5210	4.00	4.48	6.98	.1207	1.1940	472.4	.56273	.0152[illegible]	27.[illegible]
.5400	.4802	.5558	4.19	4.71	7.12	.1123	1.2040	474.8	.56430	.0154[illegible]	30.[illegible]
.5200	.4602	.5916	4.38	4.96	7.23	.1040	1.2131	477.1	.56579	.0155[illegible]	34.[illegible]
.5000	.4402	.6285	4.59	5.22	7.31	.0957	1.2214	479.4	.56720	.0156[illegible]	37.[illegible]
.4800	.4202	.6664	4.81	5.49	7.36	.0875	1.2290	481.6	.56855	.0157[illegible]	41.[illegible]
.4600	.4003	.7055	5.04	5.79	7.37	.0794	1.2358	483.9	.56983	.0158[illegible]	46.[illegible]
.4400	.3803	.7457	5.28	6.11	7.35	.0716	1.2420	486.1	.57106	.0159[illegible]	50.[illegible]
.4200	.3603	.7872	5.54	6.46	7.30	.0641	1.2477	488.4	.57224	.0160[illegible]	54.[illegible]
.4000	.3404	.8300	5.81	6.83	7.21	.0568	1.2527	490.6	.57338	.0161[illegible]	62.[illegible]
.3800	.3204	.8743	6.11	7.25	7.09	.0499	1.2573	493.0	.57448	.0162[illegible]	69.[illegible]
.3600	.3005	.9202	6.42	7.71	6.92	.0434	1.2613	495.3	.57555	.0164[illegible]	76.[illegible]
.3400	.2805	.9679	6.77	8.22	6.72	.0372	1.2649	497.8	.57658	.0165[illegible]	85.[illegible]
.3200	.2606	1.0178	7.15	8.79	6.48	.0316	1.2681	500.3	.57759	.0166[illegible]	95.[illegible]
.3000	.2407	1.0704	7.57	9.45	6.20	.0263	1.2709	502.9	.57858	.0167[illegible]	107.[illegible]
.2800	.2208	1.1261	8.03	10.21	5.88	.0216	1.2733	505.7	.57955	.0169[illegible]	120.[illegible]
.2600	.2009	1.1861	8.55	11.10	5.52	.0173	1.2754	508.6	.58051	.0170[illegible]	136.[illegible]
.2400	.1810	1.2516	9.15	12.17	5.13	.0135	1.2772	511.8	.58147	.0172[illegible]	156.[illegible]
.2200	.1612	1.3246	9.83	13.48	4.69	.0103	1.2787	515.3	.58243	.0173[illegible]	180.629
.2000	.1415	1.4086	10.63	15.12	4.23	.0075	1.2799	519.1	.58339	.0175[illegible]	211.[illegible]
.1800	.1218	1.5091	11.59	17.26	3.73	.0052	1.2809	523.4	.58438	.0177[illegible]	251.51
.1600	.1023	1.6362	12.75	20.18	3.21	.0034	1.2817	528.5	.58540	.0179[illegible]	306.79
.1400	.0832	1.8099	14.20	24.39	2.68	.0021	1.2823	534.6	.58649	.0182[illegible]	387.83
.1200	.0645	2.0744	16.04	30.93	2.16	.0011	1.2827	542.4	.58769	.0185[illegible]	518.[illegible]
.1000	.0470	2.5465	18.33	41.99	1.687	.0005	1.2831	553.3	.58908	.018970	763.[illegible]
.0900	.0390	2.9575	19.51	50.44	1.499	.0003	1.2832	560.8	.58991	.0192[illegible]	985.82
.0800	.0316	3.6319	20.33	61.62	1.359	.0002	1.2833	571.0	.59089	.0196[illegible]	1361.[illegible]
.0750	.0280	4.1673	20.31	68.33	1.307	.0002	1.2833	577.8	.59150	.0198[illegible]	1666.[illegible]
.0700	.0242	4.9999	19.61	75.81	1.259	.0001	1.2834	587.0	.59226	.0201[illegible]	2142.[illegible]
.0680	.0226	5.5053	19.00	79.03	1.236	.0001	1.2834	592.0	.59266	.0202[illegible]	2488.8
.0660	.0207	6.2222	18.08	82.37	1.207	.0001	1.2834	598.5	.59317	.0204[illegible]	2828.[illegible]
.0640	.0183	7.4179	16.60	85.83	1.168	.0001	1.2834	608.2	.59390	.0206[illegible]	3477.1
.0620	.0147	10.5286	13.74	89.12	1.105	.0000	1.2835	629.4	.59547	.0210[illegible]	5094.[illegible]
.0610	.0110	17.3317	10.38	89.99	1.029	.0000	1.2835	665.9	.59815	.0216[illegible]	8523.[illegible]

TABLE VII.- VALUES OF $\overline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.02$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -3.0^{\circ}$, $e_i = 0.06608$

$\overline{V}$	$\overline{V}_r$	$\overline{Z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_x}{g}$	$\overline{q}$	$\overline{\zeta}$	t sec	$\frac{\Delta R}{r}$	$\frac{\Delta\lambda}{\lambda}$	$\sqrt{\beta r}\,\overline{Z}$
1.0200	0.9601	0.0000020	3.000	3.177	0.0001	0.0009	0	0	0	0	0.000
1.0205	.9606	.0000040	2.954	3.135	.0001	.0014	.0007	16.5	.02049	.001[illegible]	.000
1.0210	.9611	.0000069	2.906	3.087	.0002	.0023	.0015	33.2	.04141	.002[illegible]	.000
1.0215	.9616	.0000181	2.855	3.0[illegible]	.0005	.0038	.0037	50.5	.06290	.003[illegible]	.001
1.0220	.9621	.0000492	2.801	2.9[illegible]	.0013	.0062	.0069	68.5	.08534	.004[illegible]	.001
1.0225	.9626	.0001442	2.740	2.9[illegible]	.0039	.0106	.0128	88.3	.11004	.005[illegible]	.004
1.02300	.9630	.000806[illegible]	2.637	2.8[illegible]	.0225	.0251	.0338	120.8	.15075	.007[illegible]	.024
1.0235	.9636	.002396	2.569	2.7[illegible]	.0655	.0432	.0593	142.1	.17738	.008[illegible]	.070
1.0240	.9621	.003432	2.547	2.7[illegible]	.0935	.0516	.0716	149.3	.18633	.009[illegible]	.101
1.0210	.9611	.005256	2.521	2.67[illegible]	.1427	.0637	.0894	157.9	.19706	.009[illegible]	.154
1.0200	.9601	.006952	2.505	2.6[illegible]	.1889	.0731	.1034	163.6	.20416	.009[illegible]	.204
1.0150	.9551	.014821	2.465	2.6[illegible]	.400	.1053	.1547	179.3	.22367	.010[illegible]	.438
1.0100	.9501	.02231	2.449	2.604	.598	.1275	.1916	188.0	.23440	.011[illegible]	.663
1.0050	.9451	.02965	2.442	2.59[illegible]	.790	.1450	.2228	194.1	.24192	.01[illegible]	.886
1.0000	.9401	.03688	2.439	2.5[illegible]	.978	.1595	.2487	198.8	.24774	.011[illegible]	1.106
.9950	.9351	.04405	2.440	2.58	1.161	.1720	.2725	202.7	.25251	.01[illegible]	1.328
.9900	.9301	.05128	2.443	2.60[illegible]	1.342	.1829	.2942	206.1	.25655	.01[illegible]	1.551
.9800	.9201	.06532	2.452	2.61[illegible]	1.693	.2011	.3328	211.6	.26316	.01[illegible]	2.000
.9700	.9101	.07938	2.466	2.63[illegible]	2.03	.2156	.3669	216.0	.26846	.01[illegible]	2.455
.9600	.9001	.09336	2.483	2.6[illegible]	2.36	.2279	.3972	219.8	.27290	.01[illegible]	2.918
.9500	.8901	.10731	2.503	2.67[illegible]	2.68	.2370	.4245	223.1	.27672	.01[illegible]	3.389
.9400	.8801	.12123	2.524	2.6[illegible]	3.00	.2448	.4511	226.0	.28008	.01[illegible]	3.869
.9300	.8701	.13513	2.547	2.7[illegible]	3.30	.2511	.4744	228.6	.28307	.01[illegible]	4.359
.9200	.8601	.14902	2.571	2.7[illegible]	3.59	.2561	.4971	231.0	.28577	.01[illegible]	4.849
.9100	.8501	.16291	2.596	2.77[illegible]	3.88	.2599	.5189	233.2	.28824	.01[illegible]	5.371
.9000	.8401	.17680	2.623	2.81[illegible]	4.16	.2628	.5379	235.2	.29050	.01[illegible]	5.893
.8800	.8201	.2046	2.679	2.87[illegible]	4.69	.2659	.5732	239.0	.29455	.01[illegible]	6.976
.8600	.8001	.2325	2.740	2.94[illegible]	5.19	.2663	.6065	242.3	.29809	.01[illegible]	8.110
.8400	.7801	.2605	2.804	3.02[illegible]	5.66	.2643	.6359	245.3	.30124	.01[illegible]	9.302
.8200	.7601	.2886	2.872	3.09[illegible]	6.10	.2605	.6625	248.1	.30407	.01[illegible]	10.597
.8000	.7401	.3168	2.944	3.17[illegible]	6.51	.2551	.6871	250.7	.30665	.01[illegible]	11.878
.7800	.7201	.3451	3.019	3.2[illegible]	6.88	.2484	.7100	253.2	.30902	.01[illegible]	13.274
.7600	.7001	.3736	3.099	3.3[illegible]	7.23	.2406	.7313	255.5	.31121	.01[illegible]	14.748
.7400	.6801	.4023	3.182	3.4[illegible]	7.54	.2319	.7506	257.7	.31325	.01[illegible]	16.299
.7200	.6601	.4312	3.270	3.5[illegible]	7.83	.2226	.7682	259.9	.31516	.01[illegible]	17.965
.7000	.6401	.4602	3.362	3.67[illegible]	8.08	.2127	.7847	261.9	.31695	.01[illegible]	19.724
.6800	.6201	.4895	3.459	3.77[illegible]	8.30	.2023	.8000	264.0	.31864	.01[illegible]	21.595
.6600	.6001	.5190	3.561	3.91[illegible]	8.50	.1917	.8143	265.9	.32024	.01[illegible]	23.590
.6400	.5801	.5487	3.669	4.0[illegible]	8.66	.1808	.8275	267.8	.32176	.01[illegible]	25.791
.6200	.5602	.5787	3.783	4.19	8.79	.1698	.8394	269.7	.32321	.01[illegible]	28.002
.6000	.5402	.6090	3.903	4.31	8.88	.1588	.8500	271.6	.32460	.01[illegible]	30.449
.5800	.5202	.6396	4.03	4.5[illegible]	8.95	.1478	.8611	273.4	.32593	.01[illegible]	33.080
.5600	.5002	.6704	4.17	4.6[illegible]	8.99	.1369	.8706	275.3	.32720	.01[illegible]	35.916
.5400	.4802	.7017	4.31	4.85	8.99	.1262	.8794	277.1	.32843	.01[illegible]	38.982
.5200	.4602	.7333	4.46	5.04	8.96	.1157	.8877	278.9	.32962	.01[illegible]	42.307
.5000	.4402	.7654	4.62	5.2[illegible]	8.90	.1056	.8955	280.8	.33077	.01[illegible]	45.923
.4800	.4202	.7979	4.80	5.4[illegible]	8.81	.0957	.9017	282.6	.33188	.01[illegible]	49.850
.4600	.4003	.8310	4.99	5.6[illegible]	8.68	.0862	.9080	284.5	.33296	.01[illegible]	54.196
.4400	.3803	.8647	5.19	6.0[illegible]	8.53	.0771	.9137	286.4	.33401	.01[illegible]	58.958
.4200	.3603	.8991	5.41	6.3[illegible]	8.34	.0684	.9192	288.4	.33503	.01[illegible]	64.225
.4000	.3403	.9344	5.65	6.6[illegible]	8.12	.0603	.9239	290.4	.33604	.01[illegible]	70.081
.3800	.3204	.9707	5.91	7.0[illegible]	7.87	.0526	.9285	292.5	.33702	.01[illegible]	76.633
.3600	.3004	1.0082	6.19	7.4[illegible]	7.58	.0454	.9325	294.6	.33798	.01[illegible]	84.014
.3400	.2805	1.0471	6.50	7.8[illegible]	7.27	.0387	.9365	296.9	.33893	.01[illegible]	92.394
.3200	.2605	1.0879	6.85	8.4[illegible]	6.92	.0326	.9398	299.2	.33987	.01[illegible]	101.992
.3000	.2406	1.1310	7.24	9.0[illegible]	6.55	.0270	.9419	301.7	.34080	.01[illegible]	113.104
.2800	.2207	1.1772	7.69	9.77	6.14	.0220	.9436	304.3	.34173	.01[illegible]	126.128
.2600	.2008	1.2273	8.19	10.6[illegible]	5.71	.0176	.9456	307.1	.34265	.01[illegible]	141.611
.2400	.1809	1.2838	8.77	11.67	5.25	.0137	.9471	310.2	.34358	.01[illegible]	160.356
.2200	.1611	1.3460	9.44	12.9[illegible]	4.76	.0103	.9481	313.6	.34451	.01[illegible]	183.546
.2000	.1414	1.4200	10.25	14.58	4.26	.0075	.9501	317.4	.34547	.01[illegible]	213.03
.1800	.1217	1.5113	11.22	16.7[illegible]	3.73	.0052	.9511	321.7	.34645	.01[illegible]	251.89
.1600	.1029	1.6297	12.41	19.6[illegible]	3.19	.0034	.9519	326.7	.34748	.01[illegible]	305.57
.1400	.0830	1.7950	13.91	23.9[illegible]	2.65	.0021	.9525	332.9	.34858	.01[illegible]	384.83
.1200	.0634	2.0551	15.83	30.5[illegible]	2.13	.0011	.9529	340.8	.34979	.01[illegible]	513.78
.1000	.0469	2.5263	18.23	41.8[illegible]	1.669	.0005	.9533	351.8	.35120	.01[illegible]	757.88
.0900	.0399	2.9394	19.48	50.3[illegible]	1.488	.0003	.9534	359.5	.35203	.01[illegible]	979.80
.0800	.0316	3.6178	20.34	61.6[illegible]	1.355	.0002	.9533	369.7	.35303	.01[illegible]	1356.66
.0750	.0280	4.1555	20.33	68.3[illegible]	1.306	.0002	.9533	376.5	.35364	.01[illegible]	1662.19
.0700	.0243	4.9903	19.63	75.8[illegible]	1.258	.0001	.9533	385.8	.35440	.01[illegible]	2138.7
.0680	.0226	5.4965	19.02	79.0[illegible]	1.236	.0001	.9536	390.8	.35480	.01[illegible]	2424.9
.0660	.0207	6.0142	18.09	82.3[illegible]	1.208	.0001	.9536	397.3	.35531	.01[illegible]	2824.6
.0640	.0183	7.4110	16.61	85.8[illegible]	1.169	.0001	.9538	407.0	.35604	.01[illegible]	3473.8
.0620	.0147	10.5244	13.74	89.1[illegible]	1.105	.0000	.9537	428.2	.35761	.01[illegible]	5092.4
.0610	.0110	17.3293	10.38	89.9[illegible]	1.029	.0000	.9537	464.7	.36030	.01[illegible]	8522.6

TABLE VII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.02$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -4.0^\circ$, $e_i = 0.08056$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\frac{a}{r}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\Delta x}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\frac{\Delta x}{\overline{V}}$
1.0200	0.9[illegible]	0.0000010	4.000	4.249	0.0000	0.0009	0	0	0	0.000
1.0205	.9[illegible]	.0000026	3.966	4.213	.0001	.0014	.0005	12.3	.01530	.0010[illegible]
1.0210	.9[illegible]	.0000068	3.930	4.175	.0002	.0023	.0013	24.7	.03079	.0021[illegible]
1.0215	.9[illegible]	.0000180	3.893	4.135	.0005	.0037	.0027	37.4	.04655	.0032[illegible]
1.0220	.9[illegible]	.0000484	3.854	4.094	.0013	.0061	.0050	50.4	.06276	.0043[illegible]
1.0225	.9[illegible]	.0001369	3.811	4.048	.0037	.0103	.0091	64.2	.07999	.0054[illegible]
1.0230	.9[illegible]	.0004865	3.757	3.991	.0132	.0195	.0181	81.3	.10128	.0068[illegible]
1.02314	.9[illegible]	.0011367	3.720	3.952	.0306	.0298	.0284	92.9	.11570	.0078[illegible]
1.0230	.9[illegible]	.002202	3.691	3.921	.0599	.0415	.0402	101.9	.12705	.0085[illegible]
1.0225	.9[illegible]	.003941	3.666	3.894	.1071	.0554	.0544	110.0	.13712	.0091[illegible]
1.0220	.9[illegible]	.005365	3.652	3.880	.1458	.0645	.0639	114.3	.14249	.0095[illegible]
1.0210	.9[illegible]	.007951	3.635	3.862	.216	.0784	.0783	119.8	.14937	.0099[illegible]
1.0200	.9[illegible]	.010385	3.624	3.851	.282	.0893	.0899	123.6	.15407	.0102[illegible]
1.0150	.9[illegible]	.02180	3.597	3.823	.588	.1277	.1316	134.2	.16721	.0111[illegible]
1.0100	.9[illegible]	.03275	3.586	3.812	.878	.1544	.1621	140.1	.17450	.0115[illegible]
1.0050	.9[illegible]	.04348	3.580	3.807	1.160	.1756	.1873	144.2	.17963	.0118[illegible]
1.0000	.9[illegible]	.05409	3.578	3.806	1.434	.1933	.2092	147.5	.18359	.0121[illegible]
.9950	.9[illegible]	.06460	3.577	3.807	1.703	.2084	.2288	150.2	.18684	.0123[illegible]
.9900	.9[illegible]	.07504	3.579	3.809	1.967	.2215	.2467	152.4	.18959	.0125[illegible]
.9800	.9[illegible]	.09573	3.584	3.818	2.48	.2435	.2787	156.1	.19409	.0127[illegible]
.9700	.9[illegible]	.11621	3.592	3.829	2.98	.2609	.3068	159.2	.19771	.0130[illegible]
.9600	.9[illegible]	.13652	3.603	3.843	3.46	.2750	.3321	161.8	.20074	.0132[illegible]
.9500	.8[illegible]	.15668	3.614	3.858	3.92	.2864	.3552	164.0	.20335	.0133[illegible]
.9400	.8[illegible]	.17669	3.628	3.875	4.37	.2956	.3765	166.0	.20565	.0135[illegible]
.9300	.8[illegible]	.19658	3.642	3.893	4.80	.3029	.3962	167.8	.20770	.0136[illegible]
.9200	.8[illegible]	.2163	3.657	3.912	5.22	.3086	.4147	169.4	.20956	.0137[illegible]
.9100	.8[illegible]	.2360	3.673	3.932	5.62	.3129	.4320	171.0	.21125	.0138[illegible]
.9000	.8[illegible]	.2555	3.690	3.953	6.01	.3159	.4483	172.4	.21282	.0139[illegible]
.8800	.8[illegible]	.2942	3.726	3.998	6.75	.3190	.4784	175.0	.21562	.0141[illegible]
.8600	.8[illegible]	.3324	3.765	4.047	7.42	.3185	.5056	177.3	.21809	.0143[illegible]
.8400	.7[illegible]	.3703	3.806	4.099	8.05	.3152	.5303	179.4	.22029	.0144[illegible]
.8200	.7[illegible]	.4077	3.851	4.155	8.62	.3097	.5529	181.4	.22229	.0145[illegible]
.8000	.7[illegible]	.4446	3.898	4.214	9.13	.3023	.5737	183.2	.22412	.0147[illegible]
.7800	.7[illegible]	.4812	3.948	4.277	9.60	.2934	.5929	185.0	.22581	.0148[illegible]
.7600	.7[illegible]	.5174	4.001	4.344	10.01	.2832	.6106	186.7	.22739	.0149[illegible]
.7400	.6[illegible]	.5531	4.058	4.415	10.37	.2721	.6271	188.3	.22886	.0150[illegible]
.7200	.6[illegible]	.5885	4.117	4.491	10.69	.2601	.6423	189.8	.23025	.0151[illegible]
.7000	.6[illegible]	.6234	4.181	4.572	10.95	.2476	.6564	191.4	.23157	.0152[illegible]
.6800	.6[illegible]	.6580	4.248	4.659	11.17	.2347	.6696	192.8	.23282	.0153[illegible]
.6600	.6[illegible]	.6922	4.319	4.751	11.33	.2214	.6818	194.3	.23401	.0154[illegible]
.6400	.5[illegible]	.7259	4.395	4.849	11.45	.2080	.6932	195.7	.23515	.0155[illegible]
.6200	.5[illegible]	.7593	4.476	4.955	11.53	.1946	.7037	197.2	.23625	.0155[illegible]
.6000	.5[illegible]	.7923	4.562	5.07	11.56	.1812	.7136	198.6	.23731	.0156[illegible]
.5800	.5[illegible]	.8249	4.654	5.19	11.55	.1679	.7227	200.0	.23833	.0157[illegible]
.5600	.5[illegible]	.8571	4.753	5.32	11.49	.1549	.7311	201.5	.23933	.0158[illegible]
.5400	.4[illegible]	.8890	4.859	5.47	11.39	.1421	.7390	202.9	.24029	.0159[illegible]
.5200	.4[illegible]	.9206	4.973	5.62	11.25	.1297	.7462	204.3	.24123	.0160[illegible]
.5000	.4[illegible]	.9519	5.10	5.79	11.07	.1178	.7529	205.8	.24215	.0160[illegible]
.4800	.4[illegible]	.9829	5.23	5.97	10.85	.1062	.7591	207.3	.24304	.0161[illegible]
.4600	.4[illegible]	1.0137	5.37	6.18	10.59	.0952	.7647	208.9	.24392	.0162[illegible]
.4400	.3[illegible]	1.0444	5.53	6.40	10.30	.0848	.7699	210.4	.24479	.0163[illegible]
.4200	.3[illegible]	1.0750	5.70	6.65	9.97	.0749	.7747	212.1	.24564	.0164[illegible]
.4000	.3[illegible]	1.1056	5.89	6.93	9.61	.0656	.7790	213.8	.24648	.0165[illegible]
.3800	.3[illegible]	1.1363	6.10	7.24	9.21	.0569	.7830	215.5	.24731	.0165[illegible]
.3600	.3[illegible]	1.1675	6.34	7.60	8.78	.0488	.7865	217.4	.24814	.0166[illegible]
.3400	.2[illegible]	1.1992	6.60	8.01	8.32	.0414	.7897	219.3	.24896	.0167[illegible]
.3200	.2[illegible]	1.2318	6.89	8.48	7.84	.0347	.7926	221.3	.24978	.0168[illegible]
.3000	.2[illegible]	1.2659	7.23	9.02	7.33	.0286	.7951	223.5	.25061	.0169[illegible]
.2800	.2[illegible]	1.3020	7.61	9.67	6.79	.0232	.7974	225.9	.25144	.0170[illegible]
.2600	.2[illegible]	1.3411	8.05	10.45	6.24	.0184	.7993	228.5	.25228	.0171[illegible]
.2400	.1[illegible]	1.3846	8.57	11.41	5.66	.0142	.8010	231.3	.25313	.0173[illegible]
.2200	.1[illegible]	1.4347	9.19	12.60	5.07	.0107	.8024	234.4	.25400	.0174[illegible]
.2000	.1[illegible]	1.4948	9.94	14.14	4.48	.0077	.8036	238.0	.25490	.0176[illegible]
.1800	.1[illegible]	1.5707	10.86	16.19	3.87	.0053	.8046	242.1	.25584	.0177[illegible]
.1600	.1021	1.6729	12.01	19.04	3.27	.0034	.8054	247.0	.25684	.0179[illegible]
.1400	.0[illegible]	1.8220	13.50	23.24	2.68	.0021	.8060	253.0	.25791	.0182[illegible]
.1200	.0642	2.0643	15.46	29.88	2.13	.0011	.8064	260.9	.25911	.0185[illegible]
.1000	.0[illegible]	2.5214	17.97	41.29	1.653	.0005	.8067	271.9	.26053	.0189[illegible]
.0900	.0388	2.9309	19.30	50.02	1.472	.0003	.8068	279.6	.26137	.0192[illegible]
.0800	.0[illegible]	3.6094	20.26	61.48	1.345	.0002	.8069	289.9	.26237	.0196[illegible]
.0750	.0[illegible]	4.1486	20.29	68.30	1.300	.0002	.8070	296.8	.26299	.0198[illegible]
.0700	.0[illegible]	4.9855	19.62	75.83	1.256	.0001	.8070	306.1	.26376	.0201[illegible]
.0680	.0[illegible]	5.4926	19.02	79.05	1.235	.0001	.8070	311.1	.26415	.0202[illegible]
.0660	.0[illegible]	6.2112	18.09	82.39	1.207	.0001	.8070	317.6	.26466	.0204[illegible]
.0640	.0[illegible]	7.4089	16.61	85.84	1.168	.0001	.8071	327.3	.26540	.0206[illegible]
.0620	.0[illegible]	10.5234	13.75	89.13	1.105	.0000	.8071	348.5	.26697	.0210[illegible]
.0610	.0[illegible]	17.3304	10.38	89.99	1.029	.0000	.8072	385.1	.26965	.0216[illegible]

TABLE VII.- VALUES OF $\overline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.02$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -5.0^{\circ}$, $e_i = 0.09600$

$\overline{V}$	$\overline{V}_r$	$\overline{Z}$	$-\gamma$ deg	$-\gamma$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\dot{\gamma}}{\overline{V}}$
1.0200	0.9602	0.0000000	5.000	5.000	0.0000	0.0000	0	0	0	0	0.000
1.0205	.9607	.0000012	4.973	5.000	.0001	.0014	.0014	9.8	.01221	.001065	.000
1.0210	.9612	.0000048	4.944	5.000	.0004	.0023	.0023	19.7	.02452	.002133	.000
1.0215	.9617	.0000108	4.915	5.000	.0008	.0037	.0037	29.8	.03699	.003209	.001
1.0220	.9622	.0000192	4.884	5.000	.0013	.0061	.0061	40.0	.04972	.004300	.001
1.0225	.9627	.0000300	4.851	5.000	.0020	.0102	.0102	50.3	.06303	.005434	.004
1.0230	.9632	.0000432	4.813	5.000	.0110	.0183	.0183	63.6	.07833	.006727	.013
1.0232	.9634	.0000500	4.797	5.000	.0139	.0237	.0237	70.0	.09458	.008089	.043
1.0230	.9632	.0003475	4.741	5.000	.0941	.0521	.0521	85.4	.10621	.009056	.102
1.0225	.9627	.0005948	4.725	5.000	.1504	.0657	.0657	90.4	.11249	.009576	.163
1.0220	.9622	.0007340	4.715	5.000	.1999	.0755	.0755	93.4	.11627	.009888	.215
1.0210	.9612	.0010642	4.703	4.999	.289	.0907	.0907	97.5	.12130	.010302	.313
1.0200	.9602	.0137880	4.694	4.987	.374	.1029	.0829	100.3	.12480	.010590	.405
1.0150	.9552	.02857	4.673	4.944	.770	.1462	.1112	108.3	.13475	.011405	.844
1.0100	.9502	.04278	4.664	4.908	1.147	.1766	.1438	112.8	.14031	.011860	1.271
1.0050	.9452	.05674	4.659	4.874	1.513	.2007	.1629	116.0	.14423	.012179	1.694
1.0000	.9402	.07053	4.656	4.851	1.871	.2207	.1850	118.5	.14727	.012426	2.116
.9950	.9352	.08420	4.656	4.829	2.22	.2380	.2000	120.5	.14976	.012628	2.539
.9900	.9302	.09777	4.656	4.808	2.56	.2530	.2170	122.3	.15186	.012800	2.963
.9800	.9202	.12466	4.659	4.768	3.23	.2779	.2459	125.2	.15531	.013081	3.816
.9700	.9102	.15124	4.664	4.730	3.88	.2978	.2706	127.5	.15808	.013308	4.678
.9600	.9002	.17757	4.670	4.691	4.50	.3138	.2907	129.5	.16041	.013497	5.549
.9500	.8902	.2037	4.678	4.653	5.10	.3266	.3140	131.2	.16242	.013661	6.431
.9400	.8802	.2295	4.687	4.616	5.68	.3370	.3318	132.7	.16418	.013806	7.325
.9300	.8702	.2551	4.696	4.580	6.23	.3452	.3469	134.1	.16576	.013935	8.230
.9200	.8602	.2806	4.706	4.544	6.77	.3515	.3600	135.4	.16719	.014053	9.148
.9100	.8502	.3057	4.717	4.508	7.29	.3563	.3804	136.6	.16849	.014161	10.080
.9000	.8402	.3307	4.729	4.473	7.78	.3596	.3947	137.7	.16970	.014260	11.025
.8800	.8202	.3801	4.754	4.403	8.72	.3627	.4211	139.6	.17186	.014440	12.957
.8600	.8002	.4286	4.781	4.339	9.57	.3618	.4400	141.4	.17377	.014599	14.951
.8400	.7802	.4763	4.810	4.279	10.36	.3577	.4600	143.1	.17548	.014742	17.011
.8200	.7602	.5232	4.841	4.222	11.06	.3510	.4888	144.6	.17703	.014873	19.140
.8000	.7402	.5692	4.874	4.168	11.70	.3421	.5000	146.1	.17846	.014994	21.344
.7800	.7202	.6144	4.909	4.118	12.26	.3316	.5200	147.5	.17978	.015107	23.630
.7600	.7002	.6587	4.947	4.070	12.75	.3197	.5370	148.8	.18101	.015214	26.002
.7400	.6803	.7022	4.987	4.027	13.17	.3066	.5574	150.0	.18217	.015314	28.467
.7200	.6603	.7448	5.029	3.986	13.53	.2927	.5800	151.3	.18326	.015410	31.033
.7000	.6403	.7865	5.075	3.950	13.82	.2782	.5794	152.5	.18430	.015502	33.707
.6800	.6203	.8273	5.123	3.918	14.04	.2632	.5993	153.8	.18529	.015590	36.500
.6600	.6003	.8673	5.175	3.890	14.20	.2479	.6002	154.8	.18624	.015676	39.421
.6400	.5803	.9063	5.230	3.870	14.30	.2325	.6100	156.0	.18716	.015759	42.482
.6200	.5603	.9444	5.289	3.860	14.34	.2171	.6200	157.1	.18804	.015840	45.695
.6000	.5403	.9815	5.352	3.860	14.33	.2017	.6292	158.3	.18889	.015919	49.075
.5800	.5203	1.0177	5.420	3.874	14.25	.1866	.6395	159.4	.18971	.015997	52.640
.5600	.5003	1.0530	5.493	3.900	14.12	.1717	.6494	160.6	.19052	.016074	56.409
.5400	.4803	1.0873	5.572	3.937	13.94	.1572	.6590	161.7	.19130	.016150	60.403
.5200	.4603	1.1206	5.658	3.984	13.70	.1432	.6691	162.9	.19207	.016226	64.650
.5000	.4403	1.1530	5.751	4.039	13.41	.1297	.6800	164.1	.19283	.016301	69.179
.4800	.4204	1.1844	5.852	4.102	13.08	.1167	.6907	165.4	.19357	.016376	74.006
.4600	.4004	1.2149	5.963	4.174	12.70	.1043	.6994	166.7	.19430	.016452	79.235
.4400	.3804	1.2446	6.08	7.04	12.28	.0926	.6897	168.0	.19502	.016528	84.857
.4200	.3604	1.2733	6.22	7.00	11.81	.0815	.6897	169.4	.19573	.016605	90.953
.4000	.3404	1.3014	6.37	7.09	11.31	.0712	.6890	170.8	.19644	.016683	97.601
.3800	.3205	1.3287	6.53	7.19	10.77	.0615	.6907	172.3	.19715	.016763	104.896
.3600	.3005	1.3555	6.72	8.11	10.20	.0527	.6990	173.9	.19786	.016846	112.955
.3400	.2805	1.3819	6.93	8.41	9.60	.0445	.6999	175.5	.19857	.016931	121.933
.3200	.2606	1.4083	7.17	8.73	8.96	.0371	.7010	177.3	.19929	.017019	132.027
.3000	.2406	1.4350	7.44	9.06	8.31	.0305	.7040	179.0	.20001	.017111	143.500
.2800	.2207	1.4626	7.76	9.47	7.63	.0246	.7061	181.3	.20074	.017209	156.711
.2600	.2008	1.4920	8.14	10.07	6.94	.0194	.7079	183.8	.20149	.017314	172.158
.2400	.1809	1.5245	8.59	11.14	6.24	.0149	.7096	186.2	.20226	.017427	190.564
.2200	.1610	1.5621	9.13	12.55	5.52	.0111	.7114	189.0	.20305	.017550	213.01
.2000	.1412	1.6080	9.79	13.43	4.81	.0080	.7100	192.2	.20388	.017688	241.20
.1800	.1215	1.6679	10.63	15.84	4.11	.0055	.7139	196.1	.20476	.017846	277.98
.1600	.1020	1.7519	11.70	18.55	3.42	.0035	.7147	200.8	.20570	.018032	328.49
.1400	.0827	1.8806	13.12	22.60	2.76	.0021	.7143	206.6	.20674	.018259	402.99
.1200	.0640	2.1003	15.05	29.14	2.15	.0011	.7147	214.0	.20791	.018553	515.07
.1000	.0465	2.5348	17.62	40.46	1.645	.0005	.7159	225.2	.20931	.018964	690.43
.0900	.0386	2.9355	19.04	49.59	1.456	.0003	.7151	232.8	.21016	.019244	778.51
.0800	.0314	3.6100	20.11	61.[illegible]	1.334	.0002	.7152	243.2	.21117	.019605	893.75
.0750	.0279	4.1494	20.19	68.[illegible]	1.296	.0002	.7153	250.[illegible]	.21178	.019832	969.76
.0700	.0242	4.9876	19.58	75.[illegible]	1.256	.0001	.7153	259.4	.21256	.020113	1057.5
.0680	.0225	5.4953	18.99	79.[illegible]	1.238	.0001	.7153	264.[illegible]	.21296	.020253	1094.4
.0660	.0207	6.2145	18.07	82.[illegible]	1.208	.0001	.7153	271.6	.21346	.020422	1124.8
.0640	.0183	7.4125	16.60	85.[illegible]	1.168	.0001	.7154	280.[illegible]	.21420	.020652	1148.6
.0620	.0147	10.5260	13.74	89.[illegible]	1.105	.0000	.7154	301.9	.21577	.021077	1163.2
.0610	.0110	17.3307	10.38	89.[illegible]	1.029	.0000	.7155	338.[illegible]	.21846	.021646	1163.3

TABLE VII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -6.0^{\circ}$, $e_i = 0.11198$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\Lambda$ deg	$-\frac{B}{E}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\omega}{r}$	$\frac{-\Delta\phi}{r}$	$\sqrt{\beta r \frac{\phi}{V}}$
1.0200	0.9603	0.0000010	6.000	6.37[illegible]	0.0000	0.0009	0	0	0	0	0.000
1.0205	.9609	.0000028	5.977	6.35[illegible]	.0001	.0014	.0003	8.2	.01015	.001[illegible]	.000
1.0210	.9633	.0000068	5.954	6.32[illegible]	.0002	.0023	.0009	16.4	.02037	.002[illegible]	.000
1.0215	.9618	.0000179	5.929	6.29[illegible]	.0005	.0037	.0018	24.7	.03069	.003[illegible]	.001
1.0220	.9623	.0000478	5.904	6.27[illegible]	.0013	.0061	.0033	33.2	.04118	.004[illegible]	.001
1.0225	.9628	.0001311	5.877	6.24[illegible]	.0036	.0101	.0058	41.9	.05205	.005[illegible]	.004
1.0230	.9633	.0004002	5.847	6.21[illegible]	.0109	.0177	.0107	51.6	.06412	.006[illegible]	.012
1.02337	.9637[illegible]	.0017698	5.805	6.16[illegible]	.0483	.0372	.0232	64.6	.08030	.008[illegible]	.[illegible]
1.0230	.9633	.004789	5.776	6.13[illegible]	.1303	.0612	.0387	73.4	.09121	.009[illegible]	.140
1.0225	.9628	.007208	5.765	6.12[illegible]	.1961	.0749	.0477	77.0	.09571	.009[illegible]	.211
1.0220	.9623	.009365	5.757	6.11[illegible]	.255	.0853	.0545	79.3	.09860	.010[illegible]	.2[illegible]
1.0210	.9613	.013376	5.748	6.10[illegible]	.363	.1017	.0654	82.5	.10255	.010[illegible]	.4[illegible]
1.0200	.9603	.017194	5.741	6.09[illegible]	.466	.1150	.0743	84.7	.10533	.010[illegible]	.5[illegible]
1.0150	.9553	.03525	5.723	6.08[illegible]	.951	.1625	.1060	91.2	.11333	.011[illegible]	1.04[illegible]
1.0100	.9503	.05265	5.715	6.07[illegible]	1.412	.1959	.1308	94.8	.11784	.012[illegible]	1.[illegible]
1.0050	.9453	.06974	5.710	6.07[illegible]	1.860	.2225	.1507	97.4	.12101	.012[illegible]	2.0[illegible]
1.0000	.9403	.08663	5.708	6.07[illegible]	2.30	.2447	.1680	99.5	.12348	.012[illegible]	2.5[illegible]
.9950	.9353	.10337	5.706	6.07[illegible]	2.73	.2637	.1834	101.2	.12550	.012[illegible]	3.1[illegible]
.9900	.9303	.11999	5.706	6.07[illegible]	3.15	.2803	.1977	102.5	.12721	.013[illegible]	3.[illegible]
.9800	.9203	.15290	5.707	6.07[illegible]	3.96	.3079	.2230	104.9	.13002	.013[illegible]	4.[illegible]
.9700	.9103	.18543	5.710	6.08[illegible]	4.75	.3298	.2452	106.8	.13228	.013[illegible]	5.[illegible]
.9600	.9003	.2176	5.714	6.09[illegible]	5.51	.3475	.2653	108.4	.13417	.013[illegible]	6.[illegible]
.9500	.8903	.2495	5.719	6.10[illegible]	6.25	.3617	.2836	109.8	.13581	.013[illegible]	7.[illegible]
.9400	.8803	.2810	5.725	6.11[illegible]	6.95	.3730	.3004	111.1	.13725	.014[illegible]	8.[illegible]
.9300	.8703	.3123	5.731	6.12[illegible]	7.63	.3820	.3161	112.2	.13853	.014[illegible]	10.[illegible]
.9200	.8603	.3433	5.738	6.13[illegible]	8.28	.3890	.3308	113.2	.13970	.014[illegible]	11.[illegible]
.9100	.8503	.3739	5.745	6.15[illegible]	8.91	.3941	.3445	114.2	.14076	.014[illegible]	12.[illegible]
.9000	.8403	.4043	5.753	6.16[illegible]	9.52	.3977	.3575	115.1	.14175	.014[illegible]	13.476
.8800	.8203	.4641	5.770	6.19[illegible]	10.65	.4009	.3814	116.7	.14352	.014[illegible]	15.[illegible]
.8600	.8003	.5228	5.789	6.22[illegible]	11.68	.3997	.4031	118.2	.14508	.014[illegible]	18.239
.8400	.7803	.5804	5.809	6.25[illegible]	12.62	.3950	.4228	119.5	.14648	.014[illegible]	20.[illegible]
.8200	.7603	.6367	5.831	6.29[illegible]	13.47	.3873	.4409	120.8	.14775	.015[illegible]	23.284
.8000	.7403	.6918	5.855	6.32[illegible]	14.22	.3774	.4576	122.0	.14892	.015[illegible]	25.593
.7800	.7203	.7457	5.880	6.36[illegible]	14.88	.3655	.4730	123.1	.15000	.015[illegible]	28.[illegible]
.7600	.7004	.7984	5.907	6.41[illegible]	15.46	.3521	.4872	124.2	.15102	.015[illegible]	31.516
.7400	.6804	.8498	5.936	6.45[illegible]	15.95	.3375	.5005	125.2	.15197	.015[illegible]	34.45[illegible]
.7200	.6604	.9000	5.967	6.50[illegible]	16.35	.3220	.5128	126.3	.15287	.015[illegible]	37.499
.7000	.6404	.9488	5.999	6.56[illegible]	16.67	.3057	.5242	127.3	.15373	.015[illegible]	40.[illegible]
.6800	.6204	.9963	6.034	6.61[illegible]	16.92	.2890	.5349	128.2	.15455	.015[illegible]	43.956
.6600	.6004	1.0425	6.072	6.67[illegible]	17.08	.2720	.5448	129.2	.15534	.015[illegible]	47.487
.6400	.5804	1.0873	6.112	6.74[illegible]	17.17	.2548	.5541	130.2	.15610	.015[illegible]	50.9[illegible]
.6200	.5604	1.1307	6.156	6.81[illegible]	17.18	.2377	.5628	131.1	.15683	.016[illegible]	54.[illegible]
.6000	.5404	1.1727	6.202	6.88[illegible]	17.12	.2206	.5708	132.1	.15754	.016[illegible]	58.[illegible]
.5800	.5204	1.2132	6.252	6.97[illegible]	16.99	.2038	.5783	133.0	.15823	.016[illegible]	62.751
.5600	.5004	1.2522	6.307	7.06	16.80	.1874	.5853	134.0	.15891	.016[illegible]	67.083
.5400	.4804	1.2897	6.365	7.16	16.54	.1714	.5918	135.0	.15957	.016[illegible]	71.652
.5200	.4604	1.3257	6.429	7.27	16.21	.1559	.5978	136.0	.16022	.016[illegible]	76.485
.5000	.4404	1.3602	6.499	7.38	15.83	.1409	.6034	137.0	.16085	.016[illegible]	81.612
.4800	.4205	1.3931	6.576	7.51	15.39	.1266	.6086	138.1	.16148	.016[illegible]	87.069
.4600	.4005	1.4244	6.660	7.66	14.90	.1130	.6133	139.2	.16210	.016[illegible]	92.897
.4400	.3805	1.4542	6.753	7.82	14.35	.1001	.6177	140.3	.16272	.016[illegible]	99.[illegible]
.4200	.3605	1.4824	6.856	7.99	13.76	.0880	.6218	141.5	.16333	.016[illegible]	105.884
.4000	.3405	1.5090	6.971	8.20	13.12	.0767	.6255	142.7	.16394	.016[illegible]	113.[illegible]
.3800	.3206	1.5342	7.10	8.43	12.45	.0662	.6289	144.0	.16455	.016[illegible]	121.[illegible]
.3600	.3006	1.5580	7.25	8.69	11.73	.0565	.6319	145.4	.16516	.017[illegible]	129.[illegible]
.3400	.2806	1.5806	7.41	8.99	10.98	.0476	.6347	146.8	.16578	.017[illegible]	139.[illegible]
.3200	.2607	1.6021	7.60	9.35	10.20	.0396	.6372	148.4	.16641	.017[illegible]	150.[illegible]
.3000	.2407	1.6229	7.83	9.77	9.40	.0324	.6394	150.1	.16704	.017[illegible]	162.290
.2800	.2208	1.6435	8.09	10.28	8.58	.0261	.6414	151.9	.16769	.017339	176.[illegible]
.2600	.2008	1.6646	8.40	10.90	7.75	.0205	.6431	154.0	.16836	.017[illegible]	192.[illegible]
.2400	.1809	1.6873	8.77	11.67	6.90	.0157	.6446	156.3	.16905	.017[illegible]	210.[illegible]
.2200	.1611	1.7136	9.23	12.66	6.06	.0117	.6459	158.8	.16976	.017[illegible]	233.[illegible]
.2000	.1413	1.7463	9.80	13.95	5.23	.0083	.6470	161.8	.17052	.017[illegible]	261.[illegible]
.1800	.1215	1.7909	10.54	15.72	4.41	.0057	.6479	165.4	.17133	.017[illegible]	298.49
.1600	.1019	1.8570	11.51	18.25	3.62	.0036	.6486	169.7	.17221	.018[illegible]	348.[illegible]
.1400	.0826	1.9646	12.82	22.10	2.87	.0021	.6490	175.2	.17319	.018[illegible]	420.98
.1200	.0638	2.1592	14.67	28.45	2.20	.0011	.6496	182.6	.17432	.018[illegible]	539.[illegible]
.1000	.0463	2.5657	17.24	39.85	1.646	.0005	.6499	193.3	.17570	.018[illegible]	769.[illegible]
.0900	.0384	3.9539	18.72	48.86	1.449	.0003	.6500	200.9	.17655	.019[illegible]	984.[illegible]
.0800	.0312	3.6203	19.91	60.81	1.322	.0002	.6501	211.3	.17756	.019[illegible]	1357.[illegible]
.0750	.0278	4.1582	20.06	67.90	1.283	.0002	.6502	218.3	.17818	.019[illegible]	1663.30
.0700	.0241	4.9965	19.51	75.65	1.247	.0001	.6502	227.6	.17896	.020[illegible]	2141.4
.0680	.0225	5.5046	18.94	78.93	1.229	.0001	.6502	232.7	.17936	.020[illegible]	2428.[illegible]
.0660	.0206	6.2240	18.04	82.33	1.204	.0001	.6503	239.2	.17986	.020[illegible]	2829.[illegible]
.0640	.0183	7.4216	16.58	85.81	1.167	.0001	.6503	248.9	.18060	.020[illegible]	3478.9
.0620	.0147	10.5320	13.74	89.12	1.105	.0000	.6503	270.1	.18217	.021[illegible]	5096.[illegible]
.0610	.0110	17.3319	10.38	89.99	1.030	.0000	.6504	306.6	.18485	.021[illegible]	8523.9

TABLE VII.- VALUES OF $\overline{Z}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.02$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(f) $\gamma_i = -8.0^{\circ}$, $e_i = 0.14481$

$\overline{V}$	$\overline{V}_r$	$\overline{Z}$	γ deg	γ deg	$-\frac{\dot{u}_r}{g}$	$\overline{q}$	$\overline{Q}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\,\frac{Z}{V}$
1.0200	0.9606	0.0000010	8.000	8.498	0.0000	0.0009	0	0	0	0	0.000
1.0205	.9611	.0000009	7.983	8.480	.0001	.0014	.0003	6.1	.00758	.001065	.000
1.0210	.9616	.0000007	7.965	8.463	.0003	.0023	.0007	12.3	.01520	.002132	.000
1.0215	.9621	.0000170	7.947	8.441	.0005	.0037	.0013	18.5	.02287	.003204	.001
1.0220	.9626	.0000494	7.929	8.421	.0013	.0061	.0025	24.8	.03063	.004286	.001
1.0225	.9631	.0001264	7.909	8.400	.0031	.0100	.0043	31.2	.03860	.005394	.004
1.0230	.9636	.0003740	7.887	8.377	.0102	.0171	.0077	38.1	.04714	.006579	.011
1.0235[2]	.9641[2]	.002387	7.849	8.336	.065	.0433	.0201	50.2	.06205	.008634	.070
1.0230	.9636	.007536	7.824	8.310	.205	.0768	.0342	57.6	.07132	.009916	.221
1.0225	.9631	.010660	7.817	8.302	.290	.0912	.0431	59.9	.07413	.010302	.313
1.0220	.9626	.013521	7.812	8.297	.368	.1026	.0487	61.4	.07606	.010567	.397
1.0210	.9616	.018903	7.805	8.290	.514	.1210	.0577	63.6	.07879	.010940	.556
1.0200	.9606	.02405	7.800	8.284	.653	.1361	.0651	65.2	.08075	.011209	.707
1.0150	.9556	.04852	7.786	8.273	1.309	.1908	.0928	69.5	.08648	.011994	1.434
1.0100	.9506	.07212	7.778	8.268	1.996	.2295	.1114	72.5	.08975	.012440	2.142
1.0050	.9456	.09533	7.774	8.266	2.54	.2604	.1303	74.4	.09206	.012755	2.846
1.0000	.9406	.11828	7.771	8.265	3.14	.2862	.1451	75.9	.09386	.013001	3.548
.9950	.9356	.14103	7.769	8.265	3.72	.3083	.1584	77.1	.09533	.013202	4.252
.9900	.9306	.16360	7.767	8.267	4.29	.3276	.1705	78.2	.09658	.013372	4.957
.9800	.9206	.2083	7.766	8.270	5.40	.3597	.1922	79.9	.09863	.013652	6.376
.9700	.9106	.2525	7.765	8.275	6.47	.3852	.2112	81.3	.10028	.013877	7.808
.9600	.9006	.2961	7.766	8.282	7.51	.4057	.2284	82.5	.10166	.014066	9.254
.9500	.8906	.3393	7.767	8.288	8.50	.4222	.2441	83.5	.10286	.014229	10.715
.9400	.8806	.3821	7.768	8.296	9.46	.4353	.2586	84.4	.10391	.014372	12.193
.9300	.8706	.4244	7.770	8.304	10.38	.4457	.2720	85.3	.10485	.014501	13.689
.9200	.8606	.4662	7.773	8.313	11.26	.4537	.2846	86.0	.10571	.014617	15.202
.9100	.8506	.5076	7.776	8.322	12.11	.4596	.2964	86.7	.10649	.014724	16.734
.9000	.8406	.5486	7.779	8.332	12.92	.4637	.3075	87.4	.10721	.014822	18.286
.8800	.8206	.6292	7.785	8.353	14.44	.4672	.3281	88.6	.10851	.015000	21.449
.8600	.8006	.7080	7.793	8.375	15.83	.4656	.3467	89.7	.10965	.015156	24.698
.8400	.7806	.7850	7.802	8.400	17.08	.4598	.3637	90.7	.11068	.015297	28.037
.8200	.7606	.8602	7.811	8.424	18.21	.4507	.3792	91.6	.11162	.015426	31.472
.8000	.7406	.9336	7.822	8.454	19.20	.4388	.3936	92.5	.11248	.015544	35.010
.7800	.7206	1.0050	7.833	8.483	20.07	.4248	.4068	93.3	.11328	.015654	38.655
.7600	.7006	1.0746	7.845	8.515	20.82	.4089	.4191	94.1	.11403	.015757	42.417
.7400	.6806	1.1421	7.859	8.549	21.45	.3917	.4305	94.9	.11474	.015855	46.302
.7200	.6606	1.2077	7.873	8.559	21.96	.3734	.4412	95.7	.11541	.015947	50.320
.7000	.6406	1.2712	7.888	8.625	22.36	.3543	.4511	96.4	.11604	.016035	54.479
.6800	.6206	1.3326	7.905	8.667	22.64	.3346	.4603	97.1	.11665	.016120	58.791
.6600	.6006	1.3919	7.923	8.712	22.82	.3147	.4689	97.9	.11724	.016202	63.266
.6400	.5806	1.4489	7.942	8.761	22.90	.2945	.4769	98.6	.11781	.016280	67.918
.6200	.5606	1.5037	7.964	8.813	22.87	.2744	.4844	99.3	.11835	.016357	72.761
.6000	.5407	1.5562	7.986	8.870	22.74	.2545	.4914	100.0	.11889	.016431	77.811
.5800	.5207	1.6064	8.011	8.932	22.52	.2349	.4979	100.7	.11940	.016504	83.087
.5600	.5007	1.6541	8.039	8.999	22.21	.2157	.5040	101.5	.11991	.016576	88.610
.5400	.4807	1.6993	8.068	9.071	21.81	.1970	.5097	102.2	.12041	.016646	94.405
.5200	.4607	1.7419	8.101	9.15	21.33	.1789	.5149	103.0	.12090	.016716	100.497
.5000	.4407	1.7820	8.137	9.24	20.76	.1616	.5198	103.8	.12138	.016785	106.920
.4800	.4207	1.8194	8.177	9.34	20.13	.1450	.5243	104.6	.12186	.016853	113.711
.4600	.4007	1.8540	8.222	9.46	19.41	.1292	.5285	105.4	.12233	.016921	120.914
.4400	.3807	1.8858	8.272	9.57	18.64	.1143	.5324	106.3	.12280	.016990	128.581
.4200	.3607	1.9148	8.328	9.71	17.80	.1002	.5359	107.2	.12327	.017058	136.773
.4000	.3408	1.9409	8.392	9.86	16.90	.0872	.5390	108.1	.12375	.017127	145.568
.3800	.3208	1.9641	8.464	10.04	15.95	.0750	.5419	109.1	.12422	.017198	155.058
.3600	.3008	1.9843	8.548	10.25	14.96	.0639	.5449	110.2	.12470	.017269	165.357
.3400	.2808	2.0016	8.644	10.49	13.93	.0537	.5473	111.3	.12518	.017342	176.611
.3200	.2609	2.0161	8.758	10.77	12.86	.0446	.5494	112.6	.12567	.017418	189.007
.3000	.2409	2.0279	8.892	11.10	11.77	.0364	.5510	113.9	.12618	.017496	202.79
.2800	.2210	2.0373	9.05	11.50	10.66	.0291	.5523	115.4	.12670	.017578	218.29
.2600	.2010	2.0450	9.25	12.00	9.53	.0228	.5536	117.1	.12723	.017664	235.96
.2400	.1811	2.0515	9.49	12.63	8.41	.0174	.5547	118.9	.12779	.017757	256.44
.2200	.1612	2.0586	9.80	13.44	7.29	.0128	.5554	121.1	.12838	.017857	280.71
.2000	.1414	2.0685	10.20	14.51	6.20	.0091	.5558	123.6	.12902	.017968	310.28
.1800	.1216	2.0859	10.73	16.01	5.14	.0061	.5562	126.6	.12970	.018095	347.64
.1600	.1019	2.1192	11.47	18.19	4.13	.0039	.5569	130.3	.13046	.018243	397.35
.1400	.0825	2.1865	12.52	21.59	3.19	.0022	.5604	135.1	.13132	.018426	468.54
.1200	.0635	2.3307	14.09	27.39	2.35	.0011	.5608	141.8	.13235	.018669	582.66
.1000	.0458	2.6741	16.50	38.37	1.680	.0005	.5611	151.9	.13365	.019024	802.24
.0900	.0378	3.0290	18.04	47.45	1.445	.0003	.5613	159.3	.13447	.019279	1009.67
.0800	.0308	3.6690	19.42	59.86	1.302	.0002	.5613	169.6	.13548	.019623	1375.88
.0750	.0274	4.1993	19.71	67.24	1.264	.0002	.5613	176.6	.13610	.019844	1679.73
.0700	.0239	5.0340	19.31	75.32	1.235	.0001	.5614	186.0	.13688	.020123	2157.4
.0680	.0223	5.5412	18.79	78.71	1.220	.0001	.5614	191.0	.13729	.020242	2444.7
.0660	.0205	6.2597	17.94	82.19	1.199	.0001	.5614	197.6	.13779	.020431	2885.3
.0640	.0183	7.4548	16.53	85.74	1.165	.0001	.5614	207.3	.13853	.020659	3494.4
.0620	.0147	10.5534	13.72	89.10	1.105	.0000	.5615	228.4	.14009	.021080	5106.5
.0610	.0110	17.3380	10.38	89.99	1.030	.0000	.5615	264.8	.14277	.021804	8520.9

TABLE VII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.02$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(g) $\gamma_i = -10.0^{\circ}$, $e_i = 0.17815$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\gamma$ rad	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta x}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\Delta x^2 + \Delta y^2}$
1.0300	0.9610	0.0000010	10.000	10.611	0.0000	0.0000	0	0	0	0	0.000
1.0305	.9615	.0000028	9.986	10.614	.0001	.0014	.0000	4.9	.00604	.001064	.000
1.0310	.9620	.0000068	9.972	10.591	.0002	.0023	.0005	9.9	.01210	.002131	.000
1.0315	.9625	.0000173	9.958	10.578	.0005	.0037	.0011	14.8	.01820	.003202	.001
1.0320	.9630	.0000473	9.943	10.560	.0013	.0061	.0020	19.8	.02435	.004282	.001
1.0325	.9635	.0001270	9.928	10.543	.0035	.0100	.0034	24.9	.03063	.005382	.004
1.0330	.9640	.0003610	9.911	10.505	.0098	.0168	.0060	30.3	.03725	.006540	.011
1.0335	.9645	.0012957	9.890	10.5[illegible]	.0359	.0319	.011[illegible]	36.9	.04539	.007959	.038
1.0364	.9659	.002995	9.876	10.4[illegible]	.0816	.0485	.018[illegible]	41.2	.05073	.008890	.088
1.0335	.9644	.005766	9.865	10.47[illegible]	.1576	.0673	.025[illegible]	44.6	.05491	.009618	.169
1.0330	.9635	.010430	9.854	10.4[illegible]	.284	.0904	.034[illegible]	47.7	.05871	.010277	.306
1.0320	.9629	.017802	9.845	10.4[illegible]	.485	.1178	.044[illegible]	50.5	.06213	.010872	.523
1.0310	.9619	.02452	9.839	10.4[illegible]	.667	.1380	.052[illegible]	52.2	.06412	.011229	.720
1.0300	.9609	.03098	9.835	10.44[illegible]	.841	.1546	.059[illegible]	53.4	.06569	.011490	.911
1.0350	.9559	.06172	9.823	10.4[illegible]	1.667	.2154	.082[illegible]	57.0	.07015	.012261	1.824
1.0400	.9509	.09142	9.816	10.4[illegible]	2.46	.2587	.101[illegible]	59.1	.07270	.012703	2.715
1.0450	.9459	.12063	9.812	10.4[illegible]	3.22	.2932	.116[illegible]	60.6	.07451	.013017	3.601
1.0500	.9409	.14951	9.808	10.4[illegible]	3.97	.3221	.129[illegible]	61.8	.07592	.013261	4.485
1.0550	.9359	.17814	9.805	10.4[illegible]	4.70	.3469	.141[illegible]	62.8	.07708	.013461	5.371
1.0600	.9309	.2065	9.803	10.4[illegible]	5.42	.3685	.152[illegible]	63.6	.07807	.013631	6.259
1.0600	.9209	.2628	9.799	10.4[illegible]	6.82	.4045	.171[illegible]	64.9	.07968	.013910	8.045
1.0700	.9109	.3184	9.796	10.4[illegible]	8.17	.4331	.188[illegible]	66.0	.08098	.014135	9.847
1.0800	.9009	.3733	9.794	10.4[illegible]	9.47	.4560	.204[illegible]	67.0	.08207	.014323	11.666
1.0900	.8909	.4276	9.792	10.4[illegible]	10.72	.4745	.218[illegible]	67.8	.08301	.014486	13.504
1.0400	.8809	.4814	9.791	10.4[illegible]	11.92	.4892	.230[illegible]	68.5	.08384	.014629	15.363
1.0500	.8709	.5345	9.790	10.4[illegible]	13.08	.5008	.242[illegible]	69.2	.08459	.014757	17.242
1.0600	.8609	.5871	9.789	10.4[illegible]	14.19	.5098	.254[illegible]	69.8	.08526	.014873	19.144
1.0700	.8509	.6391	9.789	10.4[illegible]	15.25	.5163	.264[illegible]	70.3	.08588	.014980	21.068
1.0800	.8409	.6905	9.788	10.4[illegible]	16.28	.5209	.274[illegible]	70.9	.08645	.015078	23.015
1.0900	.8209	.7915	9.788	10.4[illegible]	18.19	.5247	.292[illegible]	71.8	.08747	.015255	26.984
1.0600	.8009	.8902	9.788	10.5[illegible]	19.92	.5228	.309[illegible]	72.7	.08838	.015411	31.055
1.0700	.7809	.9866	9.788	10.53[illegible]	21.49	.5162	.324[illegible]	73.5	.08919	.015551	35.235
1.0800	.7609	1.0805	9.789	10.557	22.89	.5058	.338[illegible]	74.2	.08993	.015679	39.531
1.0900	.7409	1.1720	9.790	10.579	24.13	.4924	.351[illegible]	74.9	.09061	.015797	43.949
1.0800	.7210	1.2609	9.791	10.602	25.21	.4764	.363[illegible]	75.6	.09125	.015906	48.497
1.0600	.7010	1.3473	9.793	10.628	26.13	.4586	.374[illegible]	76.2	.09184	.016009	53.184
1.0400	.6810	1.4311	9.796	10.655	26.90	.4391	.384[illegible]	76.8	.09240	.016105	58.017
1.0200	.6610	1.5122	9.798	10.683	27.53	.4185	.393[illegible]	77.4	.09293	.016197	63.008
1.0000	.6410	1.5905	9.801	10.714	28.00	.3969	.402[illegible]	78.0	.09344	.016284	68.166
1.0800	.6210	1.6661	9.805	10.748	28.34	.3748	.411[illegible]	78.6	.09392	.016368	73.503
1.0600	.6010	1.7387	9.809	10.783	28.54	.3523	.418[illegible]	79.2	.09439	.016449	79.033
1.0400	.5810	1.8084	9.814	10.8[illegible]	28.61	.3296	.425[illegible]	79.8	.09484	.016527	84.770
1.0200	.5610	1.8751	9.819	10.864	28.55	.3070	.432[illegible]	80.3	.09528	.016602	90.731
1.0000	.5410	1.9387	9.825	10.900	28.37	.2846	.438[illegible]	80.9	.09570	.016676	96.933
1.0800	.5210	1.9990	9.831	10.958	28.06	.2625	.444[illegible]	81.5	.09612	.016747	103.397
1.0600	.5010	2.0561	9.839	11.01[illegible]	27.65	.2409	.450[illegible]	82.1	.09652	.016818	110.146
1.0400	.4810	2.1097	9.848	11.07[illegible]	27.12	.2200	.455[illegible]	82.7	.09692	.016887	117.207
1.0200	.4610	2.1599	9.858	11.14	26.48	.1997	.459[illegible]	83.3	.09731	.016955	124.609
1.0000	.4410	2.2065	9.870	11.21	25.75	.1802	.464[illegible]	83.9	.09770	.017022	132.389
1.0800	.4210	2.2494	9.883	11.2[illegible]	24.92	.1616	.468[illegible]	84.6	.09808	.017089	140.585
1.0600	.4010	2.2884	9.898	11.37	24.00	.1439	.472[illegible]	85.3	.09846	.017155	149.246
1.0400	.3810	2.3235	9.916	11.47	23.00	.1271	.475[illegible]	86.0	.09884	.017222	158.426
1.0200	.3611	2.3547	9.938	11.58	21.92	.1114	.478[illegible]	86.7	.09922	.017288	168.193
1.0000	.3411	2.3817	9.962	11.71	20.78	.0968	.481[illegible]	87.5	.09960	.017355	178.625
1.0800	.3211	2.4044	9.992	11.85	19.57	.0833	.484[illegible]	88.3	.09999	.017422	189.820
1.0600	.3011	2.4228	10.028	12.02	18.30	.0708	.486[illegible]	89.2	.10037	.017491	201.90
1.0400	.2811	2.4367	10.071	12.21	16.99	.0595	.488[illegible]	90.1	.10077	.017561	215.01
1.0200	.2612	2.4463	10.123	12.44	15.64	.0492	.491[illegible]	91.1	.10117	.017633	229.34
1.0000	.2412	2.4514	10.189	12.71	14.26	.0401	.493[illegible]	92.2	.10158	.017707	245.14
1.0800	.2212	2.4522	10.270	13.04	12.86	.0320	.494[illegible]	93.4	.10201	.017784	262.73
1.0600	.2013	2.4490	10.375	13.45	11.45	.0250	.496[illegible]	94.8	.10246	.017864	282.57
1.0400	.1813	2.4424	10.511	13.97	10.04	.0190	.497[illegible]	96.4	.10292	.017950	305.30
1.0200	.1614	2.4334	10.691	14.65	8.65	.0140	.498[illegible]	98.2	.10342	.018043	331.83
1.0000	.1416	2.4242	10.938	15.55	7.29	.0099	.499[illegible]	100.3	.10395	.018145	[illegible].63
1.0800	.1217	2.4183	11.28	16.89	5.97	.0066	.500[illegible]	102.8	.10453	.018259	[illegible].05
1.0600	.1020	2.4233	11.79	18.67	4.73	.0041	.500[illegible]	106.0	.10519	.018392	[illegible].36
1.0400	.0825	2.4550	12.56	21.7	3.58	.0024	.500[illegible]	110.3	.10594	.018555	[illegible].07
1.0200	.0634	2.5526	13.81	26.5	2.56	.0012	.500[illegible]	116.2	.10686	.018770	[illegible].16
1.0000	.0454	2.8325	15.91	37.2	1.750	.0005	.5018	125.6	.10806	.019088	[illegible].76
1.0900	.0373	3.1488	17.39	46.0[illegible]	1.463	.0003	.5019	132.6	.10885	.019322	1049.59
1.0800	.0303	3.7522	18.88	58.77	1.290	.0002	.5020	142.7	.10984	.019648	1407.06
1.0750	.0270	4.2689	19.30	66.4[illegible]	1.248	.0002	.5020	149.6	.11046	.019863	1707.56
1.0700	.0237	5.0946	19.05	74.8[illegible]	1.222	.0001	.5021	159.0	.11124	.020136	2183.4
1.0680	.0221	5.5992	18.60	78.4[illegible]	1.210	.0001	.5021	164.0	.11164	.020273	[illegible]
1.0660	.0204	6.3148	17.81	81.9[illegible]	1.192	.0001	.5021	170.6	.11215	.020440	[illegible].4
1.0640	.0182	7.5050	16.45	85.6[illegible]	1.161	.0001	.5021	180.2	.11288	.020666	[illegible]
1.0620	.0147	10.5854	13.70	89.0[illegible]	1.104	.0000	.5021	201.2	.11444	.021084	[illegible]
1.0610	.0110	17.3446	10.38	89.99	1.030	.0000	.502	237.4	.11710	.021647	[illegible]

TABLE VIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.04$, $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -3.0^{\circ}$, $e_i = 0.09685$

$\bar{V}$	$\bar{V}_r$	Z	γ deg	γ_a deg	$-\frac{\dot{\bar{u}}_r}{g}$	$\bar{\dot{q}}$	$\bar{q}$	τ sec	$\frac{\Delta\bar{u}}{r}$	$\frac{-\Delta\bar{V}}{r}$	$\sqrt{\beta r}\frac{\dot{\bar{q}}}{\bar{V}}$
1.0400	1.0983	0.0000013	3.000	2.847	0.0000	0.0013	0	0	0	0	0.000
1.0405	1.1004	.0000028	2.904	2.754	.0001	.0022	.0011	17.3	.02203	.001133	.000
1.0410	1.1009	.0000078	2.803	2.653	.0003	.0036	.0030	35.4	.04498	.002880	.000
1.0415	1.1014	.0000222	2.696	2.546	.0008	.0062	.0069	54.4	.06918	.003542	.001
1.0420	1.1019	.0000661	2.578	2.430	.0023	.0107	.0128	75.3	.09571	.004474	.002
1.0425	1.1024	.0002639	2.417	2.289	.0092	.0213	.0281	102.8	.13076	.006142	.008
1.04260	1.10255	.0005307	2.331	2.204	.0182	.0302	.0420	117.6	.14949	.006963	.015
1.0425	1.1025	.0009307	2.259	2.134	.0326	.0400	.0577	129.8	.16507	.007653	.027
1.0420	1.1020	.001773	2.175	2.057	.0620	.0552	.0829	144.4	.18358	.008410	.051
1.0410	1.1010	.003033	2.104	1.986	.1055	.0720	.1121	156.9	.19958	.008907	.087
1.0400	1.1000	.004154	2.062	1.946	.1450	.0841	.1334	164.5	.20922	.009258	.120
1.0350	1.0950	.009174	1.959	1.841	.299	.1236	.2081	184.4	.23447	.010242	.200
1.0300	1.0900	.013824	1.910	1.803	.478	.1500	.2631	195.3	.24812	.010704	.403
1.0250	1.0850	.018303	1.882	1.775	.631	.1707	.3080	202.9	.25771	.010421	[illegible]
1.0200	1.0800	.02267	1.864	1.760	.778	.1878	.3471	208.9	.26515	.011107	[illegible]
1.0150	1.0750	.02697	1.852	1.749	.921	.2025	.3823	213.8	.27126	.011353	[illegible]
1.0100	1.0700	.03121	1.845	1.742	1.061	.2153	.4141	218.0	.27646	.011551	[illegible]
1.0050	1.0650	.03540	1.842	1.739	1.199	.2267	.4440	221.6	.28098	.011676	1.057
1.0000	1.0600	.03956	1.841	1.737	1.334	.2369	.4721	224.9	.28499	.011805	1.127
.9950	1.0550	.04369	1.843	1.739	1.466	.2460	.4988	227.9	.28860	.011921	1.317
.9900	1.0500	.04780	1.846	1.741	1.597	.2544	.5230	230.6	.29187	.012027	1.444
.9800	1.0400	.05597	1.857	1.750	1.853	.2688	.5690	235.4	.29764	.012213	1.714
.9700	1.0300	.06410	1.873	1.766	2.10	.2809	.6111	239.5	.30262	.012375	1.982
.9600	1.0200	.07220	1.893	1.786	2.63	.2910	.6504	243.3	.30699	.012519	2.254
.9500	1.0100	.08029	1.916	1.802	2.59	.2995	.6862	246.6	.31089	.012643	2.535
.9400	1.0000	.08838	1.941	1.829	2.82	.3066	.7201	249.6	.31442	.012767	2.821
.9300	.9900	.09649	1.969	1.84	3.05	.3125	.7528	252.5	.31762	.012877	3.112
.9200	.9800	.10462	1.998	1.870	3.28	.3174	.7823	255.1	.32056	.012978	3.411
.9100	.9700	.11277	2.030	1.904	3.50	.3212	.8102	257.5	.32328	.013074	3.715
.9000	.9600	.12096	2.063	1.939	3.72	.3243	.8378	259.8	.32580	.013174	4.032
.8800	.9400	.13745	2.135	1.999	4.14	.3282	.8877	264.0	.33036	.013331	4.689
.8600	.9200	.15411	2.212	2.063	4.55	.3296	.9335	267.7	.33439	.013484	5.376
.8400	.9000	.17098	2.295	2.142	4.95	.3288	.9753	271.2	.33799	.013625	6.101
.8200	.8800	.18805	2.382	2.220	5.33	.3263	1.0136	274.4	.34123	.013758	6.880
.8000	.8600	.2053	2.475	2.303	5.69	.3222	1.0495	277.4	.34419	.013883	7.702
.7800	.8399	.2229	2.573	2.389	6.05	.3168	1.0828	280.2	.34689	.014000	8.579
.7600	.8199	.2406	2.676	2.480	6.39	.3102	1.1124	282.8	.34938	.014112	9.466
.7400	.7999	.2586	2.784	2.575	6.71	.3026	1.1406	285.4	.35168	.014222	10.484
.7200	.7799	.2768	2.897	2.674	7.01	.2941	1.1670	287.8	.35382	.014332	11.530
.7000	.7599	.2952	3.016	2.778	7.31	.2850	1.1914	290.1	.35581	.014435	12.650
.6800	.7399	.3138	3.140	2.886	7.58	.2752	1.2142	292.3	.35767	.014535	13.842
.6600	.7199	.3325	3.271	2.998	7.83	.2648	1.2355	294.4	.35942	.014633	15.115
.6400	.6999	.3515	3.408	3.117	8.07	.2541	1.2550	296.5	.36106	.014728	16.475
.6200	.6799	.3706	3.552	3.239	8.29	.2430	1.2733	298.5	.36260	.014819	17.930
.6000	.6599	.3898	3.704	3.368	8.49	.2316	1.2904	300.4	.36406	.014915	19.488
.5800	.6399	.4091	3.864	3.502	8.66	.2200	1.3063	302.4	.36545	.015006	21.150
.5600	.6199	.4284	4.03	3.644	8.82	.2083	1.3211	304.2	.36676	.015097	22.924
.5400	.5998	.4478	4.21	3.792	8.95	.1966	1.3346	306.1	.36800	.015179	24.814
.5200	.5798	.4672	4.40	3.942	9.06	.1848	1.3477	307.9	.36918	.015275	26.824
.5000	.5598	.4865	4.60	4.11	9.15	.1731	1.3596	309.7	.37031	.015364	29.160
.4800	.5398	.5057	4.82	4.28	9.21	.1614	1.3706	311.5	.37138	.015452	31.607
.4600	.5198	.5247	5.05	4.47	9.25	.1500	1.3808	313.3	.37240	.015540	34.201
.4400	.4998	.5435	5.30	4.66	9.26	.1387	1.3902	315.1	.37338	.015629	37.057
.4200	.4798	.5620	5.57	4.87	9.24	.1277	1.3990	316.9	.37431	.015718	40.142
.4000	.4597	.5800	5.86	5.09	9.19	.1170	1.4070	318.7	.37521	.015807	43.505
.3800	.4397	.5976	6.17	5.33	9.12	.1066	1.4144	320.5	.37606	.015897	47.178
.3600	.4197	.6145	6.52	5.59	9.02	.0966	1.4212	322.3	.37688	.015988	51.202
.3400	.3996	.6307	6.90	5.86	8.89	.0869	1.4274	324.2	.37767	.016081	55.647
.3200	.3796	.6459	7.32	6.16	8.72	.0777	1.4331	326.1	.37842	.016174	60.553
.3000	.3595	.6600	7.79	6.49	8.53	.0689	1.4382	328.0	.37914	.016270	66.000
.2800	.3395	.6728	8.31	6.85	8.31	.0606	1.4429	330.0	.37984	.016368	72.082
.2600	.3194	.6839	8.92	7.25	8.05	.0528	1.4472	332.0	.38050	.016469	78.912
.2400	.2993	.6931	9.61	7.69	7.76	.0456	1.4510	334.1	.38114	.016572	86.635
.2200	.2792	.6999	10.42	8.19	7.44	.0388	1.4544	336.3	.38175	.016680	95.434
.2000	.2591	.7038	11.38	8.76	7.09	.0326	1.4574	338.6	.38233	.016792	105.595
.1800	.2389	.7041	12.55	9.42	6.70	.0270	1.4601	341.1	.38289	.016910	117.353
.1600	.2187	.7001	13.99	10.15	6.28	.0219	1.4624	343.7	.38342	.017034	131.262
.1400	.1984	.6905	15.84	11.10	5.82	.0173	1.4644	346.5	.38392	.017167	147.958
.1200	.1780	.6738	18.29	12.22	5.34	.0134	1.4662	349.6	.38439	.017311	168.456
.1000	.1573	.6480	21.75	13.62	4.81	.0099	1.4677	353.1	.38483	.017471	194.414
.0900	.1458	.6309	24.08	14.48	4.53	.0084	1.4683	355.0	.38504	.017558	210.29
.0800	.1362	.6103	27.03	15.48	4.25	.0070	1.4686	357.1	.38523	.017653	228.86
.0700	.1253	.5859	30.92	16.68	3.95	.0057	1.4694	359.5	.38542	.017755	251.11
.0600	.1140	.5575	36.31	18.16	3.62	.0045	1.4696	362.1	.38560	.017871	278.74
.0500	.1019	.5256	44.47	20.11	3.27	.0034	1.4704	365.3	.38576	.018008	315.39
.0450	.0952	.5098	50.51	21.40	3.07	.0029	1.4706	367.3	.38584	.018091	339.84
.0400	.0875	.4969	59.21	23.12	2.85	.0024	1.4709	369.7	.38591	.018194	372.69
.0380	.0839	.4946	64.09	24.05	2.75	.0021	1.4710	370.9	.38594	.018245	390.43
.0360	.0796	.4966	70.58	25.26	2.62	.0019	1.4711	372.5	.38596	.018310	413.87
.0350	.0769	.5016	74.98	26.08	2.54	.0017	1.4711	373.5	.38598	.018350	429.90
.0340	.0734	.5136	81.20	27.26	2.44	.0015	1.4712	374.9	.38599	.018411	453.15
.0334	.0697	.5341	87.91	28.60	2.33	.0014	1.4713	376.5	.38599	.018474	479.75

TABLE VIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -4.0^{\circ}$, $e_i = 0.10720$

$\overline{V}$	$\overline{V}_r$	Z	γ deg	γ_r deg	$-\frac{a_r}{g}$	$\overline{q}$	ξ	t sec	$\frac{\Delta s}{r}$	$\frac{\Delta y}{r}$	$\frac{Z}{\overline{V}}$
1.1400	1.0982	.0000018	4.000	3.78	0.0000	0.0013	0	0	0	0	.000
1.1405	1.1004	.0000028	3.929	3.71	.0001	.0022	.000	12.9	.01638	.001136	.000
1.1410	1.1009	.0000078	3.855	3.64	.0003	.0036	.002	26.1	.03316	.002277	.000
1.1415	1.1014	.0000228	3.778	3.57	.0008	.0061	.004	39.8	.05048	.003432	.001
1.1420	1.1019	.0000644	3.696	3.49	.0023	.0105	.008	54.2	.06876	.004626	.002
1.1425	1.1024	.0002160	3.600	3.404	.0076	.0193	.017	70.7	.08984	.005970	.006
1.14278	1.10267	.0007794	3.492	3.303	.0280	.0370	.036	89.1	.11320	.007417	.023
1.1425	1.1024	.0019620	3.416	3.23	.0686	.0581	.058	102.2	.12982	.008421	.056
1.1420	1.1019	.003112	3.377	3.19	.1019	.0731	.074	109.0	.13848	.008935	.090
1.1410	1.1009	.005050	3.336	3.15	.1764	.0929	.096	116.2	.14767	.009473	.146
1.1400	1.0999	.006829	3.311	3.13	.238	.1078	.113	120.8	.15346	.009810	.197
1.1350	1.0949	.015036	3.248	3.07	.522	.1582	.172	132.9	.16886	.010692	.436
1.1250	1.0849	.02282	3.220	3.04	.790	.1927	.214	139.5	.17716	.011161	.665
1.1250	1.0849	.03042	3.203	3.02	1.048	.2200	.249	144.1	.18295	.011486	.890
1.1200	1.0799	.03789	3.193	3.01	1.300	.2427	.279	147.7	.18741	.011735	1.114
1.1150	1.0749	.04527	3.187	3.00	1.546	.2623	.306	150.6	.19106	.011939	1.338
1.1100	1.0699	.05258	3.183	3.00	1.788	.2794	.331	153.1	.19415	.012110	1.562
1.1050	1.0649	.05983	3.182	3.00	2.03	.2946	.354	155.3	.19683	.012259	1.786
1.1000	1.0599	.06702	3.182	3.00	2.26	.3083	.376	157.2	.19920	.012391	2.011
1.0950	1.0549	.07417	3.183	3.00	2.49	.3205	.396	159.0	.20132	.012509	2.236
1.0900	1.0499	.08127	3.186	3.00	2.71	.3316	.415	160.6	.20325	.012616	2.463
1.0800	1.0399	.09535	3.194	3.01	3.16	.3508	.450	163.4	.20664	.012805	2.919
1.0700	1.0299	.10929	3.204	3.01	3.59	.3667	.482	165.8	.20955	.012968	3.380
1.0600	1.0199	.12310	3.217	3.02	4.06	.3799	.512	168.0	.21212	.013112	3.847
1.0500	1.0099	.13679	3.232	3.04	4.41	.3908	.540	170.0	.21446	.013241	4.320
1.0400	.9999	.15036	3.248	3.05	4.86	.3998	.566	171.8	.21647	.013358	4.799
1.0300	.9899	.16383	3.266	3.07	5.18	.4071	.590	173.4	.21835	.013465	5.285
1.0200	.9799	.17720	3.284	3.08	5.55	.4129	.613	175.0	.22009	.013564	5.778
1.0100	.9699	.19046	3.305	3.10	5.91	.4174	.635	176.4	.22169	.013656	6.279
1.0000	.9599	.2036	3.326	3.11	6.25	.4207	.656	177.8	.22319	.013743	6.788
.9800	.9399	.2297	3.371	3.15	6.91	.4242	.695	180.2	.22590	.013902	7.830
.9600	.9199	.2554	3.421	3.19	7.54	.4242	.730	182.5	.22832	.014045	8.908
.9400	.8999	.2807	3.474	3.24	8.12	.4213	.763	184.6	.23049	.014176	10.025
.9200	.8799	.3057	3.531	3.29	8.66	.4159	.793	186.6	.23248	.014298	11.183
.9000	.8599	.3303	3.592	3.34	9.16	.4085	.821	188.4	.23430	.014411	12.386
.8800	.8399	.3545	3.657	3.39	9.62	.3994	.847	190.2	.23599	.014518	13.636
.8600	.8199	.3784	3.725	3.45	10.04	.3889	.871	191.9	.23756	.014619	14.938
.8400	.7999	.4019	3.798	3.51	10.43	.3772	.893	193.5	.23903	.014716	16.294
.8200	.7799	.4250	3.876	3.57	10.77	.3644	.914	195.0	.24041	.014808	17.710
.8000	.7599	.4478	3.958	3.64	11.08	.3509	.934	196.5	.24171	.014898	19.190
.7800	.7399	.4701	4.045	3.71	11.35	.3367	.953	198.0	.24295	.014984	20.738
.7600	.7199	.4919	4.137	3.79	11.59	.3220	.970	199.4	.24412	.015068	22.361
.7400	.6999	.5134	4.235	3.87	11.79	.3070	.986	200.8	.24523	.015149	24.065
.7200	.6798	.5343	4.340	3.97	11.95	.2917	1.001	202.2	.24630	.015229	25.855
.7000	.6598	.5548	4.451	4.07	12.08	.2762	1.016	203.6	.24731	.015307	27.741
.6800	.6398	.5748	4.570	4.18	12.17	.2608	1.029	204.9	.24829	.015384	29.729
.6600	.6198	.5942	4.697	4.29	12.28	.2453	1.041	206.3	.24922	.015460	31.830
.6400	.5998	.6130	4.833	4.41	12.25	.2299	1.053	207.6	.25013	.015535	34.055
.6200	.5798	.6312	4.979	4.54	12.24	.2147	1.064	209.0	.25099	.015609	36.414
.6000	.5598	.6487	5.14	4.69	12.20	.1998	1.074	210.3	.25183	.015683	38.923
.5800	.5398	.6655	5.31	4.85	12.12	.1852	1.084	211.7	.25264	.015757	41.596
.5600	.5198	.6816	5.49	4.84	12.01	.1709	1.093	213.0	.25342	.015831	44.452
.5400	.4997	.6968	5.69	5.02	11.87	.1571	1.101	214.4	.25417	.015905	47.512
.5200	.4797	.7112	5.91	5.17	11.69	.1437	1.109	215.8	.25491	.015979	50.799
.5000	.4597	.7246	6.15	5.33	11.48	.1308	1.116	217.2	.25562	.016054	54.341
.4800	.4397	.7369	6.41	5.54	11.25	.1184	1.123	218.7	.25630	.016130	58.173
.4600	.4196	.7480	6.70	5.77	10.98	.1065	1.129	220.2	.25697	.016207	62.332
.4400	.3996	.7578	7.03	5.97	10.68	.0953	1.134	221.7	.25762	.016285	66.867
.4200	.3796	.7662	7.39	6.28	10.35	.0846	1.140	223.3	.25825	.016364	71.834
.4000	.3595	.7730	7.80	6.50	9.99	.0746	1.144	224.9	.25886	.016446	77.302
.3800	.3395	.7780	8.27	6.81	9.61	.0652	1.149	226.6	.25946	.016530	83.358
.3600	.3194	.7809	8.81	7.14	9.19	.0565	1.153	228.4	.26003	.016616	90.108
.3400	.2994	.7815	9.43	7.51	8.75	.0484	1.156	230.2	.26059	.016706	97.689
.3200	.2793	.7794	10.17	7.91	8.29	.0410	1.159	232.2	.26114	.016799	107.276
.3000	.2591	.7740	11.05	8.51	7.80	.0342	1.162	234.3	.26166	.016898	117.102
.2800	.2390	.7649	12.13	9.13	7.28	.0281	1.165	236.5	.26217	.017002	128.476
.2600	.2188	.7512	13.48	9.83	6.74	.0227	1.167	238.9	.26266	.017112	140.842
.2400	.1985	.7319	15.22	10.65	6.18	.0179	1.169	241.5	.26313	.017232	154.830
.2200	.1781	.7056	17.55	11.70	5.60	.0137	1.171	244.5	.26357	.017362	170.400
.2000	.1575	.6704	20.86	13.08	4.99	.0101	1.172	247.8	.26399	.017508	188.12
.1900	.1471	.6486	23.09	13.88	4.68	.0085	1.173	249.7	.26419	.017589	198.21
.1800	.1365	.6236	25.93	14.80	4.36	.0071	1.173	251.7	.26438	.017676	208.85
.1700	.1257	.5949	29.68	16.03	4.03	.0058	1.174	253.9	.26457	.017772	220.95
.1600	.1145	.5621	34.88	17.44	3.68	.0046	1.174	256.5	.26474	.017880	234.07
.1500	.1025	.5259	42.72	19.33	3.31	.0035	1.175	259.6	.26490	.018008	248.52
.1450	.0959	.5074	48.50	20.57	3.11	.0030	1.175	261.5	.26498	.018086	256.27
.1400	.0888	.4911	56.72	22.20	2.89	.0024	1.175	263.8	.26505	.018181	264.35
.1380	.0851	.4867	61.24	23.05	2.78	.0022	1.175	264.9	.26508	.018227	268.20
.1360	.0811	.4853	67.09	24.14	2.66	.0020	1.175	266.3	.26511	.018284	270.39
.1350	.0788	.4870	70.86	24.88	2.59	.0018	1.176	267.2	.26512	.018319	271.43
.1340	.0759	.4923	75.72	25.79	2.50	.0017	1.176	268.3	.26513	.018364	272.38
.1330	.0718	.5078	83.23	27.16	2.38	.0015	1.176	270.0	.26514	.018431	273.65
.1327	.0696	.5209	87.46	28.05	2.31	.0014	1.176	270.9	.26515	.018470	274.88

TABLE VIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -5.0^{\circ}$, $e_i = 0.11918$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\ddot{r}}{g}$	$\overline{\eta}$	$\overline{\omega}$	t sec	$\frac{\Delta\lambda}{\gamma}$	$\frac{-\Delta\gamma}{\gamma}$	$\sqrt{\beta r}\,\frac{\Delta}{\gamma}$
1.0400	1.0681	0.0000010	5.000	4.727	0.0000	0.0013	0	0	0	0	0.000
1.0405	1.1003	.0000028	4.943	4.674	.0001	.0022	.0006	10.3	.01305	.001135	.000
1.0410	1.1008	.0000078	4.885	4.619	.0003	.0036	.0017	20.8	.02631	.002275	.000
1.0415	1.1013	.0000219	4.825	4.562	.0008	.0061	.0036	31.4	.03986	.003408	.001
1.0420	1.1018	.0000633	4.761	4.502	.0022	.0104	.0069	42.5	.05395	.004607	.002
1.0425	1.1023	.0002011	4.691	4.436	.0070	.0186	.0132	54.8	.06946	.005866	.006
1.04291	1.10272	.0010429	4.587	4.338	.0365	.0424	.0321	72.6	.09200	.007712	.030
1.0425	1.1023	.03016	4.519	4.273	.1055	.0720	.0560	84.2	.10682	.008869	.087
1.0420	1.1018	.04474	4.494	4.245	.1566	.0876	.0689	88.6	.11238	.009325	.129
1.0410	1.1008	.07026	4.465	4.222	.246	.1096	.0870	93.7	.11880	.009840	.202
1.0400	1.0998	.09400	4.447	4.205	.328	.1265	.1012	96.9	.12296	.010165	.271
1.0350	1.0948	.20046	4.402	4.161	.711	.1845	.1514	105.8	.13421	.011035	.593
1.0300	1.0898	.30104	4.382	4.141	1.074	.2247	.1876	110.7	.14030	.011503	.904
1.0250	1.0848	.40138	4.370	4.129	1.426	.2565	.2175	114.1	.14455	.011828	1.211
1.0200	1.0798	.50159	4.363	4.121	1.769	.2832	.2435	116.7	.14783	.012078	1.517
1.0150	1.0748	.60168	4.359	4.116	2.11	.3061	.2668	118.8	.15050	.012282	1.823
1.0100	1.0698	.70168	4.357	4.113	2.44	.3262	.2881	120.7	.15277	.012455	2.129
1.0050	1.0648	.80160	4.357	4.112	2.76	.3440	.3077	122.3	.15473	.012604	2.436
1.0000	1.0598	.90145	4.358	4.111	3.08	.3600	.3260	123.7	.15646	.012736	2.744
.9950	1.0548	.10124	4.359	4.112	3.40	.3744	.3432	125.0	.15802	.012855	3.052
.9900	1.0498	.11096	4.362	4.113	3.71	.3874	.3595	126.1	.15943	.012962	3.362
.9800	1.0398	.13023	4.369	4.117	4.31	.4099	.3897	128.2	.16191	.013155	3.994
.9700	1.0298	.14928	4.378	4.123	4.90	.4285	.4173	130.0	.16404	.013315	4.617
.9600	1.0198	.16812	4.388	4.130	5.46	.4439	.4428	131.6	.16591	.013458	5.254
.9500	1.0098	.18676	4.400	4.139	6.01	.4566	.4665	133.0	.16758	.013587	5.892
.9400	.9998	.20052	4.413	4.149	6.55	.4670	.4867	134.3	.16910	.013703	6.550
.9300	.9898	.22235	4.427	4.159	7.06	.4754	.5096	135.6	.17047	.013813	7.207
.9200	.9798	.24316	4.443	4.171	7.56	.4820	.5294	136.7	.17174	.013908	7.877
.9100	.9698	.26294	4.459	4.183	8.04	.4871	.5482	137.7	.17292	.014000	8.555
.9000	.9598	.28172	4.476	4.196	8.51	.4907	.5660	138.7	.17402	.014085	9.248
.8800	.9398	.31120	4.512	4.224	9.40	.4943	.5992	140.6	.17601	.014242	10.617
.8600	.9198	.33462	4.552	4.255	10.22	.4938	.6260	142.2	.17775	.014383	12.010
.8400	.8998	.37096	4.594	4.288	10.98	.4898	.6576	143.8	.17939	.014511	13.359
.8200	.8798	.41229	4.639	4.323	11.67	.4829	.6835	145.2	.18086	.014630	15.096
.8000	.8598	.44421	4.688	4.361	12.31	.4736	.7075	146.6	.18221	.014740	16.656
.7800	.8398	.47531	4.740	4.402	12.89	.4624	.7299	147.9	.18347	.014844	18.288
.7600	.8198	.50571	4.795	4.444	13.42	.4494	.7508	149.2	.18464	.014941	19.920
.7400	.7998	.53531	4.853	4.490	13.88	.4351	.7703	150.4	.18574	.015034	21.701
.7200	.7798	.56411	4.916	4.538	14.29	.4197	.7886	151.5	.18678	.015123	23.503
.7000	.7598	.59220	4.982	4.589	14.65	.4034	.8058	152.7	.18776	.015208	25.375
.6800	.7398	.61910	5.052	4.643	14.95	.3863	.8218	153.8	.18869	.015290	27.311
.6600	.7198	.64530	5.128	4.701	15.20	.3687	.8369	154.9	.18958	.015369	29.331
.6400	.6998	.67060	5.208	4.762	15.39	.3508	.8511	155.9	.19043	.015446	31.470
.6200	.6798	.69490	5.293	4.827	15.54	.3325	.8644	157.0	.19125	.015521	33.694
.6000	.6598	.71820	5.385	4.896	15.63	.3142	.8769	158.1	.19203	.015594	35.912
.5800	.6398	.74060	5.483	4.969	15.68	.2959	.8887	159.1	.19279	.015666	38.300
.5600	.6197	.76190	5.588	5.048	15.68	.2776	.8997	160.2	.19351	.015738	40.815
.5400	.5997	.78210	5.701	5.132	15.63	.2596	.9101	161.2	.19422	.015806	43.448
.5200	.5797	.80110	5.823	5.221	15.53	.2418	.9198	162.3	.19490	.015874	46.218
.5000	.5597	.81890	5.955	5.318	15.39	.2244	.9289	163.3	.19556	.015942	49.136
.4800	.5397	.83550	6.10	5.421	15.21	.2074	.9374	164.4	.19620	.016010	52.220
.4600	.5197	.85080	6.25	5.533	14.98	.1909	.9453	165.5	.19682	.016077	55.484
.4400	.4997	.86460	6.42	5.654	14.72	.1749	.9528	166.6	.19743	.016145	58.951
.4200	.4796	.87700	6.61	5.786	14.41	.1595	.9597	167.7	.19802	.016212	62.641
.4000	.4596	.88780	6.82	5.929	14.07	.1447	.9662	168.9	.19859	.016280	66.583
.3800	.4396	.89690	7.04	6.08	13.68	.1305	.9721	170.1	.19916	.016348	70.807
.3600	.4196	.90420	7.30	6.26	13.27	.1171	.9777	171.3	.19970	.016417	75.351
.3400	.3996	.90960	7.58	6.44	12.81	.1043	.9828	172.6	.20024	.016488	80.259
.3200	.3795	.91290	7.90	6.66	12.33	.0923	.9876	173.9	.20077	.016559	85.586
.3000	.3595	.91400	8.26	6.89	11.81	.0811	.9919	175.3	.20128	.016633	91.396
.2800	.3394	.91250	8.68	7.15	11.26	.0706	.9959	176.7	.20179	.016707	97.772
.2600	.3194	.90840	9.16	7.45	10.69	.0609	.9998	178.2	.20228	.016784	104.813
.2400	.2993	.90120	9.72	7.78	10.09	.0520	1.0029	179.8	.20276	.016864	112.640
.2200	.2792	.89060	10.39	8.17	9.47	.0438	1.0058	181.5	.20323	.016948	121.444
.2000	.2591	.87610	11.20	8.62	8.82	.0364	1.0085	183.3	.20369	.017035	131.417
.1800	.2390	.85720	12.19	9.15	8.16	.0298	1.0109	185.3	.20414	.017128	142.870
.1600	.2188	.83330	13.44	9.78	7.48	.0239	1.0130	187.5	.20458	.017222	156.192
.1400	.1986	.80327	15.06	10.56	6.78	.0187	1.0149	189.9	.20500	.017334	172.064
.1200	.1782	.76648	17.25	11.52	6.07	.0143	1.0165	192.5	.20541	.017453	191.199
.1000	.1576	.71775	20.36	12.75	5.35	.0105	1.0179	195.6	.20580	.017584	215.29
.0900	.1472	.68395	22.48	13.52	4.94	.0088	1.0185	197.3	.20598	.017657	229.84
.0800	.1367	.65562	25.18	14.42	4.51	.0073	1.0191	199.2	.20616	.017738	247.85
.0700	.1260	.62230	28.75	15.50	4.24	.0060	1.0196	201.3	.20634	.017823	267.01
.0600	.1149	.58337	33.70	16.85	3.85	.0047	1.0200	203.7	.20650	.017928	291.81
.0500	.1030	.53405	41.15	18.62	3.44	.0036	1.0205	206.6	.20665	.018036	324.28
.0450	.0966	.50181	46.60	19.78	3.23	.0031	1.0207	208.4	.20673	.018106	345.41
.0400	.0895	.46970	54.25	21.28	2.98	.0025	1.0209	210.5	.20680	.018194	372.77
.0380	.0862	.45399	58.39	22.04	2.88	.0023	1.0210	211.5	.20683	.018233	386.80
.0360	.0826	.43849	63.59	22.99	2.75	.0021	1.0211	212.8	.20685	.018283	404.08
.0350	.0805	.43138	66.82	23.56	2.69	.0019	1.0211	213.5	.20687	.018312	414.70
.0340	.0781	.42446	70.74	24.26	2.61	.0018	1.0212	214.4	.20688	.018346	427.59
.0330	.0752	.41791	75.86	25.18	2.52	.0016	1.0213	215.5	.20689	.018390	444.63
.0320	.0707	.40958	84.36	26.76	2.37	.0014	1.0214	217.3	.20690	.018461	474.16
.0318	.0689	.40166	88.65	27.46	2.31	.0013	1.0214	218.1	.20690	.018491	487.32

TABLE VIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -6.0^{\circ}$, $e_i = 0.13233$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{r}}{g}$	$\overline{q}$	$\overline{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.0400	1.0981	0.0000010	4.000	5.673	0.0000	0.0013	0	0	0	0	0.000
1.0405	1.1000	.0000028	4.953	5.629	.0001	.0022	.0005	8.6	.01084	.001135	.000
1.0410	1.1007	.0000077	4.905	5.583	.0003	.0036	.0014	17.2	.02181	.002274	.000
1.0415	1.1012	.0000218	4.855	5.537	.0008	.0061	.0030	26.0	.03296	.003423	.001
1.0420	1.1017	.0000627	4.803	5.488	.0022	.0104	.0057	35.1	.04445	.004594	.002
1.0425	1.1023	.0001934	4.747	5.435	.0067	.0182	.0106	44.9	.05682	.005847	.004
1.0430	1.1027	.0012837	4.650	5.343	.0450	.0471	.0292	61.5	.07789	.007950	.017
1.0425	1.1020	.004106	4.590	5.286	.1435	.0840	.0534	71.9	.09103	.009241	.128
1.0420	1.1017	.005861	4.571	5.269	.205	.1003	.0642	75.0	.09508	.009638	.164
1.0410	1.1007	.008999	4.550	5.248	.314	.1240	.0801	78.9	.09999	.010115	.259
1.0400	1.0997	.011941	4.536	5.234	.417	.1425	.0926	81.5	.10324	.010431	.344
1.0350	1.0947	.02572	4.501	5.200	.894	.2068	.1372	88.5	.11212	.011288	.746
1.0300	1.0897	.03894	4.485	5.184	1.347	.2516	.1695	92.4	.11697	.011755	1.134
1.0250	1.0847	.05189	4.477	5.174	1.787	.2872	.1962	95.1	.12035	.012074	1.513
1.0200	1.0797	.06468	4.472	5.168	2.22	.3170	.2194	97.2	.12296	.012324	1.902
1.0150	1.0747	.07733	4.469	5.164	2.64	.3427	.2402	98.9	.12509	.012533	2.286
1.0100	1.0697	.08988	4.468	5.162	3.06	.3652	.2592	100.4	.12689	.012704	2.670
1.0050	1.0647	.10233	4.468	5.160	3.46	.3852	.2768	101.6	.12845	.012856	3.054
1.0000	1.0597	.11468	4.469	5.160	3.86	.4030	.2931	102.8	.12984	.012988	3.440
.9950	1.0547	.12696	4.471	5.160	4.26	.4191	.3085	103.8	.13107	.013104	3.827
.9900	1.0497	.13916	4.474	5.161	4.65	.4337	.3230	104.7	.13219	.013214	4.217
.9800	1.0397	.16332	4.480	5.165	5.41	.4589	.3500	106.4	.13417	.013403	5.000
.9700	1.0297	.18721	4.489	5.169	6.14	.4797	.3746	107.8	.13587	.013566	5.790
.9600	1.0197	.21081	4.498	5.175	6.85	.4969	.3974	109.1	.13736	.013710	6.588
.9500	1.0097	.23412	4.509	5.182	7.54	.5111	.4186	110.2	.13869	.013835	7.394
.9400	.9997	.2572	4.521	5.190	8.21	.5227	.4384	111.3	.13989	.013954	8.210
.9300	.9897	.2801	4.534	5.199	8.85	.5320	.4571	112.2	.14099	.014060	9.034
.9200	.9797	.3026	4.547	5.208	9.47	.5394	.4748	113.1	.14200	.014159	9.868
.9100	.9697	.3249	4.561	5.218	10.07	.5449	.4915	114.0	.14294	.014250	10.713
.9000	.9597	.3470	4.576	5.228	10.65	.5489	.5074	114.8	.14382	.014335	11.569
.8800	.9397	.3903	4.608	5.250	11.75	.5527	.5371	116.2	.14541	.014491	13.305
.8600	.9197	.4326	4.642	5.275	12.76	.5518	.5643	117.6	.14683	.014631	15.050
.8400	.8997	.4738	4.679	5.301	13.70	.5470	.5893	118.8	.14811	.014758	16.921
.8200	.8797	.5140	4.719	5.330	14.55	.5390	.6125	120.0	.14929	.014875	18.805
.8000	.8597	.5531	4.761	5.360	15.33	.5284	.6340	121.1	.15037	.014984	20.742
.7800	.8397	.5911	4.807	5.392	16.03	.5154	.6541	122.1	.15138	.015086	22.736
.7600	.8197	.6280	4.855	5.427	16.66	.5007	.6728	123.1	.15232	.015184	24.790
.7400	.7997	.6637	4.906	5.463	17.21	.4844	.6904	124.1	.15320	.015273	26.909
.7200	.7797	.6983	4.960	5.502	17.69	.4668	.7068	125.0	.15404	.015360	29.094
.7000	.7597	.7317	5.018	5.543	18.10	.4482	.7222	126.0	.15483	.015443	31.357
.6800	.7397	.7638	5.079	5.587	18.44	.4289	.7367	126.9	.15559	.015523	33.694
.6600	.7197	.7946	5.145	5.634	18.71	.4090	.7503	127.7	.15631	.015600	36.118
.6400	.6997	.8241	5.215	5.683	18.91	.3887	.7631	128.6	.15700	.015675	38.631
.6200	.6797	.8523	5.290	5.736	19.05	.3681	.7751	129.5	.15766	.015746	41.240
.6000	.6597	.8790	5.371	5.792	19.13	.3474	.7864	130.3	.15830	.015818	43.957
.5800	.6397	.9044	5.457	5.853	19.14	.3268	.7970	131.2	.15891	.015888	46.777
.5600	.6197	.9282	5.550	5.917	19.09	.3063	.8070	132.1	.15951	.015955	49.723
.5400	.5997	.9504	5.650	5.986	18.99	.2860	.8163	132.9	.16008	.016020	52.800
.5200	.5797	.9710	5.758	6.060	18.82	.2661	.8252	133.8	.16064	.016084	56.021
.5000	.5597	.9900	5.874	6.139	18.60	.2466	.8334	134.7	.16119	.016153	59.397
.4800	.5397	1.0071	7.00	6.225	18.33	.2276	.8412	135.6	.16172	.016217	62.945
.4600	.5196	1.0224	7.14	6.318	18.00	.2091	.8484	136.5	.16223	.016283	66.681
.4400	.4996	1.0358	7.29	6.419	17.63	.1913	.8552	137.4	.16274	.016345	70.625
.4200	.4796	1.0472	7.46	6.528	17.20	.1741	.8615	138.3	.16323	.016409	74.799
.4000	.4595	1.0564	7.64	6.648	16.73	.1577	.8674	139.3	.16371	.016473	79.230
.3800	.4395	1.0633	7.85	6.779	16.22	.1420	.8729	140.3	.16419	.016537	83.948
.3600	.4195	1.0679	8.08	6.924	15.66	.1271	.8780	141.3	.16465	.016602	88.990
.3400	.3995	1.0699	8.33	7.08	15.06	.1131	.8828	142.4	.16511	.016668	94.399
.3200	.3794	1.0691	8.62	7.26	14.43	.0998	.8871	143.5	.16555	.016734	100.218
.3000	.3594	1.0654	8.95	7.46	13.76	.0875	.8912	144.7	.16599	.016802	106.540
.2800	.3394	1.0585	9.33	7.69	13.06	.0760	.8949	146.0	.16642	.016872	113.413
.2600	.3193	1.0482	9.77	7.94	12.33	.0654	.8982	147.3	.16685	.016943	120.944
.2400	.2992	1.0341	10.29	8.24	11.57	.0556	.9013	148.6	.16727	.017017	129.257
.2200	.2792	1.0157	10.90	8.57	10.79	.0467	.9041	150.1	.16768	.017094	138.531
.2000	.2590	.9928	11.65	8.97	9.99	.0387	.9066	151.7	.16808	.017174	148.914
.1800	.2389	.9645	12.57	9.44	9.18	.0316	.9088	153.5	.16848	.017259	160.744
.1600	.2188	.9301	13.73	10.00	8.35	.0252	.9108	155.4	.16887	.017350	174.399
.1400	.1985	.8887	15.25	10.69	7.50	.0197	.9126	157.5	.16925	.017448	190.440
.1200	.1782	.8389	17.31	11.56	6.66	.0150	.9141	160.0	.16961	.017555	209.72
.1000	.1577	.7788	20.26	12.69	5.81	.0109	.9154	162.8	.16997	.017675	233.63
.0900	.1473	.7441	22.27	13.39	5.38	.0092	.9160	164.3	.17014	.017741	248.02
.0800	.1368	.7058	24.84	14.22	4.96	.0076	.9166	166.1	.17031	.017813	264.67
.0700	.1261	.6634	28.23	15.22	4.52	.0062	.9171	168.0	.17047	.017893	284.33
.0600	.1151	.6167	32.95	16.47	4.08	.0049	.9175	170.3	.17062	.017983	308.33
.0500	.1034	.5655	40.02	18.12	3.63	.0037	.9179	173.0	.17076	.018089	339.26
.0450	.0971	.5387	45.17	19.18	3.39	.0032	.9181	174.6	.17083	.018152	359.11
.0400	.0902	.5126	52.33	20.55	3.13	.0026	.9183	176.5	.17090	.018228	384.45
.0350	.0871	.5030	56.13	21.24	3.01	.0024	.9184	177.5	.17093	.018264	397.12
.0360	.0837	.4948	60.83	22.07	2.89	.0022	.9185	178.5	.17095	.018306	412.31
.0350	.0818	.4916	63.67	22.56	2.81	.0021	.9186	179.2	.17096	.018330	421.3
.0340	.0797	.4895	67.01	23.13	2.74	.0019	.9186	179.9	.17098	.018357	431.89
.0330	.0773	.4893	71.10	23.83	2.66	.0018	.9187	180.7	.17099	.018390	444.79
.0320	.0743	.4930	76.56	24.77	2.55	.0016	.9187	181.9	.17100	.018433	462.28
.0310	.0690	.5135	86.85	26.64	2.37	.0013	.9188	184.0	.17101	.018513	496.92

TABLE VIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -8.0^{\circ}$, $e_i = 0.16093$

