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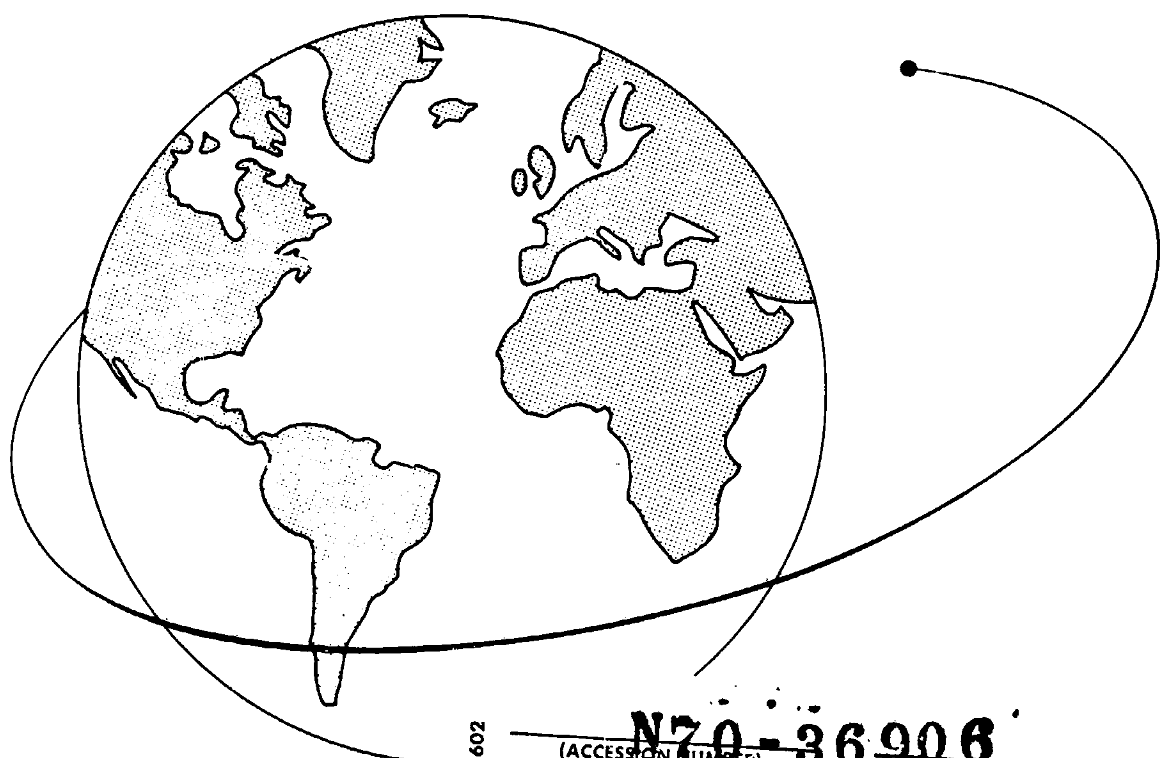
L. G. JACCHIA



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L. G. Jacchia

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Smithsonian Institution
Astrophysical Observatory
Cambridge, Massachusetts 02138

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ABSTRACT

The present models are patterned after similar models published by the author (Jacchia, 1965a). The main differences consist in the lower height (90 km instead of 120 km) of the constant-boundary surface and in a higher ratio of atomic-oxygen to molecular-oxygen density ($n(O)/n(O_2) \approx 1.5$ at 120 km instead of about 1.0). Mixing is assumed to prevail to a height of 105 km, diffusion above this height. All the recognized variations that can be connected with solar, geomagnetic, temporal, and geographic parameters are represented by empirical equations.

Tables showing temperature, density, and composition as a function of height are given for exospheric temperatures ranging from 600° to 2000°K, at 100°K intervals, and for heights from 90 to 2500 km. A summary table at the end gives densities only for the same range of heights and temperatures, but at 50°K intervals in the exospheric temperature. A set of auxiliary tables is provided to help in the evaluation of the diurnal, geomagnetic, semiannual, and seasonal-latitudinal effects.

RÉSUMÉ

Les modèles présents sont des copies de modèles analogues publiés par l'auteur (Jacchia, 1965a). Les différences principales sont la hauteur plus basse (90 km au lieu de 120 km) de la surface à limites constantes et un rapport plus élevé de la densité de l'oxygène atomique par rapport à celle de l'oxygène moléculaire ($n(O)/n(O_2) = 1,5$ à 120 km au lieu d'environ 1,0). On suppose qu'un mélange prévaloit jusqu'à une hauteur de 105 km, au dessus c'est la diffusion. Des équations empiriques tiennent compte de toutes les variations connues qui peuvent être reliées aux paramètres solaires, géomagnétiques, temporels et géographiques.

Nous donnons des tableaux montrant les variations de la température, de la densité et de la composition en fonction de la hauteur pour des températures exosphériques allant de 600° à 2000°K, à des intervalles de 100°K, et pour des hauteurs allant de 90 à 2500 km. A la fin, un tableau résumé donne les intensités seulement pour la même gamme de hauteurs et de températures mais à des intervalles de 50°K dans la température exosphérique. On donne aussi un ensemble de tableaux auxiliaires pour aider à évaluer les effets diurnes, les effets géomagnétiques, semiannuels, et les effets latitudinaux saisonniers.

КОНСПЕКТ

Настоящие модели сделаны по сходным моделям, которые были опубликованы автором (Якчия, 1965а). Основные различия заключаются в более низкой высоте (90 км вместо 120 км) поверхности атомного кислорода к молекулярному ($n(O)/n(O_2) \approx 1,5$ вместо 1,0 на высоте 120 км). Предполагается, что смешивание преобладает до высоты в 105 км, диффузия-на большей высоте. Все замеченные изменения, которые могут быть связаны с солнечными, геомагнитными, временными и географическими параметрами, представлены эмпирическими уравнениями.

Таблицы, представляющие температуру, плотность и состав как функцию высоты, даны для экзосферических температур в диапазоне от 600° до 2000°K через каждые 100°K и для высот от 90 км до 2500 км. Сводная таблица в конце воспроизводит высоты и температуры в тех же диапазонах, но через каждые 50°K для экзосферических температур. Представлен набор дополнительных таблиц, помогающих в оценке дневных, геомагнитных, полугодовых и сезонно-широтных эффектов.

NEW STATIC MODELS OF THE THERMOSPHERE AND EXOSPHERE WITH EMPIRICAL TEMPERATURE PROFILES

L. G. Jacchia

1. INTRODUCTION

Static diffusion models of the upper atmosphere with empirical temperature profiles were published by the author a few years ago (Jacchia, 1965a). These models have been widely used and can also be found incorporated in the U.S. Standard Atmosphere Supplements 1966 (COESA, 1966). Their main drawback is the assumed constancy of the boundary conditions at 120 km, shared by other atmospheric models (Nicolet, 1961, 1963; CIRA, 1965). Actually, both temperature and density undergo considerable variations at 120 km, and the neglect of this fact makes the models somewhat less reliable for heights below 200 km, as was pointed out in the text that accompanied the tables. The present tables try to remedy that situation as much as possible by taking constant-boundary conditions at the height of 90 km, which closely corresponds to that of the mesopause and also of a layer of minimum variation in the global density distribution (Cole, 1961). All the available observational material, including the most recent measurements of density and composition, has been taken into account in the construction of the present tables.

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2. COMPOSITION

We have assumed that the atmosphere is composed only of nitrogen, oxygen, argon, helium, and hydrogen, in a condition of mixing up to 105 km, and in diffusion above this height. We have adopted the sea-level composition of the U.S. Standard Atmosphere 1962 (COESA, 1962) such as would obtain after elimination of the minor constituents and of hydrogen (which is introduced in our models at a height of 500 km). There is some evidence that for helium gravitational separation starts at a lower height than for the other constituents. To eliminate the inconvenience of a separate homopause for helium, we have had recourse to the artifice of increasing the sea-level concentration of helium by an amount such that the atmospheric densities at heights where helium appears as a major constituent be in agreement with the observed densities. This results in an erroneous helium density below 105 km — a situation we were willing to tolerate in view of the entirely negligible contribution of helium to the total density at those heights. Thus the assumed sea-level composition is as follows:

	Fraction by volume $q_0(i)$	Molecular weight m_i
Nitrogen (N_2)	0.78110	28.0134
Oxygen (O_2)	0.20955	31.9988
Argon (Ar)	0.00934	39.948
Helium (He)	0.00001289	4.0026
Sum	1.00000	

The resulting sea-level mean molecular mass is $\overline{M}_0 = 28.960$.

We have assumed that any change in the mean molecular mass $\overline{M}$ in the mixing region below 105 km is caused only by oxygen dissociation. Therefore, the amount of atomic oxygen present in the atmosphere is uniquely determined by $\overline{M}$. From 90 to 105 km we have used an empirical $\overline{M}$ profile that had to satisfy certain conditions. Starting from a value not too different from $\overline{M}_0$ at 90 km, we end at 105 km with a value that would yield a concentration of atomic oxygen such that the ratio $n(O)/n(O_2)$ at 120 km would be about 1.5 and have a gradient dM/dz at 105 km roughly equal to that corresponding to the gradient in diffusion immediately above 100 km (thus minimizing the effect on the models of a change in the height of the homopause). The average observed height of the turbopause is closer to 100 than to 105 km, but we have to allow for a difference of a few kilometers between the turbopause and the effective homopause. We also constructed a model with the homopause at 100 km, which is virtually identical with the present model above 105 km, but we chose to publish the present model because it leads to a smoother $\overline{M}$ profile across the homopause. The ratio $n(O)/n(O_2) = 1.5$ at 120 km was arrived at after many attempts to construct models with ratios from 0.5 to 4; it seems to fit best the satellite-drag data, particularly near maximum solar activity. It is larger than the ratio 1.0 used in the Jacchia 1965 models and the CIRA models, but not quite so large as advocated by Von Zahn (1967).