$\overline{r}$	$\overline{V}_r$	Z	γ deg	γ rad	$-\frac{\dot{r}}{\kappa}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{t}{\tau}$	$\frac{\dot{\gamma}\tau}{\gamma}$	$\sqrt{\beta r}\,\frac{\dot{\gamma}}{\overline{V}}$
1.0400	1.0978	.000001	8.000	7.594	0.0001	0.0013	[illegible]	0	[illegible]	[illegible]	0.000
1.0405	1.1000	.000002	7.965	7.5[illegible]	.0002	.0022	.000[illegible]	6.4	.00809	.001134	.000
1.0410	1.1005	.000007	7.929	7.4[illegible]	.0005	.0036	.001[illegible]	12.9	.01624	.002273	.000
1.0415	1.1010	.000021	7.892	7.4[illegible]	.0008	.0061	.002[illegible]	19.4	.02449	.003418	.001
1.0420	1.1015	.000061	7.854	7.4[illegible]	.0012	.0103	.004[illegible]	26.1	.03290	.004582	.002
1.0425	1.1020	.000185	7.814	7.3[illegible]	.0019	.0178	.0077	33.1	.04175	.005800	.003
1.0431	1.1020	.001753	7.730	7.3[illegible]	.0608	.0550	.025[illegible]	47.6	.06560	.008296	.030
1.0425	1.1020	.003[illegible]	7.681	7.2[illegible]	.223	.1047	.0[illegible]	56.0	.07065	.009732	.184
1.0420	1.1015	.008718	7.670	7.2[illegible]	.305	.1222	.057[illegible]	58.0	.07323	.010079	.251
1.0410	1.1005	.012986	7.656	7.2[illegible]	.433	.1489	.070[illegible]	60.7	.07653	.010523	.374
1.0400	1.0995	.017020	7.646	7.2[illegible]	.555	.1700	.080[illegible]	62.4	.07877	.010829	.491
1.0350	1.0945	.03604	7.623	7.2[illegible]	1.251	.2447	.118[illegible]	67.4	.08503	.011664	1.047
1.0300	1.0895	.05434	7.612	7.1[illegible]	1.879	.2970	.145[illegible]	70.2	.08848	.012125	1.503
1.0250	1.0845	.07231	7.607	7.1[illegible]	2.49	.3388	.1683	72.1	.09090	.012448	2.116
1.0200	1.0795	.09005	7.605	7.1[illegible]	3.09	.3738	.1885	73.6	.09277	.012697	2.649
1.0150	1.0745	.10763	7.604	7.1[illegible]	3.67	.4040	.2056	74.9	.09429	.012901	3.181
1.0100	1.0695	.12505	7.604	7.1[illegible]	4.25	.4304	.2217	75.9	.09558	.013073	3.714
1.0050	1.0645	.14234	7.605	7.1[illegible]	4.82	.4540	.2366	76.8	.09670	.013222	4.249
1.0000	1.0595	.15952	7.607	7.1[illegible]	5.37	.4750	.2504	77.6	.09769	.013354	4.786
.9950	1.0545	.17657	7.610	7.1[illegible]	5.92	.4940	.2631	78.4	.09857	.013473	5.324
.9900	1.0495	.19352	7.612	7.1[illegible]	6.46	.5111	.2749	79.0	.09938	.013580	5.864
.9850	1.0395	.2271	7.619	7.1[illegible]	7.51	.5407	.2986	80.2	.10079	.013769	6.952
.9700	1.0295	.2603	7.628	7.1[illegible]	8.53	.5652	.3197	81.3	.10201	.013932	8.049
.9600	1.0195	.2930	7.637	7.1[illegible]	9.52	.5854	.3383	82.2	.10308	.014075	9.157
.9500	1.0095	.3254	7.647	7.1[illegible]	10.47	.6021	.3558	83.0	.10403	.014204	10.275
.9400	.9995	.3574	7.658	7.1[illegible]	11.39	.6157	.3736	83.7	.10490	.014320	11.405
.9300	.9895	.3890	7.669	7.2[illegible]	12.29	.6266	.3895	84.4	.10568	.014426	12.547
.9200	.9795	.4202	7.681	7.2[illegible]	13.15	.6351	.4046	85.1	.10641	.014523	13.701
.9100	.9695	.4510	7.694	7.2[illegible]	13.97	.6415	.4186	85.7	.10708	.014614	14.868
.9000	.9595	.4815	7.707	7.2[illegible]	14.77	.6461	.4322	86.3	.10771	.014699	16.048
.8800	.9395	.5411	7.735	7.2[illegible]	16.28	.6503	.4579	87.3	.10885	.014854	18.448
.8600	.9195	.5993	7.765	7.2[illegible]	17.67	.6492	.4804	88.1	.10987	.014993	20.905
.8400	.8995	.6558	7.795	7.2[illegible]	18.95	.6430	.5017	89.2	.11080	.015119	23.421
.8200	.8795	.7107	7.832	7.3[illegible]	20.11	.6333	.5217	90.0	.11164	.015235	26.001
.8000	.8595	.7639	7.869	7.3[illegible]	21.16	.6204	.5397	90.8	.11242	.015343	28.647
.7800	.8395	.8155	7.908	7.3[illegible]	22.10	.6049	.5568	91.6	.11315	.015443	31.364
.7600	.8195	.8653	7.950	7.3[illegible]	22.94	.5872	.5723	92.3	.11383	.015538	34.155
.7400	.7995	.9133	7.994	7.3[illegible]	23.66	.5676	.5877	93.0	.11447	.015628	37.025
.7200	.7795	.9595	8.042	7.4[illegible]	24.29	.5467	.6017	93.7	.11508	.015713	39.979
.7000	.7594	1.0038	8.092	7.4[illegible]	24.81	.5245	.6148	94.4	.11565	.015795	43.021
.6800	.7394	1.0462	8.145	7.4[illegible]	25.24	.5015	.6272	95.0	.11620	.015873	46.157
.6600	.7194	1.0867	8.202	7.5[illegible]	25.57	.4778	.6388	95.7	.11672	.015948	49.394
.6400	.6994	1.1251	8.263	7.5[illegible]	25.80	.4537	.6497	96.3	.11723	.016021	52.738
.6200	.6794	1.1614	8.328	7.5[illegible]	25.94	.4292	.6600	97.0	.11771	.016091	56.196
.6000	.6594	1.1955	8.398	7.6[illegible]	25.99	.4047	.6697	97.6	.11818	.016160	59.776
.5800	.6394	1.2274	8.473	7.6[illegible]	25.96	.3803	.6788	98.2	.11863	.016227	63.488
.5600	.6194	1.2570	8.553	7.7[illegible]	25.84	.3560	.6875	98.9	.11907	.016292	67.341
.5400	.5994	1.2842	8.640	7.7[illegible]	25.63	.3321	.6954	99.5	.11949	.016357	71.346
.5200	.5794	1.3089	8.734	7.8[illegible]	25.35	.3086	.7030	100.1	.11990	.016420	75.516
.5000	.5594	1.3311	8.836	7.8[illegible]	24.99	.2856	.7101	100.8	.12031	.016482	79.865
.4800	.5394	1.3505	8.947	7.9[illegible]	24.55	.2632	.7168	101.5	.12070	.016543	84.408
.4600	.5193	1.3672	9.07	8.0[illegible]	24.05	.2415	.7231	102.1	.12108	.016604	89.163
.4400	.4993	1.3809	9.20	8.1[illegible]	23.47	.2205	.7289	102.8	.12146	.016665	94.151
.4200	.4793	1.3915	9.35	8.1[illegible]	22.83	.2004	.7344	103.5	.12183	.016725	99.396
.4000	.4593	1.3990	9.51	8.2[illegible]	22.13	.1812	.7396	104.3	.12219	.016785	104.923
.3800	.4393	1.4030	9.69	8.372	21.37	.1629	.7443	105.0	.12255	.016845	110.766
.3600	.4192	1.4035	9.89	8.481	20.56	.1455	.7486	105.8	.12290	.016906	116.960
.3400	.3992	1.4002	10.12	8.604	19.69	.1291	.7529	106.6	.12324	.016967	123.551
.3200	.3792	1.3929	10.37	8.740	18.78	.1137	.7567	107.5	.12358	.017028	130.589
.3000	.3591	1.3814	10.66	8.893	18.30	.0994	.7602	108.4	.12392	.017091	138.138
.2800	.3391	1.3652	11.00	9.07	16.82	.0861	.7633	109.4	.12425	.017154	146.276
.2600	.3190	1.3442	11.39	9.26	15.79	.0738	.7660	110.4	.12458	.017219	[illegible].098
.2400	.2990	1.3178	11.86	9.49	14.72	.0626	.7685	111.5	.12491	.017286	[illegible].723
.2200	.2789	1.2856	12.41	9.76	13.64	.0524	.7706	112.6	.12523	.017356	[illegible].306
.2000	.2588	1.2470	13.08	10.07	12.54	.0433	.7725	113.9	.12555	.017428	[illegible].046
.1800	.2387	1.2012	13.91	10.44	11.41	.0351	.7742	115.3	.12586	.017503	[illegible].21
.1600	.2185	1.1475	14.96	10.90	10.27	.0279	.7756	116.9	.12618	.017583	215.16
.1400	.1983	1.0847	16.35	11.46	9.14	.0217	.7766	118.6	.12648	.017669	232.44
.1200	.1780	1.0113	18.23	12.15	8.01	.0164	.7806	120.6	.12678	.017762	252.84
.1000	.1575	.9254	20.94	13.11	6.89	.0119	.7818	122.9	.12708	.017866	277.62
.0900	.1472	.8769	22.79	13.70	6.33	.0100	.7823	124.2	.12722	.017924	[illegible].30
.0800	.1367	.8242	25.15	14.40	5.78	.0082	.7828	125.7	.12736	.017986	[illegible].07
.0700	.1261	.7668	28.29	15.25	5.22	.0066	.7833	127.4	.12750	.018054	328.61
.0600	.1152	.7041	32.64	16.3[illegible]	4.67	.0052	.7837	129.3	.12763	.018130	352.07
.0500	.1037	.6361	39.15	17.7[illegible]	4.10	.0040	.7841	131.6	.12775	.018220	381.67
.0450	.0976	.6004	43.85	18.6[illegible]	3.81	.0034	.7842	133.0	.12781	.018273	400.23
.0400	.0909	.5642	50.25	19.7[illegible]	3.50	.0028	.7844	134.6	.12787	.018335	423.18
.0380	.0880	.5501	53.65	20.3[illegible]	3.36	.0026	.7845	135.4	.12789	.018364	[illegible].32
.0360	.0849	.5367	57.70	21.0[illegible]	3.22	.0024	.7846	136.2	.12791	.018396	447.25
.0340	.0814	.5247	62.61	21.8[illegible]	3.06	.0021	.7847	137.3	.12794	.018435	[illegible].98
.0330	.0794	.5197	65.98	22.3[illegible]	2.98	.0020	.7847	137.9	.12795	.018457	[illegible].50
.0320	.0771	.5162	69.79	22.9[illegible]	2.87	.0018	.7845	138.6	.12796	.018484	[illegible].90
.0310	.0744	.5152	74.70	23.6[illegible]	2.76	.0017	.7844	139.5	.12797	.018517	[illegible].61
.0300	.0706	.5218	82.27	24.6[illegible]	2.60	.0015	.7844	140.9	.12798	.018568	[illegible].81
.0296	.0675	.5356	88.76	25.[illegible]	2.47	.0013	.7850	142.1	.12798	.018612	[illegible].86

TABLE VIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(f) $\gamma_i = -10.0^{\circ}$, $e_i = 0.19134$

$\overline{V}$	$\overline{V}_y$	z	$-\gamma$ deg	$-\gamma$ rad	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{q}$	t sec	$\frac{z}{r}$	$\frac{z\overline{V}}{r}$	$\sqrt{\beta r}\,\frac{z}{V}$
1.0400	1.0973	0.0000010	10.000	9.45[illegible]	0.0000	0.0013	0	0	0	0	0.00[illegible]
1.0405	1.0996	.0000028	9.972	9.431	.0001	.0022	.0005	5.1	.00644	.001[illegible]	[illegible]
1.0410	1.1002	.0000077	9.943	9.404	.0003	.0036	.0005	10.3	.01292	.002[illegible]	[illegible]
1.0415	1.1007	.0000217	9.914	9.37[illegible]	.0008	.0061	.0018	15.5	.01946	.003[illegible]	[illegible]
1.0420	1.1012	.0000615	9.885	9.34[illegible]	.0021	.0103	.0032	20.8	.02609	.004[illegible]	[illegible]
1.0425	1.1017	.0001811	9.853	9.31[illegible]	.0061	.0176	.0061	26.3	.03259	.005[illegible]	[illegible]
1.0430	1.1022	.0006156	9.817	9.28	.0219	.0325	.0118	32.6	.04083	.007[illegible]	[illegible]
1.04327	1.10245	.002215	9.779	9.24[illegible]	.0778	.0618	.0226	39.1	.04906	.008[illegible]	[illegible]
1.0430	1.1022	.005444	9.752	9.22[illegible]	.1907	.0967	.0358	43.7	.05488	.009[illegible]	[illegible]
1.0420	1.1012	.011669	9.730	9.20[illegible]	.407	.1413	.0528	47.7	.05982	.010[illegible]	[illegible]
1.0410	1.1002	.017032	9.720	9.19[illegible]	.594	.1703	.0639	49.6	.06228	.010[illegible]	[illegible]
1.0400	1.0992	.02213	9.713	9.18[illegible]	.771	.1937	.0730	51.0	.06398	.011[illegible]	[illegible]
1.0350	1.0942	.04625	9.696	9.16[illegible]	1.606	.2769	.1060	54.8	.06880	.011[illegible]	1.[illegible]
1.0300	1.0892	.06950	9.699	9.15[illegible]	2.40	.3356	.1301	57.0	.07148	.012[illegible]	[illegible]
1.0250	1.0842	.09233	9.686	9.15[illegible]	3.18	.3825	.1501	58.5	.07336	.012[illegible]	[illegible]
1.0200	1.0792	.11490	9.685	9.14[illegible]	3.94	.4219	.1675	59.7	.07482	.012[illegible]	3.[illegible]
1.0150	1.0742	.13725	9.686	9.14[illegible]	4.68	.4558	.1831	60.7	.07601	.013[illegible]	[illegible]
1.0100	1.0692	.15942	9.687	9.14[illegible]	5.41	.4856	.1973	61.5	.07702	.013[illegible]	[illegible]
1.0050	1.0642	.18142	9.689	9.14[illegible]	6.13	.5121	.2106	62.2	.07789	.013[illegible]	5.[illegible]
1.0000	1.0592	.2033	9.691	9.14	6.84	.5358	.2228	62.8	.07866	.013[illegible]	6.[illegible]
.9950	1.0542	.2250	9.694	9.14[illegible]	7.54	.5571	.2342	63.4	.07935	.013[illegible]	6.[illegible]
.9900	1.0492	.2465	9.698	9.14[illegible]	8.22	.5763	.2451	63.9	.07998	.013[illegible]	7.[illegible]
.9800	1.0392	.2892	9.705	9.14[illegible]	9.56	.6097	.2651	64.9	.08109	.014[illegible]	8.[illegible]
.9700	1.0292	.3314	9.714	9.15[illegible]	10.86	.6372	.2840	65.7	.08204	.014[illegible]	10.[illegible]
.9600	1.0192	.3731	9.723	9.15[illegible]	12.11	.6600	.3013	66.4	.08287	.014[illegible]	11.[illegible]
.9500	1.0092	.4142	9.734	9.15[illegible]	13.32	.6787	.3176	67.0	.08362	.014[illegible]	13.[illegible]
.9400	.9992	.4549	9.744	9.16[illegible]	14.49	.6940	.3319	67.6	.08429	.014[illegible]	14.[illegible]
.9300	.9892	.4950	9.756	9.16[illegible]	15.63	.7062	.3455	68.2	.08491	.014[illegible]	15.[illegible]
.9200	.9792	.5347	9.768	9.17[illegible]	16.72	.7157	.3594	68.7	.08548	.014[illegible]	17.[illegible]
.9100	.9692	.5738	9.780	9.17[illegible]	17.77	.7229	.3718	69.2	.08600	.014[illegible]	18.[illegible]
.9000	.9592	.6124	9.793	9.18[illegible]	18.78	.7280	.3839	69.6	.08649	.014[illegible]	20.[illegible]
.8800	.9392	.6881	9.820	9.19[illegible]	20.69	.7326	.4061	70.5	.08739	.015[illegible]	23.[illegible]
.8600	.9192	.7618	9.850	9.21[illegible]	22.45	.7309	.4264	71.2	.08819	.015[illegible]	26.573
.8400	.8992	.8333	9.881	9.23[illegible]	24.06	.7241	.4455	71.9	.08891	.015[illegible]	29.759
.8200	.8792	.9026	9.914	9.24[illegible]	25.52	.7129	.4624	72.6	.08957	.015[illegible]	33.022
.8000	.8592	.9698	9.949	9.25[illegible]	26.84	.6983	.4790	73.2	.09018	.015[illegible]	36.366
.7800	.8392	1.0347	9.987	9.27[illegible]	28.02	.6806	.4940	73.8	.09075	.015[illegible]	[illegible].795
.7600	.8192	1.0973	10.027	9.29[illegible]	29.06	.6605	.5068	74.4	.09129	.015[illegible]	[illegible].314
.7400	.7992	1.1575	10.069	9.30[illegible]	29.97	.6383	.5211	74.9	.09179	.015[illegible]	[illegible].927
.7200	.7791	1.2154	10.114	9.32[illegible]	30.74	.6145	.5341	75.5	.09226	.015[illegible]	[illegible].640
.7000	.7591	1.2707	10.162	9.34[illegible]	31.38	.5896	.5459	76.0	.09272	.016[illegible]	[illegible].459
.6800	.7391	1.3235	10.212	9.368	31.90	.5633	.5568	76.5	.09315	.016[illegible]	[illegible].391
.6600	.7191	1.3737	10.266	9.39[illegible]	32.29	.5365	.5670	77.0	.09356	.016[illegible]	[illegible].441
.6400	.6991	1.4212	10.324	9.41[illegible]	32.56	.5092	.5769	77.6	.09396	.016[illegible]	[illegible].619
.6200	.6791	1.4659	10.386	9.44[illegible]	32.71	.4816	.5863	78.1	.09434	.016[illegible]	[illegible].931
.6000	.6591	1.5077	10.452	9.50[illegible]	32.75	.4539	.5944	78.6	.09471	.016[illegible]	[illegible].387
.5800	.6391	1.5466	10.523	9.53[illegible]	32.67	.4262	.6027	79.1	.09506	.016484	[illegible].997
.5600	.6191	1.5824	10.600	9.57[illegible]	32.49	.3988	.6103	79.6	.09541	.016548	[illegible].773
.5400	.5991	1.6151	10.682	9.61[illegible]	32.20	.3718	.6172	80.1	.09574	.016611	[illegible].726
.5200	.5791	1.6444	10.772	9.66[illegible]	31.81	.3453	.6240	80.6	.09607	.016673	[illegible].870
.5000	.5590	1.6704	10.868	9.70[illegible]	31.32	.3193	.6300	81.1	.09639	.016734	[illegible].221
.4800	.5390	1.6927	10.97	9.76	30.74	.2941	.6360	81.6	.09670	.016794	[illegible].756
.4600	.5190	1.7114	11.09	9.81	30.07	.2697	.6412	82.2	.09701	.016854	[illegible].614
.4400	.4990	1.7262	11.21	9.87	29.31	.2461	.6470	82.7	.09731	.016913	[illegible].698
.4200	.4790	1.7370	11.35	9.94	28.46	.2235	.6524	83.3	.09760	.016971	[illegible].074
.4000	.4590	1.7436	11.51	10.0[illegible]	27.54	.2016	.6569	83.9	.09789	.017030	[illegible].769
.3800	.4389	1.7457	11.68	10.09	26.55	.1813	.6610	84.5	.09817	.017088	[illegible].819
.3600	.4189	1.7432	11.87	10.1[illegible]	25.49	.1618	.6655	85.1	.09845	.017147	[illegible].263
.3400	.3989	1.7357	12.08	10.2[illegible]	24.37	.1434	.6695	85.8	.09873	.017205	[illegible].147
.3200	.3788	1.7225	12.32	10.3[illegible]	23.18	.1262	.6735	86.5	.09900	.017265	[illegible].526
.3000	.3588	1.7047	12.60	10.51	21.94	.1101	.6775	87.2	.09928	.017324	[illegible].466
.2800	.3388	1.6804	12.92	10.6[illegible]	20.66	.0952	.6814	88.0	.09954	.017385	[illegible].047
.2600	.3187	1.6499	13.29	10.8[illegible]	19.34	.0815	.6811	88.8	.09981	.017447	[illegible].369
.2400	.2986	1.6124	13.73	11.0[illegible]	17.97	.0690	.6855	89.7	.10007	.017511	[illegible].55
.2200	.2785	1.5675	14.26	11.2[illegible]	16.58	.0577	.6895	90.7	.10034	.017576	[illegible].75
.2000	.2585	1.5145	14.89	11.4[illegible]	15.18	.0475	.6870	91.7	.10060	.017644	[illegible].17
.1800	.2383	1.4525	15.68	11.7[illegible]	13.75	.0385	.6860	92.9	.10085	.017714	[illegible].08
.1600	.2182	1.3805	16.69	12.1[illegible]	12.32	.0305	.6910	94.2	.10111	.017788	[illegible].84
.1400	.1979	1.2972	18.00	12.6[illegible]	10.89	.0236	.6950	95.6	.10137	.017868	277.97
.1200	.1776	1.2010	19.79	13.2[illegible]	9.47	.0177	.6990	97.3	.10162	.017953	300.24
.1000	.1572	1.0896	22.37	14.0[illegible]	8.08	.0128	.6950	99.3	.10186	.018048	[illegible].89
.0900	.1468	1.0274	24.14	14.5[illegible]	7.38	.0107	.6950	100.4	.10198	.018100	[illegible].46
.0800	.1364	.9602	26.40	15.1[illegible]	6.70	.0088	.6959	101.7	.10210	.018155	[illegible].07
.0700	.1258	.8875	29.39	15.8[illegible]	6.02	.0071	.6963	103.1	.10222	.018216	[illegible].36
.0600	.1149	.8088	33.54	16.7[illegible]	5.34	.0056	.6967	104.7	.10233	.018284	[illegible].40
.0500	.1035	.7237	39.73	17.9[illegible]	4.65	.0042	.6970	106.7	.10244	.018363	[illegible].22
.0450	.0975	.6789	44.18	18.7[illegible]	4.30	.0036	.6972	107.9	.10249	.018409	452.62
.0400	.0909	.6333	50.23	19.7[illegible]	3.93	.0030	.6974	109.3	.10254	.018463	474.95
.0380	.0881	.6151	53.36	20.2[illegible]	3.77	.0028	.6975	110.0	.10256	.018488	485.59
.0360	.0851	.5973	57.10	20.8[illegible]	3.60	.0025	.6976	110.7	.10258	.018515	497.74
.0340	.0818	.5804	61.73	21.4[illegible]	3.43	.0023	.6978	111.6	.10259	.018547	512.14
.0320	.0779	.5657	67.82	22.35	3.22	.0020	.6977	112.7	.10261	.018586	[illegible]0.37
.0310	.0756	.5602	71.82	22.92	3.10	.0018	.6977	113.4	.10262	.018610	[illegible]2.14
.0300	.0728	.5576	77.08	23.67	2.96	.0017	.6977	114.1	.10263	.018642	[illegible]7.63
.0295	.0710	.5588	80.67	24.1[illegible]	2.87	.0016	.6978	114.8	.10263	.018663	568.31
.0290	.0684	.5651	86.00	25.0[illegible]	2.74	.0014	.6980	115.7	.10264	.018694	584.62

TABLE IX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -3.0^\circ$, $e_i = 0.09685$

$\overline{V}$	$\overline{V}_r$	z	γ deg	γ_r deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta S}{r}$	$\sqrt{\beta r}\frac{z}{\overline{V}}$
1.0400	0.9801	0.0000010	3.000	3.188	0.0000	0.0009	0	0	0	0	0.000
1.0405	.9806	.0000028	2.904	3.082	.0001	.0015	.0008	17.3	.02202	.001136	.000
1.0410	.9811	.0000078	2.803	2.975	.0002	.0026	.0021	35.4	.04493	.002278	.000
1.0415	.9816	.0000220	2.696	2.861	.0006	.0044	.0045	54.3	.06902	.004139	.001
1.0420	.9821	.0000650	2.579	2.736	.0018	.0075	.0088	74.8	.09511	.004437	.002
1.0425	.9826	.0002282	2.434	2.582	.0063	.0140	.0184	99.8	.12696	.006031	.007
1.04270	.98275	.0006599	2.303	2.443	.0184	.0239	.0337	122.3	.15549	.007211	.019
1.0425	.9826	.0014296	2.205	2.337	.0397	.0351	.0520	139.4	.17732	.008070	.041
1.0420	.9820	.002385	2.134	2.264	.0662	.0453	.0693	151.2	.19236	.008639	.069
1.0410	.9810	.003916	2.066	2.193	.1087	.0579	.0917	163.0	.20743	.009192	.113
1.0400	.9800	.005998	2.025	2.149	.1468	.0672	.1084	170.4	.21684	.009526	.153
1.0350	.9750	.011498	1.921	2.039	.317	.0977	.1681	190.3	.24200	.010394	.333
1.0300	.9700	.017246	1.871	1.987	.473	.1181	.2112	201.2	.25578	.010850	.502
1.0250	.9650	.02278	1.841	1.956	.621	.1340	.2470	208.9	.26549	.011165	.667
1.0200	.9600	.02819	1.822	1.934	.764	.1471	.2782	215.0	.27306	.011407	.829
1.0150	.9550	.03350	1.809	1.923	.903	.1583	.3062	220.0	.27929	.011604	.990
1.0100	.9500	.03875	1.801	1.915	1.039	.1680	.3319	224.3	.28459	.011771	1.151
1.0050	.9450	.04394	1.796	1.910	1.171	.1765	.3556	228.1	.28922	.011916	1.312
1.0000	.9400	.04909	1.795	1.909	1.301	.1840	.3778	231.4	.29332	.012045	1.473
.9950	.9350	.05421	1.795	1.910	1.429	.1908	.3986	234.4	.29702	.012161	1.635
.9900	.9300	.05931	1.797	1.913	1.555	.1969	.4181	237.2	.30038	.012266	1.797
.9800	.9200	.06945	1.807	1.924	1.800	.2073	.4549	242.1	.30632	.012453	2.126
.9700	.9100	.07956	1.821	1.941	2.04	.2158	.4881	246.5	.31145	.012615	2.461
.9600	.9000	.08966	1.838	1.961	2.27	.2228	.5191	250.3	.31597	.012760	2.802
.9500	.8900	.09977	1.859	1.985	2.50	.2285	.5476	253.7	.32000	.012890	3.150
.9400	.8800	.10990	1.883	2.011	2.72	.2330	.5745	256.9	.32366	.013009	3.508
.9300	.8700	.12008	1.909	2.041	2.93	.2366	.5997	259.8	.32699	.013120	3.874
.9200	.8600	.13031	1.937	2.073	3.14	.2394	.6233	262.5	.33005	.013222	4.249
.9100	.8500	.14060	1.967	2.106	3.35	.2414	.6457	265.1	.33289	.013319	4.635
.9000	.8400	.15097	1.999	2.142	3.55	.2428	.6669	267.5	.33553	.013410	5.032
.8800	.8200	.17195	2.067	2.219	3.94	.2438	.7061	271.9	.34030	.013550	5.862
.8600	.8000	.19330	2.142	2.302	4.32	.2428	.7417	275.8	.34454	.013736	6.743
.8400	.7800	.2151	2.221	2.392	4.67	.2402	.7741	279.5	.34834	.013880	7.681
.8200	.7600	.2373	2.306	2.488	5.02	.2362	.8038	282.9	.35179	.014016	8.682
.8000	.7401	.2600	2.396	2.590	5.34	.2311	.8310	286.1	.35493	.014145	9.750
.7800	.7201	.2832	2.490	2.698	5.65	.2250	.8561	289.1	.35782	.014269	10.894
.7600	.7001	.3070	2.590	2.812	5.94	.2181	.8790	291.9	.36049	.014387	12.119
.7400	.6801	.3313	2.694	2.932	6.21	.2105	.9004	294.6	.36297	.014501	13.433
.7200	.6601	.3563	2.803	3.058	6.47	.2023	.9201	297.2	.36528	.014612	14.844
.7000	.6401	.3818	2.918	3.191	6.70	.1937	.9382	299.7	.36745	.014721	16.362
.6800	.6201	.4079	3.038	3.332	6.92	.1847	.9550	302.1	.36948	.014826	17.997
.6600	.6001	.4347	3.164	3.480	7.12	.1754	.9705	304.5	.37140	.014930	19.760
.6400	.5801	.4622	3.295	3.636	7.29	.1659	.9848	306.8	.37321	.015032	21.665
.6200	.5601	.4903	3.434	3.801	7.44	.1563	.9980	309.0	.37493	.015133	23.724
.6000	.5401	.5192	3.579	3.976	7.57	.1466	1.0102	311.2	.37656	.015233	25.940
.5800	.5201	.5488	3.732	4.16	7.68	.1369	1.0214	313.3	.37812	.015333	28.386
.5600	.5002	.5792	3.892	4.36	7.76	.1272	1.0317	315.5	.37960	.015431	31.027
.5400	.4802	.6103	4.06	4.57	7.82	.1177	1.0412	317.6	.38102	.015530	33.907
.5200	.4602	.6423	4.24	4.79	7.85	.1083	1.0500	319.7	.38238	.015629	37.057
.5000	.4402	.6752	4.43	5.04	7.85	.0991	1.0580	321.8	.38369	.015728	40.512
.4800	.4202	.7090	4.63	5.30	7.83	.0902	1.0653	323.9	.38494	.015828	44.312
.4600	.4002	.7438	4.85	5.58	7.77	.0815	1.0719	326.0	.38616	.015928	48.502
.4400	.3803	.7797	5.08	5.88	7.69	.0732	1.0780	328.2	.38733	.016030	53.158
.4200	.3603	.8167	5.33	6.21	7.57	.0652	1.0835	330.3	.38846	.016133	58.335
.4000	.3403	.8550	5.59	6.58	7.43	.0576	1.0884	332.5	.38956	.016238	64.126
.3800	.3204	.8948	5.88	6.98	7.25	.0505	1.0929	334.8	.39063	.016346	70.640
.3600	.3004	.9362	6.19	7.43	7.04	.0437	1.0969	337.1	.39168	.016459	78.016
.3400	.2805	.9795	6.54	7.93	6.80	.0374	1.1005	339.5	.39270	.016570	86.429
.3200	.2605	1.0251	6.91	8.50	6.52	.0316	1.1036	342.0	.39370	.016688	96.105
.3000	.2406	1.0735	7.33	9.16	6.21	.0264	1.1064	344.6	.39468	.016811	107.347
.2800	.2207	1.1252	7.80	9.92	5.87	.0216	1.1088	347.4	.39565	.016940	120.562
.2600	.2008	1.1814	8.33	10.81	5.50	.0173	1.1109	350.3	.39662	.017078	136.317
.2400	.1810	1.2434	8.93	11.89	5.09	.0135	1.1127	353.5	.39758	.017228	155.423
.2200	.1612	1.3133	9.63	13.20	4.65	.0102	1.1142	357.0	.39854	.017379	179.089
.2000	.1414	1.3946	10.45	14.87	4.18	.0075	1.1155	360.9	.39952	.017552	209.19
.1800	.1218	1.4931	11.43	17.04	3.69	.0052	1.1165	365.2	.40052	.017745	248.84
.1600	.1023	1.6189	12.63	20.00	3.18	.0034	1.1173	370.4	.40155	.017966	303.54
.1400	.0831	1.7924	14.12	24.26	2.65	.0020	1.1179	376.5	.40266	.018227	384.07
.1200	.0645	2.0581	16.00	30.87	2.14	.0011	1.1183	384.5	.40386	.018552	514.53
.1000	.0470	2.5333	18.34	42.02	1.679	.0005	1.1186	395.4	.40527	.018988	759.98
.0900	.0390	2.9473	19.54	50.50	1.495	.0003	1.1188	403.0	.40610	.019271	982.44
.0800	.0316	3.6245	20.36	61.68	1.359	.0002	1.1189	413.2	.40709	.019631	1359.17
.0750	.0280	4.1610	20.33	68.38	1.308	.0002	1.1189	420.0	.40769	.019856	1664.41
.0700	.0243	4.9945	19.63	75.85	1.259	.0001	1.1190	429.2	.40846	.020136	2140.5
.0680	.0226	5.5002	19.02	79.05	1.236	.0001	1.1190	434.2	.40886	.020275	2426.6
.0660	.0207	6.2174	18.09	82.39	1.208	.0001	1.1190	440.7	.40936	.020445	2826.1
.0640	.0183	7.4137	16.60	85.84	1.168	.0001	1.1190	450.4	.41009	.020674	3475.2
.0620	.0147	10.5300	13.74	89.12	1.106	.0000	1.1191	471.7	.41167	.021099	5095.1
.0610	.0110	17.7684	10.35	89.96	1.050	.0000	1.1191	510.4	.41451	.021699	8738.5

TABLE IX.- VALUES OF $Z_{\bar{V}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.04$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -4.0^{\circ}$, $e_i = 0.10720$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{\eta}$	$\bar{q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\frac{Z}{\bar{V}}$
1.0400	0.9802	0.0000010	4.000	4.245	0.0000	0.0009	0	0	0	0	0.000
1.0405	.9802	.0000028	3.929	4.169	.0001	.0015	.0006	12.9	.01638	.001135	.000
1.0410	.9811	.0000078	3.855	4.091	.0002	.0026	.0016	26.1	.03314	.002275	.000
1.0415	.9812	.0000219	3.778	4.009	.0006	.0043	.0032	39.7	.05039	.003406	.001
1.0420	.9821	.0000634	3.697	3.923	.0018	.0074	.0062	53.9	.06848	.004608	.002
1.0425	.9826	.0002022	3.605	3.825	.0056	.0132	.0121	69.6	.08867	.005896	.004
1.04269	.98301	.0009942	3.473	3.685	.0280	.0293	.0288	92.3	.11727	.007666	.009
1.0425	.9828	.002798	3.385	3.591	.0777	.0492	.0500	107.4	.13647	.008816	.081
1.0420	.9821	.004174	3.350	3.555	.1159	.0600	.0619	113.3	.14403	.009261	.120
1.0410	.9811	.005565	3.311	3.513	.1821	.0750	.0787	120.2	.15270	.009765	.189
1.0400	.9801	.008778	3.286	3.487	.243	.0865	.0918	124.6	.15832	.010089	.253
1.0350	.9751	.019025	3.223	3.421	.524	.1257	.1381	136.6	.17353	.010954	.551
1.0300	.9701	.02876	3.192	3.390	.788	.1526	.1716	143.2	.18182	.011418	.838
1.0250	.9651	.03827	3.174	3.371	1.043	.1737	.1992	147.8	.18762	.011741	1.120
1.0200	.9601	.04762	3.161	3.359	1.291	.1912	.2233	151.4	.19211	.011989	1.401
1.0150	.9551	.05687	3.153	3.351	1.536	.2062	.2448	154.3	.19579	.012196	1.681
1.0100	.9501	.06603	3.148	3.346	1.771	.2193	.2645	156.9	.19890	.012365	1.961
1.0050	.9451	.07513	3.144	3.344	2.00	.2308	.2827	159.1	.20161	.012512	2.243
1.0000	.9401	.08415	3.143	3.343	2.23	.2410	.2996	161.0	.20401	.012644	2.525
.9950	.9351	.09313	3.142	3.344	2.46	.2502	.3155	162.8	.20616	.012762	2.808
.9900	.9301	.10205	3.143	3.346	2.68	.2583	.3306	164.4	.20811	.012869	3.092
.9800	.9201	.11977	3.147	3.352	3.11	.2723	.3584	167.3	.21155	.013058	3.664
.9700	.9101	.13733	3.154	3.361	3.52	.2836	.3839	169.8	.21452	.013222	4.247
.9600	.9001	.15475	3.162	3.373	3.92	.2928	.4073	172.0	.21714	.013366	4.839
.9500	.8901	.17205	3.173	3.387	4.30	.3001	.4291	174.0	.21948	.013496	5.433
.9400	.8801	.18923	3.185	3.402	4.68	.3059	.4495	175.8	.22159	.013613	6.039
.9300	.8701	.2063	3.199	3.419	5.04	.3103	.4687	177.5	.22353	.013721	6.655
.9200	.8601	.2233	3.214	3.438	5.39	.3135	.4868	179.1	.22531	.013821	7.281
.9100	.8501	.2402	3.230	3.457	5.72	.3156	.5038	180.6	.22696	.013914	7.918
.9000	.8401	.2570	3.247	3.478	6.05	.3168	.5201	182.0	.22851	.014001	8.566
.8800	.8201	.2903	3.284	3.524	6.66	.3168	.5502	184.6	.23132	.014162	9.857
.8600	.8001	.3233	3.324	3.573	7.22	.3141	.5776	186.9	.23384	.014307	11.279
.8400	.7801	.3561	3.368	3.627	7.74	.3091	.6028	189.1	.23612	.014440	12.717
.8200	.7601	.3885	3.416	3.685	8.21	.3023	.6259	191.2	.23821	.014564	14.229
.8000	.7401	.4207	3.467	3.748	8.64	.2940	.6472	193.2	.24014	.014680	15.778
.7800	.7201	.4527	3.521	3.815	9.03	.2845	.6670	195.0	.24193	.014790	17.411
.7600	.7001	.4844	3.580	3.886	9.37	.2740	.6853	196.8	.24361	.014894	19.122
.7400	.6801	.5159	3.642	3.963	9.68	.2627	.7022	198.5	.24519	.014993	20.915
.7200	.6601	.5472	3.706	4.044	9.94	.2508	.7180	200.2	.24668	.015089	22.800
.7000	.6401	.5783	3.778	4.131	10.16	.2384	.7327	201.8	.24810	.015182	24.783
.6800	.6202	.6092	3.852	4.225	10.34	.2257	.7464	203.4	.24945	.015272	26.875
.6600	.6002	.6399	3.932	4.324	10.48	.2128	.7591	205.0	.25074	.015360	29.085
.6400	.5802	.6704	4.016	4.431	10.58	.1999	.7709	206.6	.25198	.015444	31.425
.6200	.5602	.7008	4.106	4.545	10.64	.1869	.7819	208.1	.25317	.015530	33.909
.6000	.5402	.7310	4.202	4.668	10.67	.1740	.7921	209.7	.25431	.015614	36.552
.5800	.5202	.7612	4.305	4.801	10.65	.1613	.8016	211.2	.25542	.015696	39.370
.5600	.5002	.7912	4.415	4.944	10.60	.1488	.8104	212.8	.25650	.015778	42.385
.5400	.4802	.8212	4.533	5.10	10.52	.1366	.8185	214.3	.25755	.015860	45.620
.5200	.4602	.8511	4.660	5.27	10.40	.1247	.8261	215.9	.25856	.015941	49.101
.5000	.4402	.8810	4.797	5.45	10.24	.1133	.8330	217.5	.25955	.016023	52.860
.4800	.4202	.9110	4.944	5.65	10.06	.1022	.8394	219.1	.26052	.016106	56.937
.4600	.4003	.9411	5.10	5.87	9.83	.0917	.8453	220.8	.26147	.016189	61.375
.4400	.3803	.9714	5.28	6.11	9.58	.0817	.8507	222.5	.26240	.016274	66.209
.4200	.3603	1.0019	5.47	6.38	9.29	.0722	.8557	224.2	.26332	.016360	71.545
.4000	.3404	1.0329	5.68	6.68	8.97	.0634	.8602	226.0	.26422	.016448	77.404
.3800	.3204	1.0644	5.91	7.01	8.63	.0550	.8642	227.9	.26511	.016538	84.032
.3600	.3004	1.0967	6.16	7.39	8.25	.0473	.8679	229.9	.26599	.016630	91.391
.3400	.2805	1.1300	6.45	7.82	7.84	.0402	.8712	231.9	.26687	.016729	99.707
.3200	.2605	1.1647	6.77	8.32	7.41	.0337	.8742	234.1	.26774	.016830	109.194
.3000	.2406	1.2013	7.13	8.90	6.95	.0279	.8768	236.4	.26861	.016936	120.134
.2800	.2207	1.2405	7.54	9.58	6.47	.0226	.8791	238.9	.26949	.017048	132.913
.2600	.2008	1.2833	8.01	10.40	5.97	.0180	.8811	241.6	.27036	.017168	148.070
.2400	.1809	1.3310	8.57	11.40	5.44	.0139	.8828	244.5	.27125	.017297	166.374
.2200	.1611	1.3860	9.22	12.64	4.90	.0105	.8842	247.8	.27216	.017429	189.000
.2000	.1413	1.4517	10.00	14.23	4.35	.0076	.8854	251.5	.27309	.017594	217.75
.1800	.1216	1.5339	10.95	16.33	3.78	.0052	.8864	255.7	.27406	.017775	255.64
.1600	.1021	1.6433	12.14	19.24	3.21	.0034	.8872	260.7	.27507	.017982	308.12
.1400	.0829	1.8006	13.66	23.50	2.65	.0020	.8878	266.9	.27617	.018212	385.84
.1200	.0643	2.0517	15.62	30.18	2.12	.0011	.8882	274.8	.27738	.018548	512.91
.1000	.0468	2.5169	18.10	41.56	1.656	.0005	.8886	285.8	.27880	.018978	755.08
.0900	.0389	2.9300	19.40	50.23	1.478	.0003	.8887	293.5	.27964	.019244	976.67
.0800	.0316	3.5098	20.32	61.59	1.350	.0002	.8888	303.8	.28064	.019627	1353.69
.0750	.0280	4.1489	20.32	68.36	1.303	.0002	.8888	310.7	.28125	.019853	1659.57
.0700	.0243	4.9853	19.64	75.86	1.257	.0001	.8889	319.9	.28202	.020134	2136.6
.0680	.0226	5.4921	19.03	79.06	1.236	.0001	.8889	324.9	.28241	.020274	2423.0
.0660	.0207	6.2106	18.10	82.40	1.208	.0001	.8889	331.4	.28292	.020443	2823.0
.0640	.0183	7.4083	16.61	85.85	1.168	.0001	.8889	341.2	.28366	.020673	3472.7
.0620	.0147	10.5283	13.74	89.13	1.106	.0000	.8890	362.4	.28523	.021099	5094.4
.0610	.0110	17.7769	10.35	89.97	1.050	.0000	.8890	401.2	.28808	.021699	8742.8

TABLE IX.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.04$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -5.0^{\circ}$, $e_i = 0.11918$

$\bar{V}$	$\bar{V}_r$	Z	$\frac{-\gamma}{\text{deg}}$	$\frac{-\lambda}{\text{deg}}$	$-\frac{\dot{u}_r}{g}$	$\bar{q}$	$\bar{Q}$	$\frac{t}{\text{sec}}$	$\frac{\Delta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\Delta}{\bar{V}}$
1.0400	.9800	0.0000010	5.000	5.305	0.0000	0.0009	0	0	0	0	0.000
1.0405	.9807	.0000028	4.943	5.245	.0001	.0015	.0005	10.3	.01304	.001150	.000
1.0410	.9814	.0000077	4.885	5.183	.0002	.0026	.0012	20.7	.02629	.002274	.000
1.0415	.9817	.0000218	4.828	5.119	.0006	.0043	.0026	31.4	.03981	.003322	.000
1.0420	.9820	.0000626	4.762	5.053	.0017	.0073	.0048	42.4	.05378	.004544	.000
1.0425	.9827	.0002923	4.693	4.980	.0053	.0129	.0092	54.3	.06886	.005841	.000
1.0430	.9840	.0013074	4.572	4.851	.0367	.0337	.0256	75.0	.09513	.007970	.000
1.0425	.9850	.004208	4.496	4.770	.1170	.0603	.0472	87.9	.11153	.009269	.000
1.0420	.9860	.005977	4.473	4.746	.1660	.0718	.0567	91.8	.11650	.009660	.000
1.0410	.9880	.009140	4.446	4.717	.254	.0885	.0707	96.6	.12257	.010133	.000
1.0400	.9900	.012103	4.428	4.698	.335	.1016	.0818	99.8	.12660	.010446	.349
1.0350	.9790	.02596	4.383	4.650	.716	.1469	.1213	108.5	.13768	.011299	.755
1.0300	.9700	.03921	4.358	4.627	1.075	.1782	.1499	113.3	.14375	.011793	1.140
1.0250	.9600	.05220	4.344	4.614	1.423	.2029	.1736	116.7	.14800	.012094	1.508
1.0200	.9500	.06501	4.334	4.605	1.763	.2235	.1942	119.4	.15129	.012335	1.866
1.0150	.9400	.07770	4.328	4.599	2.10	.2411	.2127	121.5	.15397	.012539	2.218
1.0100	.9300	.09027	4.323	4.596	2.42	.2565	.2295	123.4	.15625	.012711	2.681
1.0050	.9200	.10275	4.320	4.594	2.74	.2700	.2450	125.0	.15823	.012860	3.067
1.0000	.9100	.11515	4.318	4.593	3.05	.2820	.2595	126.4	.15998	.012990	3.400
.9950	.9000	.12748	4.317	4.594	3.36	.2928	.2731	127.7	.16154	.013111	3.844
.9900	.9000	.13973	4.317	4.595	3.66	.3024	.2860	128.9	.16297	.013218	4.234
.9800	.9200	.16404	4.318	4.600	4.25	.3188	.3098	131.0	.16548	.013408	5.000
.9700	.9400	.18811	4.322	4.607	4.82	.3320	.3316	132.8	.16764	.013577	5.818
.9600	.9600	.2120	4.327	4.615	5.37	.3428	.3516	134.4	.16955	.013716	6.624
.9500	.8900	.2356	4.333	4.625	5.90	.3513	.3700	135.9	.17126	.013841	7.439
.9400	.8800	.2590	4.341	4.636	6.40	.3579	.3877	137.2	.17280	.013960	8.206
.9300	.8700	.2822	4.349	4.649	6.89	.3630	.4040	138.5	.17421	.014067	9.104
.9200	.8600	.3052	4.359	4.662	7.36	.3666	.4195	139.6	.17551	.014168	9.953
.9100	.8500	.3280	4.369	4.677	7.82	.3690	.4341	140.7	.17672	.014260	10.815
.9000	.8400	.3507	4.379	4.692	8.25	.3702	.4480	141.7	.17785	.014347	11.693
.8800	.8200	.3954	4.403	4.725	9.07	.3698	.4738	143.6	.17991	.014505	13.479
.8600	.8000	.4393	4.430	4.761	9.81	.3662	.4973	145.4	.18176	.014648	15.315
.8400	.7800	.4825	4.459	4.801	10.49	.3599	.5189	147.0	.18344	.014778	17.213
.8200	.7600	.5250	4.490	4.844	11.10	.3515	.5388	148.5	.18498	.014897	19.207
.8000	.7400	.5667	4.524	4.890	11.64	.3414	.5572	150.0	.18640	.015011	21.253
.7800	.7200	.6077	4.560	4.940	12.12	.3298	.5742	151.3	.18774	.015117	23.374
.7600	.7000	.6480	4.599	4.993	12.54	.3170	.5900	152.7	.18899	.015217	25.579
.7400	.6800	.6875	4.641	5.050	12.90	.3034	.6047	154.0	.19017	.015312	27.872
.7200	.6600	.7263	4.686	5.111	13.19	.2890	.6184	155.2	.19129	.015404	30.265
.7000	.6400	.7643	4.734	5.177	13.43	.2742	.6311	156.5	.19235	.015492	32.759
.6800	.6200	.8015	4.785	5.248	13.60	.2590	.6430	157.7	.19338	.015577	35.362
.6600	.6000	.8380	4.840	5.323	13.72	.2437	.6541	158.9	.19436	.015659	38.093
.6400	.5800	.8738	4.899	5.405	13.79	.2283	.6644	160.1	.19530	.015740	40.958
.6200	.5600	.9087	4.962	5.493	13.80	.2129	.6741	161.3	.19622	.015819	43.970
.6000	.5400	.9429	5.030	5.588	13.76	.1977	.6830	162.5	.19710	.015896	47.142
.5800	.5200	.9763	5.103	5.690	13.67	.1827	.6914	163.7	.19797	.015973	50.497
.5600	.5000	1.0089	5.181	5.802	13.53	.1681	.6992	164.9	.19881	.016048	54.050
.5400	.4800	1.0408	5.266	5.923	13.34	.1538	.7064	166.1	.19963	.016123	57.829
.5200	.4600	1.0719	5.358	6.06	13.10	.1400	.7131	167.3	.20043	.016198	61.844
.5000	.4400	1.1023	5.458	6.20	12.82	.1268	.7193	168.6	.20122	.016277	66.137
.4800	.4200	1.1319	5.568	6.36	12.50	.1140	.7251	169.9	.20199	.016347	70.745
.4600	.4000	1.1609	5.687	6.54	12.13	.1019	.7304	171.2	.20276	.016423	75.708
.4400	.3800	1.1891	5.818	6.73	11.73	.0905	.7352	172.6	.20351	.016499	81.074
.4200	.3600	1.2169	5.963	6.95	11.29	.0797	.7397	174.1	.20426	.016576	86.919
.4000	.3400	1.2441	6.12	7.20	10.81	.0696	.7438	175.6	.20501	.016655	93.365
.3800	.3200	1.2709	6.30	7.48	10.30	.0602	.7475	177.1	.20575	.016734	100.334
.3600	.3000	1.2975	6.50	7.80	9.78	.0515	.7509	178.5	.20649	.016815	108.184
.3400	.2800	1.3241	6.73	8.16	9.19	.0435	.7539	180.0	.20723	.016906	116.831
.3200	.2600	1.3510	6.99	8.59	8.60	.0363	.7566	181.4	.20798	.016994	126.654
.3000	.2400	1.3786	7.28	9.09	7.98	.0299	.7590	182.9	.20873	.017089	137.860
.2800	.2200	1.4076	7.62	9.69	7.34	.0241	.7612	184.4	.20949	.017188	150.811
.2600	.2000	1.4388	8.02	10.41	6.69	.0190	.7631	185.9	.21027	.017291	166.014
.2400	.1800	1.4726	8.49	11.30	6.03	.0147	.7647	187.6	.21107	.017412	184.201
.2200	.1600	1.5141	9.06	12.43	5.35	.0110	.7661	189.3	.21189	.017537	206.47
.2000	.1400	1.5637	9.76	13.89	4.68	.0079	.7672	191.9	.21275	.017679	234.55
.1800	.1200	1.6280	10.63	15.86	4.01	.0054	.7682	193.9	.21365	.017841	271.33
.1600	.1000	1.7175	11.75	18.63	3.35	.0035	.7689	196.6	.21461	.018031	322.03
.1400	.0800	1.8528	13.21	22.75	2.72	.0021	.7695	212.5	.21566	.018264	397.03
.1200	.0600	2.0604	15.17	29.35	2.13	.0011	.7699	226.9	.21685	.018564	520.11
.1000	.0400	2.5236	17.74	40.84	1.643	.0005	.7702	231.3	.21826	.018981	757.09
.0900	.0300	2.9291	19.14	49.70	1.462	.0003	.7704	232.0	.21911	.019264	976.36
.0800	.0200	3.6062	20.18	61.32	1.338	.0002	.7705	245.5	.22012	.019626	1352.34
.0750	.0150	4.1462	20.24	68.21	1.295	.0002	.7705	256.0	.22073	.019858	1658.47
.0700	.0100	4.9844	19.60	75.80	1.254	.0001	.7706	265.5	.22151	.020134	2136.2
.0680	.0080	5.4921	19.01	79.03	1.233	.0001	.7706	276.6	.22191	.020274	2423.0
.0660	.0060	6.2113	18.09	82.38	1.206	.0001	.7706	277.1	.22241	.020443	2823.3
.0640	.0040	7.4096	16.61	85.84	1.168	.0001	.7706	286.8	.22315	.020674	3473.2
.0620	.0020	10.5286	13.74	89.13	1.106	.0000	.7707	298.1	.22473	.021099	5094.5
.0610	.0010	17.7728	10.35	89.96	1.050	.0000	.7707	298.8	.22757	.021699	8740.7

TABLE IX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\overline{V}_i = 1.04$, $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -6.0^{\circ}$, $e_i = 0.13233$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\Lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\Delta m}{r}$	$\frac{-\Delta\dot{m}}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.0400	0.9803	0.0000010	6.000	6.424	0.0000	0.0009	0	0	0	0	0.000
1.0405	.9808	.0000028	5.953	6.326	.0001	.0015	.0004	8.6	.01084	.001134	.000
1.0410	.9813	.0000077	5.905	6.276	.0002	.0026	.0008	17.2	.02180	.002273	.000
1.0415	.9818	.0000217	5.855	6.225	.0005	.0043	.0021	26.0	.03293	.003419	.001
1.0420	.9823	.0000621	5.804	6.158	.0017	.0073	.0040	35.0	.04435	.004585	.002
1.0425	.9828	.0001869	5.749	6.069	.0052	.0127	.0074	44.6	.05645	.005809	.005
1.04312	.98343	.0016103	5.638	5.981	.0445	.0374	.0243	63.5	.08044	.008201	.046
1.0425	.9828	.005663	5.572	5.911	.1574	.0700	.0447	74.7	.09469	.009599	.163
1.0420	.9823	.007804	5.555	5.893	.217	.0820	.0545	77.6	.09836	.009957	.225
1.0410	.9813	.011700	5.533	5.872	.325	.1002	.0690	81.3	.10301	.010406	.337
1.0400	.9803	.015361	5.519	5.857	.426	.1146	.0745	83.7	.10616	.010712	.444
1.0350	.9753	.03266	5.482	5.818	.900	.1648	.1074	90.7	.11490	.011554	.947
1.0300	.9703	.04924	5.463	5.800	1.350	.1997	.1305	94.5	.11972	.012016	1.434
1.0250	.9653	.06552	5.451	5.789	1.787	.2274	.1500	97.2	.12310	.012338	1.918
1.0200	.9603	.08159	5.443	5.782	2.21	.2504	.1750	99.3	.12571	.012588	2.400
1.0150	.9552	.09751	5.437	5.778	2.63	.2702	.1915	101.0	.12785	.012791	2.882
1.0100	.9503	.11326	5.432	5.775	3.04	.2874	.2065	102.5	.12966	.012963	3.365
1.0050	.9453	.12897	5.429	5.773	3.44	.3026	.2204	103.8	.13123	.013113	3.850
1.0000	.9403	.14454	5.427	5.773	3.83	.3161	.2333	104.9	.13262	.013245	4.336
.9950	.9353	.16002	5.426	5.773	4.22	.3281	.2454	105.9	.13387	.013363	4.825
.9900	.9303	.17541	5.425	5.774	4.60	.3389	.2569	106.9	.13500	.013471	5.315
.9800	.9203	.2059	5.425	5.778	5.34	.3573	.2782	108.6	.13700	.013661	6.304
.9700	.9103	.2361	5.426	5.783	6.05	.3722	.2970	110.0	.13872	.013824	7.303
.9600	.9003	.2660	5.429	5.790	6.74	.3841	.3135	111.3	.14024	.013968	8.314
.9500	.8903	.2956	5.433	5.798	7.40	.3936	.3281	112.5	.14159	.014097	9.336
.9400	.8803	.3249	5.437	5.807	8.04	.4011	.3407	113.5	.14282	.014214	10.371
.9300	.8703	.3540	5.442	5.817	8.65	.4067	.3523	114.5	.14394	.014321	11.419
.9200	.8603	.3827	5.448	5.828	9.24	.4107	.3621	115.4	.14498	.014420	12.480
.9100	.8503	.4112	5.455	5.839	9.80	.4132	.3692	116.3	.14594	.014511	13.556
.9000	.8403	.4394	5.462	5.851	10.34	.4146	.4010	117.1	.14684	.014597	14.646
.8800	.8203	.4950	5.478	5.878	11.35	.4140	.4247	118.6	.14848	.014755	16.873
.8600	.8003	.5494	5.495	5.907	12.28	.4097	.4457	120.0	.14996	.014896	19.165
.8400	.7803	.6028	5.515	5.938	13.11	.4024	.4650	121.3	.15130	.015025	21.527
.8200	.7603	.6550	5.536	5.972	13.85	.3928	.4828	122.5	.15253	.015144	23.963
.8000	.7403	.7061	5.560	6.010	14.51	.3812	.4992	123.7	.15367	.015255	26.479
.7800	.7203	.7561	5.585	6.049	15.09	.3680	.5145	124.8	.15474	.015359	29.080
.7600	.7003	.8049	5.612	6.092	15.58	.3535	.5286	125.9	.15574	.015458	31.772
.7400	.6803	.8525	5.641	6.136	16.00	.3380	.5418	126.9	.15669	.015551	34.562
.7200	.6603	.8990	5.673	6.187	16.33	.3217	.5541	127.9	.15759	.015641	37.458
.7000	.6403	.9442	5.706	6.240	16.59	.3049	.5657	128.9	.15846	.015727	40.468
.6800	.6203	.9883	5.743	6.297	16.78	.2878	.5763	129.9	.15928	.015809	43.600
.6600	.6003	1.0311	5.782	6.358	16.89	.2704	.5863	130.9	.16008	.015890	46.866
.6400	.5803	1.0726	5.824	6.425	16.93	.2530	.5956	131.9	.16085	.015968	50.277
.6200	.5604	1.1128	5.869	6.496	16.91	.2357	.6043	132.8	.16159	.016044	53.846
.6000	.5404	1.1517	5.918	6.573	16.81	.2186	.6126	133.8	.16231	.016119	57.587
.5800	.5204	1.1893	5.970	6.657	16.66	.2018	.6200	134.8	.16302	.016192	61.517
.5600	.5004	1.2256	6.027	6.749	16.44	.1853	.6271	135.8	.16371	.016264	65.657
.5400	.4804	1.2605	6.090	6.849	16.16	.1694	.6338	136.8	.16438	.016336	70.027
.5200	.4604	1.2940	6.157	6.958	15.82	.1539	.6397	137.8	.16504	.016407	74.654
.5000	.4404	1.3261	6.231	7.08	15.43	.1391	.6454	138.9	.16570	.016478	79.567
.4800	.4204	1.3568	6.312	7.21	14.99	.1249	.6500	140.0	.16634	.016549	84.803
.4600	.4004	1.3862	6.401	7.36	14.50	.1115	.6535	141.1	.16698	.016620	90.403
.4400	.3804	1.4141	6.500	7.52	13.96	.0987	.6569	142.2	.16761	.016691	96.417
.4200	.3605	1.4407	6.610	7.71	13.37	.0868	.6640	143.4	.16824	.016764	102.907
.4000	.3405	1.4660	6.732	7.92	12.75	.0756	.6678	144.7	.16887	.016837	109.947
.3800	.3205	1.4900	6.869	8.15	12.08	.0652	.6717	146.0	.16950	.016912	117.630
.3600	.3005	1.5128	7.02	8.42	11.39	.0556	.6743	147.4	.17013	.016989	126.070
.3400	.2806	1.5347	7.20	8.74	10.66	.0469	.6771	148.9	.17077	.017069	135.416
.3200	.2606	1.5558	7.40	9.10	9.91	.0390	.6797	150.6	.17141	.017151	145.860
.3000	.2407	1.5766	7.64	9.54	9.13	.0320	.6819	152.3	.17207	.017238	157.656
.2800	.2207	1.5974	7.92	10.06	8.34	.0257	.6839	154.2	.17274	.017329	171.150
.2600	.2008	1.6191	8.24	10.70	7.53	.0202	.6857	156.3	.17342	.017426	186.822
.2400	.1809	1.6429	8.64	11.49	6.70	.0155	.6872	158.7	.17413	.017531	205.38
.2200	.1610	1.6708	9.12	12.51	5.91	.0115	.6886	161.3	.17487	.017647	227.83
.2000	.1412	1.7057	9.72	13.84	5.10	.0082	.6896	164.4	.17565	.017776	255.85
.1800	.1215	1.7531	10.49	15.65	4.31	.0056	.6905	168.0	.17648	.017923	292.19
.1600	.1019	1.8230	11.50	18.23	3.55	.0036	.6913	172.4	.17737	.018097	341.81
.1400	.0826	1.9354	12.85	22.15	2.83	.0021	.6919	178.0	.17837	.018312	414.74
.1200	.0638	2.1365	14.74	28.57	2.18	.0011	.6922	185.5	.17952	.018593	534.12
.1000	.0463	2.5509	17.33	40.03	1.641	.0005	.6924	196.3	.18091	.018993	765.28
.0900	.0384	2.9440	18.81	49.04	1.449	.0003	.6927	204.0	.18176	.019269	981.33
.0800	.0313	3.6138	19.98	60.94	1.325	.0002	.6928	214.4	.18277	.019628	1355.19
.0750	.0278	4.1528	20.11	67.98	1.285	.0002	.6928	221.3	.18339	.019854	1661.12
.0700	.0242	4.9916	19.54	75.69	1.248	.0001	.6928	230.7	.18417	.020135	2139.2
.0680	.0225	5.4997	18.96	78.96	1.230	.0001	.6929	235.7	.18457	.020275	2426.3
.0660	.0206	6.2193	18.06	82.34	1.204	.0001	.6929	242.2	.18507	.020445	2827.0
.0640	.0183	7.4175	16.59	85.82	1.167	.0001	.6929	252.0	.18581	.020675	3476.9
.0620	.0147	10.5339	13.74	89.12	1.106	.0000	.6930	273.2	.18738	.021100	5097.0
.0610	.0110	17.7726	10.35	89.96	1.050	.0000	.6930	311.9	.19023	.021699	8740.6

TABLE IX.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.04$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -8.0^{\circ}$, $e_i = 0.16093$

$\bar{V}$	$\bar{\gamma}$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a}{g}$	$\bar{q}$	$\bar{q}$	t sec	$\frac{s}{r}$	$\frac{-\Delta\gamma}{\gamma}$	$\sqrt{\beta r}\frac{\gamma}{\gamma}$
1.0400	0.98[illegible]	0.0000010	8.000	8.488	[illegible].0000	[illegible].0009	0	0	0	0	0.0[illegible]
1.0405	.98[illegible]	.0000028	7.965	8.450	.0001	.0015	.0003	6.4	.0809	.0011[illegible]	.0[illegible]
1.0410	.98[illegible]	.0000077	7.929	8.412	.0002	.0026	.0008	12.9	.1624	.0022[illegible]	.0[illegible]
1.0415	.98[illegible]	.0000217	7.892	8.373	.0006	.0043	.0016	19.4	.2447	.0038[illegible]	.0[illegible]
1.0420	.98[illegible]	.0000615	7.855	8.333	.0017	.0073	.0030	26.1	.3285	.0045[illegible]	.0[illegible]
1.0425	.98[illegible]	.0001811	7.815	8.290	.0050	.0125	.0054	33.0	.4157	.0057[illegible]	.0[illegible]
1.04327	.98[illegible]	.002200	7.721	8.190	.0610	.0437	.0202	49.1	.6191	.0085[illegible]	.0[illegible]
1.0425	.98[illegible]	.008680	7.668	8.134	.241	.0867	.0408	58.0	.7319	.0100[illegible]	.2[illegible]
1.0420	.98[illegible]	.011551	7.657	8.123	.321	.0999	.0472	59.9	.07555	.0103[illegible]	.333
1.0410	.98[illegible]	.016860	7.642	8.108	.468	.1204	.0572	62.4	.07869	.0108[illegible]	.4[illegible]
1.0400	.98[illegible]	.02190	7.632	8.098	.608	.1368	.0653	64.1	.08087	.0111[illegible]	.6[illegible]
1.0350	.97[illegible]	.04575	7.604	8.071	1.262	.1952	.0948	69.0	.08703	.0119[illegible]	1.3[illegible]
1.0300	.97[illegible]	.06872	7.596	8.058	1.886	.2362	.1165	71.7	.09046	.0123[illegible]	2.0[illegible]
1.0250	.96[illegible]	.09130	7.580	8.050	[illegible].49	.2687	.1344	73.7	.09287	.0127[illegible]	2.6[illegible]
1.0200	.96[illegible]	.11361	7.573	8.045	[illegible].08	.2958	.1500	75.2	.09473	.0129[illegible]	3.3[illegible]
1.0150	.95[illegible]	.13571	7.568	8.042	3.66	.3190	.1639	76.4	.09626	.0131[illegible]	4.011
1.0100	.95[illegible]	.15765	7.564	8.040	[illegible].23	.3393	.1767	77.5	.09756	.0133[illegible]	4.6[illegible]
1.0050	.94[illegible]	.17943	7.560	8.039	4.79	.3572	.1884	78.4	.09868	.0134[illegible]	5.3[illegible]
1.0000	.94[illegible]	.2011	7.558	8.038	[illegible].34	.3731	.1994	79.2	.09968	.0136[illegible]	6.0[illegible]
.9950	.93[illegible]	.2226	7.555	8.038	[illegible].87	.3873	.2097	79.9	.10057	.0137[illegible]	6.711
.9900	.93[illegible]	.2440	7.554	8.039	[illegible].40	.4000	.2194	80.6	.10138	.0138[illegible]	7.3[illegible]
.9800	.92[illegible]	.2864	7.551	8.042	[illegible].43	.4217	.2375	81.8	.10281	.0140[illegible]	8.7[illegible]
.9700	.91[illegible]	.3283	7.550	8.046	[illegible].42	.4392	.2539	82.9	.10404	.0141[illegible]	10.1[illegible]
.9600	.90[illegible]	.3698	7.549	8.050	[illegible].37	.4533	.2691	83.8	.10512	.0143[illegible]	11.5[illegible]
.9500	.89[illegible]	.4109	7.549	8.056	[illegible].29	.4645	.2832	84.6	.10610	.0144[illegible]	12.9[illegible]
.9400	.88[illegible]	.4515	7.550	8.063	11.17	.4732	.2964	85.4	.10697	.0145[illegible]	14.4[illegible]
.9300	.87[illegible]	.4917	7.551	8.070	12.02	.4797	.3088	86.1	.10778	.0146[illegible]	15.8[illegible]
.9200	.86[illegible]	.5315	7.552	8.077	12.83	.4844	.3206	86.8	.10850	.0147[illegible]	17.3[illegible]
.9100	.85[illegible]	.5708	7.554	8.085	13.61	.4873	.3316	87.4	.10921	.0148[illegible]	18.8[illegible]
.9000	.84[illegible]	.6097	7.556	8.094	14.36	.4888	.3422	88.0	.10986	.0149[illegible]	20.3[illegible]
.8800	.82[illegible]	.6863	7.562	8.113	[illegible].75	.4879	.3618	89.1	.11104	.0151[illegible]	23.3[illegible]
.8600	.82[illegible]	.7611	7.568	8.134	17.02	.4827	.3796	90.1	.11209	.0152[illegible]	26.5[illegible]
.8400	.78[illegible]	.8342	7.576	8.156	18.15	.4739	.3960	91.0	.11306	.0153[illegible]	29.7[illegible]
.8200	.76[illegible]	.9054	7.584	8.181	19.16	.4623	.4112	91.9	.11394	.0155[illegible]	33.1[illegible]
.8000	.74[illegible]	.9749	7.594	8.208	[illegible].05	.4484	.4252	92.7	.11476	.0156[illegible]	36.5[illegible]
.7800	.72[illegible]	1.0426	7.605	8.236	[illegible].82	.4326	.4382	93.5	.11553	.0157[illegible]	40.1[illegible]
.7600	.70[illegible]	1.1084	7.617	8.267	[illegible].47	.4152	.4502	94.3	.11626	.0158[illegible]	43.7[illegible]
.7400	.68[illegible]	1.1723	7.630	8.300	[illegible].01	.3968	.4615	95.1	.11692	.0159[illegible]	47.5[illegible]
.7200	.66[illegible]	1.2342	7.644	8.336	[illegible].44	.3774	.4720	95.8	.11760	.0159[illegible]	51.4[illegible]
.7000	.64[illegible]	1.2942	7.659	8.374	[illegible].76	.3574	.4818	96.5	.11822	.0160[illegible]	55.4[illegible]
.6800	.62[illegible]	1.3521	7.676	8.416	[illegible].97	.3370	.4909	97.2	.11883	.0161[illegible]	59.6[illegible]
.6600	.60[illegible]	1.4079	7.693	8.460	[illegible].08	.3164	.4995	98.0	.11940	.0162[illegible]	63.9[illegible]
.6400	.58[illegible]	1.4616	7.714	8.508	[illegible].10	.2958	.5075	98.7	.11997	.0163[illegible]	68.5[illegible]
.6200	.56[illegible]	1.5132	7.735	8.561	[illegible].01	.2752	.5149	99.4	.12051	.0163[illegible]	73.2[illegible]
.6000	.54[illegible]	1.5625	7.758	8.617	[illegible].83	.2550	.5219	100.1	.12104	.0164[illegible]	78.1[illegible]
.5800	.52[illegible]	1.6095	7.784	8.679	[illegible].56	.2351	.5284	100.8	.12156	.0165[illegible]	83.2[illegible]
.5600	.50[illegible]	1.6542	7.812	8.746	[illegible].21	.2156	.5345	101.6	.12206	.0165[illegible]	88.6[illegible]
.5400	.48[illegible]	1.6966	7.843	8.819	[illegible].77	.1968	.5401	102.3	.12256	.0166[illegible]	94.2[illegible]
.5200	.46[illegible]	1.7364	7.877	8.900	[illegible].26	.1786	.5454	103.1	.12305	.0167[illegible]	100.1[illegible]
.5000	.44[illegible]	1.7738	7.915	8.989	[illegible].66	.1612	.5503	103.9	.12354	.0168[illegible]	106.2[illegible]
.4800	.42[illegible]	1.8085	7.957	9.09	[illegible].00	.1445	.5548	104.7	.12402	.0168[illegible]	113.0[illegible]
.4600	.40[illegible]	1.8407	8.004	9.20	[illegible].27	.1287	.5590	105.5	.12449	.0169[illegible]	120.0[illegible]
.4400	.38[illegible]	1.8702	8.056	9.32	[illegible].48	.1137	.5629	106.4	.12497	.0170[illegible]	127.5[illegible]
.4200	.36[illegible]	1.8969	8.115	9.46	[illegible].63	.0997	.5664	107.3	.12544	.0170[illegible]	135.4[illegible]
.4000	.34[illegible]	1.9209	8.182	9.62	[illegible].72	.0867	.5697	108.3	.12592	.0171[illegible]	144.0[illegible]
.3800	.32[illegible]	1.9421	8.258	9.80	[illegible].77	.0746	.5727	109.3	.12640	.0172[illegible]	153.3[illegible]
.3600	.30[illegible]	1.9606	8.345	10.01	[illegible].78	.0635	.5754	110.3	.12688	.0172[illegible]	163.3[illegible]
.3400	.28[illegible]	1.9763	8.447	10.25	[illegible].75	.0534	.5779	111.5	.12737	.0173[illegible]	174.3[illegible]
.3200	.26[illegible]	1.9893	8.566	10.53	[illegible].69	.0442	.5802	112.8	.12787	.0174[illegible]	186.4[illegible]
.3000	.24[illegible]	1.9999	8.708	10.87	[illegible].60	.0361	.5822	114.1	.12838	.0175[illegible]	199.9[illegible]
.2800	.22[illegible]	2.0084	8.877	11.28	[illegible].50	.0289	.5840	115.6	.12891	.0175[illegible]	215.1[illegible]
.2600	.20[illegible]	2.0152	9.08	11.78	[illegible].39	.0226	.5855	117.3	.12946	.0176[illegible]	232.5[illegible]
.2400	.18[illegible]	2.0214	9.34	12.42	[illegible].28	.0172	.5869	119.2	.13002	.0177[illegible]	252.6[illegible]
.2200	.16[illegible]	2.0283	9.66	13.24	[illegible].18	.0127	.5881	121.4	.13063	.0178[illegible]	276.5[illegible]
.2000	.14[illegible]	2.0385	10.08	14.34	[illegible].11	.0090	.5891	123.9	.13127	.0179[illegible]	305.7[illegible]
.1800	.12[illegible]	2.0565	10.63	15.86	5.06	.0061	.5899	126.9	.13196	.0181[illegible]	342.7[illegible]
.1600	.10[illegible]	2.0912	11.39	18.07	4.07	.0038	.5906	130.7	.13273	.0182[illegible]	392.1[illegible]
.1400	.08[illegible]	2.1607	12.48	21.52	[illegible].15	.0022	.5911	135.6	.13361	.0184[illegible]	463.0[illegible]
.1200	.06[illegible]	2.3083	14.09	27.39	[illegible].33	.0011	.5915	142.4	.13465	.0186[illegible]	577.0[illegible]
.1000	.04[illegible]	2.6571	16.54	38.45	[illegible].672	.0005	.5918	152.6	.13596	.0190[illegible]	797.1[illegible]
.0900	.03[illegible]	3.0162	18.09	47.57	1.442	.0003	.5919	160.0	.13678	.0192[illegible]	1005.4[illegible]
.0800	.02[illegible]	3.6600	19.47	59.96	1.303	.0002	.5920	170.4	.13780	.0196[illegible]	1372.4[illegible]
.0750	.02[illegible]	4.1917	19.76	67.34	1.265	.0002	.5920	177.3	.13842	.0198[illegible]	1676.7[illegible]
.0700	.02[illegible]	5.0074	19.33	75.36	1.236	.0001	.5921	186.7	.13920	.0201[illegible]	2154.6
.0680	.02[illegible]	5.5350	18.81	78.74	1.221	.0001	.5921	191.8	.13960	.0202[illegible]	2441.9
.0660	.02[illegible]	6.2539	17.96	82.21	1.199	.0001	.5921	198.3	.14011	.0204[illegible]	2842.7
.0640	.02[illegible]	7.4498	16.54	85.75	1.166	.0001	.5921	208.0	.14085	.0206[illegible]	3492.1
.0620	.02[illegible]	10.5597	13.72	89.10	1.106	.0000	.5922	229.2	.14241	.0211[illegible]	5107.1
.0610	.02[illegible]	17.7752	13.35	89.96	1.050	.0000	.5922	267.8	.14525	.0216[illegible]	8741.9

TABLE IX.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH; $\bar{V}_i = 1.04$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(f) $\gamma_i = -10.0^{\circ}$, $e_i = 0.19134$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a}{g}\frac{dr}{dt}$	$\bar{\tau}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta w}{r}$	$\sqrt{\beta r \frac{w}{V}}$
1.0400	0.98[illegible]	0.0000010	10.000	10.604	0.0000	0.0009	0	0	0	0	0.000
1.0405	.98[illegible]	.0000028	9.972	10.579	.0001	.0015	.0002	5.1	.00644	.001134	.000
1.0410	.98[illegible]	.0000077	9.944	10.548	.0002	.0026	.0006	10.3	.01292	.002271	.000
1.0415	.98[illegible]	.0000216	9.914	10.517	.0006	.0043	.0013	15.5	.01944	.003414	.001
1.0420	.98[illegible]	.0000611	9.885	10.486	.0017	.0073	.0024	20.8	.02606	.004568	.002
1.0425	.98[illegible]	.0001780	9.854	10.455	.0048	.0124	.0043	26.2	.03288	.005755	.005
1.0430	.98[illegible]	.0005735	9.819	10.415	.0155	.0223	.0080	32.2	.04037	.007054	.016
1.04338	.984[illegible]	.002776	9.772	10.369	.0775	.0492	.0181	40.3	.05053	.008806	.080
1.0430	.98[illegible]	.007821	9.740	10.333	.218	.0825	.0306	45.6	.05722	.009957	.20[illegible]
1.0420	.98[illegible]	.015386	9.719	10.311	.428	.1134	.0432	49.1	.06161	.010710	.4[illegible]
1.0410	.98[illegible]	.02206	9.708	10.298	.613	.1378	.0519	51.0	.06396	.011122	.6[illegible]
1.0400	.98[illegible]	.02843	9.700	10.291	.789	.1560	.0590	52.3	.06561	.011390	.8[illegible]
1.0350	.97[illegible]	.05865	9.678	10.271	1.619	.2212	.0850	56.1	.07036	.012284	1.70[illegible]
1.0300	.9709	.08781	9.665	10.261	2.41	.2672	.1041	58.2	.07302	.012652	2.558
1.0250	.9659	.11648	9.656	10.253	3.18	.3038	.1199	59.7	.07490	.012978	3.40[illegible]
1.0200	.9609	.14483	9.650	10.249	3.93	.3343	.1338	60.9	.07635	.013225	4.2[illegible]
1.0150	.9559	.17293	9.644	10.247	4.67	.3605	.1461	61.9	.07754	.013402	5.1[illegible]
1.0100	.9509	.2008	9.640	10.245	5.39	.3834	.1574	62.7	.07855	.013593	5.9[illegible]
1.0050	.9459	.2285	9.636	10.244	6.10	.4036	.1678	63.4	.07943	.013748	6.8[illegible]
1.0000	.9409	.2560	9.633	10.244	6.80	.4215	.1776	64.1	.08021	.013888	7.68[illegible]
.9950	.9359	.2834	9.630	10.244	7.48	.4375	.1867	64.6	.08090	.013998	8.543
.9900	.9309	.3105	9.627	10.244	8.15	.4518	.1953	65.2	.08154	.014109	9.410
.9800	.9209	.3644	9.623	10.247	9.46	.4763	.2113	66.1	.08265	.014299	11.156
.9700	.9109	.4178	9.619	10.253	10.72	.4960	.2259	66.9	.08361	.014458	12.920
.9600	.9009	.4705	9.616	10.254	11.93	.5119	.2394	67.7	.08446	.014604	14.70[illegible]
.9500	.8909	.5226	9.614	10.258	13.10	.5245	.2519	68.3	.08522	.014730	16.504
.9400	.8809	.5742	9.611	10.263	14.22	.5343	.2636	68.9	.08591	.014846	18.3[illegible]
.9300	.8709	.6253	9.610	10.269	15.30	.5416	.2746	69.5	.08654	.014953	20.169
.9200	.8609	.6757	9.608	10.275	16.33	.5468	.2850	70.0	.08712	.015051	22.034
.9100	.8509	.7256	9.607	10.281	17.32	.5501	.2949	70.5	.08766	.015143	23.921
.9000	.8409	.7749	9.605	10.288	18.27	.5518	.3042	71.0	.08816	.015235	25.831
.8800	.8209	.8719	9.604	10.309	20.03	.5506	.3216	71.8	.08908	.015364	29.724
.8600	.8009	.9666	9.603	10.319	21.63	.5446	.3374	72.6	.08991	.015514	33.717
.8400	.7809	1.0589	9.602	10.336	23.06	.5347	.3520	73.3	.09066	.015661	37.817
.8200	.7609	1.1488	9.602	10.356	24.34	.5215	.3654	74.0	.09136	.015709	42.031
.8000	.7409	1.2364	9.602	10.376	25.45	.5056	.3779	74.7	.09200	.015878	46.364
.7800	.7209	1.3214	9.603	10.399	26.41	.4877	.3894	75.3	.09260	.015960	50.8[illegible]
.7600	.7009	1.4040	9.605	10.423	27.23	.4680	.4002	75.9	.09317	.016033	55.4[illegible]
.7400	.6809	1.4840	9.606	10.447	27.89	.4471	.4102	76.5	.09371	.016107	60.1[illegible]
.7200	.6609	1.5613	9.609	10.473	28.40	.4251	.4195	77.1	.09423	.016184	65.0[illegible]
.7000	.6409	1.6360	9.611	10.507	28.80	.4025	.4283	77.7	.09472	.016337	70.114
.6800	.6209	1.7079	9.615	10.539	29.05	.3794	.4364	78.3	.09519	.016[illegible]	75.348
.6600	.6009	1.7770	9.618	10.574	29.17	.3561	.4440	78.8	.09564	.016495	80.7[illegible]
.6400	.5809	1.8432	9.623	10.613	29.16	.3327	.4511	79.4	.09609	.016569	86.3[illegible]
.6200	.5609	1.9064	9.628	10.653	29.02	.3095	.4577	80.0	.09652	.016664	92.244
.6000	.5409	1.9665	9.634	10.698	28.77	.2866	.4640	80.5	.09693	.016734	98.3[illegible]
.5800	.5209	2.0235	9.641	10.744	28.40	.2641	.4698	81.1	.09734	.016784	104.6[illegible]
.5600	.5010	2.0773	9.649	10.797	27.93	.2421	.4752	81.7	.09774	.016855	111.2[illegible]
.5400	.4810	2.1278	9.658	10.854	27.35	.2208	.4802	82.3	.09814	.016928	118.2[illegible]
.5200	.4610	2.1749	9.669	10.921	26.66	.2003	.4849	82.9	.09853	.016984	125.4[illegible]
.5000	.4410	2.2184	9.681	10.992	25.88	.1806	.4893	83.5	.09891	.017050	133.1[illegible]
.4800	.4210	2.2584	9.695	11.071	25.01	.1618	.4934	84.2	.09929	.017115	141.1[illegible]
.4600	.4010	2.2946	9.712	11.158	24.06	.1440	.4971	84.8	.09967	.017150	149.6[illegible]
.4400	.3810	2.3269	9.731	11.254	23.03	.1272	.5006	85.5	.10005	.017244	158.6[illegible]
.4200	.3610	2.3554	9.753	11.367	21.93	.1114	.5038	86.3	.10043	.017310	168.2[illegible]
.4000	.3410	2.3798	9.780	11.499	20.76	.0967	.5067	87.0	.10081	.017376	178.485
.3800	.3210	2.4001	9.811	11.636	19.52	.0832	.5094	87.9	.10120	.017442	189.479
.3600	.3011	2.4161	9.849	11.803	18.25	.0707	.5119	88.7	.10159	.017504	201.34
.3400	.2811	2.4279	9.895	11.997	16.93	.0593	.5141	89.7	.10198	.017578	214.22
.3200	.2611	2.4353	9.951	12.226	15.56	.0491	.5162	90.7	.10239	.017649	228.31
.3000	.2411	2.4385	10.020	12.501	14.17	.0400	.5180	91.8	.10280	.017722	243.65
.2800	.2212	2.4375	10.11	12.84	12.78	.0319	.5196	93.0	.10323	.017799	261.37
.2600	.2012	2.4328	10.22	13.25	11.36	.0249	.5210	94.4	.10369	.017879	280.71
.2400	.1813	2.4248	10.36	13.77	9.96	.0189	.5223	96.0	.10415	.017964	303.10
.2200	.1614	2.4147	10.55	14.45	8.58	.0139	.5233	97.8	.10465	.018056	329.28
.2000	.1415	2.4046	10.81	15.37	7.22	.0098	.5243	99.9	.10519	.018157	360.68
.1800	.1217	2.3981	11.17	16.65	5.92	.0066	.5250	102.5	.10577	.018277	399.69
.1600	.1020	2.4029	11.69	18.54	4.68	.0041	.5256	105.7	.10643	.018404	450.55
.1400	.0824	2.4351	12.49	21.54	3.55	.0023	.5261	110.0	.10720	.018568	521.80
.1200	.0634	2.5340	13.77	26.80	2.54	.0012	.5265	116.0	.10812	.018783	633.50
.1000	.0454	2.8166	15.91	37.17	1.741	.0005	.5268	125.4	.10933	.019103	844.99
.0900	.0374	3.1359	17.41	46.15	1.458	.0003	.5269	132.5	.11012	.019340	1045.32
.0800	.0303	3.7426	18.91	58.84	1.289	.0002	.5270	142.6	.11112	.019667	1403.47
.0750	.0271	4.2609	19.33	66.54	1.248	.0002	.5270	149.6	.11174	.019843	1704.36
.0700	.0237	5.0879	19.07	74.93	1.223	.0001	.5270	159.0	.11252	.020159	2180.5
.0680	.0222	5.5930	18.61	78.49	1.211	.0001	.5271	164.0	.11292	.020294	2467.[illegible]
.0660	.0204	6.3090	17.82	82.01	1.192	.0001	.5271	170.5	.11343	.020461	2867.7
.0640	.0182	7.5001	16.45	85.65	1.162	.0001	.5271	180.2	.11416	.020687	3515.6
.0620	.0147	10.5868	13.70	89.08	1.104	.0000	.5272	201.2	.11572	.021105	5122.6
.0610	.0110	17.7788	10.35	89.96	1.050	.0000	.5272	239.6	.11854	.021699	8743.7

TABLE X.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\overline{V}_i = 1.10$, $\gamma_i = -3.489^{\circ}$, $e_i = 0.2183$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{z}{\overline{V}}$
1.1000	1.1599	0.0000011	3.489	3.308	0.0000	0.0016	0	0	0	0	0.000
1.1005	1.1604	.0000037	3.252	3.064	.0001	.0029	.0014	17.7	.02375	.001399	.000
1.1010	1.1609	.0000137	2.992	2.849	.0005	.0056	.0042	37.0	.04969	.002814	.000
1.1015	1.1614	.0000524	2.693	2.554	.0019	.0108	.0106	59.2	.07951	.004295	.001
1.10199	1.16195	.0004016	2.154	2.043	.0148	.0300	.0384	98.9	.13288	.006496	.011
1.1015	1.1615	.0012580	1.780	1.668	.0462	.0530	.0797	126.3	.16985	.007823	.034
1.1010	1.1610	.0017700	1.653	1.546	.0656	.0628	.0954	135.7	.18253	.008203	.048
1.1000	1.1600	.002622	1.494	1.417	.0966	.0762	.1259	147.6	.19846	.008640	.070
1.0980	1.1580	.004038	1.299	1.236	.1479	.0942	.1757	162.3	.21869	.009120	.110
1.0950	1.1550	.005802	1.113	1.059	.212	.1189	.2301	176.7	.23751	.009528	.159
1.0900	1.1500	.008199	.908	.861	.298	.1319	.3042	193.2	.25960	.009917	.226
1.0800	1.1400	.011765	.645	.611	.425	.1546	.4251	216.2	.29005	.010329	.327
1.0700	1.1300	.014954	.466	.442	.510	.1665	.5997	233.8	.31317	.010552	.400
1.0600	1.1200	.015981	.332	.314	.567	.1725	.6241	249.0	.33299	.010690	.452
1.0500	1.1100	.017129	.227	.215	.603	.1747	.7133	263.0	.35105	.010777	.489
1.0400	1.1000	.017826	.145	.137	.622	.1743	.7987	276.4	.38612	.010832	.514
1.0300	1.0900	.018175	.082	.077	.629	.1720	.8829	289.4	.38466	.010865	.529
1.0200	1.0800	.018267	.037	.035	.627	.1686	.9634	302.5	.40098	.010881	.537
1.0100	1.0700	.018188	.009	.009	.619	.1644	1.0436	315.6	.41728	.010887	.540
1.0000	1.0600	.018022	.000	.000	.608	.1599	1.1229	329.0	.43367	.010888	.541
.9900	1.0500	.017856	.010	.009	.597	.1555	1.2015	342.6	.45020	.010889	.541
.9800	1.0400	.017780	.039	.037	.589	.1515	1.2792	356.4	.46684	.010895	.544
.9600	1.0200	.018263	.158	.149	.594	.1464	1.4318	384.3	.49986	.010948	.571
.9400	1.0000	.02017	.350	.329	.644	.1465	1.5740	411.0	.53093	.011082	.644
.9200	.9800	.02406	.592	.556	.753	.1522	1.7041	434.8	.55800	.011302	.784
.9000	.9600	.03018	.854	.801	.927	.1620	1.8181	454.7	.58008	.011578	1.006
.8800	.9400	.03857	1.116	1.045	1.162	.1739	1.9166	470.6	.59745	.011875	1.315
.8600	.9200	.04907	1.367	1.278	1.449	.1860	2.0003	483.4	.61102	.012169	1.712
.8400	.9000	.06149	1.604	1.497	1.779	.1972	2.0727	493.7	.62172	.012445	2.196
.8200	.8800	.07564	1.829	1.704	2.14	.2070	2.1355	502.1	.63031	.012702	2.767
.8000	.8600	.09133	2.042	1.900	2.53	.2149	2.1908	509.2	.63733	.012939	3.425
.7800	.8400	.10839	2.247	2.087	2.94	.2209	2.2386	515.3	.64317	.013158	4.169
.7600	.8200	.12668	2.446	2.267	3.36	.2251	2.2811	520.5	.64810	.013360	5.001
.7400	.7999	.14608	2.639	2.441	3.79	.2274	2.3190	525.2	.65234	.013548	5.922
.7200	.7799	.16646	2.830	2.612	4.22	.2281	2.3544	529.3	.65602	.013723	6.936
.7000	.7599	.18772	3.018	2.780	4.65	.2273	2.3859	533.0	.65925	.013888	8.045
.6800	.7399	.2098	3.206	2.946	5.07	.2250	2.4137	536.4	.66211	.014044	9.255
.6600	.7199	.2325	3.394	3.111	5.48	.2215	2.4394	539.5	.66467	.014191	10.569
.6400	.6999	.2559	3.584	3.277	5.88	.2168	2.4627	542.4	.66698	.014332	11.994
.6200	.6799	.2798	3.776	3.443	6.26	.2111	2.4841	545.2	.66907	.014466	13.536
.6000	.6599	.3041	3.972	3.611	6.69	.2046	2.5037	547.7	.67098	.014595	15.204
.5800	.6399	.3288	4.172	3.784	6.96	.1972	2.5215	550.2	.67273	.014720	17.005
.5600	.6198	.3537	4.378	3.962	7.28	.1893	2.5380	552.5	.67434	.014840	18.950
.5400	.5998	.3789	4.591	4.139	7.57	.1808	2.5531	554.7	.67583	.014957	21.051
.5200	.5798	.4042	4.812	4.325	7.84	.1719	2.5669	556.8	.67721	.015071	23.320
.5000	.5598	.4295	5.043	4.509	8.08	.1626	2.5796	558.9	.67850	.015182	25.771
.4800	.5398	.4548	5.285	4.694	8.28	.1531	2.5913	560.9	.67970	.015290	28.424
.4600	.5198	.4799	5.539	4.901	8.45	.1434	2.6021	562.9	.68083	.015397	31.295
.4400	.4997	.5047	5.809	5.112	8.59	.1337	2.6119	564.8	.68189	.015503	34.410
.4200	.4797	.5291	6.095	5.324	8.70	.1239	2.6210	566.8	.68289	.015607	37.794
.4000	.4597	.5530	6.403	5.569	8.76	.1142	2.6292	568.7	.68384	.015710	41.477
.3800	.4396	.5763	6.73	5.82	8.79	.1047	2.6368	570.5	.68473	.015813	45.497
.3600	.4196	.5988	7.09	6.08	8.79	.0953	2.6437	572.4	.68558	.015916	49.897
.3400	.3996	.6202	7.48	6.36	8.74	.0862	2.6500	574.3	.68638	.016018	54.726
.3200	.3795	.6405	7.91	6.67	8.65	.0773	2.6557	576.2	.68714	.016122	60.045
.3000	.3595	.6594	8.39	7.00	8.52	.0689	2.6609	578.2	.68787	.016225	65.938
.2800	.3394	.6766	8.93	7.37	8.35	.0608	2.6656	580.1	.68856	.016331	72.488
.2600	.3193	.6917	9.54	7.75	8.14	.0531	2.6698	582.2	.68922	.016438	79.814
.2400	.2992	.7045	10.23	8.19	7.89	.0459	2.6733	584.2	.68985	.016547	88.068
.2200	.2791	.7144	11.04	8.68	7.59	.0392	2.6770	586.4	.69045	.016659	97.420
.2000	.2590	.7209	12.00	9.24	7.25	.0330	2.6800	588.7	.69102	.016775	108.135
.1800	.2388	.7232	13.16	9.88	6.87	.0273	2.6826	591.1	.69156	.016896	120.341
.1600	.2186	.7205	14.59	10.63	6.46	.0222	2.6849	593.6	.69207	.017022	133.099
.1400	.1983	.7116	16.43	11.52	5.99	.0176	2.6869	596.4	.69256	.017157	146.477
.1200	.1778	.6948	18.86	12.60	5.49	.0135	2.6886	599.4	.69302	.017302	160.[illegible]
.1000	.1572	.6679	22.29	13.97	4.95	.0100	2.6901	602.8	.69344	.017460	[illegible]
.0800	.1361	.6283	27.53	15.77	4.36	.0071	2.6913	606.7	.69383	.017640	[illegible]
.0600	.1139	.5724	36.75	18.35	3.71	.0046	2.6923	611.6	.69418	.017857	[illegible]
.0500	.1018	.5367	44.85	20.26	3.35	.0035	2.6928	614.7	.69434	.017992	[illegible]
.0450	.0950	.5217	50.85	21.54	3.14	.0029	2.6930	616.6	.69442	.018073	[illegible]
.0400	.0874	.5076	59.48	23.22	2.91	.0024	2.6930	618.9	.69449	.018174	[illegible]
.0380	.0838	.5047	64.31	24.12	2.80	.0021	2.6933	620.1	.69451	.018224	[illegible]
.0360	.0795	.5061	70.73	25.30	2.67	.0019	2.6934	621.7	.69454	.018287	421.71
.0350	.0769	.5104	75.05	26.10	2.59	.0017	2.6935	622.5	.69455	.018324	437.51
.0340	.0734	.5215	81.07	27.23	2.48	.0016	2.6936	624.0	.69456	.018384	460.10
.0333	.0691	.5456	88.98	28.79	2.35	.0013	2.6937	625.8	.69457	.018458	491.55

TABLE X.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\bar{V}_{\gamma=0}=1.0$; $\bar{u}_a = -0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\bar{V}_i = 1.20$, $\gamma_i = -4.825^{\circ}$, $e_i = 0.4464$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\gamma$ deg	$-\frac{a_r}{g}$	$\bar{\eta}$	$\bar{\xi}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\frac{\beta r}{\bar{V}}}\frac{1}{\bar{V}}$
1.2000	1.2550	0.0000012	4.825	4.594	0.0000	0.0020	0	0	0	0	0.000
1.2005	1.2603	.0000084	4.353	4.146	.0003	.0053	.0023	18.4	.02691	.002160	.000
1.2010	1.2609	.0000654	3.791	3.611	.0026	.0148	.0094	40.3	.05895	.004441	.000
1.20126	1.26117	.0003936	3.219	3.069	.0156	.0363	.0294	62.5	.09150	.006383	.010
1.2010	1.2609	.0011563	2.819	2.685	.0459	.0622	.0571	78.0	.11423	.007633	.024
1.2000	1.2600	.002666	2.466	2.348	.1058	.0943	.0961	91.8	.13437	.008562	.047
1.1980	1.2580	.005022	2.161	2.055	.1990	.1289	.1447	103.7	.15182	.009268	.120
1.1950	1.2550	.008007	1.908	1.811	.317	.1618	.1961	113.7	.16650	.009789	.261
1.1900	1.2500	.012255	1.646	1.563	.488	.1982	.2678	124.3	.18190	.010266	.355
1.1800	1.2400	.019189	1.323	1.259	.750	.2431	.3771	137.8	.20150	.010774	.455
1.1700	1.2300	.02477	1.105	1.051	.961	.2708	.4685	147.5	.21535	.011067	.535
1.1600	1.2200	.02938	.935	.890	1.131	.2890	.5493	155.3	.22654	.011266	.710
1.1500	1.2100	.03322	.798	.759	1.269	.3011	.6234	162.2	.23619	.011412	.867
1.1400	1.2000	.03641	.680	.647	1.380	.3088	.6927	168.4	.24486	.011524	.958
1.1300	1.1900	.03906	.578	.549	1.468	.3133	.7584	174.1	.25285	.011612	1.037
1.1200	1.1800	.04122	.488	.463	1.537	.3152	.8212	179.6	.26034	.011681	1.104
1.1100	1.1700	.04295	.408	.387	1.589	.3151	.8814	184.8	.26748	.011737	1.161
1.1000	1.1600	.04431	.337	.320	1.626	.3133	.9405	189.9	.27436	.011782	1.209
1.0800	1.1400	.04607	.217	.206	1.663	.3060	1.0535	199.8	.28760	.011845	1.280
1.0600	1.1200	.04679	.124	.118	1.661	.2952	1.1620	209.7	.30047	.011883	1.324
1.0400	1.1000	.04672	.056	.053	1.631	.2821	1.2676	219.6	.31322	.011903	1.349
1.0200	1.0800	.04613	.014	.014	1.583	.2679	1.3698	229.8	.32603	.011910	1.357
1.0000	1.0600	.04527	.000	.000	1.526	.2534	1.4704	240.3	.33903	.011911	1.358
.9800	1.0400	.04441	.016	.015	1.471	.2395	1.5691	251.2	.35225	.011912	1.359
.9600	1.0200	.04395	.064	.060	1.426	.2268	1.6657	262.5	.36566	.011921	1.371
.9400	1.0000	.04388	.148	.139	1.400	.2161	1.7594	274.1	.37914	.011945	1.401
.9200	.9800	.04482	.267	.251	1.404	.2077	1.8500	285.9	.39245	.011992	1.451
.9000	.9600	.04696	.420	.394	1.443	.2021	1.9370	297.4	.40530	.012069	1.566
.8800	.9400	.05056	.603	.564	1.523	.1991	2.0191	308.5	.41738	.012176	1.725
.8600	.9200	.05582	.807	.754	1.648	.1984	2.0944	318.9	.42844	.012311	1.947
.8400	.9000	.06284	1.026	.951	1.818	.1994	2.1643	328.4	.43834	.012469	2.244
.8200	.8800	.07167	1.253	1.147	2.03	.2015	2.2273	337.0	.44705	.012642	2.622
.8000	.8600	.08227	1.483	1.337	2.28	.2040	2.2843	344.7	.45464	.012823	3.084
.7800	.8400	.09461	1.713	1.520	2.57	.2064	2.3356	351.5	.46122	.013006	3.639
.7600	.8200	.10857	1.940	1.694	2.88	.2084	2.3817	357.6	.46693	.013188	4.287
.7400	.8000	.12406	2.166	2.064	3.22	.2096	2.4233	363.0	.47190	.013366	5.028
.7200	.7800	.14096	2.388	2.204	3.57	.2099	2.4607	367.9	.47624	.013538	5.874
.7000	.7599	.15917	2.609	2.403	3.94	.2093	2.4941	372.2	.48005	.013704	6.822
.6800	.7399	.17857	2.827	2.598	4.31	.2076	2.5235	376.3	.48343	.013864	7.876
.6600	.7199	.19907	3.046	2.790	4.69	.2049	2.5524	379.9	.48643	.014018	9.048
.6400	.6999	.2205	3.264	2.980	5.06	.2013	2.5782	383.3	.48911	.014166	10.338
.6200	.6799	.2429	3.484	3.177	5.43	.1967	2.6011	386.5	.49153	.014309	11.754
.6000	.6599	.2660	3.707	3.370	5.79	.1913	2.6221	389.4	.49372	.014446	13.302
.5800	.6399	.2899	3.932	3.564	6.14	.1852	2.6410	392.2	.49572	.014579	14.994
.5600	.6199	.3143	4.163	3.760	6.47	.1784	2.6587	394.8	.49754	.014708	16.836
.5400	.5998	.3391	4.399	3.959	6.78	.1710	2.6747	397.3	.49921	.014833	18.843
.5200	.5798	.3644	4.643	4.163	7.07	.1632	2.6896	399.7	.50075	.014955	20.755
.5000	.5598	.3900	4.895	4.371	7.33	.1549	2.7027	402.0	.50218	.015074	23.400
.4800	.5398	.4157	5.157	4.583	7.57	.1464	2.7150	404.2	.50350	.015190	26.983
.4600	.5198	.4415	5.432	4.804	7.78	.1376	2.7266	406.3	.50473	.015304	29.794
.4400	.4997	.4672	5.722	5.036	7.96	.1286	2.7364	408.4	.50588	.015417	31.857
.4200	.4797	.4928	6.028	5.279	8.10	.1196	2.7455	410.5	.50696	.015528	35.199
.4000	.4597	.5180	6.354	5.538	8.21	.1105	2.7544	412.5	.50797	.015637	38.853
.3800	.4397	.5428	6.70	5.79	8.28	.1016	2.7622	414.5	.50893	.015746	42.852
.3600	.4196	.5669	7.08	6.07	8.32	.0927	2.7693	416.5	.50982	.015854	47.238
.3400	.3996	.5901	7.49	6.37	8.31	.0840	2.7755	418.5	.51067	.015963	52.071
.3200	.3795	.6123	7.94	6.69	8.27	.0756	2.7811	420.5	.51147	.016071	57.405
.3000	.3595	.6332	8.43	7.03	8.18	.0675	2.7863	422.6	.51223	.016180	63.324
.2800	.3394	.6526	8.99	7.41	8.05	.0597	2.7917	424.6	.51295	.016290	69.918
.2600	.3193	.6700	9.61	7.81	7.88	.0523	2.7960	426.7	.51363	.016402	77.304
.2400	.2992	.6850	10.33	8.28	7.67	.0453	2.7997	428.9	.51428	.016515	85.689
.2200	.2791	.6973	11.16	8.77	7.40	.0387	2.8033	431.1	.51489	.016632	95.088
.2000	.2590	.7062	12.13	9.3	7.10	.0326	2.8063	433.4	.51548	.016752	105.927
.1800	.2388	.7109	13.31	10.00	6.76	.0271	2.8090	435.8	.51603	.016876	114.488
.1600	.2186	.7106	14.77	10.76	6.36	.0220	2.8113	438.4	.51655	.017007	133.236
.1400	.1982	.7039	16.62	11.66	5.93	.0175	2.8133	441.2	.51704	.017144	150.846
.1200	.1778	.6894	19.09	12.79	5.45	.0135	2.8150	444.3	.51750	.017293	172.344
.1000	.1571	.6647	22.55	14.13	4.92	.0100	2.8165	447.7	.51793	.017455	199.401
.0800	.1360	.6269	27.84	15.95	4.35	.0070	2.8177	451.6	.51833	.017638	233.09
.0600	.1139	.5728	37.13	18.55	3.71	.0046	2.8187	456.5	.51868	.017857	275.42
.0500	.1016	.5400	45.30	20.45	3.34	.0035	2.8195	459.7	.51884	.017994	323.98
.0450	.0949	.5235	51.35	21.7	3.14	.0029	2.8199	461.6	.51891	.018076	343.99
.0400	.0871	.5101	60.10	23.45	2.90	.0024	2.8197	464.0	.51898	.018179	372.60
.0380	.0835	.5077	65.01	24.35	2.79	.0021	2.8198	465.2	.51901	.018230	400.79
.0360	.0791	.5099	71.58	25.57	2.66	.0019	2.8199	466.7	.51903	.018295	424.91
.0350	.0764	.5131	76.07	26.40	2.58	.0017	2.8199	467.8	.51905	.018338	441.55
.0340	.0727	.5284	82.54	27.68	2.46	.0015	2.8200	469.2	.51906	.018398	466.24
.0335	.0696	.5464	88.27	28.7	2.37	.0014	2.8200	470.5	.51906	.018452	489.34

TABLE X.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\overline{V}_i = 1.30$, $\gamma_i = -5.707^{\circ}$, $e_i = 0.6937$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{u_r}{g}$	$\overline{q}$	$\overline{\xi}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\psi}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.30000	1.3509	0.0000013	5.707	5.454	0.0001	0.0025	0	0	0	0	0.000
1.3302	1.3600	.0000060	5.296	5.0[illegible]	.0005	.0054	.0016	11.1	.01759	.001694	.000
1.3004	1.3602	.0000292	4.830	4.6[illegible]	.0012	.0119	.0054	23.7	.03750	.003458	.001
1.30058	1.36043	.0002589	4.103	3.9[illegible]	.0110	.0355	.0211	43.3	.06851	.005856	.006
1.3005	1.3604	.0006189	3.774	3.6[illegible]	.0264	.0549	.0355	52.1	.08259	.006850	.014
1.3000	1.3599	.0016858	3.355	3.207	.0719	.0906	.0632	63.4	.10048	.007964	.039
1.2980	1.3579	.004813	2.852	2.726	.205	.1525	.1240	76.9	.12201	.009132	.111
1.2950	1.3549	.008734	2.524	2.412	.371	.2043	.1832	85.9	.13617	.009796	.202
1.2900	1.3500	.014398	2.213	2.114	.610	.2599	.2540	94.5	.14971	.010356	.334
1.2800	1.3400	.02394	1.847	1.76[illegible]	1.008	.3291	.3675	104.8	.16591	.010930	.561
1.2600	1.3200	.03893	1.421	1.357	1.615	.4043	.5376	117.4	.18547	.011487	.927
1.2400	1.3000	.05039	1.141	1.088	2.06	.4429	.6765	126.3	.19910	.011792	1.219
1.2200	1.2800	.05931	.927	.883	2.39	.4624	.7988	133.7	.21015	.011991	1.459
1.2000	1.2600	.06624	.752	.716	2.63	.4700	.9104	140.2	.21979	.012132	1.656
1.1800	1.2400	.07151	.605	.576	2.80	.4694	1.0144	146.2	.22857	.012236	1.818
1.1600	1.2200	.07538	.479	.455	2.90	.4629	1.1124	151.9	.23678	.012313	1.949
1.1400	1.2000	.07804	.369	.351	2.96	.4521	1.2064	157.5	.24463	.012371	2.054
1.1200	1.1800	.07968	.275	.261	2.97	.4382	1.2969	163.0	.25225	.012414	2.134
1.1000	1.1600	.08044	.194	.184	2.95	.4221	1.3836	168.6	.25974	.012445	2.194
1.0800	1.1400	.08046	.127	.120	2.90	.4044	1.4683	174.1	.26718	.012465	2.235
1.0600	1.1200	.07989	.073	.069	2.84	.3857	1.5548	179.8	.27463	.012478	2.261
1.0400	1.1000	.07887	.033	.031	2.75	.3665	1.6316	185.7	.28215	.012485	2.275
1.0200	1.0800	.07753	.008	.008	2.66	.3473	1.7107	191.7	.28976	.012488	2.280
1.0000	1.0600	.07603	.000	.000	2.56	.3284	1.7883	198.0	.29749	.012488	2.280
.9800	1.0400	.07458	.009	.009	2.47	.3103	1.8644	204.5	.30536	.012488	2.283
.9600	1.0200	.07326	.038	.036	2.38	.2932	1.9391	211.3	.31336	.012491	2.290
.9400	1.0000	.07230	.088	.083	2.31	.2773	2.0121	218.2	.32147	.012500	2.308
.9200	.9800	.07189	.162	.155	2.25	.2631	2.0833	225.4	.32964	.012518	2.344
.9000	.9600	.07223	.259	.243	2.22	.2506	2.1523	232.8	.33780	.012547	2.408
.8800	.9400	.07352	.381	.356	2.21	.2401	2.2189	240.2	.34585	.012592	2.506
.8600	.9200	.07595	.526	.491	2.24	.2314	2.2826	247.5	.35368	.012654	2.649
.8400	.9000	.07969	.692	.644	2.31	.2245	2.3429	254.7	.36119	.012733	2.846
.8200	.8800	.08486	.876	.817	2.40	.2192	2.3997	261.7	.36828	.012830	3.105
.8000	.8600	.09158	1.076	1.001	2.54	.2152	2.4527	268.4	.37487	.012942	3.434
.7800	.8400	.09989	1.287	1.195	2.71	.2121	2.5019	274.7	.38093	.013067	3.842
.7600	.8200	.10983	1.506	1.396	2.92	.2096	2.5472	280.5	.38645	.013201	4.335
.7400	.8000	.12138	1.732	1.602	3.15	.2073	2.5886	286.0	.39143	.013342	4.921
.7200	.7800	.13450	1.961	1.810	3.41	.2051	2.6260	291.0	.39592	.013486	5.604
.7000	.7600	.14914	2.193	2.020	3.69	.2026	2.6610	295.6	.39995	.013632	6.392
.6800	.7400	.16521	2.426	2.230	3.99	.1997	2.6931	299.9	.40358	.013778	7.289
.6600	.7199	.18264	2.662	2.440	4.30	.1963	2.7222	303.9	.40683	.013923	8.302
.6400	.6999	.2013	2.899	2.650	4.62	.1923	2.7485	307.6	.40977	.014065	9.438
.6200	.6799	.2212	3.138	2.861	4.95	.1878	2.7722	311.1	.41242	.014205	10.704
.6000	.6599	.2422	3.380	3.073	5.27	.1826	2.7946	314.3	.41483	.014342	12.108
.5800	.6399	.2641	3.626	3.286	5.59	.1768	2.8146	317.3	.41702	.014476	13.659
.5600	.6199	.2869	3.877	3.502	5.90	.1705	2.8329	320.2	.41902	.014607	15.367
.5400	.5999	.3104	4.133	3.720	6.21	.1636	2.8497	323.0	.42085	.014735	17.245
.5200	.5798	.3346	4.396	3.942	6.49	.1564	2.8649	325.6	.42253	.014860	19.305
.5000	.5598	.3594	4.668	4.168	6.76	.1487	2.8785	328.1	.42408	.014983	21.562
.4800	.5398	.3846	4.950	4.400	7.00	.1408	2.8917	330.5	.42552	.015104	24.035
.4600	.5198	.4101	5.243	4.639	7.23	.1326	2.9033	332.8	.42685	.015223	26.743
.4400	.4998	.4357	5.551	4.886	7.42	.1242	2.9140	335.0	.42809	.015339	29.709
.4200	.4797	.4615	5.876	5.142	7.59	.1157	2.9237	337.2	.42924	.015455	32.961
.4000	.4597	.4871	6.220	5.410	7.72	.1072	2.9325	339.4	.43032	.015569	36.531
.3800	.4397	.5124	6.59	5.69	7.82	.0987	2.9404	341.5	.43133	.015682	40.455
.3600	.4196	.5373	6.98	5.98	7.88	.0903	2.9473	343.7	.43228	.015795	44.778
.3400	.3996	.5616	7.41	6.30	7.91	.0820	2.9545	345.8	.43317	.015908	49.553
.3200	.3795	.5850	7.88	6.63	7.90	.0739	2.9606	347.9	.43401	.016021	54.844
.3000	.3595	.6073	8.39	6.99	7.85	.0661	2.9660	350.0	.43480	.016134	60.727
.2800	.3394	.6281	8.96	7.38	7.75	.0586	2.9709	352.1	.43555	.016248	67.298
.2600	.3193	.6472	9.61	7.81	7.61	.0514	2.9752	354.3	.43626	.016364	74.676
.2400	.2992	.6641	10.34	8.28	7.43	.0446	2.9791	356.5	.43693	.016481	83.011
.2200	.2791	.6783	11.19	8.80	7.21	.0382	2.9825	358.8	.43756	.016601	92.496
.2000	.2590	.6892	12.19	9.38	6.93	.0322	2.9857	361.2	.43816	.016725	103.386
.1800	.2388	.6961	13.39	10.05	6.61	.0268	2.9884	363.7	.43873	.016853	116.020
.1600	.2185	.6980	14.87	10.83	6.25	.0218	2.9907	366.3	.43926	.016987	130.874
.1400	.1982	.6936	16.75	11.74	5.84	.0173	2.9925	369.2	.43976	.017128	148.631
.1200	.1778	.6813	19.24	12.86	5.38	.0134	2.9945	372.3	.44023	.017280	170.327
.1000	.1571	.6589	22.74	14.25	4.88	.0099	2.9960	375.7	.44066	.017445	197.657
.0800	.1359	.6233	28.08	16.08	4.32	.0070	2.9972	379.7	.44106	.017631	233.73
.0600	.1136	.5714	37.45	18.72	3.69	.0045	2.9982	384.6	.44141	.017854	285.68
.0500	.1014	.5396	45.69	20.65	3.33	.0034	2.9987	387.8	.44157	.017993	323.70
.0450	.0947	.5238	51.81	21.94	3.13	.0029	2.9989	389.7	.44165	.018077	349.19
.0400	.0869	.5113	60.68	23.60	2.90	.0024	2.9991	392.2	.44172	.018181	383.50
.0380	.0832	.5094	65.69	24.60	2.78	.0021	2.9990	393.4	.44174	.018234	408.19
.0360	.0787	.5127	72.44	25.84	2.65	.0018	2.9994	395.0	.44177	.018302	427.76
.0350	.0759	.5190	77.13	26.72	2.56	.0017	2.9994	396.1	.44178	.018346	444.87
.0340	.0719	.5353	84.18	28.06	2.44	.0015	2.9995	397.7	.44179	.018413	472.33
.0336	.0690	.5540	89.59	29.15	2.35	.0013	2.9996	398.9	.44180	.018464	494.65

TABLE X.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\overline{V}_i = \sqrt{2}$, $\gamma_i = -6.429^{\circ}$, $e_i = 1.0000$

$\overline{V}$	$\overline{V}_y$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{q}$	t sec	$\frac{\lambda_e}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{z}{V}$
1.414214	1.4739	0.0000014	6.429	6.168	0.0001	0.0032	0	0	0	0	0.000
1.41421	1.4739	.0000124	5.781	5.546	.0006	.0095	.0028	13.2	.02263	.002421	.000
1.41420	1.4739	.0000384	5.413	5.193	.0018	.0167	.0063	20.7	.03547	.003679	.001
1.41415	1.4739	.0001625	4.905	4.705	.0075	.0343	.0156	30.9	.05323	.005482	.003
1.41410	1.4739	.0002780	4.701	4.510	.0128	.0449	.0216	36.1	.06033	.005879	.007
1.4140	1.4739	.0004984	4.469	4.288	.0230	.0601	.0306	39.8	.06842	.006528	.011
1.4135	1.4734	.0015074	3.993	3.831	.0695	.1045	.0591	49.4	.08505	.007758	.032
1.4130	1.4729	.002440	3.768	3.614	.1124	.1328	.0789	54.0	.09294	.008294	.052
1.4120	1.4719	.004183	3.498	3.355	.1925	.1736	.1096	59.5	.10239	.008893	.089
1.4110	1.4709	.005820	3.322	3.186	.268	.2044	.1344	63.1	.10956	.009261	.124
1.4100	1.4699	.007384	3.186	3.059	.339	.2298	.1560	65.8	.11323	.009526	.157
1.4050	1.4649	.014481	2.780	2.666	.664	.3392	.2401	74.2	.12760	.010279	.309
1.4000	1.4599	.02080	2.533	2.429	.950	.3793	.3056	79.3	.13642	.010685	.447
1.3900	1.4500	.03197	2.207	2.116	1.451	.4423	.4118	84.2	.14815	.011170	.690
1.3800	1.4400	.04175	1.979	1.897	1.882	.5393	.5005	91.1	.15648	.011475	.906
1.3600	1.4200	.05838	1.651	1.582	2.60	.5932	.6504	98.4	.16876	.011964	1.288
1.3400	1.4000	.07206	1.410	1.349	3.16	.6363	.7788	104.1	.17914	.012114	1.613
1.3200	1.3800	.08345	1.215	1.162	3.51	.6708	.8938	108.9	.18999	.012294	1.897
1.3000	1.3600	.09293	1.050	1.004	3.97	.6725	.9995	113.2	.19290	.012431	2.145
1.2800	1.3400	.10078	.907	.867	4.24	.6751	1.0981	117.2	.19918	.012538	2.362
1.2600	1.3200	.10719	.781	.745	4.45	.6708	1.1910	121.0	.20503	.012624	2.552
1.2400	1.3000	.11233	.667	.636	4.59	.6612	1.2795	124.6	.21055	.012694	2.719
1.2200	1.2800	.11633	.565	.538	4.69	.6476	1.3641	128.1	.21586	.012751	2.860
1.2000	1.2600	.11930	.472	.449	4.74	.6307	1.4456	131.6	.22099	.012797	2.982
1.1800	1.2400	.12135	.387	.369	4.74	.6114	1.5242	135.1	.22601	.012835	3.085
1.1600	1.2200	.12257	.311	.296	4.72	.5903	1.6004	138.5	.23096	.012865	3.170
1.1400	1.2000	.12305	.243	.231	4.66	.5677	1.6745	142.0	.23586	.012888	3.238
1.1200	1.1800	.12288	.183	.173	4.58	.5442	1.7466	145.5	.24075	.012906	3.291
1.1000	1.1600	.12214	.130	.123	4.48	.5201	1.8171	149.2	.24565	.012926	3.331
1.0800	1.1400	.12091	.085	.081	4.37	.4957	1.8859	152.9	.25057	.012929	3.359
1.0600	1.1200	.11929	.049	.047	4.24	.4713	1.9534	156.7	.25555	.012935	3.378
1.0400	1.1000	.11737	.023	.021	4.10	.4471	2.0195	160.6	.26059	.012938	3.389
1.0200	1.0800	.11523	.006	.006	3.95	.4234	2.0844	164.7	.26571	.012939	3.399
1.0000	1.0600	.11299	.000	.000	3.81	.4004	2.1481	168.9	.27091	.012939	3.399
.9800	1.0400	.11075	.006	.006	3.67	.3782	2.2105	173.3	.27621	.012939	3.399
.9600	1.0200	.10863	.027	.024	3.53	.3570	2.2718	177.8	.28160	.012943	3.397
.9400	1.0000	.10675	.060	.055	3.41	.3370	2.3318	182.5	.28708	.012945	3.407
.9200	.9800	.10524	.110	.103	3.30	.3183	2.3905	187.4	.29263	.012953	3.432
.9000	.9600	.10424	.177	.165	3.20	.3011	2.4477	192.5	.29824	.012966	3.475
.8800	.9400	.10390	.262	.245	3.13	.2854	2.5033	197.6	.30387	.012986	3.542
.8600	.9200	.10437	.365	.342	3.08	.2713	2.5572	202.9	.30948	.013018	3.641
.8400	.9000	.10579	.488	.456	3.06	.2587	2.6090	208.3	.31503	.013060	3.778
.8200	.8800	.10830	.630	.587	3.07	.2477	2.6587	213.6	.32046	.013112	3.962
.8000	.8600	.11203	.789	.734	3.11	.2380	2.7061	218.9	.32573	.013177	4.203
.7800	.8400	.11707	.965	.896	3.18	.2296	2.7509	224.2	.33078	.013254	4.503
.7600	.8200	.12353	1.155	1.071	3.28	.2223	2.7931	229.3	.33557	.013343	4.871
.7400	.8000	.13146	1.359	1.257	3.41	.2158	2.8326	234.2	.34008	.013442	5.330
.7200	.7800	.14090	1.573	1.452	3.57	.2099	2.8694	238.9	.34429	.013549	5.871
.7000	.7600	.15187	1.796	1.655	3.76	.2044	2.9035	243.4	.34819	.013664	6.509
.6800	.7400	.16434	2.027	1.863	3.97	.1992	2.9351	247.7	.35178	.013784	7.250
.6600	.7200	.17829	2.265	2.076	4.20	.1940	2.9642	251.7	.35509	.013907	8.104
.6400	.7000	.19367	2.508	2.294	4.45	.1886	2.9910	255.5	.35811	.014034	9.078
.6200	.6799	.2104	2.757	2.514	4.71	.1831	3.0156	259.1	.36089	.014161	10.181
.6000	.6599	.2285	3.011	2.738	4.98	.1773	3.0381	262.5	.36343	.014289	11.423
.5800	.6399	.2477	3.271	2.964	5.25	.1713	3.0588	265.7	.36575	.014417	12.813
.5600	.6199	.2681	3.536	3.194	5.52	.1648	3.0777	268.8	.36789	.014543	14.360
.5400	.5999	.2895	3.809	3.428	5.79	.1581	3.0950	271.7	.36985	.014669	16.084
.5200	.5799	.3119	4.089	3.666	6.05	.1510	3.1108	274.5	.37166	.014794	17.992
.5000	.5599	.3350	4.378	3.909	6.30	.1436	3.1253	277.2	.37332	.014917	20.100
.4800	.5399	.3589	4.677	4.158	6.54	.1360	3.1385	279.8	.37486	.015039	22.429
.4600	.5198	.3833	4.989	4.413	6.75	.1282	3.1506	282.3	.37629	.015159	24.997
.4400	.4998	.4082	5.314	4.677	6.95	.1202	3.1616	284.7	.37761	.015278	27.829
.4200	.4798	.4333	5.657	4.953	7.12	.1122	3.1716	287.0	.37884	.015396	30.953
.4000	.4597	.4587	6.020	5.235	7.27	.1040	3.1807	289.3	.37999	.015514	34.400
.3800	.4397	.4840	6.41	5.53	7.39	.0959	3.1890	291.6	.38106	.015630	38.209
.3600	.4197	.5091	6.82	5.85	7.47	.0879	3.1966	293.8	.38206	.015747	42.424
.3400	.3997	.5338	7.26	6.18	7.52	.0800	3.2034	296.1	.38301	.015863	47.098
.3200	.3797	.5579	7.75	6.53	7.53	.0722	3.2095	298.3	.38389	.015979	52.294
.3000	.3595	.5810	8.28	6.91	7.51	.0647	3.2151	300.5	.38472	.016095	58.101
.2800	.3394	.6030	8.88	7.31	7.44	.0574	3.2201	302.7	.38550	.016214	64.603
.2600	.3193	.6234	9.54	7.75	7.33	.0504	3.2245	305.0	.38624	.016333	71.925
.2400	.2992	.6417	10.29	8.24	7.18	.0438	3.2285	307.3	.38693	.016455	80.219
.2200	.2791	.6577	11.16	8.78	6.99	.0376	3.2321	309.7	.38759	.016578	89.680
.2000	.2590	.6704	12.19	9.38	6.74	.0318	3.2352	312.1	.38821	.016706	100.561
.1800	.2388	.6793	13.41	10.07	6.46	.0265	3.2379	314.7	.38879	.016837	113.222
.1600	.2185	.6834	14.92	10.86	6.12	.0216	3.2403	317.4	.38933	.016975	128.129
.1400	.1982	.6812	16.83	11.80	5.73	.0172	3.2423	320.3	.38984	.017120	145.977
.1200	.1777	.6713	19.36	12.93	5.30	.0133	3.2441	323.4	.39032	.017275	167.818
.1000	.1570	.6512	22.90	14.35	4.82	.0099	3.2456	327.0	.39076	.017444	195.365
.0800	.1359	.6181	28.29	16.20	4.28	.0070	3.2468	331.0	.39116	.017633	231.78
.0600	.1136	.5686	37.74	18.87	3.67	.0045	3.2479	335.0	.39152	.017860	284.31
.0500	.1013	.5382	46.07	20.82	3.31	.0034	3.2483	339.2	.39168	.018002	322.91
.0450	.0946	.5231	52.26	22.12	3.11	.0029	3.2485	341.1	.39175	.018087	348.76
.0400	.0867	.5118	61.26	23.88	2.88	.0023	3.2488	343.6	.39182	.018194	383.81
.0380	.0829	.5105	66.37	24.83	2.77	.0021	3.2489	344.9	.39185	.018246	403.06
.0360	.0783	.5150	73.33	26.12	2.63	.0018	3.2490	346.5	.39187	.018316	429.17
.0350	.0754	.5226	78.26	27.05	2.54	.0017	3.2491	347.6	.39189	.018366	447.95
.0340	.0709	.5433	91.16	28.58	2.41	.0014	3.2492	349.4	.39190	.018441	479.39

TABLE X.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\overline{V}_i = \sqrt{3}$, $\gamma_i = -7.639^{\circ}$, $e_i = 1.9867$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\beta r}{g}$	$\overline{q}$	$\overline{\omega}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\frac{z}{\overline{V}}$
1.73205	1.7915	0.0000017	7.639	7.384	0.0001	0.0058	0	0	0	0	0.000
1.7310	1.7906	.0000435	6.533	6.314	.0024	.0888	.0074	13.2	.02898	.003603	.001
1.7300	1.7897	.0005623	5.503	5.319	.0312	.1034	.0353	[illegible]	.05596	.004447	.010
1.7280	1.7875	.003877	4.575	4.421	.215	.2707	.1101	38.2	.08031	.008594	.067
1.7250	1.7844	.009546	4.069	3.932	.529	.4230	.1894	44.[illegible]	.09361	.009599	.166
1.7200	1.7799	.018494	3.653	3.530	1.022	.5847	.2851	49.7	.10454	.010337	.325
1.7150	1.7749	.02682	3.398	3.283	1.478	.6993	.3609	52.[illegible]	.11130	.010753	.469
1.7100	1.7699	.03467	3.210	3.101	1.905	.7894	.4261	55.4	.11629	.011041	.606
1.7000	1.7599	.04922	2.933	2.833	2.69	.9276	.5377	58.3	.12368	.011437	.866
1.6800	1.7399	.07500	2.560	2.472	4.05	1.1130	.7197	63.7	.13371	.011918	1.339
1.6600	1.7200	.09751	2.297	2.217	5.21	1.2332	.8716	67.5	.14090	.012223	1.762
1.6400	1.7000	.11750	2.089	2.015	6.21	1.3150	1.0053	70.1	.14666	.012444	2.147
1.6200	1.6800	.13539	1.915	1.846	7.08	1.3707	1.1264	72.6	.15156	.012615	2.507
1.6000	1.6600	.15146	1.764	1.700	7.83	1.4073	1.2382	74.8	.15587	.012754	2.840
1.5500	1.6100	.18497	1.452	1.398	9.28	1.4416	1.4880	79.5	.16504	.013013	3.580
1.5000	1.5600	.2105	1.199	1.153	10.24	1.4221	1.7078	83.7	.17283	.013191	4.209
1.4500	1.5100	.2293	.984	.945	10.82	1.3992	1.9064	87.4	.17981	.013324	4.744
1.4000	1.4600	.2424	.797	.764	11.07	1.2951	2.0888	91.3	.18631	.013425	5.192
1.3500	1.4100	.2506	.630	.603	11.07	1.2077	2.2582	95.0	.19251	.013502	5.568
1.3000	1.3600	.2543	.482	.461	10.86	1.1126	2.4167	98.7	.19854	.013560	5.864
1.2500	1.3100	.2543	.352	.335	10.47	1.0139	2.5662	102.6	.20451	.013603	6.104
1.2000	1.2600	.2509	.238	.226	9.96	.9147	2.7076	106.6	.21050	.013634	6.273
1.1800	1.2400	.2488	.197	.188	9.73	.8755	2.7622	108.[illegible]	.21292	.013643	6.325
1.1600	1.2200	.2462	.160	.152	9.48	.8366	2.8156	109.9	.21536	.013651	6.368
1.1400	1.2000	.2433	.125	.119	9.22	.7983	2.8681	111.2	.21782	.013657	6.403
1.1200	1.1800	.2401	.095	.090	8.95	.7607	2.9196	112.5	.22031	.013662	6.431
1.1000	1.1600	.2366	.068	.064	8.68	.7238	2.9701	113.9	.22282	.013665	6.452
1.0800	1.1400	.2328	.045	.042	8.40	.6878	3.0196	117.[illegible]	.22538	.013668	6.469
1.0600	1.1200	.2288	.026	.024	8.12	.6527	3.0683	119.[illegible]	.22797	.013669	6.479
1.0400	1.1000	.2246	.012	.011	7.84	.6186	3.1161	121.3	.23060	.013670	6.480
1.0200	1.0800	.2204	.003	.003	7.56	.5856	3.1630	123.4	.23327	.013671	6.482
1.0000	1.0600	.2161	.000	.000	7.28	.5536	3.2090	125.6	.23599	.013671	6.482
.9800	1.0400	.2118	.003	.003	7.01	.5229	3.2542	127.9	.23876	.013671	6.483
.9600	1.0200	.2075	.013	.013	6.75	.4934	3.2985	130.3	.24158	.013671	6.485
.9400	1.0000	.2034	.031	.029	6.49	.4652	3.3419	132.7	.24445	.013673	6.491
.9200	.9800	.19946	.058	.054	6.25	.4382	3.3845	135.3	.24737	.013675	6.504
.9000	.9600	.19580	.093	.087	6.02	.4127	3.4261	138.0	.25034	.013679	6.527
.8800	.9400	.19250	.139	.130	5.80	.3885	3.4668	140.8	.25336	.013685	6.562
.8600	.9200	.18962	.195	.182	5.60	.3657	3.5065	143.6	.25641	.013694	6.612
.8400	.9000	.18728	.263	.245	5.42	.3442	3.5452	146.6	.25950	.013706	6.688
.8200	.8800	.18555	.344	.321	5.26	.3242	3.5828	149.7	.26262	.013722	6.798
.8000	.8600	.18453	.439	.408	5.12	.3055	3.6192	152.8	.26574	.013744	6.920
.7800	.8400	.18432	.548	.509	5.00	.2881	3.5545	156.1	.26887	.013770	7.089
.7600	.8200	.18502	.672	.622	4.91	.2720	3.6884	159.4	.27198	.013804	7.303
.7400	.8000	.18671	.810	.750	4.84	.2572	3.7210	162.7	.27506	.013843	7.570
.7200	.7800	.18951	.965	.891	4.80	.2435	3.7522	166.1	.27810	.013890	7.892
.7000	.7600	.19347	1.134	1.045	4.79	.2308	3.7820	169.6	.28107	.013945	8.292
.6800	.7400	.19869	1.319	1.212	4.80	.2190	3.8102	173.0	.28396	.014006	8.766
.6600	.7200	.2052	1.519	1.393	4.84	.2081	3.8369	176.4	.28675	.014075	9.328
.6400	.7000	.2131	1.734	1.585	4.89	.1979	3.8621	179.8	.28944	.014152	9.990
.6200	.6800	.2224	1.962	1.789	4.98	.1883	3.8857	183.1	.29200	.014234	10.762
.6000	.6600	.2331	2.205	2.004	5.08	.1792	3.9078	186.4	.29444	.014323	11.657
.5800	.6400	.2453	2.460	2.229	5.20	.1704	3.9283	189.6	.29675	.014417	12.686
.5600	.6199	.2588	2.728	2.464	5.33	.1620	3.9474	192.7	.29893	.014516	13.865
.5400	.5999	.2737	3.010	2.709	5.47	.1537	3.9651	195.8	.30099	.014618	15.207
.5200	.5799	.2900	3.304	2.962	5.63	.1456	3.9814	198.8	.30291	.014724	16.730
.5000	.5599	.3075	3.612	3.225	5.78	.1377	3.9965	201.8	.30471	.014833	18.450
.4800	.5399	.3262	3.934	3.498	5.94	.1297	4.0103	204.5	.30640	.014944	20.389
.4600	.5199	.3461	4.273	3.780	6.10	.1219	4.0230	207.2	.30797	.015057	22.569
.4400	.4998	.3669	4.628	4.073	6.25	.1140	4.0345	209.9	.30944	.015171	25.014
.4200	.4798	.3886	5.002	4.377	6.39	.1062	4.0451	212.5	.31081	.015287	27.755
.4000	.4598	.4110	5.399	4.695	6.52	.0985	4.0548	215.1	.31209	.015404	30.826
.3800	.4397	.4340	5.82	5.03	6.63	.0909	4.0635	217.6	.31329	.015521	34.265
.3600	.4197	.4574	6.27	5.38	6.71	.0833	4.0715	220.1	.31441	.015640	38.121
.3400	.3997	.4811	6.76	5.74	6.78	.0759	4.0787	222.6	.31546	.015759	42.447
.3200	.3796	.5047	7.28	6.13	6.82	.0687	4.0852	225.0	.31644	.015880	47.312
.3000	.3595	.5280	7.86	6.55	6.82	.0617	4.0910	227.4	.31736	.016001	52.795
.2800	.3395	.5506	8.49	7.00	6.80	.0549	4.0962	229.7	.31822	.016125	58.997
.2600	.3194	.5723	9.20	7.48	6.74	.0483	4.1009	232.4	.31902	.016250	66.040
.2400	.2993	.5927	10.00	8.01	6.64	.0421	4.1051	234.9	.31978	.016378	74.082
.2200	.2796	.6110	10.93	8.59	6.49	.0363	4.1088	237.4	.32049	.016508	83.324
.2000	.2590	.6269	12.00	9.24	6.31	.0308	4.1120	240.1	.32115	.016643	94.029
.1800	.2388	.6393	13.38	9.97	6.08	.0257	4.1148	242.8	.32177	.016782	106.553
.1600	.2185	.6474	14.85	10.82	5.80	.0210	4.1173	245.7	.32235	.016926	121.388
.1400	.1982	.6498	16.83	11.80	5.47	.0168	4.1194	248.8	.32289	.017079	139.244
.1200	.1777	.6448	19.44	12.99	5.09	.0130	4.1212	252.1	.32339	.017242	161.202
.1000	.1570	.6301	23.08	14.46	4.66	.0097	4.1227	255.7	.32385	.017419	189.025
.0800	.1358	.6026	28.40	16.38	4.16	.0069	4.1240	259.9	.32426	.017617	225.97
.0600	.1134	.5591	35.26	19.13	3.59	.0045	4.1250	265.0	.32463	.017853	279.56
.0500	.1010	.5320	40.79	21.14	3.26	.0034	4.1255	268.3	.32479	.018001	319.22
.0450	.0942	.5190	43.14	22.49	3.07	.0028	4.1257	270.3	.32486	.018090	345.97
.0400	.0861	.5102	46.46	24.31	2.84	.0023	4.1259	272.9	.32494	.018202	382.69
.0380	.0823	.5107	47.82	25.33	2.73	.0020	4.1260	274.2	.32496	.018260	403.22
.0360	.0774	.5184	49.32	26.74	2.59	.0018	4.1262	276.0	.32499	.018337	431.98
.0350	.0741	.5298	50.03	27.81	2.44	.0016	4.1263	277.3	.32500	.018398	454.07
.0342	.0696	.5554	50.86	29.40	2.34	.0014	4.1264	279.2	.32501	.018470	487.13

TABLE X.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\overline{V}_{\gamma=o}=1.0$; $\overline{u}_a = -0.06$, $Z_i = \overline{V}_i \times 10^{-8}$, $\beta r = 900$ - Concluded

(f) $\overline{V}_i = 2.0$, $\gamma_i = -8.209^{\circ}$, $e_i = 2.9727$

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{Q}$	t sec	$\frac{\Delta h}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
2.0000	2.0594	0.0000020	8.209	7.971	0.0001	0.0087	0	0	0	0	0.000
1.9990	2.0585	.0000121	7.591	7.371	.0008	.0214	.0031	5.9	.01439	.00199	.000
1.9980	2.0576	.0000711	6.927	6.725	.0045	.0520	.0112	12.3	.03986	.00396	.001
1.9960	2.0557	.0012719	5.681	5.515	.0808	.1193	.0634	24.3	.09889	.007174	.019
1.9940	2.0538	.004623	5.024	4.877	.293	.1171	.1350	30.6	.07421	.008660	.070
1.9920	2.0518	.008969	4.676	4.540	.543	.1665	.1949	33.9	.06231	.009297	.129
1.9900	2.0499	.012575	4.447	4.317	.797	.1847	.2454	36.1	.09767	.009724	.190
1.9850	2.0444	.02234	4.079	3.959	1.412	.2070	.3486	39.7	.09627	.010369	.338
1.9800	2.0391	.03164	3.839	3.726	1.995	.2.0730	.4330	42.0	.10190	.010775	.474
1.9700	2.0289	.04906	3.512	3.408	3.08	1.3200	.5726	45.2	.10958	.011248	.747
1.9600	2.0192	.06523	3.282	3.185	4.07	1.4035	.6898	47.5	.11500	.011570	.995
1.9400	1.9999	.09472	2.953	2.864	5.86	1.6675	.8868	50.8	.12282	.011996	1.465
1.9200	1.9799	.12126	2.711	2.629	7.43	1.9505	1.0542	53.2	.13860	.012285	1.899
1.9000	1.9599	.14544	2.518	2.441	8.82	2.0830	1.2027	55.2	.13328	.012492	2.294
1.8500	1.9100	.19772	2.146	2.078	11.70	2.2778	1.5218	59.2	.14239	.012867	3.209
1.8000	1.8600	.2406	1.862	1.802	13.88	2.3527	1.7932	62.4	.14951	.013119	4.011
1.7500	1.8100	.2760	1.628	1.574	15.50	2.3547	2.0334	65.2	.15553	.013299	4.731
1.7000	1.7600	.3048	1.426	1.378	16.66	2.3084	2.2507	67.7	.16088	.013446	5.379
1.6500	1.7100	.3279	1.247	1.203	17.43	2.2290	2.4501	70.1	.16578	.013556	5.962
1.6000	1.6600	.3459	1.085	1.045	17.87	2.1267	2.6350	72.4	.17037	.013646	6.485
1.5500	1.6100	.3592	.936	.901	18.02	2.0089	2.8077	74.7	.17476	.013727	6.95
1.5000	1.5600	.3682	.799	.768	17.92	1.8810	2.9699	77.0	.17899	.013791	7.364
1.4500	1.5100	.3734	.671	.645	17.61	1.7471	3.1229	79.3	.18314	.013844	7.72
1.4000	1.4600	.3750	.553	.530	17.13	1.6107	3.2677	81.6	.18724	.013888	8.03
1.3500	1.4100	.3733	.444	.425	16.49	1.4741	3.4053	84.0	.19132	.013923	8.29
1.3000	1.3600	.3687	.343	.328	15.74	1.3397	3.5361	86.6	.19543	.013951	8.50
1.2500	1.3100	.3615	.252	.240	14.89	1.2089	3.6608	89.2	.19959	.013973	8.67
1.2000	1.2600	.3519	.171	.163	13.97	1.0833	3.7798	92.1	.20384	.013988	8.79
1.1500	1.2100	.3404	.103	.098	13.00	.9638	3.8936	95.1	.20820	.013999	8.880
1.1000	1.1600	.3273	.049	.046	12.01	.8515	4.0023	98.4	.21269	.014004	8.927
1.0500	1.1100	.3131	.013	.012	11.02	.7468	4.1063	101.9	.21736	.014007	8.94
1.0000	1.0600	.2983	.000	.000	10.06	.6505	4.2056	105.8	.22223	.014007	8.94
.9800	1.0400	.2923	.002	.002	9.68	.6144	4.2441	107.5	.22424	.014007	8.94
.9600	1.0200	.2864	.010	.009	9.31	.5797	4.2818	109.2	.22628	.014007	8.951
.9400	1.0000	.2806	.023	.021	8.96	.5464	4.3188	111.0	.22836	.014006	8.959
.9200	.9800	.2749	.042	.039	8.61	.5145	4.3550	112.8	.23048	.014009	8.96
.9000	.9600	.2694	.067	.063	8.28	.4841	4.3905	114.8	.23263	.014011	8.981
.8800	.9400	.2642	.101	.094	7.96	.4551	4.4252	116.8	.23483	.014014	9.007
.8600	.9200	.2593	.142	.133	7.66	.4276	4.4591	118.9	.23706	.014019	9.045
.8400	.9000	.2548	.192	.179	7.37	.4015	4.4922	121.1	.23932	.014025	9.099
.8200	.8800	.2507	.252	.235	7.10	.3768	4.5245	123.3	.24162	.014034	9.172
.8000	.8600	.2471	.322	.300	6.85	.3535	4.5559	125.7	.24394	.014046	9.268
.7800	.8400	.2442	.404	.375	6.63	.3316	4.5864	128.1	.24629	.014061	9.392
.7600	.8200	.2419	.498	.461	6.42	.3111	4.6160	130.6	.24865	.014079	9.550
.7400	.8000	.2404	.604	.559	6.24	.2919	4.6446	133.2	.25102	.014100	9.748
.7200	.7800	.2398	.725	.669	6.08	.2739	4.6722	135.9	.25340	.014130	9.992
.7000	.7600	.2401	.860	.792	5.94	.2571	4.6987	138.6	.25576	.014162	10.291
.6800	.7400	.2414	1.011	.929	5.83	.2415	4.7242	141.4	.25811	.014201	10.652
.6600	.7200	.2439	1.177	1.079	5.75	.2269	4.7485	144.2	.26043	.014245	11.084
.6400	.7000	.2474	1.359	1.242	5.68	.2133	4.7717	147.1	.26272	.014295	11.589
.6200	.6800	.2523	1.557	1.420	5.64	.2006	4.7937	150.0	.26495	.014352	12.207
.6000	.6600	.2584	1.772	1.611	5.63	.1887	4.8145	152.9	.26712	.014415	12.920
.5800	.6400	.2659	2.004	1.816	5.63	.1775	4.8341	155.8	.26923	.014484	13.752
.5600	.6200	.2747	2.253	2.035	5.66	.1669	4.8525	158.7	.27126	.014560	14.717
.5400	.6000	.2850	2.519	2.267	5.70	.1569	4.8697	161.6	.27321	.014641	15.832
.5200	.5799	.2966	2.802	2.513	5.76	.1473	4.8857	164.5	.27507	.014727	17.113
.5000	.5599	.3097	3.104	2.771	5.83	.1382	4.9007	167.4	.27684	.014819	18.580
.4800	.5399	.3241	3.424	3.043	5.90	.1293	4.9145	170.2	.27852	.014915	20.256
.4600	.5199	.3398	3.763	3.329	5.99	.1208	4.9272	173.0	.28012	.015015	22.161
.4400	.4999	.3568	4.123	3.629	6.08	.1125	4.9389	175.7	.28162	.015118	24.325
.4200	.4799	.3749	4.506	3.943	6.17	.1044	4.9497	178.4	.28304	.015225	26.779
.4000	.4598	.3941	4.914	4.273	6.25	.0965	4.9595	181.1	.28437	.015335	29.558
.3800	.4396	.4142	5.35	4.62	6.32	.0888	4.9684	183.7	.28562	.015447	32.702
.3600	.4197	.4351	5.82	4.99	6.39	.0813	4.9766	186.3	.28680	.015562	36.261
.3400	.3997	.4566	6.32	5.37	6.44	.0740	4.9840	188.9	.28790	.015679	40.291
.3200	.3798	.4785	6.87	5.79	6.47	.0669	4.9906	191.5	.28893	.015798	44.861
.3000	.3599	.5005	7.47	6.22	6.47	.0601	4.9966	194.1	.28990	.015920	50.052
.2800	.3399	.5224	8.13	6.70	6.45	.0535	5.0020	196.6	.29081	.016044	55.967
.2600	.3194	.5437	8.86	7.21	6.40	.0471	5.0068	199.3	.29166	.016171	62.732
.2400	.2995	.5640	9.70	7.76	6.32	.0411	5.0111	201.9	.29246	.016300	70.505
.2200	.2795	.5829	10.65	8.37	6.20	.0354	5.0148	204.6	.29320	.016434	79.492
.2000	.2595	.5997	11.76	9.05	6.04	.0301	5.0181	207.3	.29390	.016571	89.968
.1800	.2388	.6136	13.08	9.82	5.83	.0252	5.0210	210.2	.29454	.016714	102.270
.1600	.2188	.6236	14.69	10.70	5.59	.0206	5.0235	213.2	.29515	.016863	116.925
.1400	.1988	.6283	16.71	11.72	5.29	.0165	5.0257	216.4	.29571	.017019	134.641
.1200	.1777	.6261	19.38	12.94	4.94	.0128	5.0275	219.8	.29622	.017187	156.520
.1000	.1570	.6145	23.08	14.46	4.54	.0096	5.0291	223.6	.29670	.017368	184.356
.0800	.1357	.5906	28.68	16.43	4.08	.0068	5.0303	227.8	.29712	.017572	221.47
.0600	.1133	.5511	38.40	19.24	3.54	.0044	5.0314	233.1	.29749	.017815	275.54
.0500	.1000	.5263	47.13	21.30	3.22	.0033	5.0319	236.4	.29766	.017966	315.76
.0450	.0940	.5145	53.60	22.67	3.03	.0028	5.0321	238.5	.29774	.018058	343.03
.0400	.0859	.5077	63.12	24.56	2.81	.0023	5.0323	241.1	.29781	.018174	380.76
.0380	.0819	.5094	68.65	25.61	2.70	.0020	5.0325	242.5	.29783	.018235	402.13
.0360	.0768	.5193	76.53	27.11	2.55	.0017	5.0326	244.4	.29786	.018317	432.75
.0350	.0732	.5339	82.71	28.31	2.45	.0015	5.0327	245.9	.29787	.018379	457.61
.0344	.0695	.5575	89.40	29.68	2.35	.0014	5.0328	247.5	.29788	.018446	486.17

TABLE XI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\bar{V}_{\gamma=0}=1.0$; $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\bar{V}_i = 1.10$, $\gamma_i = -3.532^{\circ}$, $e_i = 0.2185$

$\bar{V}$	$\bar{V}$	Z	γ deg	$-\lambda$ deg	$-\frac{a}{g}$	$\bar{T}$	$\bar{Q}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\frac{\beta}{r}}\,\bar{V}$
1.1000	1.0401	0.0000011	-3.532	3.736	-0.0000	0.0011	0	0	0	0	0.000
1.1005	1.0400	.0000039	-3.299	3.489	.0001	.0021	.0010	[illegible]	.02342	.001398	.000
1.1010	1.0411	.0000138	-3.044	3.219	.0004	.0040	.0031	[illegible]	.04889	.002809	.000
1.1015	1.0410	.0000514	-2.753	2.912	.0015	.0077	.0076	[illegible]	.07776	.004271	.001
1.10208	1.0421	.0005003	-2.158	2.283	.0148	.0241	.0312	[illegible]	.13667	.006722	.014
1.1015	1.0410	.0016882	-1.758	1.860	.0499	.0442	.0673	[illegible]	.17622	.008150	.04
1.1010	1.0410	.002307	-1.640	1.735	.0681	.0517	.0826	[illegible]	.18794	.008497	.06
1.1000	1.0400	.003354	-1.488	1.574	.0990	.0621	.1062	[illegible]	.20320	.008914	.09
1.0980	1.0380	.005107	-1.297	1.372	.1503	.0763	.1427	[illegible]	.22250	.009383	.140
1.0950	1.0350	.007301	-1.114	1.178	.214	.0905	.1861	[illegible]	.24152	.009783	.200
1.0900	1.0300	.0102898	-.910	.963	.301	.1062	.2453	[illegible]	.26342	.010170	.28
1.0800	1.0200	.014750	-.647	.685	.426	.1240	.3421	[illegible]	.29372	.010580	.410
1.0700	1.0100	.017875	-.468	.496	.512	.1332	.4251	[illegible]	.31878	.010804	.50
1.0600	1.0000	.02005	-.334	.354	.568	.1375	.5008	[illegible]	.33658	.010942	.562
1.0500	.9900	.02150	-.228	.242	.602	.1389	.5718	[illegible]	.35465	.011030	.614
1.0400	.9800	.02239	-.146	.155	.620	.1381	.6399	[illegible]	.37175	.011083	.64
1.0300	.9700	.02283	-.082	.087	.626	.1359	.7059	[illegible]	.38837	.011118	.665
1.0200	.9600	.02295	-.037	.039	.622	.1327	.7705	[illegible]	.40479	.011135	.675
1.0100	.9500	.02286	-.009	.010	.613	.1290	.8341	[illegible]	.42123	.011141	.679
1.0000	.9400	.02265	.000	.000	.600	.1250	.8969	[illegible]	.43780	.011142	.679
.9900	.9300	.02244	.010	.010	.588	.1211	.9590	[illegible]	.45455	.011143	.680
.9800	.9200	.02235	.039	.042	.575	.1176	1.0204	[illegible]	.47144	.011150	.684
.9600	.9000	.02299	.160	.171	.582	.1128	1.1400	[illegible]	.50508	.011204	.715
.9400	.8800	.02552	.356	.380	.631	.1123	1.2583	[illegible]	.53680	.011393	.814
.9200	.8600	.03065	.602	.643	.739	.1161	1.3737	[illegible]	.56443	.011571	1.000
.9000	.8400	.03878	.867	.928	.912	.1230	1.4420	[illegible]	.58690	.011857	1.299
.8800	.8200	.04994	1.129	1.212	1.145	.1314	1.5176	[illegible]	.60455	.012163	1.702
.8600	.8000	.06397	1.380	1.483	1.428	.1396	1.5818	[illegible]	.61832	.012463	2.231
.8400	.7800	.08063	1.615	1.740	1.752	.1470	1.6368	[illegible]	.62918	.012747	2.880
.8200	.7600	.09969	1.837	1.982	2.11	.1531	1.6841	[illegible]	.63791	.013006	3.647
.8000	.7400	.12094	2.048	2.214	2.48	.1576	1.7253	[illegible]	.64506	.013251	4.535
.7800	.7200	.14419	2.249	2.436	2.88	.1605	1.7613	[illegible]	.65102	.013475	5.546
.7600	.7000	.16928	2.442	2.652	3.27	.1619	1.7932	[illegible]	.65608	.013682	6.681
.7400	.6800	.19607	2.630	2.862	3.68	.1619	1.8214	[illegible]	.66044	.013875	7.949
.7200	.6600	.2244	2.814	3.070	4.07	.1606	1.8467	[illegible]	.66424	.014055	9.358
.7000	.6400	.2543	2.996	3.276	4.47	.1581	1.8693	[illegible]	.66760	.014226	10.899
.6800	.6200	.2856	3.175	3.482	4.84	.1545	1.8896	[illegible]	.67058	.014387	12.599
.6600	.6000	.3181	3.355	3.690	5.21	.1501	1.9080	[illegible]	.67327	.014540	14.460
.6400	.5800	.3519	3.534	3.900	5.55	.1448	1.9246	[illegible]	.67570	.014686	16.497
.6200	.5600	.3869	3.715	4.113	5.87	.1388	1.9396	[illegible]	.67792	.014827	18.723
.6000	.5400	.4231	3.899	4.331	6.17	.1323	1.9532	[illegible]	.67996	.014962	21.154
.5800	.5200	.4603	4.085	4.556	6.44	.1254	1.9656	[illegible]	.68185	.015094	23.810
.5600	.5000	.4986	4.276	4.788	6.68	.1181	1.9768	[illegible]	.68360	.015222	26.721
.5400	.4800	.5379	4.472	5.030	6.89	.1105	1.9870	[illegible]	.68523	.015344	29.884
.5200	.4600	.5782	4.674	5.282	7.07	.1028	1.9963	[illegible]	.68676	.015460	33.359
.5000	.4400	.6195	4.883	5.548	7.20	.0950	2.0047	[illegible]	.68819	.015589	37.172
.4800	.4200	.6618	5.101	5.828	7.31	.0872	2.0123	[illegible]	.68955	.015707	41.363
.4600	.4000	.7051	5.329	6.126	7.37	.0794	2.0192	[illegible]	.69084	.015829	45.984
.4400	.3800	.7494	5.568	6.445	7.39	.0718	2.0254	[illegible]	.69207	.015946	51.093
.4200	.3600	.7947	5.821	6.789	7.37	.0644	2.0310	[illegible]	.69324	.016059	56.765
.4000	.3400	.8412	6.090	7.162	7.31	.0572	2.0360	[illegible]	.69437	.016172	63.087
.3800	.3200	.8888	6.38	7.57	7.21	.0503	2.0405	[illegible]	.69545	.016289	70.171
.3600	.3000	.9375	6.69	8.02	7.06	.0438	2.0446	[illegible]	.69650	.016414	78.159
.3400	.2800	.9884	7.02	8.52	6.86	.0377	2.0481	[illegible]	.69751	.016536	87.216
.3200	.2600	1.0409	7.39	9.08	6.63	.0319	2.0513	[illegible]	.69850	.016661	97.581
.3000	.2400	1.0955	7.79	9.72	6.35	.0266	2.0540	[illegible]	.69947	.016790	109.55
.2800	.2200	1.1530	8.23	10.46	6.02	.0218	2.0564	[illegible]	.70042	.016922	123.540
.2600	.2000	1.2142	8.73	11.33	5.63	.0175	2.0585	[illegible]	.70135	.017062	140.104
.2400	.1800	1.2804	9.30	12.38	5.25	.0137	2.0603	[illegible]	.70229	.017211	160.054
.2200	.1600	1.3536	9.96	13.65	4.80	.0104	2.0617	[illegible]	.70323	.017366	184.38
.2000	.1400	1.4371	10.73	15.26	4.32	.0076	2.0630	[illegible]	.70417	.017549	215.56
.1800	.1200	1.5363	11.65	17.36	3.80	.0053	2.0640	[illegible]	.70513	.017733	256.04
.1600	.1000	1.6612	12.78	20.23	3.26	.0035	2.0647	[illegible]	.70614	.017951	311.47
.1400	.0800	1.8315	14.19	24.38	2.71	.0021	2.0653	[illegible]	.70721	.018208	392.47
.1200	.0600	2.0914	16.99	30.85	2.17	.0011	2.0658	[illegible]	.70840	.018526	522.85
.1000	.0400	2.5575	18.26	41.86	1.691	.0005	2.0661	[illegible]	.70978	.018952	767.24
.0900	.0300	2.9653	19.45	50.32	1.499	.0003	2.0662	[illegible]	.71060	.019234	988.43
.0800	.0200	3.6372	20.28	61.53	1.358	.0002	2.0663	[illegible]	.71159	.019592	1363.96
.0750	.0150	4.1720	20.27	68.27	1.306	.0002	2.0663	[illegible]	.71219	.019818	1668.78
.0700	.0100	5.0044	20.59	75.78	1.257	.0001	2.0664	[illegible]	.71296	.020095	2144.7
.0680	.0080	5.5093	20.99	79.00	1.235	.0001	2.0664	[illegible]	.71336	.020234	2430.6
.0660	.0060	6.2261	20.07	82.36	1.207	.0001	2.0664	[illegible]	.71386	.020409	2830.1
.0640	.0040	7.4217	20.59	85.82	1.168	.0001	2.0665	[illegible]	.71460	.020632	3478.9
.0620	.0020	10.5357	20.74	89.12	1.106	.0000	2.0665	[illegible]	.71617	.021097	5097.9
.0610	.0010	17.7731	20.35	89.96	1.050	.0000	2.0665	[illegible]	.71901	.021695	8740.9

TABLE XI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\bar{V}_{\gamma=0}=1.0$; $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\bar{V}_i = 1.20$, $\gamma_i = -4.877^{\circ}$, $e_i = 0.4466$

$\bar{V}$	$\bar{V}_r$	Z	γ deg	γ rad	$-\frac{\bar{u}_r}{g}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\frac{\bar{u}_r}{g}}\frac{Z}{\bar{V}}$
1.2000	1.1455	0.0000012	4.877	5.1[illegible]	0.0000	0.0015	0	0	0	0	0.000
1.2005	1.1407	.00000084	4.411	4.6[illegible]	.0000	.0039	.0021	18.2	.02656	.002157	.000
1.2010	1.1411	.00006[illegible]	3.865	4.0[illegible]	.0021	.0108	.0077	39.4	.05769	.004409	.002
1.2031	1.1414	.0004814	3.296	3.3[illegible]	.0157	.0298	.0248	64.3	.09401	.006655	.012
1.2010	1.1411	.0015330	2.796	2.9[illegible]	.0499	.0531	.0469	80.9	.11847	.007946	.038
1.2000	1.1401	.003349	2.463	2.5[illegible]	.1088	.0783	.0800	93.8	.13740	.008816	.084
1.1980	1.1381	.006229	2.165	2.2[illegible]	.202	.1062	.1191	105.4	.15448	.009506	.156
1.1950	1.1350	.009881	1.914	2.0[illegible]	.320	.1330	.1629	115.4	.16898	.010022	.248
1.1900	1.1300	.01510	1.654	1.7[illegible]	.486	.1625	.2191	125.8	.18425	.010498	.381
1.1800	1.1200	.02363	1.331	1.4[illegible]	.754	.1988	.3089	139.3	.20374	.011005	.601
1.1700	1.1100	.03053	1.113	1.1[illegible]	.965	.2209	.3829	148.9	.21753	.011299	.783
1.1600	1.1000	.03624	.944	.9[illegible]	1.134	.2353	.4489	156.7	.22869	.011499	.937
1.1500	1.0900	.04101	.805	.8[illegible]	1.271	.2446	.5089	163.6	.2383	.011646	1.070
1.1400	1.0800	.04499	.687	.7[illegible]	1.381	.2503	.5647	169.7	.24698	.011759	1.184
1.1300	1.0700	.04830	.585	.6[illegible]	1.468	.2533	.6174	175.5	.25496	.011848	1.282
1.1200	1.0600	.05101	.499	.5[illegible]	1.535	.2542	.6681	180.9	.26246	.011918	1.366
1.1100	1.0500	.05320	.414	.4[illegible]	1.585	.2534	.7176	186.2	.26962	.011975	1.438
1.1000	1.0400	.05492	.342	.3[illegible]	1.620	.2513	.7669	191.3	.27652	.012020	1.498
1.0800	1.0200	.05716	.221	.2[illegible]	1.652	.2441	.8558	201.3	.28983	.012085	1.588
1.0600	1.0000	.05810	.127	.1[illegible]	1.644	.2341	.9428	211.2	.30280	.012124	1.644
1.0400	.9800	.05805	.058	.0[illegible]	1.608	.2224	1.0270	221.3	.31570	.012144	1.675
1.0200	.9600	.05733	.015	.0[illegible]	1.554	.2098	1.1084	231.6	.32873	.012152	1.686
1.0000	.9400	.05627	.000	.0[illegible]	1.492	.1970	1.1866	242.4	.34199	.012153	1.688
.9800	.9200	.05520	.016	.0[illegible]	1.430	.1848	1.2674	253.6	.35555	.012154	1.690
.9600	.9000	.05452	.066	.0[illegible]	1.380	.1737	1.3440	265.3	.36937	.012163	1.704
.9400	.8800	.05464	.152	.0[illegible]	1.350	.1520	1.4184	277.3	.38332	.012189	1.744
.9200	.8600	.05598	.275	.0[illegible]	1.350	.1569	1.4899	289.4	.39715	.012240	1.825
.9000	.8400	.05896	.434	.0[illegible]	1.387	.1517	1.5578	301.5	.41051	.012322	1.965
.8800	.8200	.06393	.622	.0[illegible]	1.466	.1496	1.6214	313.0	.42308	.012437	2.180
.8600	.8000	.07119	.838	.0[illegible]	1.590	.1473	1.6799	323.8	.43457	.012582	2.483
.8400	.7800	.08091	1.055	1.1[illegible]	1.758	.1473	1.7332	333.7	.44482	.012750	2.890
.8200	.7600	.09316	1.286	1.3[illegible]	1.969	.1480	1.7812	342.5	.45382	.012934	3.408
.8000	.7400	.10794	1.518	1.6[illegible]	2.22	.1489	1.8242	350.4	.46164	.013125	4.048
.7800	.7200	.12518	1.748	1.8[illegible]	2.50	.1496	1.8626	357.5	.46842	.013318	4.815
.7600	.7000	.14480	1.974	2.144	2.80	.1497	1.8969	363.7	.47429	.013508	5.716
.7400	.6801	.16668	2.197	2.3[illegible]	3.12	.1493	1.9275	369.3	.47940	.013694	6.757
.7200	.6601	.19071	2.416	2.6[illegible]	3.46	.1480	1.9544	374.3	.48388	.013874	7.946
.7000	.6401	.2168	2.633	2.8[illegible]	3.81	.1459	1.9794	378.8	.48782	.014048	9.291
.6800	.6201	.2448	2.844	3.1[illegible]	4.15	.1431	2.0014	383.0	.49132	.014215	10.800
.6600	.6001	.2746	3.055	3.3[illegible]	4.50	.1394	2.0210	386.8	.49445	.014376	12.483
.6400	.5801	.3062	3.265	3.6[illegible]	4.83	.1350	2.0390	390.4	.49726	.014531	14.354
.6200	.5601	.3394	3.475	3.8[illegible]	5.15	.1300	2.0559	393.7	.49980	.014681	16.425
.6000	.5401	.3743	3.686	4.0[illegible]	5.46	.1245	2.0696	396.8	.50212	.014826	18.714
.5800	.5202	.4106	3.899	4.3[illegible]	5.75	.1184	2.0823	399.7	.50424	.014967	21.239
.5600	.5002	.4484	4.115	4.6[illegible]	6.01	.1120	2.0947	402.5	.50620	.015103	24.022
.5400	.4802	.4876	4.335	4.8[illegible]	6.25	.1052	2.1054	405.2	.50800	.015237	27.090
.5200	.4602	.5282	4.560	5.1[illegible]	6.45	.0982	2.1151	407.8	.50969	.015368	30.473
.5000	.4402	.5701	4.791	5.4[illegible]	6.63	.0911	2.1239	410.4	.51126	.015496	34.206
.4800	.4203	.6133	5.030	5.7[illegible]	6.77	.0839	2.1318	412.8	.51273	.015623	38.333
.4600	.4003	.6579	5.278	6.0[illegible]	6.87	.0767	2.1390	415.3	.51412	.015748	42.903
.4400	.3803	.7037	5.537	6.3[illegible]	6.94	.0696	2.1454	417.7	.51543	.015872	47.979
.4200	.3604	.7509	5.809	6.7[illegible]	6.96	.0626	2.1512	420.0	.51668	.015996	53.633
.4000	.3404	.7994	6.096	7.3[illegible]	6.95	.0558	2.1565	422.4	.51787	.016120	59.957
.3800	.3204	.8494	6.40	7.6[illegible]	6.89	.0492	2.1609	424.8	.51900	.016244	67.062
.3600	.3005	.9011	6.73	8.0[illegible]	6.78	.0429	2.1650	427.3	.52010	.016370	75.089
.3400	.2806	.9545	7.08	8.4[illegible]	6.63	.0370	2.1683	429.7	.52115	.016497	84.218
.3200	.2606	1.0099	7.45	9.1[illegible]	6.43	.0315	2.1712	432.3	.52217	.016627	94.679
.3000	.2407	1.0678	7.87	9.8[illegible]	6.19	.0263	2.1742	434.9	.52316	.016761	106.779
.2800	.2208	1.1287	8.33	10.5[illegible]	5.90	.0216	2.1771	437.7	.52414	.016899	120.929
.2600	.2009	1.1934	8.84	11.4[illegible]	5.56	.0174	2.1794	440.6	.52509	.017044	137.701
.2400	.1811	1.2633	9.42	12.5[illegible]	5.18	.0136	2.1810	443.8	.52604	.017196	157.907
.2200	.1613	1.3402	10.09	13.6[illegible]	4.75	.0104	2.1818	447.2	.52699	.017358	182.755
.2000	.1415	1.4275	10.86	15.4[illegible]	4.29	.0076	2.1817	451.0	.52794	.017534	214.12
.1800	.1219	1.5305	11.78	17.5[illegible]	3.79	.0053	2.1804	455.3	.52891	.017729	255.08
.1600	.1024	1.6591	12.90	20.4[illegible]	3.26	.0035	2.1780	460.2	.52992	.017949	311.08
.1400	.0832	1.8329	14.30	24.9[illegible]	2.72	.0021	2.1744	466.3	.53099	.018208	392.76
.1200	.0645	2.0956	16.08	31.[illegible]	2.18	.0011	2.1695	474.6	.53217	.018528	523.90
.1000	.0470	2.5632	18.31	41.[illegible]	1.697	.0005	2.1626	484.8	.53355	.018955	748.95
.0900	.0390	2.9708	19.47	50.[illegible]	1.503	.0003	2.1589	492.3	.53437	.019236	930.25
.0800	.0316	3.6417	20.29	61.[illegible]	1.360	.0002	2.1570	502.4	.53535	.019593	1255.63
.0750	.0280	4.1757	20.27	68.[illegible]	1.307	.0002	2.1571	509.2	.53596	.019817	1570.27
.0700	.0242	5.0074	19.59	75.[illegible]	1.258	.0001	2.1571	518.4	.53672	.020095	2146.0
.0680	.0225	5.5120	18.98	79.[illegible]	1.235	.0001	2.1572	523.4	.53712	.020234	2431.8
.0650	.0207	6.2285	18.06	82.[illegible]	1.207	.0001	2.1572	529.9	.53762	.020403	2831.1
.0640	.0183	7.4237	16.59	85.[illegible]	1.168	.0001	2.1573	539.6	.53836	.020632	3479.9
.0620	.0147	10.5369	13.74	86.[illegible]	1.106	.0000	2.1572	560.8	.53993	.021057	5008.5
.0610	.0110	17.7733	10.35	89.[illegible]	1.050	.0000	2.1[illegible]	599.5	.54277	.021655	9441.0

TABLE XI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\bar{V}_{\gamma=0}=1.0$, $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\bar{V}_i = 1.30$, $\gamma_i = -5.763^{\circ}$, $e_i = 0.6938$

$\bar{V}$	$\bar{V}_r$	$\bar{u}$	γ deg	[illegible]	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\tau}$	t sec	$\frac{\Delta\theta}{r}$	[illegible]	$\sqrt{\frac{Z}{V}}$
1.3000	1.2499	[illegible]	5.763	[illegible]	0.0000	0.0020	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.3002	1.2405	[illegible]	5.357	5.6[illegible]	.0002	.0041	.001[illegible]	11.0	.01737	[illegible]	.000
1.3004	1.2406	[illegible]	4.903	5.1[illegible]	.0011	.0090	.004[illegible]	23.3	.03685	[illegible]	.001
1.3006	1.24076	.000311	4.124	4.3[illegible]	.0111	.0296	.017[illegible]	44.4	.07041	[illegible]	.007
1.3005	1.2406	.000826	3.744	3.9[illegible]	.0294	.0482	.031[illegible]	54.5	.08626	[illegible]	.019
1.3000	1.2401	.000087	3.356	3.5[illegible]	.0774	.0764	.051[illegible]	64.9	.10281	[illegible]	.048
1.2980	1.2381	.005863	2.863	3.0[illegible]	.207	.1274	.104[illegible]	78.2	.12394	[illegible]	.135
1.2950	1.2351	.010591	2.537	2.8[illegible]	.374	.1704	.152[illegible]	87.1	.13797	[illegible]	.245
1.2900	1.2301	.017450	2.227	2.3[illegible]	.614	.2165	.212[illegible]	95.6	.15142	[illegible]	.406
1.2800	1.2200	.02904	1.862	1.9[illegible]	1.013	.2735	.324[illegible]	105.9	.16752	[illegible]	.681
1.2600	1.2000	.04731	1.436	1.5[illegible]	1.622	.3349	.445[illegible]	118.4	.18699	[illegible]	1.126
1.2400	1.1800	.06135	1.154	1.2[illegible]	2.07	.3655	.559[illegible]	127.3	.20056	[illegible]	1.484
1.2200	1.1600	.07235	.939	.9[illegible]	2.39	.3801	.660[illegible]	134.6	.21159	[illegible]	1.779
1.2000	1.1400	.08093	.763	.8[illegible]	2.63	.3848	.751[illegible]	141.1	.22122	[illegible]	2.023
1.1800	1.1200	.08750	.615	.6[illegible]	2.79	.3826	.834[illegible]	147.2	.23000	[illegible]	2.225
1.1600	1.1000	.09236	.487	.514	2.89	.3756	.911[illegible]	152.9	.23823	[illegible]	2.389
1.1400	1.0800	.09575	.3[illegible]	.3[illegible]	2.94	.3651	.993[illegible]	158.5	.24612	[illegible]	2.529
1.1200	1.0600	.09786	.281	.2[illegible]	2.95	.3521	1.066[illegible]	164.1	.25386	[illegible]	2.621
1.1000	1.0400	.09888	.199	.2[illegible]	2.92	.3373	1.13[illegible]	169.7	.26237	[illegible]	2.697
1.0800	1.0200	.09899	.130	[illegible]	2.86	.3213	1.205[illegible]	175.3	.26992	[illegible]	2.750
1.0600	1.0000	.09834	.075	.[illegible]	2.78	.3046	1.271[illegible]	181.1	.27650	[illegible]	2.783
1.0400	.9800	.09711	.034	[illegible]	2.69	.2876	1.336[illegible]	187.1	.28417	[illegible]	2.801
1.0200	.9600	.09548	.009	[illegible]	2.59	.2707	1.400[illegible]	193.3	.29197	[illegible]	2.808
1.0000	.9400	.09364	.000	[illegible]	2.48	.2542	1.462[illegible]	199.8	.29994	[illegible]	2.809
.9800	.9200	.09181	.010	[illegible]	2.38	.2383	1.523[illegible]	206.5	.30809	[illegible]	2.811
.9600	.9000	.09021	.040	[illegible]	2.28	.2235	1.582[illegible]	213.6	.31642	[illegible]	2.819
.9400	.8800	.08908	.092	[illegible]	2.20	.2098	1.640[illegible]	220.9	.32490	[illegible]	2.843
.9200	.8600	.08871	.169	[illegible]	2.14	.1975	1.696[illegible]	228.4	.33348	[illegible]	2.893
.9000	.8400	.08937	.271	[illegible]	2.10	.1868	1.751[illegible]	236.1	.34208	[illegible]	2.979
.8800	.8200	.09135	.398	[illegible]	2.07	.1776	1.803[illegible]	244.0	.35059	[illegible]	3.114
.8600	.8000	.09493	.550	[illegible]	2.12	.1701	1.853[illegible]	251.8	.35888	[illegible]	3.312
.8400	.7800	.10036	.724	[illegible]	2.18	.1640	1.900[illegible]	259.4	.36692	[illegible]	3.584
.8200	.7600	.10786	.916	[illegible]	2.28	.1592	1.943[illegible]	266.8	.37431	[illegible]	3.946
.8000	.7400	.11758	1.122	[illegible]	2.41	.1554	1.984[illegible]	273.8	.38126	[illegible]	4.409
.7800	.7200	.12963	1.339	[illegible]	2.58	.1522	2.021[illegible]	280.4	.38762	[illegible]	4.986
.7600	.7000	.14406	1.563	[illegible]	2.79	.1494	2.055[illegible]	286.5	.39340	[illegible]	5.687
.7400	.6800	.16090	1.792	[illegible]	3.02	.1466	2.086[illegible]	292.2	.39862	[illegible]	6.523
.7200	.6600	.18012	2.022	[illegible]	3.27	.1438	2.114[illegible]	297.5	.40330	[illegible]	7.505
.7000	.6400	.2017	2.253	[illegible]	3.54	.1407	2.139[illegible]	302.3	.40751	[illegible]	8.643
.6800	.6201	.2255	2.485	[illegible]	3.82	.1373	2.162[illegible]	306.8	.41129	[illegible]	9.948
.6600	.6001	.2515	2.716	[illegible]	4.12	.1334	2.183[illegible]	311.0	.41469	[illegible]	11.432
.6400	.5801	.2796	2.948	[illegible]	4.41	.1290	2.201[illegible]	314.8	.41777	[illegible]	13.102
.6200	.5601	.3098	3.181	[illegible]	4.70	.1242	2.218[illegible]	318.5	.42056	[illegible]	14.992
.6000	.5401	.3420	3.414	[illegible]	4.99	.1190	2.233[illegible]	321.9	.42309	[illegible]	17.100
.5800	.5201	.3761	3.649	[illegible]	5.26	.1133	2.247[illegible]	325.1	.42542	[illegible]	19.452
.5600	.5002	.4120	3.887	[illegible]	5.52	.1073	2.259[illegible]	328.2	.42755	[illegible]	22.070
.5400	.4802	.4497	4.129	[illegible]	5.76	.1010	2.271[illegible]	331.1	.42951	[illegible]	24.982
.5200	.4602	.4891	4.375	[illegible]	5.98	.0945	2.281[illegible]	333.9	.43133	[illegible]	28.218
.5000	.4402	.5302	4.628	[illegible]	6.17	.0879	2.290[illegible]	336.6	.43303	[illegible]	31.834
.4800	.4202	.5730	4.887	[illegible]	6.33	.0811	2.298[illegible]	339.3	.43461	[illegible]	35.[illegible]
.4600	.4003	.6175	5.155	[illegible]	6.45	.0743	2.305[illegible]	341.9	.43609	[illegible]	40.[illegible]
.4400	.3803	.6636	5.434	[illegible]	6.54	.0676	2.312[illegible]	344.4	.43749	[illegible]	45.[illegible]
.4200	.3604	.7113	5.725	[illegible]	6.60	.0609	2.318[illegible]	347.0	.43881	[illegible]	50.[illegible]
.4000	.3404	.7607	6.030	[illegible]	6.61	.0544	2.323[illegible]	349.5	.44006	[illegible]	57.[illegible]
.3800	.3204	.8119	6.35	7.54	6.58	.0481	2.328[illegible]	352.0	.44126	[illegible]	64.[illegible]
.3600	.3005	.8650	6.70	8.03	6.51	.0421	2.332[illegible]	354.5	.44240	[illegible]	72.[illegible]
.3400	.2806	.9202	7.06	8.57	6.39	.0363	2.336[illegible]	357.1	.44349	[illegible]	81.[illegible]
.3200	.2606	.9777	7.46	9.17	6.23	.0309	2.339[illegible]	359.8	.44455	[illegible]	91.[illegible]
.3000	.2407	1.0379	7.89	9.87	6.01	.0259	2.342[illegible]	362.5	.44558	[illegible]	103.[illegible]
.2800	.2208	1.1013	8.37	10.6[illegible]	5.75	.0214	2.344[illegible]	365.3	.44658	[illegible]	118.000
.2600	.2009	1.1689	8.89	11.5[illegible]	5.45	.0172	2.347[illegible]	368.3	.44755	[illegible]	134.[illegible]
.2400	.1811	1.2418	9.49	12.6[illegible]	5.09	.0136	2.348[illegible]	371.5	.44852	[illegible]	155.223
.2200	.1613	1.3220	10.17	13.9[illegible]	4.69	.0103	2.350[illegible]	375.0	.44948	[illegible]	180.274
.2000	.1416	1.4127	10.95	15.5[illegible]	4.25	.0075	2.351[illegible]	378.8	.45045	[illegible]	211.[illegible]
.1800	.1219	1.5194	11.88	17.7[illegible]	3.76	.0053	2.352[illegible]	383.1	.45143	[illegible]	253.[illegible]
.1600	.1024	1.6517	13.00	20.5[illegible]	3.25	.0034	2.353[illegible]	388.2	.45244	[illegible]	309.[illegible]
.1400	.0832	1.8293	14.40	24.7[illegible]	2.72	.0021	2.354[illegible]	394.2	.45352	[illegible]	392.[illegible]
.1200	.0646	2.0956	16.17	31.1[illegible]	2.18	.0011	2.354[illegible]	401.9	.45470	[illegible]	523.[illegible]
.1000	.0470	2.5657	18.36	42.0[illegible]	1.702	.0005	2.354[illegible]	412.7	.45607	[illegible]	769.[illegible]
.0900	.0390	2.9739	19.51	50.4[illegible]	1.507	.0003	2.354[illegible]	420.2	.45689	[illegible]	991.[illegible]
.0800	.0316	3.6444	20.30	61.5[illegible]	1.362	.0002	2.354[illegible]	430.3	.45787	[illegible]	1366.[illegible]
.0750	.0280	4.1779	20.28	68.2[illegible]	1.308	.0002	2.355[illegible]	437.1	.45848	[illegible]	1671.[illegible]
.0700	.0242	[illegible].0091	19.59	75.7[illegible]	1.258	.0001	2.355[illegible]	446.3	.45924	[illegible]	2146.[illegible]
.0650	.0205	.5134	18.98	79.0[illegible]	1.232	.0001	2.355[illegible]	451.2	.45964	[illegible]	2432.[illegible]
.0660	.0206	.2297	19.06	82.3[illegible]	1.207	.0001	2.355[illegible]	457.7	.46014	[illegible]	2831.[illegible]
.0640	.0183	.4247	16.59	85.8[illegible]	1.168	.0001	2.355[illegible]	467.4	.46087	[illegible]	3480.[illegible]
.0620	.0147	[illegible].5374	13.74	89.1[illegible]	1.106	.0000	2.355[illegible]	488.6	.46245	[illegible]	5098.[illegible]
.0610	.0110	[illegible].7734	10.35	89.9[illegible]	1.050	.0000	2.355[illegible]	527.3	.46529	[illegible]	8741.[illegible]

TABLE XI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\overline{V}_{\gamma=o}=1.0$; $\overline{u}_a = 0.06$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\overline{V}_i = \sqrt{2}$, $\gamma_i = -6.489^{\circ}$, $e_i = 1.0000$

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	[illegible]	$-\frac{a}{g}$	$\overline{q}$	$\overline{\tau}$	t sec	$\frac{\Delta s}{r}$	$\frac{\Delta \gamma}{r}$	$\sqrt{\beta r}\,\frac{\Delta t}{\overline{V}}$
1.14214	1.3546	0.00000	6.489	6.489	0.000	0.0025	0	0	0	0	0.000
1.1421	1.3545	.00001	5.798	6.065	.000	.0079	.00	14.	.02409	.002593	.000
1.1420	1.3545	.00004	5.428	5.628	.003	.0141	.01	21.	.03702	.003864	.001
1.1415	1.3544	.00013	4.919	5.147	.007	.0290	.01	31.	.05478	.005472	.004
1.1410	1.3543	.00032	4.716	4.915	.01	.0379	.01	36.	.06187	.006070	.007
1.1400	1.3542	.00059	4.485	4.693	.02	.0508	.02	40.	.06994	.006719	.013
1.1335	1.3537	.00175	4.010	4.188	.06	.0883	.04	50.	.08652	.007950	.038
1.1330	1.3531	.00290	3.785	3.955	.11	.1123	.06	54.	.09439	.008486	.060
1.1320	1.3521	.00497	3.526	3.675	.19	.1468	.09	60.	.10379	.009096	.100
1.1310	1.3511	.00690	3.341	3.485	.26	.1728	.11	63.	.10994	.009455	.147
1.1300	1.3501	.00870	3.208	3.351	.34	.1943	.13	66.	.11458	.009720	.187
1.1250	1.3451	.01724	2.800	2.935	.68	.2700	.20	74.	.12895	.010474	.359
1.1200	1.3401	.02482	2.554	2.688	.95	.3204	.25	80.	.13766	.010881	.552
1.1100	1.3301	.03826	2.208	2.329	1.45	.3901	.34	86.	.14933	.011368	.825
1.1000	1.3200	.04994	2.000	2.103	1.89	.4376	.42	91.	.15762	.011675	1.086
1.0900	1.3000	.07000	1.672	1.747	2.61	.4985	.54	99.	.16952	.012066	1.544
1.0800	1.2800	.08659	1.429	1.504	3.18	.5331	.61	104.	.17916	.012318	1.938
1.0750	1.2600	.10043	1.233	1.307	3.62	.5518	.74	109.	.18698	.012500	2.282
1.0700	1.2400	.11202	1.068	1.133	3.98	.5597	.83	113.	.19397	.012638	2.585
1.0600	1.2200	.12167	.924	.980	4.24	.5598	.91	117.	.20015	.012747	2.850
1.0500	1.2000	.12959	.796	.844	4.44	.5542	.99	121.	.20599	.012835	3.086
1.0400	1.1800	.13595	.681	.722	4.58	.5441	1.06	125.	.21153	.012906	3.290
1.0300	1.1600	.14101	.577	.611	4.67	.5307	1.13	128.	.21685	.012964	3.467
1.0200	1.1400	.14477	.463	.491	4.70	.5146	1.20	132.	.22201	.013012	3.619
1.0100	1.1200	.14742	.337	.357	4.70	.4966	1.27	136.	.22707	.013051	3.748
1.0000	1.1000	.14907	.320	.339	4.66	.4771	1.34	140.	.23207	.013082	3.855
1.0400	1.0800	.14977	.252	.267	4.60	.4566	1.39	143.	.23704	.013107	3.941
1.0300	1.0600	.14966	.184	.195	4.50	.4354	1.45	147.	.24200	.013126	4.009
1.0200	1.0400	.14889	.134	.142	4.39	.4138	1.50	150.	.24699	.013140	4.060
1.0100	1.0200	.14743	.088	.093	4.26	.3921	1.56	153.	.25203	.013149	4.095
1.0000	1.0000	.14550	.051	.054	4.12	.3705	1.61	157.	.25714	.013156	4.118
1.0400	.9800	.14318	.023	.024	3.97	.3492	1.67	161.	.26233	.013159	4.130
1.0300	.9600	.14056	.006	.006	3.81	.3285	1.72	164.	.26763	.013160	4.135
1.0200	.9400	.13792	.000	.000	3.65	.3084	1.77	168.	.27304	.013160	4.136
.9900	.9200	.13511	.006	.007	3.50	.2892	1.82	171.	.27858	.013160	4.136
.9600	.9000	.13259	.027	.029	3.36	.2709	1.87	174.	.28424	.013162	4.142
.9400	.8800	.13038	.063	.067	3.22	.2537	1.92	178.	.29002	.013166	4.159
.9200	.8600	.12857	.115	.123	3.10	.2378	1.97	181.	.29591	.013175	4.192
.9000	.8400	.12719	.186	.199	3.00	.2231	2.01	184.	.30188	.013191	4.252
.8800	.8200	.12744	.276	.297	2.92	.2098	2.07	188.	.30790	.013215	4.345
.8600	.8000	.12850	.387	.416	2.87	.1979	2.10	192.	.31392	.013250	4.483
.8400	.7800	.13032	.517	.557	2.85	.1874	2.14	195.	.31989	.013296	4.676
.8200	.7600	.13294	.668	.720	2.85	.1781	2.18	217.	.32574	.013357	4.936
.8000	.7400	.13637	.836	.904	2.89	.1700	2.21	223.	.33140	.013431	5.277
.7800	.7200	.14040	1.021	1.107	2.96	.1629	2.25	229.	.33683	.013519	5.711
.7600	.7000	.15837	1.221	1.327	3.06	.1566	2.28	234.	.34197	.013619	6.251
.7400	.6800	.17044	1.433	1.563	3.20	.1509	2.31	239.	.34679	.013731	6.911
.7200	.6600	.18497	1.654	1.805	3.36	.1457	2.34	245.	.35128	.013851	7.705
.7000	.6400	.20117	1.883	2.060	3.54	.1407	2.36	249.	.35543	.013979	8.646
.6800	.6201	.22009	2.118	2.323	3.75	.1359	2.39	254.	.35924	.014112	9.745
.6600	.6001	.24285	2.358	2.594	3.97	.1310	2.42	258.	.36274	.014249	11.021
.6400	.5801	.26964	2.601	2.870	4.20	.1259	2.45	262.	.36595	.014388	12.488
.6200	.5601	.29277	2.848	3.153	4.44	.1207	2.48	266.	.36889	.014528	14.162
.6000	.5401	.32112	3.098	3.442	4.69	.1153	2.51	270.	.37159	.014668	16.062
.5800	.5201	.35203	3.351	3.737	4.93	.1096	2.47	273.	.37406	.014807	18.209
.5600	.5001	.38502	3.608	4.040	5.16	.1037	2.48	276.	.37634	.014945	20.626
.5400	.4802	.42002	3.869	4.350	5.38	.0977	2.50	279.	.37845	.015083	23.343
.5200	.4602	.45742	4.135	4.674	5.59	.0914	2.51	282.	.38040	.015219	26.399
.5000	.4402	.49673	4.408	5.002	5.78	.0850	2.50	286.	.38221	.015354	29.803
.4800	.4202	.53812	4.688	5.336	5.94	.0786	2.52	288.	.38390	.015489	33.628
.4600	.4003	.58142	4.976	5.671	6.08	.0721	2.53	291.	.38547	.015622	37.918
.4400	.3803	.62682	5.275	6.007	6.18	.0655	2.54	294.	.38696	.015755	42.734
.4200	.3603	.67422	5.586	6.343	6.25	.0593	2.55	296.	.38835	.015887	48.153
.4000	.3404	.72362	5.912	6.680	6.29	.0530	2.55	299.	.38967	.016020	54.269
.3800	.3204	.77522	6.25	7.02	6.28	.0470	2.55	302.	.39093	.016154	61.196
.3600	.3005	.82902	6.62	7.36	6.24	.0412	2.56	304.	.39212	.016288	69.080
.3400	.2805	.88522	7.01	8.04	6.15	.0356	2.56	307.	.39326	.016425	78.104
.3200	.2606	.94412	7.42	9.12	6.01	.0304	2.57	310.	.39436	.016564	88.505
.3000	.2407	1.00602	7.87	9.83	5.83	.0255	2.57	313.	.39542	.016706	100.497
.2800	.2208	1.07115	8.37	10.64	5.60	.0211	2.57	316.	.39645	.016853	114.803
.2600	.2009	1.14114	8.91	11.57	5.32	.0170	2.57	319.	.39746	.017005	131.703
.2400	.1811	1.21711	9.54	12.72	4.99	.0134	2.59	323.	.39844	.017166	152.131
.2200	.1613	1.30031	10.22	14.09	4.61	.0102	2.58	326.	.39942	.017336	177.313
.2000	.1416	1.39141	11.02	15.77	4.19	.0075	2.58	329.	.40040	.017519	209.15
.1800	.1219	1.50461	11.96	17.85	3.73	.0052	2.58	331.	.40139	.017721	250.77
.1600	.1025	1.64091	13.10	20.46	3.23	.0035	2.58	334.	.40242	.017945	307.67
.1400	.0833	1.82251	14.50	24.70	2.71	.0021	2.58	337.	.40350	.018213	390.54
.1200	.0646	2.09281	16.25	31.11	2.19	.0011	2.58	340.	.40468	.018533	523.21
.1000	.0471	2.56641	18.43	42.11	1.70	.0005	2.58	342.	.40606	.018967	769.90
.0900	.0390	2.97541	19.55	50.[illegible]	1.510	.0003	2.5863	[illegible]	.40687	.019249	931.81
.0800	.0316	3.64601	20.32	61.[illegible]	1.364	.0002	2.5864	[illegible]	.40785	.019605	1137.26
.0700	.0250	4.17921	20.29	68.[illegible]	1.309	.0002	2.5864	[illegible]	.40845	.019829	1271.69
.0600	.0242	5.00981	19.59	75.[illegible]	1.259	.0001	2.5865	[illegible]	.40922	.020107	1447.0
.0680	.0095	5.5139	18.99	79.[illegible]	1.234	.0001	2.5865	[illegible]	.40961	.020246	[illegible]
.0660	.0207	6.2299	18.06	82.[illegible]	1.207	.0001	2.5865	[illegible]	.41012	.020414	[illegible]
.0640	.0183	7.4243	16.59	85.[illegible]	1.169	.0001	2.5865	[illegible]	.41085	.020644	[illegible]
.0620	.0147	10.5311	13.74	89.[illegible]	1.106	.0000	2.5866	[illegible]	.41242	.021067	[illegible]
.0610	.0110	17.3256	10.38	89.[illegible]	1.024	.0000	2.5866	[illegible]	.41510	.021635	[illegible]

TABLE XI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\bar{V}_{\gamma=0}=1.0$; $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\bar{V}_i = \sqrt{3}$, $\gamma_i = -7.701^{\circ}$, $e_i = 1.9865$

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\ddot{u}_r}{g}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta x}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.73205	1.6724	0.0000017	7.701	7.976	0.0001	0.0047	0	0	0	0	0.000
1.7310	1.6714	.0000438	6.603	6.840	.0021	.0235	.0060	13.7	.02876	.003609	.001
1.7300	1.6703	.0005938	5.565	5.765	.0287	.0863	.0293	26.6	.05595	.006508	.010
1.7280	1.6682	.004375	4.614	4.780	.211	.2336	.0945	38.5	.08089	.008728	.076
1.7250	1.6652	.010932	4.104	4.251	.527	.3676	.1638	44.8	.09429	.009749	.190
1.7200	1.6601	.02130	3.688	3.821	1.024	.5092	.2470	50.0	.10522	.010494	.372
1.7150	1.6551	.03097	3.432	3.557	1.484	.6093	.3128	53.3	.11196	.010913	.542
1.7100	1.6501	.04009	3.244	3.362	1.915	.6879	.3694	55.6	.11693	.011203	.703
1.7000	1.6401	.05703	2.968	3.076	2.71	.8081	.4660	59.2	.12427	.011601	1.000
1.6800	1.6201	.08713	2.596	2.692	4.08	.9684	.6234	64.0	.13423	.012085	1.556
1.6600	1.6001	.11351	2.332	2.419	5.25	1.0712	.7545	67.5	.14137	.012392	2.051
1.6400	1.5800	.13700	2.124	2.204	6.26	1.1401	.8697	70.3	.14709	.012615	2.500
1.6200	1.5600	.15810	1.949	2.024	7.13	1.1861	.9739	72.8	.15195	.012788	2.908
1.6000	1.5400	.17713	1.797	1.867	7.88	1.2153	1.0698	74.9	.15623	.012928	3.321
1.5500	1.4900	.2170	1.483	1.543	9.33	1.2379	1.2837	79.7	.16535	.013189	4.201
1.5000	1.4400	.2477	1.226	1.279	10.27	1.2135	1.4712	83.8	.17311	.013372	4.954
1.4500	1.3900	.2707	1.011	1.054	10.82	1.1603	1.6398	87.7	.18008	.013508	5.600
1.4000	1.3400	.2869	.820	.857	11.04	1.0893	1.7940	91.4	.18658	.013612	6.148
1.3500	1.2900	.2973	.651	.681	10.99	1.0074	1.9366	95.1	.19281	.013692	6.600
1.3000	1.2400	.3064	.499	.524	10.73	.9196	2.0695	98.9	.19890	.013753	6.979
1.2500	1.1900	.3030	.365	.384	10.30	.8296	2.1941	102.8	.20496	.013798	7.271
1.2000	1.1400	.2995	.248	.261	9.73	.7401	2.3115	106.9	.21107	.013831	7.487
1.1800	1.1200	.2971	.206	.217	9.47	.7050	2.3567	108.6	.21355	.013841	7.553
1.1600	1.1000	.2942	.167	.176	9.21	.6703	2.4008	110.3	.21606	.013849	7.609
1.1400	1.0800	.2909	.131	.139	8.93	.6363	2.4441	112.1	.21859	.013855	7.654
1.1200	1.0600	.2871	.099	.105	8.64	.6030	2.4864	114.0	.22117	.013861	7.690
1.1000	1.0400	.2829	.071	.075	8.35	.5705	2.5278	115.9	.22378	.013864	7.716
1.0800	1.0200	.2785	.047	.050	8.05	.5389	2.5684	117.9	.22644	.013867	7.735
1.0600	1.0000	.2737	.027	.029	7.75	.5082	2.6082	120.0	.22915	.013869	7.747
1.0400	.9800	.2688	.013	.013	7.45	.4785	2.6471	122.1	.23191	.013870	7.754
1.0200	.9600	.2637	.003	.003	7.15	.4499	2.6853	124.4	.23474	.013870	7.757
1.0000	.9400	.2586	.000	.000	6.85	.4224	2.7227	126.7	.23762	.013870	7.757
.9800	.9200	.2534	.003	.004	6.57	.3960	2.7592	129.1	.24057	.013870	7.757
.9600	.9000	.2483	.014	.015	6.29	.3708	2.7950	131.7	.24359	.013870	7.750
.9400	.8800	.2434	.033	.036	6.02	.3468	2.8300	134.3	.24668	.013872	7.739
.9200	.8600	.2388	.062	.069	5.76	.3241	2.8642	137.1	.24984	.013874	7.787
.9000	.8400	.2346	.100	.107	5.52	.3026	2.8975	140.0	.25307	.013879	7.819
.8800	.8200	.2308	.149	.160	5.29	.2824	2.9300	143.1	.25637	.013886	7.809
.8600	.8000	.2277	.211	.227	5.08	.2635	2.9616	146.2	.25972	.013896	7.944
.8400	.7800	.2254	.286	.308	4.90	.2458	2.9922	149.5	.26313	.013911	8.050
.8200	.7600	.2240	.374	.404	4.73	.2294	3.0218	152.9	.26658	.013931	8.195
.8000	.7400	.2237	.478	.517	4.59	.2143	3.0504	156.4	.27006	.013957	8.387
.7800	.7200	.2246	.597	.647	4.48	.2003	3.0779	160.0	.27355	.013989	8.638
.7600	.7000	.2269	.733	.796	4.39	.1874	3.1042	163.7	.27703	.014030	8.957
.7400	.6800	.2308	.885	.963	4.33	.1756	3.1292	167.5	.28049	.014078	9.358
.7200	.6600	.2365	1.053	1.149	4.29	.1648	3.1530	171.3	.28388	.014136	9.854
.7000	.6400	.2441	1.238	1.354	4.28	.1548	3.1754	175.1	.28721	.014208	10.460
.6800	.6200	.2537	1.438	1.577	4.30	.1456	3.1965	179.0	.29044	.014277	11.193
.6600	.6000	.2656	1.652	1.817	4.35	.1370	3.2162	182.8	.29355	.014361	12.071
.6400	.5800	.2797	1.880	2.075	4.41	.1290	3.2345	186.5	.29654	.014453	13.113
.6200	.5601	.2963	2.121	2.349	4.50	.1216	3.2515	190.2	.29938	.014553	14.339
.6000	.5401	.3155	2.374	2.638	4.60	.1142	3.2672	193.8	.30208	.014659	15.778
.5800	.5201	.3371	2.638	2.943	4.72	.1073	3.2815	197.4	.30463	.014770	17.438
.5600	.5001	.3615	2.913	3.262	4.84	.1005	3.2947	200.8	.30704	.014887	19.365
.5400	.4801	.3885	3.198	3.597	4.97	.0939	3.3067	204.2	.30929	.015007	21.582
.5200	.4601	.4182	3.492	3.947	5.11	.0874	3.3176	207.5	.31147	.015131	24.127
.5000	.4402	.4507	3.797	4.314	5.24	.0810	3.3274	210.7	.31340	.015257	27.039
.4800	.4202	.4859	4.113	4.700	5.36	.0746	3.3363	213.8	.31527	.015386	30.366
.4600	.4002	.5238	4.440	5.105	5.47	.0684	3.3444	216.9	.31702	.015517	34.163
.4400	.3802	.5646	4.780	5.533	5.57	.0623	3.3516	219.9	.31867	.015650	38.497
.4200	.3603	.6083	5.133	5.987	5.64	.0563	3.3580	222.8	.32022	.015784	43.447
.4000	.3403	.6548	5.503	6.472	5.69	.0504	3.3637	225.8	.32168	.015921	49.109
.3800	.3204	.7043	5.89	6.99	5.71	.0448	3.3688	228.7	.32307	.016059	55.604
.3600	.3004	.7570	6.30	7.56	5.69	.0393	3.3733	231.6	.32438	.016199	63.080
.3400	.2805	.8129	6.74	8.17	5.64	.0341	3.3773	234.5	.32563	.016341	71.727
.3200	.2606	.8724	7.20	8.86	5.55	.0292	3.3807	237.5	.32682	.016487	81.790
.3000	.2407	.9359	7.70	9.62	5.42	.0246	3.3837	240.6	.32797	.016637	93.590
.2800	.2208	1.0039	8.24	10.48	5.24	.0204	3.3863	243.7	.32908	.016796	107.561
.2600	.2009	1.0773	8.84	11.47	5.02	.0165	3.3885	247.0	.33015	.016957	124.299
.2400	.1811	1.1572	9.50	12.64	4.74	.0130	3.3904	250.5	.33119	.017121	144.655
.2200	.1613	1.2458	10.24	14.04	4.42	.0100	3.3920	254.2	.33222	.017299	169.886
.2000	.1416	1.3462	11.09	15.77	4.05	.0074	3.3933	258.2	.33324	.017491	201.93
.1800	.1220	1.4638	12.08	17.99	3.63	.0052	3.3943	262.7	.33426	.017702	243.96
.1600	.1025	1.6084	13.25	20.96	3.17	.0034	3.3951	267.9	.33531	.017937	301.57
.1400	.0834	1.7992	14.68	25.19	2.68	.0021	3.3957	274.1	.33641	.018210	385.55
.1200	.0647	2.0794	16.44	31.66	2.18	.0011	3.3963	281.9	.33761	.018542	519.85
.1000	.0472	2.5692	18.58	42.49	1.711	.0005	3.3965	292.7	.33898	.018977	768.65
.0900	.0391	2.9745	19.67	50.75	1.517	.0003	3.3966	300.2	.33980	.019260	991.52
.0800	.0316	3.6465	20.39	61.73	1.369	.0002	3.3967	310.2	.34077	.019617	1367.44
.0750	.0280	4.1795	20.32	68.37	1.313	.0002	3.3967	317.0	.34137	.019840	1671.80
.0700	.0242	5.0094	19.61	75.81	1.261	.0001	3.3968	326.2	.34214	.020118	2146.9
.0680	.0226	5.5132	19.00	79.02	1.237	.0001	3.3968	331.1	.34253	.020257	2432.3
.0660	.0207	6.2289	18.07	82.36	1.208	.0001	3.3968	337.6	.34303	.020425	2831.3
.0640	.0183	7.4231	16.59	85.82	1.168	.0001	3.3968	347.3	.34377	.020655	3479.6
.0620	.0147	10.5302	13.74	89.12	1.105	.0000	3.3969	368.5	.34534	.021073	5095.3
.0610	.0110	17.3264	10.38	89.99	1.029	.0000	3.3969	405.0	.34802	.021646	8521.2

TABLE XI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF EARTH SO THAT $\bar{V}_{\gamma=0}=1.0$; $\bar{u}_a = 0.06$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(f) $\bar{V}_i = 2.0$, $\gamma_i = -8.271^{\circ}$, $e_i = 2.9722$

$\bar{V}$	$\bar{V}_x$	Z	γ deg	$-\Lambda$ deg	$-\frac{\Omega_x}{c}$	$\bar{q}$	$\bar{\bar{q}}$	$\frac{\Omega}{c}$	$\frac{\Delta r}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{\Delta V}{\bar{V}}$
1.0000	1.2400	0.0000020	5.271	8.526	0.0001	0.0073	0	[illegible]	0	0	0.000
.9990	1.9990	.0000121	5.358	7.894	[illegible]	.0179	.0026	[illegible]	.01427	.001997	0.000
.9980	1.9980	.0000714	5.798	7.215	[illegible]	.0496	.0093	[illegible]	.04963	.003972	.001
.9960	1.9960	.0013435	6.744	5.921	[illegible]	.1364	.0540	[illegible]	.05846	.007235	[illegible]
.9940	1.9940	.005091	6.072	5.230	[illegible]	.2856	.1176	[illegible]	.07450	.008716	.077
.9920	1.9920	.009563	4.721	4.867	[illegible]	.4698	.1709	[illegible]	.08270	.009419	.144
.9900	1.9300	.014116	4.490	4.699	[illegible]	.6157	.2158	[illegible]	.08809	.009853	.213
.9850	1.9250	.02523	4.121	4.244	[illegible]	.9444	.3072	[illegible]	.09670	.010501	.381
.9800	1.9200	.03584	3.981	4.002	[illegible]	[illegible]024	.3820	[illegible]	.10231	.010894	.543
.9700	1.9100	.05553	3.555	3.666	[illegible]	1.1022	.5053	[illegible]	.10995	.011390	.849
.9600	1.9000	.07423	3.325	3.430	[illegible]	1.1650	.6086	[illegible]	.11534	.011714	1.148
.9400	1.8800	.10804	2.997	3.002	[illegible]	1.9683	.7822	[illegible]	.12310	.012142	1.671
1.9200	1.8600	.13856	2.755	2.844	[illegible]	1.7289	.9294	[illegible]	.12883	.012430	2.165
1.9000	1.8401	.16645	2.561	2.645	[illegible]	1.8440	1.0598	[illegible]	.13347	.012646	2.628
1.8500	1.7901	.2270	2.189	2.262	[illegible]	[illegible]93	1.3394	[illegible]	.14250	.013020	3.682
1.8000	1.7401	.2771	1.904	1.970	[illegible]	[illegible]471	1.5765	[illegible]	.14956	.013272	4.619
1.7500	1.6901	.3186	1.669	1.728	[illegible]	[illegible]997	1.7855	[illegible]	.15553	.013459	5.462
1.7000	1.6401	.3528	1.465	1.518	[illegible]	[illegible]995	1.9740	[illegible]	.16085	.013604	6.226
1.6500	1.5901	.3805	1.283	1.332	[illegible]	1.9303	2.1464	[illegible]	.16573	.013721	6.918
1.6000	1.5401	.4022	1.119	1.162	[illegible]	1.8413	2.3057	[illegible]	.17038	.013817	7.542
1.5500	1.4901	.4187	.967	1.006	[illegible]	[illegible]92	2.4540	[illegible]	.17470	.013897	8.103
1.5000	1.4401	.4302	.827	.862	[illegible]	[illegible]691	2.5928	[illegible]	.17895	.013963	8.603
1.4500	1.3901	.4371	.697	.727	[illegible]	[illegible]746	2.7233	[illegible]	.18312	.014019	9.044
1.4000	1.3401	.4398	.576	.602	[illegible]	[illegible]487	2.8463	[illegible]	.18726	.014065	9.429
1.3500	1.2901	.4387	.463	.485	[illegible]	[illegible]238	2.9625	[illegible]	.19141	.014102	9.759
1.3000	1.2401	.4340	.359	.377	[illegible]	[illegible]017	3.0727	[illegible]	.19560	.014132	10.034
1.2500	1.1901	.4261	.265	.278	[illegible]	[illegible]839	3.1773	[illegible]	.19986	.014155	10.227
1.2000	1.1401	.4153	.181	.190	[illegible]	[illegible]716	3.2767	[illegible]	.20424	.014172	10.383
1.1500	1.0901	.4021	.109	.115	[illegible]	[illegible]658	3.3712	[illegible]	.20877	.014184	10.490
1.1000	1.0401	.3869	.052	.055	[illegible]	[illegible]671	3.4611	[illegible]	.21348	.014190	10.551
1.0500	.9901	.3702	.014	.015	[illegible]	[illegible]761	3.5466	[illegible]	.21842	.014193	10.577
1.0000	.9401	.3527	.000	.000	9.35	.4933	3.6279	[illegible]	.22362	.014193	10.581
.9800	.9201	.3457	.003	.003	8.96	.4625	3.6592	[illegible]	.22578	.014193	10.581
.9600	.9001	.3387	.011	.011	8.57	.4330	3.6898	[illegible]	.22800	.014193	10.581
.9400	.8801	.3318	.025	.025	8.20	.4049	3.7198	[illegible]	.23026	.014194	10.590
.9200	.8601	.3252	.045	.048	7.84	.3781	3.7491	[illegible]	.23258	.014195	10.601
.9000	.8401	.3188	.073	.079	7.50	.3528	3.7777	[illegible]	.23496	.014198	10.620
.8800	.8201	.3128	.110	.118	7.17	.3287	3.8055	[illegible]	.23738	.014202	10.661
.8600	.8001	.3073	.155	.167	6.86	.3060	3.8327	[illegible]	.23987	.014207	10.716
.8400	.7801	.3023	.211	.227	6.57	.2847	3.8591	[illegible]	.24240	.014215	10.791
.8200	.7601	.2980	.277	.299	6.30	.2646	3.8847	[illegible]	.24498	.014226	10.901
.8000	.7401	.2946	.356	.384	[illegible]05	.2459	3.9095	[illegible]	.24761	.014241	11.044
.7800	.7201	.2921	.447	.484	[illegible]82	.2284	3.9335	[illegible]	.25027	.014255	11.233
.7600	.7001	.2906	.552	.599	[illegible]62	.2121	3.9566	[illegible]	.25297	.014285	11.477
.7400	.6801	.2904	.671	.731	[illegible]44	.1970	3.9788	[illegible]	.25568	.014312	11.777
.7200	.6601	.2917	.806	.880	[illegible]29	.1830	4.0001	[illegible]	.25841	.014347	12.151
.7000	.6401	.2944	.958	1.047	[illegible]17	.1700	4.0204	[illegible]	.26113	.014389	12.619
.6800	.6201	.2989	.125	1.234	[illegible]07	.1580	4.0397	[illegible]	.26383	.014438	13.184
.6600	.6001	.3053	.310	1.441	[illegible]	.1469	4.0579	[illegible]	.26651	.014494	13.877
.6400	.5801	.3138	.511	1.667	4.95	.1366	4.0751	[illegible]	.26913	.014556	14.709
.6200	.5601	.3245	1.729	1.914	4.92	.1271	4.0912	[illegible]	.27169	.014631	15.70
.6000	.5401	.3375	1.963	2.181	4.92	.1181	4.1062	[illegible]	.27419	.014712	16.87
.5800	.5201	.3530	2.213	2.468	4.94	.1097	4.1201	[illegible]	.27659	.014799	18.26
.5600	.5001	.3712	2.479	2.776	4.97	.1018	4.1330	[illegible]	.27891	.014894	19.88
.5400	.4801	.3921	2.760	3.105	5.02	.0943	4.1449	[illegible]	.28113	.014995	21.78
.5200	.4601	.4159	3.056	3.455	5.08	.0871	4.1558	[illegible]	.28324	.015103	23.995
.5000	.4401	.4426	3.367	3.826	5.14	.0802	4.1657	[illegible]	.28525	.015216	26.559
.4800	.4201	.4724	3.693	4.220	[illegible]	.0736	4.1747	[illegible]	.28716	.015333	29.52
.4600	.4001	.5053	4.034	4.639	[illegible]	.0672	4.1828	[illegible]	.28897	.015451	32.95
.4400	.3801	.5414	4.392	5.084	[illegible]	.0610	4.1902	[illegible]	.29068	.015568	36.92
.4200	.3601	.5808	4.766	5.559	[illegible]	.0550	4.1967	[illegible]	.29230	.015711	41.48
.4000	.3401	.6236	5.160	6.068	[illegible]	.0492	4.2026	[illegible]	.29384	.015844	46.77
.3800	.3201	.6699	[illegible]57	6.62	[illegible]	.0437	4.2078	[illegible]	.29529	.015981	52.89
.3600	.3001	.7200	[illegible]01	7.21	[illegible]	.0383	4.2124	[illegible]	.29668	.016121	59.99
.3400	.2801	.7739	[illegible]48	7.86	5.37	.0333	4.2165	[illegible]	.29799	.016265	68.28
.3200	.2601	.8320	[illegible]97	8.57	5.30	.0285	4.2200	[illegible]	.29925	.016413	78.00
.3000	.2401	.8948	[illegible]51	9.37	5.18	.0241	4.2231	[illegible]	.30045	.016565	89.47
.2800	.2201	.9627	8.08	10.27	5.03	.0200	4.2258	[illegible]	.30160	.016723	103.14
.2600	.2001	1.0368	8.72	11.31	4.83	.0162	4.2280	[illegible]	.30272	.016888	119.62
.2400	.1801	1.1182	9.41	12.52	4.58	.0128	4.2299	[illegible]	.30380	.017061	139.77
.2200	.1601	1.2090	10.20	13.97	4.29	.0098	4.2315	[illegible]	.30487	.017244	164.85
.2000	.1401	1.3124	11.08	15.75	3.95	.0073	4.2328	[illegible]	.30592	.017444	196.85
.1800	.1201	1.4338	12.11	18.03	3.56	.0051	4.2339	[illegible]	.30697	.017667	238.97
.1600	.1001	1.5832	13.31	21.06	3.12	.0034	4.2347	[illegible]	.30804	.017917	296.84
.1400	.0801	1.7797	14.77	25.34	.65	.0021	4.2353	[illegible]	.30915	.018178	381.31
.1200	.0601	2.0664	16.55	31.85	.17	.0011	4.2357	[illegible]	.31035	.018513	516.60
.1000	.0401	2.5559	18.68	42.68	1.712	.0005	4.2360	[illegible]	.31174	.018996	766.78
.0900	.0301	2.9711	19.75	50.90	1.520	.0004	4.2362	[illegible]	.31255	.019238	990.35
.0800	.0201	3.6446	20.44	61.82	1.373	.0002	4.2363	[illegible]	.31353	.019594	1366.73
.0750	.0151	4.1778	20.36	68.43	1.315	.0002	4.2363	[illegible]	.31412	.019818	1671.13
.0700	.0101	5.0076	20.63	75.83	1.262	.0001	4.2364	[illegible]	.31489	.020090	2146.1
.0680	.0081	5.5113	20.01	79.03	1.238	.0001	4.2364	[illegible]	.31528	.020233	2431.4
.0660	.0061	6.2268	18.07	82.37	1.208	.0001	4.2364	[illegible]	.31578	.020406	2830.4
.0640	.0041	7.4211	16.59	85.82	.168	.0001	4.2364	[illegible]	.31652	.020633	3478.6
.0620	.0021	10.5289	13.74	89.12	1.105	.0000	4.2365	[illegible]	.31809	.021056	5094.6
.0610	.0011	17.3246	10.38	89.99	1.029	.0000	4.2365	[illegible]	.32077	.021624	8520.3

TABLE XII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.07$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 200$

(a) $\gamma_i = -5^{\circ}$, $e_i = 0.0872$

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{\gamma}_i}{r}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta a}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0000	1.0698	0.000[illegible]	5.000	4.673	[illegible]	0.0012	0	0	0	0	0.000
1.0010	1.0708	.000[illegible]	4.999	4.672	[illegible]	.0015	.0[illegible]	48.[illegible]	.02291	.002004	.000
1.0020	1.0718	.000[illegible]	4.995	4.669	[illegible]	.0018	.0[illegible]	98.[illegible]	.04590	.004014	.000
1.0030	1.0728	.000[illegible]	4.988	4.663	[illegible]	.0023	.0[illegible]	147.[illegible]	.06900	.006032	.000
1.0050	1.0748	.000[illegible]	4.967	4.648	[illegible]	.0034	.0[illegible]	246.[illegible]	.11556	.010088	.000
1.0100	1.0798	.000[illegible]	4.865	4.550	[illegible]	.0097	.0[illegible]	500.[illegible]	.23554	.020418	.001
1.0150	1.0848	.000[illegible]	4.670	4.369	[illegible]	.0310	[illegible]	790.[illegible]	.37303	.031901	.008
1.0148	1.0846	.002[illegible]	4.520	4.299	[illegible]	.0[illegible]	[illegible]	966.[illegible]	.45719	.038666	.032
1.0150	1.0848	.005[illegible]	4.415	4.250	[illegible]	.0971	[illegible]	1092.[illegible]	.51671	.043315	.082
1.0100	1.0798	.012[illegible]	4.347	4.065	[illegible]	.1385	[illegible]	1193.[illegible]	.56489	.047005	.171
1.0050	1.0748	.017[illegible]	4.327	4.045	[illegible]	.1647	[illegible]	1245.[illegible]	.58956	.048874	.249
1.0000	1.0698	.02[illegible]	4.323	4.041	[illegible]	.1850	[illegible]	1282.[illegible]	.60683	.050181	.323
.9950	1.0648	.02785	4.328	4.044	[illegible]	.2020	[illegible]	1311.[illegible]	.62027	.051197	.396
.9900	1.0598	.03276	4.340	4.053	[illegible]	.2165	[illegible]	1334.[illegible]	.63132	.052034	.468
.9800	1.0498	.04240	4.373	4.082	[illegible]	.2406	[illegible]	1372.[illegible]	.64892	.053375	.612
.9600	1.0298	.06120	4.468	4.165	[illegible]	.2760	[illegible]	1428.4	.67413	.055321	.903
.9400	1.0098	.07998	4.587	4.269	[illegible]	.3003	[illegible]	1469.0	.69228	.056756	1.203
.9200	.9898	.09[illegible]	4.720	4.387	[illegible]	.3174	[illegible]	1501.[illegible]	.70647	.057911	1.516
.9000	.9698	.1172	4.866	4.515	[illegible]	.3292	[illegible]	1528.8	.71812	.058887	1.842
.8800	.9498	.1354	5.022	4.653	[illegible]	.3368	[illegible]	1552.[illegible]	.72798	.059740	2.185
.8600	.9297	.1547	5.188	4.798	[illegible]	.3410	.8[illegible]	1573.[illegible]	.73653	.060503	2.546
.8400	.9097	.1737	5.363	4.951	[illegible]	.3424	.9097	1592.[illegible]	.74405	.061197	2.925
.8200	.8897	.1927	5.547	5.112	[illegible]	.3415	.9[illegible]	1609.[illegible]	.75076	.061838	3.324
.8000	.8697	.2115	5.740	5.279	[illegible]	.3386	.9851	1625.8	.75681	.062435	3.746
.7800	.8497	.2312	5.94	5.45	[illegible]	.3340	1.0[illegible]	1640.6	.76231	.062998	4.192
.7600	.8296	.2506	6.15	5.64	[illegible]	.3279	1.0[illegible]	1654.6	.76734	.063530	4.664
.7400	.8096	.2701	6.37	5.82	[illegible]	.3206	1.0[illegible]	1667.6	.77197	.064039	5.163
.7200	.7896	.2898	6.61	6.02	[illegible]	.3123	1.1[illegible]	1680.4	.77626	.064526	5.692
.7000	.7696	.3095	6.85	6.23	[illegible]	.3030	1.1[illegible]	1692.[illegible]	.78025	.064996	6.253
.6800	.7495	.3293	7.10	6.44	[illegible]	.2930	1.1616	1703.8	.78397	.065451	6.848
.6600	.7295	.3491	7.37	6.66	[illegible]	.2823	1.1739	1715.[illegible]	.78745	.065893	7.481
.6400	.7094	.3690	7.65	6.89	[illegible]	.2711	1.1928	1725.[illegible]	.79072	.066324	8.154
.6200	.6894	.3889	7.94	7.14	[illegible]	.2595	1.2114	1736.[illegible]	.79380	.066746	8.872
.6000	.6694	.4089	8.25	7.39	[illegible]	.2476	1.2[illegible]	1746.7	.79671	.067159	9.637
.5800	.6493	.4287	8.58	7.65	[illegible]	.2354	1.2[illegible]	1756.[illegible]	.79946	.067566	10.454
.5600	.6293	.4485	8.92	7.93	[illegible]	.2230	1.2[illegible]	1766.4	.80207	.067968	11.327
.5400	.6092	.4682	9.29	8.22	[illegible]	.2105	1.2[illegible]	1776.[illegible]	.80455	.068364	12.263
.5200	.5891	.4878	9.67	8.53	[illegible]	.1980	1.2[illegible]	1785.7	.80691	.068758	13.267
.5000	.5691	.5072	10.09	8.85	[illegible]	.1856	1.2[illegible]	1795.[illegible]	.80915	.069149	14.346
.4800	.5490	.5264	10.53	9.20	[illegible]	.1733	1.3[illegible]	1804.[illegible]	.81129	.069538	15.508
.4600	.5289	.5452	11.01	9.56	[illegible]	.1611	1.3[illegible]	1814.[illegible]	.81334	.069927	16.762
.4400	.5088	.5637	11.52	9.94	[illegible]	.1491	1.3[illegible]	1823.6	.81530	.070316	18.119
.4200	.4887	.5818	12.07	10.35	[illegible]	.1374	1.3[illegible]	1833.0	.81717	.070707	19.592
.4000	.4686	.5994	12.67	10.79	[illegible]	.1259	1.3[illegible]	1842.[illegible]	.81896	.071100	21.193
.3800	.4484	.6164	13.32	11.26	[illegible]	.1148	1.3[illegible]	1852.[illegible]	.82068	.071496	22.942
.3600	.4283	.6328	14.04	11.77	[illegible]	.1041	1.3[illegible]	1861.[illegible]	.82233	.071897	24.857
.3400	.4081	.6483	14.84	12.32	[illegible]	.0938	1.3[illegible]	1871.7	.82391	.072304	26.964
.3200	.3879	.6628	15.72	12.92	[illegible]	.0840	1.3[illegible]	1881.[illegible]	.82542	.072718	29.293
.3000	.3676	.6763	16.71	13.57	[illegible]	.0746	1.3[illegible]	1892.[illegible]	.82688	.073142	31.881
.2800	.3473	.6885	17.83	14.29	[illegible]	.0657	1.3[illegible]	1903.2	.82828	.073576	34.774
.2600	.3270	.6992	19.11	15.09	[illegible]	.0573	1.3[illegible]	1914.4	.82962	.074023	38.031
.2400	.3065	.7082	20.59	15.99	[illegible]	.0495	1.3941	1925.8	.83091	.074488	41.730
.2200	.2860	.7152	22.34	17.00	[illegible]	.0422	1.3979	1938.0	.83214	.074972	45.973
.2000	.2653	.7199	24.43	18.16	[illegible]	.0354	1.4012	1951.[illegible]	.83332	.075481	50.903
.1800	.2445	.7220	26.98	19.52	[illegible]	.0293	1.4040	1965.1	.83445	.076023	56.724
.1600	.2233	.7212	30.20	21.13	[illegible]	.0236	1.4064	1980.4	.83552	.076606	63.746
.1400	.2017	.7175	34.41	23.10	[illegible]	.0186	1.4083	1997.[illegible]	.83654	.077248	72.477
.1200	.1792	.7115	40.22	25.61	[illegible]	.0140	1.4[illegible]	2017.[illegible]	.83750	.077977	83.851
.1000	.1552	.7060	48.98	29.09	[illegible]	.0099	1.4[illegible]	2041.8	.83840	.078856	99.971
.0900	.1419	.7095	55.48	31.50	[illegible]	.0080	1.4[illegible]	2057.4	.83883	.079401	111.487
.0850	.1347	.7145	59.68	33.02	[illegible]	.0071	1.4[illegible]	2066.7	.83903	.079722	118.883
.0800	.1267	.7249	64.90	34.88	2.06	.0061	1.4[illegible]	2077.7	.83923	.080097	128.147
.0750	.1175	.7466	71.84	37.35	1.94[illegible]	.0051	1.4[illegible]	2091.4	.83942	.080568	140.785
.0700	.1051	.8023	82.68	41.34	1.791	.0039	1.4[illegible]	2112.8	.83958	.081272	162.097
.0680	.0970	.8657	90.70	44.51	[illegible]	.0033	1.4[illegible]	2129.1	.83961	.081798	180.053

TABLE XII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.07$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 200$ - Continued

(b) $\gamma_i = -10^{\circ}$, $e_i = 0.1736$

$\bar{V}$	$\bar{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\bar{\tau}$	$\bar{Q}$	θ deg	$\frac{\Delta a}{r}$	$\frac{\Delta V}{r}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0000	1.0690	0.0000010	[illegible]	9.349	[illegible]	[illegible]	D	[illegible]	0	0	0.000
1.0010	1.0700	.0000015	[illegible]	9.348	.0000	[illegible]	.0002	24.4	.01136	.002004	.000
1.0020	1.0710	.0000022	[illegible]	9.347	.0000	[illegible]	.0005	[illegible]	.02276	.004013	.000
1.0030	1.0720	.0000033	[illegible]	9.345	.0001	[illegible]	.0008	[illegible]	.03420	.006029	.000
1.0050	1.0740	.0000075	[illegible]	9.336	.0001	[illegible]	.0017	[illegible]	.05721	.010082	.000
1.0100	1.0790	.0000593	[illegible]	9.293	.0010	[illegible]	.0067	[illegible]	.11573	.020360	.001
1.0150	1.0840	.0005203	[illegible]	9.214	.0085	[illegible]	.0222	[illegible]	.17787	.031197	.007
1.01824	1.0877	.004954	[illegible]	9.101	.1726	[illegible]	.0716	[illegible]	.24310	.042449	.059
1.0150	1.0841	.018084	[illegible]	9.034	[illegible]	[illegible]	.1391	[illegible]	.28112	.048939	.259
1.0100	1.0791	.03107	[illegible]	9.013	[illegible]	[illegible]	.1833	[illegible]	.29719	.051669	.435
1.0050	1.0741	.04291	[illegible]	9.006	[illegible]	[illegible]	.2160	[illegible]	.30684	.053308	.604
1.0000	1.0691	.05425	[illegible]	9.004	[illegible]	[illegible]	.2433	[illegible]	.31390	.054506	.767
.9950	1.0641	.06530	[illegible]	9.006	[illegible]	[illegible]	.2672	[illegible]	.31951	.055458	.928
.9900	1.0591	.07612	[illegible]	9.010	[illegible]	[illegible]	.2887	[illegible]	.32418	.056250	1.087
.9800	1.0491	.09734	[illegible]	9.022	[illegible]	[illegible]	.3267	[illegible]	.33170	.057530	1.405
.9600	1.0291	.13850	[illegible]	9.059	[illegible]	[illegible]	.3896	[illegible]	.34263	.059397	2.040
.9400	1.0091	.17843	[illegible]	9.105	[illegible]	[illegible]	.4416	[illegible]	.35060	.060768	2.685
.9200	.9891	.2174	[illegible]	9.158	[illegible]	[illegible]	.4864	[illegible]	.35694	.061863	3.341
.9000	.9691	.2554	[illegible]	9.216	[illegible]	[illegible]	.5260	[illegible]	.36220	.062778	4.013
.8800	.9491	.2925	[illegible]	9.280	4.23	[illegible]	.5615	[illegible]	.36670	.063570	4.701
.8600	.9290	.3289	[illegible]	9.347	4.67	[illegible]	.5938	[illegible]	.37065	.064270	5.408
.8400	.9090	.3644	[illegible]	9.419	[illegible]	[illegible]	.6232	[illegible]	.37417	.064901	6.134
.8200	.8890	.3990	[illegible]	9.495	[illegible]	[illegible]	.6504	[illegible]	.37735	.065476	6.882
.8000	.8689	.4329	[illegible]	9.576	[illegible]	[illegible]	.6755	[illegible]	.38025	.066006	7.653
.7800	.8489	.4659	[illegible]	9.66	[illegible]	.4728	.6987	[illegible]	.38293	.066501	8.448
.7600	.8289	.4981	[illegible]	9.75	[illegible]	.4611	.7204	[illegible]	.38541	.066964	9.269
.7400	.8089	.5294	[illegible]	9.85	[illegible]	.4476	.7406	[illegible]	.38773	.067402	10.118
.7200	.7889	.5598	[illegible]	9.95	[illegible]	.4329	.7595	[illegible]	.38990	.067819	10.996
.7000	.7688	.5894	[illegible]	10.05	[illegible]	.4170	.7772	[illegible]	.39195	.068217	11.907
.6800	.7488	.6179	[illegible]	10.16	[illegible]	.4002	.7937	[illegible]	.39389	.068599	12.852
.6600	.7288	.6456	[illegible]	10.28	[illegible]	.3828	.8093	[illegible]	.39574	.068967	13.833
.6400	.7087	.6723	[illegible]	10.41	[illegible]	.3648	.8239	[illegible]	.39750	.069323	14.855
.6200	.6887	.6979	[illegible]	10.54	[illegible]	.3466	.8376	[illegible]	.39918	.069669	15.919
.6000	.6687	.7225	[illegible]	10.68	[illegible]	.3280	.8504	[illegible]	.40079	.070006	17.029
.5800	.6486	.7460	12.13	10.83	[illegible]	.3094	.8625	[illegible]	.40233	.070335	18.189
.5600	.6286	.7683	12.36	10.99	[illegible]	.2909	.8739	[illegible]	.40382	.070658	19.403
.5400	.6085	.7895	12.60	11.16	[illegible]	.2724	.8845	[illegible]	.40526	.070976	20.676
.5200	.5885	.8094	12.86	11.34	[illegible]	.2542	.8945	[illegible]	.40665	.071289	22.014
.5000	.5684	.8281	13.14	11.54	[illegible]	.2363	.9039	[illegible]	.40799	.071599	23.422
.4800	.5483	.8454	13.45	11.75	[illegible]	.2188	.9127	[illegible]	.40929	.071907	24.908
.4600	.5283	.8613	13.78	11.97	[illegible]	.2017	.9209	[illegible]	.41056	.072213	26.480
.4400	.5082	.8757	14.14	12.21	[illegible]	.1851	.9286	[illegible]	.41179	.072518	28.147
.4200	.4881	.8886	14.54	12.48	[illegible]	.1691	.9358	[illegible]	.41298	.072824	29.920
.4000	.4680	.8998	14.98	12.76	[illegible]	.1531	.9425	[illegible]	.41415	.073130	31.813
.3800	.4479	.9092	15.46	13.07	[illegible]	.1390	.9487	[illegible]	.41528	.073439	33.838
.3600	.4278	.9168	16.00	13.42	[illegible]	.1249	.9545	[illegible]	.41639	.073751	36.016
.3400	.4078	.9224	16.61	13.79	[illegible]	.1115	.9599	[illegible]	.41747	.074067	38.367
.3200	.3874	.9259	17.29	14.21	[illegible]	.0989	.9649	[illegible]	.41853	.074389	40.918
.3000	.3673	.9270	18.07	14.68	[illegible]	.0870	.9695	[illegible]	.41956	.074718	43.701
.2800	.3470	.9257	18.96	15.20	[illegible]	.0759	.9737	[illegible]	.42057	.075056	46.756
.2600	.3267	.9217	19.99	15.79	[illegible]	.0656	.9776	[illegible]	.42156	.075405	50.135
.2400	.3063	.9148	[illegible]	16.46	[illegible]	.0561	.9811	[illegible]	.42252	.075767	53.904
.2200	.2859	.9047	[illegible]	17.24	[illegible]	.0474	.9844	[illegible]	.42346	.076147	58.153
.2000	.2653	.8910	[illegible]	18.15	[illegible]	.0394	.9873	[illegible]	.42439	.076547	63.003
.1800	.2446	.8735	[illegible]	18.23	[illegible]	.0322	.9899	1036.1	.42528	.076974	68.627
.1600	.2237	.8518	[illegible]	20.53	[illegible]	.0258	.9923	1048.3	.42616	.077438	75.285
.1400	.2023	.8256	[illegible]	22.16	[illegible]	.0201	.9944	1062.6	.42701	.077949	83.400
.1200	.1803	.7953	[illegible]	24.27	[illegible]	.0151	.9964	1079.0	.42783	.078533	93.725
.1000	.1570	.7629	[illegible]	27.20	[illegible]	.0107	.9981	1099.5	.42861	.079237	107.890
.0900	.1444	.7486	[illegible]	29.22	[illegible]	.0087	.9989	[illegible]	.42900	.079669	117.625
.0850	.1376	.7434	[illegible]	30.48	[illegible]	.0077	.9993	[illegible]	.42918	.079920	123.678
.0800	.1303	.7410	[illegible]	31.98	[illegible]	.0067	.9998	[illegible]	.42937	.080207	130.985
.0750	.1222	.7442	[illegible]	33.80	[illegible]	.0057	1.0002	[illegible]	.42955	.080551	140.333
.0700	.1124	.7609	[illegible]	36.58	.1443	.0047	1.0007	[illegible]	.42972	.081007	153.725
.0650	.0969	.8393	[illegible]	42.11	.1314	.0032	1.0014	[illegible]	.42986	.081868	182.618

TABLE XII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\overline{V}_i = 1.00$, $\overline{u}_a = -0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Continued