The adopted $\overline{M}$ profile can be found in the tables. For computer purposes we have used a sixth-degree polynomial of the form

$$M(z) = \sum_{n=0} c_n (z - 100)^n \qquad (90 < z < 105;\ z \text{ in km}) \qquad (1)$$

to represent it. The coefficients c_n are given below:

$c_0 = 28.15204$

$c_1 = -0.085586$

$c_2 = +1.2840 \times 10^{-4}$

$c_3 = -1.0056 \times 10^{-5}$

$$c_4 = -1.0210 \times 10^{-5}$$
$$c_5 = +1.5044 \times 10^{-6}$$
$$c_6 = +9.9826 \times 10^{-8} \quad .$$

The number densities of the individual species i in the region from 90 to 105 km are obtained as follows. From the density ρ the total number of particles N per unit volume is computed by

$$N = A\rho/m \quad , \tag{2}$$

where A is Avogadro's number.

For N_2, Ar, and He we have

$$n(i) = q_0(i) \frac{\overline{M}}{\overline{M}_0} N \quad , \tag{3}$$

and for O and O_2, respectively,

$$n(O) = 2N \left(1 - \frac{\overline{M}}{\overline{M}_0}\right)$$

$$n(O_2) = N \left\{ \frac{\overline{M}}{\overline{M}_0} \left[1 + q_0(O_2)\right] - 1 \right\} \quad . \tag{4}$$

For ρ in g cm^{-3} we have used $A = 6.02257 \times 10^{23}$.

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3. COMPUTATION OF DENSITIES AND BOUNDARY CONDITIONS

From 90 to 105 km, for a given temperature profile T(z), the density ρ was computed by integrating the barometric equation

$$d\ell n\rho = d\ell n\left(\frac{\overline{M}}{T}\right) - \frac{\overline{M}g}{kT}\, dz \quad , \tag{5}$$

where g is the acceleration due to gravity, and k = 8.31432 joules $(°K)^{-1}$ mol^{-1}, the universal gas constant.

At the height z = 90 km we have assumed the following boundary conditions:

$$\rho_1 = 3.46 \times 10^{-9} \text{ g cm}^{-3} \quad ,$$

$$T_1 = 183°K \quad .$$

Above 105 km the number density of each individual species n(i) was computed by integrating the diffusion equation

$$\frac{dn(i)}{n(i)} = -\frac{m_i g}{kT}\, dz - \frac{dT}{T}\,(1 + \alpha_i) \quad , \tag{6}$$

where α_i is the thermal diffusion coefficient. Following Nicolet, we have used α = -0.38 for helium, and α = 0 for the other constituents.

For hydrogen we have followed Kockarts and Nicolet (1962) and fitted the equation

$$\log_{10} n(H)_{500} = 73.13 - 39.40 \log_{10} T_\infty + 5.5 (\log_{10} T_\infty)^2 \tag{7}$$

to their concentrations at 500 km. We have assumed hydrogen to be in diffusion equilibrium above 500 km; no hydrogen densities were computed below this height. According to equation (7) hydrogen densities decrease when the temperature increases, contrary to the behavior of all other atmospheric constituents. This should be correct in the variations with the 11-year solar cycle. According to Meier (1969), however, the variations of hydrogen in the 27-day oscillations corresponding to solar rotation are in phase with those of the other constituents. It would seem, therefore, that at heights where hydrogen is a major constituent, density variations cannot be computed in a simple fashion by just changing the exospheric temperature (see Section 12).

The acceleration due to gravity was computed from the formula

$$g = 980.665\ (1 + z/R_e)^{-2}\ \text{cm sec}^{-2}\quad , \tag{8}$$

with $R_e = 6.356766 \times 10^8$ cm. This equation (Harrison, 1951; Minzner and Ripley, 1956) is an excellent approximation to the actual value of g (centrifugal force included) for the latitude of 45° 32'40".

4. TEMPERATURE PROFILES

All temperature profiles start from a constant value $T_0 = 183°K$ at the height $z_0 = 90$ km, with a gradient $G_0 = (dT/dz)_{z=z_0} = 0$, rise to an inflection point at a fixed height $z_x = 125$ km, and become asymptotic to a temperature T_∞ (often referred to as the "exospheric" temperature). Both the temperature T_x and the temperature gradient $G_x = (dT/dz)_{z=x}$ at the inflection point are functions of T_∞; for simplicity we have made G_x a function of T_x.

The quantity T_x is defined by the equation

$$T_x = a + bT + c \exp (\bar{k}\, T_\infty) \quad , \qquad (z_x = 125 \text{ km}) \quad , \tag{9}$$

with the constraint that $T_x = T_0$ when $T_\infty = T_0$ (i. e., for the hypothetical case in which the exospheric temperature is the same as the temperature at 90 km, namely 183°, there is no variation of temperature with height). The numerical values of the coefficients are as follows:

$$\begin{aligned} a &= 444.3807 \quad , \\ b &= 0.02385 \quad , \\ c &= -392.8292 \quad , \\ \bar{k} &= -0.0021357 \quad . \end{aligned}$$

For $z_0 < z < z_x$ the temperature profiles are defined by a fourth-degree polynomial:

$$T = T_x + \sum_{n=1}^{4} c_n (z - z_x)^n \quad . \tag{10}$$

The coefficients c_1, c_2, c_3, and c_4 are determined by the following conditions:

$$\text{when } z = z_0 \begin{cases} T = T_0 \\ G_0 = \left(\frac{dT}{dz}\right)_{z=z_0} = 0 \quad ; \end{cases}$$

$$\text{when } z = z_x \begin{cases} G_x = \left(\frac{dT}{dz}\right)_{z=z_x} = 1.90 \ \frac{T_x - T_0}{z_x - z_0} \\ \left(\frac{d^2T}{dz^2}\right)_{z=z_x} = 0 \end{cases} \quad . \tag{11}$$

These coefficients must be computed separately for every temperature profile, so their tabulation would be wasteful. The equation for G_x is justified in the following manner. The condition for having no inflections in the temperature profile in the interval $z_0 < z < z_x$ is given by

$$\frac{4}{3} < \frac{z_x - z_0}{T_x - T_0} G_x < 2 \quad . \tag{12}$$

Experiments with gradients within this range have shown that it is quite feasible to keep the quantity $(z_x - z_0)/(T_x - T_0)$ constant for all temperature profiles; the best value was found to be 1.90.

For $z > z_x$ the temperature profiles are determined by equations of the type

$$T = T_x + A \tan^{-1} \left\{ \frac{G_x}{A} (z - z_x)[1 + B(z - z_x)^n] \right\} \quad , \tag{13}$$

where

$$A = \frac{2}{\pi} (T_\infty - T_x) \quad ; \quad B = 4.5 \times 10^{-6} \text{ for } z \text{ in km} \quad ; \quad n = 2.5 \quad .$$

As can be seen, continuity is provided in dT/dz when z crosses z_x. The inverse tangent was selected among several suitable asymptotic functions for its ready availability in tabulated form and in computer libraries. The presence of the corrective term $[1 + B(z - z_x)^n]$ frees the temperature profiles from strict dependence on the selected type of asymptotic function.

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5. VARIATIONS IN THE THERMOSPHERE AND EXOSPHERE

Several types of variation are recognized in the atmospheric regions covered by the present models. They can be classified as follows:

1. Variations with the solar cycle;
2. Variations with the daily change in activity on the solar disk;
3. The diurnal variation;
4. Variations with geomagnetic activity;
5. The semiannual variation;
6. Seasonal-latitudinal variations of the lower thermosphere;
7. Seasonal-latitudinal variations of helium;
8. Rapid density fluctuations probably connected with gravity waves.

All these variations, with the exception of the last type, are subject to some amount of regularity and can be predicted with varying degree of accuracy on the basis of ground-based observations. It is obvious that static models cannot represent all the different types of variation equally well. They should be quite adequate when the characteristic time of the variation is much longer than the time involved in the conduction, convection, and diffusion processes; when, on the other hand, it is comparable or shorter — as in the diurnal variation and the geomagnetic effect — we must expect poorer results. By this we mean that, if we try to represent the observed density variations, we may have to introduce temperature variations that are not entirely correct, or vice versa. Since the largest observational material, by far, consists of density measurements, it is the density variations that we have tried to keep correct. We have no direct evidence so far that the resulting temperature variations might actually be incorrect, although it would not be surprising if they turned out to be so, to a certain degree. Temperatures derived from nitrogen profiles at various times of the day (Spencer, Taeusch, and Carignan, 1966; Taeusch, Niemann, Carignan, Smith, and Ballance, 1968) actually are in closer agreement with the J65 static models.

An effort was made in the CIRA 1965 tables to treat the diurnal variation apart; unfortunately the inadequacy of present-day theory does not justify the tremendous increase in the size of the tables if one were to cover the diurnal variation over the entire globe, instead of being restricted to one particular latitude as in CIRA 1965.

6. VARIATIONS WITH SOLAR ACTIVITY

The ultraviolet solar radiation that heats the earth's upper atmosphere actually consists of two components, one related to active regions on the solar disk and the other to the disk itself. The active-region component comes from areas of higher temperature and consists mainly of the spectral lines of highly ionized atoms, such as Fe XIV-XVI, Si IX-X, Mg X, etc.; the radiation from the clear disk comes from much less ionized atoms, such as He I-II and O IV, and the helium continuum. The active-region component varies rapidly from one day to the next in correspondence with the appearance and disappearance of active areas caused by the rotation of the sun and by spot formation; the disk component presumably varies more slowly in the course of the 11-year solar cycle. Since the radiation in the two components is different, we must expect the atmosphere to react in a different manner to each of them — and this is actually observed.

The 10.7-cm solar flux ($F_{10.7}$) is generally used as a readily available index of solar EUV radiation. It also consists of a disk component and of an active-area component, which can be separated by statistical methods by relating the observed values of the flux integrated over the whole solar disk to the corresponding sunspot numbers (Hachenberg, 1965) or, better, to sunspot areas. When the 10.7-cm flux increases, there is an increase in the temperature of the thermosphere and exosphere; for a given increase in the disk component, however, the temperature increases three times as much as for the same increase in the active-area component. Separate values of the two components of the solar flux are not readily available; fortunately we have found (Jacchia and Slowey, unpublished) that the disk component is, for all practical purposes, linearly related to the flux averaged, or smoothed, over approximately three solar rotations ($\bar{F}_{10.7}$). We can, therefore, replace the relation between temperature and disk component with an equivalent relation between temperature and $\bar{F}_{10.7}$. In view of the solar-wind effect on the diurnal variation (see Section 7), it appears quite probable that the variations of both the solar EUV and the solar wind contribute to this relation.

Since the temperature varies with the hour of the day, with geographic location, and with geomagnetic activity, we must specify the parameters of these variations to which the temperature is to be referred. The temperature T_c in the equation that follows is to be the nighttime minimum of the global exospheric temperature distribution when the planetary geomagnetic index K_p is zero. We find that

$$T_c = 383^\circ + 3^\circ\!.32\,\bar{F}_{10.7} + 1^\circ\!.8(F_{10.7} - \bar{F}_{10.7}) \quad (\text{for } K_p = 0) \quad ; \quad (14)$$

$F_{10.7}$ is expressed in units of 10^{-22} watts/m^2/cycles/second bandwidth.

According to Roemer (1968) the temperature variations occur with a time lag of 1.0 ± 0.12 days with respect to those of the solar flux.

If we want to compute the average exospheric temperature corresponding to a given phase of the solar cycle, i.e., to a given value of $\bar{F}_{10.7}$, we must drop the last term of equation (14), which corresponds to the day-to-day variations of solar activity, and add half of the diurnal temperature range and the difference in temperature between average and quiet geomagnetic conditions. For this purpose, see equation (27) in Section 12.

7. THE DIURNAL VARIATION

Densities derived from satellite drag show a maximum around 2 p.m. local solar time (L.S.T.), at a latitude roughly equal to that of the subsolar point; the minimum occurs around 3 a.m. at about the same latitude with opposite sign. Thus, if we consider the atmosphere above a particular locality, the diurnal variation will undergo a seasonal change; this change, however, can be incorporated in a global description of the phenomenon by a set of suitable empirical equations (Jacchia, 1965b). The purpose of these equations is to represent the density variations by use of static atmospheric models. To this effect it appears necessary to use the temperature as an auxiliary parameter, but it must be understood that this "temperature" has no claim to accuracy, since consistency between temperature and density variation cannot be achieved, on a diurnal time scale, through static models.

We shall assume that the maximum daytime exospheric temperature T_M occurs at a latitude ϕ equal to the sun's declination $\delta_\odot$, and the minimum temperature T_c at a latitude $-\delta_\odot$. The ratio $T_M/T_c = 1 + R$ changes with the solar cycle; its variation seems to be in phase with the yearly means of the geomagnetic planetary index K_p (Jacchia, 1970a) and lags about 400 days behind those of $\overline{F}_{10.7}$, indicating that there must be a solar-wind component in the heating of the upper atmosphere.

There is also some evidence that the shape of the diurnal density curve changes with height (Jacchia, 1970b) and with solar activity; present data, however, are insufficient to establish the rules of this variation with sufficient assurance, and therefore we have assumed that the parameters that fix the shape of the curve are constant.

We shall assume that the daytime maximum temperature T_D and the minimum nighttime temperature T_N at a given latitude ϕ can be represented by the equations

$$T_D = T_c(1 + R \cos^m \eta) \quad ,$$

$$T_N = T_c(1 + R \sin^m \theta) \quad , \qquad (15)$$

where

$$\eta = \frac{1}{2}|\phi - \delta_\odot| \quad ,$$

$$\theta = \frac{1}{2}|\phi + \delta_\odot| \quad .$$

The temperature T_ℓ at any given point can be expressed as a function of the hour angle H of the sun (the local solar time, counted from upper culmination). Let us write

$$T_\ell = T_N (1 + A \cos^n \frac{\tau}{2}) \quad , \qquad (16)$$

with

$$A = \frac{T_D - T_N}{T_N} = R \frac{\cos^m \eta - \sin^m \theta}{1 + R \sin^m \theta}$$

and

$$\tau = H + \beta + p \sin (H + \gamma) \qquad (-\pi < \tau < \pi) \quad ,$$

where β, γ, and p are constants. It should be remembered that T_ℓ, which is derived from T_c, is referred to $K_p = 0$.

The constant β determines the lag of the temperature maximum with respect to the sun's culmination, while p introduces in the temperature curve an asymmetry, whose location is determined by γ. Replacing T_D and T_N from equation (15), we can write

$$T_\ell = T_c(1 + R \sin^m \theta) \left(1 + R \frac{\cos^m \eta - \sin^m \theta}{1 + R \sin^m \theta} \cos^n \frac{\tau}{2}\right) \quad . \qquad (17)$$

Densities derived from satellite drag are best represented by use of the following parameters:

$m = 2.5 \qquad \beta = -37°$

$n = 3.0 \qquad p = +6°$

$\gamma = +43°$.

The quantity R varies between 0.27 and 0.4; a good average is 0.31. If yearly running means of K_p (which we shall write as $\overline{K}_p$) are available, R can be computed from the relation

$$R = 0.134 + 0.090\,\overline{K}_p \quad . \tag{18}$$

Otherwise, $\overline{F}_{10.7}$ can be used to compute R from the formula

$$R = -0.19 + 0.25 \log_{10} \overline{F}_{10.7}(t - 400^d) \quad , \tag{19}$$

where $\overline{F}_{10.7}(t - 400^d)$ indicates the value of $\overline{F}_{10.7}$ at a rate 400 days before the date for which R is to be computed.

Table 1 gives the ratio T_ℓ/T_c, multiplied by the factor 1000, as a function of local solar time (counted from midnight) and of latitude, computed with the above parameters and with R = 0.31. According to this model the hours of minimum and maximum of the daily density variation are independent of latitude and are $2^h.87$ and $14^h.08$ L.S.T., respectively.

A certain degree of smoothing must be expected in the curve of the daily density variation as determined from satellite drag. Neutral temperatures determined from Thomson scatter (Carru, Petit, and Waldteufel, 1967; McClure, 1969) show a rapid increase at sunrise, followed by a much slower increase to a maximum around 16^h, 2 hours later than the 14^h density maximum obtained from drag; the amplitude of the variation, a factor of 1.5, is much larger than that of our model. By smoothing, this temperature curve can be brought closer to the drag density curve, although smoothing alone cannot possibly account for the considerable discrepancy between the two curves. In particular, there is not the slightest indication in the drag density curves of a rapid increase at sunrise (which is a prominent feature of electron temperatures). On the other hand, temperatures derived from nitrogen profiles obtained from six rocket firings from Cape Kennedy on January 24, 1967 (Taeusch et al., 1968) essentially agree in amplitude and phase with those of the present model. Also in better agreement with the model are the temperature ranges obtained from thermosphere probes (Spencer et al., 1966), from mass-spectrometer data on the Explorer 17 (Reber and Nicolet, 1965) and the Explorer 32 (Newton, 1969), and from EUV absorption (Hall, Chagnon, and Hinteregger, 1967).

Equation (17) should lead to reasonably accurate densities up to the height where hydrogen becomes an important constituent. When hydrogen can no longer be neglected, its density variations, if known, could be represented by using for hydrogen alone a fictitious "temperature" T_H different from the temperature T of the other constituents. A formula of the type

$$T_H = (1 - c)(1 + \frac{R}{2})T_c + cT_\ell \,, \tag{20}$$

could do the trick. With c = 0 the formula gives for hydrogen a constant temperature equal to the arithmetic mean between the daytime maximum and the nighttime minimum, and there is no diurnal density variation of hydrogen. With c = 1 hydrogen has the same temperature as the other constituents; i. e., the diurnal density variation of hydrogen is in phase with the one it displays during the 11-year solar cycle. With c = -1 the diurnal variation of hydrogen is reversed and is in phase with that of the other constituents. We can expect c to lie between -1 and +1; on the basis of Meier's (1969) observations there is a definite possibility that it may be negative.

8. VARIATIONS WITH GEOMAGNETIC ACTIVITY

For practical reasons we have assumed that in the temperature changes that accompany variations in geomagnetic activity the shape of the temperature profiles remains unchanged — i. e., we have related changes in an index of geomagnetic activity with changes in the exospheric temperature T_∞ and have assumed that at all heights the densities are determined by the model temperature profile ending in T_∞. As in the case of the diurnal variation, this assumption is found to be somewhat in error because of the short characteristic time of the variations; moreover, the distribution in height of the energy dissipation involved in the phenomenon may be different from that of EUV absorption.