(c) $\gamma_i = -15^{\circ}$, $e_i = 0.2588$

$\overline{V}$	$\overline{V}_r$	$\overline{z}$	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{h}_r}{\dot{r}}$	$\overline{q}$	$\overline{\dot{q}}$	$\frac{t}{\tau}$	$\frac{\Delta u}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\frac{\beta r}{V}}\frac{z}{V}$
1.0000	1.0778	0.000[illegible]	15.000	14.023	[illegible]	0.0012	0	[illegible]	0	0	0.000
1.0010	1.0688	.000[illegible]	15.000	14.028	[illegible]	.0015	[illegible]	[illegible]	.00748	.002003	.000
1.0020	1.0698	.000[illegible]	14.998	14.028	[illegible]	.0018	[illegible]	[illegible]	.01498	.004013	.000
1.0030	1.0708	.000[illegible]	14.996	14.027	[illegible]	.0022	[illegible]	[illegible]	.02256	.006029	.000
1.0050	1.0728	.000[illegible]	14.989	14.022	[illegible]	.0034	[illegible]	[illegible]	.03763	.010080	.000
1.0100	1.0778	.000[illegible]	14.957	13.996	[illegible]	.0096	[illegible]	166.[illegible]	.07599	.020342	.001
.0150	1.0828	.000[illegible]	14.900	13.948	[illegible]	.0282	[illegible]	[illegible]	.11602	.031016	.007
.01920	1.0870[illegible]	.007491	14.803	13.860	[illegible]	.1101	.0586	[illegible]	.16691	.044512	.104
.0150	1.0828	.03154	14.755	13.812	[illegible]	.2238	.1217	[illegible]	.19424	.051720	.439
.0100	1.0778	.05085	14.748	13.800	[illegible]	.2809	.1549	[illegible]	.20339	.054130	.711
.0050	1.0728	.06869	14.748	13.796	[illegible]	.3228	.1804	[illegible]	.20921	.055662	.966
.0000	1.0678	.08989	14.752	13.796	[illegible]	.3569	.2019	[illegible]	.21355	.056804	1.215
.9950	1.0628	.10266	14.758	13.797	[illegible]	.3857	.2208	472.4	.21703	.057721	1.459
.9900	1.0578	.119[illegible]	14.766	13.800	[illegible]	.4106	.2379	478.9	.21995	.058490	1.702
.9800	1.0478	.151[illegible]	14.785	13.808	[illegible]	.4522	.2683	489.3	.22468	.059739	2.184
.9600	1.0278	.2139	14.831	13.832	[illegible]	.5126	.3187	505.[illegible]	.23161	.061571	3.151
.9400	1.0078	.2741	14.884	13.862	[illegible]	.5531	.3606	516.7	.23671	.062928	4.129
.9200	.9878	.333[illegible]	14.943	13.896	[illegible]	.5801	.3966	[illegible]	.24075	.064000	5.122
.9000	.9678	.3954	15.007	13.934	[illegible]	.5970	.4285	[illegible]	.24413	.064901	6.134
.8800	.9478	.4461	15.076	13.975	6.44	.6061	.4572	[illegible]	.24702	.065680	7.169
.8600	.9278	.5002	15.149	14.019	7.08	.6090	.4833	[illegible]	.24957	.066368	8.226
.8400	.9077	.5589	15.226	14.066	7.67	.6068	.5072	[illegible]	.25185	.066986	9.308
.8200	.8877	.6040	15.309	14.116	8.21	.6004	.5292	[illegible]	.25391	.067549	10.417
.8000	.8677	.6536	15.396	14.169	[illegible]	.5905	.5496	[illegible]	.25580	.068067	11.555
.7800	.8477	.7017	[illegible]	14.23	[illegible]	.5777	.5685	[illegible]	.25754	.068549	12.723
.7600	.8276	.7482	[illegible]	14.28	[illegible]	.5625	.5861	[illegible]	.25916	.069000	13.923
.7400	.8076	.7932	[illegible]	14.35	[illegible]	.5454	.6026	[illegible]	.26068	.069424	15.158
.7200	.7876	.8364	[illegible]	14.41	[illegible]	.5266	.6180	[illegible]	.26211	.069827	16.429
.7000	.7676	.8780	[illegible]	14.48	[illegible]	.5065	.6324	[illegible]	.26346	.070211	17.739
.6800	.7475	.9179	[illegible]	14.56	[illegible]	.4853	.6460	[illegible]	.26474	.070578	19.090
.6600	.7275	.9560	[illegible]	14.64	[illegible]	.4634	.6587	[illegible]	.26596	.070930	20.485
.6400	.7075	.9923	[illegible]	14.72	[illegible]	.4409	.6707	[illegible]	.26713	.071271	21.928
.6200	.6874	1.0268	[illegible]	14.81	[illegible]	.4180	.6819	[illegible]	.26825	.071600	23.421
.6000	.6674	1.0593	[illegible]	14.90	[illegible]	.3950	.6925	[illegible]	.26933	.071920	24.968
.5800	.6473	1.0898	[illegible]	15.01	[illegible]	.3718	.7025	[illegible]	.27037	.072231	26.573
.5600	.6273	1.1183	[illegible]	15.11	[illegible]	.3488	.7118	[illegible]	.27137	.072536	28.241
.5400	.6072	1.1446	[illegible]	15.23	[illegible]	.3260	.7207	[illegible]	.27234	.072834	29.977
.5200	.5872	1.1688	[illegible]	15.35	[illegible]	.3035	.7289	[illegible]	.27328	.073127	31.787
.5000	.5671	1.1906	[illegible]	15.49	[illegible]	.2815	.7367	[illegible]	.27420	.073416	33.676
.4800	.5470	1.2101	17.88	15.63	[illegible]	.2599	.7440	[illegible]	.27509	.073701	35.653
.4600	.5270	1.2271	18.16	15.79	[illegible]	.2390	.7509	[illegible]	.27596	.073983	37.726
.4400	.5069	1.2415	18.46	15.96	[illegible]	.2188	.7573	[illegible]	.27680	.074264	39.903
.4200	.4868	1.2532	18.79	16.14	[illegible]	.1993	.7633	[illegible]	.27763	.074543	42.197
.4000	.4667	1.2620	[illegible]	16.34	[illegible]	.1805	.7689	[illegible]	.27845	.074823	44.619
.3800	.4465	1.2679	[illegible]	16.56	[illegible]	.1627	.7742	[illegible]	.27924	.075102	47.186
.3600	.4264	1.2706	[illegible]	16.81	[illegible]	.1457	.7791	[illegible]	.28002	.075383	49.914
.3400	.4063	1.2700	[illegible]	17.08	[illegible]	.1296	.7836	[illegible]	.28079	.075667	52.825
.3200	.3861	1.2659	[illegible]	17.38	[illegible]	.1145	.7878	[illegible]	.28154	.075959	55.945
.3000	.3659	1.2580	[illegible]	17.72	[illegible]	.1003	.7917	[illegible]	.28229	.076245	59.304
.2800	.3457	1.2462	[illegible]	18.10	[illegible]	.0872	.7953	[illegible]	.28302	.076543	62.942
.2600	.3254	1.2301	[illegible]	18.54	[illegible]	.0750	.7987	[illegible]	.28374	.076848	66.906
.2400	.3051	1.2093	[illegible]	19.04	[illegible]	.0637	.8017	[illegible]	.28445	.077163	71.261
.2200	.2847	1.1837	[illegible]	19.62	[illegible]	.0535	.8045	[illegible]	.28515	.077491	76.089
.2000	.2642	1.1526	[illegible]	20.31	[illegible]	.0443	.8070	[illegible]	.28583	.077835	81.502
.1800	.2437	1.1157	[illegible]	21.14	[illegible]	.0360	.8093	[illegible]	.28651	.078199	87.659
.1600	.2228	1.0725	[illegible]	22.16	[illegible]	.0286	.8114	[illegible]	.28718	.078590	94.795
.1400	.2010	1.0225	[illegible]	23.43	[illegible]	.0221	.8132	[illegible]	.28784	.079019	103.284
.1200	.1790	.9652	[illegible]	25.12	[illegible]	.0165	.8149	[illegible]	.28848	.079503	113.783
.1000	.1566	.9026	[illegible]	27.46	[illegible]	.0116	.8164	[illegible]	.28910	.080078	127.647
.0900	.1449	.8706	[illegible]	29.08	[illegible]	.0094	.8171	[illegible]	.28941	.080424	136.802
.0850	.1386	.8554	[illegible]	30.07	[illegible]	.0083	.8175	[illegible]	.28956	.080622	142.322
.0800	.1322	.8417	[illegible]	31.25	[illegible]	.0073	.8178	[illegible]	.28970	.080844	148.785
.0750	.1257	.8309	[illegible]	32.71	[illegible]	.0063	.8182	[illegible]	.28985	.081103	156.676
.0700	.1192	.8268	[illegible]	34.64	[illegible]	.0053	.8186	[illegible]	.28999	.081423	167.038
.0640	.1012	.8512	81.53	38.56	[illegible]	.0038	.8192	[illegible]	.29015	.082016	188.091

TABLE XII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\bar{V}_i = 1.00$, $\bar{u}_a = -0.07$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 200$ - Concluded

(d) $\gamma_i = -20^\circ$, $e_i = 0.3420$

$\bar{V}$	$\bar{V}_r$	z	$\frac{-z}{10^6}$	$\frac{-\Lambda}{10^6}$	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\beta r}\,\frac{\theta}{\bar{V}}$
1.0000	1.0660	0.0000010	20.000	18.713	0.0000	0.0012	0	0	0	0	0.000
1.0010	1.0671	.0000015	20.000	18.714	.0000	.0015	.0001	12.5	.00550	.0020[illegible]	.000
1.0020	1.0681	.0000022	19.999	18.714	.0000	.0018	.0003	25.0	.01102	.0040[illegible]	.000
1.0030	1.0691	.0000033	19.997	18.714	.0001	.0022	.0004	37.4	.01656	.0061[illegible]	.000
1.0050	1.0711	.0000075	19.992	18.712	.0001	.0034	.0009	62.4	.02769	.0108[illegible]	.000
1.0100	1.0761	.0000589	19.968	18.69[illegible]	.0010	.0095	.0034	125.8	.05590	.0203[illegible]	.001
1.0150	1.0811	.0004933	19.927	18.66[illegible]	.0080	.0279	.0108	191.1	.08510	.0309[illegible]	.007
1.09187	1.08597	.009966	19.847	18.59[illegible]	.346	.1266	.0508	283.4	.12657	.0459[illegible]	.138
1.0150	1.0811	.04570	19.814	18.55[illegible]	.744	.2681	.1100	330.5	.14775	.0535[illegible]	.637
1.0100	1.0761	.07107	19.813	18.54[illegible]	1.152	.3306	.1374	344.2	.15395	.0558[illegible]	.995
1.0050	1.0711	.09479	19.816	18.54[illegible]	1.530	.3774	.1580	353.3	.15801	.0572[illegible]	1.334
1.0000	1.0661	.11768	19.822	18.54[illegible]	1.892	.4157	.1771	360.1	.16108	.0583[illegible]	1.665
.9950	1.0611	.14004	19.830	18.548	2.24	.4482	.1933	365.8	.16357	.0592[illegible]	1.990
.9900	1.0561	.16200	19.839	18.550	2.58	.4765	.2079	370.5	.16566	.0600[illegible]	2.314
.9800	1.0461	.2050	19.859	18.556	3.24	.5236	.2339	378.3	.16906	.0612[illegible]	2.959
.9600	1.0261	.2884	19.904	18.574	4.47	.5922	.2772	390.0	.17406	.0630[illegible]	4.249
.9400	1.0061	.3690	19.957	18.596	5.62	.6381	.3131	398.8	.17775	.0644[illegible]	5.552
.9200	.9861	.4473	20.014	18.622	6.69	.6685	.3442	406.1	.18069	.0654[illegible]	6.876
.9000	.9661	.5233	20.075	18.650	7.67	.6875	.3717	412.1	.18315	.0663[illegible]	8.223
.8800	.9460	.5973	20.140	18.680	8.59	.6975	.3965	417.6	.18526	.0671[illegible]	9.598
.8600	.9260	.6690	20.209	18.712	9.43	.7004	.4190	422.2	.18711	.0678[illegible]	11.002
.8400	.9060	.7387	20.282	18.747	10.21	.6974	.4396	426.7	.18878	.0684[illegible]	12.437
.8200	.8860	.8063	20.359	18.784	10.91	.6896	.4586	430.8	.19028	.0689[illegible]	13.905
.8000	.8659	.8717	20.441	18.823	11.55	.6778	.4762	434.7	.19166	.0695[illegible]	15.409
.7800	.8459	.9349	20.53	18.86	12.13	.6627	.4925	438.4	.19294	.0699[illegible]	16.950
.7600	.8259	.9959	20.62	18.91	12.64	.6449	.5078	442.0	.19413	.0704[illegible]	18.531
.7400	.8059	1.0546	20.72	18.96	13.09	.6248	.5220	445.4	.19524	.0708[illegible]	20.155
.7200	.7858	1.1111	20.82	19.00	13.48	.6028	.5354	448.5	.19629	.0712[illegible]	21.823
.7000	.7658	1.1651	20.93	19.06	13.80	.5794	.5479	451.6	.19728	.0716[illegible]	23.539
.6800	.7458	1.2167	21.04	19.11	14.07	.5548	.5596	454.7	.19823	.0719[illegible]	25.305
.6600	.7257	1.2659	21.17	19.17	14.29	.5293	.5707	457.9	.19913	.0723[illegible]	27.125
.6400	.7057	1.3124	21.30	19.23	14.44	.5032	.5810	461.0	.19999	.0726[illegible]	29.001
.6200	.6856	1.3564	21.44	19.30	14.54	.4767	.5908	463.8	.20081	.0729[illegible]	30.939
.6000	.6656	1.3976	21.59	19.37	14.59	.4500	.6000	467.0	.20161	.0733[illegible]	32.941
.5800	.6455	1.4360	21.75	19.45	14.59	.4233	.6086	469.8	.20238	.0736[illegible]	35.014
.5600	.6255	1.4715	21.92	19.53	14.54	.3967	.6168	472.9	.20312	.0739[illegible]	37.161
.5400	.6054	1.5040	22.11	19.61	14.44	.3704	.6244	475.8	.20384	.0741[illegible]	39.389
.5200	.5854	1.5334	22.31	19.71	14.29	.3444	.6316	478.9	.20454	.0744[illegible]	41.704
.5000	.5653	1.5596	22.53	19.81	14.10	.3191	.6384	482.0	.20522	.0747[illegible]	44.114
.4800	.5452	1.5825	22.76	19.92	13.86	.2943	.6448	485.2	.20588	.0750[illegible]	46.625
.4600	.5251	1.6019	23.02	20.03	13.58	.2703	.6507	488.3	.20653	.0753[illegible]	49.248
.4400	.5051	1.6176	23.30	20.16	13.26	.2470	.6563	491.7	.20717	.0755[illegible]	51.993
.4200	.4850	1.6296	23.60	20.30	12.90	.2247	.6616	494.8	.20779	.0758[illegible]	54.871
.4000	.4648	1.6376	23.96	20.45	12.51	.2032	.6665	498.4	.20840	.0761[illegible]	57.897
.3800	.4447	1.6414	24.34	20.62	12.08	.1828	.6711	502.1	.20899	.0763[illegible]	61.088
.3600	.4246	1.6409	24.77	20.81	11.62	.1634	.6754	505.7	.20958	.0766[illegible]	64.462
.3400	.4044	1.6358	25.25	21.02	11.13	.1451	.6793	509.6	.21016	.0769[illegible]	68.041
.3200	.3842	1.6258	25.80	21.25	10.61	.1279	.6830	513.5	.21073	.0772[illegible]	71.852
.3000	.3640	1.6107	26.42	21.51	10.06	.1118	.6865	517.9	.21130	.0774[illegible]	75.930
.2800	.3438	1.5902	27.14	21.81	9.49	.0968	.6896	522.6	.21185	.0777[illegible]	80.313
.2600	.3235	1.5637	27.97	22.15	8.90	.0830	.6926	527.3	.21240	.0780[illegible]	85.053
.2400	.3032	1.5310	28.96	22.54	8.29	.0704	.6952	532.7	.21295	.0783[illegible]	90.215
.2200	.2827	1.4916	30.14	23.00	7.66	.0589	.6977	538.5	.21348	.0786[illegible]	95.884
.2000	.2622	1.4449	31.59	23.55	7.02	.0485	.6999	544.7	.21402	.0789[illegible]	102.168
.1800	.2415	1.3904	33.38	24.21	6.37	.0392	.7019	551.7	.21454	.0792[illegible]	109.239
.1600	.2207	1.3273	35.69	25.02	5.71	.0310	.7038	559.5	.21506	.0796[illegible]	117.319
.1400	.1995	1.2551	38.75	26.06	5.04	.0238	.7054	568.6	.21557	.0800[illegible]	126.780
.1200	.1777	1.1732	43.02	27.43	4.37	.0176	.7069	579.5	.21608	.0804[illegible]	138.263
.1000	.1549	1.0823	49.45	29.37	3.67	.0122	.7082	593.3	.21657	.0809[illegible]	153.065
.0900	.1428	1.0348	54.13	30.72	3.31	.0099	.7089	601.9	.21680	.0812[illegible]	162.606
.0850	.1364	1.01132	57.07	31.55	3.13	.0088	.7092	606.8	.21692	.0814[illegible]	168.263
.0800	.1296	.9887	60.59	32.53	2.94	.0077	.7095	612.6	.21704	.0816[illegible]	174.788
.0750	.1224	.9583	64.95	33.73	2.73	.0066	.7098	619.3	.21715	.0818[illegible]	182.585
.0700	.1143	.9527	70.60	35.30	2.51	.0055	.7102	627.9	.21726	.0821[illegible]	192.475
.0640	.1021	.9532	80.90	38.26	2.19	.0041	.7106	642.7	.21737	.0825[illegible]	210.640

TABLE XIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$

(a) $\gamma_i = -5^{\circ}$, $e_i = 0.0872$

$\overline{r}$	$\overline{V}_r$	$\overline{u}$	$-\gamma$ deg	$\frac{\dot{r}}{g}$	$-\frac{\dot{\overline{V}}_r}{g}$	$\overline{q}$	$\overline{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta\overline{V}}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
.000	0.9303	0.00000	5.000	5.[illegible]	0.000	0.0008	[illegible]	0	0	0	0.000
.010	.9313	.00000[illegible]	4.999	5.[illegible]	.000[illegible]	.0010	.00[illegible]	48.9	.02290	.002004	.000
.020	.9323	.00000[illegible]	4.995	5.[illegible]	.000[illegible]	.0012	.00[illegible]	97.8	.04589	.004014	.000
.030	.9333	.00000[illegible]	4.988	5.[illegible]	.000[illegible]	.0015	.00[illegible]	147.2	.06898	.006030	.000
.050	.9353	.00000[illegible]	4.967	5.[illegible]	.000[illegible]	.0022	.00[illegible]	246.[illegible]	.11553	.010085	.000
.100	.9403	.00005[illegible]	4.865	5.[illegible]	.000[illegible]	.0064	.00[illegible]	499.[illegible]	.23521	.020390	.001
.150	.9453	.00055[illegible]	4.676	5.[illegible]	.0069	.0198	.03[illegible]	781.[illegible]	.36869	.031545	.008
.1711	.9479	.00302[illegible]	4.483	4.[illegible]	.0377	.0464	.077[illegible]	1002.[illegible]	.47403	.039986	.[illegible]
.150	.9452	.00886[illegible]	4.353	4.[illegible]	.1104	.0789	.157[illegible]	1148.[illegible]	.54380	.045375	.124
.100	.9402	.01685[illegible]	4.289	4.[illegible]	.209	.1074	.19[illegible]	1238.[illegible]	.58664	.048611	.236
.050	.9352	.02389	4.267	4.[illegible]	.294	.1261	.23[illegible]	1288.[illegible]	.61030	.050381	.336
.000	.9302	.03058	4.260	4.[illegible]	.374	.1408	.26[illegible]	1325.[illegible]	.62721	.051641	.432
.950	.9252	.03719	4.269	4.[illegible]	.451	.1529	.29[illegible]	1353.[illegible]	.64050	.052631	.527
.900	.9202	.04348	4.269	4.[illegible]	.526	.1633	.31[illegible]	1377.[illegible]	.65150	.053451	.621
.800	.9102	.05605	4.296	4.[illegible]	.670	.1804	.35[illegible]	1415.[illegible]	.66913	.054771	.809
.600	.8902	.08077	4.379	4.[illegible]	.943	.2046	.43[illegible]	1471.[illegible]	.69460	.056701	1.190
.400	.8702	.10531	4.485	4.[illegible]	1.200	.2206	.48[illegible]	1512.[illegible]	.71309	.058133	1.584
.200	.8502	.12990	4.606	4.[illegible]	1.444	.2310	.54[illegible]	1546.[illegible]	.72765	.059289	1.997
.000	.8303	.15465	4.740	5.[illegible]	1.675	.2372	.58[illegible]	1574.[illegible]	.73967	.060271	2.430
.800	.8103	.17963	4.884	5.[illegible]	1.895	.2404	.62[illegible]	1598.[illegible]	.74991	.061132	2.887
.600	.7903	.20490	5.038	5.[illegible]	2.11	.2409	.65[illegible]	1620.[illegible]	.75882	.061906	3.370
.400	.7703	.23055	5.200	5.[illegible]	2.30	.2395	.68[illegible]	1640.[illegible]	.76671	.062612	3.881
.200	.7503	.25665	5.371	5.[illegible]	2.49	.2363	.71[illegible]	1658.[illegible]	.77379	.063267	4.424
.000	.7304	.28289	5.550	6.[illegible]	2.67	.2317	.74[illegible]	1674.[illegible]	.78021	.063880	5.001
.800	.7104	.3097	5.74	6.30	2.83	.2259	.76[illegible]	1691.[illegible]	.78607	.064459	5.615
.600	.6904	.3369	5.93	6.54	2.99	.2191	.79[illegible]	1706.[illegible]	.79146	.065010	6.269
.400	.6704	.3646	6.14	6.79	3.13	.2115	.81[illegible]	1720.[illegible]	.79646	.065539	6.968
.200	.6505	.3928	6.36	7.04	3.27	.2033	.83[illegible]	1734.[illegible]	.80111	.066048	7.715
.000	.6305	.4215	6.58	7.3[illegible]	3.39	.1945	.84[illegible]	1747.[illegible]	.80547	.066541	8.518
.800	.6106	.4507	6.82	7.6[illegible]	3.49	.1853	.86[illegible]	1759.[illegible]	.80956	.067021	9.374
.600	.5906	.4805	7.06	7.9[illegible]	3.59	.1758	.87[illegible]	1772.[illegible]	.81341	.067491	10.296
.400	.5706	.5109	7.32	8.1[illegible]	3.68	.1660	.89[illegible]	1784.[illegible]	.81706	.067951	11.289
.200	.5507	.5419	7.59	8.4[illegible]	3.75	.1561	.9[illegible]	1796.[illegible]	.82052	.068404	12.360
.000	.5308	.5735	7.88	8.[illegible]	3.81	.1462	.91[illegible]	1807.[illegible]	.82382	.068851	13.517
.800	.5108	.6057	8.18	9.[illegible]	3.85	.1362	.92[illegible]	1819.[illegible]	.82696	.069295	14.770
.600	.4909	.6387	8.49	9.[illegible]	3.89	.1263	.93[illegible]	1830.[illegible]	.82997	.069735	16.151
.400	.4710	.6725	8.83	10.[illegible]	3.91	.1166	.94[illegible]	1841.[illegible]	.83286	.070175	17.612
.200	.4510	.7071	9.18	10.[illegible]	3.91	.1070	.95[illegible]	1853.[illegible]	.83563	.070614	19.230
.000	.4311	.7425	9.56	11.[illegible]	3.90	.0977	.96[illegible]	1864.[illegible]	.83830	.071055	21.002
.800	.4112	.7789	9.96	11.[illegible]	3.88	.0886	.96[illegible]	1875.[illegible]	.84089	.071498	22.949
.600	.3914	.8164	10.38	12.[illegible]	3.84	.0799	.97[illegible]	1887.[illegible]	.84338	.071946	25.099
.400	.3715	.8551	10.84	12.[illegible]	3.79	.0715	.98[illegible]	1899.[illegible]	.84580	.072400	27.483
.200	.3516	.8951	11.33	13.[illegible]	3.73	.0635	.99[illegible]	1910.[illegible]	.84816	.072861	30.138
.000	.3318	.9366	11.86	14.[illegible]	3.65	.0559	.99[illegible]	1923.[illegible]	.85045	.073331	33.113
.800	.3120	.9799	12.43	15.[illegible]	3.55	.0488	.99[illegible]	1935.[illegible]	.85270	.073814	36.466
.600	.2922	1.0252	13.06	16.[illegible]	3.44	.0421	1.00[illegible]	1948.[illegible]	.85489	.074310	40.274
.400	.2725	1.0731	13.74	17.[illegible]	3.32	.0360	1.00[illegible]	1962.[illegible]	.85705	.074824	44.634
.200	.2528	1.1240	14.50	18.[illegible]	3.18	.0303	1.00[illegible]	1976.[illegible]	.85918	.075359	49.673
.000	.2332	1.1787	15.33	19.[illegible]	3.02	.0252	1.00[illegible]	1991.[illegible]	.86128	.075919	55.564
.800	.2137	1.2382	16.27	21.[illegible]	2.86	.0205	1.01[illegible]	2006.[illegible]	.86337	.076511	62.541
.600	.1943	1.3041	17.32	23.[illegible]	2.68	.0164	1.01[illegible]	2024.[illegible]	.86546	.077141	70.938
.400	.1750	1.3786	18.52	25.[illegible]	2.49	.0129	1.01[illegible]	2042.[illegible]	.86756	.077818	81.232
.200	.1560	1.4648	19.99	28.[illegible]	2.29	.0098	1.01[illegible]	2063.[illegible]	.86968	.078557	94.161
.000	.1373	1.5681	21.47	32.[illegible]	2.09	.0072	1.01[illegible]	2087.[illegible]	.87185	.079374	110.879
.800	.1190	1.6968	23.31	36.[illegible]	1.887	.0052	1.01[illegible]	2114.[illegible]	.87409	.080295	133.318
.600	.1013	1.8657	25.43	42.[illegible]	1.694	.0036	1.02[illegible]	2146.[illegible]	.87644	.081359	164.907
.400	.0846	2.1013	27.80	50.[illegible]	1.520	.0024	1.02[illegible]	2186.[illegible]	.87895	.082621	212.26
.200	.0691	2.4568	30.14	60.[illegible]	1.381	.0015	1.02[illegible]	2239.[illegible]	.88175	.084173	289.54
.000	.0542	3.0728	31.31	73.[illegible]	1.277	.0009	1.02[illegible]	2316.[illegible]	.88514	.086203	434.96
.900	.0462	3.6494	30.41	80.[illegible]	1.223	.0006	1.02[illegible]	2376.[illegible]	.88745	.087590	573.45
.850	.0415	4.1393	29.08	84.[illegible]	1.188	.0005	1.02[illegible]	2421.[illegible]	.88905	.088506	688.69
.800	.0358	5.0435	26.53	87.[illegible]	1.140	.0004	1.02[illegible]	2493.[illegible]	.89149	.089797	891.57
.750	.0268	7.9917	20.83	89.[illegible]	1.072	.0002	1.02[illegible]	2674.[illegible]	.89752	.092421	[illegible]6.94
.720	.0168	5.0421	13.51	89.[illegible]	1.003	.0001	1.02[illegible]	3105.[illegible]	.91170	.096890	1579.63

TABLE XIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Continued

(b) $\gamma_i = -10^{\circ}$, $e_i = 0.1736$

$\overline{V}$	$\overline{V}_r$	$\overline{u}$	$\frac{\gamma}{deg}$	$\frac{\gamma}{\gamma_i}$	$-\frac{a_r}{g}$	$\overline{t}$	$\overline{Q}$	$\frac{t}{sec}$	$\frac{\Delta\overline{s}}{\overline{r}}$	$\frac{\overline{s}}{\overline{r}}$	$\sqrt{\beta r}\,\frac{\overline{s}}{\overline{r}}$
1.0000	0.9311	0.0000010	10.000	10.744	0.0000	.0008	0	[illegible]	0	0	[illegible]
1.0010	.9321	.0000015	9.999	10.744	.0000	.0010	.0002	24.4	.01136	.0020	[illegible]
1.0020	.9331	.0000022	9.997	10.744	.0000	.0012	.0003	49.1	.02276	.0040	[illegible]
1.0030	.9341	.0000033	9.994	10.743	.0000	.0015	.0006	73.8	.03420	.0060	[illegible]
1.0050	.9361	.0000075	9.984	10.728	.0001	.0023	.0012	123.2	.05720	.0100	[illegible]
1.0100	.9411	.0000591	9.934	10.666	.0007	.0064	.0045	248.6	.11565	.0203	[illegible]
1.0150	.9461	.0005068	9.847	10.572	.0063	.0189	.0145	379.6	.17712	.0310	[illegible]
1.01887	.9499	.006472	9.703	10.414	.0812	.0683	.0547	545.9	.25591	.0437	[illegible]
1.0150	.9461	.38595	9.617	10.321	.394	.1354	.1114	699.7	.59182	.0607	[illegible]
1.0100	.9411	.94264	9.591	10.300	.529	.1732	.1435	654.4	.30664	.0532	[illegible]
1.0050	.9361	.95804	9.579	10.292	.716	.1971	.1677	674.2	.31591	.0548	[illegible]
1.0000	.9311	.97284	9.573	10.289	.893	.2178	.1881	689.0	.32279	.0559	[illegible]
.9950	.9261	.98728	9.571	10.291	1.064	.2352	.2061	701.8	.32831	.0569	[illegible]
.9900	.9211	.10146	9.571	10.297	1.230	.2501	.2223	710.8	.33292	.0576	[illegible]
.9800	.9111	.12927	9.576	10.309	1.548	.2746	.2509	727.2	.34040	.0589	[illegible]
.9600	.8911	.18339	9.598	10.346	2.15	.3092	.2982	751.7	.35137	.0608	[illegible]
.9400	.8711	.23361	9.631	10.400	2.70	.3312	.3373	770.1	.35944	.0621	[illegible]
.9200	.8511	.28876	9.671	10.463	3.20	.3447	.3709	784.9	.36588	.0632	[illegible]
.9000	.8311	.33841	9.717	10.533	3.67	.3518	.4004	797.7	.37126	.0641	[illegible]
.8800	.8111	.38770	9.768	10.606	4.10	.3542	.4269	808.9	.37590	.0649	[illegible]
.8600	.7911	.43640	9.823	10.689	4.49	.3527	.4508	819.0	.38000	.0656	[illegible]
.8400	.7711	.48433	9.882	10.771	4.85	.3482	.4725	828.4	.38367	.0663	[illegible]
.8200	.7512	.53133	9.946	10.866	5.17	.3411	.4924	837.2	.38701	.0669	[illegible]
.8000	.7312	.57715	10.015	10.969	5.46	.3321	.5108	845.3	.39008	.0674	[illegible]
.7800	.7112	.62228	10.09	11.08	5.71	.3214	.5277	853.1	.39293	.0679	[illegible]
.7600	.6912	.66673	10.17	11.19	5.93	.3095	.5433	860.6	.39559	.0684	[illegible]
.7400	.6712	.71110	10.25	11.31	6.12	.2964	.5579	867.6	.39809	.0688	[illegible]
.7200	.6513	.75339	10.34	11.44	6.28	.2826	.5714	874.6	.40046	.0693	[illegible]
.7000	.6313	.79959	10.43	11.58	6.41	.2683	.5839	881.7	.40270	.0697	[illegible]
.6800	.6113	.83710	10.53	11.73	6.51	.2535	.5956	888.4	.40485	.0701	[illegible]
.6600	.5913	.87775	10.64	11.89	6.58	.2384	.6065	894.9	.40691	.0705	[illegible]
.6400	.5714	.91700	10.75	12.06	6.62	.2233	.6166	901.7	.40889	.0708	[illegible]
.6200	.5514	.95556	10.88	12.25	6.63	.2082	.6260	908.2	.41080	.0712	[illegible]
.6000	.5315	.99335	11.01	12.45	6.61	.1932	.6348	914.7	.41266	.0715	23.417
.5800	.5115	1.0305	11.15	12.67	6.57	.1784	.6429	921.4	.41446	.0719	[illegible]
.5600	.4916	1.0667	11.30	12.90	6.51	.1639	.6505	927.9	.41621	.0722	26.937
.5400	.4716	1.1020	11.47	13.16	6.42	.1498	.6576	934.7	.41792	.0726	[illegible]
.5200	.4517	1.1366	11.65	13.44	6.31	.1362	.6641	941.7	.41960	.0729	30.911
.5000	.4317	1.1704	11.84	13.75	6.17	.1231	.6702	948.7	.42125	.0732	33.[illegible]
.4800	.4118	1.2034	12.05	14.09	6.01	.1106	.6758	955.8	.42287	.0736	35.456
.4600	.3919	1.2358	12.28	14.46	5.84	.0986	.6809	963.3	.42447	.0740	[illegible]
.4400	.3720	1.2675	12.54	14.88	5.64	.0874	.6857	970.8	.42606	.0743	[illegible]
.4200	.3521	1.2988	12.82	15.35	5.42	.0768	.6900	978.9	.42763	.0747	43.[illegible]
.4000	.3322	1.3296	13.13	15.87	5.19	.0669	.6940	987.2	.42920	.0750	47.[illegible]
.3800	.3124	1.3602	13.48	16.47	4.94	.0577	.6976	996.1	.43077	.0754	50.[illegible]
.3600	.2925	1.3909	13.87	17.16	4.68	.0492	.7009	005.4	.43234	.0758	54.[illegible]
.3400	.2727	1.4219	14.31	17.94	4.40	.0415	.7039	015.3	.43392	.0762	59.[illegible]
.3200	.2530	1.4537	14.81	18.86	4.11	.0345	.7066	026.0	.43551	.0766	64.[illegible]
.3000	.2333	1.4869	15.38	19.95	3.81	.0283	.7090	037.4	.43713	.0770	70.[illegible]
.2800	.2136	1.5226	16.05	21.25	3.51	.0227	.7111	049.9	.43878	.0775	76.[illegible]
.2600	.1941	1.5620	16.83	22.83	3.20	.0179	.7129	063.9	.44047	.0780	84.[illegible]
.2400	.1746	1.6073	17.76	24.78	2.89	.0138	.7146	079.3	.44221	.0785	94.710
.2200	.1554	1.6616	18.87	27.24	2.58	.0103	.7160	097.2	.44403	.0791	106.811
.2000	.1365	1.7302	20.22	30.43	2.28	.0075	.7172	117.7	.44596	.0796	122.[illegible]
.1800	.1180	1.8219	21.89	34.66	1.998	.0052	.7182	142.2	.44798	.0801	143.1[illegible]
.1600	.1001	1.9528	23.94	40.42	1.731	.0035	.7191	172.3	.45020	.0815	179.[illegible]
.1400	.0834	2.1528	26.42	48.37	1.511	.0023	.7198	211.1	.45266	.0827	217.[illegible]
.1200	.0680	2.4823	29.12	59.18	1.352	.0014	.7204	263.3	.45547	.0842	282.[illegible]
.1000	.0537	3.0898	30.83	72.80	1.258	.0009	.7210	340.8	.45891	.0862	436.[illegible]
.0900	.0459	3.6673	30.17	80.21	1.214	.0006	.7213	401.9	.46125	.0876	576.26
.0850	.0414	4.1571	28.94	83.91	1.183	.0005	.7214	446.9	.46286	.0885	691.65
.0800	.0357	5.0586	26.46	87.40	1.139	.0004	.7217	518.4	.46530	.0898	868.[illegible]
.0750	.0267	7.0953	20.82	89.79	1.077	.0002	.7220	699.4	.47130	.0924	1567.60
.0720	.0168	9.0422	13.51	89.08	1.003	.0001	.7223	1129.9	.48648	.0986	1579.[illegible]

TABLE XIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Continued

(c) $\gamma_i = -15^{\circ}$, $e_i = 0.2588$

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a}{g}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.0000	0.9326	0.0000010	15.000	16.113	0.0000	0.0008	0	0	0	0	0.000
1.0010	.9336	.0000015	15.000	16.112	.0000	.0010	.0001	16.4	.00748	.002003	.000
1.0020	.9346	.0000020	14.998	16.109	.0000	.0012	.0002	33.0	.01498	.004013	.000
1.0030	.9356	.0000033	14.996	16.106	.0000	.0015	.0004	49.4	.02250	.006028	.000
1.0050	.9376	.0000075	14.989	16.096	.0001	.0023	.0008	82.7	.03762	.010079	.000
1.0100	.9425	.0000589	14.957	16.055	.0007	.0064	.0030	166.4	.07596	.020333	.001
1.0150	.9475	.0004937	14.901	15.984	.0062	.0188	.0096	253.0	.11572	.030935	.007
1.01982	.95231	.009741	14.786	15.861	.1224	.0844	.0449	374.1	.17188	.045822	.135
1.0150	.9475	.04435	14.718	15.793	.555	.1778	.0971	436.5	.20075	.053424	.618
1.0100	.9425	.06913	14.699	15.779	.860	.2190	.1215	455.3	.20930	.055668	.968
1.0050	.9375	.09230	14.688	15.773	1.142	.2497	.1405	467.5	.21491	.057138	1.299
1.0000	.9325	.11467	14.681	15.771	1.410	.2745	.1567	476.6	.21914	.058248	1.622
.9950	.9275	.13652	14.676	15.773	1.669	.2955	.1710	484.1	.22257	.059145	1.940
.9900	.9225	.15800	14.672	15.774	1.921	.3136	.1840	490.6	.22546	.059901	2.257
.9800	.9125	.2001	14.669	15.783	2.41	.3433	.2069	501.0	.23016	.061134	2.888
.9600	.8925	.2820	14.669	15.807	3.31	.3853	.2451	516.9	.23711	.062952	4.154
.9400	.8725	.3615	14.675	15.840	4.14	.4118	.2766	528.8	.24225	.064299	5.439
.9200	.8525	.4390	14.686	15.879	4.90	.4279	.3048	538.5	.24637	.065377	6.748
.9000	.8325	.5147	14.699	15.922	5.61	.4363	.3278	546.8	.24982	.066282	8.087
.8800	.8125	.5886	14.716	15.970	6.24	.4387	.3493	554.3	.25281	.067066	9.458
.8600	.7925	.6608	14.734	16.021	6.83	.4363	.3687	560.8	.25545	.067760	10.867
.8400	.7725	.7314	14.755	16.077	7.35	.4302	.3844	567.1	.25782	.068385	12.314
.8200	.7525	.8003	14.778	16.137	7.82	.4210	.4027	572.8	.25999	.068955	13.802
.8000	.7325	.8675	14.803	16.200	8.23	.4094	.4176	578.2	.26198	.069482	15.336
.7800	.7126	.9331	14.83	16.27	8.59	.3957	.4314	583.4	.26384	.069973	16.917
.7600	.6926	.9969	14.86	16.35	8.90	.3805	.4444	588.4	.26558	.070433	18.550
.7400	.6726	1.0590	14.89	16.42	9.16	.3640	.4566	593.1	.26722	.070869	20.238
.7200	.6526	1.1193	14.92	16.51	9.36	.3466	.4679	597.7	.26877	.071283	21.986
.7000	.6326	1.1779	14.96	16.60	9.52	.3284	.4776	602.4	.27026	.071679	23.797
.6800	.6127	1.2347	15.00	16.70	9.64	.3099	.4875	606.8	.27168	.072059	25.677
.6600	.5927	1.2896	15.05	16.80	9.71	.2910	.4965	611.5	.27304	.072426	27.632
.6400	.5727	1.3426	15.09	16.90	9.73	.2721	.5046	615.9	.27436	.072781	29.667
.6200	.5527	1.3937	15.15	17.04	9.71	.2532	.5124	620.4	.27564	.073127	31.790
.6000	.5338	1.4429	15.20	17.18	9.65	.2345	.5197	624.8	.27688	.073464	34.009
.5800	.5128	1.4900	15.26	17.30	9.55	.2161	.5265	629.5	.27810	.073794	36.331
.5600	.4928	1.5352	15.33	17.42	9.42	.1982	.5328	634.1	.27929	.074119	38.769
.5400	.4729	1.5782	15.40	17.65	9.24	.1808	.5387	638.6	.28045	.074439	41.333
.5200	.4529	1.6192	15.48	17.84	9.03	.1640	.5441	643.5	.28160	.074756	44.037
.5000	.4330	1.6580	15.56	18.05	8.79	.1478	.5492	648.4	.28273	.075071	46.897
.4800	.4130	1.6947	15.66	18.28	8.52	.1324	.5539	653.4	.28385	.075384	49.932
.4600	.3931	1.7292	15.77	18.54	8.22	.1178	.5583	658.6	.28497	.075698	53.163
.4400	.3732	1.7615	15.89	18.83	7.88	.1040	.5623	664.0	.28608	.076013	56.618
.4200	.3533	1.7917	16.02	19.16	7.53	.0910	.5660	669.8	.28719	.076330	60.329
.4000	.3333	1.8196	16.17	19.53	7.15	.0790	.5694	675.7	.28830	.076651	64.334
.3800	.3135	1.8455	16.35	19.95	6.75	.0679	.5725	682.2	.28942	.076978	68.682
.3600	.2936	1.8693	16.55	20.44	6.33	.0577	.5753	689.0	.29056	.077313	73.434
.3400	.2737	1.8913	16.78	21.02	5.89	.0484	.5779	696.3	.29171	.077657	78.669
.3200	.2539	1.9118	17.04	21.68	5.45	.0400	.5802	704.3	.29288	.078014	84.489
.3000	.2341	1.9310	17.36	22.48	4.99	.0326	.5823	712.9	.29409	.078387	91.029
.2800	.2144	1.9497	17.74	23.45	4.53	.0260	.5842	722.5	.29533	.078780	98.477
.2600	.1947	1.9689	18.20	24.64	4.06	.0203	.5858	733.2	.29662	.079199	107.094
.2400	.1752	1.9900	18.76	26.15	3.60	.0155	.5872	745.4	.29798	.079653	117.262
.2200	.1558	2.0157	19.47	28.09	3.14	.0114	.5885	759.5	.29942	.080152	129.575
.2000	.1366	2.0504	20.38	30.66	2.70	.0082	.5896	776.1	.30097	.080714	144.981
.1800	.1178	2.1016	21.57	34.19	2.29	.0056	.5905	796.6	.30267	.081364	165.119
.1600	.0995	2.1841	23.14	39.19	1.912	.0036	.5913	822.4	.30457	.082146	193.045
.1400	.0823	2.3275	25.24	46.51	1.592	.0023	.5919	856.7	.30677	.083131	235.12
.1200	.0667	2.5975	27.84	57.21	1.361	.0014	.5926	905.1	.30941	.084451	306.12
.1000	.0527	3.1596	29.98	71.61	1.239	.0008	.5930	981.6	.31280	.086342	446.84
.0900	.0453	3.7240	29.69	79.99	1.202	.0006	.5933	1041.6	.31514	.087691	585.18
.0850	.0410	4.2075	28.63	83.55	1.176	.0005	.5935	1086.3	.31675	.088587	700.05
.0800	.0355	5.0981	26.32	87.24	1.136	.0004	.5937	1157.0	.31917	.089850	901.24
.0750	.0267	8.0044	20.81	89.77	1.072	.0002	.5940	1336.1	.32512	.092428	1509.34
.0720	.0168	8.0426	13.51	89.98	1.003	.0001	.5943	1766.4	.33928	.096690	1579.73

TABLE XIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Concluded

(d) $\gamma_i = -20^{\circ}$, $e_i = 0.3420$

$\overline{V}$	$\overline{V}_r$	$\overline{u}$	$\overline{\gamma}$ deg	$-\lambda$ deg	$-\frac{\dot{r}}{g}$	$\overline{\tau}$	$\overline{q}$	$\frac{\dot{r}}{\beta r}$	$\frac{\Delta r}{r}$	$\frac{\Delta \dot{r}}{r}$	$\sqrt{\beta r}\frac{\dot{r}}{V}$
1.0000	0.93[illegible]	0.0000010	[illegible].000	21.468	[illegible].0000	0.0008	0	[illegible]	[illegible]	0	0.000
1.0010	.93[illegible]	.0000015	[illegible].000	21.466	.0000	.0010	.0001	[illegible]	[illegible].0550	.002003	.000
1.0020	.93[illegible]	.0000022	[illegible].999	21.464	.0000	.0012	.0002	[illegible]	[illegible].0102	.004015	.000
1.0030	.93[illegible]	.0000033	[illegible].997	21.460	.0000	.0015	.0003	[illegible]	[illegible].0656	.006028	.000
1.0050	.93[illegible]	.0000075	[illegible].992	21.452	.0001	.0023	.0006	[illegible]	[illegible].0769	.010078	.000
1.0100	.94[illegible]	.0000589	[illegible].968	21.418	.0007	.0064	.0023	[illegible]	[illegible].0588	.020328	.00[illegible]
1.0150	.94[illegible]	.0004877	[illegible].927	21.367	.0061	.0188	.0073	[illegible]	[illegible].0494	.030874	.00[illegible]
1.02047	.95[illegible]	.012870	[illegible].832	21.257	.1623	.0978	.0392	[illegible]	.13012	.047212	.17[illegible]
1.0150	.95[illegible]	.06323	[illegible].772	21.202	.794	.1136	.0879	[illegible]	.15229	.055197	.88[illegible]
1.0100	.94[illegible]	.09569	[illegible].756	21.191	1.195	.0593	.1084	[illegible]	.15813	.057294	1.34[illegible]
1.0050	.93[illegible]	.12626	[illegible].744	21.186	1.568	.0938	.1246	[illegible]	.16206	.058704	1.77[illegible]
1.0000	.93[illegible]	.15583	[illegible].735	21.185	1.924	.0221	.1384	[illegible]	.16506	.059782	2.20[illegible]
.9950	.92[illegible]	.18475	[illegible].728	21.185	2.27	.0459	.1507	[illegible]	.16750	.060658	2.62[illegible]
.9900	.92[illegible]	.2132	[illegible].722	21.186	2.60	.0666	.1618	[illegible]	.16957	.061399	3.04[illegible]
.9800	.91[illegible]	.2690	[illegible].712	21.191	3.25	.0906	.1816	[illegible]	.17296	.062613	3.88[illegible]
.9600	.89[illegible]	.3774	[illegible].697	21.209	4.45	.0486	.2147	[illegible]	.17797	.064409	5.56[illegible]
.9400	.87[illegible]	.4826	[illegible].687	21.232	5.55	.0791	.2420	[illegible]	.18170	.065744	7.26[illegible]
.9200	.85[illegible]	.5850	[illegible].679	21.259	6.57	.0974	.2656	[illegible]	.18469	.066813	8.99[illegible]
.9000	.83[illegible]	.6849	[illegible].672	21.290	7.49	.1068	.2865	[illegible]	.18720	.067713	10.76[illegible]
.8800	.81[illegible]	.7823	[illegible].667	21.325	8.34	.1093	.3051	[illegible]	.18938	.068489	12.57[illegible]
.8600	.79[illegible]	.8774	[illegible].663	21.362	9.11	.1064	.3220	[illegible]	.19130	.069177	14.42[illegible]
.8400	.77[illegible]	.9700	[illegible].660	21.402	9.79	.0991	.3374	[illegible]	.19304	.069796	16.31[illegible]
.8200	.75[illegible]	1.0603	[illegible].657	21.445	10.41	.0883	.3516	[illegible]	.19462	.070365	18.28[illegible]
.8000	.73[illegible]	1.1481	[illegible].655	21.492	10.95	.0746	.3646	[illegible]	.19608	.070883	20.29[illegible]
.7800	.71[illegible]	1.2335	[illegible].65	21.54	11.42	.0586	.3767	[illegible]	.19744	.071369	22.36[illegible]
.7600	.69[illegible]	1.3165	[illegible].65	21.60	11.81	.0408	.3878	[illegible]	.19871	.071824	24.49[illegible]
.7400	.67[illegible]	1.3969	[illegible].65	21.65	12.15	.0216	.3982	[illegible]	.19992	.072254	26.69[illegible]
.7200	.65[illegible]	1.4748	[illegible].65	21.72	12.41	.0013	.4079	[illegible]	.20106	.072662	28.96[illegible]
.7000	.63[illegible]	1.5501	[illegible].66	21.78	12.61	.0802	.4169	[illegible]	.20215	.073055	31.31[illegible]
.6800	.61[illegible]	1.6227	[illegible].66	21.85	[illegible].74	.0585	.4254	[illegible]	.20320	.073428	33.74[illegible]
.6600	.59[illegible]	1.6926	[illegible].66	21.93	[illegible].82	.0366	.4332	[illegible]	.20421	.073788	36.26[illegible]
.6400	.57[illegible]	1.7597	19.66	22.01	[illegible].84	.0145	.4405	[illegible]	.20518	.074134	38.88[illegible]
.6200	.55[illegible]	1.8240	19.67	22.10	[illegible].80	.0026	.4474	[illegible]	.20613	.074472	41.60[illegible]
.6000	.53[illegible]	1.8854	19.67	22.20	[illegible].70	.0709	.4538	[illegible]	.20705	.074802	44.43[illegible]
.5800	.51[illegible]	1.9438	19.68	22.31	[illegible].55	.0495	.4597	[illegible]	.20795	.075124	47.39[illegible]
.5600	.49[illegible]	1.9991	19.69	22.42	[illegible].35	.0287	.4653	[illegible]	.20883	.075440	50.48[illegible]
.5400	.47[illegible]	2.0513	19.70	22.55	[illegible].10	.0085	.4705	[illegible]	.20970	.075750	53.72[illegible]
.5200	.45[illegible]	2.1002	19.71	22.69	[illegible].81	.0890	.4753	[illegible]	.21056	.076057	57.11[illegible]
.5000	.43[illegible]	2.1459	19.73	22.85	[illegible].47	.1702	.4798	[illegible]	.21140	.076360	60.69[illegible]
.4800	.41[illegible]	2.1882	19.75	23.02	[illegible].09	.2524	.4839	[illegible]	.21225	.076662	64.47[illegible]
.4600	.39[illegible]	2.2270	19.77	23.21	[illegible].67	.3354	.4878	[illegible]	.21308	.076965	68.46[illegible]
.4400	.37[illegible]	2.2623	19.80	23.42	[illegible].22	.4195	.4913	[illegible]	.21392	.077264	72.71[illegible]
.4200	.35[illegible]	2.2940	19.83	23.67	[illegible].73	.5045	.4946	[illegible]	.21476	.077564	77.24[illegible]
.4000	.33[illegible]	2.3219	19.87	23.94	[illegible].21	.5906	.4976	[illegible]	.21560	.077870	82.09[illegible]
.3800	.31[illegible]	2.3462	19.92	24.26	[illegible].67	.6777	.5004	[illegible]	.21645	.078179	87.31[illegible]
.3600	.29[illegible]	2.3667	[illegible].98	24.63	[illegible].10	.7660	.5029	[illegible]	.21732	.078493	92.97[illegible]
.3400	.27[illegible]	2.3836	[illegible].05	25.05	[illegible].51	.8552	.5052	[illegible]	.21820	.078814	99.14[illegible]
.3200	.25[illegible]	2.3968	[illegible].15	25.56	[illegible].91	.9456	.5073	[illegible]	.21910	.079145	105.92[illegible]
.3000	.23[illegible]	2.4065	[illegible].26	26.17	[illegible].30	.0370	.5091	[illegible]	.22004	.079488	113.44[illegible]
.2800	.21[illegible]	2.4132	[illegible].41	26.91	[illegible].68	.0295	.5108	[illegible]	.22100	.079847	121.88[illegible]
.2600	.19[illegible]	2.4175	[illegible].61	27.83	[illegible].05	.0230	.5123	[illegible]	.22202	.080224	131.49[illegible]
.2400	.17[illegible]	2.4205	[illegible].87	29.00	4.44	.0174	.5136	[illegible]	.22309	.080633	142.63[illegible]
.2200	.15[illegible]	2.4241	[illegible].22	30.50	3.83	.0128	.5147	[illegible]	.22424	.081075	155.82[illegible]
.2000	.13[illegible]	2.4317	[illegible].70	32.56	3.25	.0091	.5157	[illegible]	.22550	.081567	171.95[illegible]
.1800	.11[illegible]	2.4495	[illegible].38	35.40	2.69	.0061	.5166	[illegible]	.22689	.082130	192.45[illegible]
.1600	.09[illegible]	2.4899	[illegible].37	39.55	2.19	.0039	.5173	[illegible]	.22848	.082800	220.08[illegible]
.1400	.08[illegible]	2.5795	[illegible].83	45.87	1.749	.0024	.5179	[illegible]	.23037	.083634	260.57[illegible]
.1200	.06[illegible]	2.7817	[illegible].92	55.75	1.416	.0014	.5184	[illegible]	.23274	.084794	327.83[illegible]
.1000	.05[illegible]	3.2734	[illegible].08	70.31	1.234	.0008	.5189	[illegible]	.23596	.086519	462.93[illegible]
.0900	.04[illegible]	3.8104	[illegible].09	78.82	1.131	.0006	.5191	[illegible]	.23806	.087604	598.75[illegible]
.0850	.04[illegible]	4.2813	[illegible].23	83.06	1.168	.0005	.5193	[illegible]	.23985	.088674	712.32[illegible]
.0800	.03[illegible]	5.1542	[illegible].12	87.02	1.133	.0004	.5195	[illegible]	.24224	.089905	911.15[illegible]
.0750	.02[illegible]	8.0176	[illegible].79	89.75	1.072	.0002	.5198	1130.7	.24810	.092437	1511.80[illegible]
.0720	.01[illegible]	8.0426	13.51	89.98	1.003	.0001	.5201	1560.3	.26225	.096690	1579.73[illegible]

TABLE XIV.- VALUES OF Z FUNCTION AND RELATED QUANTIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS SO THAT $\bar{V}_{\gamma=0}=1.0$; $\bar{u}_a = -0.07$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 200$

(a) $\bar{V}_i = \sqrt{2}$, $\gamma_i = -13.580$, $e_i = 1.0000$

$\bar{V}$	$\bar{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{\gamma}_r}{g}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\dot{\gamma}V}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.41421	1.4823	0.0000014	13.580	12.945	0.0001	0.0033	0	0	0	0	0.000
1.41421	1.4827	.0000127	12.200	11.628	.0003	.0098	.0030	74.4	.04819	.011028	.000
1.41420	1.4829	.0000377	11.455	10.918	.0008	.0168	.0064	114.[illegible]	.07417	.016469	.000
1.41415	1.4831	.0001599	10.383	9.895	.0035	.0347	.0159	171.6	.11161	.023691	.001
1.41410	1.4831	.0002737	9.953	9.486	.0060	.0454	.0220	194.[illegible]	.12659	.026379	.003
1.4140	1.4831	.0004910	9.464	9.020	.0108	.0608	.0311	220.5	.14367	.029301	.005
1.4135	1.4828	.0014860	8.459	8.061	.0327	.1057	.0601	274.0	.17880	.034841	.015
1.4130	1.4824	.002400	7.981	7.606	.0529	.1344	.0765	299.5	.19549	.037252	.024
1.4120	1.4814	.004127	7.411	7.061	.0907	.1758	.1125	325.[illegible]	.21547	.039952	.041
1.4110	1.4805	.005714	7.038	6.706	.1252	.2070	.1367	349.7	.22854	.041609	.058
1.4100	1.4795	.007287	6.757	6.438	.1600	.2328	.1596	364.8	.23841	.042802	.073
1.4050	1.4747	.014[illegible]	5.890	5.611	.313	.3235	.2442	411.1	.26898	.046190	.144
1.4000	1.4697	.020[illegible]	5.368	5.113	.448	.3845	.3107	439.4	.28754	.048019	.207
1.3900	1.4598	.031[illegible]	4.677	4.453	.654	.4688	.4187	477.4	.31241	.050204	.321
1.3800	1.4498	.041[illegible]	4.193	3.991	.852	.5268	.5094	504.7	.33009	.051575	.422
1.3600	1.4299	.057[illegible]	3.498	3.327	1.256	.6019	.6615	545.5	.35612	.053324	.600
1.3400	1.4099	.071[illegible]	2.986	2.838	1.493	.6459	.7417	576.7	.37608	.054451	.751
1.3200	1.3899	.08240	2.573	2.444	1.706	.6709	.8086	603.[illegible]	.39268	.055259	.883
1.3000	1.3700	.091[illegible]	2.224	2.111	1.877	.6830	1.0159	627.1	.40734	.055873	.998
1.2800	1.3500	.099[illegible]	1.921	1.821	[illegible]	.6859	1.1261	649.0	.42067	.056356	1.099
1.2600	1.3300	.105[illegible]	1.653	1.566	[illegible]	.6817	1.2106	669.8	.43307	.056742	1.187
1.2400	1.3100	.110[illegible]	1.412	1.337	2.17	.6722	1.3005	689.8	.44480	.057055	1.264
1.2200	1.2900	.114[illegible]	1.195	1.130	[illegible]	.6585	1.3865	709.3	.45604	.057311	1.331
1.2000	1.2700	.11770	.998	.943	[illegible]	.6415	1.4693	728.3	.46692	.057519	1.387
1.1800	1.2500	.11971	.820	.774	[illegible]	.6221	1.5492	747.5	.47757	.057688	1.435
1.1600	1.2300	.12090	.659	.621	[illegible]	.6008	1.6267	766.5	.48804	.057823	1.474
1.1400	1.2100	.12137	.514	.484	[illegible]	.5780	1.7[illegible]0	785.7	.49843	.057929	1.506
1.1200	1.1900	.12119	.386	.363	[illegible]	.5543	1.7753	805.2	.50878	.058010	1.530
1.1000	1.1700	.12045	.275	.258	[illegible]	.5300	1.8[illegible]	825.0	.51914	.058069	1.549
1.0800	1.1500	.1192[illegible]	.180	.169	[illegible]	.5053	1.9169	845.3	.52957	.058110	1.561
1.0600	1.1300	.1178[illegible]	.104	.098	[illegible]	.4807	1.9[illegible]	866.[illegible]	.54009	.058136	1.569
1.0400	1.1100	.11573	.048	.045	[illegible]	.4562	2.0[illegible]	887.9	.55074	.058150	1.574
1.0200	1.0900	.1136[illegible]	.012	.011	[illegible]	.4322	2.1[illegible]	910.[illegible]	.56156	.058155	1.575
1.0000	1.0700	.1114[illegible]	.000	.000	[illegible]	.4089	2.1[illegible]	933.4	.57255	.058156	1.575
.9800	1.0500	.1098[illegible]	.013	.012	1.737	.3864	2.2[illegible]	957.[illegible]	.58373	.058157	1.576
.9600	1.0300	.1071[illegible]	.054	.051	1.674	.3650	2.3[illegible]	982.[illegible]	.59511	.058163	1.578
.9400	1.0100	.1051[illegible]	.126	.117	1.615	.3448	2.3700	1008.[illegible]	.60667	.058181	1.583
.9200	.9900	.1037[illegible]	.231	.215	1.563	.3259	2.4[illegible]	1035.1	.61840	.058217	1.595
.9000	.9700	.1027[illegible]	.373	.346	1.519	.3084	2.48[illegible]	1062.[illegible]	.63023	.058279	1.615
.8800	.9500	.10241	.552	.512	1.485	.2925	2.5[illegible]	1091.[illegible]	.64213	.058374	1.646
.8600	.9300	.1026[illegible]	.772	.714	1.463	.2782	2.6[illegible]	1120.1	.65400	.058510	1.691
.8400	.9100	.1048[illegible]	1.032	.953	1.454	.2654	2.6[illegible]	1149.7	.66574	.058695	1.755
.8200	.8900	.1065[illegible]	1.333	1.228	1.457	.2543	2.7[illegible]	1179.1	.67727	.058932	1.840
.8000	.8700	.1103[illegible]	1.672	1.537	1.477	.2446	2.7[illegible]	1208.[illegible]	.68845	.059224	1.951
.7800	.8500	.1153[illegible]	2.046	1.878	1.511	.2361	2.7[illegible]	1237.2	.69919	.059572	2.092
.7600	.8299	.1217[illegible]	2.453	2.246	1.561	.2288	2.8[illegible]	1265.7	.70940	.059972	2.266
.7400	.8099	.1296[illegible]	2.887	2.638	1.6[illegible]	.2224	2.8[illegible]	1293.[illegible]	.71902	.060420	2.478
.7200	.7899	.1391[illegible]	3.346	3.050	1.70[illegible]	.2166	2.9[illegible]	1319.7	.72800	.060908	2.732
.7000	.7699	.1500[illegible]	3.824	3.477	1.7[illegible]	.2113	2.9[illegible]	1344.[illegible]	.73632	.061429	3.032
.6800	.7498	.1626[illegible]	4.319	3.916	1.901	.2062	2.9[illegible]	1367.[illegible]	.74400	.061975	3.382
.6600	.7298	.1766[illegible]	4.828	4.365	[illegible]	.2011	3.0[illegible]	1390.[illegible]	.75105	.062538	3.785
.6400	.7097	.1921[illegible]	5.349	4.822	2.14	.1959	3.0[illegible]	1411.[illegible]	.75750	.063112	4.246
.6200	.6897	.2090	5.882	5.286	[illegible]	.1905	3.0744	1431.[illegible]	.76341	.063692	4.768
.6000	.6696	.2273	6.425	5.755	[illegible]	.1848	3.0[illegible]	1450.[illegible]	.76881	.064274	5.357
.5800	.6495	.2467	6.980	6.230	[illegible]	.1787	3.1[illegible]	1468.[illegible]	.77375	.064854	6.016
.5600	.6295	.2673	7.548	6.711	[illegible]	.1723	3.1[illegible]	1485.4	.77827	.065431	6.751
.5400	.6094	.2889	8.129	7.199	[illegible]	.1655	3.1[illegible]	1501.[illegible]	.78242	.066002	7.567
.5200	.5893	.3115	8.727	7.695	[illegible]	.1584	3.1[illegible]	1517.1	.78624	.066566	8.472
.5000	.5692	.3349	9.345	8.200	[illegible]	.1509	3.1[illegible]	1531.9	.78975	.067125	9.472
.4800	.5491	.3590	9.984	8.717	3.19	.1432	3.2[illegible]	1546.[illegible]	.79299	.067676	10.577
.4600	.5290	.3837	10.649	9.248	[illegible]	.1352	3.2[illegible]	1560.[illegible]	.79599	.068222	11.796
.4400	.5088	.4089	11.345	9.795	3.40	.1270	3.2[illegible]	1573.3	.79877	.068761	13.141
.4200	.4887	.4343	12.078	10.360	3.49	.1187	3.2[illegible]	1586.[illegible]	.80135	.069296	14.624
.4000	.4685	.4600	12.853	10.948	3.57	.1103	3.2[illegible]	1599.[illegible]	.80375	.069827	16.263
.3800	.4483	.4856	13.68	11.56	3.63	.1019	3.2[illegible]	1611.7	.80599	.070355	18.073
.3600	.4281	.5111	14.56	12.21	3.68	.0935	3.2[illegible]	1624.3	.80809	.070881	20.079
.3400	.4079	.5363	15.52	12.89	3.71	.0852	3.2[illegible]	1636.4	.81005	.071407	22.308
.3200	.3876	.5609	16.56	13.61	3.72	.0771	3.2[illegible]	1648.7	.81188	.071935	24.791
.3000	.3673	.5848	17.71	14.39	3.72	.0692	3.2[illegible]	1661.1	.81361	.072466	27.568
.2800	.3469	.6077	18.99	15.23	3.69	.0615	3.2[illegible]	1673.6	.81523	.073003	30.692
.2600	.3265	.6292	20.43	16.14	3.65	.0542	3.2[illegible]	1686.4	.81675	.073547	34.224
.2400	.3060	.6491	22.07	17.14	3.58	.0471	3.3[illegible]	1699.4	.81818	.074103	38.249
.2200	.2854	.6670	23.97	18.25	3.49	.0405	3.3[illegible]	1713.1	.81953	.074675	42.879
.2000	.2646	.6826	26.22	19.51	3.38	.0342	3.3[illegible]	1727.7	.82080	.075267	48.269
.1800	.2436	.6955	28.95	20.95	3.24	.0284	3.3[illegible]	1742.3	.82198	.075887	54.641
.1600	.2223	.7052	32.35	22.65	3.08	.0231	3.3[illegible]	1758.4	.82310	.076545	62.331
.1400	.2005	.7117	36.76	24.70	2.89	.0182	3.3[illegible]	1776.3	.82414	.077259	71.897
.1200	.1778	.7155	42.81	27.30	2.67	.0137	3.3[illegible]	1796.9	.82511	.078059	84.372
.1000	.1534	.7221	51.92	30.87	2.40	.0097	3.3[illegible]	1822.3	.82599	.079013	102.120
.0900	.1398	.7313	58.69	33.37	[illegible]	.0078	3.3[illegible]	1838.9	.82640	.079603	114.905
.0850	.1323	.7405	63.10	34.95	[illegible]	.0068	3.3[illegible]	1848.1	.82660	.079952	123.197
.0800	.1240	.7564	68.62	36.92	[illegible]	.0059	3.3[illegible]	1859.8	.82678	.080361	133.719
.0750	.1142	.7874	76.09	39.59	[illegible]	.0048	3.3[illegible]	1874.9	.82695	.080885	148.469
.0720	.1068	.8242	82.46	41.94	[illegible]	.0041	3.3[illegible]	1887.6	.82703	.081317	161.877
.0700	.1002	.8711	88.65	44.32	1.78[illegible]	.0035	3.3[illegible]	1900.1	.82706	.081735	175.994
.0690	.0954	.9160	93.35	46.24	1.70[illegible]	.0032	3.3[illegible]	1910.0	.82706	.082058	187.750

TABLE XIV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = -0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Continued

(b) $\overline{V}_i = \sqrt{3}$, $\gamma_i = -16.006^{\circ}$, $e_i = 1.9417$

$\overline{V}$	$\overline{V}_r$	Z	γ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{\tau}$	$\overline{q}$	$\dot{\gamma}$ deg/sec	$\frac{\Delta a}{r}$	$\frac{\Delta \gamma}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.7320	1.7994	0.0000017	16.066	15.449	0.0001	0.0058	0	0	0	0	0.000
1.7310	1.7983	.0000035	15.575	14.977	.0001	.0083	.0008	16.4	.01286	.003645	.000
1.7300	1.7972	.0000070	15.092	14.511	.0002	.0117	.0018	50.9	.02554	.007121	.000
1.7280	1.7960	.0000284	14.070	13.527	.0008	.0235	.0057	66.6	.05232	.014088	.000
1.7250	1.7934	.0002239	12.399	11.919	.0059	.0657	.0210	120.[illegible]	.09623	.024415	.002
1.7200	1.7890	.0032221	9.815	9.433	.0848	.2478	.10107	207.7	.16425	.037770	.024
1.7150	1.7844	.010171	8.458	8.128	.267	.4375	.2015	252.7	.20009	.043533	.084
1.7100	1.7794	.017862	7.706	7.404	.468	.5758	.2855	277.7	.22003	.046365	.148
1.7000	1.7694	.03276	6.803	6.534	.853	.7692	.4203	308.1	.24409	.049427	.271
1.6800	1.7497	.05947	5.778	5.547	1.533	1.0977	.6265	342.9	.27167	.052468	.501
1.6600	1.7297	.08278	5.120	4.913	2.11	1.1557	.7920	365.8	.28964	.054181	.709
1.6400	1.7098	.10343	4.623	4.434	2.61	1.2552	.9350	383.8	.30342	.055355	.892
1.6200	1.6898	.12188	4.217	4.043	3.04	1.3235	1.0632	398.6	.31483	.056237	1.064
1.6000	1.6699	.13845	3.871	3.709	3.41	1.3697	1.1806	411.8	.32472	.056937	1.224
1.5500	1.6199	.17295	3.168	3.031	4.14	1.4199	1.4410	439.7	.34541	.058208	1.578
1.5000	1.5699	.19923	2.607	2.491	4.63	1.4102	1.6687	463.8	.36269	.059079	1.879
1.4500	1.5200	.2187	2.135	2.037	4.93	1.3638	1.8736	485.9	.37806	.059715	2.133
1.4000	1.4700	.2324	1.725	1.643	5.07	1.3940	2.0614	507.[illegible]	.39227	.060193	2.347
1.3500	1.4200	.2410	1.363	1.296	5.09	1.4096	2.2354	528.2	.40578	.060557	2.524
1.3000	1.3700	.2451	1.042	.989	5.00	1.4165	2.3983	546.1	.41889	.060831	2.667
1.2500	1.3200	.2455	.759	.719	4.84	1.0192	2.5516	570.7	.43183	.061034	2.777
1.2000	1.2700	.2425	.513	.484	4.61	.9208	2.6967	593.3	.44479	.061177	2.857
1.1800	1.2500	.2405	.425	.401	4.50	.8817	2.7527	604.7	.45002	.061220	2.882
1.1600	1.2300	.2381	.344	.325	4.39	.8430	2.8075	616.4	.45528	.061255	2.906
1.1400	1.2100	.2353	.270	.255	4.27	.8049	2.8614	627.9	.46059	.061284	2.919
1.1200	1.1900	.2322	.204	.192	4.15	.7673	2.9141	639.1	.46596	.061306	2.932
1.1000	1.1700	.2288	.146	.137	4.02	.7305	2.9659	642.5	.47139	.061322	2.942
1.0800	1.1500	.2252	.096	.090	3.90	.6944	3.0168	653.4	.47689	.061334	2.949
1.0600	1.1300	.2213	.055	.052	3.77	.6593	3.0667	664.3	.48247	.061341	2.953
1.0400	1.1100	.2173	.025	.024	3.64	.6252	3.1157	675.7	.48814	.061345	2.955
1.0200	1.0900	.2132	.006	.006	3.51	.5921	3.1638	687.7	.49390	.061346	2.956
1.0000	1.0700	.2090	.000	.000	3.38	.5601	3.2111	700.2	.49976	.061347	2.956
.9800	1.0500	.2049	.007	.007	3.26	.5293	3.2575	712.9	.50572	.061347	2.956
.9600	1.0300	.2007	.029	.027	3.14	.4997	3.3029	726.2	.51179	.061349	2.957
.9400	1.0100	.19676	.067	.063	3.02	.4714	3.3476	740.2	.51796	.061351	2.960
.9200	.9900	.19297	.124	.115	2.91	.4444	3.3913	754.5	.52424	.061364	2.965
.9000	.9700	.18945	.200	.185	2.80	.4187	3.4340	769.3	.53062	.061382	2.977
.8800	.9500	.18628	.298	.276	2.70	.3945	3.4759	784.9	.53710	.061410	2.995
.8600	.9300	.18354	.419	.388	2.61	.3716	3.5167	800.8	.54366	.061451	3.018
.8400	.9100	.18132	.566	.523	2.53	.3501	3.5565	817.4	.55030	.061508	3.053
.8200	.8900	.17971	.740	.682	2.46	.3300	3.5953	834.6	.55698	.061584	3.099
.8000	.8700	.17881	.944	.868	2.39	.3113	3.6328	852.3	.56369	.061681	3.161
.7800	.8500	.17872	1.178	1.081	2.34	.2940	3.6692	870.5	.57041	.061806	3.240
.7600	.8300	.17953	1.444	1.322	2.30	.2779	3.7043	888.9	.57709	.061959	3.341
.7400	.8100	.18135	1.742	1.592	2.27	.2631	3.7380	907.7	.58370	.062140	3.465
.7200	.7900	.18426	2.074	1.890	2.26	.2494	3.7703	926.6	.59022	.062359	3.619
.7000	.7700	.18835	2.439	2.217	2.26	.2368	3.8012	945.6	.59659	.062610	3.805
.6800	.7499	.19370	2.837	2.572	2.27	.2251	3.8306	964.9	.60279	.062895	4.029
.6600	.7299	.2004	3.267	2.954	2.29	.2143	3.8584	983.8	.60877	.063214	4.294
.6400	.7099	.2085	3.728	3.361	2.32	.2042	3.8846	1002.8	.61453	.063565	4.606
.6200	.6898	.2179	4.220	3.792	2.37	.1946	3.9092	1021.3	.62003	.063946	4.971
.6000	.6698	.2289	4.740	4.245	2.42	.1856	3.9323	1039.5	.62525	.064355	5.395
.5800	.6497	.2413	5.289	4.720	2.48	.1769	3.9539	1057.4	.63019	.064788	5.883
.5600	.6297	.2551	5.865	5.214	2.55	.1685	3.9739	1074.8	.63485	.065240	6.443
.5400	.6096	.2704	6.469	5.728	2.63	.1603	3.9925	1092.0	.63922	.065715	7.081
.5200	.5895	.2870	7.101	6.260	2.71	.1522	4.0097	1108.4	.64332	.066200	7.805
.5000	.5694	.3049	7.762	6.811	2.80	.1442	4.0256	1124.5	.64715	.066700	8.624
.4800	.5493	.3241	8.453	7.380	2.88	.1362	4.0402	1140.4	.65072	.067210	9.548
.4600	.5292	.3444	9.178	7.969	2.97	.1283	4.0536	1155.4	.65405	.067726	10.580
.4400	.5091	.3657	9.939	8.579	3.05	.1203	4.0659	1170.5	.65716	.068249	11.755
.4200	.4890	.3880	10.742	9.213	3.12	.1124	4.0772	1185.1	.66006	.068777	13.064
.4000	.4688	.4110	11.591	9.872	3.19	.1044	4.0875	1199.1	.66276	.069309	14.539
.3800	.4486	.4347	12.49	10.56	3.26	.0966	4.0969	1213.2	.66528	.069846	16.178
.3600	.4284	.4589	13.46	11.28	3.33	.0888	4.1054	1227.2	.66762	.070387	18.497
.3400	.4082	.4833	14.50	12.04	3.35	.0811	4.1131	1241.0	.66981	.070930	20.102
.3200	.3879	.5078	15.63	12.85	3.38	.0735	4.1202	1254.5	.67186	.071482	22.442
.3000	.3677	.5321	16.87	13.71	3.39	.0661	4.1265	1268.3	.67377	.072039	25.086
.2800	.3472	.5561	18.25	14.63	3.39	.0590	4.1322	1282.1	.67556	.072604	28.087
.2600	.3267	.5793	19.78	15.63	3.36	.0521	4.1374	1295.8	.67723	.073179	31.511
.2400	.3062	.6015	21.53	16.72	3.32	.0455	4.1420	1310.1	.67879	.073768	35.446
.2200	.2856	.6224	23.54	17.92	3.26	.0392	4.1461	1324.7	.68026	.074373	40.007
.2000	.2647	.6414	25.91	19.27	3.18	.0332	4.1497	1340.0	.68162	.075000	45.353
.1800	.2437	.6582	28.76	20.82	3.07	.0277	4.1530	1355.9	.68289	.075657	51.716
.1600	.2224	.6726	32.30	22.62	2.94	.0225	4.1558	1373.1	.68408	.076353	59.448
.1400	.2004	.6843	36.88	24.78	2.78	.0178	4.1584	1392.0	.68518	.077109	69.129
.1200	.1776	.6945	43.14	27.51	2.58	.0135	4.1606	1413.6	.68619	.077952	81.847
.1000	.1530	.7079	52.54	31.25	2.34	.0095	4.1626	1440.1	.68711	.078994	100.112
.0900	.1393	.7217	59.54	33.86	2.20	.0076	4.1636	1457.0	.68753	.079583	113.411
.0850	.1316	.7339	64.11	35.52	2.12	.0067	4.1641	1467.4	.68773	.079952	122.113
.0800	.1231	.7540	69.87	37.60	2.02	.0057	4.1646	1479.7	.68792	.080390	133.285
.0750	.1129	.7918	77.77	40.48	1.904	.0047	4.1651	1496.0	.68808	.080958	149.304
.0720	.1049	.8376	84.72	43.10	1.812	.0039	4.1655	1510.1	.68816	.081443	164.514
.0700	.0977	.9018	92.00	46.00	1.723	.0033	4.1659	1525.4	.68817	.081953	182.184
.0690	.0900	.9879	99.27	49.15	1.641	.0028	4.1662	1541.8	.68812	.082481	202.47

TABLE XIV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = -0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Concluded

(c) $\overline{V}_i = 2.0$, $\gamma_i = -17.249^{\circ}$, $e_i = 2.8804$

$\overline{V}$	$\overline{r}$	z	$\overline{\gamma}$	$-\overline{\theta}$ deg	$-\frac{\dot{r}}{r}$	$\overline{q}$	$\overline{\dot{q}}$	$\frac{\dot{V}}{V}$	$\frac{\Delta\theta}{r}$	$\frac{\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\dot{\theta}}{V}$
2.0000	2.0671	0.0000020	-17.249	16.674	[illegible]	0.0088	0	[illegible]	0	0	0.000
1.9990	2.0662	.0000030	-16.969	16.403	[illegible]	.0108	.0005	[illegible]	.00650	.002001	.000
1.9980	2.0653	.0000044	-16.685	16.127	[illegible]	.0132	.0011	[illegible]	.01313	.004005	.000
1.9960	2.0630	.0000099	-16.399	15.560	[illegible]	.0194	.0027	[illegible]	.02678	.008020	.000
1.9940	2.0611	.0000222	-16.489	14.969	[illegible]	.0292	.0052	[illegible]	.04100	.012043	.000
1.9920	2.0597	.0000496	-14.952	14.353	[illegible]	.0436	.0091	[illegible]	.05585	.016070	.000
1.9900	2.0575	.0001106	14.188	13.710	[illegible]	.0650	.0153	[illegible]	.07136	.020087	.001
1.9850	2.0531	.0007749	11.426	12.006	[illegible]	.1711	.0486	[illegible]	.11253	.029824	.006
1.9800	2.0488	.003759	10.779	10.413	[illegible]	.3747	.1222	[illegible]	.15108	.037740	.027
1.9700	2.0392	.017322	8.880	8.576	[illegible]	.7997	.3062	[illegible]	.19568	.045468	.125
1.9600	2.0299	.03359	7.739	7.666	[illegible]	1.0941	.4583	[illegible]	.21787	.048747	.242
1.9400	2.0099	.06824	6.871	6.632	[illegible]	1.4766	.6960	[illegible]	.24321	.052040	.469
1.9200	1.9896	.09208	6.195	5.973	2.64	1.7247	.8870	[illegible]	.25938	.053892	.678
1.9000	1.9697	.11744	5.690	5.488	3.32	1.8998	1.0516	[illegible]	.27157	.055161	.874
1.8500	1.9198	.17218	4.778	4.604	4.81	2.1585	1.3962	[illegible]	.29391	.057207	1.316
1.8000	1.8698	.2170	4.115	3.961	5.96	2.2701	1.6836	[illegible]	.31057	.058502	1.705
1.7500	1.8199	.2539	3.380	3.349	6.88	2.2960	1.9353	[illegible]	.32435	.059428	2.052
1.7000	1.7699	.2841	3.125	3.001	7.63	2.2666	2.1616	[illegible]	.33640	.060134	2.364
1.6500	1.7199	.3084	2.725	2.614	7.83	2.1995	2.3684	[illegible]	.34735	.060693	2.643
1.6000	1.6699	.3273	2.365	2.266	8.07	2.1064	2.5596	[illegible]	.35753	.061146	2.893
1.5500	1.6200	.3416	2.038	1.950	8.18	1.9956	2.7378	[illegible]	.36720	.061517	3.116
1.5000	1.5700	.3514	1.737	1.659	8.17	1.8731	2.9049	[illegible]	.37650	.061824	3.314
1.4500	1.5200	.3574	1.458	1.391	[illegible]	1.7433	3.0624	[illegible]	.38558	.062077	3.486
1.4000	1.4700	.3597	1.200	1.143	[illegible]	1.6100	3.2114	[illegible]	.39453	.062284	3.633
1.3500	1.4200	.3586	.962	.914	[illegible]	1.4758	3.3527	[illegible]	.40344	.062452	3.757
1.3000	1.3700	.3546	.743	.705	7.24	1.3430	3.4871	[illegible]	.41238	.062585	3.858
1.2500	1.3200	.3480	.545	.516	[illegible]	1.2135	3.6153	[illegible]	.42142	.062686	3.937
1.2000	1.2700	.3390	.370	.350	6.44	1.0887	3.7375	[illegible]	.43063	.062759	3.995
1.1500	1.2200	.3280	.222	.209	6.00	.9698	3.8544	[illegible]	.44007	.062807	4.034
1.1000	1.1700	.3155	.106	.099	5.55	.8577	3.9661	[illegible]	.44980	.062835	4.056
1.0500	1.1200	.3018	.028	.027	5.10	.7532	4.0729	[illegible]	.45990	.062846	4.065
1.0000	1.0700	.2875	.000	.000	4.66	.6569	4.1751	[illegible]	.47042	.062848	4.066
.9800	1.0500	.2818	.005	.005	4.48	.6208	4.2146	[illegible]	.47475	.062848	4.067
.9600	1.0300	.2761	.021	.020	4.32	.5860	4.2534	[illegible]	.47916	.062849	4.067
.9400	1.0100	.2705	.049	.046	4.15	.5527	4.2914	[illegible]	.48365	.062852	4.070
.9200	.9900	.2650	.090	.084	3.99	.5208	4.3287	[illegible]	.48822	.062857	4.074
.9000	.9700	.2597	.146	.135	3.84	.4903	4.3652	[illegible]	.49287	.062867	4.081
.8800	.9500	.2547	.217	.201	[illegible]	.4613	4.4009	[illegible]	.49760	.062881	4.094
.8600	.9300	.2500	.306	.283	[illegible]	.4337	4.4359	[illegible]	.50240	.062903	4.112
.8400	.9100	.2457	.414	.382	[illegible]	.4076	4.4700	[illegible]	.50728	.062934	4.137
.8200	.8900	.2418	.543	.500	[illegible]	.3829	4.5033	[illegible]	.51222	.062975	4.171
.8000	.8700	.2385	.694	.638	[illegible]	.3595	4.5357	[illegible]	.51722	.063029	4.216
.7800	.8500	.2358	.870	.799	[illegible]	.3376	4.5672	[illegible]	.52227	.063097	4.275
.7600	.8300	.2337	1.072	.982	[illegible]	.3171	4.5977	[illegible]	.52736	.063183	4.349
.7400	.8100	.2324	1.303	1.190	[illegible]	.2978	4.6273	[illegible]	.53246	.063289	4.442
.7200	.7900	.2320	1.562	1.424	[illegible]	.2798	4.6558	[illegible]	.53756	.063416	4.556
.7000	.7700	.2324	1.854	1.685	[illegible]	.2631	4.6833	[illegible]	.54265	.063568	4.696
.6800	.7500	.2340	2.177	1.974	[illegible]	.2474	4.7097	[illegible]	.54770	.063745	4.866
.6600	.7296	.2366	2.535	2.292	[illegible]	.2329	4.7350	[illegible]	.55268	.063950	5.069
.6400	.7095	.2404	2.927	2.638	[illegible]	.2193	4.7591	[illegible]	.55758	.064183	5.311
.6200	.6896	.2454	3.354	3.014	[illegible]	.2066	4.7821	[illegible]	.56237	.064446	5.598
.6000	.6695	.2518	3.817	3.419	[illegible]	.1947	4.8038	[illegible]	.56703	.064738	5.934
.5800	.6498	.2595	4.317	3.852	[illegible]	.1835	4.8243	[illegible]	.57155	.065058	6.327
.5600	.6298	.2686	4.352	4.314	[illegible]	.1730	4.8436	[illegible]	.57590	.065407	6.784
.5400	.6097	.2792	4.425	4.804	[illegible]	.1630	4.8617	[illegible]	.58007	.065781	7.311
.5200	.5897	.2912	4.035	5.320	[illegible]	.1534	4.8785	[illegible]	.58405	.066180	7.919
.5000	.5696	.3046	4.584	5.864	[illegible]	.1442	4.8943	[illegible]	.58783	.066602	8.616
.4800	.5495	.3194	4.172	6.435	[illegible]	.1354	4.9089	[illegible]	.59142	.067044	9.412
.4600	.5294	.3357	4.101	7.034	[illegible]	.1267	4.9223	[illegible]	.59481	.067504	10.320
.4400	.5091	.3532	3.376	7.661	[illegible]	.1183	4.9348	[illegible]	.59801	.067981	11.352
.4200	.4891	.3719	4.999	8.317	[illegible]	.1103	4.9462	[illegible]	.60102	.068472	12.524
.4000	.4690	.3918	4.375	9.006	[illegible]	.1021	4.9567	[illegible]	.60384	.068976	13.853
.3800	.4488	.4127	11.51	9.73	[illegible]	.0942	4.9663	[illegible]	.60649	.069493	15.359
.3600	.4286	.4344	12.92	10.49	[illegible]	.0865	4.9751	[illegible]	.60897	.070020	17.067
.3400	.4084	.4569	[illegible]	11.29	[illegible]	.0790	4.9830	[illegible]	.61129	.070558	19.005
.3200	.3881	.4799	14.78	12.15	[illegible]	.0716	4.9903	[illegible]	.61346	.071106	21.208
.3000	.3678	.5031	[illegible]	13.05	[illegible]	.0644	4.9968	[illegible]	.61549	.071665	23.718
.2800	.3474	.5265	17.30	14.03	[illegible]	.0575	5.0027	[illegible]	.61738	.072237	26.591
.2600	.3270	.5495	19.10	15.09	[illegible]	.0508	5.0080	[illegible]	.61915	.072822	29.892
.2400	.3064	.5721	20.91	16.24	[illegible]	.0444	5.0127	[illegible]	.62081	.073423	33.711
.2200	.2858	.5937	23.00	17.51	[illegible]	.0383	5.0169	[illegible]	.62235	.074044	38.166
.2000	.2649	.6141	25.44	18.93	[illegible]	.0326	5.0207	[illegible]	.62379	.074689	43.421
.1800	.2439	.6327	28.38	20.54	[illegible]	.0272	5.0240	[illegible]	.62512	.075365	49.711
.1600	.2225	.6494	32.02	22.42	[illegible]	.0222	5.0269	[illegible]	.62636	.076084	57.397
.1400	.2005	.6640	36.71	24.67	[illegible]	.0176	5.0295	[illegible]	.62751	.076863	67.074
.1200	.1777	.6776	43.12	27.49	[illegible]	.0133	5.0318	[illegible]	.62856	.077736	79.861
.1000	.1529	.6955	52.72	31.36	[illegible]	.0094	5.0339	[illegible]	.62951	.078777	98.359
.0900	.1390	.7123	59.87	34.05	[illegible]	.0076	5.0349	[illegible]	.62994	.079423	111.930
.0850	.1313	.7265	64.55	35.77	[illegible]	.0066	5.0354	[illegible]	.63014	.079808	120.868
.0800	.1227	.7409	70.47	37.93	[illegible]	.0057	5.0359	[illegible]	.63033	.080265	132.437
.0750	.1125	.7526	79.67	40.95	[illegible]	.0046	5.0365	[illegible]	.63050	.080863	149.275
.0720	.1038	.8441	84.35	43.78	[illegible]	.0038	5.0369	[illegible]	.63057	.081388	165.786
.0700	.0952	.8244	[illegible]	47.17	[illegible]	.0031	5.0373	[illegible]	.63057	.081983	186.766

TABLE XV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$

(a) $\overline{V}_i = \sqrt{2}$, $\gamma_i = -13.725^{\circ}$, $e_i = 1.0000$

$\overline{V}$	$\overline{V}_r$	Z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{a_r}{g}$	$\overline{\tau}$	$\overline{q}$	t sec	$\frac{\Delta s}{r}$	$\frac{\Delta V}{r}$	$\sqrt{\beta r}\frac{\gamma}{V}$
1.414214	1.3463	0.0000014	13.725	14.432	0.0001	0.0024	0	0	0	0	0.000
1.41421	1.3463	.0000152	13.244	12.876	.0003	.0080	.0025	79.8	.05169	.011918	.000
1.41420	1.3463	.0000456	11.494	12.087	.0008	.0139	.0054	120.1	.07788	.017424	.000
1.41415	1.3464	.0001946	10.421	10.960	.0035	.0286	.0132	177.3	.11533	.024674	.000
1.41410	1.3465	.0003334	9.992	10.510	.0060	.0374	.0182	200.2	.13028	.027369	.000
1.4140	1.3466	.0005986	9.504	9.997	.0108	.0501	.0257	226.2	.14732	.030293	.000
1.4135	1.3443	.0018149	8.502	8.943	.0328	.0871	.0495	279.5	.18233	.035840	.010
1.4130	1.3437	.002940	8.026	8.443	.0531	.1107	.0661	305.0	.19895	.038254	.020
1.4120	1.3426	.005047	7.457	7.845	.0911	.1447	.0916	335.1	.21884	.040957	.050
1.4110	1.3415	.007329	7.086	7.455	.1268	.1704	.1123	354.9	.23185	.042619	.070
1.4100	1.3405	.008922	6.805	7.160	.1608	.1916	.1302	369.7	.24167	.043819	.086
1.4050	1.3354	.017533	5.942	6.253	.315	.2660	.2002	416.0	.27207	.047211	.170
1.4000	1.3303	.02522	5.421	5.706	.451	.3160	.2546	444.1	.29052	.049046	.254
1.3900	1.3203	.03883	4.730	4.981	.689	.3847	.3427	482.0	.31523	.051241	.384
1.3800	1.3102	.05080	4.246	4.473	.894	.4315	.4162	509.1	.33281	.052628	.510
1.3600	1.2901	.07122	3.550	3.743	1.233	.4914	.5400	549.1	.35868	.054381	.739
1.3400	1.2701	.08810	3.035	3.203	1.500	.5254	.6458	580.6	.37847	.055523	.967
1.3200	1.2501	.10224	2.620	2.766	1.712	.5437	.7403	607.1	.39506	.056633	1.194
1.3000	1.2301	.11407	2.268	2.397	1.878	.5513	.8269	630.8	.40968	.056963	1.237
1.2800	1.2100	.12391	1.962	2.075	2.00	.5513	.9075	652.6	.42299	.057454	1.365
1.2600	1.1900	.13200	1.690	1.789	2.10	.5455	.9833	673.4	.43539	.057844	1.477
1.2400	1.1700	.13853	1.446	1.533	2.16	.5354	1.0552	693.4	.44714	.058170	1.575
1.2200	1.1500	.14366	1.226	1.300	2.20	.5219	1.1239	712.9	.45843	.058433	1.660
1.2000	1.1300	.14752	1.025	1.089	2.20	.5059	1.1897	732.4	.46939	.058644	1.733
1.1800	1.1100	.15022	.844	.897	2.22	.4880	1.2532	751.4	.48013	.058828	1.795
1.1600	1.0900	.15189	.679	.723	2.20	.4686	1.3145	770.9	.49073	.058964	1.846
1.1400	1.0700	.15263	.531	.566	2.17	.4483	1.3740	790.4	.50127	.059077	1.888
1.1200	1.0500	.15253	.400	.426	2.12	.4272	1.4317	810.2	.51182	.059166	1.920
1.1000	1.0300	.15171	.285	.304	2.07	.4058	1.4880	830.4	.52241	.059224	1.945
1.0800	1.0100	.15026	.188	.201	2.01	.3843	1.5428	851.2	.53312	.059267	1.964
1.0600	.9900	.14830	.109	.116	1.939	.3629	1.5964	872.8	.54397	.059299	1.973
1.0400	.9700	.14594	.050	.054	1.867	.3419	1.6488	895.2	.55500	.059331	1.979
1.0200	.9500	.14329	.013	.014	1.793	.3214	1.7000	918.6	.56626	.059316	1.981
1.0000	.9300	.14051	.000	.000	1.719	.3015	1.7502	942.8	.57777	.059317	1.981
.9800	.9100	.13773	.014	.015	1.646	.2825	1.7992	968.0	.58954	.059318	1.987
.9600	.8900	.13510	.057	.062	1.575	.2645	1.8473	994.5	.60159	.059325	1.999
.9400	.8700	.13282	.133	.144	1.512	.2475	1.8942	1022.1	.61390	.059345	1.998
.9200	.8500	.13106	.246	.266	1.456	.2318	1.9399	1050.7	.62646	.059389	2.015
.9000	.8300	.13004	.396	.430	1.408	.2173	1.9844	1080.6	.63921	.059455	2.044
.8800	.8100	.12998	.590	.641	1.371	.2042	2.0274	1111.2	.65208	.059569	2.089
.8600	.7900	.13111	.826	.899	1.346	.1925	2.0690	1143.0	.66497	.059727	2.146
.8400	.7700	.13368	1.105	1.206	1.335	.1821	2.1089	1174.9	.67777	.059940	2.220
.8200	.7500	.13793	1.428	1.561	1.338	.1730	2.1469	1207.2	.69034	.060217	2.309
.8000	.7300	.14408	1.790	1.962	1.358	.1651	2.1829	1239.2	.70254	.060555	2.547
.7800	.7100	.15235	2.189	2.405	1.393	.1582	2.2167	1270.6	.71424	.060964	2.760
.7600	.6900	.16290	2.619	2.884	1.444	.1522	2.2484	1301.3	.72533	.061429	3.031
.7400	.6700	.17589	3.075	3.396	1.509	.1467	2.2777	1330.9	.73574	.061946	3.362
.7200	.6500	.19140	3.551	3.933	1.589	.1417	2.3048	1359.0	.74542	.062505	3.719
.7000	.6300	.2095	4.043	4.491	1.681	.1369	2.3297	1386.1	.75437	.063098	4.233
.6800	.6103	.2303	4.546	5.067	1.783	.1322	2.3524	1411.3	.76259	.063715	4.789
.6600	.5903	.2536	5.059	5.658	1.896	.1275	2.3732	1435.5	.77012	.064347	5.434
.6400	.5704	.2796	5.578	6.262	2.01	.1226	2.3920	1458.1	.77702	.064989	6.175
.6200	.5505	.3081	6.103	6.878	2.13	.1176	2.4091	1479.4	.78333	.065633	7.014
.6000	.5306	.3392	6.633	7.507	2.25	.1123	2.4246	1499.7	.78910	.066278	7.994
.5800	.5108	.3728	7.169	8.149	2.37	.1067	2.4386	1518.9	.79441	.066919	9.090
.5600	.4907	.4088	7.711	8.808	2.49	.1010	2.4513	1537.4	.79928	.067555	10.322
.5400	.4708	.4471	8.261	9.485	2.60	.0950	2.4627	1554.8	.80378	.068186	11.710
.5200	.4510	.4879	8.820	10.184	2.70	.0888	2.4731	1571.7	.80794	.068811	13.018
.5000	.4311	.5309	9.390	10.908	2.79	.0826	2.4824	1588.1	.81180	.069429	15.017
.4800	.4112	.5763	9.974	11.664	2.87	.0762	2.4907	1603.9	.81540	.070044	16.974
.4600	.3914	.6240	10.574	12.455	2.94	.0698	2.4983	1619.5	.81877	.070654	19.183
.4400	.3716	.6740	11.194	13.290	2.99	.0635	2.5050	1634.6	.82194	.071261	21.692
.4200	.3518	.7264	11.838	14.177	3.03	.0573	2.5111	1649.7	.82492	.071869	24.468
.4000	.3320	.7813	12.509	15.126	3.05	.0512	2.5164	1664.8	.82774	.072477	27.624
.3800	.3123	.8388	13.21	16.15	3.04	.0452	2.5212	1679.6	.83042	.073089	31.216
.3600	.2926	.8992	13.95	17.26	3.02	.0396	2.5255	1694.7	.83298	.073706	35.314
.3400	.2729	.9627	14.74	18.49	2.98	.0342	2.5293	1710.3	.83543	.074333	40.042
.3200	.2533	1.0297	15.59	19.84	2.92	.0291	2.5326	1725.9	.83779	.074973	45.506
.3000	.2337	1.1008	16.49	21.37	2.84	.0245	2.5355	1742.3	.84007	.075630	51.894
.2800	.2143	1.1770	17.48	23.11	2.73	.0202	2.5380	1759.4	.84230	.076309	59.447
.2600	.1949	1.2594	18.56	25.12	2.60	.0163	2.5402	1777.4	.84448	.077015	68.504
.2400	.1757	1.3500	19.76	27.50	2.46	.0129	2.5421	1796.9	.84663	.077766	79.552
.2200	.1567	1.4517	21.09	30.34	2.29	.0099	2.5437	1817.9	.84878	.078564	93.319
.2000	.1380	1.5691	22.60	33.84	2.11	.0074	2.5450	1841.6	.85094	.079429	110.950
.1800	.1197	1.7098	24.31	38.23	1.926	.0053	2.5461	1868.6	.85314	.080365	134.336
.1600	.1020	1.8872	26.24	43.90	1.736	.0037	2.5471	1900.3	.85544	.081468	166.807
.1400	.0852	2.1261	28.36	51.34	1.558	.0024	2.5478	1939.3	.85783	.082741	214.77
.1200	.0694	2.4782	30.41	61.13	1.405	.0015	2.5485	1990.8	.86061	.084264	292.05
.1000	.0543	3.0858	31.35	73.52	1.285	.0009	2.5491	2066.5	.86394	.086279	436.40
.0900	.0469	3.6561	30.41	80.50	1.225	.0006	2.5494	2126.5	.86623	.087651	574.50
.0850	.0415	4.1438	29.07	84.06	1.189	.0005	2.5495	2171.3	.86782	.088563	689.43
.0800	.0357	5.0459	26.52	87.46	1.140	.0004	2.5498	2242.8	.87026	.089851	892.00
.0750	.0267	7.9906	20.83	89.79	1.072	.0002	2.5501	2424.2	.87628	.092472	1506.75
.0720	.0168	8.0335	13.51	89.98	1.003	.0001	2.5504	2854.8	.89046	.096740	1977.93

TABLE XV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Continued

(b) $\overline{V}_i = \sqrt{3}$, $\gamma_i = -16.216^{\circ}$, $e_i = 1.9406$

$\overline{V}$	$\overline{V}_r$	$\overline{u}$	$-\gamma$ deg	$-\Lambda$ deg	$-\frac{1}{r}\frac{dr}{d\tau}$	$\overline{q}$	$\overline{\gamma}$	τ sec	$\frac{\Delta s}{r}$	$\frac{\Delta V}{r}$	$\sqrt{\overline{\mu}}\,\overline{V}^2$
1.73205	1.6650	0.0000017	16.216	16.889	0.0001	0.0046	0	0	0	0	0.000
1.7310	1.6637	.0000070	15.730	16.394	.0001	.0066	.0006	16.4	.01273	.003645	.000
1.7300	1.6626	.0000150	15.251	15.896	.0002	.0093	.0024	32.9	.02528	.007122	.000
1.7280	1.6602	.0000400	14.242	14.836	.0006	.0186	.0095	66.0	.05176	.014092	.000
1.7250	1.6568	.0002[illegible]	12.587	13.115	.0018	.0520	.0360	130.9	.09521	.024454	.002
1.7200	1.6511	.0044[illegible]	9.973	10.394	.0784	.2030	.0820	207.7	.16401	.038181	.029
1.7150	1.6458	.0116[illegible]	8.578	8.941	.259	.3668	.1477	253.0	.20084	.044195	.096
1.7100	1.6407	.0207[illegible]	7.812	8.145	.461	.4863	.2204	279.5	.22108	.047109	.172
1.7000	1.6305	.0484[illegible]	6.901	7.197	.851	.6582	.3[illegible]	309.7	.24527	.050232	.320
1.6800	1.6104	.0704[illegible]	5.872	6.127	1.559	.8558	.5[illegible]	344.[illegible]	.27281	.053345	.593
1.6600	1.5903	.09847	5.212	5.441	2.12	.9796	.6[illegible]	367.4	.29068	.055049	.839
1.6400	1.5703	.12339	4.713	4.9[illegible]	[illegible]	1.0620	.7849	385.1	.30438	.056238	1.064
1.6200	1.5502	.14576	4.305	4.4[illegible]	[illegible]	1.1174	.8966	399.[illegible]	.31572	.057132	1.272
1.6000	1.5302	.16591	3.957	4.1[illegible]	[illegible]	1.1537	.9950	412.[illegible]	.32554	.057842	1.466
1.5500	1.4801	.2082	3.248	3.4[illegible]	[illegible]	1.1884	1.2124	440.[illegible]	.34611	.059135	1.900
1.5000	1.4301	.2408	2.681	2.812	4.64	1.1718	1.4015	464.9	.36332	.060026	2.270
1.4500	1.3801	.2653	2.202	2.313	[illegible]	1.1242	1.5709	487.[illegible]	.37867	.060680	2.587
1.4000	1.3300	.2827	1.784	1.878	[illegible]	1.0574	1.7453	508.[illegible]	.39291	.061175	2.856
1.3500	1.2800	.2941	1.414	1.492	[illegible]	.9789	1.8677	529.[illegible]	.40649	.061554	3.081
1.3000	1.2300	.3000	1.085	1.147	4.94	.8940	2.0002	550.4	.41974	.061842	3.264
1.2500	1.1800	.3012	.793	.840	4.74	.8065	2.1243	572.[illegible]	.43290	.062057	3.407
1.2000	1.1300	.2981	.538	.571	4.49	.7192	2.2411	595.4	.44617	.062210	3.513
1.1800	1.1100	.2959	.447	.475	4.37	.6848	2.2860	605.0	.45155	.062256	3.546
1.1600	1.0900	.2931	.363	.386	4.25	.6510	2.3299	614.9	.45698	.062295	3.573
1.1400	1.0700	.2898	.285	.304	4.12	.6177	2.3728	625.0	.46248	.062326	3.595
1.1200	1.0500	.2861	.216	.230	3.98	.5851	2.4148	635.7	.46807	.062350	3.613
1.1000	1.0300	.2821	.154	.165	3.85	.5533	2.4559	646.6	.47374	.062368	3.626
1.0800	1.0100	.2776	.109	.109	3.71	.5224	2.4[illegible]	657.8	.47951	.062381	3.635
1.0600	.9900	.2729	.059	.063	3.51	.4923	2.5[illegible]	669.5	.48539	.062389	3.642
1.0400	.9700	.2680	.027	.029	3.43	.4633	2.5[illegible]	681.7	.49139	.062394	3.644
1.0200	.9500	.2630	.007	.008	3.29	.4353	2.6[illegible]	694.2	.49753	.062395	3.646
1.0000	.9300	.2578	.000	.000	3.15	.4084	2.6[illegible]	707.5	.50380	.062396	3.646
.9800	.9100	.2527	.008	.009	3.02	.3826	2.6[illegible]	721.2	.51022	.062396	3.646
.9600	.8900	.2476	.031	.035	2.89	.3580	2.7[illegible]	735.[illegible]	.51678	.062398	3.648
.9400	.8700	.2427	.073	.075	2.76	.3346	2.7[illegible]	750.6	.52351	.062404	3.652
.9200	.8500	.2382	.134	.135	2.65	.3125	2.7[illegible]	766.5	.53039	.062417	3.661
.9000	.8300	.2340	.218	.218	2.53	.2916	2.8[illegible]	782.9	.53743	.062438	3.677
.8800	.8100	.2303	.325	.325	2.43	.2719	2.8[illegible]	800.[illegible]	.54461	.062472	3.702
.8600	.7900	.2274	.460	.460	2.33	.2535	2.8[illegible]	818.[illegible]	.55194	.062522	3.739
.8400	.7700	.2252	.622	.622	2.25	.2364	2.9[illegible]	836.7	.55938	.062592	3.792
.8200	.7500	.2240	.816	.816	2.17	.2205	2.9[illegible]	855.[illegible]	.56692	.062686	3.864
.8000	.7300	.2240	1.042	1.042	2.11	.2059	2.9[illegible]	875.[illegible]	.57459	.062809	3.960
.7800	.7100	.2253	1.303	1.303	2.06	.1924	3.0[illegible]	896.[illegible]	.58216	.062965	4.085
.7600	.6900	.2282	1.599	1.601	2.02	.1800	3.0[illegible]	917.[illegible]	.58977	.063157	4.245
.7400	.6700	.2327	1.930	1.937	1.997	.1687	3.0[illegible]	938.[illegible]	.59732	.063389	4.447
.7200	.6501	.2392	2.298	2.3[illegible]	1.985	.1583	3.0[illegible]	960.7	.60475	.063663	4.698
.7000	.6301	.2477	2.699	2.[illegible]	1.987	.1488	3.0[illegible]	982.[illegible]	.61202	.063980	5.005
.6800	.6101	.2586	3.134	3.4[illegible]	2.00	.1400	3.1[illegible]	1004.1	.61907	.064339	5.377
.6600	.5902	.2718	3.600	4.0[illegible]	2.03	.1319	3.1[illegible]	1025.7	.62587	.064738	5.824
.6400	.5702	.2877	4.095	4.5[illegible]	2.07	.1243	3.1[illegible]	1047.0	.63237	.065175	6.356
.6200	.5503	.3062	4.616	5.[illegible]	2.12	.1171	3.1[illegible]	1068.1	.63857	.065646	6.985
.6000	.5303	.3276	5.162	5.8[illegible]	2.17	.1102	3.1[illegible]	1088.[illegible]	.64443	.066147	7.721
.5800	.5104	.3518	5.730	6.4[illegible]	2.23	.1036	3.2[illegible]	1108.[illegible]	.64996	.066674	8.579
.5600	.4905	.3791	6.318	7.2[illegible]	2.30	.0971	3.2[illegible]	1128.1	.65516	.067223	9.573
.5400	.4706	.4093	6.926	7.9[illegible]	2.37	.0907	3.2[illegible]	1147.1	.66004	.067788	10.720
.5200	.4507	.4427	7.553	8.[illegible]	2.45	.0845	3.2[illegible]	1165.[illegible]	.66461	.068369	12.039
.5000	.4308	.4791	8.199	9.5[illegible]	2.51	.0783	3.2[illegible]	1183.[illegible]	.66889	.068960	13.552
.4800	.4110	.5187	8.865	10.[illegible]	2.58	.0722	3.2[illegible]	1201.2	.67290	.069561	15.283
.4600	.3911	.5615	9.553	11.[illegible]	2.64	.0661	3.2[illegible]	1218.[illegible]	.67666	.070171	17.263
.4400	.3713	.6075	10.264	12.[illegible]	2.69	.0602	3.2[illegible]	1235.[illegible]	.68019	.070787	19.527
.4200	.3515	.6569	11.001	13.[illegible]	2.73	.0543	3.2[illegible]	1252.[illegible]	.68351	.071410	22.119
.4000	.3318	.7097	11.768	14.[illegible]	2.76	.0487	3.2[illegible]	1268.[illegible]	.68664	.072040	25.092
.3800	.3121	.7661	12.57	15.[illegible]	2.78	.0431	3.2[illegible]	1285.[illegible]	.68961	.072679	28.512
.3600	.2924	.8263	13.41	16.[illegible]	2.77	.0379	3.2[illegible]	1301.[illegible]	.69242	.073328	32.460
.3400	.2727	.8906	14.30	17.[illegible]	2.75	.0328	3.2[illegible]	1318.[illegible]	.69510	.073988	37.043
.3200	.2531	.9594	15.24	19.41	2.72	.0281	3.3[illegible]	1335.[illegible]	.69766	.074663	42.400
.3000	.2336	1.0333	16.25	21.[illegible]	2.66	.0237	3.3[illegible]	1353.[illegible]	.70012	.075357	48.712
.2800	.2142	1.1133	17.33	22.92	2.58	.0196	3.3064	1371.[illegible]	.70250	.076075	56.229
.2600	.1949	1.2005	18.51	25.06	2.48	.0159	3.3087	1390.[illegible]	.70482	.076822	65.298
.2400	.1757	1.2968	19.80	27.55	2.36	.0126	3.3106	1411.0	.70708	.077609	76.416
.2200	.1568	1.4051	21.22	30.52	2.22	.0097	3.3122	1433.1	.70932	.078445	90.327
.2000	.1381	1.5300	22.80	34.2[illegible]	2.06	.0073	3.3136	1457.6	.71155	.079347	108.192
.1800	.1199	1.6789	24.57	38.61	1.897	.0053	3.3147	1485.1	.71381	.080338	131.909
.1600	.1023	1.8648	26.53	44.33	1.724	.0037	3.3157	1517.6	.71614	.081452	164.831
.1400	.0854	2.1117	28.64	51.77	1.557	.0024	3.3165	1557.1	.71861	.082742	213.32
.1200	.0696	2.4700	30.63	61.45	1.41[illegible]	.0015	3.3171	1608.6	.72134	.084296	291.09
.1000	.0544	3.0803	31.47	73.67	1.289	.0009	3.3177	1684.3	.72466	.086312	435.63
.0900	.0463	3.6509	30.46	80.57	1.227	.0006	3.3180	1744.3	.72694	.087688	573.69
.0850	.0416	4.1388	29.10	84.18	1.19[illegible]	.0005	3.3182	1789.1	.72853	.088601	688.61
.0800	.0358	5.0418	26.53	87.4[illegible]	1.14[illegible]	.0004	3.3184	1860.3	.73098	.089891	891.28
.0750	.0287	7.9807	20.83	89.79	1.07[illegible]	.0002	3.3187	2042.0	.73700	.092516	1506.56
.0720	.0168	8.0337	13.51	89.97	1.003	.0001	3.3191	2472.9	.75118	.096784	1777.98

TABLE XV.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF MARS SO THAT $\overline{V}_{\gamma=0}=1.0$; $\overline{u}_a = 0.07$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 200$ - Concluded