The density variations with geomagnetic activity can be represented with a fair degree of approximation by adding to the exospheric temperature a quantity ΔT_g, which is a function of the 3-hourly planetary geomagnetic index K_p or its equivalent a_p. We can write (Jacchia, Slowey, and Verniani, 1967)

$$\Delta T_g = 28° K_p + 0°.03 \exp (K_p) \tag{21}$$

or

$$\Delta T_g = 1°.0 a_p + 100° [1 - \exp (-0.08 a_p)] \quad . \tag{22}$$

The average time lag between the variations in the geomagnetic index and those in the temperature is 6.7 hours (7.2 hours at low latitudes, less than 6 hours at high latitudes). This means that to compute ΔT_g by equation (21) or (22) for a given time t, K_p or a_p must be taken for a time t <u>minus</u> 6.7 hours. There is some indication that ΔT_g is somewhat greater, possibly by 20% or so, at high geomagnetic latitudes. No appreciable difference in ΔT_g has been detected between the night hemisphere and the sunlit hemisphere. Values of ΔT_g from equation (21) are given as a function of K_p and a_p in Table 2.

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9. THE SEMIANNUAL VARIATION

As is well known, geomagnetic activity is greater around the equinoxes than around solstices. This semiannual increase in geomagnetic activity results, of course, in a corresponding increase of atmospheric disturbances, which is entirely accounted for by equation (21) or (22). This apparent semiannual variation must not be confused with a true, global semiannual variation, which is evident also after the geomagnetic effect has been eliminated. This semiannual variation, with maxima in April and October and minima in January and July, has an amplitude that depends on solar activity and is roughly proportional to the smoothed 10.7-cm solar flux $\overline{F}_{10.7}$. Table 3 gives at 10-day intervals the correction ΔT_s to be applied to the exospheric temperature to account approximately for the semiannual variation. The table is computed for $\overline{F}_{10.7} = 100$, so the tabular values must be multiplied by $\overline{F}_{10.7}/100$ to obtain the actual corrections. Table 3 has been computed by using the formula given by Jacchia, Slowey, and Campbell (1969), which is reproduced below:

$$\Delta T_s = 2.^{\circ}41 + \overline{F}_{10.7}[0.349 + 0.206 \sin(360^{\circ}\tau + 226.^{\circ}5)] \sin(720^{\circ}\tau + 247.^{\circ}6) , \tag{23}$$

where

$$\tau = \frac{d}{Y} + 0.1145\left(\left\{\frac{1 + \sin[360^{\circ}(d/Y) + 342.^{\circ}3]}{2}\right\}^{2.16} - \frac{1}{2}\right) ;$$

d = days since January 1 ;

Y = length of tropical year in days .

The dates of maxima and minima according to this formula, with their corresponding values of ΔT_s for $\overline{F}_{10.7} = 100$, are as follows.

Secondary minimum (-16°) : January 15
Secondary maximum (+28°) : April 3
Primary minimum (-50°) : July 30
Primary maximum (+49°) : October 28 .

In reality the semiannual variation is not a very regular phenomenon. Both the shape and the amplitude of the variation show erratic changes from cycle to cycle; sizable residuals must be expected when using equation (23), which was obtained by fitting the observed density data from 1958 to 1965 (inclusive). King-Hele and Walker (1968) think there might be a systematic modulation of the amplitude with a cycle of about 33 months, but this effect needs confirmation.

Equation (23) seems to give a correct representation of the relative amplitudes of the density variation at different heights in the interval from 250 to 800 km. Cook (1967, 1969) found that at 1100 km the amplitude is systematically higher. Our data on the Echo 2 satellite confirm this result, but show that the excess variation that remains after subtracting equation (23) differs in shape and phase from the semiannual variation in the region 200 to 800 km. The maxima and minima show no alternation of primary and secondary, and occur some 25 days earlier, following the solstices and equinoxes by only 8 days instead of the average 33 of equation (23). We suggest that this residual semiannual variation is a result of the seasonal migration of helium: if a vertical flux accompanies the helium migration (Kasprzak, 1969), the total mass of helium in any given height layer may vary in the course of the year.

A semiannual density variation found by Cook (1969) at 90 km, which — if confirmed — would make equation (23) inapplicable at heights below 200 km, is spurious according to Groves (1969, private communication), and caused by an insufficient discrimination between the diurnal and seasonal-latitudinal variations.

10. SEASONAL-LATITUDINAL VARIATIONS OF THE LOWER THERMOSPHERE

In the present models we have assumed that temperature and density are constant at 90 km all over the globe. In reality, seasonal-latitudinal variations are observed at that height — fairly large in temperature, although relatively small in density. All the variations we have described so far could be taken into account with a fair degree of approximation by operating on the exospheric temperature; such a procedure is obviously impossible for the seasonal-latitudinal variations, for which it is necessary to operate on the lower boundary conditions. However reluctantly, the decision to keep the lower boundary conditions constant had to be taken to prevent the models from becoming unmanageable in their complexity.

An attempt was made in the U. S. Standard Atmosphere Supplements, 1966 (COESA, 1966) to effect a smooth junction between the densities of lower-thermosphere models with seasonal variations and the densities of upper-atmosphere models computed by use of constant boundary conditions at 120 km. The models were limited to a fixed, intermediate latitude and to three seasons (summer, winter, and spring/fall); any greater detail would have entailed a prohibitive proliferation of tables. If we wanted to have models for every month at 15° intervals in latitude, the number of models would increase by a factor of 84!

The amplitude of the seasonal-latitudinal density variations increases very rapidly between 90 and 100 km; the maximum amplitude is apparently reached between 105 and 120 km; above this height it must decrease because above 200 km there seem to be no appreciable seasonal-latitudinal variations other than those involved in the global pattern of the diurnal variation. This means that the temperature variations, which at 100 km are in phase with the density variations, must undergo a phase inversion around 110 km and reach a maximum amplitude, in opposite phase with respect to the densities, somewhere around 150 km. While it is relatively easy to represent the density variations in analytical, and even in tabular, form, it would be prohibitively laborious to do the same thing for the temperatures. We thought that the best that could be done was to give formulas for computing the seasonal-latitudinal variations in density, ignoring the temperature variations.

The equation we present here is an attempt to fit the seasonal variations as derived by Champion (1967) and Groves (1969, private communication). We find that the values of log ρ given by the models must be corrected by adding a quantity $\Delta \log \rho$ given by

$$\Delta \log \rho = 0.02(z - 90) \frac{\phi}{|\phi|} \exp[-0.045(z - 90)] \sin^2 \phi \sin \frac{360°}{Y} (d + 100) , \tag{24}$$

where ϕ is the geographic latitude, z the height in kilometers, Y the duration of the tropical year in days (365 or 366), and d the number of days elapsed since January 1. In Table 4 we have tabulated the maximum amplitude S of the variation as a function of height, the phase P of the variation, and $\sin^2 \phi$; $\Delta_s \log \rho$ is obtained as a product of these three quantities.

11. SEASONAL-LATITUDINAL VARIATIONS OF HELIUM

A strong increase of helium concentration above the winter pole has been revealed by mass-spectrometer measurements (Hartmann et al., 1968; Kasprzak et al., 1968; Krankowski, Kasprzak, and Nier, 1968; Müller and Hartmann, 1969), by observing the intensity of the λ 10830 resonance line of helium (Fedorova, 1967; Shefov, 1968; Tinsley, 1968) and from satellite-drag data (Jacchia and Slowey, 1968; Keating and Prior, 1968). The amplitude of the variation and its latitudinal depedence are still under investigation; the phase seems to be better established, with the maximum occurring just after the winter solstice. Under this assumption regarding the phase, we find that a flexible and relatively simple expression for the number density n(He) of helium is the following:

$$\frac{n(He)}{n_0(He)} = A + (B - A)\left[\left(\frac{\varepsilon - \delta'_\odot}{2\varepsilon}\right)^p \sin^r\left(\frac{\pi}{4} + \frac{\phi}{2}\right) + \left(\frac{\varepsilon + \delta'_\odot}{2\varepsilon}\right)^p \sin^r\left(\frac{\pi}{4} - \frac{\phi}{2}\right)\right], \tag{25}$$

where $n_0(He)$ is the value of n(He) given by the models, ε the obliquity of the ecliptic, $\delta_\odot$ the declination of the sun at time $t - \Delta t$, and ϕ the geographic latitude.

As of now it is difficult to give reliable values for all the parameters; we can recommend the following set:

$$A = 0.5 \;, \quad B = 2.3 \;; \quad p = 2.5 \;; \quad r = 4 \;, \quad \Delta t = 8 \text{ days} \;.$$

The value of Δt was derived indirectly, from the semiannual variation of helium at 1100 km (see Section 9), under the assumption that the phenomenon is caused by the seasonal migration of helium. Some of the numerical parameters, especially p and r, are only poorly determined and are likely to be considerably improved in the near future. In view of these uncertainties it appears to be premature to give tables of the helium variation

As can be easily seen, A and B are, respectively, the maximum and the minimum value that $n(He)/n_0(He)$ can reach. If we assume that the values we have given for them are correct, we shall have at the winter pole 2.3 times as much helium as in the tabular models, and at the summer pole 0.5 times the tabular value — a helium variation by a factor of 4.6.

12. HYDROGEN

As we mentioned in Section 3, there is some evidence that equation (7) can be used only to determine the average amount of hydrogen corresponding to a given phase of the solar cycle, but not the variations of hydrogen on a shorter time scale. To account for Meier's (1969) observations, we have followed, for our private use, a procedure that we shall briefly outline. First, we compute the average exospheric temperature $\overline{T}_\infty$ that corresponds to a given value of $\overline{F}_{10.7}$ from the formulas

$$\overline{T}_c = 383° + 3.°32\ \overline{F}_{10.7} \quad ,$$

$$\overline{T}_\infty = \overline{T}_c \left(1 + \frac{R}{2}\right) + 56° \tag{26}$$

[$\overline{T}_c$ is computed from equation (14) in which the last term has been dropped; $\overline{T}_\infty$ is obtained by adding half of the diurnal temperature range and 56° to account for the average heating coming from the geomagnetic effect ($K_p = 2$)]. If we choose to disregard the variations of R and use simply its average value, for which we can take 0. 31, equation (26) simplifies and becomes

$$\overline{T}_\infty = 498° + 3.°83\ \overline{F}_{10.7} \quad . \tag{27}$$

We compute the hydrogen number density $\overline{n}(H)_{500}$ at 500 km from equation (7) using $\overline{T}_\infty$ instead of T_∞. For heights above 500 km we compute n(H) by integrating the hydrostatic equation for a temperature T′ obtained by taking into account all the short-time-scale variations in which we believe hydrogen behaves in the manner described by Meier (1969). We do not claim that this procedure is physically justifiable, or even elegant; all we try to do is to prevent hydrogen in our models from varying in a manner contrary to observations.

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13. THE TABLES

Tables 1 to 4 are auxiliary tables designed to help in the computation of the diurnal, geomagnetic, semiannual, and seasonal-latitudinal effects when no use is made of an electronic-computer program. No auxiliary table is provided for the evaluation of the seasonal-latitudinal variation of helium, for which the parameters are still somewhat uncertain and whose effect on the total density is too complicated to be accounted for in a simple table.

Table 5 gives temperature, composition, density, and pressure scale height as a function of height for exospheric temperatures ranging from 600 to 2000°K, at 100°K intervals, and for heights from 90 to 2500 km. It should be understood that no good observational data exist above 1100 km, so that all tabular data above this height must be considered as unconfirmed extrapolation.

When only densities are required, Table 6 should be used to greater advantage. In it, densities only are synoptically assembled for the same heights as in Table 5, but at 50°K intervals in exospheric temperature for easier interpolation.

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14. COMPARISON WITH OBSERVATIONS

A comparison of the models with atmospheric densities derived from satellite-drag data obtained at the Smithsonian Astrophysical Observatory is shown in Figure 1. Ten-day means of the residuals in $\log_{10} \rho$ are plotted for five satellites with effective heights ranging from 270 to 1130 km (the "effective" height is the weighted mean of the heights above the geoid in the satellite's orbit, with the drag taken as weight; for satellites in eccentric orbits it corresponds roughly to the perigee height augmented by half the density scale height). The scatter in the residuals is due in part to errors in the drag determination and in part to the failure of the models to represent atmospheric density correctly. As can be seen, the mean systematic error is very close to zero for all satellites. Slowly varying systematic deviations, probably connected with imperfections in the relation between the exospheric temperature and the smoothed component of the 10.7-cm solar flux (equation (14)) can be detected here and there, but they never exceed 0.05 in $\log \rho$ (12% in the density). The larger, quasi-periodic oscillations in the residuals of Echo 2 and Explorer 19 are the result of our imperfect knowledge of the seasonal migrations of helium and the associated semiannual helium variation.

It should be pointed out that the densities were computed from the observed drag using a drag coefficient variable with the mean molecular mass of the atmosphere. The constants in the formula for the drag coefficient (Cook, 1966) were adjusted to give $C_D = 2.2$ at heights below 300 km, a value generally used by researchers. This value would correspond to an accommodation coefficient of 0.95 in the case of diffuse reflection from an oxygen-coated spherical surface. Although $C_D = 2.2$ at 300 km is well within the margin of theoretical error, a value $C_D = 2.4$ is, according to Cook, the most probable. If we accept the latter value, all tabular densities should be decreased by 10%. Such a decrease would bring the densities closer to the average total densities inferred from mass-spectrometer data (which, however, show such a wide scatter that the significance of the coincidence is open to question).

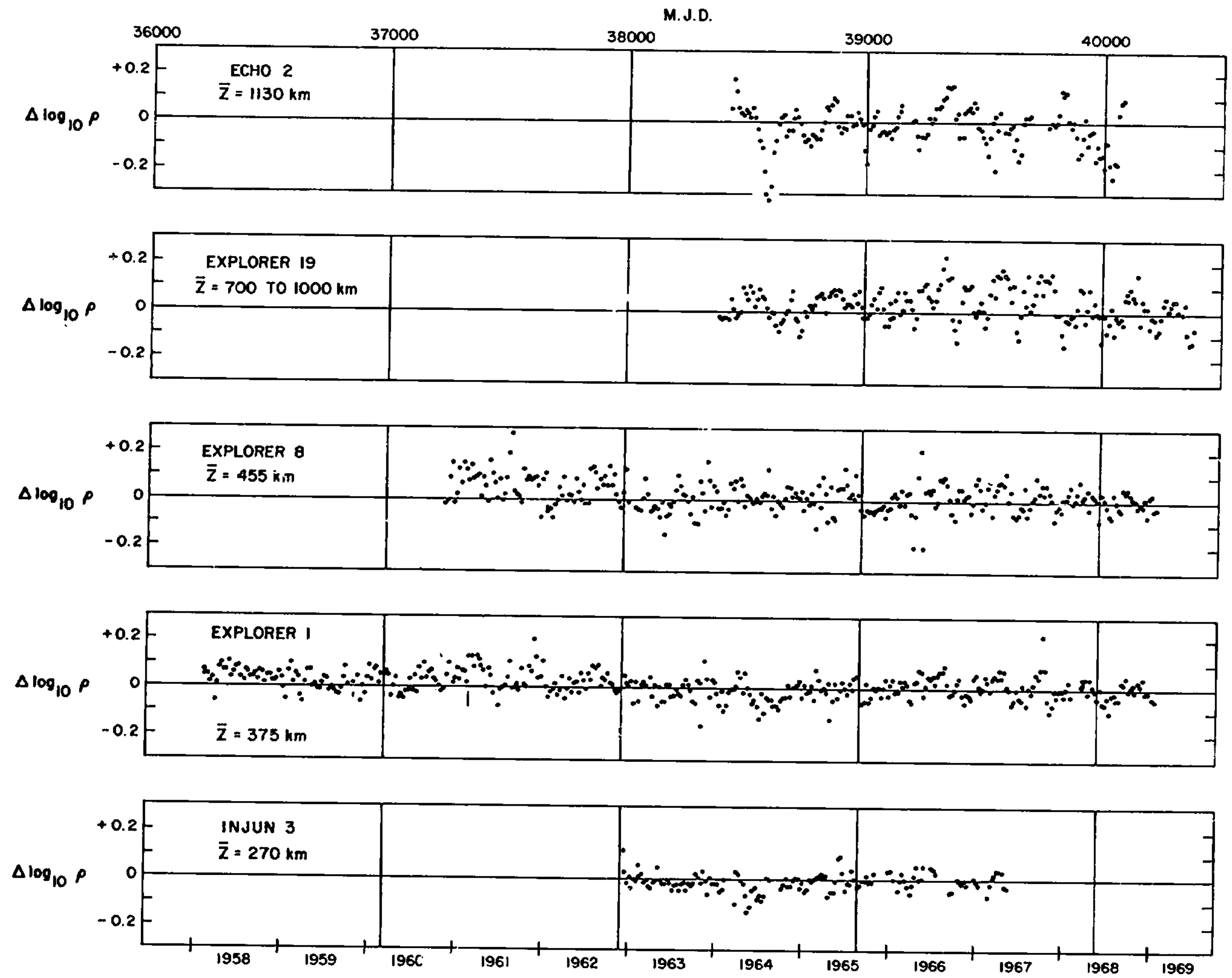

Figure 1. Ten-day means of the logarithmic density residuals from the model for five satellites with effective heights between 270 and 1130 km. M. J. D. in abscissa is the Modified Julian Day (J. D. minus 2 400 000.5). A correction for the semiannual variation of helium has been applied to the residuals of Echo 2.

15. NUMERICAL EXAMPLES

Suppose we want to find the atmospheric density given by the models above a point with the following geographic coordinates:

longitude = 120° W of Greenwich, latitude = +45°,

on January 20, 1969, at 19^h11^m U.T. = 11^h0^m L.S.T., for three heights: z = 140 km, z = 350 km, z = 800 km.

We shall first compute T_c from equation (14). For that purpose we need the smoothed solar flux $\overline{F}_{10.7}$ for that date and the actual flux $F_{10.7}$ on the day before (to account for the lag of $1^d.0$). Consulting solar records we find the following: $\overline{F}_{10.7} = 157$, $F_{10.7} = 136$, so $T_c = 863°.4$. This is the minimum exospheric temperature anywhere on the globe at the desired instant, for quiet geomagnetic conditions ($K_p = 0$).

Next we shall use equation (16) or Table 1 to compute the exospheric temperature T_ℓ. Table 1 is computed for R = 0.31, but the actual R at the date was either 0.33 or 0.36, according to whether we use equation (18) with $\overline{K}_p = 2.17$ or equation (19) with $\overline{F}_{10.7}(t - 400) = 157$. Let us take R = 0.345; this value is 11% greater than the value of R used for Table 1. The declination of the sun on January 20.8 was -20°.0. For $\phi = +45°$ and L.S.T. = 11^h0^m, Table 1 gives $T_\ell / T_c = 1.154$. To account for the change in R,

$$T_\ell / T_c = 1 + 0.154 \times 1.11 = 1.171 \quad .$$

This gives $T_\ell = 1011°$.

We now must evaluate the temperature differentials ΔT_g and ΔT_s to be added to T_ℓ to account for the geomagnetic and the semiannual effects. For ΔT_g we must first look up the value of K_p at a time $6^h.7$ before the desired date, i. e., on January 20 at $12^h.5$ U. T. From geomagnetic records we find for that time $K_p = 2^+ (a_p = 9)$. From equations (21) or (22), or from Table 2, we obtain $\Delta T_g = +66°$. Table 3 yields $\delta T_s = -15.4$ and $\Delta T_s = -15.4 \times 1.55 = -24°$, so the final exospheric temperature is $T_\infty = 1011° + 66° - 24° = 1053°$.