(c) $\overline{V}_i = 2.0$, $\gamma_i = -17.398^{\circ}$, $e_i = 2.8783$

$\overline{V}$	$\overline{V}_r$	z	$-\gamma$ deg	$-\lambda$ deg	$-\frac{\dot{\gamma}r}{g}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\dot{\lambda}r}{V}$	$\frac{-\dot{\gamma}V}{r}$	$\sqrt{\beta r}\frac{z}{V}$
2.0000	1.9333	0.0000020	17.398	18.018	0.0001	0.0072	0	0	[illegible]	[illegible]	0.000
1.9990	1.9330	.0000030	17.121	17.732	.0001	.0088	.0004	7.3	.00644	.00200	.000
1.9980	1.9330	.0000044	16.840	17.441	.0001	.0108	.0009	14.6	.01300	.00400	.000
1.9960	1.9280	.0000099	16.259	16.842	.0003	.0160	.0022	29.4	.02652	.00802	.000
1.9940	1.9240	.0000222	15.656	16.217	.0006	.0239	.0040	45.0	.04059	.01204	.000
1.9920	1.9240	.0000496	15.026	15.566	.0013	.0356	.0074	61.4	.05528	.01607	.000
1.9900	1.9223	.0001108	14.369	14.887	.0029	.0530	.0123	78.3	.07061	.02009	.000
1.9850	1.9168	.0007853	12.623	13.080	.0206	.1421	.0394	123.2	.11142	.02989	.000
1.9800	1.9113	.0039968	10.961	11.360	.1035	.4126	.1008	165.9	.14030	.03800	.000
1.9700	1.9000	.0129658	9.016	9.347	.510	.8861	.2605	215.8	.19592	.05604	.141
1.9600	1.8900	.03835	7.023	8.360	.989	.9455	.3930	240.2	.21834	.06941	.277
1.9400	1.8700	.07422	4.988	7.249	1.893	1.0802	.5991	268.1	.24372	.08276	.541
1.9200	1.8504	.10694	3.310	6.549	2.70	1.2054	.7641	286.0	.25983	.09464	.78
1.9000	1.8300	.13686	1.804	6.026	3.41	1.4458	.9059	299.5	.27195	.09396	1.01
1.8500	1.7803	.2018	0.889	5.081	4.89	1.7634	1.2018	324.7	.29412	.08800	1.54
1.8000	1.7300	.2554	4.221	4.302	6.01	2.0512	1.4474	344.2	.31004	.08933	2.00
1.7500	1.6800	.3000	6.682	3.835	6.84	2.2636	1.6616	360.6	.32431	.08926	2.46
1.7000	1.6300	.3367	8.222	3.360	7.44	2.4278	1.8534	375.4	.33630	.08098	2.80
1.6500	1.5800	.3666	9.816	2.941	7.84	2.5594	2.0281	389.2	.34719	.08155	3.14
1.6000	1.5300	.3903	11.451	2.563	8.08	2.6691	2.1838	402.5	.35735	.08202	3.45
1.5500	1.4800	.4084	13.117	2.217	8.16	2.7642	2.3380	415.5	.36702	.08241	3.72
1.5000	1.4300	.4213	14.809	1.897	8.12	2.8499	2.4774	428.5	.37636	.08273	3.97
1.4500	1.3800	.4295	16.523	1.600	7.98	2.9304	2.6081	441.7	.38550	.08290	4.18
1.4000	1.3300	.4333	18.257	1.323	7.74	3.0089	2.7312	455.3	.39456	.08321	4.37
1.3500	1.2800	.4331	20.011	1.066	7.41	3.0878	2.8474	469.3	.40361	.08339	4.55
1.3000	1.2300	.4291	21.784	.828	7.06	3.1691	2.9574	483.9	.41275	.08353	4.68
1.2500	1.1800	.4218	23.577	.611	6.64	3.2544	3.0617	499.5	.42205	.08364	4.78
1.2000	1.1300	.4115	25.394	.418	6.19	3.3449	3.1608	16.1	.43159	.08372	4.84
1.1500	1.0800	.3996	27.237	.253	5.72	3.7416	3.2549	34.0	.44146	.08375	4.90
1.1000	1.0300	.3836	29.114	.121	5.23	3.6453	3.3443	53.3	.45174	.08381	4.92
1.0500	.9800	.3671	31.031	.033	4.75	3.5565	3.4294	74.6	.46252	.08389	4.94
1.0000	.9300	.3498	33.000	.000	4.28	3.4757	3.5101	98.3	.47388	.08382	4.94
.9800	.9100	.3428	33.808	.006	4.10	3.4457	3.5412	108.4	.47861	.08382	4.94
.9600	.8900	.3359	34.623	.025	3.92	3.4170	3.5716	119.1	.48345	.08382	4.94
.9400	.8700	.3291	35.444	.058	3.75	3.3896	3.6014	130.2	.48841	.08383	4.95
.9200	.8500	.3225	36.272	.107	3.58	3.3636	3.6305	141.7	.49349	.08383	4.95
.9000	.8300	.3163	37.107	.161	3.42	3.3390	3.6588	153.9	.49869	.08385	4.97
.8800	.8100	.3104	37.949	.261	3.27	3.3156	3.6865	166.6	.50401	.08386	4.99
.8600	.7900	.3050	38.798	.370	3.13	3.2936	3.7134	179.9	.50945	.08389	5.02
.8400	.7700	.3002	39.654	.504	3.00	3.2729	3.7396	193.9	.51501	.08393	5.05
.8200	.7500	.2962	40.517	.664	2.87	3.2536	3.7650	208.5	.52068	.08395	5.10
.8000	.7300	.2930	41.389	.854	2.76	3.2354	3.7896	223.6	.52645	.08405	5.14
.7800	.7100	.2908	42.269	1.076	2.66	3.2186	3.8134	239.2	.53230	.08414	5.27
.7600	.6900	.2899	43.157	1.332	2.57	3.2029	3.8364	255.6	.53823	.08426	5.39
.7400	.6700	.2902	44.053	1.626	2.49	3.1884	3.8584	272.7	.54420	.08440	5.54
.7200	.6500	.2921	44.958	1.959	2.42	3.1750	3.8795	290.1	.55019	.08456	5.72
.7000	.6301	.2957	45.870	2.333	2.37	3.1626	3.8996	308.1	.55618	.08477	5.94
.6800	.6101	.3011	46.787	2.750	2.33	3.1511	3.9187	326.3	.56212	.08500	6.21
.6600	.5901	.3087	47.871	3.211	2.30	3.1405	3.9368	345.0	.56799	.08526	6.61
.6400	.5701	.3186	49.312	3.717	2.29	3.1306	3.9538	364.0	.57376	.08559	7.05
.6200	.5502	.3309	50.786	4.267	2.28	3.1217	3.9698	383.0	.57938	.08594	7.54
.6000	.5302	.3458	52.296	4.863	2.29	3.1132	3.9846	401.9	.58484	.08633	8.11
.5800	.5103	.3636	53.840	5.503	2.31	3.1052	3.9985	420.2	.59011	.08674	8.82
.5600	.4904	.3844	55.416	6.188	2.33	3.0977	4.0112	439.9	.59516	.08719	9.70
.5400	.4704	.4083	57.023	6.917	2.37	3.0905	4.0230	458.9	.59999	.08765	10.69
.5200	.4506	.4355	58.660	7.692	2.40	3.0837	4.0337	477.3	.60459	.08812	11.84
.5000	.4307	.4661	60.326	8.514	2.44	3.0771	4.0436	495.8	.60896	.08877	13.18
.4800	.4108	.5002	62.022	9.385	2.49	3.0708	4.0525	513.7	.61310	.08928	14.78
.4600	.3910	.5379	63.747	10.307	2.53	3.0646	4.0605	531.7	.61701	.08980	16.59
.4400	.3711	.5793	65.503	11.287	2.56	3.0587	4.0678	549.4	.62071	.09045	18.65
.4200	.3514	.6247	67.291	12.331	2.60	3.0529	4.0743	567.0	.62421	.09100	21.05
.4000	.3316	.6741	69.115	13.447	2.62	3.0473	4.0801	584.5	.62751	.09166	23.81
.3800	.3119	.7277	71.98	14.65	2.63	3.0420	4.0853	601.9	.63064	.09232	27.09
.3600	.2922	.7858	73.88	15.95	2.63	3.0369	4.0898	619.3	.63361	.09298	30.81
.3400	.2726	.8488	73.84	17.36	2.62	3.0320	4.0939	637.0	.63644	.09365	35.34
.3200	.2530	.9170	74.85	18.92	2.59	3.0274	4.0974	654.9	.63914	.09434	40.5
.3000	.2335	.9911	75.93	20.65	2.55	3.0231	4.1005	673.4	.64172	.09505	46.7
.2800	.2141	1.0720	77.09	22.60	2.48	3.0192	4.1032	692.4	.64421	.09579	54.1
.2600	.1948	1.1610	78.34	24.83	2.40	3.0156	4.1055	712.4	.64662	.09659	63.1
.2400	.1757	1.2600	79.70	27.42	2.29	3.0124	4.1075	733.4	.64897	.09773	74.8
.2200	.1568	1.3718	81.19	30.48	2.17	3.0096	4.1091	756.3	.65128	.09882	88.1
.2000	.1382	1.5010	82.84	34.18	2.03	3.0072	4.1105	781.3	.65357	.09919	106.1
.1800	.1200	1.6550	84.67	38.76	1.872	3.0052	4.1117	809.6	.65588	.09017	130.0
.1600	.1024	1.8465	86.67	44.55	1.711	3.0037	4.1126	842.4	.65825	.08138	163.2
.1400	.0856	2.0991	88.86	52.01	1.553	3.0024	4.1134	882.4	.66073	.08261	217.0
.1200	.0698	2.4621	90.77	61.66	1.412	3.0015	4.1141	934.2	.66347	.08416	320.1
.1000	.0545	3.0753	91.55	73.78	1.291	3.0009	4.1147	509.8	.66679	.08621	434.9
.0900	.0463	3.6465	90.51	80.63	1.229	3.0006	4.1150	569.9	.66907	.08758	572.9
.0850	.0416	4.1348	93.13	84.14	1.190	3.0005	4.1151	614.6	.67066	.08856	687.9
.0800	.0358	4.3386	96.55	87.49	1.141	3.0004	4.1154	686.1	.67311	.08978	890.7
.0750	.0267	7.9890	90.83	89.79	1.072	3.0002	4.1157	867.8	.67913	.09240	1506.4
.0720	.0168	8.3336	93.51	89.97	1.003	3.0001	4.1160	998.7	.69331	.09669	1977.9

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -0.5^{\circ}$, $e_i = 0.00873$

$\bar{V}$	Z	$-\gamma$ deg	$-\frac{\beta r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta t}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\frac{Z}{\bar{V}}$
1.0000	0.0000010	0.500	0.0000	0.0010	0	[illegible]	0	0	0.000
1.0005	.0000025	.497	.0001	.0016	.0044	[illegible]	.11624	.001012	.000
1.0010	.0000063	.486	.0002	.0025	.0117	[illegible]	.33640	.002044	.000
1.0015	.0000168	.468	.0005	.0041	.0244	[illegible]	.36595	.003132	.001
1.0020	.0000563	.433	.0017	.0075	.0534	[illegible]	.53767	.004476	.002
1.00213	.0001175	.407	.0035	.0109	.0839	[illegible]	.64916	.005293	.004
1.0020	.0002997	.384	.0063	.0146	.1193	[illegible]	.74245	.005937	.006
1.0015	.0003460	.365	.0111	.0192	.1675	[illegible]	.83828	.006563	.011
1.0010	.0004923	.357	.0148	.0222	.1996	[illegible]	.88988	.006888	.015
1.0005	.0006070	.354	.0182	.0247	.2259	[illegible]	.92735	.007120	.018
1.0000	.0007162	.353	.0215	.0268	.2489	[illegible]	.95725	.007304	.021
.9990	.0009273	.356	.0278	.0304	.2889	[illegible]	1.00390	.007593	.028
.9980	.0011354	.362	.0340	.0335	.3236	[illegible]	1.04002	.007818	.034
.9970	.0013433	.370	.0402	.0364	.3546	[illegible]	1.06955	.008007	.040
.9960	.0015528	.380	.0469	.0390	.3829	[illegible]	1.09450	.008170	.047
.9950	.0017761	.391	.0528	.0416	.4090	[illegible]	1.11606	.008315	.053
.9940	.0019901	.403	.0593	.0439	.4335	[illegible]	1.13500	.008447	.060
.9930	.0022216	.416	.0660	.0462	.4564	[illegible]	1.15189	.008567	.067
.9920	.0024447	.429	.0728	.0485	.4780	[illegible]	1.16698	.008679	.074
.9910	.0026685	.443	.0798	.0507	.4986	[illegible]	1.18067	.008783	.081
.9900	.0029929	.456	.0870	.0528	.5181	[illegible]	1.19316	.008881	.089
.9880	.0034338	.485	.1019	.0569	.5547	[illegible]	1.21513	.009061	.104
.9860	.0039776	.513	.1176	.0609	.5803	[illegible]	1.23392	.009224	.121
.9840	.0045541	.542	.1340	.0647	.6194	[illegible]	1.25022	.009374	.138
.9820	.0051134	.570	.1512	.0685	.6485	[illegible]	1.26453	.009513	.157
.9800	.0057756	.599	.1692	.0721	.6758	[illegible]	1.27722	.009642	.176
.9750	.0074432	.668	.2147	.0809	.7373	[illegible]	1.30347	.009932	.229
.9700	.0092878	.736	.2670	.0893	.7913	[illegible]	1.32408	.010184	.287
.9650	.0112287	.801	.3227	.0972	.8395	[illegible]	1.34076	.010408	.351
.9600	.0134451	.864	.3897	.1047	.8830	[illegible]	1.35459	.010608	.420
.9550	.0157644	.924	.4558	.1119	.9226	[illegible]	1.36627	.010791	.495
.9500	.0182819	.983	.5319	.1187	.9590	[illegible]	1.37629	.010957	.575
.9400	.02354	1.095	.6964	.1314	1.0239	[illegible]	1.39264	.011253	.751
.9300	.02936	1.201	.8719	.1429	1.0804	[illegible]	1.40552	.011511	.947
.9200	.03565	1.301	.9894	.1533	1.1306	[illegible]	1.41596	.011739	1.163
.9100	.04238	1.398	1.1357	.1626	1.1755	[illegible]	1.42465	.011943	1.397
.9000	.04953	1.491	1.3337	.1710	1.2162	[illegible]	1.43200	.012129	1.651
.8800	.06498	1.669	1.7715	.1852	1.3875	[illegible]	1.44387	.012455	2.215
.8600	.08184	1.838	[illegible]	.1962	1.3481	[illegible]	1.45309	.012737	2.855
.8400	.09999	2.00	[illegible]	.2045	1.4007	[illegible]	1.46052	.012986	3.571
.8200	.11932	2.16	[illegible]	.2103	1.4469	[illegible]	1.46667	.013209	4.366
.8000	.13975	2.32	[illegible]	.2140	1.4878	[illegible]	1.47188	.013412	5.241
.7800	.16120	2.47	[illegible]	.2157	1.5243	[illegible]	1.47635	.013599	6.200
.7600	.18359	2.62	4.19	.2158	1.5572	[illegible]	1.48025	.013772	7.247
.7400	.2069	2.78	[illegible]	.2142	1.5868	[illegible]	1.48369	.013934	8.387
.7200	.2310	2.93	[illegible]	.2114	1.6137	[illegible]	1.48676	.014087	9.624
.7000	.2558	3.09	[illegible]	.2074	1.6381	[illegible]	1.48952	.014232	10.965
.6800	.2814	3.24	[illegible]	[illegible]	1.6604	[illegible]	1.49202	.014370	12.416
.6600	.3077	3.40	[illegible]	[illegible]	1.6808	[illegible]	1.49430	.014503	13.985
.6400	.3346	3.57	[illegible]	.1895	1.6995	[illegible]	1.49639	.014630	15.682
.6200	.3620	3.73	[illegible]	.1821	1.7166	[illegible]	1.49831	.014753	17.516
.6000	.3900	3.91	[illegible]	.1741	1.7322	[illegible]	1.50010	.014872	19.498
.5800	.4184	4.09	[illegible]	.1657	1.7466	[illegible]	1.50176	.014988	21.642
.5600	.4473	4.27	[illegible]	.1570	1.7598	[illegible]	1.50331	.015101	23.962
.5400	.4765	4.46	[illegible]	.1479	1.7719	[illegible]	1.50476	.015212	26.475
.5200	.5061	4.66	[illegible]	.1387	1.7830	[illegible]	1.50612	.015321	29.200
.5000	.5360	4.87	[illegible]	.1294	1.7932	[illegible]	1.50741	.015428	32.160
.4800	.5661	5.09	[illegible]	.1201	1.8025	[illegible]	1.50863	.015534	35.381
.4600	.5964	5.33	[illegible]	.1108	1.8111	[illegible]	1.50978	.015639	38.895
.4400	.6267	5.57	[illegible]	.1017	1.8189	[illegible]	1.51088	.015744	42.732
.4200	.6572	5.84	[illegible]	.0927	1.8260	[illegible]	1.51192	.015848	46.939
.4000	.6875	6.12	[illegible]	.0839	1.8325	[illegible]	1.51292	.015952	51.566
.3800	.7178	6.43	[illegible]	.0754	1.8384	[illegible]	1.51388	.016057	56.678
.3600	.7480	6.76	[illegible]	.0672	1.8437	[illegible]	1.51479	.016163	62.331
.3400	.7778	7.12	[illegible]	.0594	1.8485	[illegible]	1.51567	.016270	68.632
.3200	.8073	7.52	[illegible]	.0520	1.8528	[illegible]	1.51652	.016379	75.688
.3000	.8364	7.96	[illegible]	.0451	1.8567	[illegible]	1.51734	.016490	83.638
.2800	.8648	8.45	[illegible]	.0386	1.8602	[illegible]	1.51813	.016604	92.672
.2600	.8926	9.01	[illegible]	.0326	1.8632	[illegible]	1.51889	.016721	102.995
.2400	.9195	9.65	[illegible]	.0271	1.8659	[illegible]	1.51964	.016843	114.945
.2200	.9455	10.39	[illegible]	.0221	1.8682	[illegible]	1.52036	.016971	128.924
.2000	.9703	11.27	[illegible]	.0176	1.8703	[illegible]	1.52106	.017105	145.545
.1800	.9938	12.32	[illegible]	.0137	1.8720	[illegible]	1.52175	.017249	165.637
.1600	1.0160	13.63	[illegible]	.0103	1.8735	[illegible]	1.52243	.017404	190.498
.1400	1.0368	15.29	[illegible]	.0075	1.8747	[illegible]	1.52309	.017575	222.1
.1200	1.0566	17.49	[illegible]	.0051	1.8757	[illegible]	1.52375	.017768	264.15
.1000	1.0766	20.56	[illegible]	.0033	1.8764	[illegible]	1.52440	.017991	322.98
.0900	1.0877	22.61	[illegible]	.0025	1.8768	[illegible]	1.52473	.018119	362.56
.0800	1.1007	25.19	[illegible]	.0019	1.87704	[illegible]	1.52505	.018264	412.75
.0700	1.1176	28.52	[illegible]	.0014	1.8773	[illegible]	1.52538	.018429	478.98
.0600	1.1428	33.01	[illegible]	.0009	1.8775	[illegible]	1.52571	.018625	571.38
.0500	1.1859	39.39	[illegible]	.0006	1.8777	[illegible]	1.52605	.018869	711.57
.0400	1.2739	49.08	[illegible]	.0004	1.8778	[illegible]	1.52638	.019196	955.95
.0300	1.4884	64.49	[illegible]	.0002	1.8779	[illegible]	1.52671	.019689	1488.44
.0200	2.0007	83.50	1.201	.0001	1.8781	[illegible]	1.52692	.020468	3001.0
.0100	3.3320	90.00	1.000	.0000	1.8782	[illegible]	1.52696	.021803	9996.1

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -1.0^{\circ}$, $e_i = 0.01745$

$\overline{V}$	Z	$-\gamma$ deg	$-\frac{\Delta\gamma}{\gamma}$	$\overline{r}$	$\overline{q}$	$\frac{s}{r}$	$\frac{\Delta s}{r}$	$\frac{-\Delta V}{r}$	$\frac{\overline{V}\overline{r}}{\overline{V}}$
1.0000	0.0000010	1.000	0.0000	0.0010	0	[illegible]	0	0	[illegible]
1.0005	.0000025	.998	.0001	.0016	.0022	[illegible]	.05769	.001006	[illegible]
1.0010	.0000062	.993	.0004	.0025	.0037	[illegible]	.11615	.002023	[illegible]
1.0015	.0000158	.985	.0009	.0050	.0114	[illegible]	.17644	.003064	[illegible]
1.0020	.0000430	.972	.0013	.0066	.0216	[illegible]	.24154	.004176	[illegible]
1.0025	.0001658	.947	.0046	.0130	.0468	[illegible]	.33102	.005676	[illegible]
1.00256	.0002710	.939	.0062	.0166	.0614	[illegible]	.36415	.006221	[illegible]
1.0025	.0004125	.930	.0124	.0204	.0772	[illegible]	.39278	.006688	[illegible]
1.0020	.0008451	.917	.0254	.0292	.1136	[illegible]	.44225	.007486	[illegible]
1.0015	.0011705	.913	.0313	.0343	.1351	[illegible]	.46494	.007849	[illegible]
1.0010	.0014685	.911	.0341	.0384	.1524	[illegible]	.48062	.008101	[illegible]
1.0005	.0017588	.909	[illegible]	.0419	.1674	[illegible]	.49323	.008298	[illegible]
1.0000	.002029	.909	[illegible]	.0450	.1807	[illegible]	.50350	.008461	[illegible]
.9990	.002565	.910	[illegible]	.0505	.2044	[illegible]	.51998	.008723	[illegible]
.9980	.003089	.912	[illegible]	.0553	.2251	[illegible]	.53304	.008931	[illegible]
.9970	.003606	.915	.1078	.0596	.2438	[illegible]	.54389	.009104	.108
.9960	.004118	.919	.1230	.0635	.2611	[illegible]	.55318	.009252	.124
.9950	.004628	.923	.1381	.0672	.2771	[illegible]	.56132	.009383	.140
.9940	.005137	.928	[illegible]	.0706	.2921	[illegible]	.56856	.009500	.155
.9930	.005645	.933	[illegible]	.0738	.3064	[illegible]	.57508	.009606	.170
.9920	.006153	.938	.1831	.0769	.3199	[illegible]	.58102	.009703	.186
.9910	.006661	.943	.1980	.0798	.3328	[illegible]	.58646	.009792	.202
.9900	.007171	.949	[illegible]	.0826	.3451	[illegible]	.59149	.009875	.217
.9880	.008194	.960	[illegible]	.0878	.3684	[illegible]	.60051	.010026	.249
.9860	.009223	.972	[illegible]	.0927	.3902	[illegible]	.60844	.010160	.281
.9840	.010261	.985	[illegible]	.0973	.4106	[illegible]	.61551	.010280	.314
.9820	.011307	.998	[illegible]	.1016	.4300	[illegible]	.62188	.010390	.345
.9800	.012362	1.011	[illegible]	.1057	.4483	[illegible]	.62766	.010492	.378
.9750	.015045	1.044	[illegible]	.1151	.4906	[illegible]	.64016	.010716	.463
.9700	.017794	1.078	[illegible]	.1236	.5289	[illegible]	.65055	.010908	.550
.9650	.02062	1.112	[illegible]	.1314	.5637	[illegible]	.65941	.011077	.641
.9600	.02351	1.147	[illegible]	.1384	.5962	[illegible]	.66710	.011229	.735
.9550	.02648	1.183	[illegible]	.1450	.6242	[illegible]	.67388	.011367	.832
.9500	.02952	1.218	[illegible]	.1511	.6546	[illegible]	.67993	.011493	.932
.9400	.03582	1.289	1.010	.1621	.7062	[illegible]	.69030	.011720	1.143
.9300	.04242	1.360	1.104	.1718	.7525	574.3	.69895	.011920	1.368
.9200	.04931	1.431	1.361	.1803	.7945	[illegible]	.70631	.012099	1.608
.9100	.05649	1.502	1.542	.1878	.8330	[illegible]	.71269	.012262	1.862
.9000	.06396	1.573	1.747	.1943	.8684	[illegible]	.71829	.012413	2.132
.8800	.07971	1.714	[illegible]	.2051	.9318	[illegible]	.72770	.012682	[illegible].717
.8600	.09653	1.855	[illegible]	.2131	.9871	[illegible]	.73735	.012920	[illegible].367
.8400	.11436	1.995	2.84	.2187	1.0358	[illegible]	.74174	.013135	[illegible].084
.8200	.13317	2.14	[illegible]	.2222	1.0792	[illegible]	.74718	.013331	[illegible].872
.8000	.15290	2.28	[illegible]	.2238	1.1181	[illegible]	.75189	.013512	[illegible].734
.7800	.17353	2.42	[illegible]	.2238	1.1531	[illegible]	.75600	.013681	[illegible].674
.7600	.19500	2.56	[illegible]	.2224	1.1848	[illegible]	.75965	.013839	[illegible].697
.7400	.2173	2.71	4.22	.2196	1.2137	[illegible]	.76291	.013989	8.808
.7200	.2403	2.85	[illegible]	.2156	1.2400	[illegible]	.76584	.014131	10.013
.7000	.2641	3.00	[illegible]	.2107	1.2640	[illegible]	.76850	.014267	11.318
.6800	.2886	3.15	[illegible]	.2048	1.2860	644.7	.77093	.014398	[illegible].730
.6600	.3137	3.31	[illegible]	.1982	1.3061	647.4	.77316	.014524	14.258
.6400	.3394	3.47	6.42	.1909	1.3246	[illegible]	.77522	.014646	15.910
.6200	.3657	3.64	6.80	.1830	1.3416	[illegible]	.77712	.014764	[illegible].696
.6000	.3926	3.81	7.07	.1747	1.3572	[illegible]	.77889	.014879	[illegible].628
.5800	.4199	3.99	[illegible]	.1660	1.3715	[illegible]	.78054	.014992	[illegible].720
.5600	.4477	4.17	[illegible]	.1570	1.3847	[illegible]	.78208	.015102	[illegible].985
.5400	.4759	4.36	7.71	.1479	1.3968	[illegible]	.78354	.015210	[illegible].442
.5200	.5045	4.56	[illegible]	.1385	1.4079	[illegible]	.78490	.015317	[illegible].108
.5000	.5335	4.76	[illegible]	.1291	1.4181	[illegible]	.78620	.015423	[illegible].008
.4800	.5627	5.00	[illegible]	.1177	1.4275	[illegible]	.78748	.015527	[illegible].167
.4600	.5921	5.23	[illegible]	.1104	1.4360	[illegible]	.78868	.015631	[illegible].615
.4400	.6217	5.48	8.21	.1013	1.4439	[illegible]	.78969	.015735	[illegible].389
.4200	.6514	5.75	[illegible]	.0923	1.4510	[illegible]	.79074	.015838	[illegible].529
.4000	.6812	6.03	[illegible]	.0835	1.4575	[illegible]	.79175	.015942	[illegible].088
.3800	.7109	5.34	[illegible]	.0750	1.4634	[illegible]	.79271	.016047	[illegible].125
.3600	.7406	6.68	[illegible]	.0669	1.4686	[illegible]	.79364	.016152	[illegible].713
.3400	.7700	7.04	7.85	.0592	1.4736	[illegible]	.79453	.016259	[illegible].943
.3200	.7992	7.44	7.67	.0518	1.4780	[illegible]	.79538	.016368	74.927
.3000	.8281	7.89	7.45	.0449	1.4819	[illegible]	.79621	.016479	[illegible].805
.2800	.8564	8.39	7.19	.0384	1.4853	[illegible]	.79701	.016593	[illegible].758
.2600	.8842	8.95	[illegible]	.0324	1.4884	[illegible]	.79776	.016711	[illegible].019
.2400	.9112	9.60	[illegible]	.0269	1.4911	[illegible]	.79853	.016833	[illegible].900
.2200	.9374	10.35	[illegible]	.0220	1.4935	[illegible]	.79926	.016960	[illegible].822
.2000	.9625	11.23	[illegible]	.0176	1.4955	[illegible]	.79997	.017094	[illegible].377
.1800	.9865	12.30	[illegible]	.0136	1.4973	[illegible]	.80067	.017241	[illegible].420
.1600	[illegible]	13.61	4.84	.0103	1.4987	[illegible]	.80135	.017397	[illegible].342
.1400	1.0309	15.28	4.33	.0074	1.4999	[illegible]	.80201	.017569	220.90
.1200	1.0516	17.49	[illegible]	.0051	1.5009	[illegible]	.80267	.017762	262.89
.1000	1.0726	20.58	[illegible]	.0033	1.5017	[illegible]	.80333	.017987	321.78
.0900	1.0843	22.64	[illegible]	.0025	1.5020	[illegible]	.80366	.018110	[illegible].42
.0800	1.0979	25.22	[illegible]	.0017	1.5023	[illegible]	.80398	.018260	411.71
.0700	1.1155	28.56	[illegible]	.0014	1.5025	[illegible]	.80431	.018427	[illegible].08
.0600	1.1414	33.06	[illegible]	.0009	1.5027	[illegible]	.80464	.018624	670.70
.0500	1.1854	39.45	1.778	.0006	1.5029	[illegible]	.80498	.018868	[illegible].21
.0400	1.2741	49.14	1.529	.0004	1.5031	[illegible]	.80532	.019192	[illegible].57
.0300	1.4890	64.53	1.340	.0002	1.5032	[illegible]	.80564	.019680	[illegible].03
.0200	2.0007	83.50	1.200	.0001	1.5033	[illegible]	.80585	.020463	[illegible].2
.0100	3.3321	90.00	1.000	.0000	1.5034	[illegible]	.80589	.02180[illegible]	[illegible].2

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -2.0^{\circ}$, $e_i = 0.03490$

$\overline{V}$	Z	$-\gamma$ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\dot{q}}$	t sec	$\frac{\dot{\gamma}r}{V}$	$\frac{-A\gamma}{r}$	$\sqrt{\beta r}\frac{Z}{\overline{V}}$
1.0000	0.0000010	2.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000021	1.999	.0001	.0016	.0011	23.5	.02874	.001004	.000
1.0010	.0000061	1.997	.0002	.0025	.0028	47.2	.05767	.002013	.000
1.0015	.0000134	1.994	.0004	.0039	.0056	71.2	.08700	.003034	.000
1.0020	.0000300	1.989	.0012	.0063	.0102	95.9	.11729	.004069	.001
1.0025	.0001112	1.978	.0033	.0106	.0184	122.9	.15039	.005232	.003
1.0029	.0005613	1.961	.0170	.0240	.0442	165.8	.20290	.007058	.017
1.0025	.0016257	1.950	.0489	.0406	.0766	193.9	.23729	.008212	.049
1.0020	.0023340	1.947	.0713	.0486	.0925	203.6	.24920	.008618	.070
1.0015	.0029868	1.945	.0897	.0548	.1049	210.2	.25718	.008889	.089
1.0010	.0035598	1.945	.1081	.0601	.1154	215.2	.26331	.009097	.108
1.0005	.0041100	1.944	.1258	.0648	.1248	219.3	.26832	.009267	.126
1.0000	.0047772	1.944	.1432	.0691	.1334	222.8	.27258	.009412	.145
.9990	.0059[illegible]	1.944	.1770	.0767	.1487	228.5	.27959	.009650	.177
.9980	.0070[illegible]	1.944	.210	.0833	.1623	233.1	.28526	.009842	.211
.9970	.0081[illegible]	1.947	.243	.0894	.1747	237.1	.29003	.010004	.244
.9960	.0091[illegible]	1.948	.275	.0949	.1862	240.4	.29416	.010143	.277
.9950	.0102[illegible]	1.950	.307	.1001	.1969	243.4	.29781	.010267	.310
.9940	.0113[illegible]	1.952	.338	.1049	.2070	246.1	.30107	.010380	.342
.9930	.0124[illegible]	1.955	.369	.1094	.2165	248.6	.30402	.010480	.37[illegible]
.9920	.0134[illegible]	1.957	.401	.1137	.2256	250.8	.30672	.010575	.407
.9910	.0145[illegible]	1.959	.432	.1178	.2343	252.8	.30921	.010669	.439
.9900	.0155[illegible]	1.962	.462	.1217	.2427	254.7	.31151	.010757	.472
.9880	.0176[illegible]	1.967	.524	.1290	.2585	258.2	.31567	.010875	.539
.9860	.0197[illegible]	1.973	.584	.1357	.2734	261.2	.31936	.011000	.601
.9840	.02185	1.979	.645	.1420	.2873	264.0	.32266	.011120	.666
.9820	.02393	1.985	.705	.1478	.3006	266.5	.32565	.011223	.731
.9800	.02601	1.991	.765	.1533	.3132	268.8	.32839	.011328	.796
.9750	.03121	2.007	.913	.1658	.3424	273.8	.33435	.011537	.960
.9700	.03642	2.023	1.060	.1768	.3690	278.0	.33938	.011704	1.126
.9650	.04162	2.040	1.205	.1866	.3935	281.7	.34373	.011848	1.294
.9600	.04684	2.057	1.349	.1954	.4163	284.9	.34756	.011980	1.464
.9550	.05206	2.075	1.492	.2034	.4377	287.8	.35098	.012113	1.635
.9500	.05730	2.093	1.633	.2106	.4578	290.5	.35407	.012230	1.809
.9400	.06782	2.130	1.913	.2231	.4950	295.2	.35947	.012457	2.165
.9300	.07841	2.168	2.19	.2336	.5288	299.2	.36408	.012662	2.529
.9200	.08906	2.207	2.46	.2423	.5599	302.8	.36810	.012772	2.904
.9100	.09979	2.247	2.72	.2495	.5886	306.0	.37166	.012869	3.290
.9000	.11059	2.287	2.99	.2555	.6154	308.9	.37486	.013021	3.686
.8800	.13242	2.370	3.50	.2644	.6640	313.9	.38040	.013240	4.514
.8600	.15456	2.459	3.99	.2696	.7072	318.4	.38508	.013444	5.392
.8400	.17701	2.549	4.46	.2721	.7460	322.3	.38913	.013620	6.388
.8200	.19977	2.637	4.91	.2721	.7811	325.8	.39270	.013775	7.309
.8000	.2228	2.733	5.35	.2702	.8130	329.0	.39587	.013930	8.356
.7800	.2462	2.831	5.76	.2666	.8422	331.9	.39873	.014069	9.4[illegible]
.7600	.2698	2.931	6.15	.2616	.8690	334.7	.40133	.014200	10.651
.7400	.2938	3.04	6.52	.2553	.8936	337.3	.40371	.014324	11.909
.7200	.3179	3.15	6.87	.2480	.9163	339.8	.40590	.014442	13.249
.7000	.3424	3.26	7.19	.2399	.9375	342.1	.40793	.014546	14.674
.6800	.3671	3.38	7.49	.2310	.9566	344.3	.40981	.014672	16.1[illegible]
.6600	.3920	3.51	7.76	.2216	.9746	346.5	.41158	.014772	17.820
.6400	.4172	3.64	8.01	.2116	.9911	348.6	.41323	.014875	19.550
.6200	.4425	3.77	8.23	.2014	1.0065	350.6	.41479	.014974	21.414
.6000	.4681	3.91	8.43	.1908	1.0207	352.6	.41626	.015075	23.405
.5800	.4938	4.06	8.59	.1800	1.0339	354.5	.41766	.015172	25.541
.5600	.5197	4.22	8.73	.1592	1.0460	356.4	.41898	.015267	27.839
.5400	.5456	4.39	8.84	.1583	1.0573	358.3	.42024	.015362	30.315
.5200	.5717	4.56	8.92	.1474	1.0677	360.2	.42143	.015456	32.983
.5000	.5979	4.75	8.97	.1367	1.0773	362.0	.42258	.015549	35.871
.4800	.6240	4.95	8.99	.1261	1.0862	363.8	.42368	.015642	39.002
.4600	.6502	5.16	8.97	.1157	1.0943	365.7	.42473	.015735	42.407
.4400	.6764	5.39	8.93	.1056	1.1018	367.5	.42574	.015828	46.119
.4200	.7025	5.63	8.86	.0958	1.1087	369.4	.42671	.015922	50.180
.4000	.7285	5.90	8.74	.0864	1.1149	371.3	.42765	.016017	54.639
.3800	.7544	6.19	8.60	.0773	1.1207	373.2	.42855	.016112	59.555
.3600	.7800	6.51	8.42	.0687	1.1259	375.1	.42943	.016210	65.000
.3400	.8054	6.85	8.21	.0605	1.1306	377.1	.43027	.016309	71.061
.3200	.8304	7.24	7.97	.0528	1.1348	379.2	.43109	.016410	77.850
.3000	.8550	7.67	7.70	.0456	1.1387	381.3	.43189	.016514	85.503
.2800	.8792	8.15	7.39	.0389	1.1421	383.5	.43267	.016622	94.146
.2600	.9028	8.70	7.04	.0328	1.1451	385.8	.43342	.016734	104.165
.2400	.9257	9.34	6.66	.0272	1.1476	388.2	.43416	.016850	115.711
.2200	.9479	10.08	6.26	.0221	1.1501	390.8	.43488	.016973	129.252
.2000	.9692	10.95	5.81	.0176	1.1521	393.6	.43558	.017104	145.375
.1800	.9895	12.01	5.34	.0137	1.1539	396.7	.43627	.017244	164.985
.1600	1.0090	13.33	4.84	.0103	1.1553	400.0	.43695	.017397	189.180
.1400	1.0276	15.00	4.32	.0074	1.1564	403.8	.43762	.017569	220.20
.1200	1.0459	17.22	3.77	.0051	1.1576	408.2	.43829	.017766	261.47
.1000	1.0651	20.33	3.20	.0033	1.1583	413.3	.43894	.017979	319.54
.0900	1.0762	22.41	2.91	.0025	1.1587	416.4	.43927	.018108	358.74
.0800	1.0896	25.02	2.62	.0019	1.1589	419.9	.43960	.018252	408.5[illegible]
.0700	1.1073	28.39	2.33	.0014	1.1592	423.9	.43993	.018419	474.54
.0600	1.1336	32.93	2.04	.0009	1.1594	428.8	.44027	.018616	566.81
.0500	1.1787	39.38	1.768	.0006	1.1597	435.1	.44061	.018862	707.22
.0400	1.2696	49.15	1.523	.0004	1.1597	443.8	.44095	.019192	952.18
.0300	1.4878	64.60	1.339	.0002	1.1598	457.9	.44128	.019688	1487.89
.0200	2.0010	83.53	1.201	.0001	1.1600	485.1	.44149	.020448	3001.5
.0100	3.3320	90.00	1.000	.0000	1.1601	563.4	.44152	.021803	9996.1

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -3.0^{\circ}$, $e_i = 0.05234$

$\bar{V}$	Z	γ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta s}{r}$	$\frac{\dot{\gamma}r}{V}$	$\sqrt{\bar{\sigma}_r}\frac{Z}{\bar{V}}$
1.0000	0.0000010	3.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000035	2.999	.0001	.0016	.0007	15.7	.01913	.001003	.000
1.0010	.0000061	2.998	.0002	.0025	.0019	31.4	.03835	.002010	.000
1.0015	.0000152	2.995	.0004	.0039	.0037	47.3	.05775	.003025	.000
1.0020	.0000247	2.991	.0012	.0062	.0067	63.5	.07755	.004060	.001
1.0025	.0001033	2.986	.0031	.0102	.0117	80.5	.09843	.005150	.003
1.0030	.0003356	2.975	.0101	.0185	.0222	101.1	.12355	.006459	.010
1.00318	.0008555	2.971	.0257	.0295	.0363	117.4	.14356	.007498	.026
1.0030	.0017452	2.965	.0525	.0421	.0525	129.9	.15884	.008290	.052
1.0025	.002976	2.962	.0895	.0549	.0691	139.2	.17031	.008884	.089
1.0020	.004003	2.960	.1203	.0636	.0804	144.5	.17669	.009214	.120
1.0015	.004959	2.959	.1490	.0707	.0897	148.2	.18130	.009452	.148
1.0010	.005816	2.958	.1764	.0768	.0978	151.2	.18496	.009642	.176
1.0005	.006769	2.958	.203	.0824	.1051	153.7	.18801	.009799	.203
1.0000	.007644	2.958	.229	.0874	.1118	155.9	.19064	.009935	.229
.9990	.009359	2.958	.280	.0965	.1236	159.5	.19501	.010161	.281
.9980	.011041	2.959	.331	.1046	.1346	162.4	.19858	.010346	.332
.9970	.012700	2.960	.380	.1118	.1445	164.9	.20161	.010502	.382
.9960	.014345	2.961	.429	.1186	.1537	167.0	.20425	.010639	.432
.9950	.015972	2.962	.477	.1248	.1622	169.0	.20658	.010759	.482
.9940	.017591	2.963	.525	.1306	.1703	170.7	.20868	.010868	.531
.9930	.019202	2.965	.572	.1362	.1780	172.3	.21058	.010966	.580
.9920	.02081	2.966	.619	.1414	.1853	173.7	.21232	.011057	.629
.9910	.02240	2.968	.666	.1463	.1923	175.0	.21393	.011140	.678
.9900	.02400	2.970	.713	.1511	.1990	176.3	.21542	.011217	.727
.9880	.02717	2.973	.805	.1599	.2118	178.5	.21812	.011357	.825
.9860	.03032	2.977	.897	.1681	.2237	180.5	.22051	.011482	.923
.9840	.03347	2.980	.988	.1757	.2350	182.3	.22266	.011594	1.020
.9820	.03660	2.984	1.078	.1828	.2457	183.9	.22462	.011695	1.118
.9800	.03973	2.988	1.168	.1895	.2559	185.4	.22641	.011789	1.216
.9750	.04751	2.999	1.390	.2046	.2796	188.7	.23032	.011993	1.462
.9700	.05525	3.010	1.608	.2178	.3011	191.4	.23362	.012167	1.709
.9650	.06297	3.021	1.823	.2296	.3210	193.9	.23649	.012318	1.958
.9600	.07066	3.032	2.03	.2400	.3396	196.0	.23902	.012451	2.208
.9550	.07833	3.044	2.24	.2494	.3570	198.0	.24129	.012572	2.461
.9500	.08598	3.056	2.45	.2579	.3734	199.7	.24334	.012681	2.715
.9400	.10123	3.081	2.85	.2726	.4038	202.9	.24694	.012874	3.231
.9300	.11642	3.106	3.25	.2846	.4335	205.6	.25004	.013042	3.755
.9200	.13155	3.132	3.63	.2944	.4570	208.0	.25275	.013189	4.290
.9100	.14663	3.159	4.00	.3025	.4807	210.1	.25516	.013322	4.834
.9000	.16166	3.187	4.36	.3090	.5028	212.1	.25734	.013443	5.389
.8800	.19159	3.244	5.06	.3180	.5431	215.6	.26115	.013646	6.531
.8600	.2213	3.304	5.71	.3227	.5791	218.7	.26440	.013842	7.721
.8400	.2509	3.366	6.32	.3239	.6116	221.4	.26724	.014008	8.960
.8200	.2803	3.431	6.89	.3223	.6411	223.9	.26976	.014158	10.254
.8000	.3095	3.499	7.43	.3184	.6681	226.2	.27203	.014295	11.604
.7800	.3384	3.571	7.92	.3126	.6929	228.3	.27410	.014423	13.017
.7600	.3672	3.645	8.37	.3052	.7158	230.4	.27600	.014542	14.496
.7400	.3958	3.723	8.79	.2964	.7370	232.3	.27775	.014655	16.047
.7200	.4242	3.805	9.16	.2865	.7566	234.1	.27938	.014763	17.675
.7000	.4523	3.891	9.50	.2757	.7747	235.9	.28091	.014866	19.385
.6800	.4802	3.982	9.80	.2642	.7916	237.6	.28234	.014964	21.186
.6600	.5079	4.08	10.06	.2522	.8073	239.2	.28370	.015059	23.084
.6400	.5352	4.18	10.28	.2397	.8219	240.8	.28498	.015152	25.089
.6200	.5623	4.28	10.46	.2270	.8355	242.4	.28620	.015242	27.209
.6000	.5891	4.40	10.60	.2140	.8481	244.0	.28736	.015330	29.455
.5800	.6156	4.52	10.71	.2010	.8599	245.5	.28847	.015417	31.839
.5600	.6417	4.64	10.78	.1880	.8708	247.1	.28953	.015502	34.376
.5400	.6674	4.78	10.81	.1751	.8809	248.6	.29055	.015586	37.080
.5200	.6928	4.92	10.81	.1623	.8904	250.1	.29154	.015669	39.970
.5000	.7178	5.08	10.77	.1498	.8991	251.6	.29249	.015752	43.067
.4800	.7423	5.24	10.69	.1375	.9072	253.2	.29340	.015835	46.395
.4600	.7664	5.42	10.58	.1256	.9147	254.7	.29429	.015918	49.982
.4400	.7899	5.62	10.43	.1141	.9216	256.3	.29515	.016001	53.860
.4200	.8130	5.83	10.24	.1031	.9279	257.9	.29598	.016084	58.070
.4000	.8354	6.06	10.03	.0925	.9338	259.5	.29680	.016168	62.657
.3800	.8573	6.31	9.77	.0824	.9391	261.2	.29759	.016254	67.679
.3600	.8784	6.59	9.49	.0729	.9440	262.9	.29836	.016342	73.203
.3400	.8989	6.90	9.17	.0639	.9484	264.7	.29911	.016435	79.314
.3200	.9186	7.24	8.82	.0555	.9525	266.5	.29985	.016532	86.117
.3000	.9374	7.63	8.44	.0477	.9561	268.5	.30057	.016636	93.745
.2800	.9554	8.08	8.03	.0406	.9594	270.5	.30128	.016714	102.366
.2600	.9724	8.58	7.58	.0340	.9623	272.6	.30198	.016806	112.202
.2400	.9884	9.18	7.12	.0280	.9649	274.9	.30266	.016923	123.549
.2200	1.0033	9.87	6.62	.0227	.9671	277.3	.30334	.017048	136.529
.2000	1.0170	10.70	6.10	.0180	.9691	280.0	.30401	.017193	152.548
.1800	1.0295	11.71	5.56	.0140	.9708	282.9	.30467	.017388	171.589
.1600	1.0410	12.98	5.00	.0104	.9722	286.1	.30532	.017631	195.179
.1400	1.0515	14.61	4.42	.0075	.9734	289.8	.30598	.017921	225.31
.1200	1.0616	16.79	3.82	.0051	.9744	294.0	.30663	.018273	265.41
.1000	1.0731	19.86	3.22	.0033	.9752	299.1	.30728	.018747	321.93
.0900	1.0805	21.92	2.92	.0025	.9755	302.2	.30760	.018112	360.15
.0800	1.0903	24.53	2.62	.0019	.9758	305.6	.30793	.018213	408.85
.0700	1.1047	27.90	2.32	.0014	.9760	309.6	.30827	.018816	473.45
.0600	1.1283	32.47	2.03	.0009	.9762	314.6	.30860	.018611	564.14
.0500	1.1713	38.98	1.757	.0006	.9764	320.8	.30894	.018865	702.80
.0400	1.2617	48.87	1.514	.0004	.9765	329.6	.30929	.019170	946.31
.0300	1.4831	64.53	1.335	.0002	.9767	343.8	.30962	.019655	1483.15
.0200	2.0007	83.54	1.200	.0001	.9768	371.2	.30983	.020468	3001.1
.0100	3.3320	90.00	1.000	.0000	.9769	449.5	.30987	.021803	9996.1

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -4.0^{\circ}$, $e_i = 0.06976$

$\bar{V}$	Z	γ deg	$-\frac{\bar{\gamma}}{\beta}$	$\bar{q}$	ζ	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\frac{\beta r}{\bar{V}}}\,Z$
1.0000	0.0000016	4.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	4.000	.0001	.0016	.0007	11.8	.01433	.001002	.000
1.0010	.0000063	3.998	.0002	.0025	.0014	23.5	.02872	.002008	.000
1.0015	.0000192	3.996	.0005	.0039	.0028	35.4	.04321	.003020	.000
1.0020	.0000383	3.993	.0011	.0062	.0050	47.4	.05792	.004048	.001
1.0025	.0001000	3.989	.0030	.0101	.0087	60.0	.07320	.005114	.003
1.0030	.0002934	3.984	.0088	.0173	.0157	74.0	.09035	.006309	.009
1.00334	.0011442	3.976	.0344	.0341	.0316	91.7	.11268	.007821	.034
1.0030	.002923	3.970	.0880	.0545	.0512	104.0	.12708	.008864	.087
1.0025	.004438	3.968	.1335	.0670	.0633	109.5	.13378	.009328	.133
1.0020	.005775	3.967	.1736	.0764	.0724	113.0	.13801	.009621	.173
1.0015	.007037	3.967	.211	.0842	.0801	115.6	.14118	.009842	.211
1.0010	.008255	3.966	.248	.0911	.0869	117.7	.14374	.010019	.247
1.0005	.009443	3.966	.283	.0973	.0929	119.4	.14591	.010169	.283
1.0000	.010610	3.966	.318	.1030	.0986	121.0	.14778	.010299	.318
.9990	.012900	3.966	.387	.1133	.1088	123.6	.15093	.010518	.387
.9980	.015149	3.967	.454	.1225	.1180	125.7	.15352	.010697	.455
.9970	.017368	3.967	.519	.1308	.1264	127.5	.15573	.010850	.523
.9960	.019565	3.968	.585	.1385	.1342	129.1	.15765	.010984	.590
.9950	.02175	3.969	.648	.1456	.1416	130.5	.15936	.011102	.656
.9940	.02391	3.970	.713	.1523	.1485	131.8	.16090	.011209	.722
.9930	.02607	3.971	.777	.1586	.1553	132.9	.16230	.011306	.788
.9920	.02821	3.972	.840	.1646	.1619	134.0	.16358	.011395	.853
.9910	.03035	3.973	.902	.1703	.1674	135.0	.16476	.011477	.919
.9900	.03248	3.974	.965	.1757	.1731	135.9	.16586	.011554	.984
.9880	.03672	3.977	1.088	.1859	.1841	137.5	.16786	.011692	1.115
.9860	.04093	3.980	1.211	.1953	.1944	139.0	.16963	.011815	1.245
.9840	.04513	3.984	1.332	.2040	.2041	140.3	.17122	.011926	1.376
.9820	.04932	3.985	1.453	.2122	.2133	141.5	.17266	.012027	1.507
.9800	.05348	3.988	1.572	.2199	.2221	142.6	.17399	.012119	1.637
.9750	.06385	3.996	1.868	.2372	.2429	145.1	.17689	.012322	1.965
.9700	.07416	4.004	2.16	.2524	.2611	147.1	.17935	.012494	2.294
.9650	.08440	4.012	2.44	.2658	.2778	148.9	.18149	.012643	2.624
.9600	.09460	4.021	2.72	.2777	.2934	150.6	.18337	.012776	2.956
.9550	.10475	4.030	3.00	.2885	.3094	152.0	.18506	.012895	3.291
.9500	.11486	4.039	3.27	.2981	.3221	153.3	.18660	.013003	3.627
.9400	.13495	4.057	3.81	.3147	.3464	155.7	.18930	.013194	4.307
.9300	.15489	4.076	4.32	.3283	.3724	157.7	.19162	.013359	4.996
.9200	.17468	4.096	4.82	.3393	.3990	159.5	.19365	.013504	5.696
.9100	.19432	4.116	5.30	.3482	.4256	161.1	.19547	.013635	6.406
.9000	.21378	4.137	5.77	.3553	.4517	162.6	.19712	.013753	7.127
.8800	.2524	4.180	6.66	.3650	.4708	165.3	.19999	.013963	8.604
.8600	.2904	4.226	7.49	.3696	.5022	167.6	.20246	.014144	10.131
.8400	.3279	4.273	8.26	.3703	.5306	169.7	.20463	.014305	11.709
.8200	.3647	4.323	8.97	.3677	.5564	171.6	.20656	.014450	13.344
.8000	.4010	4.376	9.62	.3625	.5800	173.4	.20831	.014583	15.039
.7800	.4367	4.431	10.22	.3551	.6019	175.0	.20990	.014706	16.797
.7600	.4718	4.489	10.76	.3459	.6221	176.6	.21138	.014821	18.625
.7400	.5063	4.549	11.24	.3352	.6408	178.1	.21274	.014929	20.525
.7200	.5401	4.614	11.67	.3233	.6583	179.5	.21402	.015031	22.505
.7000	.5733	4.681	12.04	.3104	.6746	180.9	.21522	.015129	24.570
.6800	.6058	4.754	12.36	.2968	.6898	182.3	.21635	.015222	26.726
.6600	.6376	4.823	12.62	.2826	.7038	183.6	.21743	.015312	28.981
.6400	.6687	4.904	12.84	.2680	.7166	184.9	.21845	.015399	31.344
.6200	.6990	4.993	13.00	.2531	.7284	186.1	.21943	.015484	33.823
.6000	.7286	5.087	13.11	.2380	.7393	187.4	.22036	.015566	36.429
.5800	.7574	5.18	13.18	.2230	.7494	188.7	.22126	.015647	39.174
.5600	.7853	5.28	13.19	.2080	.7602	189.9	.22213	.015726	42.070
.5400	.8124	5.39	13.16	.1931	.7694	191.2	.22296	.015804	45.133
.5200	.8386	5.51	13.08	.1786	.7779	192.4	.22377	.015881	48.381
.5000	.8639	5.64	12.96	.1643	.7859	193.7	.22456	.015958	51.833
.4800	.8882	5.78	12.79	.1504	.7933	195.0	.22532	.016034	55.513
.4600	.9115	5.93	12.58	.1370	.8001	196.3	.22606	.016110	59.447
.4400	.9338	6.09	12.32	.1241	.8064	197.6	.22678	.016187	63.668
.4200	.9550	6.27	12.04	.1117	.8123	198.9	.22749	.016263	68.212
.4000	.9750	6.47	11.70	.0999	.8177	200.3	.22818	.016340	73.125
.3800	.9938	6.69	11.33	.0887	.8226	201.8	.22886	.016419	78.459
.3600	1.0114	6.93	10.92	.0782	.8272	203.2	.22953	.016498	84.282
.3400	1.0276	7.19	10.48	.0683	.8313	204.8	.23019	.016579	90.672
.3200	1.0425	7.50	9.81	.0591	.8351	206.4	.23083	.016663	97.731
.3000	1.0558	7.84	9.30	.0506	.8385	208.1	.23147	.016749	105.584
.2800	1.0677	8.24	8.97	.0429	.8416	209.9	.23210	.016838	114.393
.2600	1.0779	8.69	8.41	.0358	.8443	211.8	.23273	.016931	124.370
.2400	1.0864	9.23	7.82	.0294	.8469	213.9	.23335	.017028	135.797
.2200	1.0931	9.86	7.21	.0237	.8489	216.1	.23396	.017132	149.058
.2000	1.0980	10.62	6.59	.0187	.8508	218.5	.23458	.017243	164.695
.1800	1.1010	11.50	5.99	.0144	.8525	221.2	.23519	.017363	183.496
.1600	1.1022	12.75	5.29	.0108	.8538	224.2	.23580	.017495	206.66
.1400	1.1018	14.30	4.63	.0077	.8550	227.7	.23642	.017643	236.10
.1200	1.1005	16.38	3.96	.0052	.8560	231.8	.23704	.017813	275.13
.1000	1.1000	19.35	3.30	.0033	.8567	236.7	.23767	.018015	330.00
.0900	1.1012	21.[illegible]	2.97	.0026	.8570	239.6	.23799	.018133	367.07
.0800	1.1048	23.92	2.65	.0019	.8573	243.0	.23832	.018268	414.31
.0700	1.1131	27.26	2.34	.0014	.8575	247.0	.23864	.018424	477.03
.0600	1.1306	31.82	2.04	.0009	.8577	251.9	.23898	.018613	565.28
.0500	1.1679	38.32	1.750	.0006	.8579	258.1	.23932	.018852	700.77
.0400	1.2540	48.32	1.505	.0004	.8581	266.9	.23967	.019178	940.51
.0300	1.4761	64.23	1.328	.0002	.8582	280.2	.24001	.019679	1476.07
.0200	1.9999	83.53	1.200	.0001	.8583	308.[illegible]	.24022	.020467	2999.9
.0100	3.3320	90.00	1.000	.0000	.8584	387.1	.24026	.021803	9996.1

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(f) $\gamma_i = -5.0^{\circ}$, $e_i = 0.08716$

$\overline{V}$	z	γ deg	$-\frac{a_r}{g}$	$\overline{q}$	$\overline{\xi}$	t sec	$\frac{\Delta s}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\beta r}\,\frac{Z}{\overline{V}}$
1.0000	0.0000010	5.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	5.000	.0001	.0016	.0004	9.4	.01145	.001002	.000
1.0010	.0000061	4.999	.0002	.0025	.0011	18.8	.02294	.002007	.000
1.0015	.0000151	4.997	.0005	.0039	.0022	28.3	.03450	.003015	.000
1.0020	.0000350	4.995	.0012	.0062	.0040	37.9	.04620	.004040	.001
1.0025	.0000982	4.990	.0029	.0100	.0068	47.8	.05825	.005094	.003
1.0030	.0002753	4.987	.0082	.0167	.0120	58.5	.07137	.006239	.008
1.00346	.0014316	4.986	.0431	.0382	.0284	75.7	.09237	.008076	.043
1.0030	.004165	4.974	.1253	.0650	.0490	86.9	.10600	.009257	.125
1.0025	.005982	4.973	.1799	.0778	.0589	90.7	.11063	.009660	.179
1.0020	.007629	4.972	.229	.0878	.0666	93.2	.11374	.009931	.228
1.0015	.009193	4.972	.276	.0962	.0732	95.2	.11613	.010139	.275
1.0010	.010704	4.971	.322	.1037	.0791	96.8	.11809	.010309	.321
1.0005	.012190	4.971	.366	.1106	.0845	98.2	.11975	.010453	.366
1.0000	.013647	4.971	.409	.1168	.0894	99.4	.12120	.010579	.409
.9990	.016508	4.971	.495	.1282	.0984	101.4	.12364	.010792	.496
.9980	.019320	4.972	.578	.1383	.1066	103.0	.12566	.010968	.581
.9970	.02210	4.972	.661	.1475	.1140	104.5	.12739	.011118	.665
.9960	.02485	4.973	.742	.1560	.1209	105.7	.12890	.011249	.748
.9950	.02757	4.974	.823	.1640	.1274	106.8	.13025	.011366	.831
.9940	.03028	4.974	.903	.1714	.1336	107.8	.13146	.011472	.914
.9930	.03298	4.975	.983	.1784	.1394	108.7	.13256	.011567	.996
.9920	.03567	4.976	1.061	.1851	.1450	109.6	.13357	.011659	1.079
.9910	.03834	4.977	1.140	.1914	.1503	110.3	.13450	.011737	1.161
.9900	.04100	4.978	1.218	.1975	.1555	111.0	.13537	.011813	1.243
.9880	.04631	4.980	1.373	.2088	.1652	112.4	.13695	.011950	1.406
.9860	.05158	4.982	1.526	.2192	.1744	113.5	.13835	.012072	1.569
.9840	.05684	4.984	1.678	.2290	.1830	114.6	.13961	.012182	1.733
.9820	.06207	4.987	1.828	.2381	.1912	115.5	.14076	.012282	1.896
.9800	.06728	4.989	1.978	.2466	.1991	116.4	.14181	.012374	2.059
.9750	.08023	4.995	2.35	.2659	.2172	118.4	.14412	.012575	2.469
.9700	.09310	5.001	2.71	.2828	.2339	120.0	.14607	.012746	2.879
.9650	.10588	5.006	3.07	.2977	.2492	121.4	.14777	.012895	3.292
.9600	.11860	5.015	3.42	.3110	.2635	122.7	.14928	.013027	3.706
.9550	.13124	5.022	3.76	.3229	.2769	123.9	.15062	.013145	4.123
.9500	.14382	5.029	4.10	.3336	.2896	124.9	.15185	.013253	4.542
.9400	.16879	5.044	4.76	.3520	.3132	126.8	.15400	.013443	5.387
.9300	.19353	5.059	5.40	.3669	.3346	128.4	.15585	.013606	6.243
.9200	.2180	5.075	6.02	.3791	.3544	129.9	.15749	.013751	7.110
.9100	.2423	5.091	6.62	.3889	.3728	131.2	.15894	.013880	7.989
.9000	.2664	5.108	7.19	.3966	.3900	132.4	.16025	.013998	8.879
.8800	.3138	5.142	8.28	.4070	.4214	134.5	.16256	.014205	10.699
.8600	.3604	5.179	9.30	.4117	.4496	136.4	.16455	.014384	12.571
.8400	.4060	5.217	10.23	.4121	.4751	138.1	.16629	.014543	14.501
.8200	.4508	5.257	11.09	.4088	.4983	139.6	.16785	.014684	16.492
.8000	.4946	5.300	11.87	.4026	.5196	141.0	.16927	.014811	18.548
.7800	.5375	5.344	12.58	.3939	.5393	142.4	.17056	.014937	20.672
.7600	.5794	5.391	13.21	.3833	.5575	143.7	.17175	.015049	22.871
.7400	.6203	5.441	13.77	.3710	.5744	144.9	.17287	.015154	25.147
.7200	.6602	5.493	14.26	.3574	.5900	146.1	.17391	.015254	27.508
.7000	.6991	5.549	14.68	.3428	.6046	147.2	.17489	.015349	29.960
.6800	.7369	5.607	15.03	.3273	.6182	148.3	.17582	.015440	32.508
.6600	.7735	5.669	15.32	.3112	.6309	149.4	.17670	.015527	35.161
.6400	.8091	5.735	15.53	.2948	.6427	150.5	.17754	.015611	37.927
.6200	.8435	5.806	15.69	.2780	.6538	151.5	.17835	.015693	40.814
.6000	.8767	5.880	15.78	.2611	.6641	152.5	.17913	.015772	43.835
.5800	.9086	5.961	15.81	.2442	.6738	153.6	.17987	.015849	46.999
.5600	.9393	6.05	15.78	.2274	.6828	154.6	.18059	.015923	50.320
.5400	.9687	6.14	15.69	.2109	.6912	155.7	.18129	.016000	53.814
.5200	.9966	6.24	15.55	.1947	.6990	156.7	.18197	.016073	57.497
.5000	1.0232	6.35	15.35	.1788	.7063	157.8	.18263	.016148	61.390
.4800	1.0482	6.46	15.09	.1634	.7131	158.9	.18328	.016218	65.514
.4600	1.0718	6.59	14.79	.1486	.7194	160.0	.18390	.016290	69.897
.4400	1.0937	6.73	14.44	.1343	.7252	161.1	.18452	.016362	74.570
.4200	1.1140	6.88	14.04	.1207	.7306	162.3	.18512	.016434	79.548
.4000	1.1325	7.05	13.59	.1077	.7356	163.5	.18572	.016507	84.936
.3800	1.1492	7.24	13.10	.0954	.7402	164.7	.18630	.016580	90.726
.3600	1.1640	7.45	12.57	.0839	.7445	166.0	.18688	.016654	97.001
.3400	1.1768	7.68	12.00	.0731	.7483	167.3	.18745	.016730	103.840
.3200	1.1876	7.94	11.40	.0631	.7519	168.7	.18802	.016806	111.337
.3000	1.1961	8.25	10.77	.0539	.7551	170.2	.18858	.016887	119.610
.2800	1.2024	8.60	10.10	.0455	.7580	171.8	.18913	.016970	128.831
.2600	1.2063	9.00	9.41	.0379	.7606	173.5	.18969	.017056	139.196
.2400	1.2076	9.48	8.69	.0310	.7629	175.4	.19024	.017146	150.951
.2200	1.2063	10.05	7.96	.0249	.7649	177.4	.19080	.017241	164.494
.2000	1.2022	10.74	7.21	.0196	.7667	179.6	.19136	.017343	180.333
.1800	1.1953	11.60	6.45	.0150	.7683	182.0	.19192	.017454	199.290
.1600	1.1856	12.70	5.69	.0112	.7696	184.8	.19248	.017576	222.30
.1400	1.1733	14.14	4.93	.0079	.7707	188.1	.19306	.017713	251.42
.1200	1.1589	16.10	4.17	.0054	.7716	191.9	.19364	.017870	289.73
.1000	1.1441	18.93	3.43	.0034	.7724	196.6	.19424	.018059	343.23
.0900	1.1377	20.87	3.07	.0026	.7727	199.4	.19455	.018169	379.24
.0800	1.1334	23.34	2.72	.0019	.7729	202.6	.19486	.018296	425.03
.0700	1.1334	26.59	2.38	.0014	.7732	206.5	.19518	.018444	485.76
.0600	1.1424	31.06	2.06	.0010	.7734	211.2	.19551	.018624	571.18
.0500	1.1709	37.52	1.756	.0006	.7735	217.4	.19585	.018854	702.56
.0400	1.2487	47.57	1.498	.0004	.7737	226.1	.19620	.019174	936.53
.0300	1.4677	63.84	1.321	.0002	.7738	240.5	.19654	.019654	1467.67
.0200	1.9987	83.49	1.199	.0001	.7740	268.2	.19676	.020467	2398.0
.0100	3.3320	90.00	1.000	.0000	.7741	346.6	.19680	.021803	9996.2

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\overline{V}_i = 1.00$, $\overline{u}_a = 0$, $Z_i = \overline{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(g) $\gamma_i = -6.0^{\circ}$, $e_i = 0.10453$

$\overline{V}$	Z	$-\gamma$ deg	$-\frac{\partial\gamma}{\partial}$	$\overline{q}$	$\overline{\tau}$	t sec	$\frac{\Delta u}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{u}{V}$
1.0000	0.0000010	0.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	0.000	.0001	.0016	.0004	7.8	.00953	.001002	.000
1.0010	.0000061	0.999	.0002	.0025	.0009	15.7	.01909	.002006	.000
1.0015	.0000151	0.998	.0002	.0039	.0018	23.6	.02870	.003016	.000
1.0020	.0000379	0.998	.0013	.0062	.0033	31.6	.03841	.004036	.001
1.0025	.0000970	5.979	.0029	.0099	.0057	39.7	.04836	.005080	.003
1.0030	.0006652	5.978	.0080	.0164	.0098	48.5	.05899	.006197	.008
1.0035	.0017185	5.977	.0517	.0418	.0260	64.7	.07879	.008273	.051
1.0030	.005465	5.974	.1644	.0745	.0468	74.7	.09107	.009559	.164
1.0025	.007590	5.976	.228	.0877	.0554	77.6	.09456	.009924	.227
1.0020	.009542	5.976	.287	.0982	.0621	79.6	.09699	.010179	.286
1.0015	.011408	5.975	.343	.1072	.0680	81.2	.09889	.010378	.342
1.0010	.013219	5.975	.397	.1153	.0733	82.5	.10046	.010543	.396
1.0005	.014992	5.975	.450	.1226	.0781	83.6	.10180	.010683	.450
1.0000	.016737	5.975	.502	.1294	.0824	84.5	.10298	.010806	.502
.9990	.02017	5.975	.604	.1417	.0907	86.2	.10497	.011014	.606
.9980	.02394	5.974	.705	.1527	.0980	87.5	.10662	.011187	.708
.9970	.02687	5.974	.804	.1627	.1047	88.7	.10804	.011335	.808
.9960	.03017	5.973	.901	.1720	.1110	89.7	.10926	.011465	.909
.9950	.03344	5.973	.995	.1806	.1169	90.6	.11038	.011581	1.008
.9940	.03670	5.972	1.094	.1887	.1225	91.4	.11138	.011685	1.108
.9930	.03994	5.972	1.190	.1964	.1278	92.2	.11228	.011780	1.207
.9920	.04316	5.971	1.284	.2036	.1329	92.9	.11312	.011867	1.305
.9910	.04637	5.970	1.378	.2105	.1378	93.5	.11389	.011948	1.404
.9900	.04956	5.969	1.472	.2171	.1426	94.1	.11461	.012023	1.502
.9880	.05593	5.968	1.658	.2295	.1523	95.2	.11591	.012166	1.698
.9860	.06226	5.964	1.842	.2409	.1595	96.2	.11707	.012281	1.894
.9840	.06856	5.962	2.02	.2515	.1658	97.0	.11811	.012391	2.090
.9820	.07484	5.959	2.20	.2614	.1720	97.8	.11906	.012490	2.286
.9800	.08109	5.959	2.38	.2707	.1781	98.6	.11993	.012582	2.482
.9750	.09663	5.952	2.83	.2918	.1927	100.2	.12184	.012782	2.973
.9700	.11206	5.945	3.26	.3102	.2148	101.5	.12346	.012952	3.466
.9650	.12738	5.935	3.69	.3265	.2275	102.7	.12487	.013101	3.960
.9600	.14261	5.911	4.11	.3410	.2404	103.8	.12612	.013232	4.456
.9550	.15775	5.917	4.52	.3540	.2531	104.8	.12724	.013350	4.955
.9500	.17280	5.915	4.92	.3657	.2661	105.7	.12826	.013457	5.457
.9400	.2027	5.905	5.72	.3857	.2861	107.2	.13004	.013646	6.668
.9300	.2322	5.849	6.48	.4020	.3057	108.6	.13159	.013809	7.491
.9200	.2615	5.871	7.22	.4151	.3251	109.8	.13294	.013953	8.527
.9100	.2904	5.874	7.93	.4257	.3446	110.9	.13415	.014082	9.575
.9000	.3191	5.869	8.62	.4341	.3643	111.9	.13525	.014198	10.636
.8800	.3755	6.117	9.91	.4452	.3850	113.6	.13718	.014404	12.802
.8600	.4307	6.148	11.11	.4502	.4103	115.2	.13883	.014582	15.026
.8400	.4848	6.150	12.22	.4503	.4341	116.6	.14029	.014740	17.313
.8200	.5376	6.213	13.22	.4461	.4564	117.9	.14170	.014881	19.667
.8000	.5891	6.249	14.14	.4394	.4749	119.1	.14278	.015011	22.092
.7800	.6394	6.306	14.96	.4297	.4919	120.1	.14386	.015130	24.592
.7600	.6884	6.357	15.70	.4178	.5070	121.3	.14487	.015241	27.173
.7400	.7360	6.371	16.34	.4041	.5210	122.3	.14580	.015345	29.839
.7200	.7823	6.411	16.90	.3891	.5334	123.3	.14668	.015443	32.597
.7000	.8272	6.459	17.37	.3729	.5448	124.3	.14751	.015536	35.452
.6800	.8707	6.507	17.76	.3558	.5544	125.2	.14829	.015626	38.412
.6600	.9127	6.560	18.07	.3381	.5620	126.1	.14904	.015711	41.485
.6400	.9531	6.616	18.30	.3199	.5679	127.0	.14975	.015793	44.678
.6200	.9920	6.675	18.45	.3015	.5721	127.9	.15044	.015873	48.001
.6000	1.0293	6.739	18.53	.2829	.5746	128.8	.15109	.015950	51.466
.5800	1.0649	6.807	18.53	.2644	.5756	129.7	.15173	.016026	55.083
.5600	1.0988	6.881	18.46	.2460	.5749	130.6	.15235	.016100	58.867
.5400	1.1310	6.959	18.34	.2279	.5727	131.5	.15294	.016172	62.832
.5200	1.1613	7.04	18.1	.2101	.5699	132.4	.15352	.016243	66.997
.5000	1.1897	7.14	17.84	.1928	.5667	133.3	.15409	.016314	71.380
.4800	1.2161	7.24	17.51	.1760	.5630	134.2	.15464	.016383	76.005
.4600	1.2404	7.35	17.12	.1598	.5588	135.2	.15518	.016453	80.898
.4400	1.2627	7.47	16.67	.1443	.5542	136.2	.15572	.016522	86.091
.4200	1.2827	7.60	16.16	.1295	.5493	137.2	.15624	.016591	91.619
.4000	1.3004	7.75	15.60	.1154	.5439	138.2	.15675	.016661	97.527
.3800	1.3156	7.91	15.00	.1021	.5382	139.3	.15726	.016730	103.864
.3600	1.3283	8.09	14.34	.0896	.5322	140.4	.15777	.016801	110.695
.3400	1.3384	8.30	13.63	.0780	.5258	141.4	.15827	.016873	118.096
.3200	1.3457	8.53	12.84	.0672	.5191	142.6	.15876	.016947	126.160
.3000	1.3501	8.80	12.15	.0573	.5121	144.1	.15926	.017022	135.007
.2800	1.3514	9.10	11.27	.0482	.5048	145.6	.15975	.017100	144.789
.2600	1.3494	9.46	10.53	.0400	.4973	147.1	.16025	.017180	155.701
.2400	1.3440	9.89	9.68	.0327	.4895	148.7	.16074	.017265	168.005
.2200	1.3351	10.40	8.81	.0262	.4814	150.5	.16124	.017354	182.058
.2000	1.3224	11.03	7.93	.0206	.4731	152.5	.16174	.017449	198.357
.1800	1.3057	11.81	7.07	.0157	.4646	154.8	.16225	.017552	217.62
.1600	1.2851	12.82	6.17	.0116	.4559	157.3	.16277	.017666	240.96
.1400	1.2606	14.15	5.25	.0082	.4470	160.3	.16330	.017792	270.12
.1200	1.2325	15.97	4.44	.0055	.4378	163.9	.16385	.017939	308.13
.1000	1.2004	18.64	3.60	.0035	.4286	168.3	.16441	.018114	360.73
.0900	1.1877	20.48	3.21	.0027	.4089	171.0	.16471	.018217	395.90
.0800	1.1745	22.85	2.82	.0020	.4091	174.1	.16501	.018336	440.45
.0700	1.1651	25.98	2.45	.0014	.4093	177.8	.16531	.018475	499.31
.0600	1.1538	30.32	2.09	.0010	.4095	182.3	.16563	.018645	581.89
.0500	1.1813	36.67	1.772	.0006	.4097	188.3	.16597	.018864	708.76
.0400	1.1474	46.68	1.497	.0004	.4098	196.5	.16631	.019173	935.52
.0300	1.4589	63.34	1.213	.0002	.4100	211.1	.16666	.019666	1358.90
.0200	1.9970	93.42	1.196	.0001	.4101	39.2	.16699	.020466	2995.5
.0100	3.3320	90.00	1.000	.0000	.4102	327.6	.16692	.021803	9996.2

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(h) $\gamma_i = -8.0^{\circ}$, $e_i = 0.13917$

$\bar{V}$	Z	γ deg	$-\frac{\pi r}{s}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\dot{\gamma}}{\dot{\gamma}}$	$\sqrt{\beta r}\frac{Z}{\bar{V}}$
1.0000	0.0000010	0.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	0.000	.0001	.0016	.0002	5.9	.00713	.001002	.000
1.0010	.0000061	0.000	.0002	.0025	.0007	11.8	.01427	.002005	.000
1.0015	.0000151	0.000	.0004	.0039	.0014	17.7	.02144	.003014	.000
1.0020	.0000377	0.000	.0011	.0062	.0025	23.7	.02868	.004030	.001
1.0025	.0000956	0.000	.0029	.0098	.0042	29.7	.03604	.005054	.003
1.0030	.0002540	0.992	.0076	.0161	.0072	36.3	.04377	.006149	.008
1.0035	.0008001	0.959	.0241	.0285	.0131	43.6	.05285	.007424	.024
1.00372	.002290	0.960	.0690	.0483	.0221	50.4	.06117	.008592	.068
1.0035	.004990	0.915	.1502	.0713	.0331	55.6	.06734	.009457	.149
1.0030	.008213	0.902	.247	.0913	.0431	58.8	.07129	.010012	.246
1.0025	.010952	0.9[illegible]	.329	.1053	.0500	60.7	.07358	.010332	.328
1.0020	.013513	0.9[illegible]	.406	.1168	.0556	62.1	.07525	.010566	.405
1.0015	.015974	0.9[illegible]	.480	.1269	.0601	63.2	.07658	.010752	.479
1.0010	.018372	0.9[illegible]	.552	.1359	.0640	64.1	.07769	.010908	.551
1.0005	.02072	0.9[illegible]	.622	.1441	.0669	64.9	.07865	.011043	.621
1.0000	.02304	0.9[illegible]	.691	.1518	.0723	65.6	.07949	.011161	.691
.9990	.02760	0.980	.827	.1657	.0791	66.8	.08093	.011363	.829
.9980	.03209	0.9[illegible]	.961	.1782	.0859	67.8	.08213	.011531	.965
.9970	.03652	0.9[illegible]	1.092	.1897	.0911	68.6	.08317	.011676	1.099
.9960	.04092	0.961	1.223	.2003	.0971	69.4	.08407	.011804	1.232
.9950	.04528	0.981	1.352	.2101	.1022	70.0	.08489	.011917	1.365
.9940	.04961	0.9[illegible]	1.480	.2194	.1070	70.6	.08562	.012020	1.497
.9930	.05393	0.9[illegible]	1.606	.2282	.1115	71.2	.08629	.012114	1.629
.9920	.05822	0.9[illegible]	1.733	.2365	.1159	71.7	.08690	.012200	1.761
.9910	.06250	0.9[illegible]	1.858	.2444	.1201	72.2	.08747	.012280	1.892
.9900	.06676	0.9[illegible]	1.983	.2520	.1241	72.6	.08800	.012354	2.023
.9880	.07524	0.9[illegible]	2.23	.2661	.1317	73.4	.08896	.012489	2.285
.9860	.08367	0.9[illegible]	2.48	.2792	.1389	74.2	.08982	.012610	2.546
.9840	.09207	0.9[illegible]	2.72	.2914	.1457	74.8	.09060	.012718	2.807
.9820	.10043	0.9[illegible]	2.96	.3028	.1522	75.4	.09130	.012817	3.068
.9800	.10876	0.991	3.20	.3135	.1585	75.9	.09195	.012908	3.329
.9750	.12945	0.9[illegible]	3.79	.3377	.1726	77.1	.09337	.013107	3.983
.9700	.14998	0.9[illegible]	4.36	.3599	.1857	78.2	.09457	.013276	4.638
.9650	.17036	0.002	4.92	.3776	.1973	79.1	.09562	.013424	5.296
.9600	.19062	0.007	5.49	.3942	.2076	79.9	.09655	.013554	5.957
.9550	.2107	0.01[illegible]	6.04	.4092	.2169	80.6	.09738	.013672	6.620
.9500	.2308	0.03[illegible]	6.58	.4226	.2257	81.2	.09814	.013778	7.287
.9400	.2704	0.025	7.63	.4455	.2422	82.4	.09947	.013966	8.630
.9300	.3096	0.034	8.65	.4641	.2572	83.4	.10062	.014128	9.988
.9200	.3484	0.044	9.62	.4792	.2710	84.3	.10164	.014272	11.361
.9100	.3867	0.054	10.56	.4912	.2839	85.1	.10254	.014400	12.749
.9000	.4246	0.064	11.46	.5007	.3060	85.9	.10336	.014516	14.154
.8800	.4991	0.085	13.18	.5132	.3339	87.2	.10481	.014720	17.015
.8600	.5718	0.104	14.75	.5186	.3563	88.4	.10605	.014897	19.947
.8400	.6428	0.13	16.20	.5185	.3765	89.5	.10714	.015053	22.956
.8200	.7119	0.1[illegible]	17.51	.5138	.3950	90.4	.10812	.015193	26.046
.8000	.7792	0.1[illegible]	18.70	.5053	.4120	91.3	.10901	.015321	29.222
.7800	.8447	0.213	19.77	.4938	.4276	92.2	.10983	.015439	32.488
.7600	.9082	0.243	20.71	.4799	.4420	93.0	.11059	.015548	35.850
.7400	.9698	0.274	21.53	.4639	.4556	93.8	.11129	.015651	39.314
.7200	1.0293	0.308	22.23	.4463	.4682	94.5	.11196	.015748	42.888
.7000	1.0868	0.343	22.82	.4274	.4798	95.3	.11258	.015839	46.576
.6800	1.1421	0.379	23.30	.4075	.4908	96.0	.11318	.015927	50.388
.6600	1.1953	0.420	23.67	.3869	.5010	96.7	.11374	.016010	54.332
.6400	1.2462	0.463	23.93	.3658	.5105	97.4	.11429	.016091	58.418
.6200	1.2949	0.508	24.08	.3444	.5194	98.1	.11481	.016169	62.655
.6000	1.3411	0.557	24.14	.3229	.5278	98.7	.11531	.016244	67.055
.5800	1.3849	0.609	24.10	.3015	.5356	99.4	.11580	.016318	71.632
.5600	1.4261	0.665	23.96	.2802	.5429	100.1	.11627	.016389	76.400
.5400	1.4647	0.725	23.73	.2593	.5497	100.8	.11673	.016459	81.374
.5200	1.5006	0.79	23.41	.2389	.5560	101.4	.11717	.016528	86.575
.5000	1.5337	0.862	23.01	.2189	.5620	102.0	.11761	.016596	92.023
.4800	1.5639	0.940	22.52	.1996	.5676	102.6	.11804	.016663	97.742
.4600	1.5910	9.02	21.95	.1810	.5727	103.1	.11846	.016729	103.759
.4400	1.6149	9.12	21.32	.1632	.5775	103.7	.11887	.016795	110.108
.4200	1.6356	9.22	20.61	.1462	.5820	104.2	.11928	.016861	116.826
.4000	1.6528	9.34	19.83	.1301	.5861	104.6	.11968	.016927	123.958
.3800	1.6664	9.46	19.00	.1149	.5899	105.1	.12008	.016993	131.556
.3600	1.6762	9.61	18.10	.1007	.5934	105.5	.12048	.017060	139.683
.3400	1.6821	9.77	17.16	.0874	.5966	105.9	.12087	.017127	148.418
.3200	1.6838	9.95	16.16	.0752	.5996	106.	.12127	.017195	157.853
.3000	1.6811	10.17	15.13	.0639	.6023	106.[illegible]	.12166	.017265	168.107
.2800	1.6737	10.41	14.08	.0537	.6047	106.9	.12206	.017337	179.329
.2600	1.6615	10.70	12.98	.0444	.6069	107.[illegible]	.12245	.017411	191.711
.2400	1.6440	11.05	11.84	.0362	.6089	107.[illegible]	.12286	.017489	205.51
.2200	1.6211	11.47	10.63	.0289	.6106	108.[illegible]	.12326	.017570	221.05
.2000	1.5922	11.98	9.35	.0226	.6122	108.6	.12368	.017656	238.83
.1800	1.5571	12.63	8.41	.0172	.6136	109.5	.12410	.017748	259.52
.1600	1.5154	13.48	7.27	.0126	.6147	109.[illegible]	.12454	.017849	284.15
.1400	1.4670	14.60	6.16	.0089	.6157	110.[illegible]	.12499	.017961	314.35
.1200	1.4117	16.17	5.08	.0059	.6165	110.[illegible]	.12545	.018089	352.92
.1000	1.3504	18.50	4.05	.0037	.6172	111.[illegible]	.12595	.018243	405.13
.0900	1.3183	20.13	3.56	.0028	.6175	111.[illegible]	.12621	.018333	439.44
.0800	1.2864	22.25	3.09	.0021	.6177	111.[illegible]	.12647	.018437	482.40
.0700	1.2564	25.10	2.64	.0015	.6179	111.[illegible]	.12675	.018559	538.47
.0600	1.2324	29.10	2.20	.0010	.6181	111.[illegible]	.12701	.018709	616.21
.0500	1.2240	35.07	1.83	.0006	.6183	111.[illegible]	.12736	.018904	734.41
.0400	1.2598	44.75	1.522	.0004	.6184	112.[illegible]	.12770	.019184	944.84
.0300	1.3435	61.67	1.249	.0002	.6185	112.[illegible]	.12805	.019654	1443.47
.0200	1.4925	91.18	1.196	.0001	.6187	112.[illegible]	.12829	.020463	2488.8
.0100	1.4906	90.00	1.047	.0000	.6188	112.[illegible]	.12833	.021856	10471.9

TABLE XVI.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(i) $\gamma_i = -10.0^{\circ}$, $e_i = 0.17365$

$\bar{V}$	Z	γ deg	$-\frac{\beta r}{\bar{s}}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\bar{u}_a}{\bar{r}}$	$\frac{\bar{u}_\theta}{\bar{r}}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0000	0.0000000	10.000	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	10.000	.0000	.0016	.0002	4.7	.00568	.0010[illegible]	.000
1.0010	.0000061	9.999	.0001	.0025	.0006	9.4	.01137	.0020[illegible]	.000
1.0015	.0000112	9.999	.0004	.0039	.0011	14.2	.01708	.0030[illegible]	.000
1.0020	.0000175	9.997	.0011	.0062	.0020	18.9	.02284	.0040[illegible]	.001
1.0025	.0000948	9.996	.0029	.0098	.0034	23.8	.02867	.0050[illegible]	.003
1.0030	.0002450	9.994	.0074	.0159	.0057	28.8	.03473	.0061[illegible]	.007
1.0035	.0007281	9.991	.0219	.0272	.0100	34.4	.04152	.0073[illegible]	.022
1.00384	.0028858	9.988	.0861	.0540	.0202	41.5	.05015	.0088[illegible]	.085
1.0035	.008330	9.989	.221	.0864	.0327	46.5	.05609	.0096[illegible]	.219
1.0030	.011120	9.984	.335	.1062	.0404	48.7	.05873	.0103[illegible]	.333
1.0025	.014470	9.984	.435	.1210	.0461	50.0	.06039	.0106[illegible]	.433
1.0020	.017631	9.983	.530	.1334	.0509	51.1	.06164	.0108[illegible]	.528
1.0015	.02068	9.983	.621	.1444	.0552	51.9	.06265	.0110[illegible]	.620
1.0010	.02366	9.983	.711	.1542	.0591	52.6	.06350	.0111[illegible]	.709
1.0005	.02659	9.983	.798	.1632	.0626	53.2	.06424	.0113[illegible]	.797
1.0000	.02947	9.983	.884	.1717	.0660	53.8	.06490	.0114[illegible]	.884
.9990	.03515	9.983	1.054	.1870	.0721	54.7	.06602	.0116[illegible]	1.056
.9980	.04075	9.983	1.220	.2008	.0776	55.5	.06695	.0117[illegible]	1.225
.9970	.04628	9.983	1.384	.2135	.0828	56.2	.06776	.0119[illegible]	1.392
.9960	.05176	9.984	1.547	.2252	.0875	56.8	.06848	.0120[illegible]	1.559
.9950	.05720	9.984	1.708	.2362	.0920	57.3	.06911	.0121[illegible]	1.725
.9940	.06261	9.984	1.867	.2465	.0963	57.8	.06969	.0122[illegible]	1.890
.9930	.06799	9.985	2.03	.2562	.1004	58.2	.07022	.0123[illegible]	2.054
.9920	.07335	9.985	2.18	.2654	.1042	58.6	.07070	.0124[illegible]	2.218
.9910	.07869	9.986	2.34	.2742	.1080	59.0	.07115	.0125[illegible]	2.382
.9900	.08400	9.986	2.49	.2826	.1116	59.3	.07157	.0126[illegible]	2.546
.9880	.09459	9.987	2.80	.2984	.1184	60.0	.07233	.0128[illegible]	2.872
.9860	.10512	9.988	3.11	.3130	.1248	60.6	.07301	.0129[illegible]	3.198
.9840	.11559	9.989	3.41	.3266	.1308	61.1	.07362	.0129[illegible]	3.524
.9820	.12602	9.990	3.71	.3392	.1366	61.5	.07418	.0130[illegible]	3.850
.9800	.13641	9.992	4.01	.3512	.1421	62.0	.07469	.0131[illegible]	4.176
.9750	.16223	9.994	4.75	.3781	.1548	62.9	.07582	.0133[illegible]	4.992
.9700	.18784	9.997	5.47	.4016	.1665	63.8	.07678	.0135[illegible]	5.810
.9650	.2133	10.001	6.17	.4225	.1773	64.5	.07761	.0136[illegible]	6.630
.9600	.2385	10.004	6.87	.4410	.1874	65.1	.07835	.0138[illegible]	7.454
.9550	.2636	10.008	7.55	.4576	.1969	65.7	.07901	.0139[illegible]	8.281
.9500	.2886	10.013	8.22	.4725	.2058	66.2	.07961	.0140[illegible]	9.113
.9400	.3380	10.018	9.53	.4980	.2224	67.1	.08067	.0142[illegible]	10.787
.9300	.3868	10.026	10.79	.5188	.2376	67.9	.08159	.0143[illegible]	12.479
.9200	.4351	10.034	12.01	.5355	.2516	68.7	.08240	.0145[illegible]	14.188
.9100	.4828	10.042	13.18	.5489	.2647	69.3	.08312	.0146[illegible]	15.916
.9000	.5299	10.050	14.31	.5594	.2768	69.9	.08377	.0147[illegible]	17.664
.8800	.6225	10.067	16.43	.5732	.2992	71.0	.08492	.0149[illegible]	21.221
.8600	.7128	10.086	18.39	.5790	.3192	71.9	.08591	.0151[illegible]	24.864
.8400	.8007	10.105	20.18	.5787	.3373	72.8	.08678	.0152[illegible]	28.598
.8200	.8864	10.125	21.80	.5732	.3538	73.6	.08757	.0154[illegible]	32.427
.8000	.9696	10.146	23.27	.5637	.3691	74.3	.08828	.0155[illegible]	36.359
.7800	1.0503	10.169	24.58	.5507	.3831	75.0	.08893	.0156[illegible]	40.398
.7600	1.1286	10.193	25.71	.5349	.3961	75.7	.08954	.0157[illegible]	44.550
.7400	1.2043	10.218	26.74	.5170	.4082	76.3	.09010	.0158[illegible]	48.824
.7200	1.2774	10.245	27.59	.4972	.4195	76.9	.09063	.0159[illegible]	53.225
.7000	1.3478	10.273	28.30	.4759	.4300	77.5	.09113	.0160[illegible]	57.762
.6800	1.4154	10.303	28.87	.4536	.4398	78.0	.09161	.0161[illegible]	62.443
.6600	1.4801	10.333	29.31	.4305	.4489	78.6	.09207	.0162[illegible]	67.279
.6400	1.5420	10.369	29.61	.4069	.4575	79.2	.09250	.0163[illegible]	72.279
.6200	1.6008	10.404	29.77	.3830	.4655	79.7	.09292	.0164[illegible]	77.456
.6000	1.6565	10.445	29.82	.3589	.4730	80.3	.09333	.0164[illegible]	82.823
.5800	1.7089	10.487	29.38	.3349	.4800	80.8	.09372	.0165[illegible]	88.393
.5600	1.7581	10.530	29.54	.3112	.4866	81.4	.09410	.0155[illegible]	94.184
.5400	1.8038	10.581	29.22	.2878	.4928	81.9	.09447	.0166[illegible]	100.212
.5200	1.8460	10.634	28.80	.2649	.4985	82.5	.09483	.0167[illegible]	106.498
.5000	1.8844	10.691	28.27	.2427	.5039	83.1	.09518	.0168[illegible]	113.066
.4800	1.9191	10.754	27.63	.2211	.5089	83.7	.09553	.0168[illegible]	119.942
.4600	1.9497	10.823	26.91	.2004	.5135	84.3	.09587	.0169[illegible]	127.156
.4400	1.9762	10.899	26.09	.1805	.5179	84.9	.09621	.0170[illegible]	134.743
.4200	1.9984	10.983	25.18	.1616	.5219	85.5	.09654	.0170[illegible]	142.743
.4000	2.0160	11.08	24.19	.1437	.5256	86.2	.09687	.0172[illegible]	151.203
.3800	2.0289	11.18	23.13	.1268	.5291	86.9	.09719	.0172[illegible]	160.180
.3600	2.0369	11.30	22.00	.1110	.5323	87.6	.09752	.0172[illegible]	169.740
.3400	2.0396	11.43	20.80	.0963	.5352	88.4	.09784	.0173[illegible]	179.964
.3200	2.0368	11.58	19.55	.0827	.5379	89.2	.09816	.0174[illegible]	190.949
.3000	2.0282	11.76	18.25	.0702	.5403	90.1	.09849	.0174[illegible]	202.82
.2800	2.0134	11.96	16.91	.0589	.5425	91.0	.09881	.0175[illegible]	215.72
.2600	1.9921	12.20	15.54	.0486	.5445	92.1	.09914	.0176[illegible]	229.86
.2400	1.9638	12.49	14.14	.0395	.5463	93.2	.09948	.0176[illegible]	245.47
.2200	1.9280	12.84	12.72	.0315	.5480	94.4	.09982	.0177[illegible]	262.91
.2000	1.8843	13.27	11.31	.0246	.5494	95.8	.10016	.0178[illegible]	282.65
.1800	1.8320	13.82	9.89	.0186	.5506	97.4	.10052	.0179[illegible]	305.33
.1600	1.7705	14.53	8.50	.0136	.5517	99.2	.10089	.0180[illegible]	331.97
.1400	1.6993	15.49	7.14	.0096	.5526	101.4	.10127	.0181[illegible]	364.13
.1200	1.6177	16.84	5.82	.0063	.5534	104.0	.10167	.0182[illegible]	404.44
.1000	1.5260	18.87	4.58	.0039	.5540	107.4	.10210	.0183[illegible]	457.81
.0900	1.4768	20.31	3.99	.0030	.5542	109.5	.10233	.0184[illegible]	492.26
.0800	1.4261	22.18	3.42	.0022	.5545	111.9	.10257	.0185[illegible]	534.80
.0700	1.3755	24.73	2.89	.0015	.5547	114.9	.10282	.0186[illegible]	586.48
.0600	1.3281	28.35	2.39	.0010	.5548	118.7	.10308	.0187[illegible]	664.05
.0500	1.2923	33.83	1.939	.0006	.5550	123.7	.10337	.0188[illegible]	[illegible]
.0400	1.2937	42.94	1.552	.0004	.5551	131.1	.10369	.0192[illegible]	970.27
.0300	1.4354	59.75	1.292	.0002	.5552	144.4	.10404	.0196[illegible]	1435.44
.0200	1.9870	82.83	1.192	.0001	.5554	173.2	.10430	.0204[illegible]	2980.4
.0100	3.4906	90.00	1.047	.0000	.5555	256.1	.10434	.0218[illegible]	10471.9

TABLE XVII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR LIFTING ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$, $\gamma_i = -0.5^{\circ}$, $e_i = 0.00873$

(a) L/D = 0.5

$\bar{V}$	z	$\frac{-\gamma}{\text{deg}}$	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{Q}$	$\frac{t}{\text{sec}}$	$\frac{\Delta r}{r}$	$\frac{-\Delta V}{V}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0000	0.0000010	0.500	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	.497	.0001	.0016	.0044	95.1	.11626	.001012	.000
1.0010	.0000063	.494	.0002	.0025	.0117	193.4	.23651	.002044	.000
1.0015	.0000168	.490	.0006	.0041	.0245	300.3	.36740	.003133	.001
1.0022	.0001134	.479	.0033	.0107	.0830	529.8	.64842	.005255	.003
1.0025	.0003356	.315	.0113	.0184	.1667	688.3	.84257	.006460	.010
1.0030	.0004374	.288	.0147	.0210	.1997	734.1	.89858	.006756	.013
1.0035	.0005246	.265	.0176	.0229	.2271	768.2	.94029	.006958	.016
1.0040	.0006025	.250	.0206	.0245	.2514	796.1	.97444	.007112	.018
.9990	.0007389	.221	.0246	.0273	.2944	841.5	1.02989	.007340	.022
.9980	.0008567	.199	.0287	.0291	.3327	878.5	1.07516	.007506	.026
.9970	.0009605	.179	.0321	.0308	.3670	910.6	1.11422	.007634	.029
.9960	.0010532	.162	.0352	.0321	.4000	939.2	1.14905	.007737	.032
.9950	.0011369	.149	.0379	.0333	.4324	965.3	1.18082	.007824	.034
.9940	.0012133	.137	.0405	.0343	.4622	989.5	1.21024	.007897	.037
.9930	.0012838	.128	.0428	.0352	.4911	1012.2	1.23780	.007961	.039
.9920	.0013497	.120	.0449	.0360	.5192	1033.6	1.26385	.008018	.041
.9910	.0014120	.116	.0469	.0367	.5464	1054.1	1.28862	.008069	.043
.9900	.0014718	.111	.0489	.0374	.5730	1073.6	1.31230	.008116	.045
.9880	.0015872	.110	.0528	.0387	.6244	1110.5	1.35687	.008202	.048
.9860	.0017037	.104	.0566	.0399	.6737	1144.8	1.39826	.008283	.052
.9840	.0018260	.100	.0603	.0410	.7213	1176.9	1.43685	.008362	.056
.9820	.0019594	.095	.0645	.0423	.7692	1206.8	1.47285	.008443	.060
.9800	.002108	.090	.0692	.0437	.8112	1234.8	1.50740	.008526	.065
.9750	.002558	.190	.0837	.0475	.9139	1296.4	1.58007	.008747	.079
.9700	.003134	.243	.1028	.0519	1.0014	1347.3	1.64052	.008978	.097
.9650	.003825	.284	.1238	.0566	1.0892	1389.3	1.68990	.009200	.119
.9600	.004610	.326	.1468	.0613	1.1618	1423.5	1.73053	.009419	.144
.9550	.005464	.369	.1750	.0659	1.2314	1452.6	1.76447	.009613	.172
.9500	.006362	.415	.2095	.0702	1.2950	1477.3	1.79329	.009788	.201
.9400	.008215	.504	.2899	.0777	1.4028	1517.8	1.84010	.010084	.262
.9300	.010053	.591	.3714	.0836	1.4989	1550.5	1.87722	.010320	.324
.9200	.011809	.680	.4574	.0882	1.5856	1577.6	1.90811	.010511	.385
.9100	.013448	.765	.5416	.0916	1.6637	1601.5	1.93479	.010668	.443
.9000	.014960	.846	.6232	.0940	1.7356	1622.6	1.95846	.010798	.499
.8800	.017647	.276	.02[illegible]	.0965	1.8642	1660.7	1.99965	.011007	.602
.8600	.02005	.268	.0[illegible]	.0971	1.9[illegible]	1694.2	2.03525	.011174	.700
.8400	.02244	.284	.0[illegible]	.0969	2.09[illegible]	1724.4	2.07[illegible]6	.011325	.801
.8200	.02504	.322	.0[illegible]	.0954	2.1931	1752.5	2.09516	.011474	.910
.8000	.02803	.370	.0[illegible]	.0958	2.2832	1778.2	2.12050	.011627	1.051
.7800	.03144	.420	.0[illegible]	.0953	2.3[illegible]	1801.[illegible]	2.14312	.011783	1.209
.7600	.03524	.463	.0[illegible]	.0945	2.4429	1822.4	2.16329	.011935	1.391
.7400	.03933	.497	.0[illegible]	.0934	2.5098	1842.[illegible]	2.18133	.012090	1.594
.7200	.04357	.521	1.0[illegible]	.0918	2.57[illegible]	1860.[illegible]	2.19755	.012234	1.815
.7000	.04785	.539	1.124	.0897	2.6274	1877.7	2.21225	.012370	2.051
.6800	.05211	.546	1.189	.0871	2.67[illegible]	1893.[illegible]	2.2257	.012497	2.299
.6600	.05631	.550	1.247	.0840	2.72[illegible]	1908.[illegible]	2.23808	.012618	2.559
.6400	.06044	.569	1.298	.0806	2.7707	1923.[illegible]	2.24958	.012729	2.833
.6200	.06456	.588	1.343	.0769	2.8110	1937.[illegible]	2.26032	.012837	3.124
.6000	.06872	.617	1.383	.0731	2.8412	1950.7	2.27040	.012943	3.436
.5800	.07303	.656	1.421	.0692	2.8825	1963.[illegible]	2.27988	.013048	3.777
.5600	.07756	.706	1.457	.0654	2.9[illegible]	1976.[illegible]	2.28881	.013154	4.155
.5400	.08241	.766	1.493	.0615	2.94[illegible]	1989.2	2.29722	.013262	4.578
.5200	.08766	.836	1.529	.0577	2.9[illegible]	2001.4	2.30513	.013372	5.057
.5000	.09336	.915	1.[illegible]	.0540	2.9[illegible]	2013.[illegible]	2.31258	.013486	5.602
.4800	.09955	1.000	1.[illegible]	.0504	3.0107	2025.[illegible]	2.31956	.013603	6.222
.4600	.10624	1.092	1.[illegible]	.0468	3.0470	2036.[illegible]	2.32612	.013722	6.929
.4400	.11345	1.190	1.[illegible]	.0433	3.07[illegible]	2047.[illegible]	2.33227	.013845	7.735
.4200	.12117	1.295	1.[illegible]	.0398	3.0722	2058.[illegible]	2.33803	.013969	8.655
.4000	.12940	1.408	1.[illegible]	.0364	3.0972	2069.[illegible]	2.34343	.014097	9.705
.3800	.13817	1.53	1.[illegible]	.0331	3.1[illegible]	2079.9	2.34849	.014226	10.908
.3600	.14750	1.67	1.[illegible]	.0299	3.1123	2090.4	2.35324	.014359	12.291
.3400	.15746	1.83	1.[illegible]	.0268	3.1237	2100.[illegible]	2.35769	.014495	13.894
.3200	.16816	2.02	1.[illegible]	.0238	3.1333	2111.[illegible]	2.36187	.014636	15.755
.3000	.17974	2.24	1.[illegible]	.0209	3.1418	2121.[illegible]	2.36579	.014781	17.974
.2800	.19237	2.51	1.[illegible]	.0182	3.1492	2131.9	2.36946	.014934	20.611
.2600	.2063	2.84	1.[illegible]	.0157	3.1557	2142.[illegible]	2.37290	.015094	23.808
.2400	.2219	3.23	1.[illegible]	.0133	3.1612	2152.9	2.37612	.015264	27.741
.2200	.2399	3.72	1.[illegible]	.0111	3.1660	2163.[illegible]	2.37911	.015445	32.666
.2000	.2597	4.34	1.[illegible]	.0091	3.1700	2173.[illegible]	2.38190	.015641	38.958
.1800	.2831	5.11	1.709	.0073	3.1734	2183.[illegible]	2.38449	.015854	47.185
.1600	.3107	6.12	1.[illegible]	.0057	3.1762	2193.[illegible]	2.38688	.016088	58.248
.1400	.3437	7.47	1.[illegible]	.0043	3.1784	2203.[illegible]	2.38909	.016349	73.657
.1200	.3845	9.31	1.[illegible]	.0031	3.1801	2222.[illegible]	2.39111	.016645	97.135
.1000	.4370	11.98	1.[illegible]	.0021	3.1814	2[illegible]	2.39299	.016989	131.104
.0900	.4699	13.80	1.[illegible]	.0017	3.1820	2241.[illegible]	2.39383	.017187	156.630
.0800	.5094	16.10	1.[illegible]	.0013	3.1824	2252.[illegible]	2.39466	.017408	191.040
.0700	.5588	19.08	1.[illegible]	.0010	3.1828	2261.3	2.39545	.017659	239.50
.0600	.6240	23.05	1.[illegible]	.0007	3.1831	2271.7	2.39622	.017953	312.00
.0500	.7171	28.55	1.[illegible]	.0005	3.1833	2281.[illegible]	2.39[illegible]	.018310	430.28
.0400	.8665	36.29	1.[illegible]	.0003	3.1836	2291.[illegible]	2.39769	.018768	49.91
.0300	1.1385	46.61	1.[illegible]	.0002	3.1837	2321.9	2.39840	.019391	1138.50
.0200	1.6624	56.90	1.[illegible]	.0001	3.1839	2318.8	2.39907	.020262	2493.7
.0100	3.0821	62.24	1.[illegible]	.0000	3.1840	2[illegible]	2.39990	.021716	8246.2

TABLE XVII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR LIFTING ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.00$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$, $\gamma_i = -0.5^{\circ}$, $e_i = 0.00873$ - Concluded

(b) L/D = 1.0

$\bar{V}$	Z	$-\gamma$ deg	$-\frac{a_m}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta m}{r}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{\dot{\gamma}}{V}$
1.0000	0.0000010	0.500	0.0000	0.0010	0	0	0	0	0.000
1.0005	.0000025	.496	.0001	.0016	.0044	95.1	.11628	.001012	.000
1.0010	.0000063	.495	.0003	.0025	.0117	193.5	.23661	.002044	.000
1.0015	.0000168	.404	.0007	.0041	.0245	300.7	.36785	.003133	.001
1.0021	.0001096	.379	.0033	.0105	.0826	529.1	.64757	.005215	.003
1.0015	.0003058	.28[illegible]	.0130	.0176	.1657	691.6	.84668	.006557	.009
1.0010	.0003866	.223	.0164	.0197	.1996	741.2	.90739	.006618	.012
1.0005	.0004488	.16[illegible]	.0191	.0212	.2292	779.3	.95389	.006784	.013
1.0000	.0004981	.1[illegible]	.0211	.0223	.2538	811.4	.99315	.006901	.015
.9990	.0005669	.0[illegible]	.0240	.0238	.3001	866.2	1.06004	.007046	.017
.9950	.0006043	.040	.0256	.0245	.3428	914.3	1.11882	.007118	.018
.9970	.0006166	.004	.0261	.0246	.3835	959.5	1.17390	.007143	.019
.9960	.0006083	-.032	.0257	.0244	.4234	1003.8	1.22781	.007127	.018
.9950	.0005840	-.060	.0247	.0239	.4631	1048.6	1.2824	.007083	.019
.9940	.0005480	-.079	.0231	.0231	.5033	1095.3	1.33911	.007014	.017
.9930	.0005050	-.089	.0213	.0221	.5445	1145.6	1.39952	.006924	.015
.9920	.0004605	-.096	.0194	.0210	.5872	1199.0	1.46505	.006823	.014
.9910	.0004205	-.070	.0177	.0201	.6318	1258.4	1.53700	.006723	.013
.9900	.0003922	-.038	.0165	.0193	.6789	1323.7	1.61609	.006646	.012
.9880	.0004034	.2[illegible]7	.0169	.0195	.7796	1466.9	1.78919	.006680	.012
.9860	.0005410	.179	.0228	.0226	.8789	1597.5	1.94676	.007018	.017
.9840	.0007972	.247	.0333	.0271	.9635	1691.1	2.05946	.007441	.024
.9820	.0010972	.275	.0457	.0317	1.0331	1755.9	2.13733	.007798	.034
.9800	.0014071	.279	.0585	.0357	1.0922	1803.8	2.19480	.008077	.045
.9750	.002114	.235	.0874	.0432	1.2133	1887.6	2.29490	.008535	.0[illegible]
.9700	.002645	.164	.1089	.0477	1.3141	1948.0	2.36671	.008790	.052
.9650	.003286	.101	.1223	.0500	1.4050	1998.6	2.42657	.008930	.059
.9600	.003763	.049	.1288	.0508	1.4907	2044.9	2.48102	.009000	.069
.9550	.003849	.020	.1309	.0507	1.5737	2089.5	2.53321	.009029	.101
.9500	.003849	.020	.1314	.0502	1.6555	2133.6	2.58667	.009040	.103
.9400	.003849	.068	.1495	.0507	1.8152	2220.4	2.68492	.009145	.112
.9300	.004279	.203	.1685	.0545	1.9634	2297.7	2.77331	.009369	.148
.9200	.005465	.253	.2013	.0600	2.0937	2360.0	2.84368	.009654	.178
.9100	.006710	.253	.259	.0647	2.2077	2409.8	2.89942	.009895	.221
.9000	.007744	.183	.296	.0676	2.3100	2451.9	2.94597	.010067	.258
.8800	.008917	.08[illegible]	.333	.0686	2.4943	2525.2	3.02576	.010248	.334
.8600	.009552	.094	.349	.0670	2.6640	2593.4	3.09832	.010350	.333
.8400	.010944	.201	.387	.0674	2.8209	2657.3	3.16472	.010519	.389
.8200	.013122	.267	.457	.0698	2.9608	2713.0	3.22125	.010756	.480
.8000	.015549	.247	.528	.0714	3.0837	2760.4	3.26821	.010972	.585
.7800	.017424	.188	.577	.0709	3.1937	2802.5	3.30883	.011127	.679
.7600	.018684	.144	.603	.0688	3.2947	2841.8	3.34587	.011233	.735
.7400	.019777	.107	.621	.0663	3.3888	2879.8	3.38072	.011320	.802
.7200	.02126	.232	.651	.0642	3.4765	2916.5	3.41346	.011428	.887
.7000	.02350	.301	.698	.0628	3.5572	2951.2	3.44355	.011579	1.007
.6800	.02618	.335	.755	.0617	3.6306	2983.3	3.47067	.011731	1.155
.6600	.02888	.328	.809	.0601	3.6973	3013.1	3.49510	.011874	1.313
.6400	.03127	.289	.849	.0579	3.7581	3041.2	3.51741	.011996	1.465
.6200	.03326	.277	.875	.0552	3.8142	3068.2	3.53820	.012100	1.609
.6000	.03507	.28[illegible]	.893	.0522	3.8661	3094.6	3.55784	.012196	1.7[illegible]
.5800	.03700	.329	.912	.0493	3.9142	3120.4	3.57647	.012294	1.917
.5600	.03953	.394	.939	.0467	3.9585	3145.6	3.59405	.012405	2.118
.5400	.04256	.460	.975	.0442	3.9992	3170.0	3.61047	.012527	2.3[illegible]
.5200	.04603	.508	1.016	.0418	4.0363	3193.5	3.62570	.012657	2.65[illegible]
.5000	.04968	.532	1.054	.0394	4.0700	3216.1	3.63979	.012788	2.9[illegible]
.4800	.05327	.540	1.085	.0368	4.1006	3238.0	3.65289	.012900	3.329
.4600	.05672	.554	1.107	.0342	4.1283	3259.3	3.66515	.013002	3.699
.4400	.06013	.583	1.122	.0315	4.1536	3280.3	3.67669	.013139	4.099
.4200	.06370	.640	1.135	.0289	4.1766	3301.1	3.68760	.013252	4.550
.4000	.06773	.725	1.149	.0263	4.1973	3321.6	3.69789	.013377	5.079
.3800	.07240	.83	1.167	.0240	4.2161	3341.9	3.70756	.013508	5.716
.3600	.07781	.95	1.188	.0217	4.2328	3361.9	3.71661	.013648	6.484
.3400	.08391	1.06	1.210	.0195	4.2476	3381.6	3.72502	.013798	7.404
.3200	.09058	1.18	1.230	.0174	4.2608	3400.9	3.73284	.013948	8.492
.3000	.09777	1.30	1.244	.0154	4.2723	3420.1	3.74009	.014105	9.727
.2800	.10549	1.45	1.253	.0135	4.2824	3439.1	3.74683	.014266	11.304
.2600	.11397	1.54	1.257	.0116	4.2911	3458.1	3.75310	.014434	13.150
.2400	.12355	1.89	1.258	.0099	4.2986	3477.1	3.75891	.014613	15.44[illegible]
.2200	.13471	2.23	1.257	.0083	4.3050	3496.3	3.76429	.014806	18.370
.2000	.14798	2.56	1.255	.0069	4.3104	3515.6	3.76924	.015014	22.197
.1800	.16395	3.21	1.252	.0056	4.3149	3535.1	3.77378	.015247	27.34[illegible]
.1600	.18336	3.91	1.245	.0044	4.3185	3555.0	3.77791	.015504	34.360
.1400	.2073	4.74	.231	.0033	4.3214	3575.8	3.78164	.01579[illegible]	44.412
.1200	.2375	6.19	.209	.0024	4.3236	3596.8	3.78501	.016109	59.374
.1000	.2777	8.17	1.178	.0017	4.3253	3619.5	3.78803	.016485	83.297
.0900	.3035	9.54	1.159	.0013	4.3260	3631.6	3.78942	.016701	101.183
.0800	.3354	11.29	1.138	.0011	4.3265	3644.6	3.79074	.016943	125.77[illegible]
.0700	.3760	13.58	1.117	.0008	4.3270	3658.6	3.79200	.017218	161.14[illegible]
.0600	.4305	16.88	1.096	.0006	4.3274	3674.2	3.79320	.017540	215.23
.0500	.5088	20.72	1.079	.0004	4.3277	3692.4	3.79435	.017928	305.26
.0400	.6322	26.19	1.073	.0003	4.3280	3715.0	3.79549	.018417	474.14
.0300	.8458	32.83	1.077	.0001	4.3282	3745.8	3.79662	.019060	845.77
.0200	1.2503	39.25	1.081	.0001	4.3284	3795.8	3.79783	.019940	1875.51
.0100	2.4028	43.58	1.019	.0000	4.3285	3927.4	3.79950	.021443	7208.4