At z = 350 km the seasonal-latitudinal density variations, according to Table 4, are negligible; and helium is a minor constituent, so the helium variations can be neglected, too. We therefore enter Table 6 with an exospheric temperature of 1053° and find, for z = 350 km, $\log_{10} \rho(g/cm^3) = -14.011$.

For z = 140 km Table 6 gives $\log \rho = -11.403$. To this value, however, we must add a correction for seasonal-latitudinal variations in the lower thermosphere. Table 4 gives $S = 0.105$, $P = +0.882$, $\sin^2 \phi = 0.500$, from which we obtain $\Delta \log \rho = SP \sin^2 \phi = +0.046$, and the final density $\log \rho = -11.403 + 0.046 = -11.357$.

At z = 800 km helium is an important constituent, so we must take into account the seasonal-latitudinal variations of helium. To use equation (25) we must look up the declination of the sun 8 days before January 20.8; for January 12.8 we find $\delta_\odot = -21°.6$. With the suggested values for A, B, p, and r, we find $n(He)/n_0(He) = 1.684$. This means that the tabular number density of helium must be increased by a factor 1.684. From Table 5 we find, by interpolation, for $T_\infty = 1051°$,

$$\log n(O) = 5.513 \qquad \text{i. e.,} \qquad n(O) = 3.26 \times 10^5$$

$$\log n_0(He) = 5.998 \qquad \qquad n_0(He) = 9.95 \times 10^5 \; .$$

All other atmospheric constituents are negligible. Applying the correction factor 1.684 to $n_0(He)$, we obtain $n(He) = 1.676 \times 10^6$. Taking into account the atomic masses of O and He, we find that the relative increase in total density caused by the increased helium is

$$\frac{\rho}{\rho_0} = \frac{n(O) + \frac{1}{4}\, n(He)}{n(O) + \frac{1}{4}\, n_0(He)} = 1.296 \quad ; \quad \log_{10} \frac{\rho}{\rho_0} = + 0.113 \quad .$$

From Table 6, for z = 800 km, $T_\infty = 1053°$, we find $\log \rho = -16.815$. The final density, corrected for helium variation, is therefore $\log \rho = -16.815 + 0.113 = -16.702$.

16. ACKNOWLEDGMENT

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Table 1. Ratio of the local temperature T_ℓ to the global minimum temperature T_c as a function of L. S. T. and of latitude (φ). All ratios have been multiplied by 1000 to eliminate the decimal point.

+23°44

L. S. T.

φ	0	1	2	3	4	5	6	7	8	9	10	11
90	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198
75	1159	1156	1155	1155	1155	1157	1161	1168	1178	1191	1204	1218
60	1119	1114	1112	1112	1111	1116	1123	1137	1156	1181	1207	1233
45	1083	1076	1074	1076	1074	1079	1089	1108	1135	1169	1206	1241
30	1054	1045	1042	1042	1049	1048	1061	1083	1116	1156	1200	1243
15	1032	1023	1020	1017	[illegible]	1026	1039	1064	1099	1143	1191	1236
0	1019	1009	1006	1006	1007	1012	1026	1052	1085	1129	1177	1223
-15	1012	1004	1001	[illegible]	1001	1005	1019	1042	1074	1115	1150	1202
-30	1010	1003	1001	[illegible]	1001	1005	1017	1036	1065	1100	1139	1176
-45	1013	1007	1005	1004	1005	1009	1018	1034	1057	1085	1116	1146
-60	1023	1019	1017	1017	1018	1021	1026	1037	1054	1074	1095	1116
-75	1042	1040	1039	1039	1039	1040	1043	1049	1051	1068	1079	1090
-90	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069

φ	12	13	14	15	16	17	18	19	20	21	22	23
90	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198
75	1229	1236	1239	1237	1231	1222	1211	1200	1188	1178	1170	1163
60	1253	1267	1272	1269	1258	1241	1220	1198	1177	1157	1140	1128
45	1270	1289	1296	1292	1276	1253	1224	1193	1163	1136	1113	1095
30	1277	1300	1309	1303	1284	1256	1222	1185	1150	1117	1089	1068
15	1274	1299	1308	1301	1281	1251	1214	1174	1136	1100	1070	1047
0	1260	1285	1294	1288	1268	1237	1200	1161	1122	1087	1057	1034
-15	1237	1260	1269	1263	1244	1216	1181	1145	1109	1076	1048	1027
-30	1206	1226	1234	1229	1212	1188	1158	1126	1094	1066	1042	1023
-45	1171	1187	1193	1189	1176	1156	1132	1106	1080	1057	1038	1023
-60	1134	1145	1149	1146	1137	1123	1106	1088	1070	1054	1040	1030
-75	1099	1105	1107	1105	1101	1093	1085	1075	1066	1058	1051	1045
-90	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069

[illegible]

L. S. T.

φ	0	1	2	3	4	5	6	7	8	9	10	11
90	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188
75	1149	1145	1145	1145	1145	1147	1151	1158	1168	1182	1195	1209
60	1112	1105	1103	1103	1103	1106	1114	1128	1148	1172	1199	1225
45	1075	1069	1066	1066	1066	1071	1081	1100	1128	1162	1200	1236
30	1049	1039	1036	1035	1037	1042	1055	1078	1111	1152	1197	1240
15	1028	1019	1016	1015	1016	1022	1036	1061	1096	1141	1192	1236
0	1017	1008	1004	1004	1005	1010	1024	1049	1085	1131	1179	1225
-15	1012	1004	1000	1000	1001	1006	1019	1043	1076	1118	1163	1207
-30	1011	1004	1001	1001	1002	1008	1018	1036	1067	1104	1144	1182
-45	1015	1009	1007	1007	1007	1011	1020	1037	1061	1091	1123	1154
-60	1027	1023	1021	1021	1022	1024	1031	1042	1059	1080	1103	1125
-75	1049	1046	1045	1045	1045	1047	1050	1056	1065	1075	1087	1099
-90	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077

φ	12	13	14	15	16	17	18	19	20	21	22	23
90	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188
75	1220	1227	1230	1228	1222	1213	1202	1190	1179	1169	1160	1153
60	1246	1260	1265	1262	1250	1233	1212	1190	1168	1148	1132	1119
45	1265	1285	1292	1287	1271	1247	1218	1187	1157	1129	1106	1088
30	1275	1298	1307	1301	1282	1254	1219	1182	1145	1112	1084	1062
15	1275	1300	1309	1303	1282	1251	1214	1173	1134	1098	1067	1044
0	1264	1289	1298	1292	1271	1240	1203	1162	1123	1087	1056	1033
-15	1243	1266	1275	1269	1250	1221	1186	1148	1111	1077	1049	1027
-30	1214	1235	1242	1237	1220	1195	1164	1131	1098	1069	1044	1024
-45	1179	1196	1202	1198	1185	1164	1139	112	1086	1062	1041	1026
-60	1143	1155	1159	1156	1147	1132	1114	1095	1077	1060	1046	1035
-75	1108	1114	1116	1115	1110	1102	1093	1083	1074	1065	1058	1052
-90	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077

Table 1 (Cont.)

δ_O = [illegible]

L.S.T.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
90	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159
75	1120	1117	1116	1116	1117	1119	1122	1130	1140	1153	1167	1181	1192	1200	1202	1201	1195	1186	1174	1163	1151	1140	1132	1125
60	1084	1079	1077	1077	1078	1081	1089	1103	1123	1148	1175	1201	1225	1237	1242	1239	1227	1210	1189	1166	1144	1124	1107	1093
45	1055	1049	1045	1045	1046	1050	1061	1080	1109	1144	1182	1218	1248	1268	1275	1270	1254	1230	1200	1169	1138	1110	1086	1067
30	1033	1025	1022	1021	1022	1027	1041	1064	1098	1140	1186	1230	1266	1289	1298	1292	1273	1244	1208	1170	1133	1099	1070	1048
15	1020	1011	1007	1007	1009	1014	1028	1053	1090	1136	1186	1234	1274	1300	1309	1303	1282	1250	1211	1169	1129	1092	1060	1036
0	1014	1005	1001	1001	1002	1008	1022	1048	1085	1132	1182	1231	1271	1297	1307	1300	1279	1247	1207	1165	1124	1087	1055	1031
-15	1013	1004	1001	1000	1001	1007	1020	1045	1081	1125	1173	1220	1258	1283	1292	1285	1265	1234	1197	1157	1118	1082	1052	1029
-30	1018	1007	1004	1004	1005	1010	1022	1044	1076	1116	1159	1200	1235	1257	1265	1260	1241	1214	1180	1145	1109	1077	1050	1029
-45	1025	1019	1016	1015	1016	1020	1030	1048	1075	1107	1143	1177	1204	1223	1230	1225	1210	1187	1160	1131	1102	1076	1053	1036
-60	1043	1038	1036	1036	1036	1039	1047	1059	1078	1101	1126	1150	1170	1183	1188	1185	1174	1158	1139	1118	1097	1079	1063	1051
-75	1069	1067	1066	1066	1066	1067	1071	1078	1087	1099	1113	1125	1135	1142	1145	1143	1137	1129	1119	1108	1097	1088	1080	1073
-90	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103

δ_O = [illegible]

L.S.T.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
90	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130
75	1093	1091	1090	1090	1090	1092	1096	1103	1113	1126	1140	1153	1164	1171	1174	1172	1166	1157	1146	1135	1124	1113	1105	1098
60	1062	1057	1055	1055	1055	1058	1066	1080	1099	1124	1151	1176	1197	1211	1216	1213	1202	1185	1164	1142	1120	1100	1083	1071
45	1034	1031	1028	1028	1029	1033	1044	1063	1091	1125	1162	1198	1228	1247	1254	1249	1234	1210	1181	1150	1119	1092	1068	1050
30	1022	1014	1011	1011	1011	1017	1030	1053	1086	1128	1173	1216	1252	1275	1284	1278	1259	1230	1195	1158	1121	1087	1059	1037
15	1015	1006	1002	1002	1003	1009	1023	1048	1085	1131	1181	1229	1268	1294	1303	1297	1276	1244	1205	1164	1123	1087	1055	1031
0	1013	1004	1000	1000	1001	1007	1022	1048	1086	1133	1184	1233	1273	1300	1310	1303	1282	1249	1209	1167	1125	1087	1055	1030
-15	1015	1006	1002	1002	1003	1009	1023	1048	1085	1131	1181	1229	1268	1294	1303	1297	1276	1244	1205	1164	1123	1087	1055	1031
-30	1022	1014	1011	1011	1011	1017	1030	1053	1086	1128	1173	1216	1252	1275	1284	1278	1259	1230	1195	1158	1121	1087	1059	1037
-45	1038	1031	1028	1028	1029	1033	1044	1063	1091	1125	1162	1199	1228	1247	1254	1249	1234	1210	1181	1150	1119	1092	1068	1050
-60	1062	1057	1055	1055	1055	1058	1066	1080	1099	1124	1151	1176	1197	1211	1216	1213	1202	1185	1164	1142	1120	1100	1083	1071
-75	1093	1091	1090	1090	1090	1092	1096	1103	1113	1126	1140	1153	1164	1171	1174	1172	1166	1157	1146	1135	1124	1113	1105	1098
-90	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130

δ_O = -10°

L.S.T.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
90	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103
75	1069	1067	1066	1066	1066	1067	1071	1078	1087	1099	1113	1125	1135	1142	1145	1143	1137	1129	1119	1108	1097	1088	1080	1073
60	1043	1038	1036	1036	1036	1039	1047	1059	1078	1101	1126	1150	1170	1183	1188	1185	1174	1158	1139	1118	1097	1079	1063	1051
45	1025	1019	1016	1015	1016	1020	1030	1048	1075	1107	1143	1177	1204	1223	1230	1225	1210	1187	1160	1131	1102	1076	1053	1036
30	1018	1007	1004	1004	1005	1010	1022	1044	1076	1116	1159	1200	1235	1257	1265	1260	1241	1214	1180	1145	1109	1077	1050	1029
15	1013	1004	1001	1000	1001	1007	1020	1045	1081	1125	1173	1220	1258	1283	1292	1285	1265	1234	1197	1157	1118	1082	1052	1029
0	1014	1005	1001	1001	1002	1008	1022	1048	1085	1132	1182	1231	1271	1297	1307	1300	1279	1247	1207	1165	1124	1087	1055	1031
-15	1020	1011	1007	1007	1009	1014	1028	1053	1090	1136	1186	1234	1274	1300	1309	1303	1282	1250	1211	1169	1129	1092	1060	1036
-30	1033	1025	1022	1021	1022	1027	1041	1064	1098	1140	1186	1230	1266	1289	1298	1292	1273	1244	1208	1170	1133	1099	1070	1048
-45	1055	1049	1045	1045	1046	1050	1061	1080	1109	1144	1182	1218	1248	1268	1275	1270	1254	1230	1200	1169	1138	1110	1086	1067
-60	1084	1079	1077	1077	1078	1081	1089	1103	1123	1148	1175	1201	1223	1237	1242	1239	1227	1210	1189	1166	1144	1124	1107	1093
-75	1120	1117	1116	1116	1117	1119	1122	1130	1140	1153	1167	1181	1192	1200	1202	1201	1195	1186	1174	1163	1151	1140	1132	1125
-90	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159

Table 1 (Cont.)

δ☉ = -20°

L S T

δ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
90	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077	1077
75	1049	[illegible]	1045	1045	1045	1047	1050	1056	1065	1075	1087	1099	1108	1114	1116	1115	1110	1102	1093	1083	1074	1065	1058	1052
60	1027	1023	1021	1021	1022	1024	1031	1042	1059	1080	1103	1125	1143	1155	1159	1156	1147	1132	1114	1095	1077	1060	1046	1035
45	1015	1009	1007	1007	1007	1011	1020	1037	1061	1091	1123	1154	1179	1196	1202	1198	1185	1164	1139	1112	1086	1062	1041	1026
30	[illegible]	1004	1001	[illegible]	1001	1006	1018	1038	1067	1104	1144	1182	1214	1235	1242	1237	1220	1195	1164	1131	1098	1069	1044	1024
15	1012	1004	1002	1002	1001	1006	1019	1043	1076	1118	1163	1207	1243	1266	1275	1269	1250	1221	1186	1148	1111	1077	1049	1027
0	1017	1008	1014	1014	1005	1010	1024	1049	1085	1130	1179	1225	1264	1289	1298	1292	1271	1240	1203	1162	1123	1087	1056	1033
-15	1029	1019	1015	1015	1016	1022	1036	1061	1096	1141	1190	1236	1275	1300	1309	1303	1282	1251	1214	1173	1134	1098	1067	1044
-30	1048	1039	1035	1034	1037	1042	1055	1078	1111	1152	1197	1240	1275	1298	1307	1301	1282	1254	1219	1182	1145	1112	1084	1062
-45	1076	1067	1066	1065	1065	1071	1081	1100	1128	1162	1200	1236	1265	1285	1292	1287	1271	1247	1218	1187	1157	1129	1106	1088
-60	[illegible]	1105	1103	1103	1103	1106	1114	1128	1148	1172	1199	1225	1246	1260	1265	1262	1250	1233	1212	1190	1168	1148	1132	1119
-75	1149	1145	1145	1145	1145	1147	1151	1158	1168	1181	1195	1209	1220	1227	1230	1228	1222	1213	1202	1190	1179	1169	1160	1153
-90	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188	1188

δ☉ = -23°44

L S T

δ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
90	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069	1069
75	1042	1040	1039	1039	1039	1040	1043	1049	1057	1068	1079	1090	1099	1105	1107	1105	1101	1093	1085	1075	1066	1058	1051	1045
60	1023	1019	1017	1017	1018	1020	1026	1037	1054	1074	1095	1116	1134	1145	1149	1146	1137	1123	1106	1088	1070	1054	1040	1030
45	1013	1007	1005	1005	1005	1009	1018	1034	1057	1085	1116	1146	1171	1187	1193	1189	1176	1156	1132	1106	1080	1057	1038	1023
30	1010	1003	1001	1000	1001	1005	1017	1036	1065	1100	1139	1176	1206	1226	1234	1229	1212	1188	1158	1126	1094	1066	1042	1023
15	1012	1004	1001	1000	1001	1006	1019	1042	1074	1115	1160	1202	1237	1260	1269	1263	1244	1216	1181	1145	1109	1076	1048	1027
0	1018	1009	1006	1006	1007	1012	1026	1050	1085	1129	1177	1223	1260	1285	1294	1288	1268	1237	1200	1161	1122	1087	1057	1034
-15	1032	1023	1020	1019	1020	1026	1039	1064	1099	1143	1191	1236	1274	1299	1308	1301	1281	1251	1214	1174	1136	1100	1070	1047
-30	1054	1045	1042	1042	1043	1049	1061	1083	1116	1156	1200	1243	1277	1300	1309	1303	1284	1256	1222	1185	1150	1117	1089	1068
-45	1083	1075	1074	1074	1074	1077	1089	1108	1135	1169	1206	1241	1270	1289	1296	1292	1276	1253	1224	1193	1163	1136	1113	1095
-60	1119	1114	1112	1112	1113	1116	1123	1137	1156	1181	1207	1233	1253	1267	1272	1269	1258	1241	1220	1198	1177	1157	1140	1128
-75	1159	1156	1155	1155	1155	1157	1161	1168	1178	1191	1204	1218	1229	1236	1239	1237	1231	1222	1211	1200	1188	1178	1170	1163
-90	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198

Table 2. Temperature increment as a function of geomagnetic indices.

K_p	a_p	ΔT (deg.)	K_p	a_p	ΔT (deg.)
0_0	0	0	5-	39	134
0+	2	9	5_0	48	145
1-	3	19	5+	56	156
1_0	4	28	6-	67	167
1+	5	37	6_0	80	180
2-	6	47	6+	94	194
2_0	7	56	7-	111	210
2+	9	66	7_0	132	229
3-	12	75	7+	154	251
3_0	15	85	8-	179	279
3+	18	94	8_0	207	313
4-	22	104	8+	236	358
4_0	27	114	9-	300	417
4+	32	124	9_0	400	495

Table 3. Temperature corrections δT_s for the semiannual variation, computed from equation (23), for $\overline{F}_{10.7} = 100$.

Date		ΔT_s	Date		ΔT_s
Jan.	1	-11°6	July	9	-43°6
	11	-15.6		19	-47.9
	21	-15.4		29	-50.1
	31	-11.9	Aug.	8	-48.8
Feb.	10	- 6.5		18	-42.9
	20	+ 0.1		28	-31.9
March	2	+ 7.8	Sept.	7	-16.4
	12	+16.2		17	+ 1.7
	22	+23.5		27	+19.7
April	1	+27.5	Oct.	7	+34.9
	11	+26.7		17	+45.1
	21	+21.1		27	+49.0
May	1	+12.5	Nov.	6	+46.7
	11	+ 2.7		16	+39.2
	21	- 7.1		26	+28.0
	31	-16.0	Dec.	6	+15.1
June	10	-24.1		16	+ 2.5
	20	-31.3		26	- 7.7
	30	-37.8			

The actual correction is $\Delta T_s = \frac{\overline{F}_{10.7}}{100} \delta T_s$.