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -2.0^\circ$, $e_i = 0.05337$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\frac{z}{\bar{V}}$
1.0200	0.0000010	2.000	0.0000	0.0011	0	0	0	0	0.000
1.0205	.0000026	1.930	.0001	.0017	.001[illegible]	25.0	.03110	.001067	.000
1.0210	.0000069	1.855	.0002	.0028	.002[illegible]	51.0	.06362	.002141	.000
1.0215	.0000184	1.774	.0004	.0045	.0075	78.7	.09813	.003235	.001
1.0220	.0000517	1.682	.0014	.0076	.0136	109.2	.13618	.004383	.002
1.0225	.0001834	1.559	.0054	.0143	.0291	148.9	.18584	.005788	.005
1.0226.5	.0004008	1.477	.0123	.0212	.0460	175.2	.21863	.006657	.012
1.0225	.0007382	1.410	.0224	.0287	.0654	196.7	.24557	.007335	.022
1.0220	.0013133	1.345	.0403	.0383	.0915	217.8	.27186	.007969	.039
1.0210	.002180	1.284	.0668	.0492	.1232	237.9	.29698	.008544	.064
1.0200	.002944	1.250	.0901	.0570	.1468	250.1	.31217	.008880	.087
1.0150	.006324	1.169	.1926	.0825	.2296	282.7	.35273	.009735	.187
1.0100	.009428	1.137	.286	.0995	.2898	300.7	.37507	.010184	.280
1.0050	.012420	1.124	.375	.1128	.3397	313.6	.39088	.010496	.371
1.0000	.015356	1.120	.461	.1239	.3834	323.6	.40322	.010737	.461
.9950	.018264	1.123	.545	.1335	.4226	331.9	.41335	.010935	.551
.9900	.02116	1.130	.629	.1419	.4585	339.0	.42197	.011105	.641
.9800	.02698	1.155	.793	.1562	.5225	350.8	.43608	.011386	.825
.9700	.03288	1.188	.957	.1680	.5790	360.2	.44740	.011617	1.016
.9600	.03890	1.228	1.120	.1781	.6296	368.2	.45681	.011815	1.216
.9500	.04507	1.272	1.285	.1868	.6755	375.1	.46484	.011990	1.423
.9400	.05141	1.320	1.450	.1942	.7179	381.2	.47183	.012148	1.641
.9300	.05792	1.371	1.616	.2007	.7569	386.5	.47799	.012293	1.868
.9200	.06464	1.424	1.784	.2064	.7932	391.4	.48348	.012427	2.108
.9100	.07155	1.479	1.953	.2113	.8270	395.8	.48841	.012552	2.359
.9000	.07867	1.535	2.12	.2155	.8587	399.9	.49289	.012669	2.622
.8800	.09354	1.652	2.47	.2222	.9164	407.1	.50071	.012887	3.189
.8600	.10927	1.774	2.82	.2267	.9675	413.3	.50735	.013085	3.812
.8400	.12587	1.900	3.17	.2294	1.0139	418.8	.51307	.013268	4.495
.8200	.14334	2.029	3.53	.2305	1.0554	423.7	.51806	.013440	5.244
.8000	.16165	2.161	3.88	.2302	1.0931	428.2	.52246	.013601	6.062
.7800	.18080	2.296	4.23	.2285	1.1272	432.2	.52639	.013753	6.954
.7600	.2008	2.439	4.58	.2256	1.1584	436.0	.52991	.013898	7.926
.7400	.2215	2.576	4.92	.2217	1.1869	439.5	.53308	.014037	8.984
.7200	.2431	2.721	5.25	.2169	1.2130	442.7	.53597	.014171	10.129
.7000	.2654	2.870	5.57	.2112	1.2369	445.7	.53861	.014300	11.374
.6800	.2884	3.02	5.88	.2048	1.2588	448.6	.54104	.014424	12.724
.6600	.3121	3.18	6.18	.1977	1.2790	451.3	.54327	.014545	14.188
.6400	.3365	3.34	6.46	.1901	1.2975	453.9	.54534	.014663	15.775
.6200	.3615	3.51	6.72	.1820	1.3146	456.4	.54726	.014778	17.494
.6000	.3872	3.68	6.97	.1735	1.3303	458.9	.54905	.014891	19.359
.5800	.4134	3.86	7.19	.1647	1.3447	461.2	.55073	.015001	21.383
.5600	.4401	4.05	7.39	.1557	1.3580	463.4	.55230	.015110	23.578
.5400	.4674	4.24	7.57	.1465	1.3702	465.6	.55378	.015217	25.954
.5200	.4950	4.45	7.72	.1372	1.3814	467.8	.55517	.015323	28.560
.5000	.5232	4.66	7.85	.1279	1.3917	469.9	.55649	.015428	31.379
.4800	.5516	4.89	7.94	.1186	1.4012	472.0	.55774	.015532	34.477
.4600	.5804	5.13	8.01	.1093	1.4098	474.1	.55892	.015636	37.855
.4400	.6095	5.38	8.05	.1003	1.4178	476.1	.56005	.015740	41.558
.4200	.6388	5.66	8.05	.0914	1.4250	478.2	.56112	.015843	45.629
.4000	.6682	5.95	8.02	.0827	1.4315	480.3	.56215	.015948	50.119
.3800	.6978	6.26	7.95	.0744	1.4375	482.3	.56313	.016053	55.088
.3600	.7273	6.60	7.86	.0663	1.4429	484.4	.56408	.016159	60.610
.3400	.7568	6.97	7.72	.0586	1.4478	486.6	.56498	.016266	66.777
.3200	.7861	7.38	7.55	.0514	1.4522	488.7	.56585	.016376	73.700
.3000	.8152	7.83	7.34	.0445	1.4561	491.0	.56669	.016488	81.521
.2800	.8439	8.34	7.09	.0381	1.4596	493.3	.56750	.016603	90.420
.2600	.8722	8.91	6.80	.0322	1.4627	495.7	.56829	.016722	100.634
.2400	.8998	9.57	6.48	.0268	1.4654	498.2	.56905	.016846	112.475
.2200	.9267	10.33	6.12	.0219	1.4678	500.9	.56979	.016975	126.368
.2000	.9527	11.22	5.72	.0175	1.4698	503.7	.57050	.017112	142.906
.1800	.9777	12.30	5.28	.0136	1.4716	506.8	.57121	.017258	162.949
.1600	1.0016	13.62	4.81	.0103	1.4731	510.2	.57189	.017415	187.693
.1400	1.0244	15.31	4.30	.0074	1.4743	514.0	.57257	.017589	219.50
.1200	1.0464	17.53	3.77	.0051	1.4753	518.4	.57323	.017784	261.59
.1000	1.0689	20.63	3.21	.0033	1.4760	523.6	.57389	.018010	320.67
.0900	1.0813	22.70	2.92	.0025	1.4764	526.6	.57422	.018140	360.43
.0800	1.0957	25.29	2.63	.0019	1.4767	530.1	.57454	.018285	410.89
.0700	1.1141	28.64	2.34	.0014	1.4769	534.1	.57487	.018452	477.48
.0600	1.1408	33.14	2.05	.0009	1.4771	539.0	.57520	.018650	570.38
.0500	1.1855	39.53	1.778	.0006	1.4773	545.2	.57564	.018895	711.29
.0400	1.2748	49.21	1.530	.0004	1.4774	553.8	.57588	.019224	956.14
.0300	1.4899	64.56	1.341	.0002	1.4776	567.8	.57620	.019717	1489.86
.0200	2.0009	83.51	1.201	.0001	1.4777	595.0	.57641	.020495	3001.3
.0100	3.4903	96.00	1.047	.0000	1.4778	677.5	.57645	.021883	10470.8

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -3.0^{\circ}$, $e_i = 0.06608$

$\bar{V}$	Z	$-\gamma$ deg	$-\frac{\dot{\bar{r}}}{\bar{g}}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\Delta\theta}{T}$	$\frac{-\Delta\gamma}{T}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0200	0.0000010	3.000	0.0000	0.0011	0	0	0	0	0.000
1.0205	.0000026	2.974	.0001	.0017	.0008	16.5	.02050	.001066	.000
1.0210	.0000068	2.906	.0002	.0028	.0022	33.3	.04143	.002137	.000
1.0215	.0000182	2.855	.0006	.0045	.0044	50.5	.06296	.003220	.001
1.0220	.0000496	2.800	.0015	.0074	.0083	68.6	.08552	.004335	.001
1.0225	.0001481	2.736	.0043	.0129	.0156	88.7	.11066	.005551	.004
1.02291	.0007169	2.644	.0220	.0283	.0371	118.6	.14792	.007302	.021
1.0225	.002004	2.581	.0615	.0473	.0644	138.7	.17296	.008445	.059
1.0220	.002941	2.598	.0902	.0573	.0799	146.2	.18237	.008867	.086
1.0210	.004578	2.531	.1402	.0713	.0998	155.1	.19355	.009364	.135
1.0200	.006090	2.515	.1864	.0820	.1161	161.0	.20078	.009683	.179
1.0150	.013093	2.475	.399	.1188	.1730	176.8	.22044	.010539	.387
1.0100	.019755	2.460	.599	.1441	.2154	185.4	.23117	.011001	.587
1.0050	.02627	2.454	.792	.1641	.2499	191.5	.23868	.011324	.784
1.0000	.03270	2.452	.981	.1808	.2799	196.3	.24449	.011572	.981
.9950	.03907	2.453	1.166	.1952	.3068	200.2	.24924	.011776	1.178
.9900	.04540	2.457	1.348	.2078	.3313	203.5	.25383	.011948	1.376
.9800	.05795	2.468	1.704	.2289	.3750	209.0	.25983	.012231	1.774
.9700	.07041	2.484	2.05	.2459	.4135	213.4	.26510	.012458	2.178
.9600	.08280	2.502	2.38	.2598	.4481	217.1	.26950	.012650	2.588
.9500	.09515	2.523	2.71	.2713	.4797	220.4	.27329	.012816	3.005
.9400	.10745	2.546	3.03	.2808	.5089	223.2	.27661	.012963	3.429
.9300	.11973	2.570	3.34	.2886	.5359	225.8	.27956	.013095	3.862
.9200	.13199	2.596	3.64	.2950	.5612	228.2	.28223	.013216	4.304
.9100	.14424	2.623	3.94	.3000	.5849	230.4	.28466	.013326	4.755
.9000	.15647	2.651	4.22	.3040	.6073	232.4	.28689	.013429	5.216
.8800	.18092	2.711	4.78	.3090	.6483	236.1	.29087	.013615	6.168
.8600	.2054	2.775	5.30	.3108	.6866	239.3	.29434	.013781	7.165
.8400	.2298	2.843	5.79	.3100	.7194	242.3	.29742	.013933	8.207
.8200	.2543	2.914	6.26	.3070	.7504	245.0	.30019	.014072	9.304
.8000	.2787	2.990	6.69	.3022	.7788	247.6	.30271	.014201	10.451
.7800	.3032	3.069	7.10	.2959	.8050	249.9	.30501	.014323	11.662
.7600	.3278	3.152	7.47	.2883	.8291	252.2	.30713	.014438	12.938
.7400	.3523	3.240	7.82	.2796	.8516	254.4	.30910	.014546	14.284
.7200	.3769	3.332	8.14	.2701	.8723	256.4	.31093	.014654	15.705
.7000	.4015	3.429	8.43	.2598	.8916	258.4	.31265	.014755	17.208
.6800	.4261	3.531	8.69	.2489	.9095	260.3	.31427	.014853	18.800
.6600	.4508	3.638	8.93	.2376	.9262	262.2	.31580	.014949	20.489
.6400	.4754	3.752	9.13	.2259	.9417	264.0	.31734	.015042	22.284
.6200	.5000	3.872	9.30	.2140	.9561	265.8	.31861	.015134	24.194
.6000	.5246	3.997	9.44	.2020	.9695	267.6	.31992	.015224	26.231
.5800	.5492	4.13	9.56	.1899	.9819	269.3	.32117	.015312	28.407
.5600	.5737	4.27	9.64	.1778	.9935	271.0	.32236	.015400	30.736
.5400	.5982	4.42	9.69	.1657	1.0042	272.7	.32350	.015486	33.234
.5200	.6226	4.59	9.71	.1539	1.0142	274.4	.32460	.015573	35.920
.5000	.6469	4.76	9.70	.1422	1.0234	276.1	.32565	.015659	38.815
.4800	.6711	4.94	9.66	.1308	1.0319	277.8	.32667	.015745	41.944
.4600	.6952	5.14	9.59	.1197	1.0398	279.5	.32765	.015832	45.337
.4400	.7190	5.35	9.49	.1089	1.0470	281.2	.32860	.015918	49.026
.4200	.7427	5.58	9.36	.0986	1.0537	283.0	.32951	.016006	53.053
.4000	.7662	5.84	9.19	.0886	1.0598	284.8	.33040	.016095	57.465
.3800	.7894	6.11	9.00	.0791	1.0654	286.6	.33126	.016185	62.320
.3600	.8123	6.41	8.77	.0701	1.0704	288.5	.33210	.016277	67.689
.3400	.8348	6.75	8.51	.0616	1.0751	290.4	.33291	.016371	73.658
.3200	.8569	7.12	8.23	.0536	1.0792	292.4	.33371	.016467	80.336
.3000	.8786	7.54	7.91	.0462	1.0830	294.4	.33448	.016567	87.858
.2800	.8997	8.01	7.56	.0394	1.0864	296.6	.33524	.016670	96.397
.2600	.9203	8.55	7.18	.0331	1.0894	298.8	.33597	.016777	106.183
.2400	.9401	9.17	6.77	.0274	1.0920	301.2	.33670	.016890	117.517
.2200	.9593	9.90	6.33	.0222	1.0944	303.8	.33741	.017009	130.813
.2000	.9777	10.77	5.87	.0177	1.0964	306.5	.33811	.017136	146.649
.1800	.9952	11.82	5.37	.0137	1.0981	309.6	.33879	.017273	165.866
.1600	1.0119	13.13	4.86	.0103	1.0996	312.9	.33947	.017422	189.739
.1400	1.0281	14.80	4.32	.0074	1.1008	316.7	.34014	.017588	220.30
.1200	1.0441	17.03	3.76	.0051	1.1018	321.0	.34080	.017777	261.03
.1000	1.0616	20.14	3.18	.0033	1.1025	326.2	.34146	.017998	318.49
.0900	1.0720	22.23	2.89	.0025	1.1029	329.3	.34179	.018126	357.33
.0800	1.0848	24.85	2.60	.0019	1.1031	332.8	.34212	.018270	406.80
.0700	1.1022	28.24	2.31	.0014	1.1034	336.8	.34246	.018436	472.37
.0600	1.1286	32.81	2.03	.0009	1.1036	341.7	.34279	.018633	564.30
.0500	1.1742	39.30	1.761	.0006	1.1038	348.0	.34313	.018880	704.52
.0400	1.2662	49.13	1.520	.0004	1.1039	356.8	.34348	.019212	949.65
.0300	1.4867	64.63	1.338	.0002	1.1040	371.0	.34381	.019710	1486.78
.0200	2.0011	83.55	1.201	.0001	1.1042	398.2	.34402	.020490	3001.6
.0100	3.4903	90.00	1.047	.0000	1.1043	480.7	.34405	.021878	10470.9

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -4.0^\circ$, $e_i = 0.08056$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{\dot{\bar{V}}}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\dot{z}}{\bar{V}}$
1.0200	0.0000010	4.000	0.0000	0.0011	0	0	0	0	0.000
1.0205	.0000026	3.966	.0001	.0017	.0006	12.3	.01530	.001065	.000
1.0210	.0000068	3.930	.0002	.0028	.0016	24.8	.03080	.002135	.000
1.0215	.0000181	3.893	.0006	.0045	.0033	37.4	.04658	.003214	.001
1.0220	.0000487	3.853	.0015	.0074	.0060	50.5	.06285	.004315	.001
1.0225	.0001393	3.810	.0043	.0125	.0110	64.4	.08027	.005482	.004
1.0230	.0005420	3.753	.0166	.0246	.0230	82.8	.10311	.006992	.016
1.02308	.0010092	3.726	.0310	.0336	.0320	91.2	.11367	.007682	.030
1.0230	.0016878	3.703	.0518	.0435	.0419	98.3	.12247	.008254	.049
1.0220	.004622	3.659	.1417	.0718	.0709	112.3	.14002	.009383	.136
1.0210	.006932	3.642	.212	.0877	.0875	118.0	.14713	.009836	.204
1.0200	.009098	3.631	.278	.1002	.1007	121.9	.15191	.010140	.268
1.0150	.019239	3.605	.586	.1440	.1480	132.5	.16516	.010978	.569
1.0100	.02895	3.595	.877	.1744	.1825	138.5	.17247	.011437	.860
1.0050	.03848	3.590	1.160	.1986	.2109	142.6	.17759	.011759	1.149
1.0000	.04788	3.589	1.437	.2188	.2357	145.9	.18155	.012007	1.436
.9950	.05720	3.590	1.708	.2362	.2579	148.5	.18479	.012210	1.725
.9900	.06645	3.592	1.974	.2514	.2782	150.8	.18753	.012383	2.014
.9800	.08478	3.600	2.49	.2768	.3143	154.5	.19202	.012664	2.595
.9700	.10291	3.611	3.00	.2973	.3462	157.6	.19562	.012891	3.183
.9600	.12087	3.623	3.48	.3139	.3748	160.1	.19863	.013081	3.777
.9500	.13869	3.638	3.95	.3276	.4010	162.3	.20122	.013246	4.380
.9400	.15636	3.653	4.41	.3388	.4251	164.3	.20350	.013391	4.990
.9300	.17390	3.670	4.85	.3478	.4475	166.1	.20553	.013522	5.610
.9200	.19132	3.688	5.28	.3551	.4685	167.7	.20736	.013639	6.239
.9100	.2086	3.706	5.69	.3608	.4882	169.2	.20904	.013747	6.877
.9000	.2258	3.726	6.10	.3651	.5068	170.6	.21058	.013847	7.527
.8800	.2598	3.767	6.86	.3703	.5412	173.2	.21334	.014028	8.857
.8600	.2933	3.812	7.57	.3714	.5722	175.4	.21577	.014189	10.231
.8400	.3263	3.859	8.22	.3694	.6005	177.5	.21793	.014333	11.655
.8200	.3589	3.910	8.83	.3648	.6265	179.5	.21988	.014466	13.132
.8000	.3911	3.963	9.39	.3580	.6505	181.3	.22166	.014589	14.665
.7800	.4227	4.020	9.89	.3494	.6726	183.0	.22331	.014703	16.259
.7600	.4539	4.080	10.35	.3393	.6931	184.6	.22483	.014811	17.919
.7400	.4846	4.143	10.76	.3279	.7122	186.1	.22625	.014914	19.648
.7200	.5149	4.211	11.12	.3156	.7299	187.6	.22759	.015011	21.453
.7000	.5446	4.282	11.44	.3025	.7464	189.1	.22885	.015105	23.339
.6800	.5738	4.357	11.71	.2888	.7618	190.5	.23005	.015195	25.314
.6600	.6024	4.437	11.93	.2747	.7762	191.9	.23118	.015283	27.384
.6400	.6306	4.522	12.11	.2602	.7896	193.3	.23227	.015367	29.558
.6200	.6581	4.612	12.24	.2456	.8022	194.6	.23330	.015450	31.845
.6000	.6851	4.708	12.33	.2308	.8138	196.0	.23430	.015531	34.255
.5800	.7115	4.811	12.38	.2161	.8248	197.3	.23526	.015611	36.801
.5600	.7372	4.921	12.39	.2015	.8349	198.6	.23618	.015689	39.495
.5400	.7624	5.04	12.35	.1871	.8444	200.0	.23707	.015767	42.353
.5200	.7868	5.17	12.27	.1730	.8532	201.3	.23793	.015844	45.392
.5000	.8105	5.30	12.16	.1592	.8614	202.6	.23877	.015921	48.633
.4800	.8336	5.45	12.00	.1457	.8691	204.0	.23958	.015997	52.098
.4600	.8558	5.61	11.81	.1328	.8761	205.4	.24037	.016074	55.814
.4400	.8773	5.78	11.58	.1203	.8827	206.8	.24114	.016151	59.815
.4200	.8979	5.97	11.31	.1083	.8887	208.2	.24190	.016228	64.138
.4000	.9177	6.18	11.01	.0969	.8942	209.7	.24263	.016307	68.827
.3800	.9365	6.41	10.68	.0861	.8994	211.2	.24336	.016386	73.938
.3600	.9544	6.67	10.31	.0760	.9040	212.8	.24406	.016467	79.537
.3400	.9713	6.95	9.91	.0664	.9083	214.5	.24476	.016550	85.705
.3200	.9871	7.28	9.48	.0576	.9122	216.2	.24544	.016636	92.544
.3000	1.0018	7.64	9.02	.0493	.9157	218.0	.24612	.016724	100.182
.2800	1.0153	8.05	8.53	.0418	.9188	219.9	.24678	.016815	108.783
.2600	1.0276	8.53	8.02	.0349	.9217	221.9	.24744	.016911	118.565
.2400	1.0385	9.09	7.48	.0288	.9242	224.0	.24809	.017012	129.613
.2200	1.0481	9.76	6.92	.0232	.9264	226.3	.24873	.017118	142.919
.2000	1.0562	10.55	6.34	.0184	.9283	228.9	.24937	.017233	158.435
.1800	1.0630	11.53	5.74	.0142	.9300	231.7	.25001	.017357	177.165
.1600	1.0684	12.76	5.13	.0106	.9314	234.8	.25065	.017494	200.33
.1400	1.0728	14.35	4.51	.0076	.9326	238.4	.25128	.017647	229.89
.1200	1.0768	16.49	3.88	.0052	.9335	242.6	.25192	.017822	269.20
.1000	1.0820	19.53	3.25	.0033	.9343	247.6	.25256	.018030	324.60
.0900	1.0863	21.57	2.93	.0025	.9346	250.6	.25289	.018151	362.10
.0800	1.0932	24.16	2.62	.0019	.9349	254.0	.25322	.018289	409.95
.0700	1.1049	27.54	2.32	.0014	.9351	258.0	.25355	.018449	473.53
.0600	1.1259	32.11	2.03	.0009	.9353	262.9	.25388	.018642	562.95
.0500	1.1669	38.65	1.750	.0006	.9355	269.2	.25423	.018884	700.14
.0400	1.2563	48.63	1.508	.0004	.9357	278.0	.25458	.019214	942.23
.0300	1.4795	64.44	1.332	.0002	.9358	292.3	.25491	.019715	1479.47
.0200	2.0005	83.55	1.200	.0001	.9359	319.8	.25512	.020501	3000.7
.0100	3.4903	90.00	1.047	.0000	.9360	402.3	.25516	.021890	10470.8

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-8}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -5.0^\circ$, $e_i = 0.09600$

$\bar{V}$	Z	$\frac{\bar{V}}{\bar{u}_a}$	$-\frac{\bar{u}_r}{\bar{V}}$	$\bar{q}$	$\bar{\xi}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta\psi}{r}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0200	0.0000010	[illegible]	[illegible]	0.0011	0	0	0	0	0.000
1.0200	.0000026	[illegible]	[illegible]	.0017	.0005	[illegible]	.01221	.001065	.000
1.0200	.0000068	[illegible]	[illegible]	.0024	.0014	[illegible]	.02453	.002134	.000
1.0200	.0000180	[illegible]	[illegible]	.0045	.0026	[illegible]	.03701	.003210	.001
1.0200	.0000482	[illegible]	[illegible]	.0073	.0048	[illegible]	.04977	.004304	.001
1.0200	.0001350	[illegible]	[illegible]	.0123	.0086	[illegible]	.06320	.005448	.004
1.0200	.0004516	[illegible]	[illegible]	.0225	.0164	[illegible]	.07906	.006789	.013
1.0200	.0012924	[illegible]	[illegible]	.0381	.0286	[illegible]	.09300	.007957	.038
1.0200	.002814	[illegible]	[illegible]	.0562	.0428	[illegible]	.10338	.008822	.083
1.0200	.004702	[illegible]	[illegible]	.0725	.0557	[illegible]	.11015	.009383	.138
1.0200	.006325	[illegible]	[illegible]	.0840	.0649	[illegible]	.11425	.009722	.186
1.0200	.009276	[illegible]	[illegible]	.1015	.0791	[illegible]	.11944	.010151	.273
1.0200	.012067	[illegible]	[illegible]	.1154	.0904	[illegible]	.12301	.010444	.355
1.0150	.02519	[illegible]	[illegible]	.1647	.1316	[illegible]	.13304	.011268	.745
1.0100	.03790	[illegible]	[illegible]	.1983	.1618	[illegible]	.13862	.011724	1.123
1.0050	.05018	[illegible]	[illegible]	.2265	.1867	[illegible]	.14254	.012044	1.498
1.0000	.06241	[illegible]	[illegible]	.2498	.2084	[illegible]	.14558	.012292	1.872
.9950	.07452	[illegible]	[illegible]	.2696	.2278	[illegible]	.14806	.012495	2.247
.9900	.08655	[illegible]	[illegible]	.2869	.2456	[illegible]	.15016	.012666	2.623
.9800	.11035	[illegible]	[illegible]	.3158	.2772	[illegible]	.15360	.012948	3.375
.9700	.13355	[illegible]	[illegible]	.3391	.3052	[illegible]	.15637	.013174	4.140
.9600	.15715	[illegible]	[illegible]	.3580	.3303	[illegible]	.15868	.013363	4.911
.9500	.18020	[illegible]	[illegible]	.3734	.3533	[illegible]	.16067	.013527	5.690
.9400	.2030	[illegible]	[illegible]	.3860	.3744	[illegible]	.16242	.013671	6.477
.9300	.2255	[illegible]	[illegible]	.3962	.3941	[illegible]	.16398	.013801	7.278
.9200	.2480	[illegible]	[illegible]	.4043	.4125	[illegible]	.16540	.013918	8.088
.9100	.2702	[illegible]	[illegible]	.4106	.4298	[illegible]	.16669	.014025	8.908
.9000	.2922	[illegible]	[illegible]	.4154	.4462	[illegible]	.16788	.014124	9.740
.8800	.3355	[illegible]	[illegible]	.4208	.4764	[illegible]	.17001	.014303	11.439
.8600	.3751	[illegible]	[illegible]	.4217	.5037	[illegible]	.17188	.014461	13.188
.8400	.4198	[illegible]	[illegible]	.4190	.5287	[illegible]	.17356	.014603	14.991
.8200	.4600	[illegible]	[illegible]	.4132	.5516	[illegible]	.17508	.014733	16.852
.8000	.5006	[illegible]	[illegible]	.4050	.5727	[illegible]	.17647	.014853	18.774
.7800	.5395	[illegible]	[illegible]	.3948	.5923	[illegible]	.17775	.014965	20.762
.7600	.5761	[illegible]	[illegible]	.3829	.6105	[illegible]	.17894	.015070	22.819
.7400	.6155	[illegible]	[illegible]	.3696	.6274	[illegible]	.18006	.015170	24.952
.7200	.6580	[illegible]	[illegible]	.3552	.6431	[illegible]	.18111	.015264	27.165
.7000	.6875	[illegible]	[illegible]	.3399	.6575	[illegible]	.18211	.015354	29.465
.6800	.7221	[illegible]	[illegible]	.3240	.6715	[illegible]	.18306	.015441	31.858
.6600	.7557	[illegible]	[illegible]	.3076	.6843	[illegible]	.18396	.015525	34.352
.6400	.7884	[illegible]	[illegible]	.2909	.6963	[illegible]	.18482	.015606	36.954
.6200	.8199	[illegible]	[illegible]	.2741	.7075	[illegible]	.18565	.015685	39.674
.6000	.8504	[illegible]	[illegible]	.2572	.7180	[illegible]	.18645	.015762	42.522
.5800	.8798	[illegible]	[illegible]	.2403	.7278	[illegible]	.18722	.015837	45.509
.5600	.9081	[illegible]	[illegible]	.2236	.7370	[illegible]	.18797	.015911	48.649
.5400	.9352	[illegible]	[illegible]	.2072	.7455	[illegible]	.18869	.015985	51.957
.5200	.9611	[illegible]	[illegible]	.1912	.7535	[illegible]	.18940	.016057	55.449
.5000	.9858	[illegible]	[illegible]	.1755	.7609	[illegible]	.19008	.016129	59.146
.4800	1.0091	[illegible]	[illegible]	.1604	.7676	[illegible]	.19075	.016200	63.069
.4600	1.0311	[illegible]	[illegible]	.1457	.7743	[illegible]	.19140	.016271	67.245
.4400	1.0517	[illegible]	[illegible]	.1317	.7802	[illegible]	.19204	.016342	71.706
.4200	1.0708	[illegible]	[illegible]	.1183	.7857	[illegible]	.19267	.016414	76.496
.4000	1.0884	[illegible]	[illegible]	.1056	.7908	[illegible]	.19329	.016487	81.631
.3800	1.1044	[illegible]	[illegible]	.0936	.7955	[illegible]	.19390	.016560	87.193
.3600	1.1188	[illegible]	[illegible]	.0823	.7998	[illegible]	.19450	.016634	93.234
.3400	1.1314	[illegible]	[illegible]	.0717	.8038	[illegible]	.19509	.016710	99.833
.3200	1.1423	[illegible]	[illegible]	.0619	.8074	[illegible]	.19568	.016788	107.087
.3000	1.1512	[illegible]	[illegible]	.0529	.8106	[illegible]	.19627	.016868	115.118
.2800	1.1581	8.37	9.73	.0446	.8136	[illegible]	.19684	.016952	124.082
.2600	1.1629	8.79	9.07	.0372	.8162	[illegible]	.19742	.017039	134.185
.2400	1.1658	9.29	8.39	.0305	.8186	[illegible]	.19800	.017130	145.700
.2200	1.1660	9.88	7.70	.0245	.8207	[illegible]	.19857	.017227	158.998
.2000	1.1640	10.60	6.98	.0193	.8225	[illegible]	.19915	.017331	174.605
.1800	1.1597	11.49	6.26	.0148	.8241	[illegible]	.19973	.017444	193.282
.1600	1.1530	12.62	5.53	.0110	.8254	[illegible]	.20031	.017569	216.19
.1400	1.1443	14.09	4.81	.0078	.8264	[illegible]	.20090	.017709	245.20
.1200	1.1340	16.11	4.09	.0053	.8273	[illegible]	.20150	.017870	283.51
.1000	1.1241	19.00	3.37	.0034	.8282	[illegible]	.20212	.018063	337.22
.0900	1.1204	[illegible]	3.03	.0026	.8286	[illegible]	.20243	.018176	373.46
.0800	1.1190	[illegible]	[illegible]	.0019	.8288	[illegible]	.20275	.018306	419.63
.0700	1.1222	[illegible]	[illegible]	.0014	.8291	[illegible]	.20307	.018457	480.94
.0600	1.1346	[illegible]	[illegible]	.0009	.8293	[illegible]	.20340	.018641	567.89
.0500	1.1670	[illegible]	1.751	.0006	.8294	[illegible]	.20374	.018874	700.19
.0400	1.2488	47.86	[illegible]	.0004	.8296	[illegible]	.20410	.019198	936.63
.0300	1.4705	[illegible]	[illegible]	.0002	.8297	[illegible]	.20444	.019699	1470.47
.0200	1.9993	[illegible]	1.200	.0001	.8298	[illegible]	.20465	.020491	2998.9
.0100	3.4903	40.00	[illegible]	.0000	.8300	[illegible]	.20469	.021880	6470.8

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(f) $\gamma_i = -8.0^\circ$, $e_i = 0.14481$

$\bar{V}$	z	γ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\xi}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\bar{V}}{r}$	$\sqrt{\bar{V}}\frac{Z}{\bar{V}}$
1.0200	0.0000010	8.000	0.0000	0.0011	0	0	[illegible]	0	0.000
1.0205	.0000026	7.993	.0001	.0017	.0003	6.1	.00758	.001065	.000
1.0210	.0000068	7.985	.0002	.0028	.0008	12.3	.01520	.002132	.000
1.0215	.0000179	7.947	.0005	.0045	.0016	18.5	.02288	.003205	.001
1.0220	.0000476	7.928	.0015	.0073	.0024	24.8	.03065	.004289	.001
1.0225	.0001296	7.909	.0040	.0120	.0052	31.3	.03866	.005402	.004
1.0230	.0003831	7.88[illegible]	.0118	.0207	.0093	38.3	.04733	.006606	.011
1.0234	.0021192	7.521	.0651	.0488	.0226	49.3	.06108	.008506	.062
1.0230	.006320	7.429	.1940	.0842	.0396	56.5	.06990	.009721	.185
1.0225	.009130	7.421	.280	.1010	.047[illegible]	58.9	.07285	.010126	.268
1.0220	.011697	7.416	.359	.1142	.054[illegible]	60.5	.07488	.010404	.343
1.0210	.016494	7.409	.505	.1353	.064[illegible]	62.8	.07768	.010788	.485
1.0200	.02107	7.400	.645	.1525	.072[illegible]	64.4	.07968	.011062	.620
1.0150	.04280	7.392	1.303	.2147	.104[illegible]	69.1	.08546	.011855	1.265
1.0100	.06374	7.359	1.932	.2588	.127[illegible]	71.8	.08874	.012303	1.893
1.0050	.08433	7.335	2.54	.2940	.146[illegible]	73.7	.09105	.012619	2.517
1.0000	.10468	7.306	3.14	.3235	.163[illegible]	75.1	.09285	.012865	3.140
.9950	.12484	7.276	3.73	.3489	.178[illegible]	76.4	.09432	.013066	3.764
.9900	.14483	7.244	4.30	.3711	.192[illegible]	77.4	.09557	.013237	4.389
.9800	.18442	7.191	5.42	.4083	.216[illegible]	79.1	.09761	.013517	5.645
.9700	.2235	7.140	6.50	.4381	.238[illegible]	80.5	.09926	.013742	6.912
.9600	.2621	7.092	7.55	.4623	.257[illegible]	81.7	.10063	.013930	8.191
.9500	.3003	7.038	8.56	.4820	.275[illegible]	82.7	.10182	.014093	9.483
.9400	.3380	7.8[illegible]	9.53	.4981	.291[illegible]	83.6	.10287	.014236	10.788
.9300	.3753	7.82[illegible]	10.47	.5110	.307[illegible]	84.5	.10380	.014365	12.108
.9200	.4122	7.81[illegible]	11.38	.5213	.321[illegible]	85.2	.10465	.014481	13.442
.9100	.4487	7.84[illegible]	12.25	.5292	.334[illegible]	85.9	.10542	.014587	14.793
.9000	.4848	7.849	13.09	.5350	.347[illegible]	86.6	.10613	.014685	16.159
.8800	.5556	7.868	14.67	.5415	.370[illegible]	87.7	.10741	.014862	18.941
.8600	.6247	7.884	16.12	.5421	.392[illegible]	88.8	.10854	.015018	21.792
.8400	.6921	7.911	17.44	.5380	.411[illegible]	89.8	.10954	.015158	24.718
.8200	.7578	7.915	18.64	.5300	.429[illegible]	90.7	.11046	.015285	27.723
.8000	.8216	7.960	19.72	.5189	.445[illegible]	91.6	.11130	.015402	30.811
.7800	.8836	7.98[illegible]	20.69	.5051	.461[illegible]	92.4	.11208	.015511	33.986
.7600	.9438	8.015	21.52	.4892	.475[illegible]	93.2	.11280	.015613	37.255
.7400	1.0021	8.046	22.25	.4716	.488[illegible]	93.9	.11349	.015710	40.624
.7200	1.0584	8.078	22.86	.4525	.501[illegible]	94.6	.11413	.015801	44.098
.7000	1.1126	8.113	23.37	.4324	.512[illegible]	95.3	.11474	.015888	47.685
.6800	1.1649	8.149	23.76	.4115	.523[illegible]	96.0	.11532	.015971	51.392
.6600	1.2150	8.189	24.06	.3901	.533[illegible]	96.7	.11588	.016051	55.227
.6400	1.2629	8.230	24.25	.3683	.542[illegible]	97.4	.11642	.016128	59.200
.6200	1.3086	8.275	24.34	.3463	.551[illegible]	98.1	.11693	.016203	63.321
.6000	1.3520	8.323	24.34	.3242	.5601	98.8	.11743	.016275	67.601
.5800	1.3930	8.375	24.24	.3024	.561[illegible]	99.4	.11791	.016346	72.054
.5600	1.4316	8.431	24.05	.2808	.5751	100.1	.11838	.016416	76.692
.5400	1.4676	8.492	23.78	.2596	.5813	100.8	.11884	.016484	81.534
.5200	1.5010	8.557	23.42	.2389	.5865	101.5	.11929	.016551	86.596
.5000	1.5317	8.628	22.97	.2188	.5942	102.2	.11972	.016617	91.899
.4800	1.5595	8.706	22.46	.1993	.5999	102.9	.12015	.016682	97.468
.4600	1.5844	8.791	21.86	.1806	.6055	103.7	.12057	.016747	103.330
.4400	1.6062	8.885	21.20	.1628	.6097	104.4	.12099	.016811	109.516
.4200	1.6249	8.988	20.47	.1457	.6142	105.2	.12140	.016876	116.064
.4000	1.6402	9.10[illegible]	19.69	.1296	.6184	106.1	.12181	.016941	123.018
.3800	1.6521	9.23	18.83	.1144	.6222	106.9	.12221	.017006	130.430
.3600	1.6604	9.3[illegible]	17.93	.1002	.625[illegible]	107.8	.12261	.017071	138.363
.3400	1.6648	9.54	16.98	.0870	.6296	108.8	.12301	.017138	146.892
.3200	1.6652	9.[illegible]	15.99	.0748	.6331	109.8	.12341	.017205	156.112
.3000	1.6614	9.74	14.95	.0635	.6348	110.8	.12380	.017275	166.139
.2800	1.6531	10.39	13.89	.0533	.637[illegible]	112.0	.12421	.017346	177.120
.2600	1.6401	10.49	12.79	.0441	.6394	113.2	.12461	.017419	189.248
.2400	1.6222	10.54	11.64	.0359	.6413	114.6	.12502	.017496	202.77
.2200	1.5989	11.26	10.55	.0287	.6433	116.1	.12543	.017577	217.04
.2000	1.5701	11.39	9.42	.0224	.6446	117.7	.12585	.017662	232.51
.1800	1.5353	12.45	8.29	.0170	.6466	119.6	.12628	.017754	249.88
.1600	1.4943	13.30	7.17	.0125	.6472	121.8	.12672	.017855	269.17
.1400	1.4468	14.14	6.08	.0088	.6482	124.4	.12718	.017968	290.03
.1200	1.3930	15.04	5.01	.0059	.6492	127.5	.12765	.018097	313.25
.1000	1.3337	16.40	4.00	.0037	.6499	131.4	.12815	.018251	339.12
.0900	1.3029	20.05	3.52	.0028	.6499	133.8	.12841	.018342	354.31
.0800	1.2725	22.20	3.05	.0020	.6502	136.6	.12869	.018447	371.18
.0700	1.2443	25.08	2.61	.0015	.6504	140.0	.12897	.018570	389.25
.0600	1.2223	29.12	2.20	.0010	.6504	144.2	.12927	.018722	411.16
.0500	1.2165	35.15	1.825	.0006	.650[illegible]	149.8	.12958	.018919	439.92
.0400	1.2558	44.40	1.507	.0004	.6504	157.9	.12992	.019202	474.84
.0300	1.4439	61.05	1.300	.0002	.6510	172.0	.13028	.019677	1443.91
.0200	1.9931	93.22	1.196	.0001	.6511	200.4	.13052	.020486	2494.6
.0100	3.4903	90.00	1.047	.0000	.6512	283.2	.13055	.021878	10[illegible]0.8

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -6.0^{\circ}$, $e_i = 0.11198$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{\dot{\gamma} r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\dot{V}_a}{g}$	$\frac{\dot{V}_w}{g}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.0200	0.000000[illegible]	6.000	0.0000	0.0011	0	0	0	0	0.000
1.0205	.000000[illegible]	5.97[illegible]	.0001	.0017	.0004	8.2	.01015	.00106[illegible]	.000
1.0210	.000000[illegible]	5.954	.0002	.0028	.0011	16.4	.02037	.0021[illegible]	.000
1.0215	.000001[illegible]	5.929	.0006	.0045	.0022	24.7	.03070	.0032[illegible]	.001
1.0220	.000004[illegible]	5.904	.0015	.0073	.0039	33.2	.04121	.0042[illegible]	.001
1.0225	.000013[illegible]	5.87[illegible]	.0041	.0122	.0070	42.0	.05216	.0054[illegible]	.004
1.0230	.000047[illegible]	5.846	.0128	.0216	.0130	52.0	.06454	.0066[illegible]	.012
1.02331	.001572[illegible]	5.808	.0483	.0420	.0261	63.6	.07902	.0081[illegible]	.046
1.0230	.003944	5.783	.1212	.0665	.0420	71.7	.08910	.0091[illegible]	.116
1.0225	.006613	5.770	.1883	.0828	.0525	75.6	.09388	.0096[illegible]	.180
1.0220	.008070	5.763	.248	.0949	.0605	77.1	.09696	.0099[illegible]	.237
1.0210	.011650	5.753	.357	.1137	.0730	81.3	.10103	.0104[illegible]	.342
1.0200	.015051	5.747	.461	.1289	.0831	83.6	.10386	.0106[illegible]	.443
1.0150	.03109	5.732	.947	.1830	.1201	90.1	.11194	.0115[illegible]	.919
1.0100	.04651	5.724	1.409	.2211	.1472	93.8	.11646	.0119[illegible]	1.332
1.0050	.06167	5.72[illegible]	1.859	.2515	.1697	96.4	.11964	.0122[illegible]	1.641
1.0000	.07664	5.72[illegible]	2.30	.2768	.1893	98.4	.12211	.0125[illegible]	2.279
.9950	.09148	5.72[illegible]	2.73	.2987	.2068	100.1	.12412	.0127[illegible]	2.758
.9900	.10620	5.72[illegible]	3.15	.3178	.2228	101.5	.12583	.0128[illegible]	3.218
.9800	.13533	5.72[illegible]	3.98	.3495	.2514	103.9	.12863	.0131[illegible]	4.143
.9700	.16412	5.734	4.78	.3754	.2766	105.7	.13088	.0133[illegible]	5.076
.9600	.19258	5.744	5.55	.3963	.2993	107.4	.13277	.0135[illegible]	6.018
.9500	.2207	5.75[illegible]	6.29	.4133	.3201	108.7	.13439	.0137[illegible]	6.970
.9400	.2486	5.76[illegible]	7.01	.4271	.3392	110.0	.13581	.0138[illegible]	7.934
.9300	.2762	5.77[illegible]	7.70	.4383	.3570	111.1	.13709	.0140[illegible]	8.908
.9200	.3034	5.78[illegible]	8.37	.4472	.3736	112.1	.13824	.0141[illegible]	9.895
.9100	.3304	5.79[illegible]	9.02	.4541	.3893	113.1	.13930	.0142[illegible]	10.893
.9000	.3571	5.80[illegible]	9.64	.4592	.4041	114.0	.14027	.0143[illegible]	11.905
.8800	.4097	5.83[illegible]	10.82	.4650	.4314	115.6	.14201	.0145[illegible]	13.968
.8600	.4612	5.86[illegible]	11.90	.4658	.4561	117.0	.14354	.0146[illegible]	16.087
.8400	.5115	5.89[illegible]	12.89	.4625	.4787	118.4	.14492	.0148[illegible]	18.267
.8200	.5606	5.92[illegible]	13.79	.4559	.4995	119.6	.14616	.0149[illegible]	20.510
.8000	.6086	5.95[illegible]	14.61	.4466	.5187	120.7	.14730	.0150[illegible]	22.821
.7800	.6553	5.99[illegible]	15.33	.4350	.5364	121.8	.14835	.0151[illegible]	25.205
.7600	.7009	6.03[illegible]	15.98	.4216	.5529	122.9	.14934	.0152[illegible]	27.665
.7400	.7451	6.07[illegible]	16.54	.4066	.5683	123.9	.15026	.0153[illegible]	30.208
.7200	.7881	6.11[illegible]	17.02	.3905	.5826	124.9	.15113	.0154[illegible]	32.839
.7000	.8298	6.16[illegible]	17.43	.3735	.5959	125.8	.15195	.0155[illegible]	35.563
.6800	.8701	6.21[illegible]	17.75	.3557	.6084	126.8	.15273	.0156[illegible]	38.389
.6600	.9091	6.26[illegible]	18.00	.3374	.6201	127.7	.15348	.0157[illegible]	41.322
.6400	.9466	6.32[illegible]	18.18	.3188	.6311	128.6	.15420	.0158[illegible]	44.373
.6200	.9827	6.38[illegible]	18.28	.3001	.6413	129.5	.15489	.0158[illegible]	47.539
.6000	1.0172	6.44[illegible]	18.31	.2813	.6509	130.4	.15556	.0159[illegible]	50.862
.5800	1.0503	6.51[illegible]	18.27	.2626	.6598	131.3	.15620	.0160[illegible]	54.324
.5600	1.0817	6.59[illegible]	18.17	.2441	.6682	132.2	.15682	.0161[illegible]	57.947
.5400	1.1114	6.670	18.01	.2259	.6760	133.1	.15743	.0161[illegible]	61.746
.5200	1.1395	6.75[illegible]	17.78	.2081	.6834	134.0	.15802	.0162[illegible]	65.739
.5000	1.1658	6.851	17.49	.1909	.6902	135.0	.15860	.0163[illegible]	69.945
.4800	1.1902	6.95[illegible]	17.14	.1742	.6965	135.9	.15917	.0163[illegible]	74.387
.4600	1.2127	7.07	16.74	.1580	.7025	136.9	.15972	.0164[illegible]	78.991
.4400	1.2333	7.19	16.28	.1426	.7080	137.9	.16027	.0165[illegible]	84.088
.4200	1.2518	7.32	15.77	.1279	.7130	138.9	.16080	.0165[illegible]	89.414
.4000	1.2682	7.47	15.22	.1140	.7178	140.0	.16133	.0166[illegible]	95.112
.3800	1.2823	7.64	14.62	.1008	.7221	141.1	.16185	.0167[illegible]	101.233
.3600	1.2941	7.83	13.98	.0885	.7261	142.2	.16237	.0167[illegible]	107.838
.3400	1.3034	8.04	13.29	.0770	.7298	143.4	.16288	.0168[illegible]	115.006
.3200	1.3102	8.28	12.58	.0663	.7331	144.7	.16339	.0169[illegible]	122.829
.3000	1.3143	8.55	11.83	.0565	.7362	146.1	.16390	.0170[illegible]	131.426
.2800	1.3155	8.87	11.05	.0476	.7389	147.5	.16441	.0170[illegible]	140.947
.2600	1.3138	9.24	10.25	.0395	.7414	149.1	.16492	.0171[illegible]	151.493
.2400	1.3090	9.68	9.42	.0323	.7436	150.8	.16543	.0172[illegible]	163.623
.2200	1.3009	10.21	8.59	.0259	.7456	152.6	.16594	.0173[illegible]	177.395
.2000	1.2894	10.85	7.74	.0203	.7473	154.7	.16646	.0174[illegible]	193.411
.1800	1.2744	11.65	6.88	.0155	.7488	157.0	.16698	.0175[illegible]	212.30
.1600	1.2558	12.68	6.03	.0115	.7501	159.5	.16751	.0176[illegible]	235.46
.1400	1.2338	14.04	5.18	.0082	.7512	162.7	.16806	.0176[illegible]	264.39
.1200	1.2089	15.91	4.35	.0055	.7521	166.3	.16861	.0179[illegible]	302.22
.1000	1.1826	18.63	3.55	.0034	.7528	170.8	.16919	.0181[illegible]	354.[illegible]
.0900	1.1700	20.50	3.16	.0026	.7531	173.5	.16948	.0182[illegible]	390.01
.0800	1.1593	22.90	2.78	.0020	.7534	176.7	.16979	.0183[illegible]	434.74
.0700	1.1525	26.08	2.42	.0014	.7536	180.4	.17010	.0184[illegible]	493.95
.0600	1.1543	30.48	2.08	.0010	.7538	185.0	.17042	.0186[illegible]	577.17
.0500	1.1754	36.88	1.763	.0006	.7540	191.1	.17076	.0188[illegible]	705.25
.0400	1.2457	46.94	1.495	.0004	.7541	199.7	.17111	.0191[illegible]	929.04
.0300	1.4609	63.45	1.315	.0002	.7543	214.1	.17146	.0196[illegible]	1460.90
.0200	1.9976	83.45	1.199	.0001	.7544	242.0	.17168	.0204[illegible]	2996.4
.0100	3.4903	90.00	1.047	.0000	.7545	324.6	.17172	.0218[illegible]	10470.8

TABLE XIX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.04$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\gamma_i = -3.0^\circ$, $e_i = 0.09685$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{q}$	t sec	$\frac{\Delta s}{r}$	$\frac{-\Delta y}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.0400	0.0000010	3.000	0.0000	0.0011	0	0	0	0	0.000
1.0405	.0000028	2.904	.0001	.0018	.0009	17.3	.02203	.001136	.000
1.0410	.0000078	2.803	.0002	.0031	.0025	35.4	.04495	.002279	.000
1.0415	.0000221	2.696	.0007	.0052	.0053	54.4	.06910	.003438	.001
1.0420	.0000658	2.578	.0021	.0090	.0106	75.1	.09540	.004650	.002
1.0425	.0002431	2.426	.0076	.0173	.0228	101.1	.12861	.006101	.007
1.04265	.0005900	2.317	.0185	.0270	.0377	119.8	.15249	.007086	.017
1.0425	.0011609	2.230	.0363	.0378	.0552	134.7	.17133	.007838	.033
1.0420	.002051	2.155	.0641	.0502	.0961	147.7	.18786	.008471	.059
1.0410	.003436	2.086	.1073	.0648	.1017	159.9	.20338	.009046	.099
1.0400	.004676	2.044	.1459	.0754	.1209	167.4	.21291	.009389	.135
1.0350	.010239	1.940	.318	.1103	.1880	187.2	.23811	.010265	.297
1.0300	.015393	1.872	.476	.1336	.2365	198.1	.25182	.010724	.448
1.0250	.02036	1.862	.626	.1518	.2767	205.8	.26146	.011040	.596
1.0200	.02521	1.843	.771	.1668	.3117	211.8	.26897	.011282	.741
1.0150	.02997	1.831	.914	.1797	.3432	216.8	.27513	.011480	.886
1.0100	.03467	1.824	1.050	.1909	.3720	221.0	.28038	.011648	1.030
1.0050	.03932	1.820	1.186	.2008	.3987	224.7	.28495	.011793	1.174
1.0000	.04394	1.819	1.318	.2096	.4236	228.0	.28901	.011922	1.318
.9950	.04852	1.820	1.448	.2175	.4471	231.0	.29266	.012038	1.463
.9900	.05308	1.823	1.577	.2247	.4693	233.7	.29597	.012143	1.609
.9800	.06216	1.833	1.828	.2370	.5104	238.6	.30182	.012330	1.903
.9700	.07119	1.848	2.07	.2473	.5481	242.8	.30687	.012492	2.202
.9600	.08021	1.867	2.31	.2557	.5828	246.6	.31131	.012636	2.506
.9500	.08922	1.888	2.54	.2628	.6151	250.0	.31528	.012766	2.818
.9400	.09825	1.913	2.77	.2685	.6453	253.1	.31886	.012885	3.136
.9300	.10730	1.940	2.99	.2732	.6737	256.0	.32212	.012995	3.461
.9200	.11639	1.969	3.21	.2770	.7005	258.6	.32512	.013097	3.795
.9100	.12551	2.000	3.43	.2799	.7258	261.1	.32790	.013193	4.138
.9000	.13469	2.032	3.64	.2820	.7499	263.4	.33047	.013284	4.490
.8800	.15322	2.102	4.05	.2844	.7944	267.7	.33513	.013452	5.223
.8600	.17201	2.178	4.44	.2845	.8349	271.6	.33926	.013606	6.000
.8400	.19109	2.259	4.82	.2827	.8719	275.2	.34295	.013749	6.824
.8200	.21105	2.346	5.18	.2793	.9058	278.5	.34629	.013883	7.700
.8000	.2302	2.437	5.52	.2746	.9371	281.5	.34933	.014010	8.632
.7800	.2503	2.533	5.86	.2688	.9659	284.4	.35212	.014131	9.626
.7600	.2707	2.634	6.17	.2620	.9925	287.2	.35469	.014247	10.685
.7400	.2915	2.740	6.47	.2543	1.0172	289.8	.35708	.014359	11.816
.7200	.3126	2.852	6.75	.2459	1.0040	292.2	.35929	.014467	13.026
.7000	.3341	2.969	7.02	.2370	1.0612	294.5	.36137	.014572	14.320
.6800	.3560	3.091	7.26	.2275	1.0808	296.7	.36331	.014675	15.707
.6600	.3783	3.219	7.49	.2176	1.0990	298.8	.36513	.014776	17.194
.6400	.4009	3.354	7.70	.2075	1.1159	301.3	.36685	.014874	18.791
.6200	.4238	3.496	7.88	.1970	1.1316	303.4	.36847	.014971	20.508
.6000	.4471	3.644	8.05	.1865	1.1461	305.5	.37001	.015067	22.357
.5800	.4708	3.801	8.19	.1758	1.1596	307.5	.37147	.015162	24.351
.5600	.4948	3.966	8.31	.1651	1.1721	309.5	.37286	.015256	26.505
.5400	.5190	4.14	8.41	.1544	1.1836	311.5	.37418	.015350	28.835
.5200	.5436	4.33	8.48	.1438	1.1943	313.5	.37544	.015443	31.360
.5000	.5684	4.52	8.53	.1333	1.2041	315.4	.37665	.015537	34.105
.4800	.5935	4.73	8.55	.1230	1.2132	317.3	.37780	.015630	37.093
.4600	.6188	4.95	8.54	.1129	1.2216	319.3	.37891	.015724	40.355
.4400	.6443	5.19	8.50	.1031	1.2292	321.2	.37997	.015818	43.926
.4200	.6699	5.45	8.44	.0936	1.2363	323.1	.38099	.015913	47.849
.4000	.6956	5.73	8.35	.0844	1.2427	325.1	.38197	.016009	52.173
.3800	.7215	6.03	8.22	.0756	1.2485	327.1	.38292	.016106	56.958
.3600	.7473	6.36	7.97	.0672	1.2539	329.1	.38383	.016206	62.277
.3400	.7731	6.73	7.89	.0593	1.2587	331.2	.38472	.016307	68.219
.3200	.7989	7.13	7.67	.0518	1.2630	333.4	.38557	.016411	74.896
.3000	.8245	7.57	7.42	.0448	1.2669	335.6	.38640	.016517	82.447
.2800	.8498	8.08	7.02	.0382	1.2704	337.9	.38720	.016628	91.053
.2600	.8749	8.64	6.69	.0322	1.2735	340.2	.38798	.016742	100.946
.2400	.8995	9.30	6.48	.0268	1.2762	342.8	.38874	.016862	112.438
.2200	.9236	10.06	6.10	.0218	1.2786	345.4	.38948	.016988	125.950
.2000	.9472	10.96	5.51	.0174	1.2806	348.3	.39020	.017122	143.077
.1800	.9700	12.04	5.24	.0135	1.2824	351.4	.39091	.017266	161.669
.1600	.9922	13.38	4.76	.0102	1.2839	354.8	.39160	.017422	186.033
.1400	1.0137	15.08	4.26	.0074	1.2851	358.7	.39229	.017594	217.23
.1200	1.0352	17.33	3.73	.0051	1.2861	363.1	.39296	.017788	258.79
.1000	1.0578	20.47	3.17	.0032	1.2870	368.3	.39362	.018015	317.33
.0900	1.0705	22.22	2.89	.0025	1.2872	371.4	.39395	.018145	356.85
.0800	1.0856	24.18	2.61	.0019	1.2875	374.9	.39428	.018292	407.10
.0700	1.1050	26.57	2.32	.0014	1.2877	378.9	.39462	.018460	473.58
.0600	1.1330	29.11	2.04	.0009	1.2879	383.9	.39495	.018659	[illegible]
.0500	1.1797	33.56	1.770	.0006	1.2881	390.1	.39529	.018906	607.81
.0400	1.2717	44.38	1.526	.0004	1.2883	398.8	.39563	.019238	753.77
.0300	1.4898	64.17	1.343	.0002	1.2884	412.9	.39596	.019733	1459.75
.0200	2.0012	83.53	1.201	.0001	1.2885	440.1	.39617	.020512	3001.8
.0100	3.4905	90.00	1.047	.0000	1.2886	522.6	.39620	.021900	10471.5

TABLE XVIII.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.02$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(g) $\gamma_i = -10.0^{\circ}$, $e_i = 0.17815$

$\bar{V}$	$\bar{z}$	$\frac{\gamma}{deg}$	$-\frac{\beta r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	$\frac{t}{sec}$	$\frac{\dot{\bar{V}}}{\bar{V}}$	$\frac{-\Delta V}{r}$	$\sqrt{\beta r}\,\frac{\dot{\bar{z}}}{\bar{q}}$
1.0200	0.0000010	10.000	0.0000	.0011	0	0		0	0.00
1.0205	.0000026	9.986	.0001	.0017	.0002	4.9	.00060	.001064	.00
1.0210	.0000064	9.972	.0002	.0028	.0006	9.9	.01211	.002138	.00
1.0215	.0000127	9.958	.0005	.0045	.0013	14.8	.01820	.00320	.00
1.0220	.0000474	9.943	.0015	.0073	.0023	19.8	.02437	.004284	.00
1.0225	.0001274	9.928	.0039	.0120	.0041	24.9	.03067	.005384	.00
1.0230	.0003674	9.911	.0113	.0203	.0073	30.4	.03737	.006559	.01
1.0235	.0014489	9.888	.0445	.0403	.0148	37.5	.04610	.008081	.04
1.02358	.002660	9.878	.0817	.0547	.0203	40.6	.04997	.008759	.07
1.0235	.004423	9.870	.1358	.0705	.0263	43.3	.05323	.009324	.13
1.0230	.008823	9.858	.271	.0994	.0373	46.9	.05764	.010099	.25
1.0220	.015434	9.849	.473	.1312	.0496	49.8	.06121	.010711	.45
1.0210	.02143	9.844	.656	.1542	.0580	51.5	.06332	.011077	.67
1.0200	.02717	9.841	.833	.1732	.0660	52.7	.06485	.011344	.79
1.0150	.05448	9.832	1.659	.2423	.0936	56.4	.06934	.012123	1.61
1.0100	.08085	9.828	2.45	.2915	.1142	58.5	.07191	.012567	2.40
1.0050	.10677	9.827	3.22	.3309	.1312	60.0	.07372	.012881	3.16
1.0000	.13240	9.826	3.97	.3639	.1461	61.2	.07513	.013128	3.912
.9950	.15778	9.827	4.71	.3923	.1595	62.1	.07629	.013326	4.75
.9900	.18297	9.827	5.43	.4173	.1716	62.9	.07727	.013496	5.54
.9800	.23281	9.830	6.84	.4598	.1934	64.3	.07888	.013775	7.11
.9700	.2820	9.834	8.21	.4921	.2127	65.4	.08018	.014000	8.722
.9600	.3306	9.839	9.52	.5192	.2300	66.3	.08127	.014180	10.332
.9500	.3787	9.844	10.79	.5413	.2458	67.1	.08220	.014350	11.910
.9400	.4261	9.849	12.02	.5592	.2604	67.9	.08303	.014494	13.693
.9300	.4731	9.855	13.20	.5737	.2740	68.5	.08376	.014622	15.260
.9200	.5194	9.862	14.34	.5851	.2867	69.1	.08443	.014737	16.9[illegible]
.9100	.5652	9.869	15.43	.5939	.2987	69.7	.08504	.014843	18.6[illegible]
.9000	.6105	9.876	16.48	.6004	.3100	70.2	.08560	.014941	20.359
.8800	.6994	9.891	18.46	.5075	.3309	71.1	.08661	.015117	23.843
.8600	.7860	9.907	20.28	.6081	.3498	72.0	.08750	.015271	27.414
.8400	.8704	9.925	21.93	.6033	.3672	72.8	.08830	.015412	31.0[illegible]
.8200	.9524	9.944	23.43	.5942	.3831	73.5	.08902	.015539	34.8[illegible]
.8000	1.0321	9.964	24.77	.5816	.3978	74.2	.08969	.015656	38.7[illegible]
.7800	1.1094	9.985	25.96	.5660	.4114	74.8	.09030	.015764	42.6[illegible]
.7600	1.1843	10.007	27.00	.5480	.4241	75.4	.09088	.015865	46.74[illegible]
.7400	1.2566	10.032	27.90	.5281	.4359	76.0	.09142	.015961	50.942
.7200	1.3263	10.057	28.65	.5066	.4470	76.6	.09193	.016051	55.262
.7000	1.3934	10.084	29.26	.4839	.4573	77.2	.09242	.016137	59.716
.6800	1.4577	10.114	29.74	.4604	.4669	77.7	.09288	.016220	64.3[illegible]
.6600	1.5193	10.145	30.08	.4362	.4759	78.3	.09332	.016299	69.0[illegible]
.6400	1.5780	10.178	30.30	.4116	.4844	78.8	.09375	.016375	73.9[illegible]
.6200	1.6337	10.214	30.39	.3869	.4923	79.4	.09416	.016444	79.0[illegible]
.6000	1.6863	10.252	30.35	.3621	.4998	79.9	.09455	.016513	84.3[illegible]
.5800	1.7358	10.294	30.20	.3375	.5067	80.5	.09494	.016576	89.7[illegible]
.5600	1.7821	10.338	29.94	.3133	.5133	81.0	.09531	.016659	95.4[illegible]
.5400	1.8249	10.387	29.56	.2895	.5194	81.6	.09568	.016725	101.3[illegible]
.5200	1.8643	10.439	29.08	.2662	.5251	82.1	.09604	.016741	107.5[illegible]
.5000	1.9001	10.496	28.50	.2437	.5304	82.7	.09639	.016846	114.0[illegible]
.4800	1.9321	10.558	27.82	.2219	.5354	83.3	.09673	.016920	120.7[illegible]
.4600	1.9602	10.627	27.05	.2009	.5400	83.9	.09707	.016983	127.8[illegible]
.4400	1.9842	10.702	26.19	.1809	.5444	84.5	.09740	.017046	135.2[illegible]
.4200	2.0040	10.786	25.25	.1618	.5484	85.1	.09773	.017109	143.1[illegible]
.4000	2.0194	10.879	24.23	.1438	.5521	85.8	.09806	.017171	151.4[illegible]
.3800	2.0301	10.983	23.14	.1268	.5556	86.5	.09839	.017234	160.2[illegible]
.3600	2.0360	11.10	21.99	.1110	.5587	87.2	.09871	.017298	169.6[illegible]
.3400	2.0368	11.24	20.78	.0962	.5617	88.0	.09904	.017362	179.7[illegible]
.3200	2.0322	11.39	19.51	.0826	.5644	88.8	.09936	.017426	190.5[illegible]
.3000	2.0218	11.56	18.20	.0701	.5668	89.7	.09969	.017492	202.1[illegible]
.2800	2.0055	11.77	16.85	.0588	.5690	90.6	.10001	.017560	214.8[illegible]
.2600	1.9828	12.01	15.47	.0485	.5710	91.7	.10035	.017640	228.1[illegible]
.2400	1.9533	12.30	14.06	.0394	.5728	92.8	.10068	.017702	244.1[illegible]
.2200	1.9165	12.65	12.65	.0314	.5745	94.0	.10102	.017778	261.[illegible]
.2000	1.8719	13.08	11.23	.0245	.5759	95.4	.10137	.017857	280.7[illegible]
.1800	1.8190	13.63	9.82	.0185	.5771	97.0	.10173	.017943	303.1[illegible]
.1600	1.7572	14.35	8.43	.0136	.5782	98.9	.10210	.018035	329.47
.1400	1.6859	15.32	7.08	.0095	.5791	101.1	.10249	.018137	361.26
.1200	1.6047	16.69	5.78	.0063	.5799	103.7	.10290	.018254	401.16
.1000	1.5137	18.73	4.54	.0039	.5805	107.1	.10333	.018391	454.11
.0900	1.4650	20.18	3.96	.0029	.5808	109.2	.10356	.018472	488.35
.0800	1.4151	22.07	3.40	.0022	.5810	111.7	.10380	.018565	530.66
.0700	1.3634	24.64	2.87	.0015	.5812	114.7	.10405	.018673	585.16
.0600	1.3192	28.29	2.37	.0010	.5814	118.5	.10432	.018806	659.61
.0500	1.2851	33.82	1.928	.0006	.5815	123.5	.10461	.018980	771.05
.0400	1.2688	43.00	1.547	.0004	.5816	131.0	.10493	.019210	966.60
.0300	1.4345	59.88	1.291	.0002	.5818	144.4	.10528	.019633	1434.48
.0200	1.9874	82.86	1.192	.0001	.5819	173.2	.10554	.020449	2981.0
.0100	3.4903	90.00	1.047	.0000	.5820	256.1	.10558	.021837	10470.8

TABLE XIX.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.04$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\gamma_i = -5.0^{\circ}$, $e_i = 0.11918$

$\bar{V}$	z	γ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\frac{r}{\bar{V}}}\frac{\dot{\theta}}{\bar{V}}$
1.0400	0.0000010	5.000	0.0000	0.0011	0	0	0	0	0.000
1.0405	.0000028	4.945	.0001	.0018	.0005	10.3	.01305	.001135	.000
1.0410	.0000077	4.885	.0002	.0031	.0015	20.5	.02630	.002274	.000
1.0415	.0000218	4.825	.0007	.0052	.0030	31.4	.03983	.003424	.001
1.0420	.0000629	4.762	.0020	.0088	.0058	42.5	.05386	.004600	.002
1.0425	.0001964	4.692	.0061	.0156	.0110	54.5	.06915	.005864	.006
1.04297	.0011640	4.580	.0352	.0379	.0287	73.7	.09352	.007841	.033
1.0425	.003552	4.508	.1124	.0661	.0516	86.0	.10913	.009081	.102
1.0420	.005152	4.484	.1611	.0796	.0626	90.2	.11439	.009495	.148
1.0410	.007984	4.456	.2349	.0988	.0786	96.1	.12063	.009982	.230
1.0400	.010628	4.438	.2958	.1137	.0912	98.3	.12473	.010301	.307
1.0350	.02297	4.382	.5715	.1652	.1359	107.2	.13589	.011163	.666
1.0300	.03477	4.370	1.074	.2008	.1682	112.0	.14197	.011629	1.013
1.0250	.04632	4.358	1.420	.2289	.1950	116.4	.14622	.011953	1.356
1.0200	.05772	4.349	1.760	.2524	.2182	118.0	.14950	.012203	1.698
1.0150	.06900	4.344	2.110	.2726	.2390	120.2	.15218	.012407	2.039
1.0100	.08017	4.341	2.45	.2903	.2580	122.0	.15445	.012579	2.381
1.0050	.09126	4.339	2.75	.3059	.2755	123.5	.15642	.012729	2.724
1.0000	.10228	4.339	3.07	.3198	.2918	125.0	.15816	.012861	3.068
.9950	.11322	4.339	3.38	.3323	.3072	126.3	.15973	.012979	3.414
.9900	.12410	4.340	3.67	.3435	.3217	127.5	.16114	.013087	3.761
.9800	.14567	4.345	4.28	.3629	.3486	129.6	.16364	.013276	4.459
.9700	.16701	4.351	4.86	.3787	.3732	131.4	.16578	.013439	5.165
.9600	.18813	4.359	5.42	.3917	.3959	133.0	.16767	.013583	5.879
.9500	.2090	4.368	5.95	.4022	.4170	134.4	.16936	.013712	6.601
.9400	.2298	4.379	6.48	.4106	.4367	135.8	.17089	.013829	7.333
.9300	.2503	4.390	6.98	.4173	.4553	137.0	.17228	.013936	8.073
.9200	.2706	4.403	7.47	.4223	.4729	138.1	.17357	.014034	8.824
.9100	.2907	4.416	7.94	.4259	.4895	139.3	.17476	.014126	9.584
.9000	.3107	4.430	8.37	.4283	.5053	140.2	.17587	.014212	10.355
.8800	.3500	4.460	9.24	.4298	.5347	142.1	.17789	.014370	11.931
.8600	.3886	4.494	10.05	.4275	.5615	143.8	.17970	.014511	13.555
.8400	.4264	4.530	10.75	.4223	.5862	145.4	.18134	.014641	15.229
.8200	.4635	4.569	11.40	.4145	.6090	146.8	.18284	.014760	16.957
.8000	.4998	4.610	12.00	.4047	.6301	148.2	.18423	.014872	18.743
.7800	.5354	4.655	12.55	.3932	.6497	149.6	.18552	.014976	20.592
.7600	.5702	4.702	13.06	.3802	.6680	150.9	.18673	.015075	22.507
.7400	.6042	4.753	13.41	.3662	.6850	152.1	.18787	.015169	24.494
.7200	.6374	4.807	13.77	.3512	.7009	153.3	.18894	.015259	26.558
.7000	.6698	4.864	14.07	.3355	.7158	154.5	.18996	.015345	28.705
.6800	.7013	4.926	14.41	.3193	.7297	155.7	.19094	.015428	30.941
.6600	.7320	4.991	14.49	.3028	.7427	156.8	.19187	.015509	33.274
.6400	.7619	5.061	14.63	.2860	.7549	157.9	.19276	.015588	35.712
.6200	.7908	5.136	14.71	.2692	.7663	159.1	.19362	.015665	38.264
.6000	.8188	5.216	14.74	.2523	.7770	160.2	.19445	.015740	40.940
.5800	.8458	5.302	14.72	.2356	.7870	161.3	.19525	.015813	43.751
.5600	.8719	5.395	14.65	.2191	.7963	162.4	.19603	.015886	46.710
.5400	.8970	5.495	14.53	.2030	.8050	163.5	.19678	.015958	49.833
.5200	.9210	5.602	14.37	.1871	.8132	164.7	.19752	.016029	53.136
.5000	.9440	5.719	14.15	.1718	.8208	165.8	.19823	.016100	56.638
.4800	.9658	5.846	13.91	.1569	.8278	167.0	.19893	.016171	60.363
.4600	.9865	5.984	13.61	.1425	.8344	168.2	.19961	.016242	64.336
.4400	1.0060	6.14	13.28	.1288	.8405	169.4	.20028	.016313	68.589
.4200	1.0242	6.30	12.91	.1157	.8461	170.7	.20094	.016385	73.158
.4000	1.0412	6.48	12.47	.1032	.8513	172.0	.20159	.016457	78.087
.3800	1.0567	6.69	12.05	.0915	.8561	173.3	.20223	.016531	83.427
.3600	1.0709	6.92	11.57	.0805	.8605	174.7	.20285	.016605	89.244
.3400	1.0836	7.17	11.05	.0702	.8646	176.2	.20347	.016682	95.615
.3200	1.0948	7.46	10.51	.0606	.8682	177.7	.20409	.016761	102.639
.3000	1.1044	7.79	9.94	.0518	.8716	179.3	.20470	.016842	110.438
.2800	1.1123	8.16	9.34	.0438	.8746	181.1	.20530	.016927	119.172
.2600	1.1184	8.60	8.72	.0364	.8773	182.9	.20590	.017015	129.046
.2400	1.1227	9.12	8.08	.0299	.8797	184.9	.20650	.017108	140.338
.2200	1.1251	9.73	7.43	.0241	.8818	187.0	.20710	.017208	153.425
.2000	1.1256	10.48	6.75	.0190	.8837	189.4	.20769	.017314	168.838
.1800	1.1241	11.39	6.07	.0146	.8853	192.0	.20829	.017429	187.347
.1600	1.1207	12.56	5.38	.0108	.8866	195.0	.20890	.017557	210.14
.1400	1.1158	14.08	4.68	.0078	.8878	198.4	.20950	.017701	237.11
.1200	1.1100	16.14	4.00	.0053	.8887	202.4	.21012	.017866	277.51
.1000	1.1051	19.09	3.34	.0033	.8895	207.3	.21074	.018064	341.53
.0900	1.1042	21.10	2.98	.0026	.8898	210.2	.21106	.018180	368.06
.0800	1.1058	23.65	2.65	.0019	.8901	213.6	.21139	.018312	414.67
.0700	1.1122	26.99	2.34	.0014	.8903	217.6	.21171	.018467	476.64
.0600	1.1280	31.54	2.03	.0009	.8905	222.4	.21205	.018654	564.00
.0500	1.1641	38.09	1.746	.0006	.8907	228.7	.21239	.018892	698.45
.0400	1.2497	48.16	1.500	.0004	.8908	237.5	.21274	.019218	937.29
.0300	1.4734	64.23	1.320	.0002	.8910	251.4	.21308	.019721	1473.42
.0200	1.9998	93.54	1.200	.0001	.8911	279.5	.21330	.020511	2999.7
.0100	3.4906	90.00	1.047	.0000	.8912	340.0	.21333	.021900	10471.7

TABLE XIX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.04$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\gamma_i = -4.0^{\circ}$, $e_i = 0.10720$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\zeta}$	t sec	$\frac{\Delta\phi}{r}$	$\frac{-\Delta\phi}{r}$	$\sqrt{\beta r}\frac{\Delta\phi}{\bar{V}}$
1.0400	0.0000000	4.000	0.0000	0.0011	0	0	0	0	0.000
1.0405	.0000008	3.924	.0001	.0018	.0007	12.9	.01638	.0011[illegible]	.000
1.0410	.0000078	3.854	.0002	.0031	.0018	26.1	.03315	.0022[illegible]	.000
1.0415	.0000311	3.778	.0007	.0052	.0039	39.7	.05043	.0034[illegible]	.001
1.0420	.0000[illegible]	3.694	.0020	.0088	.0075	54.0	.06862	.0046[illegible]	.002
1.0425	.0008[illegible]	3.602	.0065	.0160	.0147	70.2	.08922	.0059[illegible]	.005
1.04284	.0008[illegible]	3.483	.0272	.0331	.0323	90.7	.11517	.0075[illegible]	.0[illegible]
1.0425	.0023[illegible]	3.407	.0731	.0536	.0543	104.7	.13310	.0086[illegible]	.0[illegible]
1.0420	.0035[illegible]	3.364	.1123	.0664	.0682	111.1	.14118	.0090[illegible]	.1[illegible]
1.0410	.0057[illegible]	3.324	.1792	.0837	.0875	118.1	.15011	.0096[illegible]	.1[illegible]
1.0400	.0077[illegible]	3.299	.241	.0969	.1024	122.6	.15582	.0099[illegible]	.2[illegible]
1.0350	.0168[illegible]	3.239	.523	.1415	.1547	134.7	.17112	.0108[illegible]	.4[illegible]
1.0300	.0255[illegible]	3.206	.789	.1720	.1924	141.3	.17942	.0112[illegible]	.744
1.0250	.03400	3.180	1.046	.1961	.2236	145.9	.18521	.011610	.99[illegible]
1.0200	.04234	3.178	1.296	.2162	.2507	149.5	.18969	.0118[illegible]	1.24[illegible]
1.0150	.0505[illegible]	3.170	1.540	.2334	.2750	152.4	.19335	.0120[illegible]	1.49[illegible]
1.0100	.05873	3.160	1.780	.2484	.2971	154.9	.19645	.0122[illegible]	1.74[illegible]
1.0050	.06682	3.164	2.01	.2617	.3176	157.1	.19915	.0123[illegible]	1.99[illegible]
1.0000	.07485	3.165	2.25	.2736	.3367	159.1	.20153	.012514	2.24[illegible]
.9950	.08283	3.164	2.47	.2842	.3547	160.8	.20367	.0126[illegible]	2.4[illegible]
.9900	.09077	3.169	2.70	.2938	.3717	162.4	.20561	.0127[illegible]	2.7[illegible]
.9800	.10651	3.170	3.13	.3103	.4031	165.3	.20902	.0129[illegible]	3.2[illegible]
.9700	.12210	3.180	3.55	.3238	.4319	167.7	.21196	.0130[illegible]	3.7[illegible]
.9600	.13756	3.191	3.96	.3349	.4584	169.9	.21455	.0132[illegible]	4.2[illegible]
.9500	.15289	3.204	4.36	.3440	.4831	171.9	.21686	.0133[illegible]	4.8[illegible]
.9400	.16811	3.218	4.74	.3512	.5062	173.7	.21895	.0134[illegible]	5.3[illegible]
.9300	.18322	3.234	5.11	.3570	.5279	175.4	.22086	.0135[illegible]	5.910
.9200	.19823	3.251	5.47	.3615	.5484	177.0	.22261	.0136[illegible]	6.4[illegible]
.9100	.2133	3.269	5.82	.3647	.5678	178.4	.22424	.0137[illegible]	7.0[illegible]
.9000	.2280	3.288	6.16	.3669	.5862	179.8	.22576	.0138[illegible]	7.5[illegible]
.8800	.2573	3.330	6.79	.3685	.6205	182.3	.22852	.0140[illegible]	8.7[illegible]
.8600	.2863	3.375	7.39	.3670	.6518	184.7	.23098	.0141[illegible]	9.9[illegible]
.8400	.3150	3.424	7.94	.3630	.6806	186.8	.23321	.014304	11.2[illegible]
.8200	.3433	3.476	8.45	.3568	.7071	188.8	.23524	.0144[illegible]	12.5[illegible]
.8000	.3714	3.532	8.91	.3488	.7316	190.7	.23711	.0145[illegible]	13.9[illegible]
.7800	.3991	3.590	9.34	.3394	.7543	192.5	.23885	.0146[illegible]	15.3[illegible]
.7600	.4264	3.650	9.72	.3288	.7755	194.2	.24047	.0147[illegible]	16.8[illegible]
.7400	.4535	3.724	10.07	.3172	.7952	195.9	.24199	.0148[illegible]	18.3[illegible]
.7200	.4802	3.796	10.37	.3048	.8135	197.5	.24342	.0149[illegible]	20.0[illegible]
.7000	.5066	3.872	10.64	.2918	.8306	199.1	.24477	.0150[illegible]	21.7[illegible]
.6800	.5327	3.953	10.87	.2783	.8466	200.6	.24606	.015123	23.5[illegible]
.6600	.5584	4.039	11.06	.2644	.8615	202.1	.24729	.015208	25.3[illegible]
.6400	.5838	4.132	11.21	.2504	.8755	203.6	.24846	.015292	27.3[illegible]
.6200	.6088	4.229	11.32	.2362	.8885	205.0	.24958	.015374	29.4[illegible]
.6000	.6335	4.333	11.40	.2219	.9006	206.5	.25065	.015454	31.6[illegible]
.5800	.6577	4.444	11.44	.2078	.9120	207.9	.25169	.015534	34.021
.5600	.6816	4.563	11.45	.1938	.9226	209.3	.25269	.015612	36.51[illegible]
.5400	.7051	4.690	11.42	.1799	.9324	210.8	.25365	.015690	39.171
.5200	.7281	4.827	11.36	.1664	.9416	212.2	.25458	.015768	42.00[illegible]
.5000	.7507	4.974	11.26	.1532	.9501	213.7	.25549	.015844	45.041
.4800	.7728	5.13	11.13	.1403	.9580	215.2	.25637	.015923	48.300
.4600	.7944	5.31	10.96	.1279	.9654	216.6	.25722	.016001	51.810
.4400	.8155	5.49	10.76	.1160	.9722	218.2	.25805	.016080	55.604
.4200	.8361	5.70	10.53	.1045	.9784	219.7	.25886	.016159	59.720
.4000	.8561	5.92	10.27	.0936	.9842	221.3	.25965	.016239	64.20[illegible]
.3800	.8754	6.17	9.98	.0833	.9895	222.9	.26043	.016321	69.124
.3600	.8942	6.44	9.66	.0735	.9943	224.6	.26118	.016405	74.52[illegible]
.3400	.9122	6.75	9.30	.0644	.9987	226.4	.26192	.016491	80.4[illegible]
.3200	.9295	7.09	8.92	.0558	1.0027	228.2	.26265	.016579	87.14[illegible]
.3000	.9461	7.48	8.40	.0480	1.0063	230.1	.26337	.016670	94.60[illegible]
.2800	.9618	7.91	8.08	.0407	1.0096	232.1	.26407	.0167[illegible]	103.0[illegible]
.2600	.9767	8.42	7.62	.0341	1.0125	234.2	.26476	.0168[illegible]	112.6[illegible]
.2400	.9906	9.01	7.13	.0281	1.0150	236.5	.26545	.0169[illegible]	123.824
.2200	1.0036	9.70	6.62	.0227	1.0173	238.9	.26612	.017090	136.84[illegible]
.2000	1.0155	10.53	6.09	.0180	1.0193	241.6	.26679	.017194	152.3[illegible]
.1800	1.0265	11.55	5.54	.0139	1.0210	244.5	.26745	.017388	171.0[illegible]
.1600	1.0366	12.82	4.98	.0104	1.0224	247.7	.26811	.017410	194.3[illegible]
.1400	1.0460	14.46	4.39	.0075	1.0236	251.4	.26876	.017650	224.3[illegible]
.1200	1.0555	16.65	3.80	.0051	1.0246	255.7	.26942	.017810	263.8[illegible]
.1000	1.0667	19.74	3.15	.0033	1.0254	260.8	.27007	.018024	320.01
.0900	1.0741	21.82	2.90	.0025	1.0257	263.8	.27040	.018149	358.03
.0800	1.0842	24.44	2.60	.0019	1.0260	267.3	.27073	.0182[illegible]	406.5[illegible]
.0700	1.0991	27.84	2.31	.0014	1.0262	271.4	.27107	.018454	471.02
.0600	1.1233	32.44	2.02	.0009	1.0264	276.3	.27141	.0186[illegible]	561.67
.0500	1.1675	38.98	1.751	.0006	1.0266	282.6	.27175	.0188[illegible]	700.49
.0400	1.2595	48.91	1.511	.0004	1.0267	291.4	.27210	.0192[illegible]	944.64
.0300	1.4829	64.59	1.335	.0002	1.0269	305.7	.27243	.0197[illegible]	1482.95
.0200	2.0009	83.56	1.201	.0001	1.0270	333.0	.27264	.020511	3001.3
.0100	3.4905	90.00	1.047	.0000	1.0271	415.6	.27268	.021900	10471.5

TABLE XIX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.04$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\gamma_i = -8.0^{\circ}$, $e_i = 0.16093$

$\bar{V}$	Z	γ deg	$-\frac{\beta r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{Z}{\bar{V}}$
1.0400	0.0000010	8.000	0.0000	0.0011	0	0	0	0	0.000
1.0405	.0000028	7.965	.0001	.0018	.0003	6.4	.00809	.001134	.000
1.0410	.0000077	7.929	.0002	.0031	.0009	12.9	.01624	.002272	.000
1.0415	.0000217	7.892	.0007	.0052	.0019	19.4	.02448	.003417	.001
1.0420	.0000617	7.855	.0020	.0087	.0035	26.1	.03287	.004578	.002
1.0425	.0001831	7.815	.0058	.0150	.0065	33.0	.04166	.005786	.005
1.0431	.0019584	7.725	.0609	.0492	.0226	48.3	.06094	.008419	.056
1.0435	.007417	7.675	.232	.0956	.0448	57.0	.07190	.009899	.213
1.0420	.009998	7.664	.313	.1108	.0522	59.5	.07437	.010231	.288
1.0410	.014742	7.649	.460	.1342	.0636	61.5	.07759	.010664	.425
1.0400	.019238	7.639	.600	.1530	.0729	63.3	.07980	.010961	.555
1.0350	.04047	7.614	1.250	.2192	.1063	66.2	.08601	.011792	1.173
1.0300	.06091	7.602	1.882	.2657	.1307	71.0	.09245	.012252	1.774
1.0250	.08098	7.594	2.49	.3027	.1508	72.9	.09186	.012574	2.370
1.0200	.10071	7.590	3.08	.3336	.1684	74.4	.09373	.012823	2.965
1.0150	.12046	7.587	3.67	.3602	.1842	75.7	.09526	.013026	3.560
1.0100	.13994	7.585	4.24	.3835	.1985	76.7	.09655	.013198	4.157
1.0050	.15929	7.584	4.80	.4041	.2118	77.6	.09767	.013347	4.755
1.0000	.17850	7.584	5.36	.4225	.2242	78.4	.09866	.013479	5.355
.9950	.19759	7.584	5.90	.4390	.2358	79.2	.09955	.013598	5.958
.9900	.2166	7.585	6.43	.4538	.2468	79.8	.10036	.013705	6.562
.9800	.2542	7.587	7.47	.4793	.2672	81.0	.10178	.013895	7.781
.9700	.2914	7.591	8.45	.5002	.2858	82.1	.10300	.014058	9.010
.9600	.3281	7.595	9.45	.5172	.3029	83.0	.10408	.014201	10.252
.9500	.3644	7.601	10.39	.5310	.3189	83.8	.10504	.014329	11.508
.9400	.4003	7.606	11.29	.5420	.3339	84.6	.10591	.014446	12.776
.9300	.4358	7.613	12.16	.5506	.3480	85.3	.10671	.014552	14.059
.9200	.4709	7.620	13.00	.5571	.3612	85.9	.10744	.014650	15.357
.9100	.5056	7.628	13.80	.5617	.3738	86.6	.10812	.014741	16.669
.9000	.5399	7.636	14.59	.5646	.3858	87.1	.10876	.014826	17.997
.8800	.6073	7.653	16.03	.5661	.4081	88.2	.10992	.014982	20.702
.8600	.6729	7.672	17.36	.5626	.4285	89.2	.11096	.015121	23.474
.8400	.7369	7.693	18.57	.5552	.4473	90.1	.11190	.015249	26.319
.8200	.7992	7.715	19.66	.5443	.4646	91.0	.11276	.015366	29.240
.8000	.8598	7.739	20.63	.5308	.4807	91.8	.11356	.015474	32.241
.7800	.9185	7.765	21.49	.5150	.4957	92.6	.11431	.015576	35.328
.7600	.9755	7.793	22.24	.4973	.5096	93.3	.11501	.015671	38.506
.7400	1.0306	7.822	22.88	.4782	.5227	94.0	.11567	.015762	41.781
.7200	1.0838	7.854	23.41	.4579	.5348	94.6	.11630	.015848	45.158
.7000	1.1351	7.887	23.84	.4368	.5462	95.4	.11690	.015931	48.645
.6800	1.1843	7.923	24.16	.4150	.5569	96.1	.11747	.016011	52.249
.6600	1.2315	7.962	24.38	.3927	.5670	96.8	.11802	.016087	55.978
.6400	1.2766	8.003	24.51	.3702	.5764	97.5	.11855	.016161	59.841
.6200	1.3195	8.048	24.54	.3477	.5852	98.2	.11906	.016233	63.849
.6000	1.3602	8.096	24.50	.3252	.5934	98.8	.11955	.016303	68.012
.5800	1.3986	8.147	24.34	.3030	.6012	99.5	.12003	.016372	72.343
.5600	1.4346	8.203	24.10	.2811	.6085	100.2	.12050	.016439	76.856
.5400	1.4682	8.263	23.78	.2596	.6153	100.9	.12096	.016505	81.567
.5200	1.4992	8.329	23.39	.2388	.6216	101.6	.12140	.016571	86.494
.5000	1.5276	8.400	22.91	.2185	.6276	102.3	.12184	.016635	91.657
.4800	1.5533	8.479	22.37	.1989	.6332	103.0	.12227	.016699	97.080
.4600	1.5761	8.564	21.75	.1802	.6384	103.7	.12270	.016762	102.799
.4400	1.5960	8.659	21.07	.1622	.6432	104.5	.12311	.016826	108.817
.4200	1.6128	8.763	20.32	.1452	.6477	105.3	.12353	.016889	115.200
.4000	1.6264	8.879	19.52	.1290	.6518	106.1	.12394	.016953	129.213
.3800	1.6367	9.01	18.66	.1139	.6556	107.0	.12434	.017017	129.213
.3600	1.6435	9.16	17.75	.0997	.6592	107.9	.12475	.017081	136.956
.3400	1.6466	9.32	16.80	.0865	.6624	108.9	.12515	.017147	145.287
.3200	1.6458	9.51	15.80	.0743	.6654	109.9	.12556	.017214	154.298
.3000	1.6410	9.73	14.77	.0632	.6682	111.0	.12596	.017282	164.105
.2800	1.6320	9.98	13.71	.0530	.6706	112.1	.12637	.017353	174.855
.2600	1.6184	10.28	12.62	.0438	.6729	113.4	.12677	.017426	186.738
.2400	1.6000	10.64	11.52	.0357	.6749	114.8	.12719	.017502	200.01
.2200	1.5766	11.07	10.41	.0285	.6766	116.3	.12761	.017582	215.00
.2000	1.5479	11.60	9.29	.0223	.6782	118.0	.12803	.017668	232.18
.1800	1.5135	12.26	8.17	.0169	.6796	119.9	.12847	.017760	252.24
.1600	1.4731	13.13	7.07	.0124	.6808	122.1	.12892	.017861	276.21
.1400	1.4268	14.29	5.99	.0088	.6818	124.7	.12938	.017974	305.74
.1200	1.3745	15.91	4.95	.0058	.6826	127.9	.12986	.018103	343.63
.1000	1.3174	18.31	3.95	.0036	.6833	131.8	.13037	.018259	395.22
.0900	1.2879	19.98	3.46	.0028	.6835	134.2	.13064	.018351	429.29
.0800	1.2589	22.15	3.02	.0020	.6838	137.1	.13091	.018456	472.09
.0700	1.2304	25.07	2.59	.0014	.6840	140.5	.13120	.018581	528.19
.0600	1.2126	29.16	2.16	.0010	.6842	144.8	.13150	.018734	606.30
.0500	1.2094	35.24	1.814	.0006	.6844	150.4	.13182	.018934	725.65
.0400	1.2521	45.06	1.563	.0004	.6845	158.6	.13216	.019220	939.10
.0300	1.4445	62.03	1.390	.0002	.6846	172.8	.13252	.019699	1444.49
.0200	1.9936	93.25	1.196	.0001	.6848	201.2	.13275	.020907	2990.3
.0100	3.4905	90.00	1.047	.0000	.6849	263.9	.13279	.021900	10471.6

TABLE XIX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.04$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\gamma_i = -6.0^{\circ}$, $e_i = 0.13233$

$\bar{V}$	z	γ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\lambda_s}{r}$	$\frac{-\Omega}{r}$	$\sqrt{\beta r}\,\frac{z}{\bar{V}}$
1.0400	0.0000000	6.000	0.0000	0.0011	0	0	0	0	0.000
1.0405	.0000048	5.953	.0001	.0018	.0004	8.6	.01084	.001135	.000
1.0410	.0000077	5.905	.0002	.0031	.0012	17.2	.02180	.002273	.000
1.0415	.0000218	5.856	.0007	.0052	.0025	26.0	.03294	.003421	.001
1.0420	.0000624	5.804	.0020	.0088	.0048	35.1	.04440	.004590	.002
1.0425	.0001900	5.748	.0060	.01530	.0089	44.7	.05663	.005827	.005
1.04306	.0014330	5.644	.0446	.0421	.0262	62.5	.07913	.008072	.041
1.0425	.004807	5.581	.1504	.0769	.0490	73.2	.09283	.009417	.138
1.0420	.006741	5.563	.211	.0910	.0584	76.3	.09668	.009794	.194
1.0410	.010227	5.542	.319	.1118	.0724	80.0	.10146	.010248	.295
1.0400	.013504	5.528	.421	.1282	.0834	82.6	.10466	.010568	.390
1.0350	.02889	5.492	.897	.1852	.1232	89.5	.11347	.011418	.837
1.0300	.04364	5.475	1.348	.2249	.1520	93.4	.11831	.011882	1.271
1.0250	.05812	5.464	1.787	.2564	.1759	96.1	.12169	.012205	1.700
1.0200	.07240	5.458	2.22	.2827	.1966	98.2	.12430	.012455	2.130
1.0150	.08655	5.454	2.64	.3054	.2152	99.9	.12643	.012659	2.558
1.0100	.10057	5.451	3.05	.3251	.2321	101.4	.12824	.012831	2.987
1.0050	.11450	5.450	3.45	.3426	.2478	102.7	.12980	.012981	3.418
1.0000	.12832	5.449	3.85	.3582	.2624	103.8	.13119	.013113	3.850
.9950	.14206	5.450	4.24	.3722	.2761	104.8	.13243	.013241	4.283
.9900	.15571	5.451	4.62	.3848	.2890	105.7	.13356	.013339	4.719
.9800	.18278	5.454	5.37	.4065	.3130	107.4	.13554	.013531	5.595
.9700	.2095	5.459	6.10	.4242	.3350	108.8	.13725	.013698	6.471
.9600	.2360	5.465	6.80	.4387	.3552	110.1	.13876	.013835	7.376
.9500	.2622	5.473	7.47	.4504	.3741	111.3	.14010	.013964	8.280
.9400	.2881	5.481	8.13	.4598	.3917	112.3	.14131	.014080	9.196
.9300	.3138	5.490	8.75	.4672	.4083	113.3	.14242	.014187	10.122
.9200	.3391	5.500	9.36	.4728	.4240	114.2	.14345	.014285	11.059
.9100	.3643	5.511	9.94	.4768	.4388	115.1	.14440	.014377	12.008
.9000	.3891	5.522	10.51	.4793	.4529	115.9	.14528	.014462	12.970
.8800	.4380	5.546	11.56	.4808	.4792	117.4	.14690	.014619	14.930
.8600	.4858	5.573	12.53	.4780	.5032	118.7	.14834	.014760	16.945
.8400	.5325	5.602	13.42	.4719	.5253	120.0	.14965	.014888	19.017
.8200	.5781	5.633	14.22	.4629	.5457	121.2	.15085	.015006	21.149
.8000	.6226	5.666	14.94	.4517	.5646	122.3	.15196	.015116	23.347
.7800	.6660	5.702	15.58	.4385	.5822	123.4	.15300	.015219	25.614
.7600	.7082	5.740	16.15	.4237	.5986	124.4	.15397	.015316	27.954
.7400	.7492	5.781	16.63	.4077	.6138	125.4	.15488	.015408	30.374
.7200	.7891	5.824	17.04	.3907	.6281	126.4	.15575	.015496	32.878
.7000	.8277	5.870	17.38	.3730	.6415	127.4	.15657	.015580	35.472
.6800	.8650	5.920	17.65	.3546	.6540	128.3	.15736	.015662	38.163
.6600	.9011	5.973	17.84	.3359	.6658	129.2	.15811	.015740	40.966
.6400	.9359	6.030	17.97	.3170	.6767	130.1	.15884	.015816	43.868
.6200	.9693	6.091	18.03	.2980	.6870	131.1	.15954	.015891	46.899
.6000	1.0013	6.156	18.02	.2790	.6967	132.0	.16021	.015963	50.063
.5800	1.0318	6.227	17.95	.2602	.7057	132.9	.16087	.016034	53.369
.5600	1.0609	6.302	17.82	.2417	.7142	133.8	.16151	.016104	56.833
.5400	1.0884	6.384	17.63	.2236	.7221	134.7	.16213	.016171	60.468
.5200	1.1144	6.473	17.38	.2058	.7295	135.7	.16273	.016241	64.292
.5000	1.1387	6.569	17.08	.1886	.7364	136.6	.16332	.016309	68.324
.4800	1.1614	6.674	16.72	.1720	.7428	137.6	.16390	.016376	72.586
.4600	1.1823	6.789	16.32	.1560	.7488	138.6	.16447	.016443	77.104
.4400	1.2013	6.916	15.86	.1408	.7544	139.6	.16503	.016510	81.910
.4200	1.2185	7.05	15.35	.1262	.7595	140.7	.16558	.016578	87.037
.4000	1.2337	7.21	14.80	.1124	.7643	141.8	.16612	.016646	92.530
.3800	1.2469	7.38	14.21	.0994	.7687	142.9	.16666	.016714	98.439
.3600	1.2579	7.57	13.59	.0872	.7728	144.1	.16719	.016784	104.826
.3400	1.2667	7.79	12.92	.0759	.7765	145.3	.16772	.016856	111.767
.3200	1.2731	8.04	12.22	.0654	.7799	146.6	.16825	.016929	119.356
.3000	1.2771	8.32	11.49	.0557	.7830	148.0	.16877	.017004	127.723
.2800	1.2786	8.65	10.74	.0469	.7858	149.5	.16929	.017082	136.988
.2600	1.2773	9.03	9.96	.0390	.7883	151.1	.16982	.017163	147.379
.2400	1.2732	9.48	9.17	.0318	.7906	152.9	.17034	.017248	159.151
.2200	1.2662	10.02	8.36	.0256	.7926	154.8	.17087	.017339	172.661
.2000	1.2561	10.68	7.54	.0200	.7943	156.9	.17140	.017436	188.416
.1800	1.2429	11.51	6.71	.0153	.7958	159.3	.17194	.017541	207.15
.1600	1.2265	12.56	5.89	.0113	.7971	161.9	.17248	.017657	229.98
.1400	1.2073	13.95	5.07	.0081	.7982	165.1	.17304	.017788	258.70
.1200	1.1856	15.87	4.27	.0054	.7991	168.8	.17361	.017939	296.40
.1000	1.1632	18.64	3.49	.0034	.7999	173.4	.17420	.018121	348.97
.0900	1.1530	20.54	3.11	.0026	.8002	176.1	.17450	.018228	384.32
.0800	1.1447	22.98	2.75	.0019	.8004	179.3	.17481	.018351	429.26
.0700	1.1407	26.21	2.40	.0014	.8007	183.1	.17512	.018495	488.88
.0600	1.1456	30.65	2.06	.0009	.8009	187.8	.17545	.018671	572.81
.0500	1.1702	37.11	1.755	.0006	.8010	193.9	.17579	.018898	702.15
.0400	1.2446	47.20	1.494	.0004	.8012	202.6	.17614	.019214	933.46
.0300	1.4631	63.65	1.317	.0002	.8013	217.1	.17649	.019713	1463.13
.0200	1.9981	83.48	1.199	.0001	.8015	244.9	.17671	.020510	2997.2
.0100	3.4905	90.00	1.047	.0000	.8016	327.5	.17674	.021900	10471.6

TABLE XIX.- VALUES OF $Z_{\bar{}}$ FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS; $\bar{V}_i = 1.04$, $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(f) $\gamma_i = -10.0^{\circ}$, $e_i = 0.19134$

$\bar{V}$	Z	$-\gamma$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\bar{q}}$	t sec	$\frac{\Delta\alpha}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\dot{\bar{V}}}{\bar{V}}$
1.0400	0.0000010	10.000	0.0000	0.0011	0	0	0	0	0.000
1.0405	.0000028	9.972	.0001	.0018	.0003	5.1	.00644	.001134	.000
1.0410	.0000077	9.943	.0002	.0031	.0007	10.3	.01292	.002271	.000
1.0415	.0000216	9.914	.0007	.0052	.0015	15.5	.01945	.003414	.001
1.0420	.0000613	9.885	.0020	.0087	.0028	20.8	.02607	.004571	.002
1.0425	.0001795	9.853	.0056	.0149	.0051	26.3	.03293	.005764	.005
1.0430	.0005927	9.815	.0185	.0270	.0097	32.4	.04059	.007091	.017
1.04327	.002473	9.775	.0773	.0553	.0203	39.7	.04978	.008676	.071
1.0430	.006517	9.746	.204	.0897	.0332	44.7	.05604	.009754	.187
1.0425	.0101444	9.733	.317	.1118	.0416	46.9	.05891	.010247	.292
1.0420	.013353	9.725	.417	.1281	.0479	48.4	.06069	.010553	.384
1.0410	.019317	9.714	.603	.1537	.0578	50.3	.06309	.010954	.557
1.0400	.02500	9.707	.780	.1744	.0658	51.6	.06477	.011242	.721
1.0350	.05191	9.687	1.612	.2483	.0952	55.4	.06956	.012069	1.505
1.0300	.07786	9.678	2.41	.3004	.1167	57.6	.07223	.012525	2.268
1.0250	.10337	9.672	3.18	.3420	.1346	59.1	.07411	.012845	3.026
1.0200	.12858	9.668	3.93	.3768	.1501	60.3	.07556	.013095	3.782
1.0150	.15356	9.666	4.68	.4067	.1641	61.2	.07675	.013294	4.539
1.0100	.17834	9.665	5.40	.4329	.1768	62.1	.07776	.013465	5.297
1.0050	.2029	9.664	6.12	.4562	.1886	62.8	.07864	.013617	6.058
1.0000	.2274	9.664	6.82	.4768	.1995	63.4	.07941	.013748	6.821
.9950	.2517	9.664	7.51	.4954	.2098	64.0	.08011	.013867	7.588
.9900	.2758	9.664	8.19	.5121	.2196	64.5	.08074	.013974	8.357
.9800	.3236	9.666	9.51	.5408	.2376	65.5	.08185	.014163	9.906
.9700	.3709	9.669	10.79	.5643	.2541	66.3	.08280	.014326	11.470
.9600	.4176	9.673	12.03	.5835	.2693	67.0	.08364	.014469	13.049
.9500	.4637	9.677	13.22	.5990	.2835	67.7	.08439	.014597	14.645
.9400	.5094	9.682	14.36	.6114	.2967	68.3	.08508	.014713	16.257
.9300	.5545	9.687	15.47	.6211	.3092	68.8	.08570	.014819	17.886
.9200	.5990	9.692	16.53	.6283	.3210	69.3	.08627	.014917	19.534
.9100	.6431	9.698	17.56	.6335	.3322	69.8	.08680	.015008	21.200
.9000	.6865	9.704	18.54	.6367	.3428	70.3	.08730	.015093	22.885
.8800	.7719	9.718	20.37	.6382	.3628	71.1	.08821	.015248	26.315
.8600	.8550	9.733	22.06	.6342	.3807	71.9	.08902	.015388	29.827
.8400	.9360	9.749	23.59	.6256	.3973	72.6	.08976	.015514	33.427
.8200	1.0146	9.767	24.96	.6133	.4127	73.3	.09043	.015631	37.120
.8000	1.0909	9.786	26.18	.5979	.4270	73.9	.09106	.015739	40.910
.7800	1.1649	9.806	27.26	.5799	.4403	74.5	.09165	.015840	44.804
.7600	1.2364	9.827	28.19	.5599	.4526	75.1	.09220	.015935	48.807
.7400	1.3055	9.850	28.98	.5382	.4642	75.7	.09271	.016025	52.926
.7200	1.3720	9.875	29.64	.5152	.4751	76.3	.09321	.016111	57.168
.7000	1.4360	9.902	30.16	.4913	.4852	76.8	.09368	.016192	61.541
.6800	1.4972	9.930	30.54	.4666	.4947	77.4	.09413	.016271	66.053
.6600	1.5557	9.960	30.80	.4414	.5036	77.9	.09456	.016347	70.713
.6400	1.6114	9.993	30.94	.4160	.5120	78.4	.09498	.016420	75.533
.6200	1.6641	10.028	30.95	.3905	.5198	79.0	.09538	.016491	80.522
.6000	1.7139	10.066	30.85	.3651	.5272	79.5	.09577	.016560	85.694
.5800	1.7605	10.107	30.63	.3399	.5341	80.0	.09615	.016628	91.063
.5600	1.8040	10.151	30.03	.3152	.5406	80.6	.09652	.016694	96.643
.5400	1.8442	10.196	29.88	.2910	.5467	81.1	.09688	.016759	102.454
.5200	1.8809	10.250	29.34	.2674	.5524	81.7	.09723	.016823	108.514
.5000	1.9141	10.307	28.71	.2446	.5577	82.2	.09758	.016886	114.847
.4800	1.9436	10.369	27.99	.2225	.5626	82.8	.09792	.016948	121.477
.4600	1.9693	10.437	27.18	.2014	.5673	83.4	.09826	.017010	128.434
.4400	1.9910	10.512	26.28	.1812	.5716	84.0	.09859	.017071	135.751
.4200	2.0086	10.596	25.31	.1620	.5756	84.7	.09892	.017133	143.470
.4000	2.0218	10.689	24.26	.1439	.5793	85.3	.09925	.017194	151.634
.3800	2.0305	10.793	23.15	.1268	.5828	86.0	.09958	.017256	160.300
.3600	2.0344	10.910	21.97	.1109	.5860	86.8	.09990	.017318	169.532
.3400	2.0333	11.04	20.74	.0961	.5889	87.5	.10022	.017381	179.410
.3200	2.0270	11.20	19.46	.0825	.5916	88.4	.10055	.017445	190.028
.3000	2.0151	11.37	18.14	.0700	.5940	89.2	.10088	.017510	201.51
.2800	1.9973	11.58	16.78	.0586	.5962	90.2	.10121	.017577	213.99
.2600	1.9733	11.82	15.39	.0484	.5983	91.2	.10154	.017646	227.68
.2400	1.9426	12.11	13.99	.0393	.6001	92.3	.10188	.017718	242.82
.2200	1.9048	12.44	12.57	.0313	.6017	93.6	.10222	.017792	259.75
.2000	1.8595	12.90	11.16	.0244	.6031	95.0	.10257	.017872	278.93
.1800	1.8061	13.46	9.75	.0185	.6044	96.6	.10293	.017956	301.01
.1600	1.7440	14.18	8.37	.0135	.6054	98.5	.10331	.018048	327.00
.1400	1.6727	15.16	7.03	.0095	.6064	100.7	.10370	.018150	358.43
.1200	1.5918	16.54	5.73	.0063	.6071	103.4	.10411	.018266	397.96
.1000	1.5016	18.60	4.50	.0039	.6078	106.8	.10454	.018404	450.49
.0900	1.4536	20.06	3.92	.0029	.6080	108.9	.10478	.018485	484.52
.0800	1.4044	21.97	3.37	.0022	.6083	111.4	.10502	.018578	524.64
.0700	1.3556	24.56	2.85	.0015	.6085	114.4	.10527	.018687	580.96
.0600	1.3106	28.24	2.36	.0010	.6086	118.2	.10554	.018821	655.32
.0500	1.2780	33.82	1.917	.0006	.6088	123.3	.10583	.018995	766.85
.0400	1.2841	43.06	1.541	.0004	.6089	130.8	.10616	.019248	963.11
.0300	1.4336	60.01	1.290	.0002	.6090	144.3	.10651	.019690	1433.65
.0200	1.9877	82.90	1.193	.0001	.6092	173.1	.10677	.020504	2981.6
.0100	3.4905	90.00	1.047	.0000	.6093	256.0	.10680	.021900	10471.6

TABLE XX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS SO THAT $\bar{V}_{\gamma=0} = 1.0$; $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$

(a) $\bar{V}_i = 1.10$, $\gamma_i = -3.510^{\circ}$, $e_i = 0.2184$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\dot{q}}$	t sec	$\frac{\rho a}{r}$	$\frac{-\dot{\gamma}}{r}$	$\sqrt{\beta r}\,\frac{\dot{V}}{\bar{V}}$
1.1000	0.0000011	3.510	0.0000	0.0013	0	0	0	0	0.000
1.1005	.0000039	3.275	.0001	.0025	.0012	17.6	.02359	.001348	.000
1.1010	.0000138	3.037	.0005	.0047	.0037	36.7	.04210	.002811	.000
1.1015	.0000520	2.723	.0017	.0092	.0091	58.5	.07863	.004789	.001
1.10203	.0004469	2.156	.0148	.0870	.0348	100.2	.13474	.006672	.012
1.1015	.0014530	1.769	.0480	.0485	.0734	128.6	.17300	.007463	.040
1.1010	.002014	1.647	.0665	.0571	.0910	137.7	.18518	.008347	.055
1.1000	.002956	1.491	.0975	.0690	.1177	149.3	.20078	.008774	.081
1.0980	.004526	1.298	.1491	.0850	.1506	163.8	.22032	.009749	.124
1.0950	.006488	1.113	.213	.1011	.2079	178.1	.23947	.009962	.178
1.0900	.009156	.906	.299	.1187	.2740	194.6	.26147	.010040	.252
1.0800	.013132	.646	.426	.1389	.3826	217.5	.29185	.010[illegible]	.365
1.0700	.015911	.467	.511	.1494	.4758	235.0	.31494	.010[illegible]	.446
1.0600	.017844	.333	.567	.1545	.5607	250.3	.33475	.01061	.505
1.0500	.019130	.228	.603	.1563	.6406	264.3	.35281	.01040	.547
1.0400	.019913	.140	.621	.1557	.7172	277.6	.36990	.01096	.574
1.0300	.02031	.062	.627	.1534	.7915	290.7	.38648	.01099	.591
1.0200	.02041	.037	.625	.1501	.8643	303.8	.40285	.011004	.600
1.0100	.02032	.009	.616	.1462	.9359	317.0	.41921	.011011	.604
1.0000	.02014	.000	.604	.1419	1.0066	330.4	.43568	.011011	.604
.9900	.019952	.010	.593	.1378	1.0769	344.1	.45231	.011012	.605
.9800	.019869	.031	.584	.1340	1.1462	358.0	.46907	.011019	.608
.9600	.02042	.153	.588	.1291	1.2814	386.1	.50238	.011072	.638
.9400	.02261	.353	.638	.1288	1.4087	413.1	.53176	.011206	.722
.9200	.02705	.596	.747	.1335	1.5259	437.1	.56109	.011432	.882
.9000	.03408	.840	.920	.1419	1.6247	457.1	.58335	.011713	1.136
.8800	.04370	1.122	1.154	.1519	1.7122	473.2	.60085	.012014	1.450
.8600	.05578	1.373	1.439	.1620	1.7890	486.1	.61451	.012311	1.946
.8400	.07009	1.609	1.766	.1712	1.8484	496.4	.62529	.012591	2.593
.8200	.08642	1.833	2.13	.1790	1.9031	505.0	.63394	.012850	3.142
.8000	.10458	2.045	2.51	.1851	1.9569	512.1	.64102	.013089	3.922
.7800	.12438	2.248	2.91	.1895	1.9989	518.2	.64692	.013310	4.754
.7600	.14567	2.444	3.32	.1922	2.0300	523.5	.65191	.013515	5.750
.7400	.16832	2.635	3.74	.1933	2.0632	528.2	.65620	.013705	6.824
.7200	.19221	2.823	4.15	.1929	2.0928	532.4	.65994	.013883	8.009
.7000	.2172	3.008	4.56	.1911	2.1195	536.2	.66323	.014050	9.310
.6800	.2433	3.192	4.96	.1881	2.1437	539.7	.66615	.014208	10.733
.6600	.2703	3.376	5.35	.1840	2.1655	542.9	.66876	.014358	12.256
.6400	.2982	3.561	5.72	.1789	2.1853	545.8	.67113	.014501	13.976
.6200	.3268	3.748	6.08	.1730	2.2034	548.6	.67328	.014639	15.813
.6000	.3562	3.938	6.41	.1664	2.2199	551.3	.67524	.014771	17.809
.5800	.3862	4.132	6.72	.1592	2.2349	553.8	.67705	.014898	19.975
.5600	.4168	4.331	7.00	.1515	2.2486	556.2	.67873	.015022	22.327
.5400	.4479	4.536	7.26	.1434	2.2611	558.5	.68028	.015142	24.881
.5200	.4794	4.744	7.48	.1350	2.2726	560.8	.68173	.015260	27.656
.5000	.5113	4.959	7.67	.1264	2.2830	562.9	.68308	.015375	30.679
.4800	.5434	5.200	7.83	.1177	2.2926	565.1	.68435	.015488	33.965
.4600	.5758	5.442	7.95	.1089	2.3013	567.2	.68555	.015600	37.554
.4400	.6084	5.698	8.03	.1002	2.3092	569.2	.68668	.015710	41.460
.4200	.6410	5.970	8.08	.0915	2.3164	571.3	.68776	.015820	45.785
.4000	.6736	6.259	8.08	.0831	2.3230	573.3	.68878	.015929	50.519
.3800	.7061	6.47	8.05	.0748	2.3289	575.4	.68975	.016037	55.743
.3600	.7384	6.91	7.97	.0668	2.3343	577.5	.69068	.016148	61.531
.3400	.7704	7.27	7.86	.0592	2.3391	579.6	.69157	.016259	67.972
.3200	.8019	7.67	7.70	.0519	2.3435	581.7	.69243	.016371	75.180
.3000	.8330	8.12	7.50	.0450	2.3474	583.9	.69325	.016489	83.229
.2800	.8633	8.61	7.25	.0386	2.3508	586.2	.69404	.016601	92.189
.2600	.8929	9.17	6.96	.0326	2.3539	588.5	.69481	.016721	103.024
.2400	.9214	9.81	6.63	.0271	2.3566	591.0	.69555	.016845	115.181
.2200	.9489	10.50	6.26	.0221	2.3589	593.6	.69627	.016974	129.394
.2000	.9750	11.42	5.85	.0177	2.3609	596.4	.69697	.017110	146.250
.1800	.9996	12.47	5.40	.0137	2.3627	599.4	.69766	.017255	166.605
.1600	1.0226	13.77	4.91	.0104	2.3641	602.7	.69833	.017411	191.745
.1400	1.0440	15.42	4.38	.0075	2.3653	606.4	.69899	.017583	223.71
.1200	1.0640	17.60	3.83	.0052	2.3663	610.7	.69964	.017777	265.99
.1000	1.0837	20.65	3.25	.0033	2.3671	615.8	.70029	.017998	325.11
.0900	1.0944	22.69	2.95	.0025	2.3674	618.8	.70061	.018126	364.80
.0800	1.1069	25.24	2.66	.0019	2.3677	622.2	.70093	.018262	415.10
.0700	1.1232	28.55	2.36	.0014	2.3679	626.2	.70126	.018434	481.37
.0600	1.1474	33.02	2.07	.0009	2.3681	631.0	.70159	.018629	573.72
.0500	1.1894	39.37	1.784	.0006	2.3683	637.2	.70192	.018871	713.64
.0400	1.2759	49.03	1.531	.0004	2.3685	645.8	.70226	.019197	956.82
.0300	1.4885	64.42	1.340	.0002	2.3686	659.8	.70258	.019688	1488.47
.0200	2.0009	83.48	1.200	.0001	2.3687	687.0	.70280	.020467	3001.3
.0100	3.4906	60.00	1.047	.0000	2.3688	769.5	.70283	.021854	10471.8

TABLE XX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS SO THAT $\bar{V}_{\gamma=0} = 1.0$; $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(b) $\bar{V}_i = 1.20$, $\gamma_i = -4.850^\circ$, $e_i = 0.4465$

$\bar{V}$	z	γ deg	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\omega}$	t sec	$\frac{\Delta s}{r}$	$\frac{-y}{r}$	$\sqrt{\beta r}\frac{\gamma}{\bar{V}}$
1.2000	0.0000012	4.856	0.0000	0.0017	0	0	0	0	0.000
1.2000	.0000084	4.82	.0003	.0046	.0040	18.3	.02674	.0021[illegible]	.000
1.2010	.0000644	3.847	.0023	.0127	.0083	39.8	.05831	.004[illegible]	.002
1.20129	.0004343	3.022	.0157	.0330	.0269	63.3	.09273	.006[illegible]	.013
1.2010	.0013282	2.507	.0476	.0576	.0531	79.4	.11632	.007787	.033
1.2000	.002980	2.404	.1073	.0861	.0879	92.7	.13585	.008686	.074
1.1980	.005975	2.163	.200	.1173	.1317	104.5	.15313	.009[illegible]	.140
1.1950	.008871	1.971	.318	.1470	.1800	114.5	.16772	.009903	.223
1.1900	.013565	1.750	.484	.1799	.2431	125.0	.18305	.010379	.342
1.1800	.02124	1.327	.752	.2204	.3443	138.5	.20260	.010887	.540
1.1700	.02743	1.109	.963	.2452	.4247	148.1	.21642	.011180	.703
1.1600	.03254	.940	1.133	.2614	.4975	156.0	.22759	.011380	.842
1.1500	.03681	.801	1.270	.2721	.5645	162.8	.23724	.011526	.960
1.1400	.04036	.684	1.381	.2788	.6271	169.0	.24590	.011638	1.062
1.1300	.04331	.581	1.468	.2825	.6862	174.8	.25389	.011727	1.150
1.1200	.04572	.471	1.536	.2839	.7420	180.2	.26138	.011797	1.225
1.1100	.04766	.411	1.587	.2834	.7976	185.4	.26853	.011853	1.288
1.1000	.04919	.339	1.623	.2815	.8504	190.6	.27542	.011898	1.342
1.0800	.05117	.229	1.658	.2742	.9540	200.5	.28870	.011962	1.421
1.0600	.05199	.125	1.653	.2638	1.0499	210.4	.30161	.012000	1.471
1.0400	.05193	.067	1.620	.2514	1.1459	220.4	.31443	.012020	1.498
1.0200	.05128	.035	1.569	.2379	1.2359	230.6	.32734	.012028	1.508
1.0000	.05032	.000	1.510	.2243	1.3260	241.3	.34046	.012029	1.510
.9800	.04937	.016	1.452	.2113	1.4143	252.4	.35384	.012030	1.511
.9600	.04875	.049	1.404	.1994	1.5009	263.8	.36744	.012039	1.523
.9400	.04882	.100	1.377	.1893	1.5846	275.6	.38114	.012064	1.558
.9200	.04993	.171	1.378	.1814	1.6655	287.5	.39469	.012113	1.628
.9000	.05244	.427	1.416	.1760	1.7429	299.3	.40778	.012192	1.748
.8800	.05665	.612	1.496	.1729	1.8146	310.6	.42009	.012303	1.931
.8600	.06279	.819	1.620	.1719	1.8817	321.0	.43135	.012443	2.190
.8400	.07100	1.040	1.789	.1723	1.9428	330.9	.44141	.012605	2.536
.8200	.08134	1.268	[illegible]	.1737	1.9981	339.6	.45026	.012783	2.976
.8000	.09378	1.499	[illegible]	.1753	2.0478	347.4	.45796	.012969	3.517
.7800	.10827	1.729	2.53	.1768	2.0924	354.3	.46463	.013156	4.164
.7600	.12471	1.957	2.84	.1778	2.1324	360.5	.47042	.013342	4.923
.7400	.14299	2.181	3.17	.1781	2.1683	365.9	.47545	.013524	5.797
.7200	.16300	2.402	3.52	.1776	2.2005	370.9	.47985	.013700	6.792
.7000	.18463	2.620	3.88	.1762	2.2295	375.3	.48373	.013870	7.913
.6800	.2078	2.836	4.24	.1738	2.2556	379.4	.48716	.014033	9.166
.6600	.2323	3.051	4.60	.1706	2.2792	383.2	.49022	.014190	10.558
.6400	.2581	3.266	4.96	.1665	2.3006	386.6	.49296	.014341	12.099
.6200	.2851	3.481	5.30	.1616	2.3200	389.8	.49544	.014487	13.796
.6000	.3132	3.698	5.64	.1561	2.3376	392.9	.49768	.014628	15.661
.5800	.3423	3.918	5.96	.1499	2.3536	395.7	.49973	.014765	17.707
.5600	.3724	4.142	6.26	.1432	2.3681	398.4	.50162	.014897	19.949
.5400	.4032	4.371	6.53	.1361	2.3814	401.0	.50335	.015026	22.140
.5200	.4349	4.606	6.76	.1286	2.3934	403.5	.50495	.015152	25.088
.5000	.4671	4.849	7.01	.1208	2.4044	405.9	.50644	.015275	28.028
.4800	.5000	5.101	7.20	.1129	2.4144	408.2	.50783	.015396	31.248
.4600	.5333	5.363	7.39	.1048	2.4234	410.5	.50913	.015515	34.780
.4400	.5670	5.639	7.48	.0967	2.4317	412.7	.51035	.015632	38.661
.4200	.6010	5.929	7.57	.0886	2.4392	414.9	.51150	.015749	42.932
.4000	.6353	6.238	7.42	.0807	2.4459	417.1	.51259	.015864	47.645
.3800	.6696	6.57	7.63	.0728	2.4520	419.3	.51362	.015980	52.863
.3600	.7039	6.92	7.60	.0652	2.4575	421.4	.51459	.016096	58.659
.3400	.7381	7.30	7.53	.0579	2.4625	423.6	.51553	.016212	65.126
.3200	.7720	7.72	7.41	.0509	2.4669	425.9	.51642	.016329	72.378
.3000	.8056	8.18	7.25	.0442	2.4709	428.1	.51727	.016448	80.557
.2800	.8386	8.69	7.04	.0380	2.4744	430.5	.51809	.016569	89.847
.2600	.8709	9.27	6.79	.0322	2.4775	432.9	.51888	.016694	100.484
.2400	.9023	9.92	6.50	.0268	2.4802	435.4	.51964	.016822	112.783
.2200	.9326	10.67	6.16	.0219	2.4826	438.1	.52037	.016955	127.172
.2000	.9616	11.56	5.77	.0175	2.4846	440.9	.52108	.017095	144.245
.1800	.9892	12.63	5.34	.0137	2.4864	443.9	.52178	.017244	164.865
.1600	1.0151	13.93	4.87	.0103	2.4879	447.3	.52246	.017403	190.327
.1400	1.0392	15.59	4.36	.0075	2.4891	451.0	.52312	.017578	222.69
.1200	1.0618	17.78	3.80	.0051	2.4901	455.3	.52377	.017773	265.46
.1000	1.0839	20.83	3.25	.0033	2.4908	460.5	.52442	.017998	325.18
.0900	1.0957	22.87	2.97	.0025	2.4911	463.5	.52474	.018128	365.24
.0800	1.1098	25.42	2.66	.0019	2.4914	466.9	.52506	.018272	415.94
.0700	1.1262	28.72	2.35	.0014	2.4917	470.8	.52539	.018437	482.66
.0600	1.1509	33.17	2.07	.0010	2.4919	475.6	.52572	.018633	575.47
.0500	1.1931	39.49	1.790	.0006	2.4920	481.8	.52605	.018875	715.85
.0400	1.2789	49.09	1.555	.0004	2.4922	490.4	.52638	.019200	949.21
.0300	1.4900	64.42	1.341	.0002	2.4923	504.3	.52671	.019690	1469.98
.0200	2.0009	83.47	1.201	.0001	2.4924	531.5	.52692	.020468	3001.3
.0100	3.4906	90.00	1.047	.0000	2.4926	614.0	.52695	.021856	10471.8

TABLE XX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS SO THAT $\bar{V}_{\gamma=0} = 1.0$; $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(c) $\bar{V}_i = 1.30$, $\gamma_i = -5.735^{\circ}$, $e_i = 0.6938$

$\bar{V}$	z	$\frac{-\gamma}{\cos\gamma}$	$-\frac{a_r}{g}$	$\bar{q}$	$\bar{\xi}$	t, sec	$\frac{\Delta\bar{V}}{\bar{V}}$	$\frac{-\Delta\bar{V}}{r}$	$\sqrt{\beta r}\,\frac{\Delta\bar{V}}{\bar{V}}$
1.3000	0.0000013	[illegible]	0.0001	0.0022	0	0	0	0	0.000
1.3002	.0000060	[illegible]	.0002	.0047	.001[illegible]	11.1	.01748	.001[illegible]	.000
1.3004	.0000190	[illegible]	.0011	.0104	.004[illegible]	23.5	.03717	.001448	.001
1.3005	.0002832	4.10[illegible]	.0110	.0325	.016[illegible]	43.6	.05946	.005981	.0[illegible]
1.3005	.0007136	3.759	.0278	.0515	.033[illegible]	53.3	.08439	.007008	.01[illegible]
1.3000	.0018704	[illegible]	.0729	.0833	.060[illegible]	64.1	.10162	.008[illegible]	.0[illegible]
1.2980	.005295	[illegible]	.206	.1397	.114[illegible]	77.6	.12296	.009[illegible]	.1[illegible]
1.2950	.009595	2.530	.371	.1869	.167	86.5	.13706	.009[illegible]	[illegible]
1.2900	.015814	[illegible]	.612	.2377	.233[illegible]	95.1	.15055	.010[illegible]	.3[illegible]
1.2800	.02631	[illegible]	1.010	.3007	.3[illegible]	105.3	.16670	.011[illegible]	.6[illegible]
1.2600	.04281	[illegible]	1.618	.3687	.4904	117.9	.18622	.011[illegible]	1.01[illegible]
1.2400	.05546	[illegible]	2.06	.4032	.6166	126.8	.19982	.011[illegible]	1.34[illegible]
1.2200	.06535	[illegible]	2.39	.4203	.7880	134.2	.21087	.012[illegible]	1.60[illegible]
1.2000	.07303	[illegible]	2.63	.4263	.829[illegible]	140.7	.22050	.012241	1.82[illegible]
1.1800	.07890	[illegible]	2.79	.4249	.923[illegible]	146.7	.22928	.012[illegible]	
1.1600	.08322	[illegible]	2.89	.4181	1.012[illegible]	152.5	.23750	.012[illegible]	2.1[illegible]
1.1400	.08622	[illegible]	2.95	.4074	1.095[illegible]	158.1	.24537	.012462	2.2[illegible]
1.1200	.08807	[illegible]	2.96	.3940	1.178[illegible]	163.6	.25302	.012[illegible]	2.3[illegible]
1.1000	.08894	[illegible]	2.94	.3785	1.257[illegible]	169.1	.26055	.012[illegible]	2.42[illegible]
1.0800	.08900	[illegible]	2.88	.3616	1.333[illegible]	174.8	.26804	.012577	2.47[illegible]
1.0600	.08839	[illegible]	2.81	.3439	1.407[illegible]	180.5	.27555	.012[illegible]	2.50[illegible]
1.0400	.08727	[illegible]	2.72	.3259	1.480[illegible]	186.4	.28314	.012[illegible]	2.51[illegible]
1.0200	.08580	[illegible]	2.63	.3078	1.551[illegible]	192.5	.29084	.012600	2.5[illegible]
1.0000	.08414	[illegible]	2.52	.2901	1.621[illegible]	198.9	.29869	.012600	2.52[illegible]
.9800	.08252	[illegible]	2.43	.2731	1.6894	205.5	.30669	.012600	2.52[illegible]
.9600	.08107	[illegible]	2.33	.2571	1.756[illegible]	212.4	.31484	.012604	2.53[illegible]
.9400	.08000	[illegible]	2.26	.2424	1.8216	219.5	.32313	.012613	2.554
.9200	.07963	[illegible]	2.20	.2291	1.8851	226.9	.33149	.012631	2.567
.9000	.08021	[illegible]	2.16	.2175	1.9468	234.4	.33985	.012[illegible]	2.670
.8800	.08[illegible]	.389	2.16	.2076	2.0058	242.0	.34812	.012[illegible]	2.78[illegible]
.8600	.084[illegible]	.537	2.18	.1995	2.0623	249.6	.35616	.012774	2.95[illegible]
.8400	.089[illegible]	.70[illegible]	2.25	.1930	2.1157	257.0	.36388	.012[illegible]	3.182
.8200	.095[illegible]	.89[illegible]	2.34	.1880	2.1657	264.2	.37115	.012918	3.484
.8000	.103[illegible]	1.09[illegible]	2.48	.1840	2.2125	271.0	.37791	.013070	3.874
.7800	.11325	1.312	2.65	.1808	2.2558	277.4	.38411	.013206	4.350
.7600	.12514	1.533	2.85	.1781	2.2947	283.4	.38975	.013340	4.940
.7400	.13864	1.740	3.09	.1756	2.3307	289.0	.39484	.013458	5.635
.7200	.15474	1.990	3.34	.1730	2.3635	294.1	.39943	.013642	6.447
.7000	.17254	2.28[illegible]	3.62	.1702	2.3934	298.8	.40354	.013793	7.367
.6800	.19177	2.45[illegible]	3.91	.1670	2.4205	303.2	.40723	.013943	8.460
.6600	.2129	2.688	4.22	.1633	2.4451	307.3	.41056	.014061	9.67[illegible]
.6400	.2354	2.92[illegible]	4.52	.1591	2.4675	311.1	.41356	.014240	11.04[illegible]
.6200	.2599	3.160	4.83	.1543	2.4878	314.6	.41628	.014364	12.57[illegible]
.6000	.2856	3.39[illegible]	5.14	.1490	2.5062	317.9	.41874	.014528	14.27[illegible]
.5800	.3126	3.63[illegible]	5.44	.1432	2.5229	321.0	.42099	.014665	16.17[illegible]
.5600	.3409	3.884	[illegible]	.1370	2.5382	324.0	.42305	.014759	18.262
.5400	.3703	4.134	6.00	.1304	2.5522	326.8	.42494	.014931	20.574
.5200	.4008	4.390	6.25	.1234	2.5645	329.5	.42668	.015061	23.12[illegible]
.5000	.4323	4.65[illegible]	6.48	.1162	2.5760	332.1	.42830	.015188	25.938
.4800	.4646	4.924	6.69	.1088	2.5863	334.6	.42980	.015314	29.039
.4600	.4977	5.207	6.87	.1012	2.5957	337.0	.43119	.015437	32.434
.4400	.5315	5.501	7.02	.0936	2.6043	339.4	.43250	.015560	36.239
.4200	.5659	5.811	7.13	.0860	2.6120	341.8	.43372	.015681	40.418
.4000	.6007	6.138	7.21	.0784	2.6189	344.1	.43488	.01580	45.050
.3800	.6358	6.48	7.25	.0710	2.6252	346.4	.43596	.015928	50.197
.3600	.6712	6.86	7.25	.0637	2.6309	348.7	.43699	.016044	55.935
.3400	.7067	7.26	7.21	.0567	2.6359	351.0	.43797	.016163	62.357
.3200	.7422	7.69	7.12	.0499	2.6405	353.3	.43890	.016288	69.578
.3000	.7774	8.17	7.00	.0435	2.6445	355.6	.43978	.016408	77.744
.2800	.8124	8.70	6.82	.0374	2.6481	358.1	.44063	.016532	87.039
.2600	.8468	9.29	6.60	.0317	2.6512	360.6	.44144	.016665	97.705
.2400	.8805	9.96	6.34	.0265	2.6540	363.1	.44222	.016794	110.058
.2200	.9132	10.74	6.03	.0217	2.6564	365.9	.44297	.016933	124.532
.2000	.9449	11.64	5.67	.0174	2.6585	368.8	.44370	.017075	141.728
.1800	.9751	12.72	5.27	.0136	2.6602	371.9	.44441	.017227	162.515
.1600	1.0037	14.05	4.82	.0103	2.6617	375.3	.44509	.017396	188.202
.1400	1.0307	15.73	4.33	.0074	2.6629	379.1	.44576	.017568	220.86
.1200	1.0561	17.93	3.80	.0051	2.6639	383.4	.44642	.017764	264.03
.1000	1.0810	20.99	3.24	.0033	2.6647	388.5	.44707	.017995	324.29
.0900	1.0940	23.03	2.95	.0025	2.6650	391.5	.44740	.018124	364.68
.0800	1.1087	25.59	2.66	.0019	2.6653	394.9	.44772	.018271	415.77
.0700	1.1269	28.89	2.37	.0014	2.6655	398.7	.44804	.018437	482.95
.0600	1.1526	33.33	2.07	.0010	2.6657	403.7	.44837	.018614	576.31
.0500	1.1955	39.62	1.793	.0006	2.6659	409.9	.44870	.018877	717.29
.0400	1.2816	49.19	1.536	.0004	2.6660	418.4	.44904	.019204	961.18
.0300	1.4916	64.45	1.342	.0002	2.6662	432.[illegible]	.44936	.019690	1491.64
.0200	2.0010	83.46	1.201	.0001	2.6663	4[illegible]	.44957	.020467	3001.5
.0100	3.4906	90.00	1.047	.0000	2.6664	442.6	.44960	.021856	10471.8

TABLE XX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS SO THAT $\bar{V}_{\gamma=0} = 1.0$; $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(d) $\bar{V}_i = \sqrt{2}$, $\gamma_i = -6.460^\circ$, $e_i = 1.0000$

$\bar{V}$	z	γ deg	$-\frac{a_x}{g}$	$\bar{\tau}$	$\bar{q}$	t sec	$\frac{\Delta x}{r}$	$\frac{\Delta y}{r}$	$\sqrt{\frac{\pi}{2}}\frac{z}{\bar{V}}$
1.41421	0.0000014	6.460	0.0001	0.0028	0	0	0	0	0.000
1.41421	.0000124	5.813	.0005	.0084	.0025	13.1	.02257	.002426	.000
1.41420	.0000[illegible]	5.41[illegible]	.0018	.0156	.0060	21.3	.03661	.003[illegible]	.001
1.41415	.0001[illegible]	4.904	.0075	.0316	.0144	31.6	.05429	.005[illegible]	.004
1.41410	.0003[illegible]	4.709	.0128	.0413	.0199	35.5	.06112	.005[illegible]	.006
1.4140	.0005[illegible]	4.477	.0230	.0554	.0286	40.2	.06921	.006[illegible]	.012
1.4135	.0016[illegible]	3.993	.0694	.0961	.0544	50.0	.08612	.007[illegible]	.035
1.4130	.0026[illegible]	3.77[illegible]	.1126	.1223	.0727	54.4	.09370	.008393	.056
1.4120	.0045[illegible]	3.507	.1939	.1599	.1009	59.9	.10313	.008[illegible]	.097
1.4110	.0063[illegible]	3.331	.268	.1883	.1237	63.5	.10930	.009[illegible]	.135
1.4100	.0080[illegible]	3.19[illegible]	.340	.2117	.1435	66.2	.11395	.009[illegible]	.171
1.4050	.0157[illegible]	2.77[illegible]	.665	.2939	.2208	74.6	.12835	.010[illegible]	.337
1.4000	.0226[illegible]	2.54[illegible]	.958	.3492	.2809	79.7	.13708	.010[illegible]	.486
1.3900	.0348[illegible]	2.217	1.455	.4255	.3784	86.5	.14878	.011[illegible]	.753
1.3800	.0455[illegible]	1.989	1.887	.4776	.4599	91.4	.15710	.011[illegible]	.991
1.3600	.0637[illegible]	1.661	2.60	.5448	.5973	98.8	.16934	.011[illegible]	1.407
1.3400	.0788[illegible]	1.419	3.17	.5835	.7149	104.4	.17870	.012[illegible]	1.765
1.3200	.0913[illegible]	1.224	3.62	.6050	.8201	109.2	.18654	.012[illegible]	2.076
1.3000	.1018[illegible]	1.059	3.97	.6148	.9166	113.6	.19344	.012[illegible]	2.349
1.2800	.1104[illegible]	.915	4.24	.6161	1.0066	117.5	.19972	.012646	2.589
1.2600	.1175[illegible]	.789	4.45	.6111	1.0914	121.3	.20556	.012733	2.800
1.2400	.1233[illegible]	.673	4.59	.6012	1.1720	124.9	.21110	.012803	2.983
1.2200	.1277[illegible]	.570	4.68	.5877	1.2490	128.5	.21641	.012861	3.143
1.2000	.1311[illegible]	.477	4.72	.5712	1.3230	131.9	.22156	.012908	3.2[illegible]
1.1800	.1334[illegible]	.39[illegible]	4.72	.5525	1.3944	135.4	.22660	.012946	3.3[illegible]
1.1600	.1348[illegible]	.31[illegible]	4.69	.5322	1.4635	138.9	.23156	.012977	3.4[illegible]
1.1400	.1354[illegible]	.24[illegible]	4.63	.5106	1.5306	142.4	.23650	.013001	3.5[illegible]
1.1200	.1352[illegible]	.18[illegible]	4.55	.4883	1.5959	146.0	.24142	.013019	3.6[illegible]
1.1000	.1345[illegible]	.13[illegible]	4.44	.4654	1.6596	149.6	.24636	.013033	3.666
1.0800	.1331[illegible]	.08[illegible]	4.32	.4424	1.7218	153.3	.25135	.013044	3.699
1.0600	.1314[illegible]	.05[illegible]	4.18	.4194	1.7827	157.2	.25638	.013[illegible]	3.719
1.0400	.1293[illegible]	.02[illegible]	4.03	.3966	1.8423	161.2	.26150	.013[illegible]	3.730
1.0200	.1269[illegible]	.00[illegible]	3.89	.3744	1.9007	165.3	.26670	.013[illegible]	3.734
1.0000	.1244[illegible]	.00[illegible]	3.74	.3528	1.9579	169.6	.27200	.013[illegible]	3.[illegible]
.9800	.1220[illegible]	.00[illegible]	3.59	.3321	2.0141	174.1	.27741	.013[illegible]	3.7[illegible]
.9600	.1197[illegible]	.02[illegible]	3.45	.3124	2.0690	178.7	.28293	.013[illegible]	3.74[illegible]
.9400	.1176[illegible]	.06[illegible]	3.32	.2938	2.1228	183.6	.28855	.013[illegible]	3.7[illegible]
.9200	.1160[illegible]	.112	3.20	.2765	2.1753	188.6	.29426	.013[illegible]	3.7[illegible]
.9000	.1150[illegible]	.161	3.11	.2606	2.2264	193.8	.30003	.013[illegible]	3.[illegible]
.8800	.1147[illegible]	.26[illegible]	3.03	.2461	2.2760	199.1	.30584	.013[illegible]	3.[illegible]
.8600	.1154[illegible]	.37[illegible]	2.98	.2331	2.3239	204.6	.31164	.013[illegible]	4.0[illegible]
.8400	.1173[illegible]	.50[illegible]	2.96	.2215	2.3699	210.1	.31739	.013[illegible]	4.1[illegible]
.8200	.1204[illegible]	.64[illegible]	2.96	.2114	2.4139	215.6	.32301	.013[illegible]	4.4[illegible]
.8000	.1251[illegible]	.811	3.00	.2025	2.4557	222.1	.32846	.013[illegible]	4.[illegible]
.7800	.1313[illegible]	.991	3.07	.1947	2.4951	226.6	.33369	.013[illegible]	5.0[illegible]
.7600	.1392[illegible]	1.186	3.18	.1879	2.5320	231.8	.33864	.013[illegible]	5.[illegible]
.7400	.1489[illegible]	1.393	3.31	.1818	2.5664	236.9	.34330	.013[illegible]	6.0[illegible]
.7200	.1605[illegible]	1.611	3.47	.1763	2.5983	241.8	.34763	.013[illegible]	6.[illegible]
.7000	.1739[illegible]	1.83[illegible]	3.65	.1710	2.6278	246.4	.35165	.013821	7.4[illegible]
.6800	.1893[illegible]	2.071	3.86	.1659	2.6549	250.8	.35535	.013947	8.[illegible]
.6600	.2065	2.309	4.09	.1608	2.6798	254.9	.35875	.014077	9.[illegible]
.6400	.2255	2.55[illegible]	4.33	.1556	2.7025	258.9	.36186	.014204	10.[illegible]
.6200	.2463	2.80[illegible]	4.58	.1502	2.7233	262.6	.36471	.014342	11.[illegible]
.6000	.2688	3.05[illegible]	4.84	.1446	2.7423	266.1	.36732	.014[illegible]	13.4[illegible]
.5800	.2929	3.310	5.10	.1386	2.7595	269.4	.36972	.014609	15.148
.5600	.3185	3.57[illegible]	5.35	.1324	2.7753	272.6	.37192	.014741	17.063
.5400	.3456	3.840	5.60	.1260	2.7896	275.6	.37394	.014872	19.200
.5200	.3741	4.11[illegible]	5.84	.1193	2.8026	278.5	.37581	.015002	21.55[illegible]
.5000	.4038	4.39[illegible]	6.06	.1123	2.8144	281.2	.37754	.015131	24.28[illegible]
.4800	.4347	4.687	6.26	.1053	2.8251	283.9	.37915	.015260	27.172
.4600	.4668	4.98[illegible]	6.44	.0981	2.8348	286.5	.38064	.015388	30.441
.4400	.4997	5.30[illegible]	6.60	.0908	2.8436	289.1	.38203	.015509	34.074
.4200	.5336	5.631	6.72	.0835	2.8516	291.6	.38333	.015634	38.115
.4000	.5682	5.97[illegible]	6.82	.0763	2.8588	294.0	.38456	.015758	42.6[illegible]
.3800	.6035	6.34	6.88	.0691	2.8652	296.4	.38514	.015882	47.644
.3600	.6393	6.74	6.90	.0622	2.8710	298.9	.38679	.016006	53.2[illegible]
.3400	.6754	7.16	6.89	.0554	2.8762	301.3	.38781	.016121	59.597
.3200	.7118	7.61	6.83	.0489	2.8809	303.7	.38878	.016[illegible]	66.735
.3000	.7483	8.11	6.74	.0426	2.8850	306.1	.38970	.0163[illegible]	74.833
.2800	.7847	8.66	6.59	.0368	2.8886	308.7	.39058	.016513	84.077
.2600	.8208	9.27	6.40	.0312	2.8918	311.2	.39142	.016645	94.712
.2400	.8565	9.96	6.17	.0261	2.8946	313.9	.39223	.016772	107.06[illegible]
.2200	.8914	10.76	5.88	.0214	2.8971	316.7	.39300	.016[illegible]	121.5[illegible]
.2000	.9254	11.68	5.55	.0172	2.8992	319.7	.39375	.017070	138.810
.1800	.9583	12.79	5.17	.0135	2.9009	322.8	.39447	.017[illegible]	159.717
.1600	.9897	14.13	4.75	.0102	2.9024	326.3	.39516	.017[illegible]	185.5[illegible]
.1400	1.0195	15.83	4.28	.0074	2.9037	330.1	.39584	.017[illegible]	218.[illegible]
.1200	1.0479	18.06	3.77	.0051	2.9047	334.5	.39651	.017[illegible]	261.[illegible]
.1000	1.0758	21.14	3.23	.0033	2.9054	339.7	.39716	.018[illegible]	322.[illegible]
.0900	1.0904	23.19	2.94	.0025	2.9058	342.7	.39749	.018[illegible]	363.[illegible]
.0800	1.1065	25.75	2.66	.0019	2.9060	346.1	.39781	.018[illegible]	414.94
.0700	1.1261	29.06	2.36	.0014	2.9062	350.1	.39813	.018[illegible]	482.[illegible]
.0600	1.1532	33.49	2.08	.0010	2.9065	354.9	.39846	.018[illegible]	576.56
.0500	1.1971	39.78	1.796	.0006	2.9067	361.1	.39879	.018[illegible]	718.[illegible]
.0400	1.2839	49.32	1.541	.0004	2.9068	369.6	.39912	.019[illegible]	962.9[illegible]
.0300	1.4934	64.50	1.344	.0002	2.9069	383.5	.39945	.019710	1493.43
.0200	2.0011	83.47	1.201	.0001	2.9071	410.6	.39966	.020[illegible]	3001.7
.0100	3.4829	90.00	1.045	.0000	2.9072	492.9	.39969	.021871	10448.6

TABLE XX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS SO THAT $\bar{V}_{\gamma=0} = 1.0$; $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Continued

(e) $\bar{V}_i = \sqrt{3}$, $\gamma_i = -7.669^{\circ}$, $e_i = 1.9866$

$\bar{V}$	Z	$-\gamma$ deg	$-\frac{\dot{\gamma}r}{\bar{g}}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{Z}{\bar{q}}$
1.7320	0.0000017	7.669	0.0001	0.0052	0	0	0	0	0.000
1.7310	.0000437	5.567	.0023	.0261	.0066	13.7	.02887	.003606	.001
1.7300	.000578	5.533	.0300	.0946	.0322	26.6	.05597	.006477	.010
1.7280	.004114	4.594	.213	.2518	.1021	38.3	.08060	.008660	.071
1.7250	.010203	4.065	.528	.3948	.1763	44.7	.09395	.009673	.179
1.7200	.019823	3.670	1.023	.5463	.2657	49.9	.10488	.010414	.346
1.7150	.02879	3.414	1.481	.6535	.3364	53.1	.11163	.010832	.504
1.7100	.03723	3.226	1.910	.7378	.3972	55.0	.11661	.011121	.653
1.7000	.05291	2.949	2.70	.8668	.5012	59.0	.12397	.011518	.934
1.6800	.08073	2.577	4.07	1.0394	.6707	63.9	.13397	.012000	1.441
1.6600	.10505	2.314	5.23	1.1507	.8120	67.4	.14118	.012306	1.898
1.6400	.12668	2.105	6.23	1.2259	.9363	70.2	.14688	.012528	2.317
1.6200	.14608	1.931	7.10	1.2767	1.0488	72.7	.15176	.012700	2.705
1.6000	.16353	1.780	7.85	1.3095	1.1525	74.9	.15606	.012839	3.066
1.5500	.2000	1.467	9.30	1.3377	1.3840	79.6	.16521	.013098	3.871
1.5000	.2279	1.213	10.26	1.3156	1.5873	83.8	.17298	.013280	4.559
1.4500	.2487	.997	10.82	1.2625	1.7706	87.6	.17996	.013414	5.145
1.4000	.2632	.808	11.06	1.1899	1.9386	91.4	.18646	.013516	5.641
1.3500	.2724	.640	11.03	1.1052	2.0943	95.1	.19267	.013595	6.053
1.3000	.2768	.490	10.79	1.0137	2.2398	98.8	.19873	.013654	6.387
1.2500	.2770	.358	10.39	.9194	2.3765	102.7	.20475	.013699	6.648
1.2000	.2736	.242	9.85	.8250	2.5057	106.7	.21080	.013730	6.839
1.1800	.2713	.201	9.60	.7878	2.5554	108.4	.21324	.013740	6.897
1.1600	.2686	.163	9.35	.7511	2.6042	110.2	.21571	.013748	6.946
1.1400	.2655	.128	9.08	.7149	2.6519	111.9	.21821	.013754	6.986
1.1200	.2620	.097	8.80	.6795	2.6987	113.7	.22074	.013759	7.017
1.1000	.2582	.069	8.52	.6448	2.7445	115.6	.22330	.013762	7.041
1.0800	.2541	.046	8.23	.6110	2.7895	117.6	.22590	.013765	7.057
1.0600	.2497	.026	7.94	.5781	2.8336	119.6	.22855	.013767	7.067
1.0400	.2452	.012	7.65	.5462	2.8769	121.7	.23125	.013768	7.073
1.0200	.2406	.003	7.36	.5154	2.9193	123.9	.23399	.013768	7.075
1.0000	.2359	.000	7.08	.4857	2.9609	126.1	.23679	.013768	7.076
.9800	.2312	.003	6.80	.4571	3.0017	128.5	.23965	.013768	7.076
.9600	.2265	.014	6.52	.4298	3.0416	130.9	.24256	.013768	7.075
.9400	.2220	.032	6.25	.4037	3.0807	133.5	.24553	.013770	7.074
.9200	.2178	.059	6.01	.3789	3.1190	136.1	.24856	.013772	7.101
.9000	.2138	.096	5.77	.3554	3.1563	139.9	.25165	.013776	7.128
.8800	.2103	.144	5.55	.3332	3.1928	143.8	.25480	.013783	7.170
.8600	.2073	.202	5.35	.3123	3.2283	144.4	.25799	.013792	7.234
.8400	.2050	.274	5.16	.2928	3.2629	147.4	.26123	.013806	7.320
.8200	.2033	.358	5.00	.2746	3.2964	151.2	.26450	.013824	7.430
.8000	.2026	.457	4.86	.2577	3.3288	154.5	.26779	.013847	7.597
.7800	.2028	.571	4.75	.2420	3.3600	157.9	.27108	.013876	7.802
.7600	.2042	.700	4.66	.2276	3.3900	161.4	.27436	.013913	8.061
.7400	.2068	.845	4.59	.2142	3.4188	164.9	.27762	.013957	8.389
.7200	.2108	1.006	4.55	.2020	3.4461	168.5	.28082	.014008	8.784
.7000	.2163	1.183	4.54	.1907	3.4721	172.1	.28395	.014062	9.269
.6800	.2233	1.375	4.56	.1802	3.4967	175.7	.28700	.014136	9.859
.6600	.2321	1.582	4.60	.1705	3.5198	179.3	.28994	.014216	10.549
.6400	.2426	1.803	4.66	.1614	3.5414	182.9	.29276	.014295	11.370
.6200	.2549	2.038	4.74	.1528	3.5616	186.4	.29545	.014385	12.333
.6000	.2691	2.285	4.84	.1446	3.5803	189.8	.29802	.014482	13.453
.5800	.2851	2.545	4.96	.1368	3.5977	193.2	.30045	.014584	14.74
.5600	.3031	2.817	5.09	.1292	3.6137	196.5	.30273	.014691	16.23
.5400	.3229	3.101	5.23	.1218	3.6284	199.7	.30488	.014802	17.940
.5200	.3446	3.396	5.38	.1145	3.6419	202.8	.30689	.014916	19.88
.5000	.3682	3.704	5.52	.1073	3.6542	205.8	.30878	.015033	22.090
.4800	.3935	4.024	5.67	.1001	3.6655	208.8	.31054	.015154	24.594
.4600	.4205	4.358	5.80	.0931	3.6757	211.7	.31220	.015277	27.424
.4400	.4492	4.707	5.93	.0861	3.6850	214.5	.31375	.015396	30.624
.4200	.4794	5.074	6.04	.0792	3.6934	217.2	.31520	.015520	34.240
.4000	.5110	5.460	6.13	.0723	3.7009	220.0	.31656	.015645	38.327
.3800	.5440	5.87	6.20	.0657	3.7077	222.7	.31783	.015773	42.951
.3600	.5783	6.30	6.25	.0591	3.7138	225.3	.31903	.015900	48.19
.3400	.6137	6.77	6.26	.0528	3.7193	228.0	.32017	.016029	54.14
.3200	.6500	7.27	6.24	.0467	3.7242	230.7	.32123	.016160	60.93
.3000	.6871	7.81	6.18	.0409	3.7285	233.3	.32224	.016294	68.711
.2800	.7249	8.41	6.09	.0353	3.7323	236.1	.32320	.016430	77.665
.2600	.7631	9.07	5.95	.0301	3.7356	238.9	.32411	.016566	88.04
.2400	.8015	9.83	5.77	.0253	3.7385	241.7	.32497	.016713	100.19
.2200	.8400	10.66	5.54	.0208	3.7410	244.7	.32580	.016862	114.54
.2000	.8782	11.64	5.27	.0168	3.7432	247.8	.32658	.017017	131.72
.1800	.9158	12.80	4.95	.0132	3.7450	251.2	.32734	.017181	152.64
.1600	.9527	14.21	4.57	.0100	3.7465	254.8	.32807	.017355	178.640
.1400	.9887	15.97	4.19	.0073	3.7478	258.8	.32878	.017542	211.86
.1200	1.0237	18.26	3.69	.0051	3.7488	263.3	.32946	.017755	255.9
.1000	1.0587	21.41	3.18	.0033	3.7496	268.6	.33013	.017995	317.6
.0900	1.0769	23.49	2.91	.0025	3.7499	271.7	.33046	.018133	358.9
.0800	1.0968	26.09	2.63	.0019	3.7502	275.1	.33079	.018286	411.30
.0700	1.1201	29.42	2.35	.0014	3.7504	279.2	.33111	.018454	480.0
.0600	1.1509	33.87	2.07	.0010	3.7506	284.0	.33144	.018655	575.4
.0500	1.1983	40.16	1.798	.0006	3.7508	290.2	.33177	.018903	718.9
.0400	1.2878	49.64	1.545	.0004	3.7510	298.7	.33210	.019231	965.8
.0300	1.4974	64.66	1.348	.0002	3.7511	312.6	.33248	.019719	1497.3
.0200	2.0016	83.48	1.201	.0001	3.7512	339.6	.33263	.020491	3002.4
.0100	3.4900	90.00	1.047	.0000	3.7513	422.1	.33266	.021879	10470.1

TABLE XX.- VALUES OF Z FUNCTION AND RELATED QUANTITIES FOR BALLISTIC ENTRY INTO ATMOSPHERE OF VENUS SO THAT $\bar{V}_{\gamma=0} = 1.0$; $\bar{u}_a = 0$, $Z_i = \bar{V}_i \times 10^{-6}$, $\beta r = 900$ - Concluded

(f) $\bar{V}_i = 2.0$, $\gamma_i = -8.240^\circ$, $e_i = 2.9725$

$\bar{V}$	z	$-\gamma$ deg	$-\frac{\beta r}{\sigma}$	$\bar{q}$	$\bar{Q}$	t sec	$\frac{\Delta\theta}{r}$	$\frac{-\Delta\gamma}{r}$	$\sqrt{\beta r}\,\frac{\Delta}{\bar{V}}$
2.0000	0.0000000	8.240	0.0001	0.0080	0	0	0	0	0.000
.9990	.0000124	7.624	.0007	.0196	.0028	5.9	.01433	.00192	.008
.9980	.0000724	6.962	.0043	.0476	.0103	12.3	.02975	.00393	.031
.9960	.001307	5.711	.0783	.2035	.0586	24.3	.05888	.00729	.020
.9940	.004848	5.047	.290	.3909	.1262	30.7	.07436	.00862	.074
.9920	.009040	4.698	.540	.5326	.1827	34.0	.08251	.00931	.136
.9900	.013311	4.467	.795	.6445	.2303	36.2	.08788	.009793	.201
.9850	.02372	4.099	1.412	.8549	.3276	39.8	.09649	.010432	.358
.9800	.03364	3.859	1.998	1.0118	.4071	42.1	.10211	.010823	.510
.9700	.05223	3.533	3.09	1.2449	.5384	45.3	.10977	.011316	.795
.9600	.06951	3.303	4.09	1.4179	.6486	47.5	.11518	.011641	1.065
.9400	.10104	2.974	5.88	1.6663	.8337	50.8	.12297	.012065	1.573
.9200	.12947	2.732	7.46	1.8379	.9908	53.3	.12873	.012355	2.025
.9000	.15540	2.539	8.86	1.9616	1.1301	55.3	.13339	.012569	2.444
.8500	.2116	2.166	11.74	2.1414	1.4292	59.2	.14246	.012942	3.412
.8000	.2579	1.882	13.95	2.2075	1.6831	62.4	.14954	.013194	4.294
.7500	.2961	1.648	15.55	2.2046	1.9075	65.2	.15555	.013377	5.07[illegible]
.7000	.3275	1.445	16.70	2.1563	2.1101	67.7	.16088	.013521	5.774
.6500	.3527	1.264	17.46	2.0768	2.2958	70.1	.16577	.013637	6.412
.6000	.3724	1.101	17.88	1.9761	2.4677	72.4	.17036	.013732	6.995
.5500	.3872	.951	18.00	1.8611	2.6280	74.7	.17475	.013816	7.476
.5000	.3973	.812	17.88	1.7371	2.7782	76.9	.17899	.013875	7.944
.4500	.4033	.684	17.54	1.6079	2.9197	79.3	.18315	.013929	8.346
.4000	.4054	.564	17.03	1.4767	3.0534	81.6	.18727	.013974	8.656
.3500	.4040	.453	16.36	1.3459	3.1801	84.1	.19138	.014011	8.9[illegible]
.3000	.3993	.351	15.57	1.2176	3.3004	86.6	.19553	.014040	9.215
.2500	.3917	.258	14.69	1.0934	3.4149	89.3	.19974	.014062	9.402
.2000	.3816	.176	13.74	.9744	3.5249	92.2	.20405	.014078	9.540
.1500	.3693	.106	12.74	.8618	3.6278	95.3	.20849	.014089	9.653
.1000	.3552	.050	11.72	.7563	3.7269	98.6	.21309	.014095	9.696
.0500	.3398	.014	10.70	.6585	3.8214	102.3	.21788	.014098	9.708
.0000	.3237	.000	9.71	.5690	3.9115	106.3	.22291	.014098	9.712
.9800	.3173	.002	9.33	.5355	3.9463	108.0	.22499	.014098	9.712
.9600	.3108	.010	8.95	.5034	3.9804	109.8	.22711	.014098	9.714
.9400	.3045	.024	8.59	.4728	4.0138	111.7	.22928	.014099	9.719
.9200	.2984	.044	8.24	.4435	4.0465	113.6	.23149	.014100	9.731
.9000	.2925	.070	7.90	.4156	4.0784	115.7	.23375	.014102	9.750
.8800	.2869	.105	7.57	.3891	4.1096	117.8	.23605	.014106	9.781
.8600	.2817	.148	7.27	.3640	4.1401	120.0	.23840	.014111	9.826
.8400	.2769	.201	6.98	.3403	4.1697	122.3	.24078	.014117	9.890
.8200	.2727	.264	6.71	.3180	4.1986	124.7	.24321	.014123	9.975
.8000	.2692	.338	6.46	.2970	4.2266	127.1	.24567	.014141	10.094
.7800	.2664	.424	6.23	.2773	4.2538	129.7	.24817	.014155	10.245
.7600	.2644	.523	6.03	.2589	4.2800	132.4	.25068	.014178	10.438
.7400	.2635	.635	5.85	.2418	4.3054	135.2	.25321	.014204	10.681
.7200	.2636	.763	5.69	.2258	4.3297	138.0	.25574	.014235	10.981
.7000	.2648	.905	5.56	.2110	4.3530	140.9	.25827	.014273	11.341
.6800	.2675	1.064	5.46	.1972	4.3753	143.9	.26079	.014324	11.768
.6600	.2715	1.238	5.38	.1844	4.3965	146.9	.26327	.014364	12.340
.6400	.2771	1.429	5.32	.1725	4.4166	150.0	.26571	.014423	12.947
.6200	.2843	1.637	5.29	.1614	4.4356	153.1	.26809	.014486	13.754
.6000	.2932	1.861	5.28	.1510	4.4534	156.2	.27041	.014555	14.696
.5800	.3039	2.102	5.29	.1412	4.4701	159.3	.27266	.014633	15.719
.5600	.3165	2.360	5.32	.1320	4.4856	162.4	.27482	.014717	16.966
.5400	.3311	2.634	5.36	.1233	4.5001	165.5	.27689	.014808	18.392
.5200	.3476	2.924	5.42	.1150	4.5134	168.6	.27887	.014903	20.061
.5000	.3660	3.231	5.49	.1070	4.5257	171.6	.28075	.015002	21.942
.4800	.3865	3.555	5.57	.0992	4.5370	174.6	.28254	.015110	24.157
.4600	.4090	3.897	5.64	.0918	4.5474	177.5	.28423	.015221	26.672
.4400	.4334	4.257	5.72	.0845	4.5568	180.4	.28583	.015334	29.548
.4200	.4597	4.638	5.79	.0775	4.5653	183.3	.28734	.015452	32.855
.4000	.4879	5.041	5.85	.0707	4.5731	186.2	.28876	.015572	36.590
.3800	.5178	5.47	5.90	.0641	4.5800	189.0	.29010	.015695	40.637
.3600	.5494	5.93	5.93	.0576	4.5861	191.8	.29136	.015821	45.781
.3400	.5827	6.42	5.94	.0515	4.5919	194.6	.29256	.015950	51.412
.3200	.6174	6.94	5.93	.0455	4.5969	197.4	.29368	.016081	57.877
.3000	.6534	7.52	5.88	.0399	4.6013	200.2	.29474	.016216	65.319
.2800	.6906	8.14	5.80	.0345	4.6052	203.1	.29575	.016354	73.988
.2600	.7287	8.84	5.68	.0294	4.6086	206.0	.29670	.016496	84.085
.2400	.7677	9.62	5.53	.0247	4.6116	209.0	.29761	.016643	95.964
.2200	.8073	10.50	5.33	.0204	4.6142	212.1	.29847	.016796	110.090
.2000	.8471	11.52	5.08	.0165	4.6164	215.4	.29929	.016955	127.067
.1800	.8870	12.73	4.79	.0130	4.6182	218.8	.30007	.017123	147.840
.1600	.9268	14.18	4.45	.0099	4.6198	222.6	.30083	.017305	173.770
.1400	.9661	15.99	4.06	.0072	4.6210	226.7	.30155	.017497	207.03
.1200	1.0051	18.33	3.62	.0050	4.6221	231.3	.30225	.017713	251.28
.1000	1.0446	21.54	3.13	.0032	4.6229	236.7	.30293	.017958	313.38
.0900	1.0653	23.65	2.88	.0025	4.6232	239.8	.30326	.018097	355.10
.0800	1.0877	26.27	2.61	.0019	4.6235	243.3	.30360	.018251	407.90
.0700	1.1137	29.62	2.34	.0014	4.6237	247.4	.30393	.018426	477.31
.0600	1.1472	34.10	2.07	.0009	4.6239	252.3	.30426	.018630	573.60
.0500	1.1974	40.40	1.796	.0006	4.6241	258.5	.30459	.018880	718.44
.0400	1.2894	49.87	1.547	.0004	4.6242	267.1	.30488	.019210	967.02
.0300	1.4999	64.80	1.350	.0002	4.6244	280.9	.30523	.019698	1499.87
.0200	2.0020	83.49	1.201	.0001	4.6245	307.8	.30544	.020469	3003.0
.0100	3.4900	90.00	1.047	.0000	4.6246	390.3	.30547	.021887	10470.1

TABLE XXI.- COMPARISON OF RESULTS OBTAINED USING EXPONENTIAL MODEL ATMOSPHERE WITH RESULTS OBTAINED USING ARDC (1956) MODEL ATMOSPHERE; $\overline{V}_i = 1.0$, $\overline{u}_a = 0$

$\frac{L}{D}$	$\frac{m}{\rho_0 S}$	$-\gamma_i$ deg	$\left(\frac{-\dot{\gamma}_i r}{g}\right)_{max}$ ARDC	$\left(\frac{-\dot{\gamma}_i r}{g}\right)_{max}$ Exp.	$\frac{\Delta(-\dot{\gamma}_i r/g)_{max}}{(-\dot{\gamma}_i r/g)_{max}}$	q_c ARDC	q_c Exp.	$\frac{\Delta q_c}{q_c}$	Q_c ARDC	Q_c Exp.	$\frac{\Delta Q_c}{Q_c}$	s, mi. ARDC	s, mi. Exp.	$\frac{\Delta s}{s}$
0	[illegible]	1.0	8.06	8.24	0.023	178.5	189.2	0.060	32,895	32,632	-0.008	2312.5	2370.8	0.0250
		2.0	8.77	9.04	.031	214.5	228.7	.066	26,241	25,673	-.022	1354.7	1377.3	.0167
		3.0	10.25	10.86	.060	251.0	270.6	.077	22,440	21,742	-.031	976.7	986.3	.0098
		4.0	12.46	13.22	.061	286.3	308.8	.079	19,877	19,154	-.036	768.4	773.1	.0062
		5.0	14.98	15.83	.057	318.2	343.4	.079	18,003	17,295	-.039	635.0	637.7	.0042
		6.0	17.45	18.54	.063	347.2	375.0	.080	16,557	15,883	-.041	541.7	543.6	.0035
0	4.0	1.0	8.61	8.24	-.043	249.7	267.2	.070	47,255	46,563	-.015	2501.9	2566.3	.0257
		2.0	9.09	9.04	-.006	301.1	322.8	.072	37,578	36,480	-.029	1448.9	1468.8	.0137
		3.0	10.79	10.86	.006	358.3	382.7	.068	32,004	30,853	-.036	1038.1	1046.2	.0078
		4.0	13.13	13.22	.007	411.4	436.7	.062	28,248	27,161	-.038	813.1	817.1	.0055
		5.0	15.83	15.83	.000	461.8	485.6	.051	25,508	24,561	-.039	669.7	673.1	.0051
		6.0	18.74	18.54	-.011	505.9	530.4	.048	23,404	22,508	-.038	569.9	573.0	.0054
0	8.0	1.0	9.06	8.24	-.091	365.2	376.8	.032	67,648	66,426	-.018	2698.9	2766.7	.0251
		2.0	9.71	9.04	-.069	439.2	456.1	.038	53,475	51,808	-.031	1543.0	1561.0	.0117
		3.0	11.31	10.86	-.040	521.9	540.8	.035	45,314	43,753	-.034	1098.1	1106.2	.0074
		4.0	13.99	13.22	-.05	603.2	617.8	.024	39,848	38,495	-.034	856.4	862.1	.0066
		5.0	16.77	15.83	-.056	675.4	687.5	.018	35,888	34,738	-.033	703.4	708.5	.0072
		6.0	19.63	18.54	-.056	740.5	750.1	.013	32,866	31,882	-.030	597.5	602.4	.0082
0.5	2.0	1.0	1.99	1.99	.000	141.9	138.0	-.027	48,880	48,961	.002	3111.7	3174.2	.0201
		2.0	3.39	3.98	.189	220.3	233.6	.061	36,191	35,530	-.018	2005.7	2026.8	.0105
		3.0	6.68	7.86	.177	288.3	309.3	.073	28,514	27,390	-.039	1482.4	1488.9	.0044
0.5	4.0	2.0	1.97	1.99	.010	193.6	194.5	.005	70,083	69,541	-.008	3214.0	3273.1	.0184
		4.0	3.38	3.98	.178	307.9	330.2	.072	52,165	50,380	-.034	2058.7	2072.9	.0069
		6.0	6.74	7.86	.166	403.6	437.7	.084	40,824	38,815	-.049	1513.8	1518.5	.0031
0.5	8.0	2.0	1.99	1.99	.000	264.7	273.8	.043	100,410	98,745	-.017	3323.9	3373.1	.0148
		4.0	3.39	3.98	.174	435.5	466.4	.071	74,506	71,413	-.042	2109.8	2119.1	.0044
		6.0	7.12	7.85	.103	592.4	619.0	.047	57,697	54,984	-.047	1543.4	1548.0	.0030
1.0	2.0	1.0	1.34	1.34	.000	111.9	104.3	-.068	68,348	69,352	.015	6297.4	6393.3	.0152
		2.0	2.72	2.78	.022	168.8	190.6	.010	49,793	50,105	.006	4486.7	4535.8	.0109
		4.0	5.23	5.84	.117	238.7	263.8	.044	38,747	38,158	-.015	3554.9	3581.7	.0075
1.0	4.0	1.0	1.33	1.34	.006	130.1	147.0	-.020	97,895	98,467	.006	6407.2	6509.8	.0160
		2.0	2.51	2.78	.108	259.2	269.6	.040	71,835	71,028	-.011	4545.5	4588.2	.0094
		4.0	4.96	5.84	.177	349.7	373.4	.080	56,058	54,063	-.036	3592.8	3614.4	.0060
1.0	8.0	1.0	1.35	1.34	-.007	207.2	207.3	.001	140,330	139,777	-.004	6528.4	6628.0	.0153
		2.0	2.36	2.78	.178	352.7	381.2	.082	103,620	100,664	-.029	4608.0	4640.8	.0071
		4.0	5.00	5.84	.168	492.8	528.5	.070	80,246	76,576	-.046	3630.7	3647.0	.0045

Note: Units of Q_c and q_c are Btu/ft^2 and Btu/ft^2/sec, respectively.

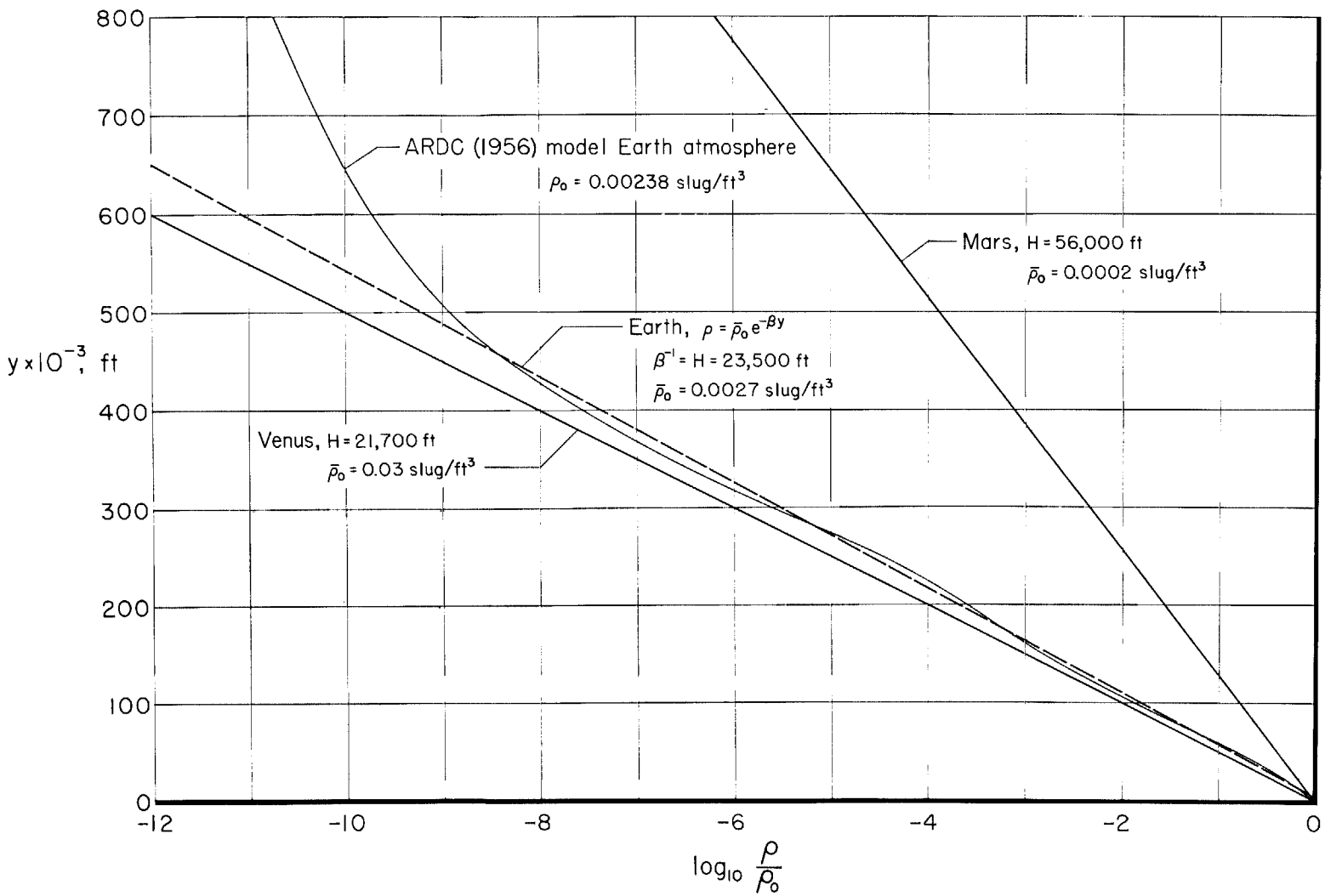


Figure 1.- Exponential approximations of the atmospheres of Earth, Mars, and Venus.

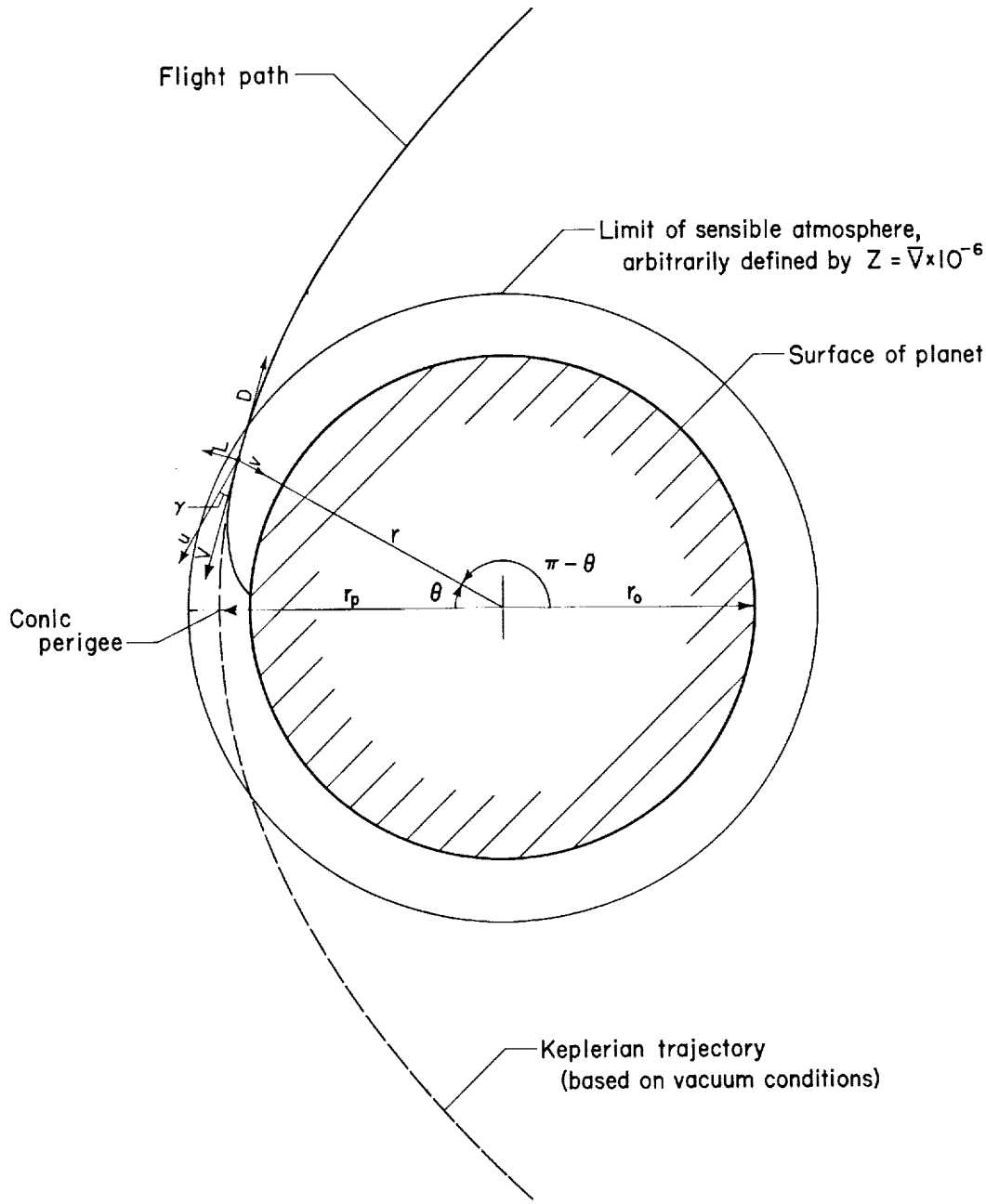
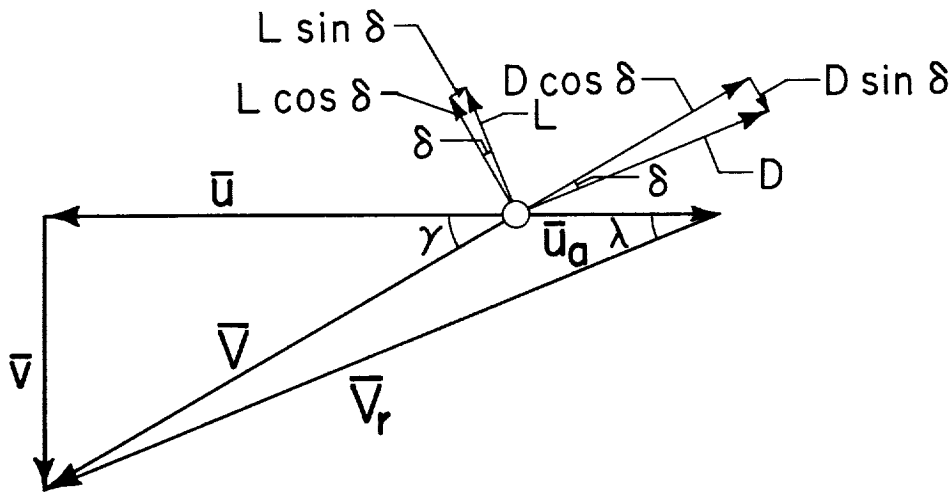
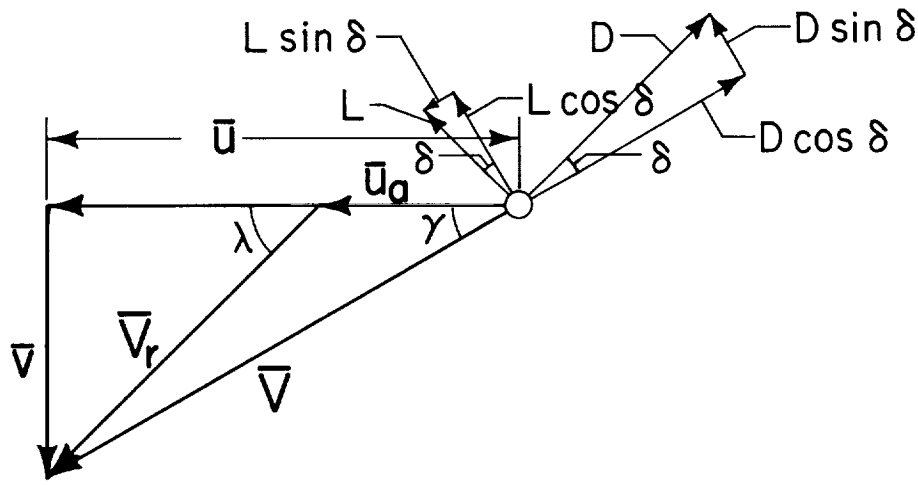


Figure 2.- Coordinate system and convention of notation used in analysis.



(a) $\bar{u}_a$ negative



(b) $\bar{u}_a$ positive

Figure 3.- Components of gas-dynamic force in case of rotating atmosphere.

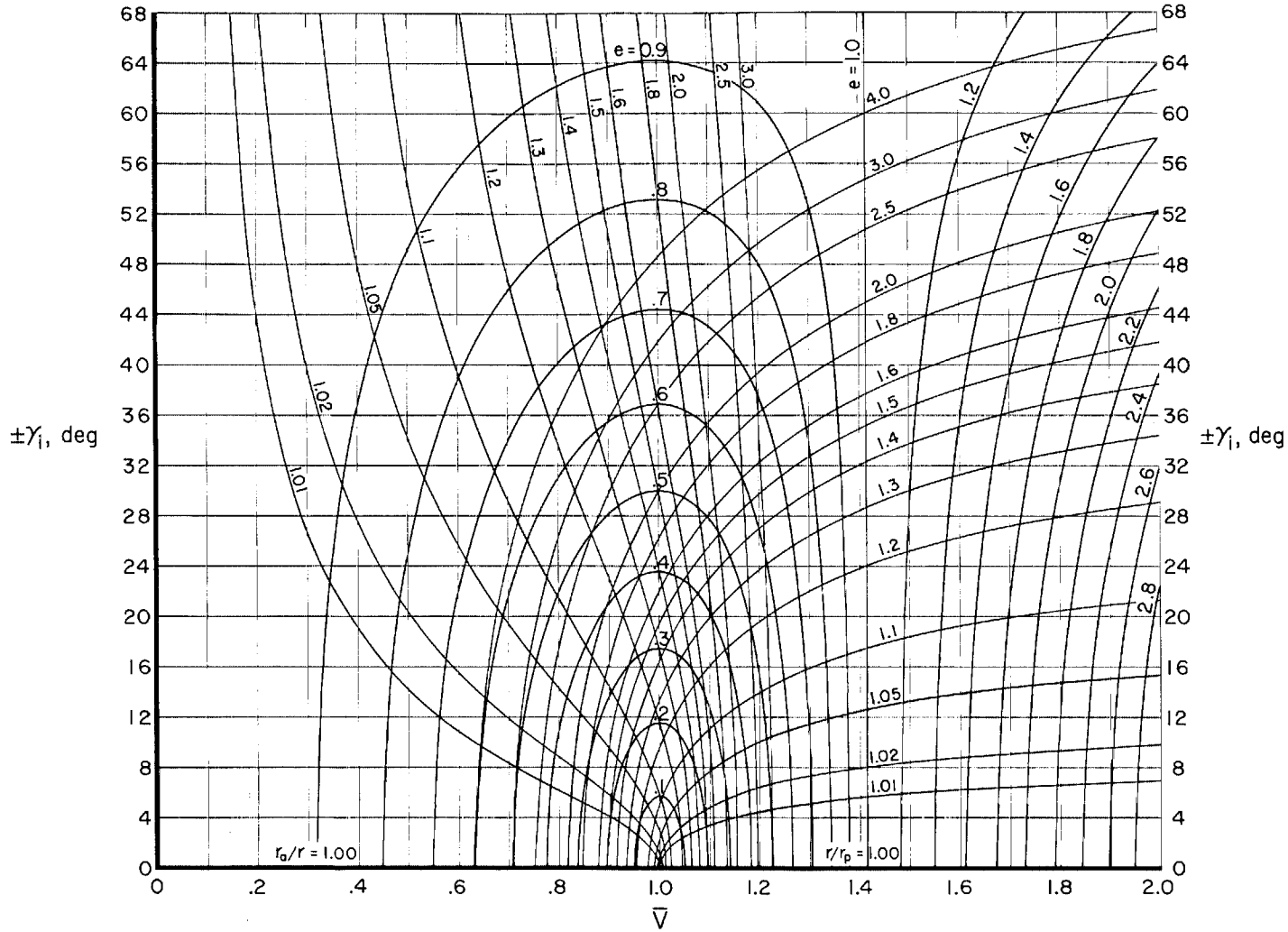
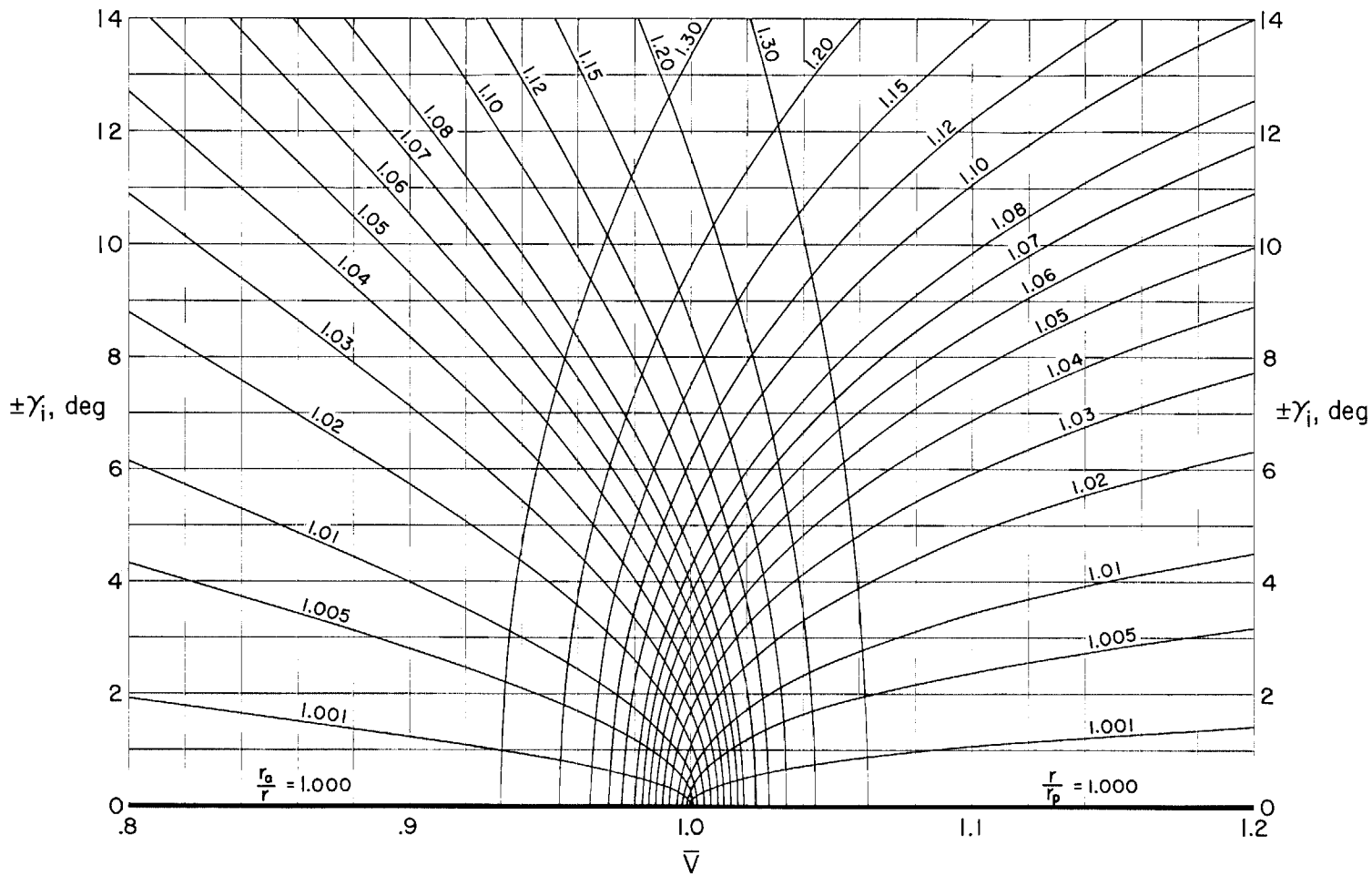
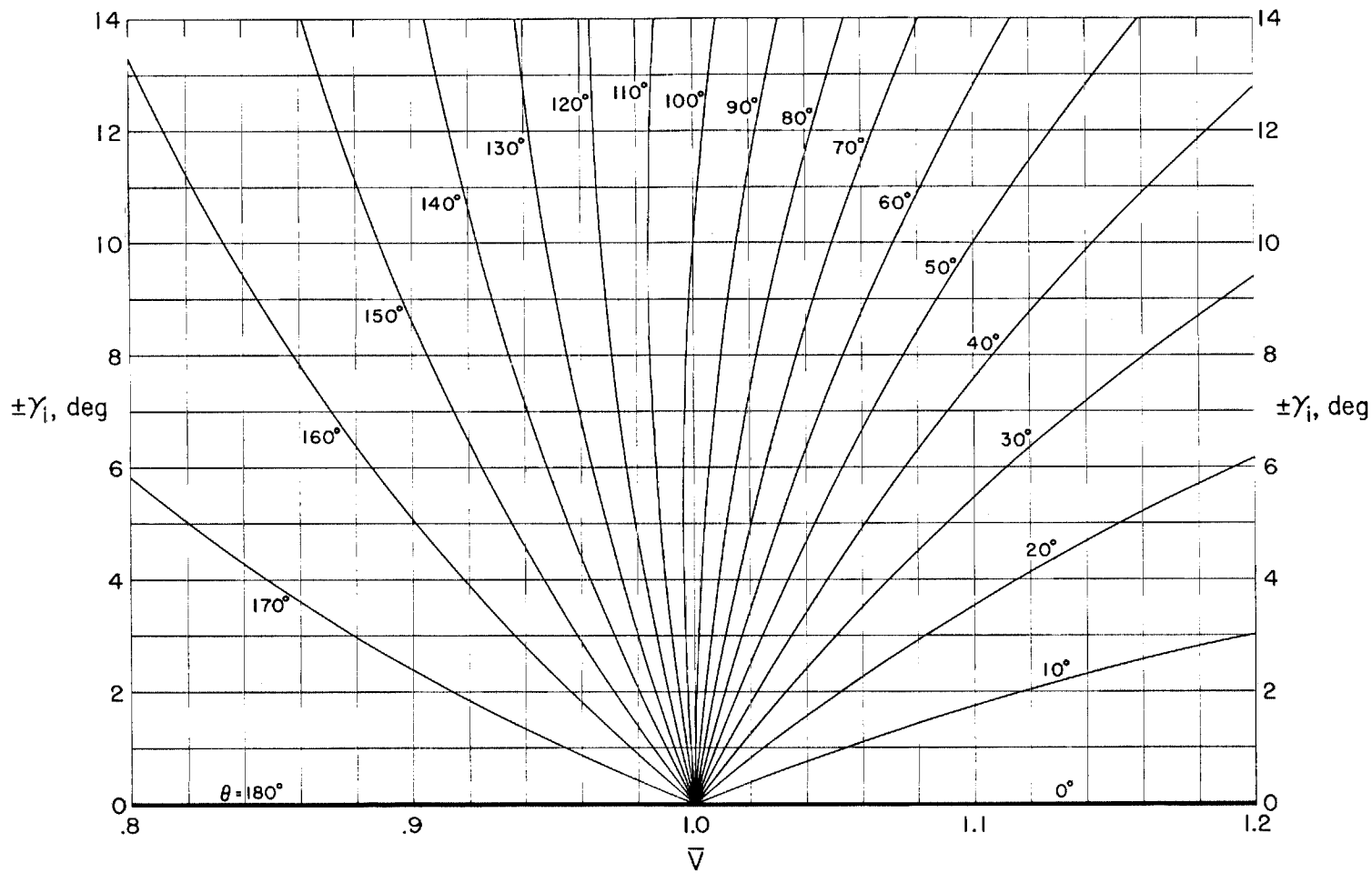


Figure 4.- Graphical representation of Keplerian (two-body, point-mass) motion.



(a) Variation of flight-path angle with dimensionless velocity at constant values of radial distance.

Figure 5.- Flight conditions for various radial distances and polar angles in Keplerian (two-body, point-mass) motion.



(b) Variation of flight-path angle with dimensionless velocity at constant values of polar angle (true anomaly).

Figure 5.- Concluded.

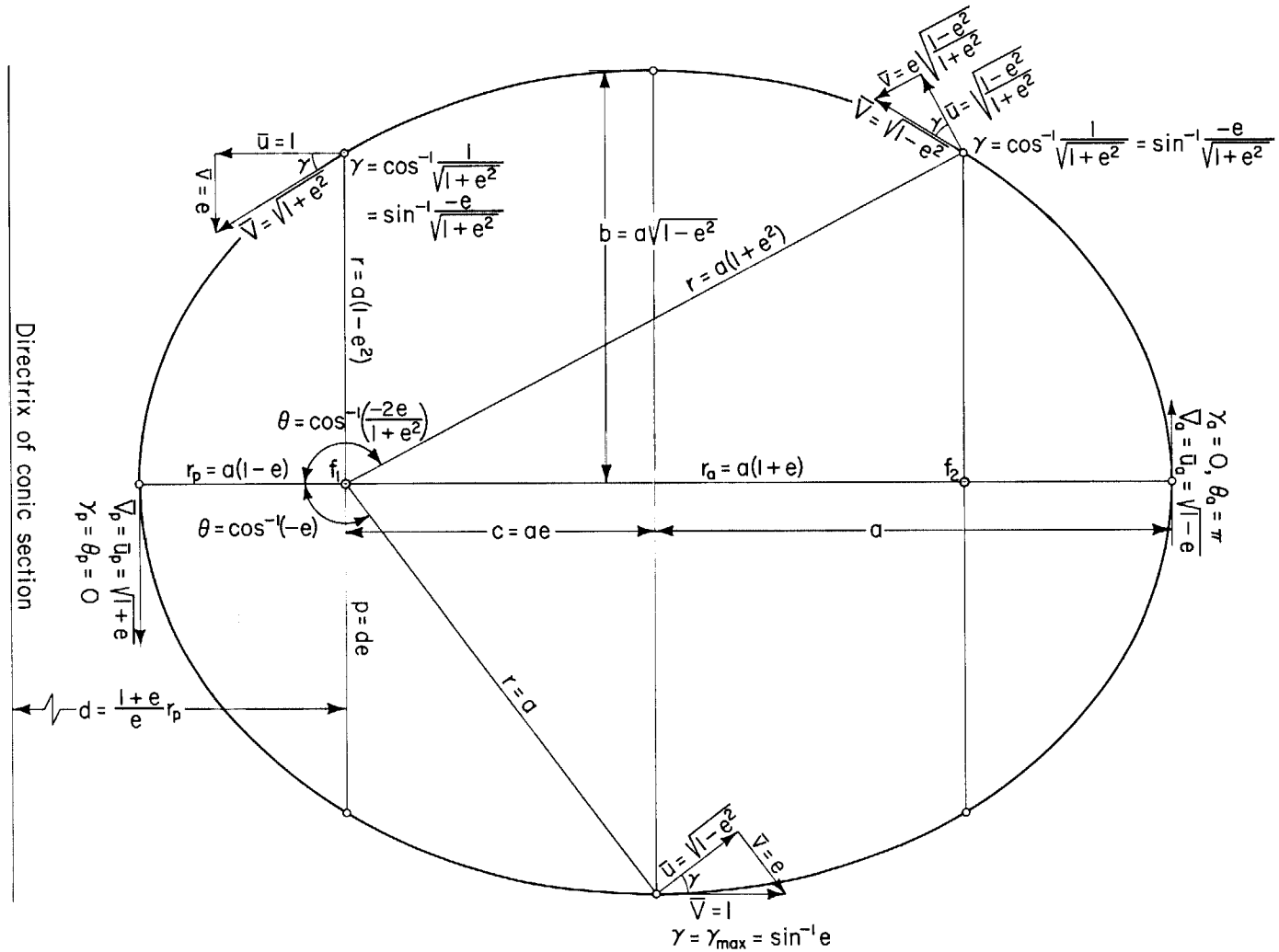


Figure 6.- The relationships between orbit parameters and variables at certain discrete points of a Keplerian (two-body, point-mass) orbit.

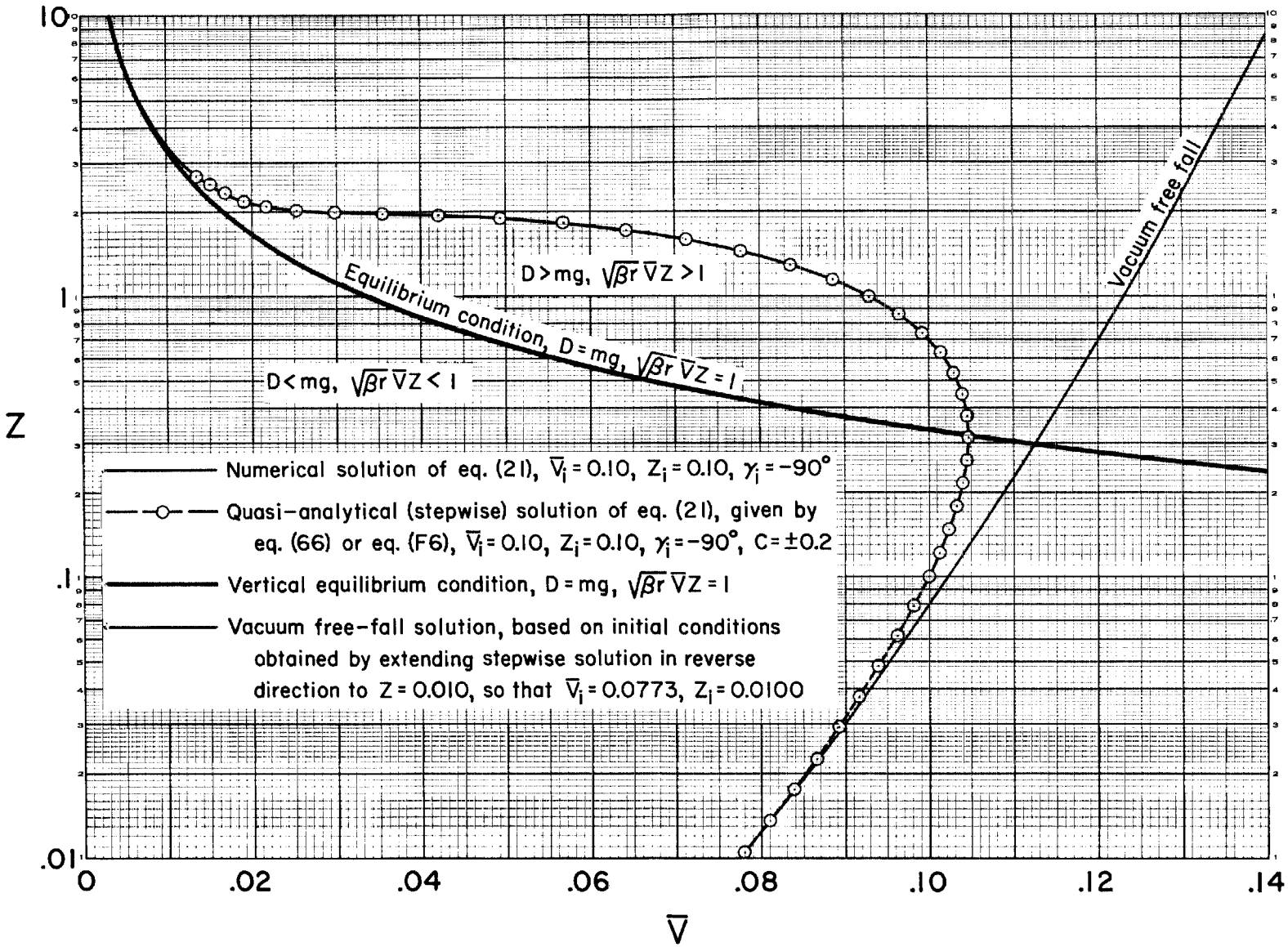


Figure 7.- Comparison of a quasi-analytical (stepwise) solution of equation (21) with a numerical solution for conditions of relatively low-speed vertical descent in the atmosphere of Earth or Venus; $\bar{u}_a = 0$, $\beta r = 900$, $L/D = 0$.

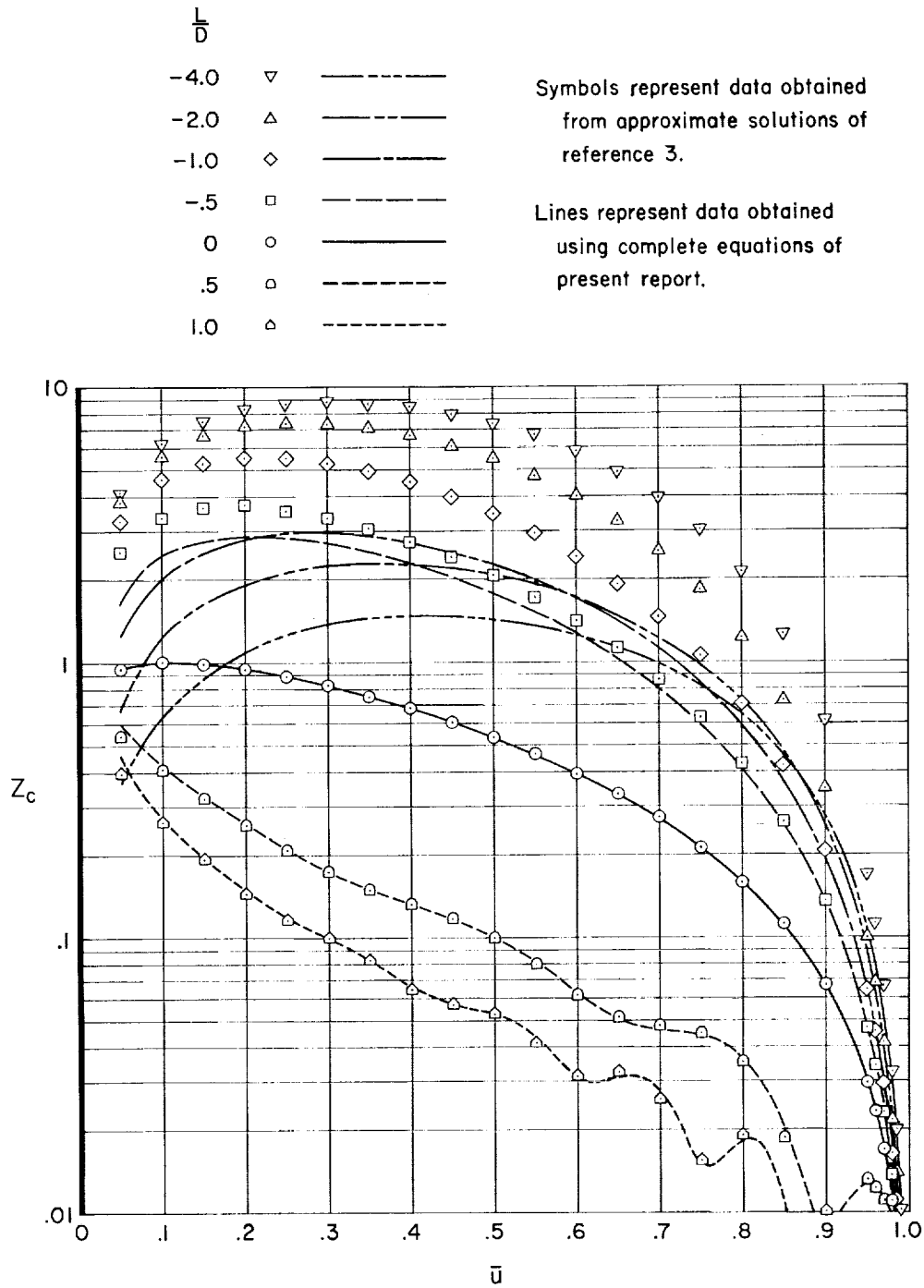


Figure 8.- Comparison of several approximate solutions of reference 3 with more accurate solutions obtained using equations of the present report; $\bar{V}_i = 1.0$, $\bar{u}_a = 0$.

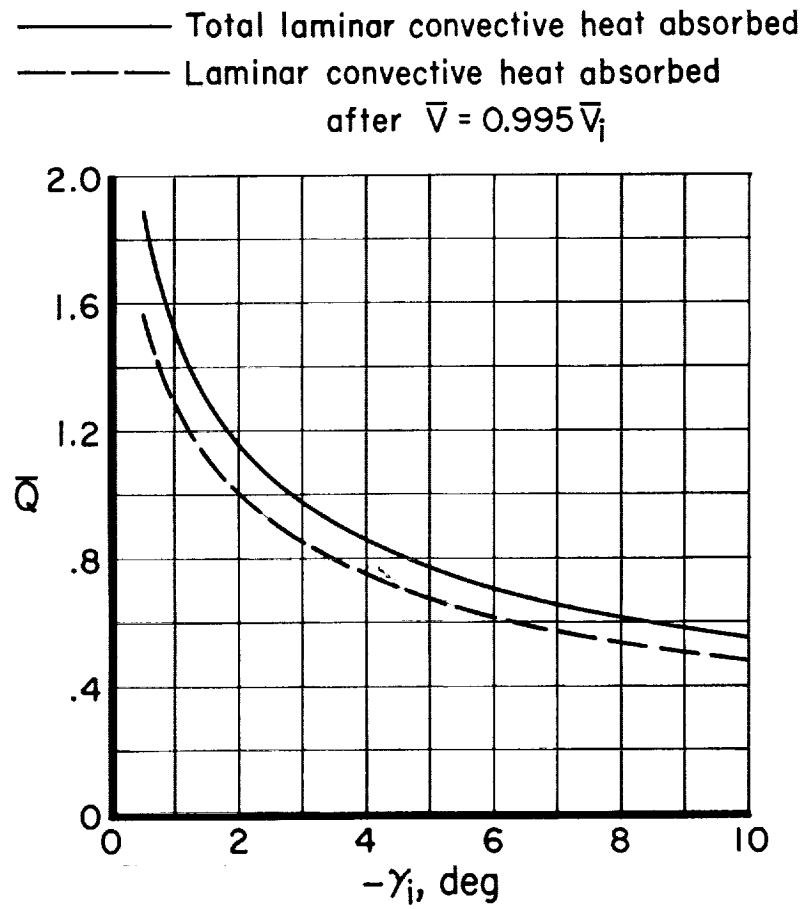
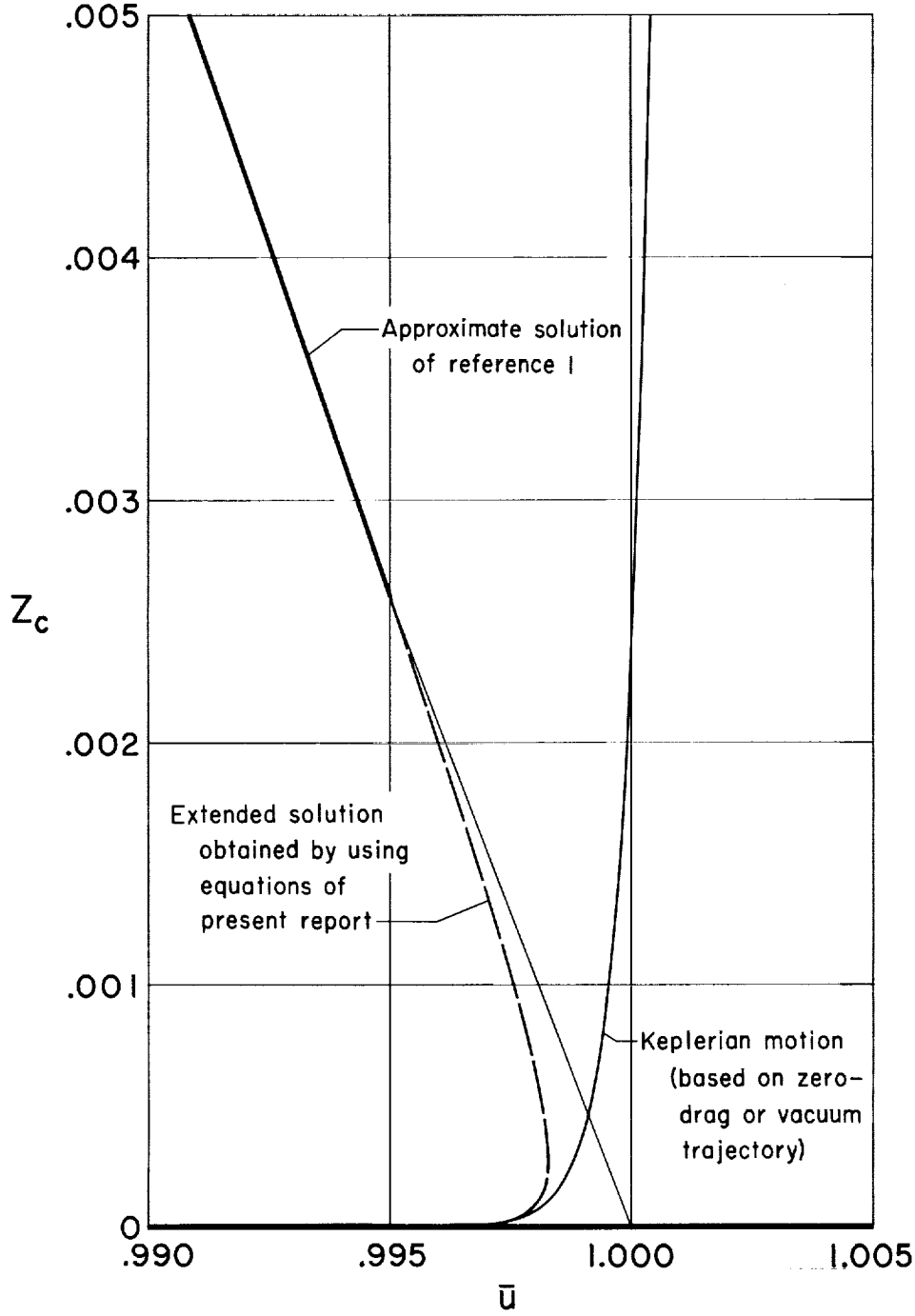
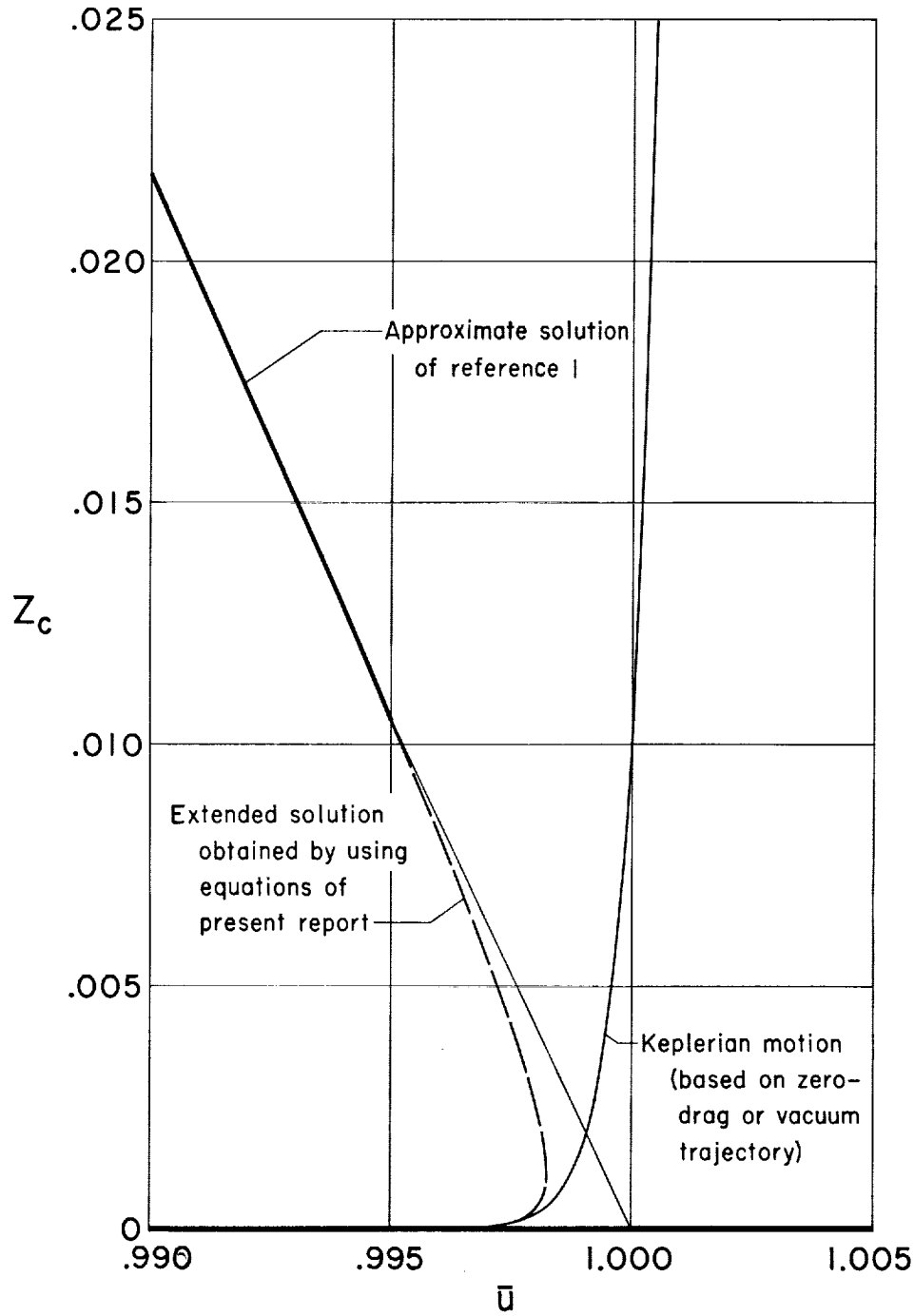


Figure 9.- The variation with initial flight-path angle of the laminar convective heat absorbed by nonlifting vehicles from the effective beginning of entry and from the point where $\overline{V} = 0.995\ \overline{V}_i$; $\overline{V}_i = 1.0$, $\overline{u}_a = 0$.



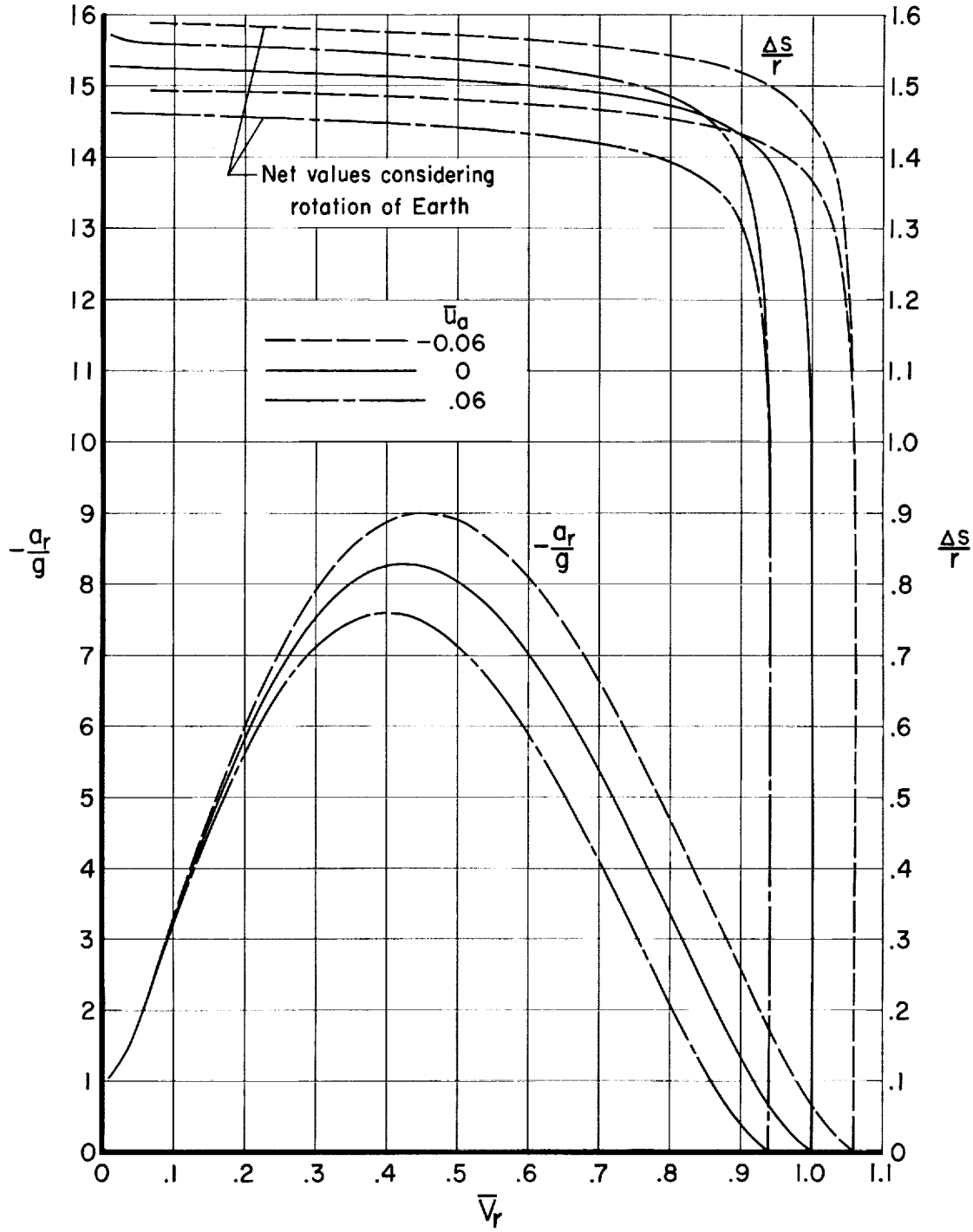
(a) $\gamma_i = -1^{\circ}$

Figure 10.- Comparison of two approximate solutions of reference 1 for the initial phase of entry with more accurate solutions obtained using equations of the present report; $\bar{V}_i = 1.0$, $\bar{u}_a = 0$, $L/D = 0$.



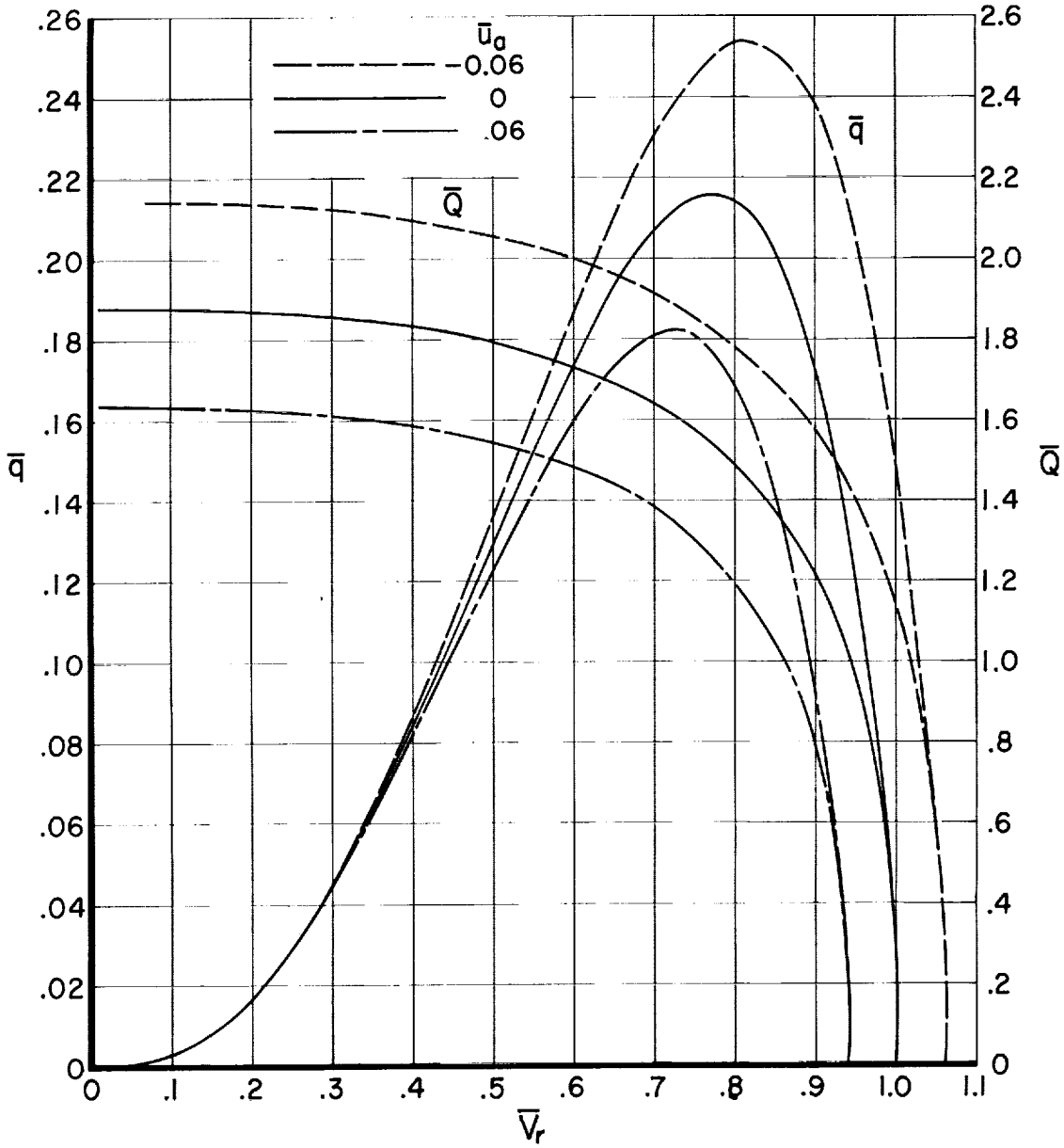
(b) $\gamma_i = -4^\circ$

Figure 10.- Concluded.



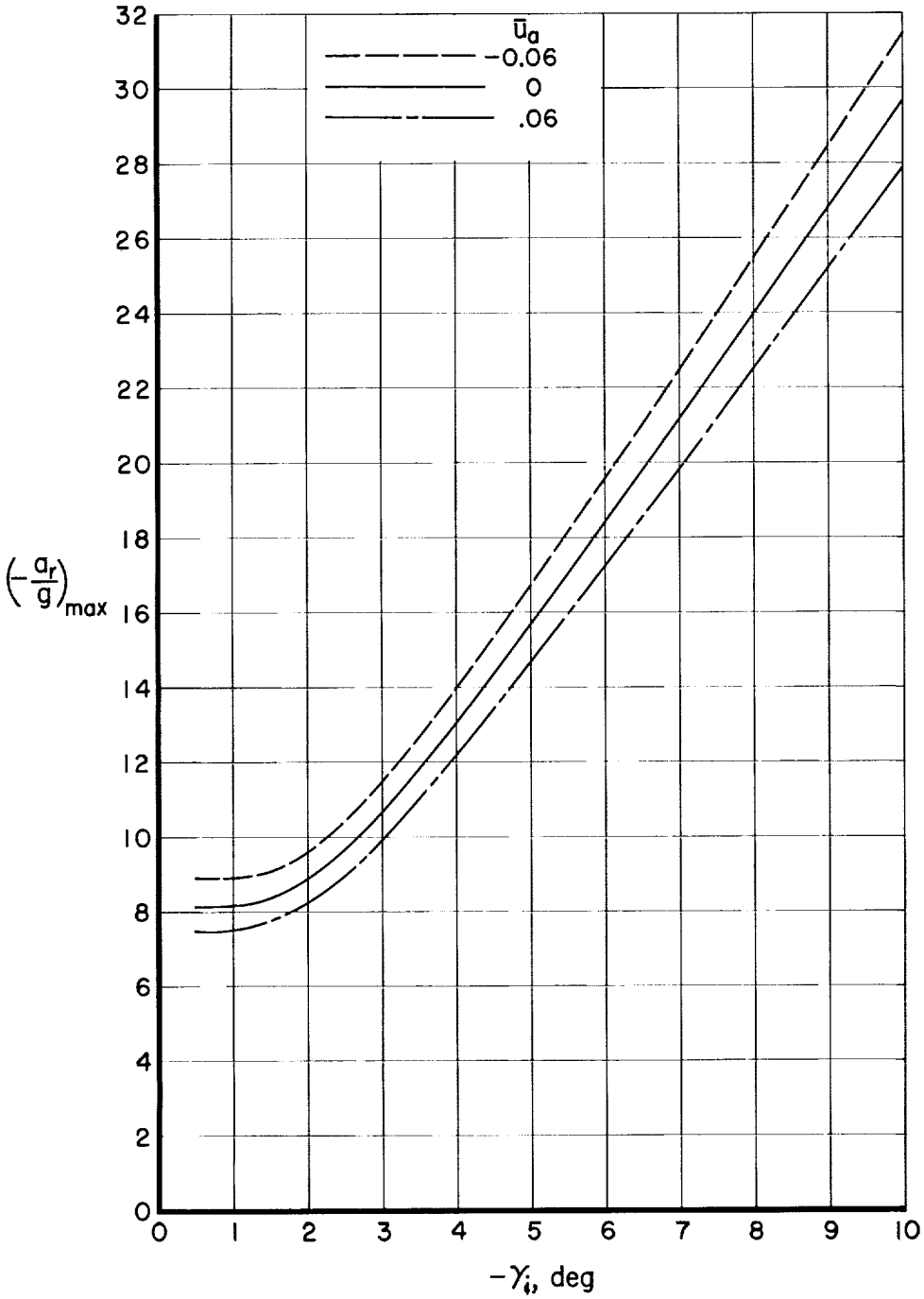
(a) $-a_r/g$, $\Delta s/r$

Figure 11.- The effects of Earth's rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = 1.0$, $\gamma_i = -0.5^{\circ}$.



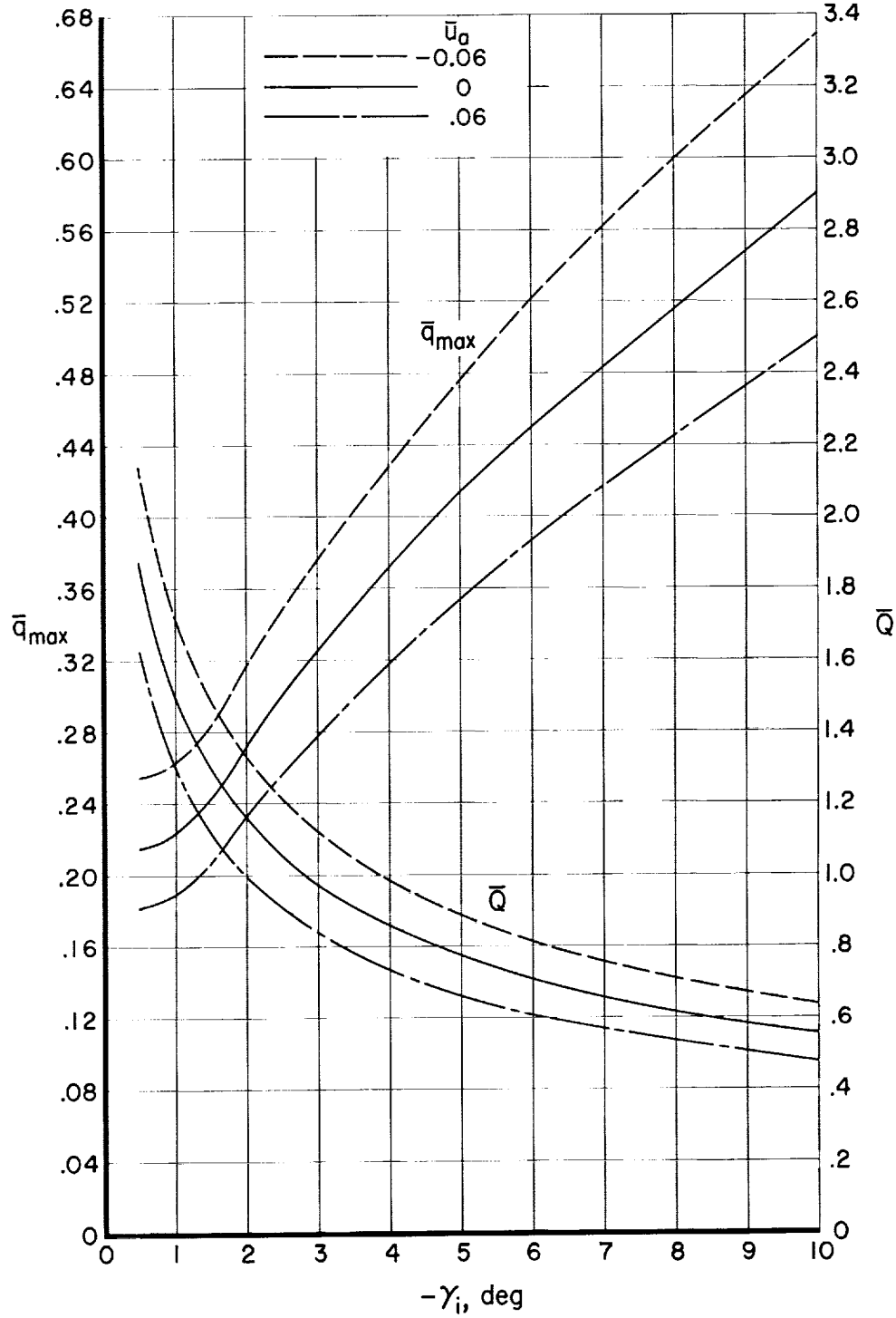
(b) $\bar{q}$, $\bar{Q}$

Figure 11.- Concluded.



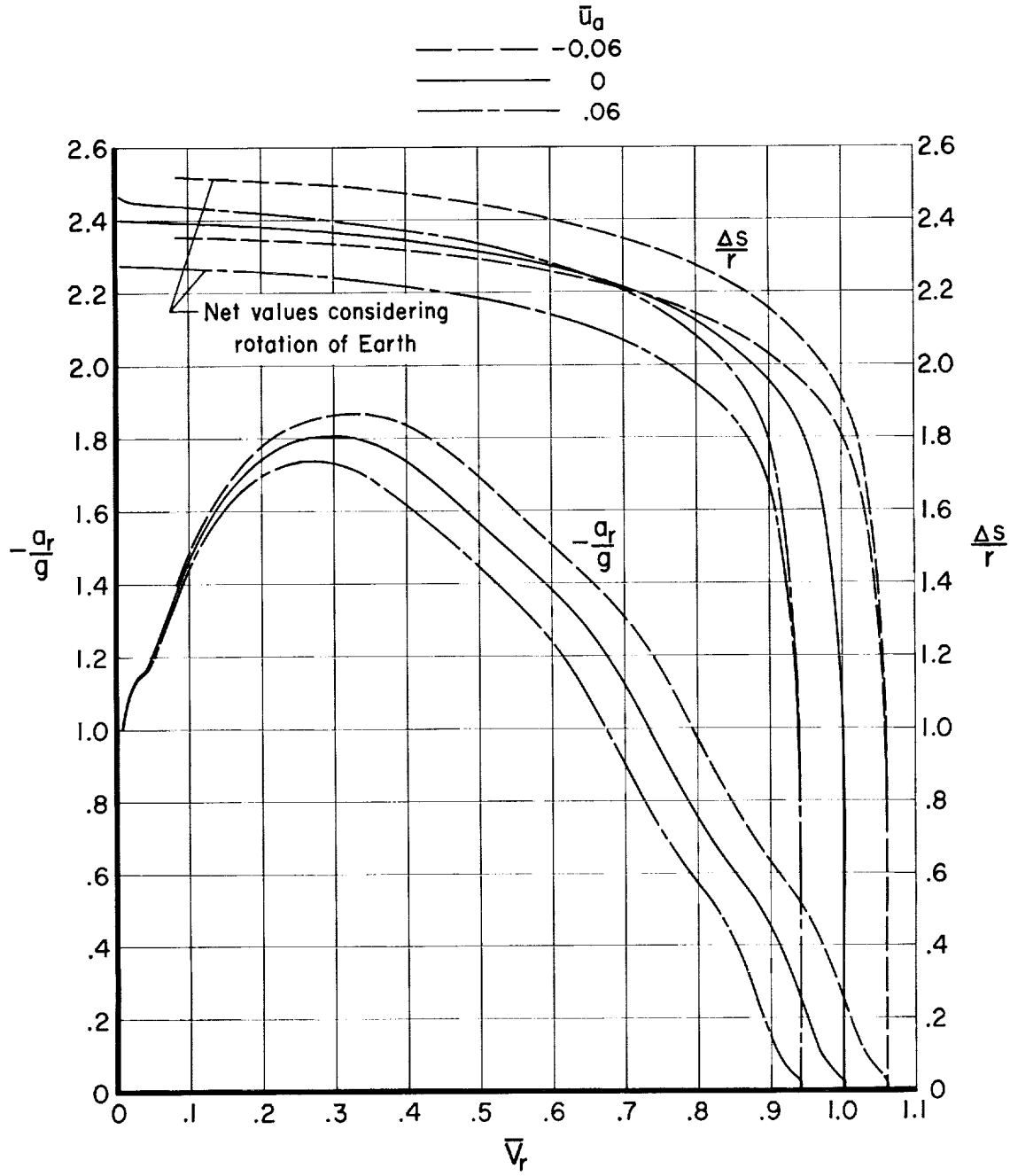
(a) $(-a_r/g)_{max}$

Figure 12.- The effects of initial values of flight-path angle on the maximum values of $(-a_r/g)$ and $\bar{q}$ druing entry of nonlifting vehicles into atmosphere of Earth; $\bar{V}_i = 1.0$.



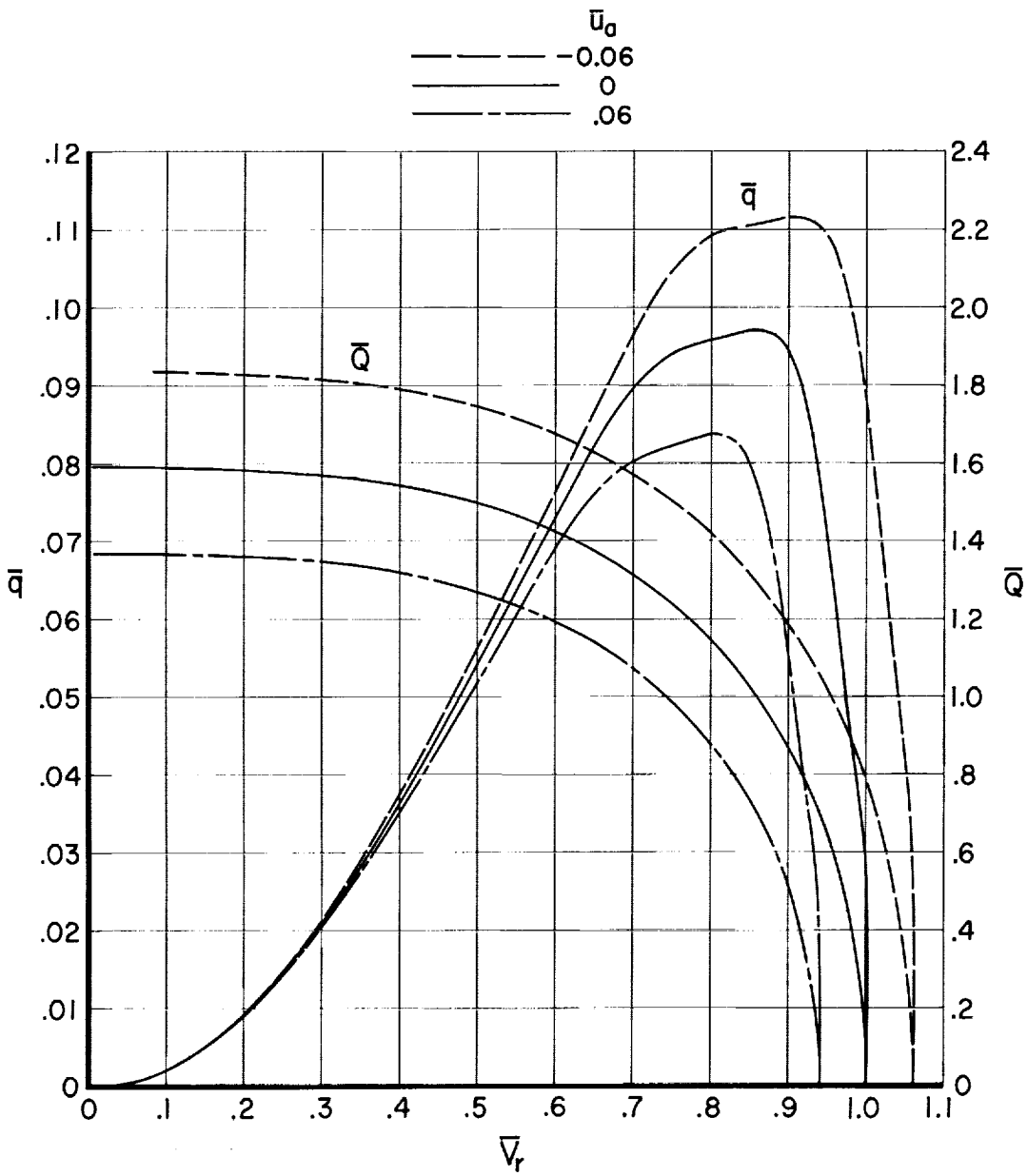
(b) $\bar{q}_{max}$, $\bar{Q}$

Figure 12.- Concluded.



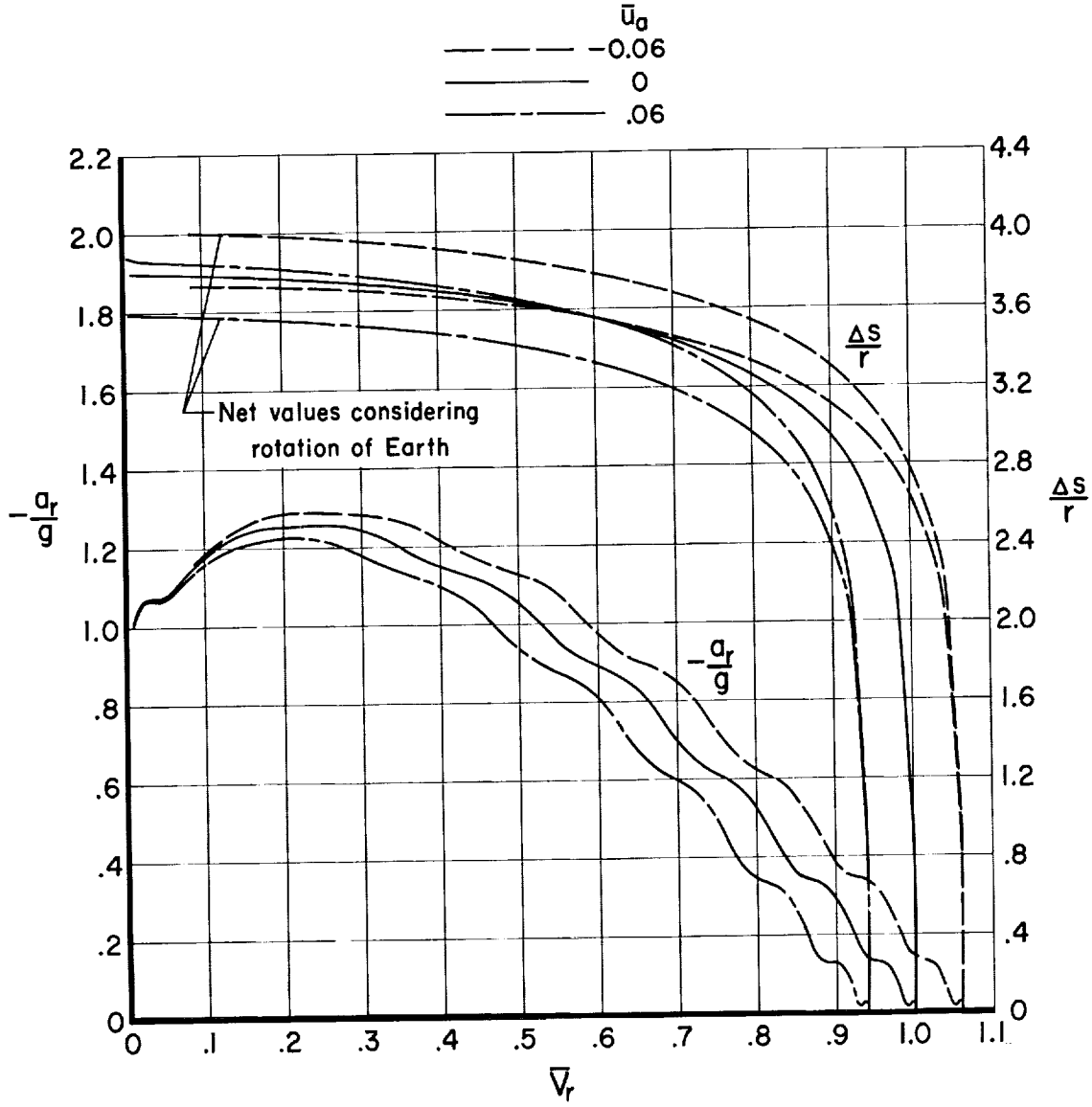
(a) $-a_r/g$, $\Delta s/r$

Figure 13.- The effects of Earth's rotation on the motion and heating of lifting vehicles during atmosphere entry; $\bar{V}_i = 1.0$, $\gamma_i = -0.5^\circ$, $L/D = 0.5$.



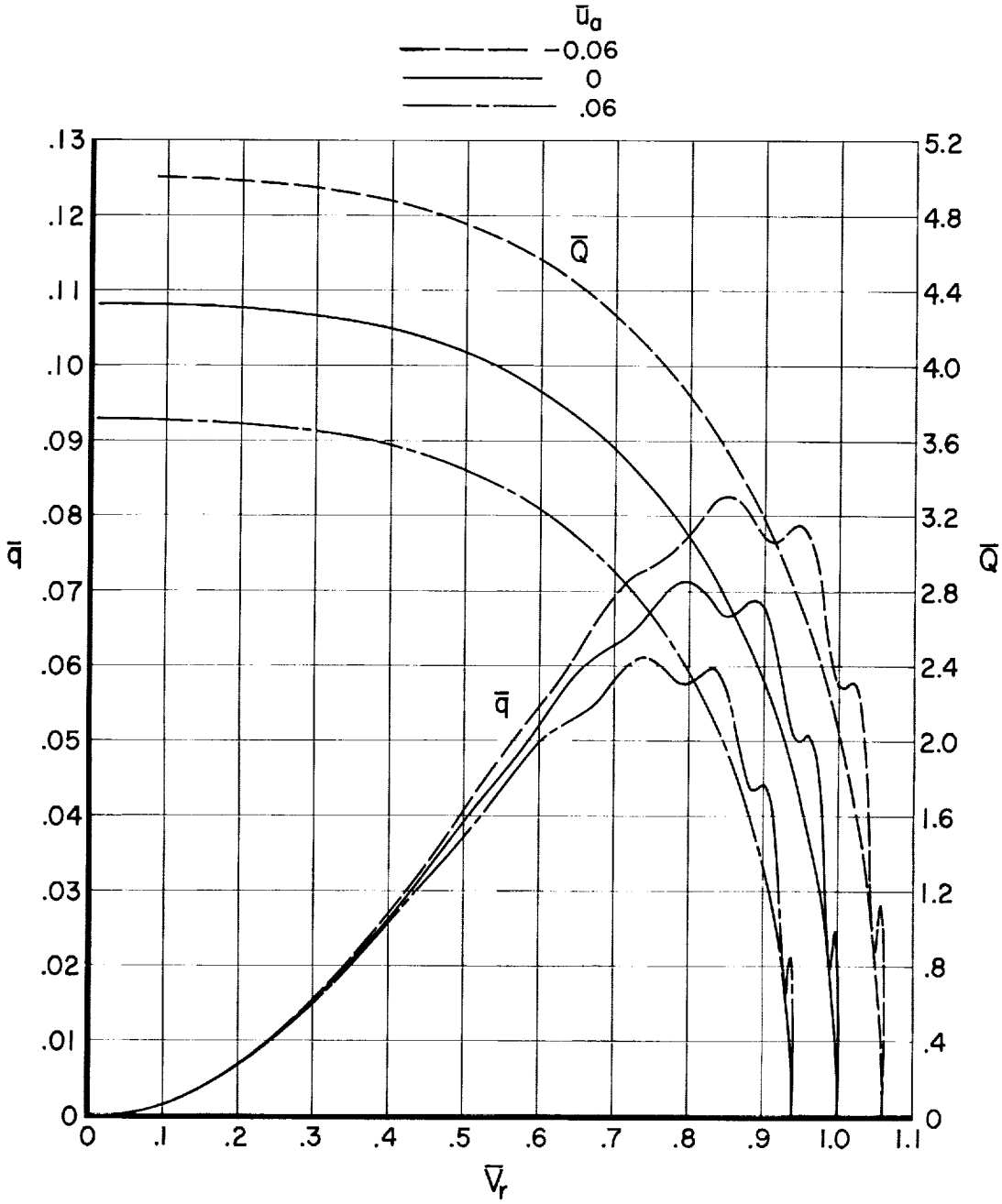
(b) $\bar{q}$, $\bar{Q}$

Figure 13.- Concluded.



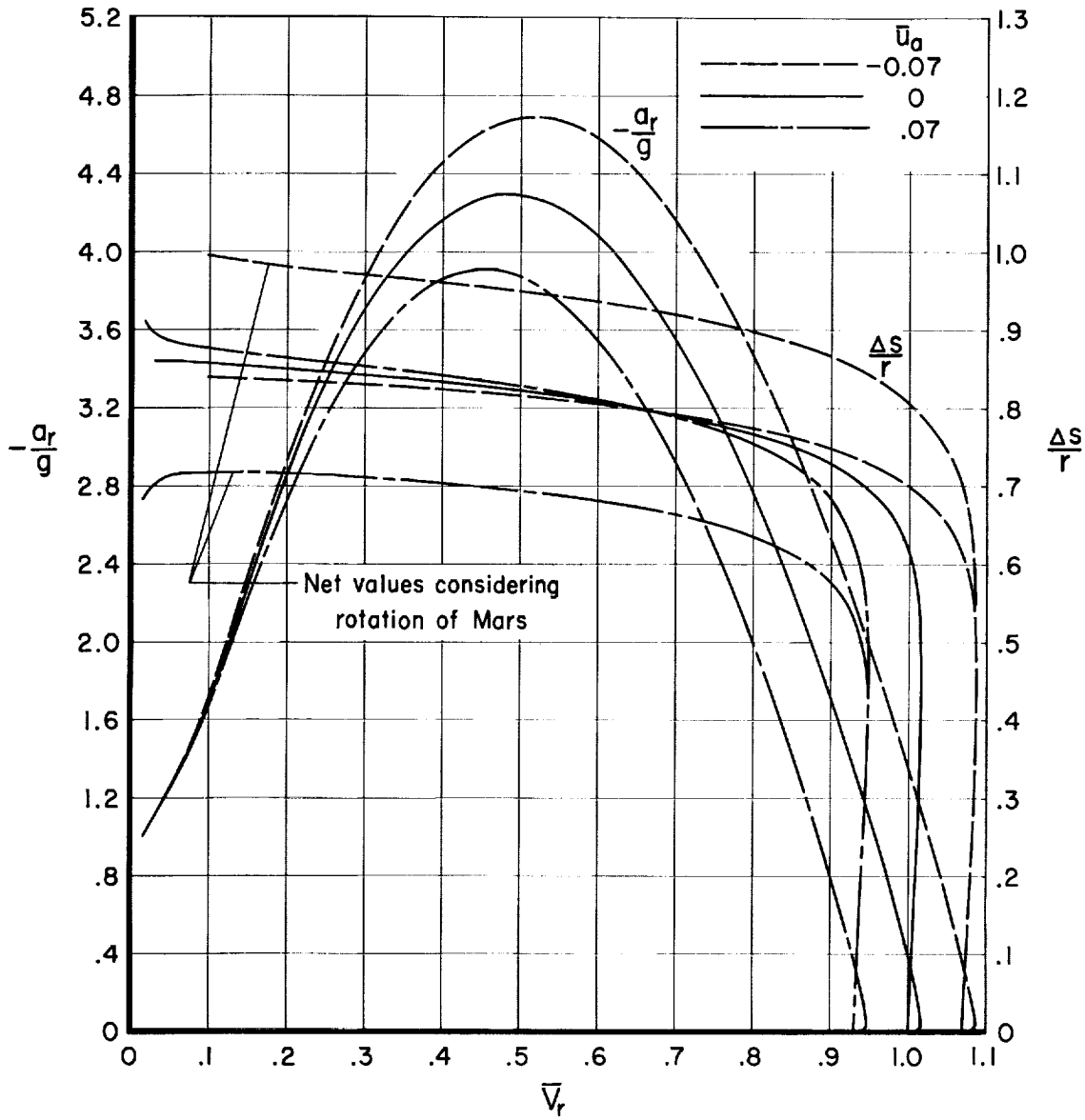
(a) $-a_r/g$, $\Delta s/r$

Figure 14.- The effects of Earth's rotation on the motion and heating of lifting vehicles during atmosphere entry; $\bar{V}_i = 1.0$, $\gamma_i = -0.5^{\circ}$, $L/D = 1.0$.



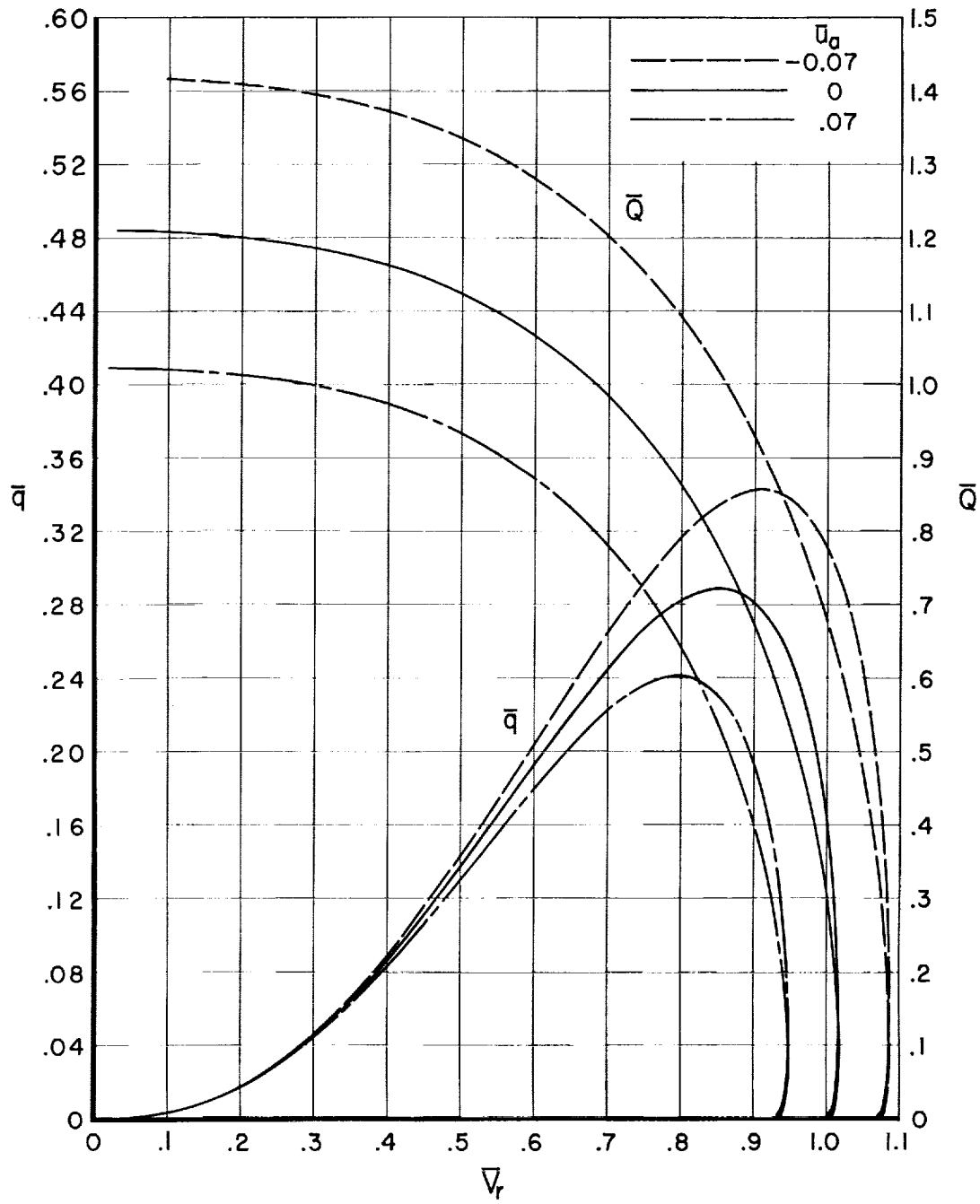
(b) $\bar{q}$, $\bar{Q}$

Figure 14.- Concluded.



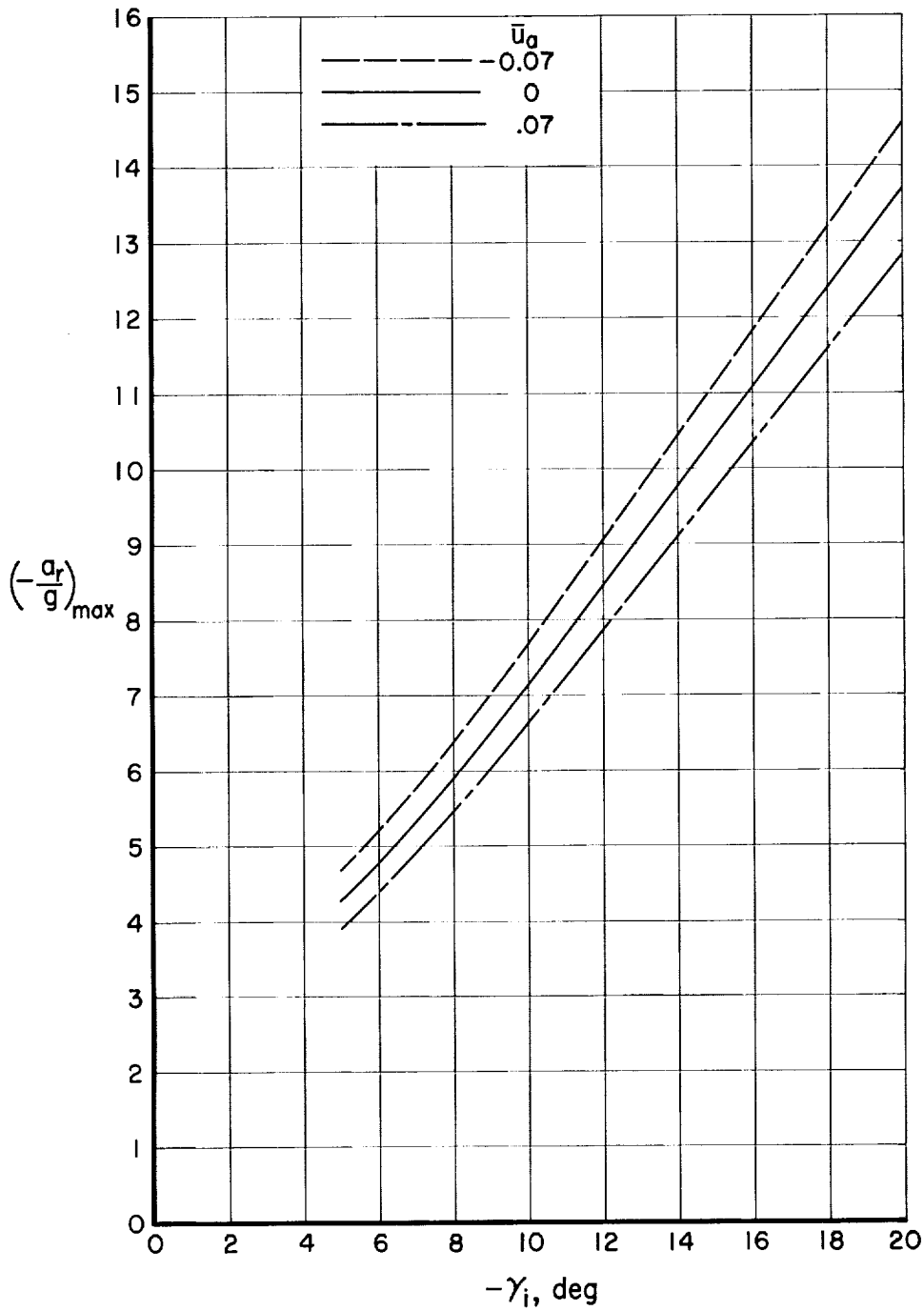
(a) $-a_r/g$, $\Delta s/r$

Figure 15.- The effects of Mars' rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = 1.0$, $\gamma_i = -5.0^{\circ}$.



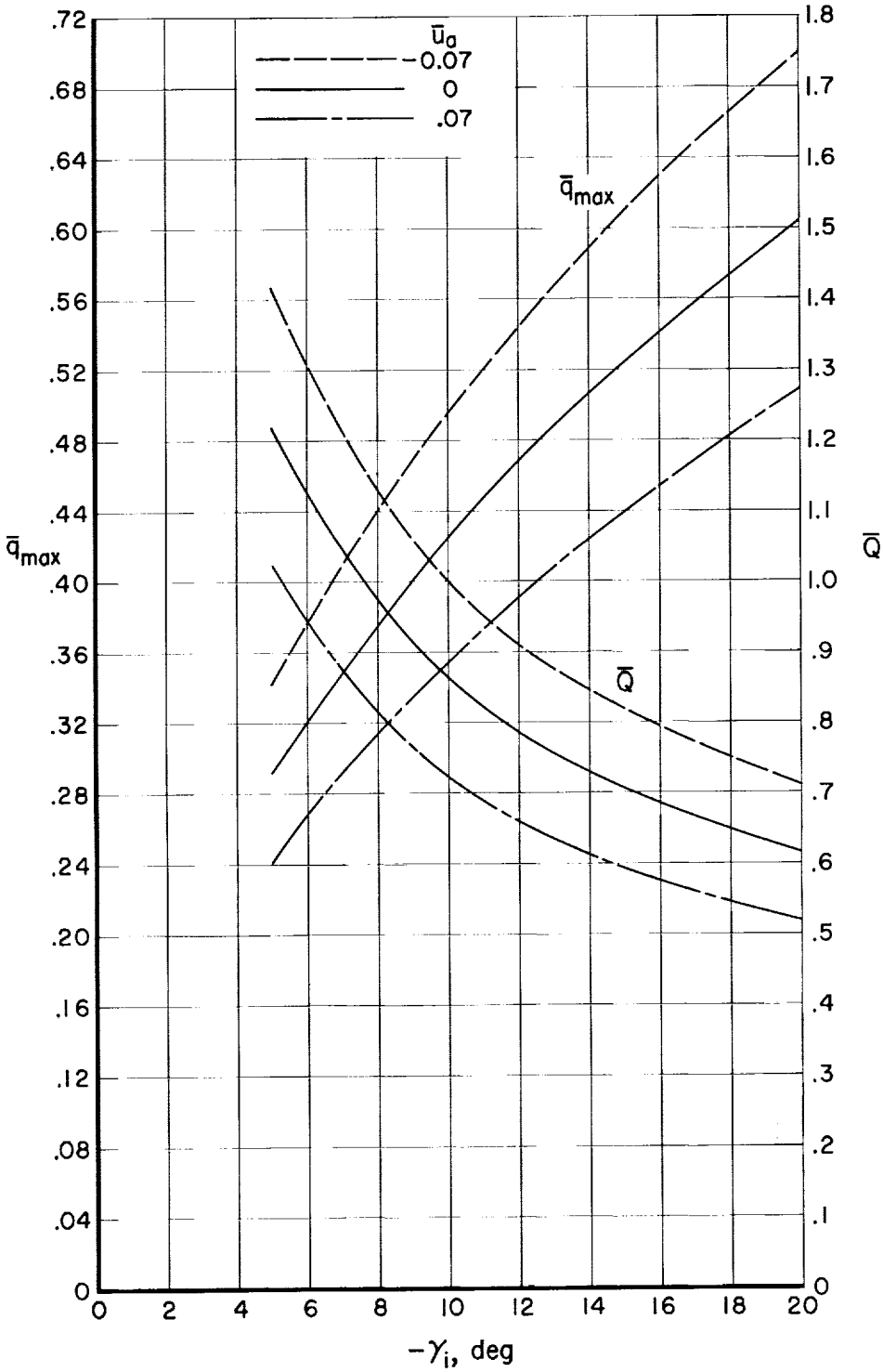
(b) $\bar{q}$, $\bar{Q}$

Figure 15.- Concluded.



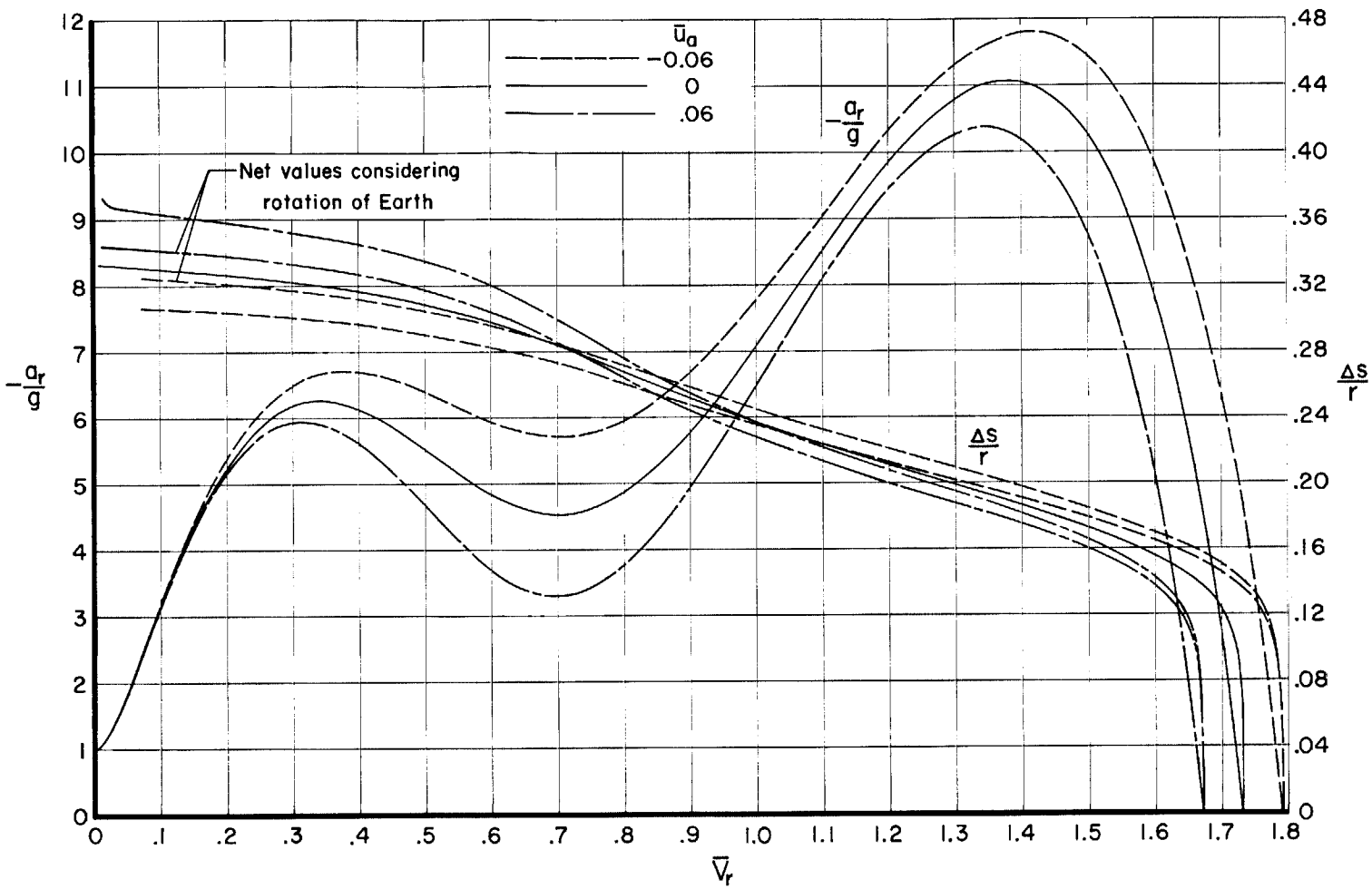
(a) $(-a_r/g)_{max}$

Figure 16.- The effects of initial values of flight-path angle on the maximum values of $(-a_r/g)$ and $\bar{q}$ during entry of nonlifting vehicles into atmosphere of Mars; $\bar{V}_i = 1.0$.



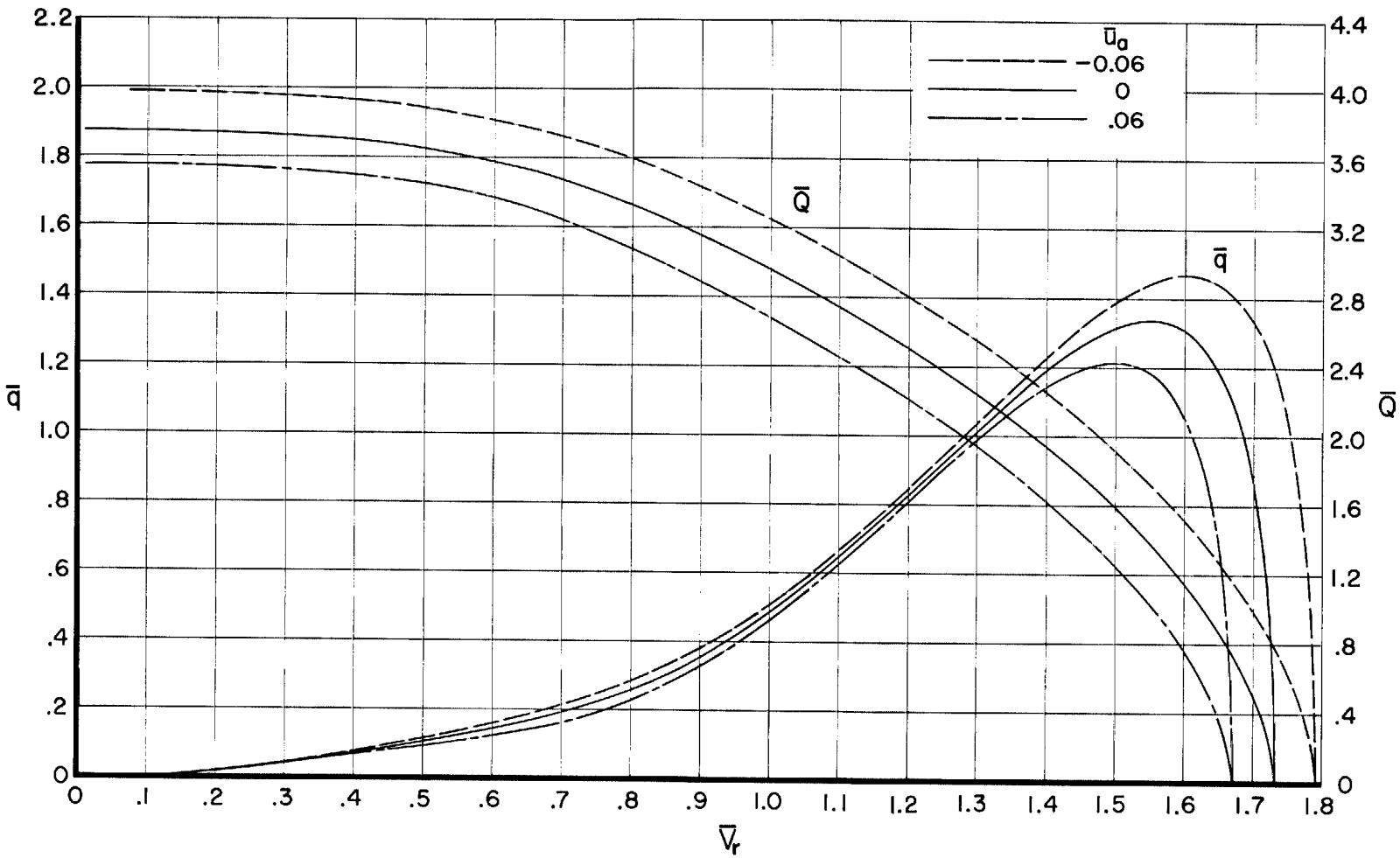
(b) $\bar{q}_{max}$, $\bar{Q}$

Figure 16.- Concluded.



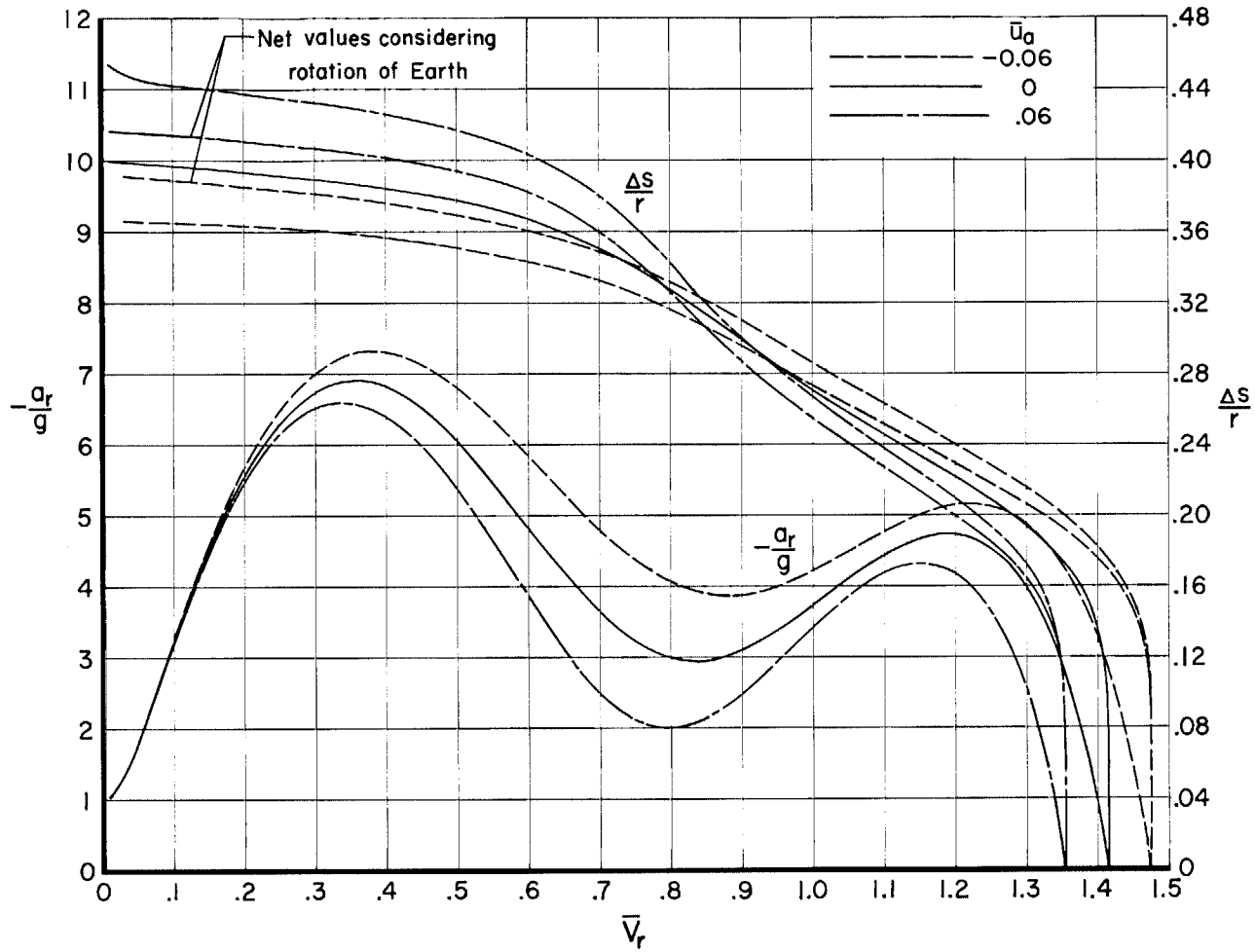
(a) $-a_r/g$, $\Delta s/r$

Figure 18.- The effects of Earth's rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = \sqrt{3}$, $\gamma_i = -7.67^{\circ}$.



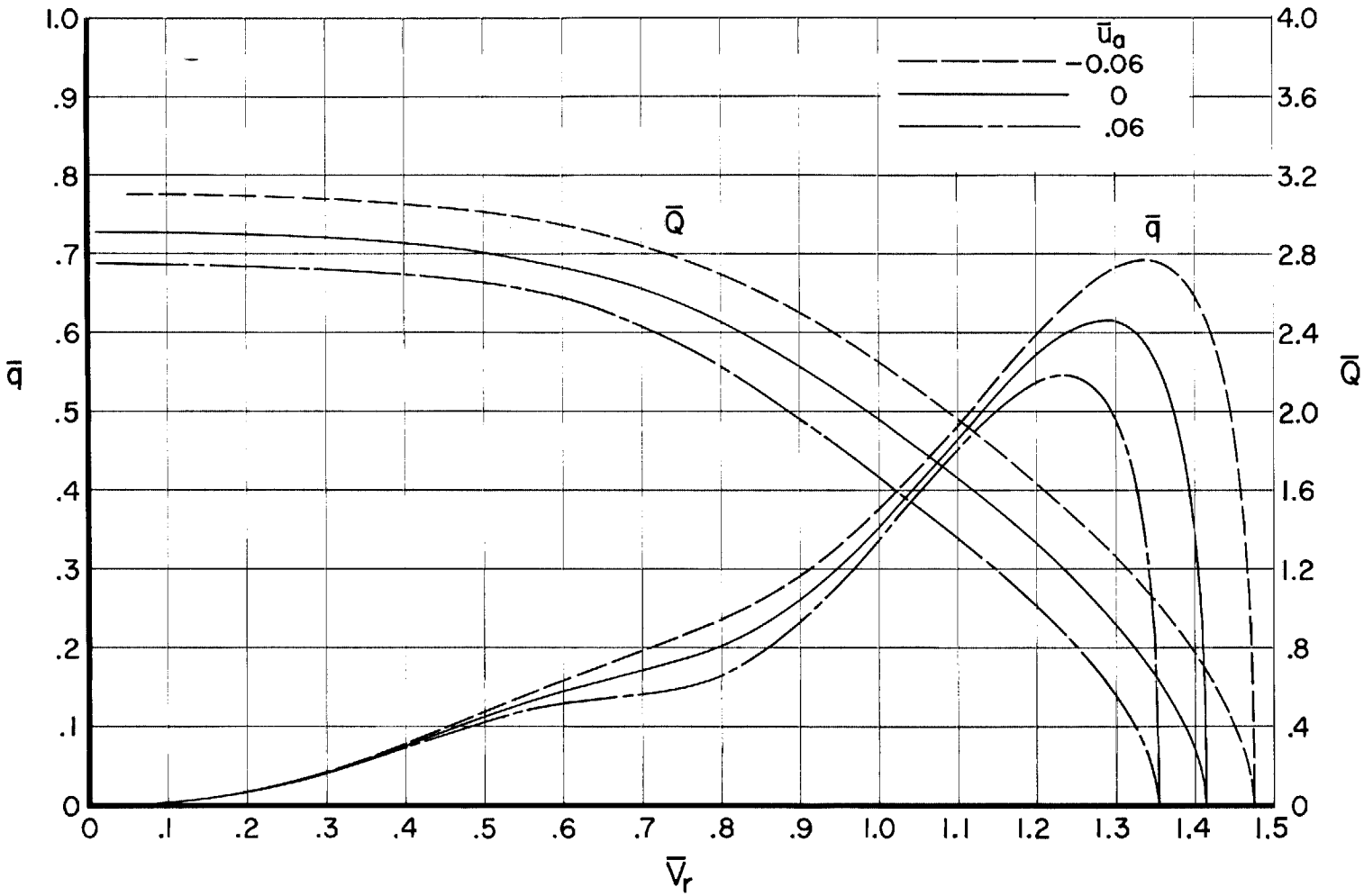
(b) $\bar{q}$, $\bar{Q}$

Figure 18.- Concluded.



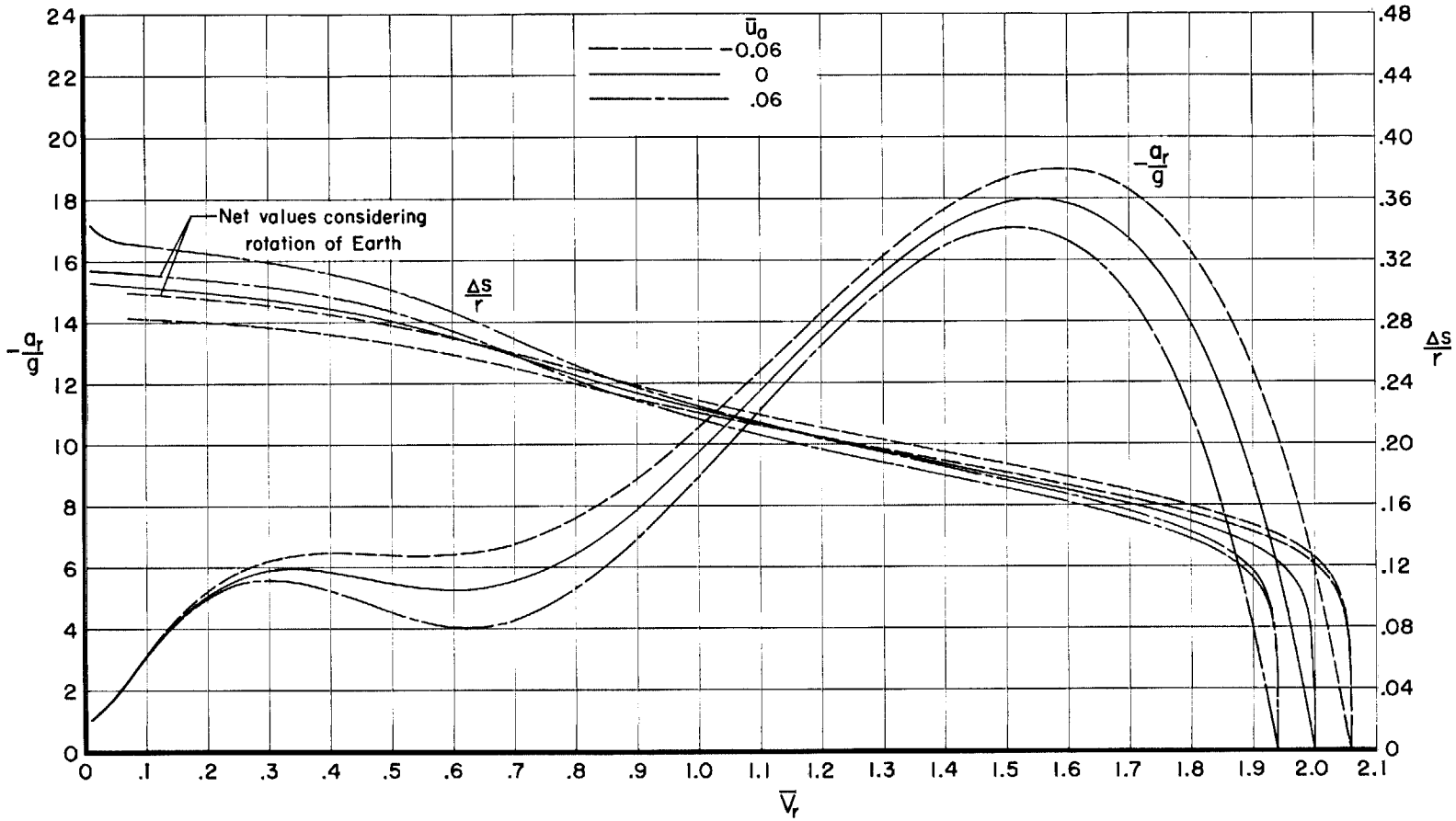
(a) $-a_r/g$, $\Delta s/r$

Figure 17.- The effects of Earth's rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = \sqrt{2}$, $\gamma_i = -6.46^{\circ}$.



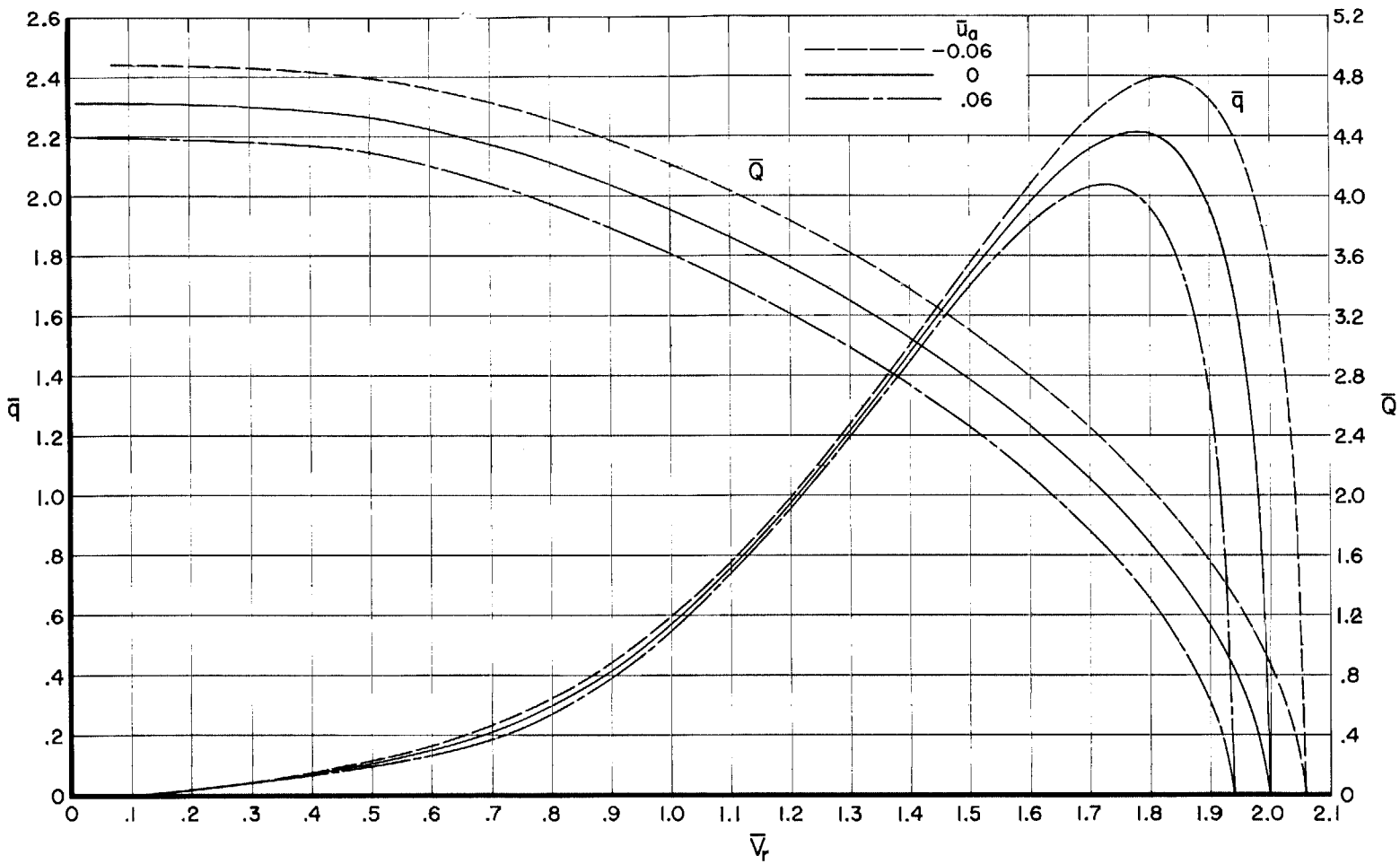
(b) $\bar{q}$, $\bar{Q}$

Figure 17.- Concluded.



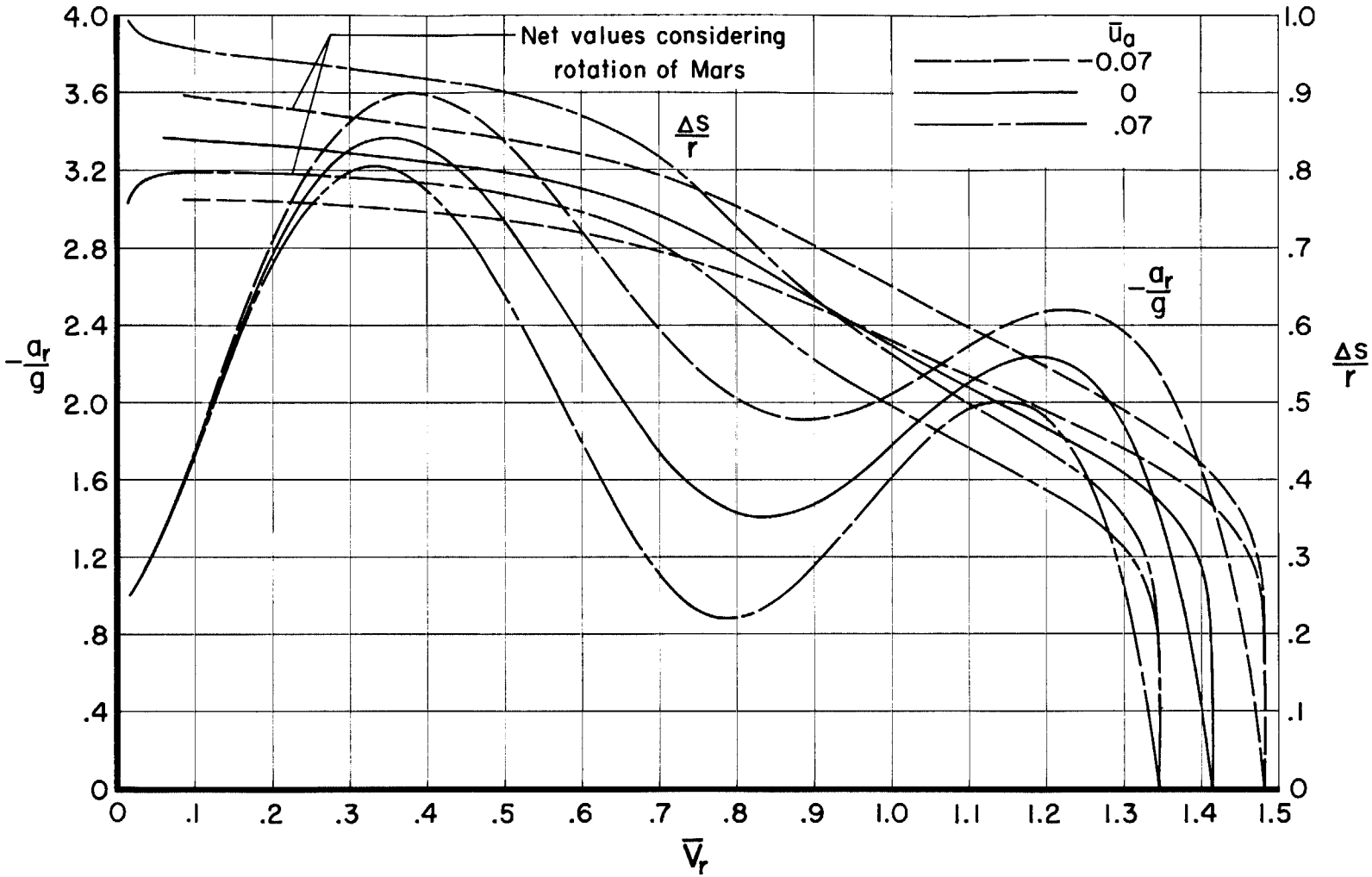
(a) $-a_r/g$, $\Delta s/r$

Figure 19.- The effects of Earth's rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = 2.0$, $\gamma_i = -8.24^{\circ}$.



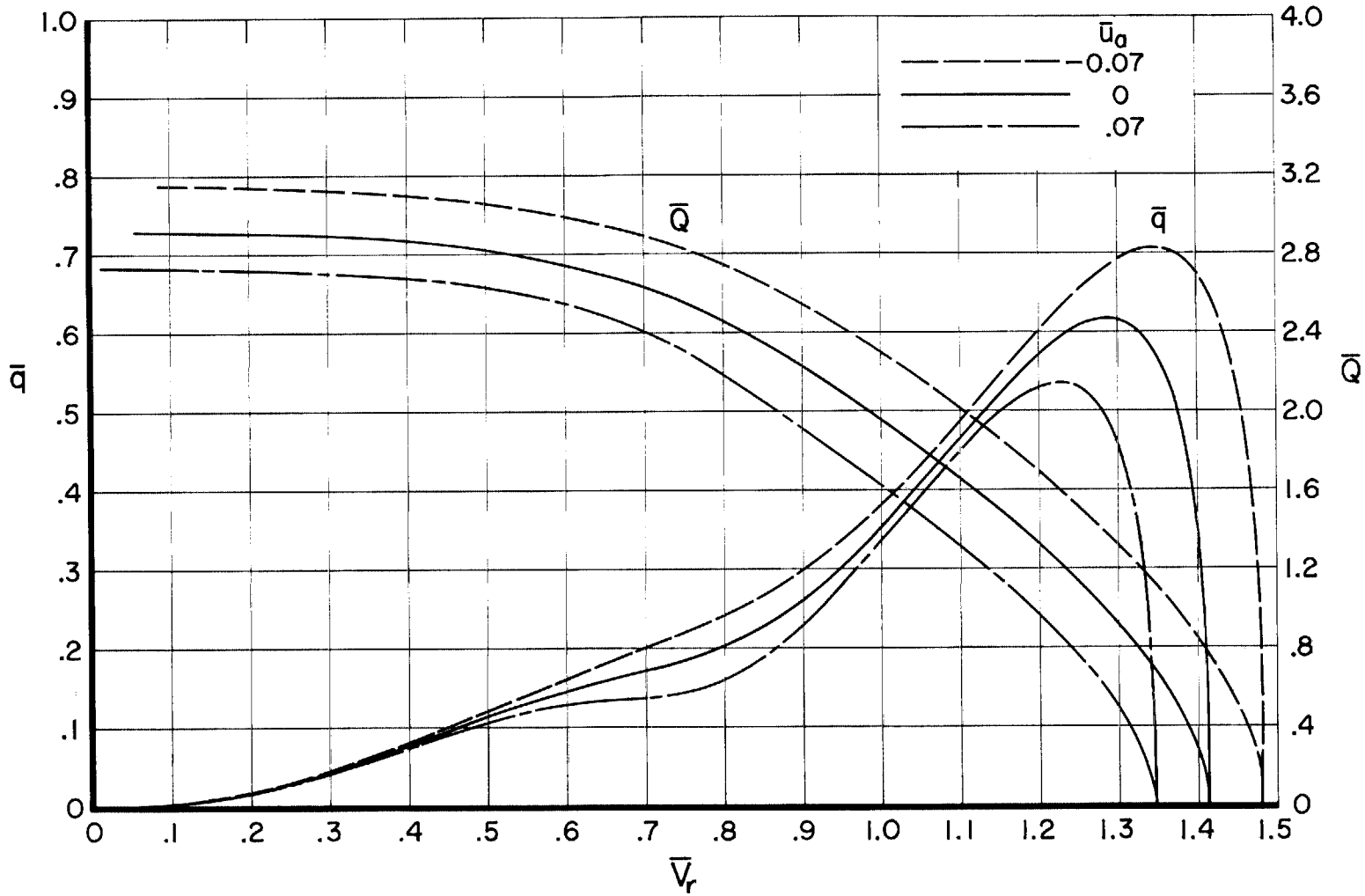
(b) $\bar{q}$, $\bar{Q}$

Figure 19.- Concluded.



(a) $-a_r/g$, $\Delta s/r$

Figure 20.- The effects of Mars' rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = \sqrt{2}$, $\gamma_i = -13.65^\circ$.



(b) $\bar{q}$, $\bar{Q}$

Figure 20.- Concluded.

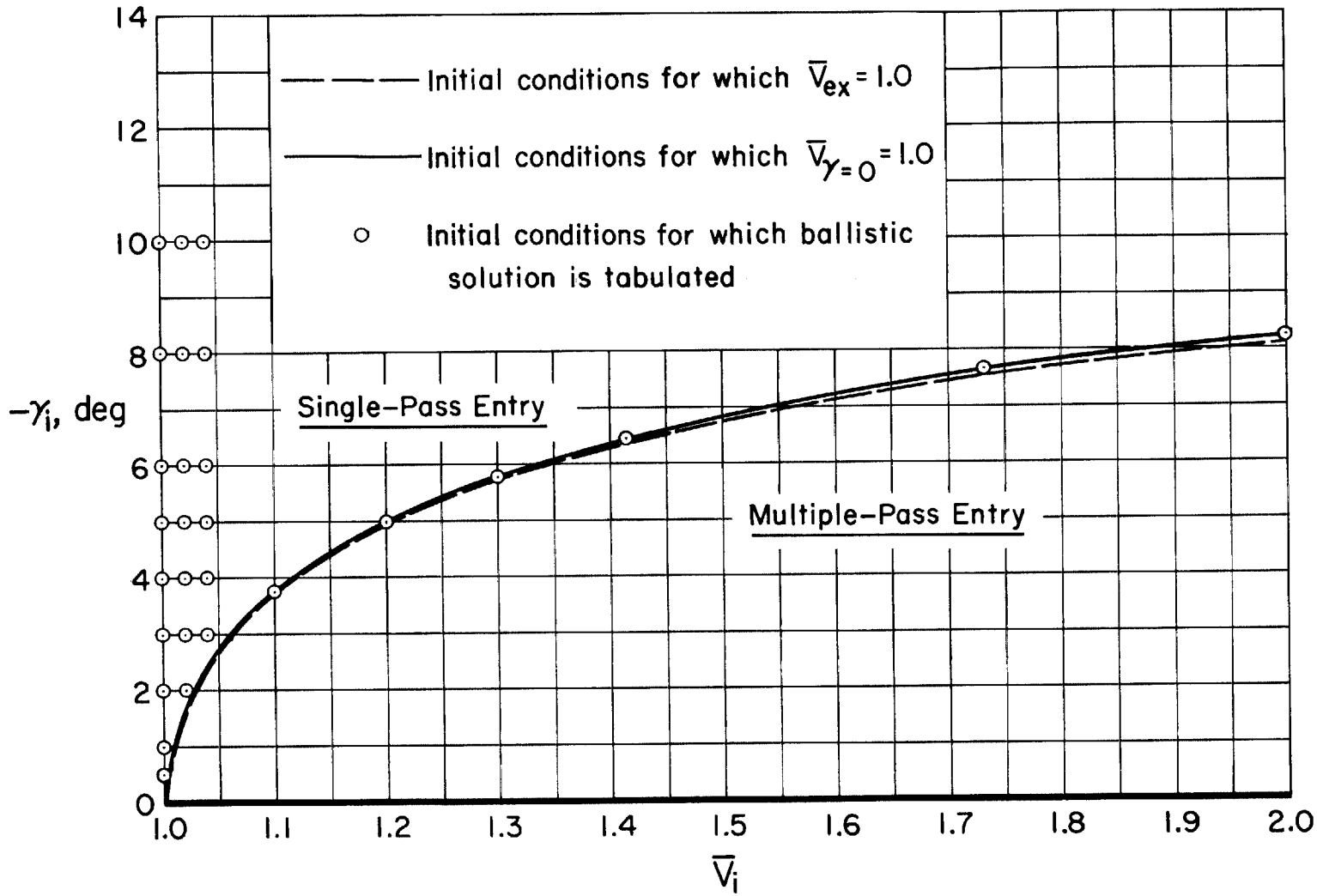
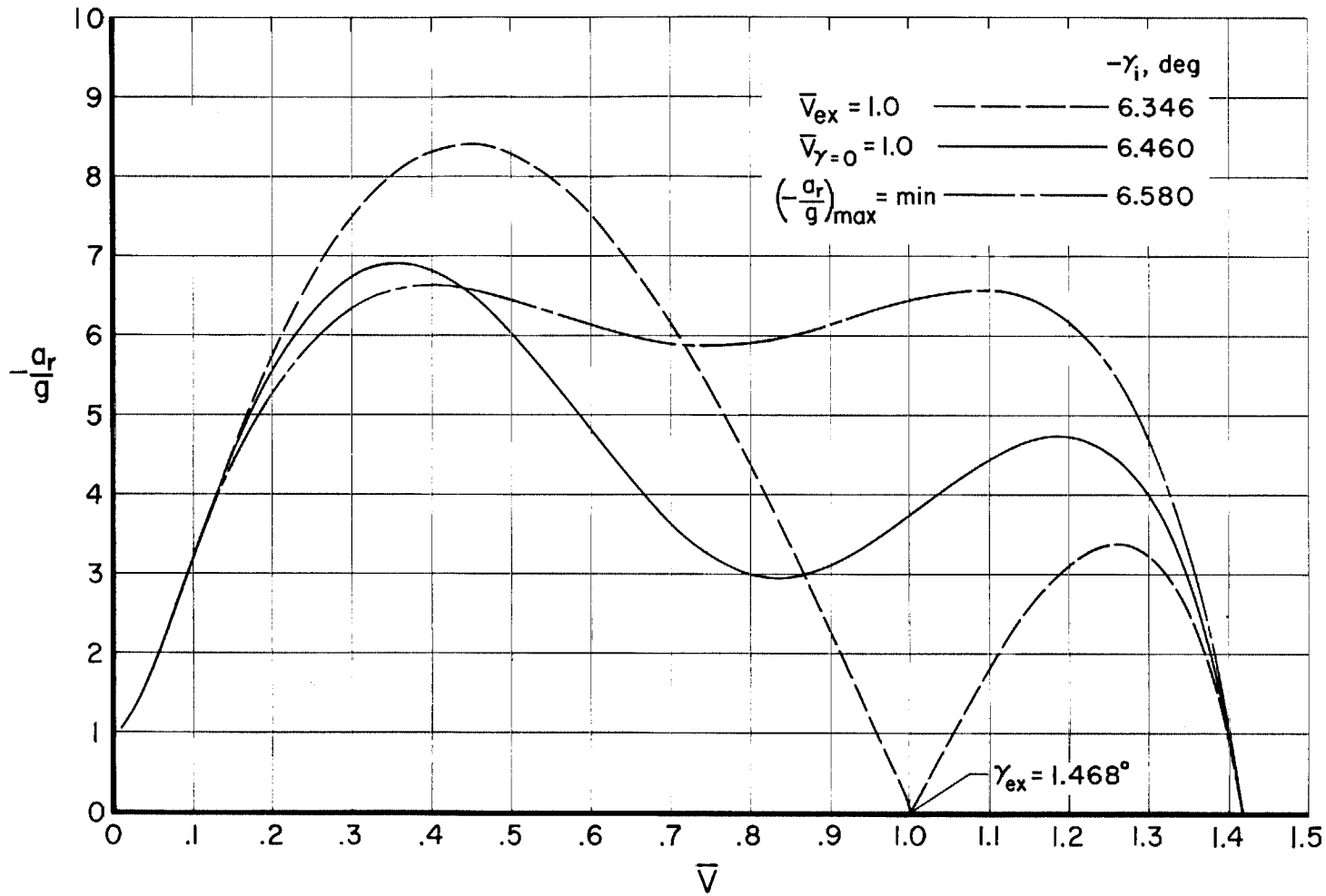
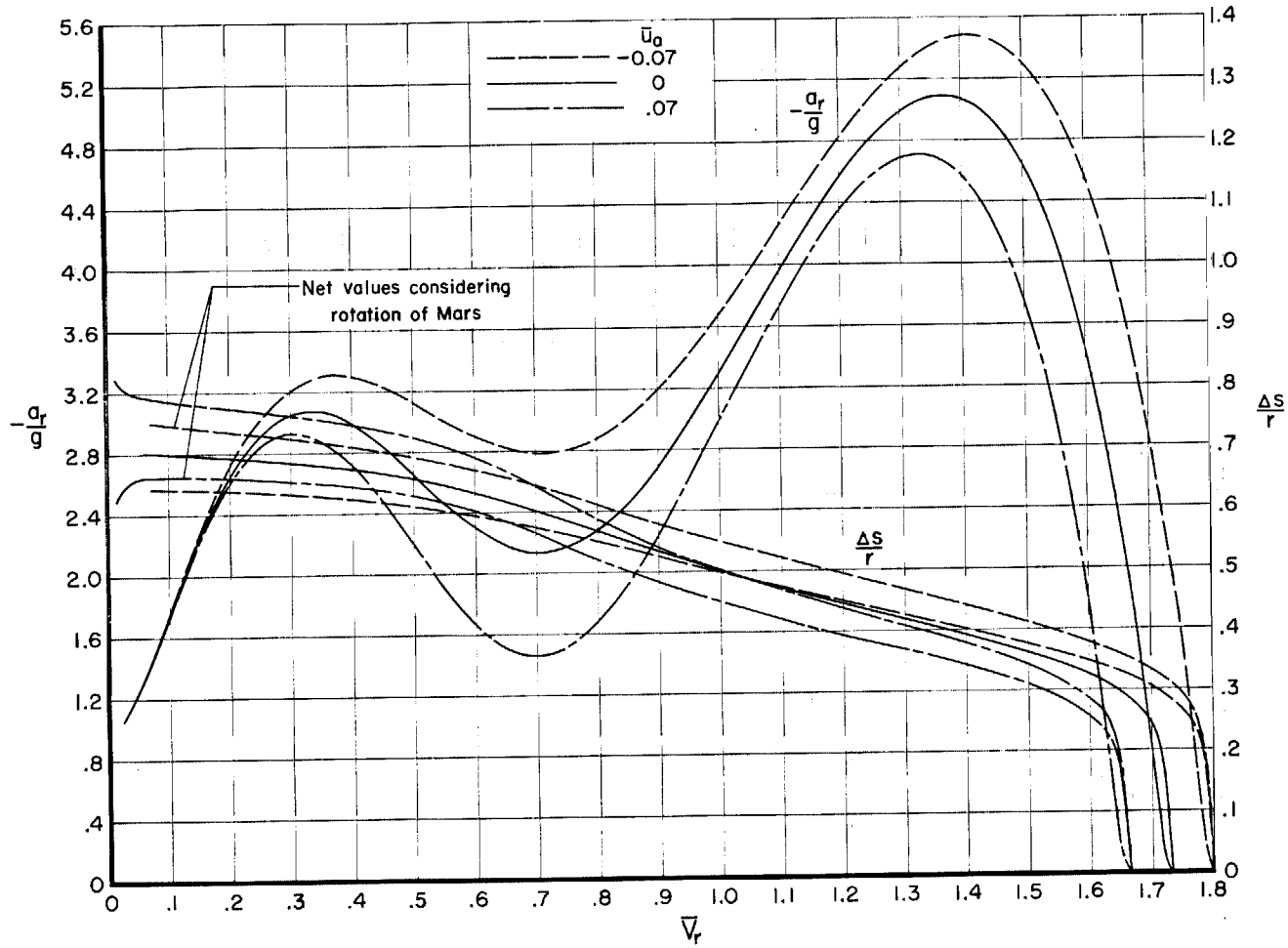


Figure 23.- The minimum values of initial flight-path angle for single-pass entry of nonlifting vehicles into the atmosphere of Earth (or Venus) at supercircular velocity; $\overline{u}_a = 0$.



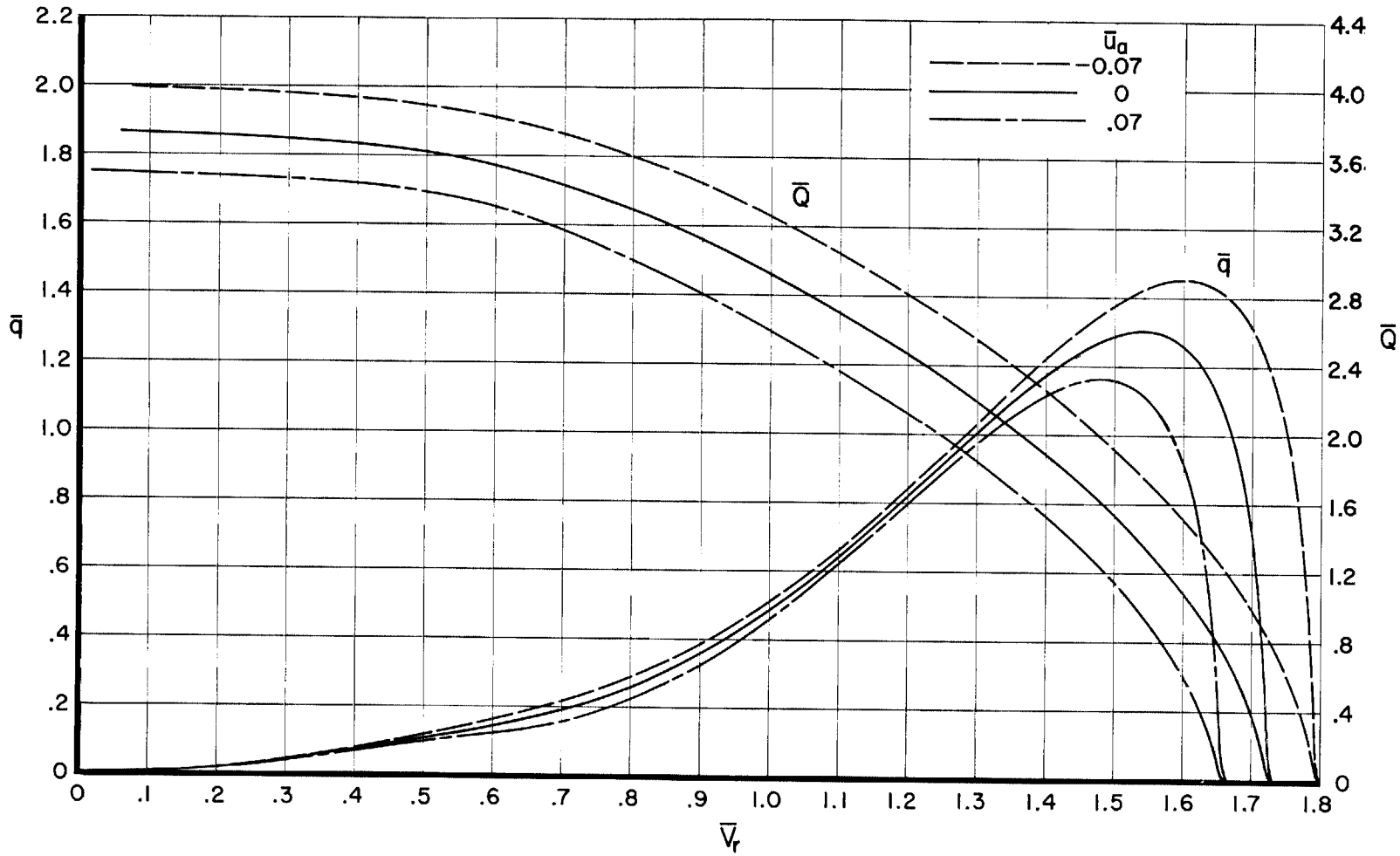
(a) $\bar{V}_i = \sqrt{2}$

Figure 24.- The variation of gas-dynamic deceleration with velocity during nonlifting entry into atmosphere of Earth (or Venus) at supercircular velocity; $\bar{u}_a = 0$.



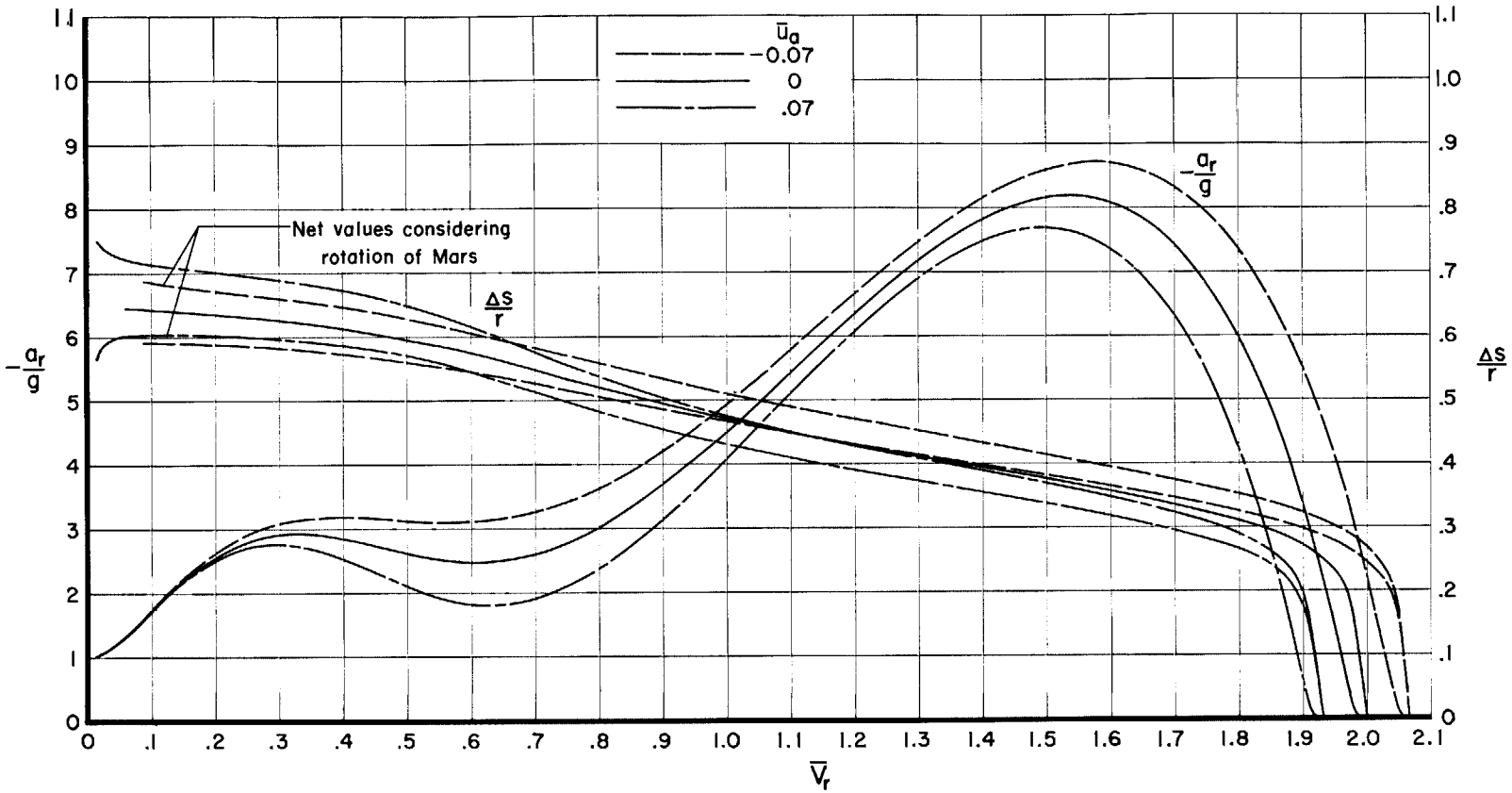
(a) $-a_r/g$, $\Delta s/r$

Figure 21.- The effects of Mars' rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = \sqrt{3}$, $\gamma_i = -16.14^{\circ}$.



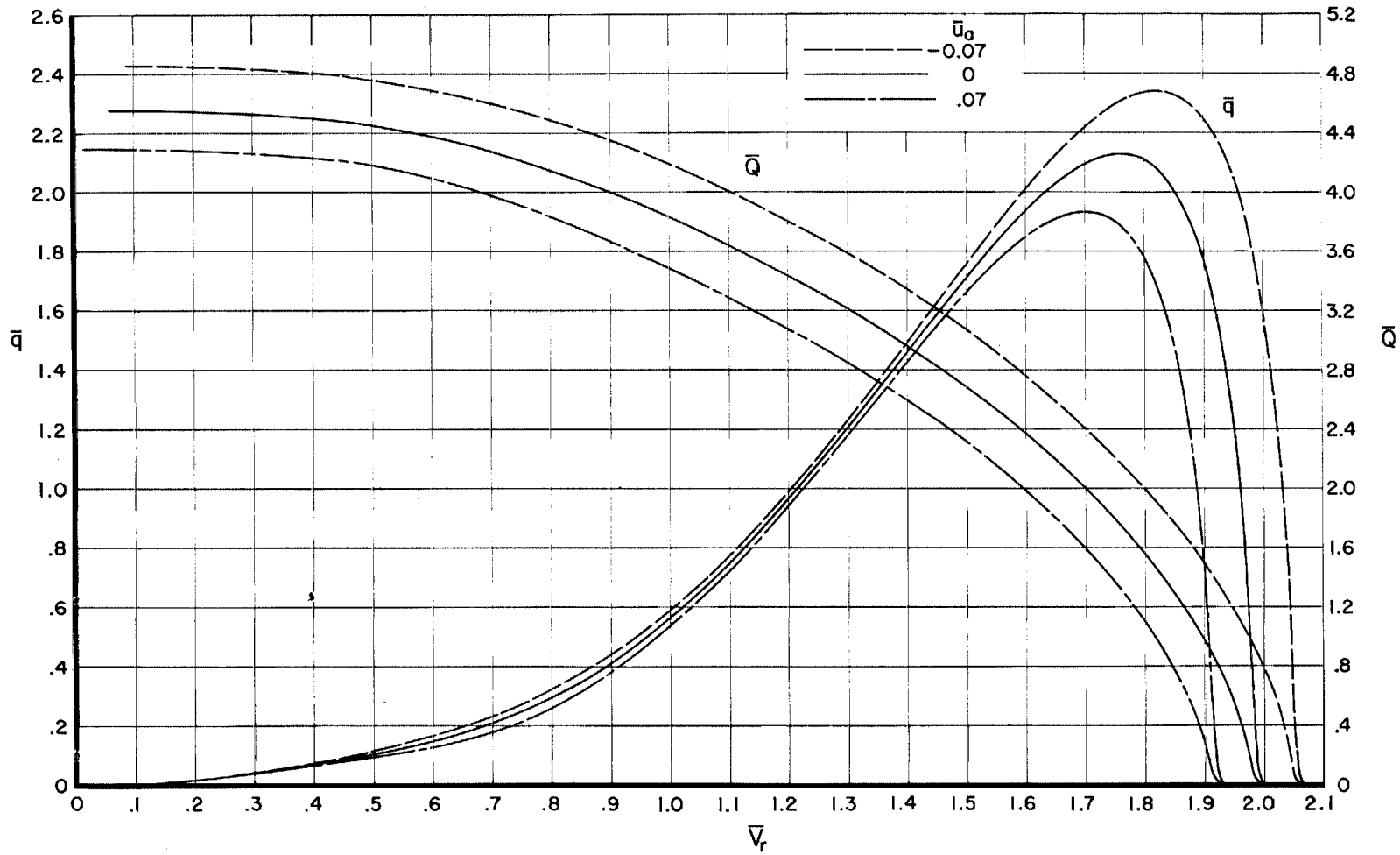
(b) $\bar{q}$, $\bar{Q}$

Figure 21.- Concluded.



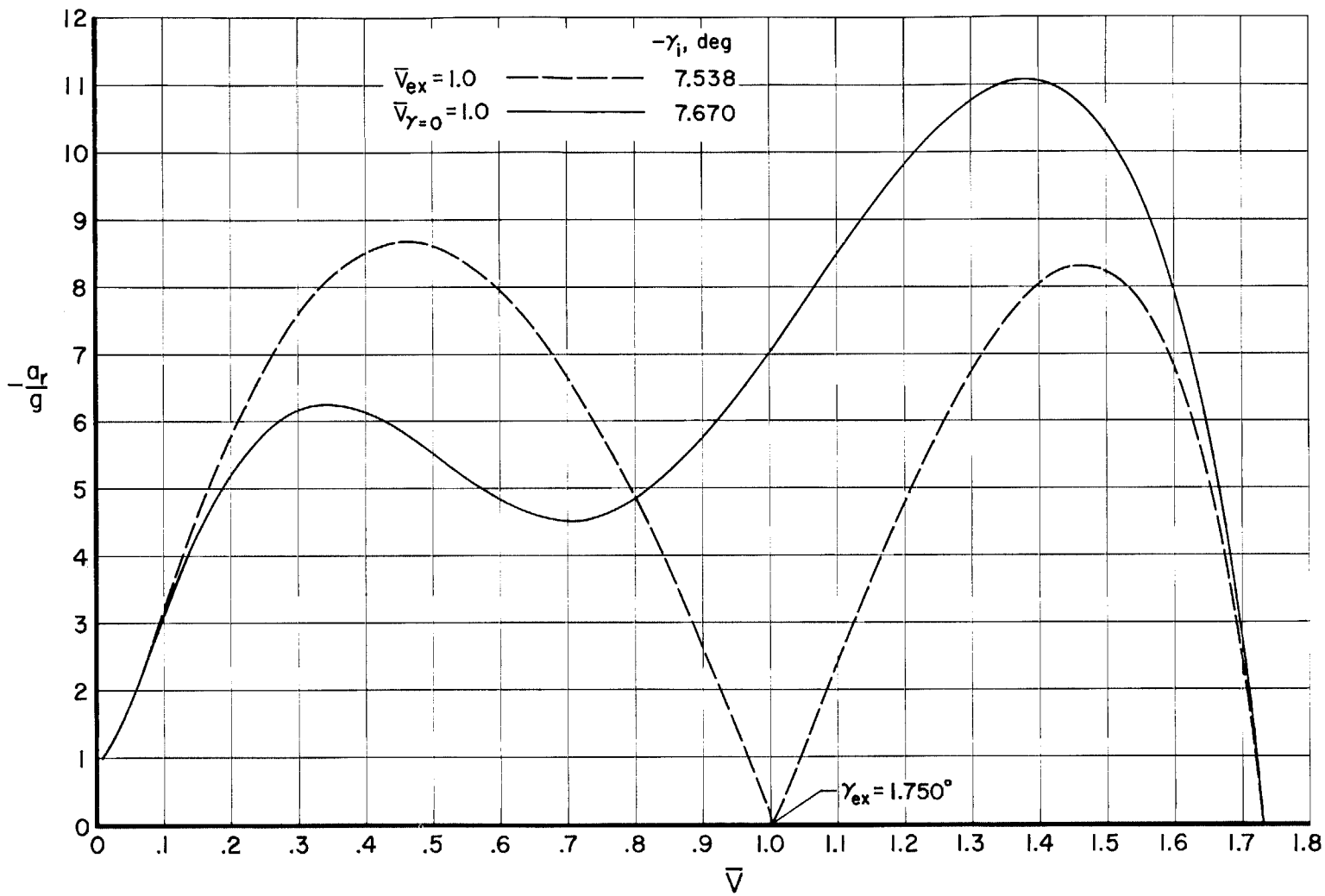
(a) $-a_r/g$, $\Delta s/r$

Figure 22.- The effects of Mars' rotation on the motion and heating of nonlifting vehicles during atmosphere entry; $\bar{V}_i = 2.0$, $\gamma_i = -17.32^{\circ}$.



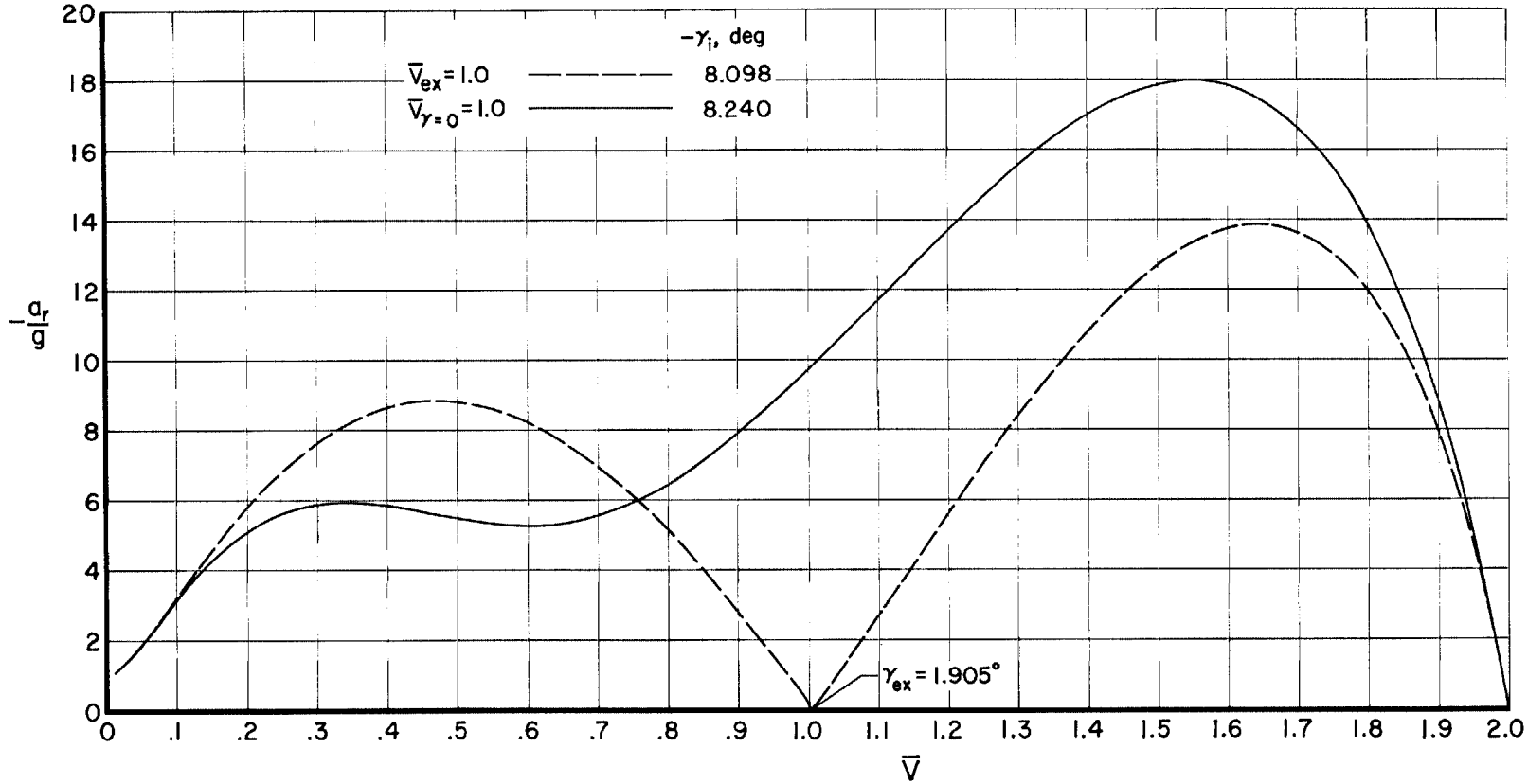
(b) $\bar{q}$, $\bar{Q}$

Figure 22.- Concluded.



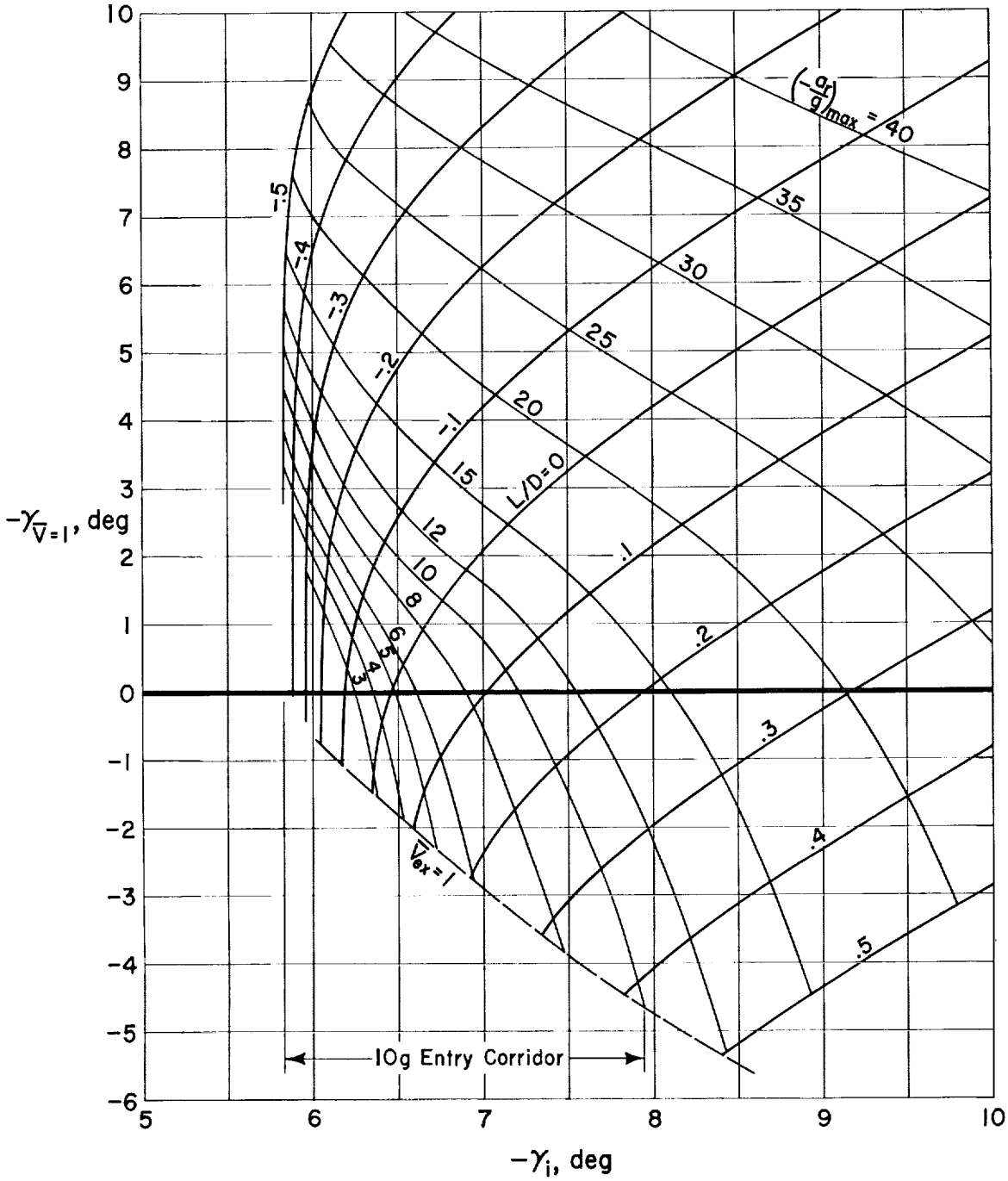
(b) $\bar{V}_i = \sqrt{3}$

Figure 24.- Continued.



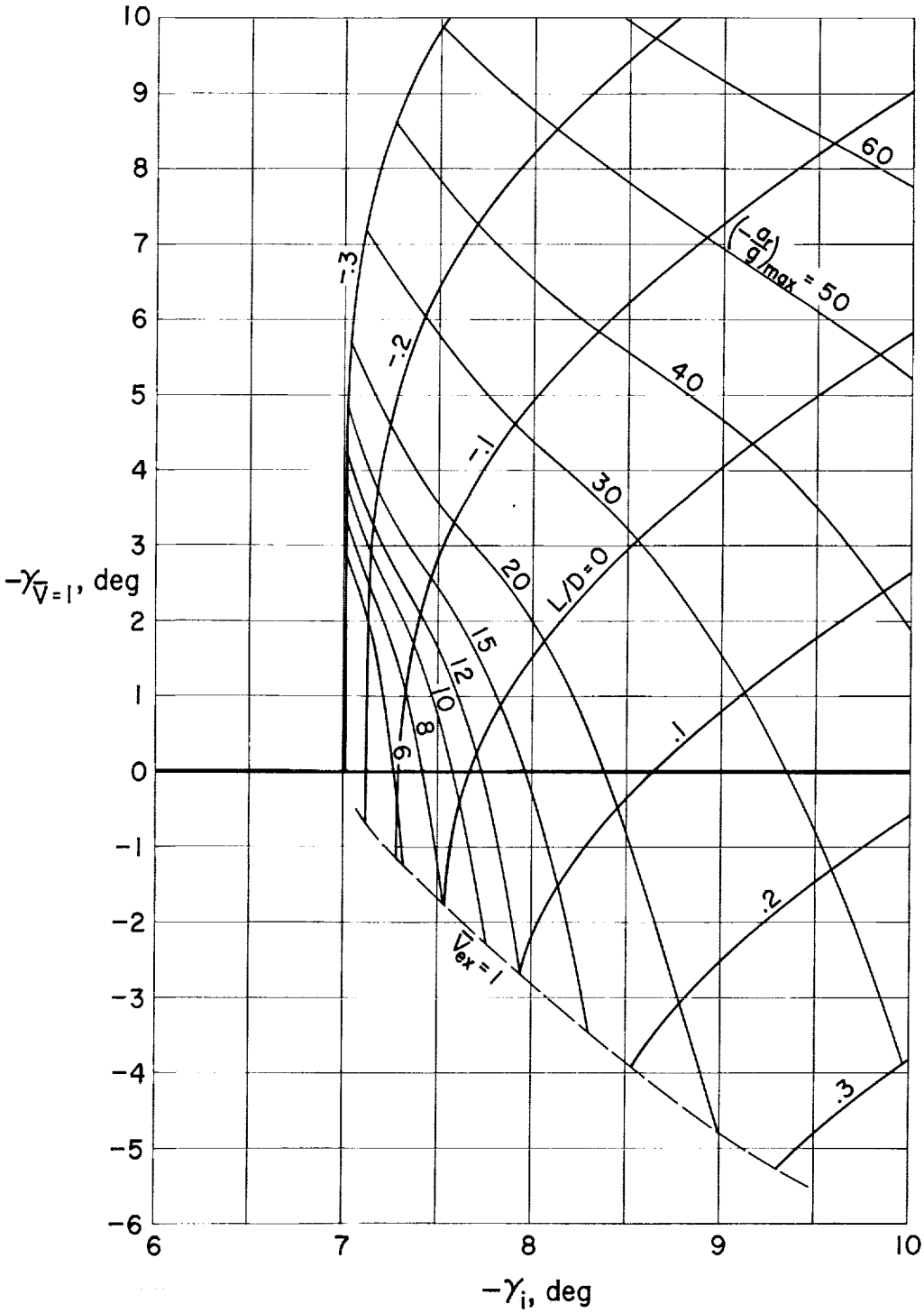
(c) $\overline{V}_i$ = 2.0

Figure 24.- Concluded.



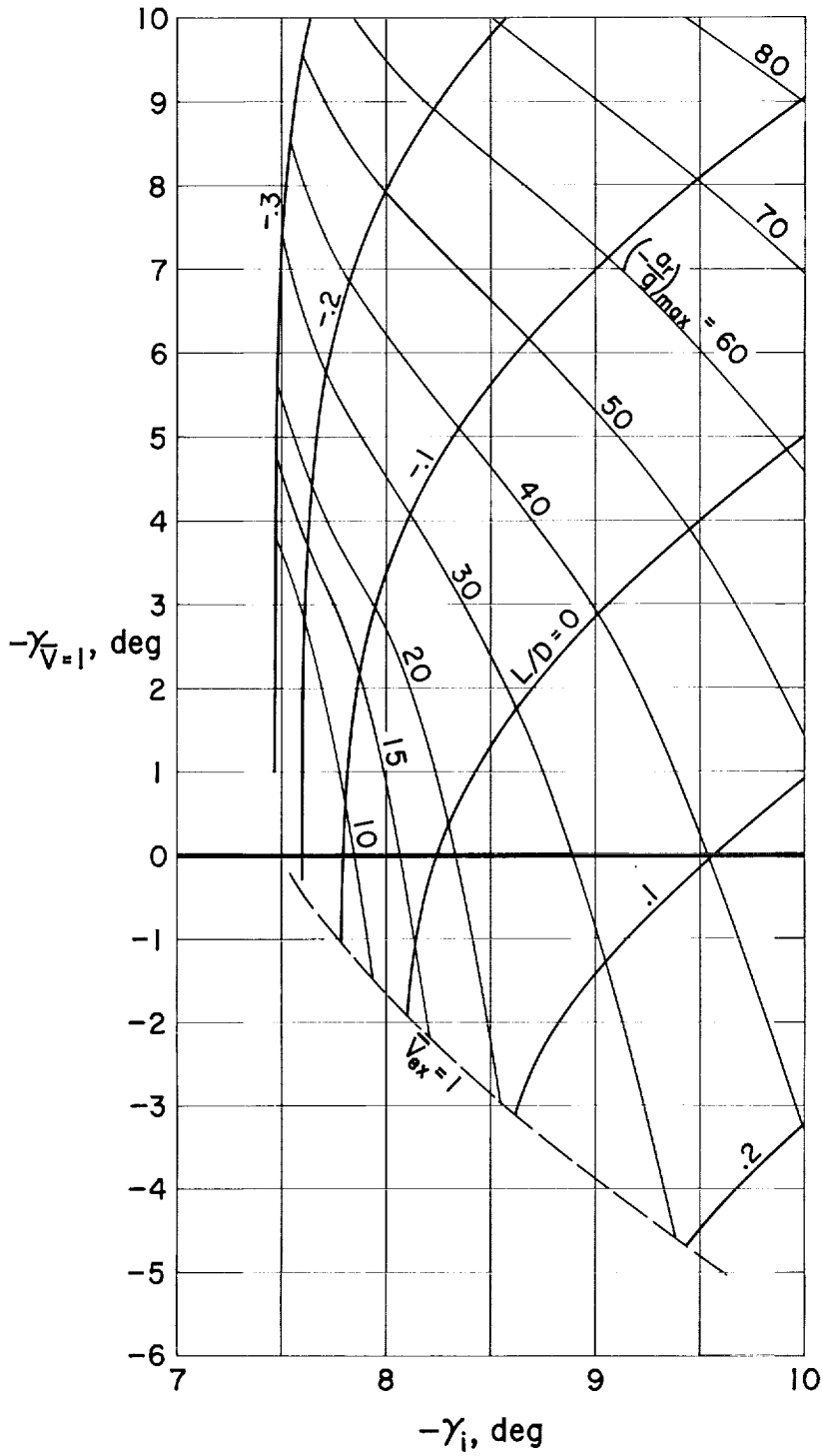
(a) $\bar{V}_i = \sqrt{2}$

Figure 25.- Nominal results of lifting entry at supercircular velocity into the atmospheres of Earth and Venus; $\bar{u}_a = 0$.



(b) $\bar{V}_i = \sqrt{3}$

Figure 25.- Continued.



(c) $\bar{V}_i = 2.0$

Figure 25.- Concluded.