Table 4. Tables for the seasonal-latitudinal density variation $\Delta \log \rho = S P \sin^2 \phi$.

a) Table of the maximum amplitude $S = 0.02(z - 90) \exp[-0.045(z - 90)]$

z (km)	S	z (km)	S	z (km)	S
90	0.000	130	0.132	200	0.016
95	0.080	135	0.105	220	0.007
100	0.128	150	0.081	240	0.004
105	0.153	160	0.060	260	0.001
110	0.163	170	0.044	280	0.001
115	0.162	180	0.031	300	0.000
120	0.156	190	0.022		

b) Table of the phase $P = \sin \frac{360°}{Y} (d + 100)$*

Day	P	Day	P	Day	P	Day	P
Jan. 1	±0.989	Apr. 1	∓0.129	June 30	∓0.994	Sept. 28	±0.086
11	±0.948	11	∓0.297	July 10	∓0.961	Oct. 8	±0.255
21	±0.880	21	∓0.456	20	∓0.900	18	±0.417
31	±0.786	May 1	∓0.602	30	∓0.812	20	±0.567
Feb. 10	±0.668	11	∓0.730	Aug. 9	∓0.699	Nov. 7	±0.699
20	±0.531	21	∓0.836	19	∓0.567	17	±0.812
Mar. 2	±0.378	31	∓0.978	29	∓0.417	27	±0.900
12	±0.214	June 10	∓0.972	Sept. 8	∓0.255	Dec. 7	±0.961
22	±0.043	20	∓0.998	18	∓0.086	17	±0.994
Apr. 1	∓0.129	30	∓0.994	28	±0.086	27	±0.998

*Take the upper sign for the Northern Hemisphere, the lower for the Southern Hemisphere.

c) Table of $\sin^2 \phi$

ϕ	$\sin^2 \phi$	ϕ	$\sin^2 \phi$	ϕ	$\sin^2 \phi$
0°	0.000	30°	0.250	60°	0.750
5	0.008	35	0.329	65	0.821
10	0.030	40	0.413	70	0.883
15	0.067	45	0.500	75	0.933
20	0.117	50	0.587	80	0.970
25	0.179	55	0.671	85	0.992
30	0.250	60	0.750	90	1.000

Table 5. Atmospheric temperature, density, and composition as functions of height and exospheric temperature.

EXOSPHERIC TEMPERATURE = 600 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.2	13.5910	13.0068	11.7821	11.6688	8.8097	28.79	5.55	2.401E-09	-8.620
94.0	184.0	13.4314	12.8371	11.8706	11.5092	8.6501	28.65	5.61	1.662E-09	-8.779
96.0	185.6	13.2714	12.6646	11.8937	11.3492	8.4901	28.49	5.69	1.150E-09	-8.939
98.0	188.2	13.1116	12.4909	11.8713	11.18[illegible]4	8.3303	28.32	5.81	7.959E-10	-9.099
100.0	192.0	12.9527	12.3173	11.8187	11.0304	8.1714	28.15	5.97	5.520E-10	-9.258
102.0	197.1	12.7954	12.1446	11.7474	10.87[illegible]	8.0141	27.98	6.17	3.843E-10	-9.415
104.0	203.6	12.6404	11.9735	11.6650	10.7182	7.9591	27.81	6.41	2.690E-10	-9.570
106.0	211.5	12.4892	11.8047	11.5743	10.5387	7.7680	27.64	6.71	1.896E-10	-9.722
108.0	220.9	12.3419	11.6390	11.4821	10.3367	7.7379	27.45	7.06	1.348E-10	-9.870
110.0	231.7	12.1984	11.4781	11.3912	10.1409	7.7075	27.27	7.46	9.688E-11	-10.014
115.0	264.9	11.8601	11.1000	11.1731	9.6834	7.6315	26.79	8.69	4.468E-11	-10.350
120.0	305.2	11.5552	10.7604	10.9726	9.2746	7.5586	26.30	10.21	2.238E-11	-10.650
125.0	349.6	11.2847	10.4599	10.7928	8.9141	7.4917	25.83	11.93	1.219E-11	-10.914
130.0	393.7	11.0476	10.1963	10.6352	8.5979	7.4333	25.37	13.70	7.198E-12	-11.143
135.0	432.0	10.8406	9.9657	10.4997	8.3199	7.3845	24.92	15.33	4.567E-12	-11.340
140.0	462.3	10.6576	9.7608	10.3825	8.0715	7.3443	24.49	16.72	3.069E-12	-11.513
145.0	485.5	10.4916	9.5742	10.2787	7.8439	7.3104	24.06	17.90	2.152E-12	-11.667
150.0	503.2	10.3376	9.4005	10.1840	7.6308	7.2810	23.63	18.91	1.554E-12	-11.808
155.0	516.9	10.1918	9.2356	10.0958	7.4279	7.2546	23.21	19.81	1.148E-12	-11.940
160.0	527.7	10.0520	9.0773	10.0121	7.2324	7.2303	22.79	20.63	8.622E-13	-12.064
170.0	543.7	9.7848	8.7739	9.8539	6.8569	7.1860	21.96	22.12	5.053E-13	-12.296
180.0	554.9	9.5286	8.4825	9.7038	6.4953	7.1452	21.17	23.49	3.079E-13	-12.512
190.0	563.2	9.2799	8.1992	9.5589	6.1433	7.1065	20.43	24.79	1.934E-13	-12.714
200.0	569.7	9.0365	7.9220	9.4178	5.7984	7.0694	19.74	26.02	1.247E-13	-12.904
210.0	574.8	8.7973	7.6493	9.2795	5.4589	7.0333	19.12	27.19	8.219E-14	-13.085
220.0	578.9	8.5614	7.3803	9.1435	5.1239	6.9981	18.57	28.29	5.526E-14	-13.258
230.0	582.3	8.3284	7.1145	9.0093	4.7927	6.9636	18.08	29.31	3.781E-14	-13.422
240.0	585.1	8.0977	6.8513	8.8767	4.4646	6.9297	17.66	30.26	2.626E-14	-13.581
250.0	587.4	7.8691	6.5904	8.7453	4.1393	6.8962	17.28	31.13	1.848E-14	-13.733
260.0	589.4	7.6423	6.3315	8.6152	3.8164	6.8631	16.95	31.95	1.316E-14	-13.881
270.0	591.0	7.4170	6.0744	8.4860	3.4957	6.8304	16.65	32.71	9.462E-15	-14.024
280.0	592.3	7.1932	5.8188	8.3578	3.1770	6.7979	16.37	33.44	6.861E-15	-14.164
290.0	593.4	6.9707	5.5648	8.2303	2.8600	6.7658	16.10	34.16	5.011E-15	-14.300
300.0	594.3	6.7493	5.3120	8.1036	2.5446	6.7338	15.84	34.89	3.684E-15	-14.434
310.0	595.1	6.5290	5.0605	7.[illegible]776	2.2308	6.7021	15.56	35.66	2.723E-15	-14.565
320.0	595.8	6.3098	4.8101	7.8522	1.9183	6.6705	15.27	36.49	2.023E-15	-14.694
330.0	596.3	6.0915	4.5608	7.7273	1.6072	6.6391	14.95	37.42	1.509E-15	-14.821
340.0	596.8	5.8741	4.3125	7.6030	1.2973	6.6079	14.59	38.49	1.131E-15	-14.947
350.0	597.2	5.6575	4.0652	7.4792	.9886	6.5768	14.18	39.74	8.505E-16	-15.070
360.0	597.5	5.4418	3.8188	7.3559	.6811	6.5459	13.72	41.23	6.422E-16	-15.192
370.0	597.8	5.2268	3.5733	7.2330	.3746	6.5151	13.20	43.01	4.869E-16	-15.313
380.0	598.1	5.0127	3.3287	7.1106	.0693	6.4844	12.61	45.15	3.706E-16	-15.431
390.0	598.3	4.7992	3.0849	6.9886		6.4538	11.97	47.75	2.834E-16	-15.548
400.0	598.5	4.5865	2.8420	6.8671		6.4233	11.27	50.88	2.177E-16	-15.662

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 600 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	598.8	4.1632	2.3584	6.6252		6.3628		9.75	59.16	1.307E-16	-15.884
440.0	599.0	3.7426	1.8781	6.3850		6.3026		8.20	70.82	8.053E-17	-16.094
460.0	599.2	3.3247	1.4007	6.1462		6.2428		6.75	86.54	5.131E-17	-16.290
480.0	599.3	2.9094	.9263	5.9089		6.1834		5.52	106.55	3.402E-17	-16.468
500.0	599.4	2.4965	.4547	5.6731		6.1244	6.1241	4.54	130.34	2.361E-17	-16.627
520.0	599.5	2.0862		5.4387		6.0657	6.1093	3.80	156.57	1.719E-17	-16.765
540.0	599.6	1.6783		5.2058		6.0074	6.0946	3.26	183.49	1.311E-17	-16.882
560.0	599.7	1.2728		4.9742		5.9495	6.0800	2.87	209.48	1.043E-17	-16.982
580.0	599.7	.8697		4.7439		5.8919	6.0654	2.59	233.51	8.600E-18	-17.065
600.0	599.7	.4690		4.5150		5.8346	6.0510	2.39	255.20	7.293E-18	-17.137
620.0	599.8	.0706		4.2875		5.7776	6.0366	2.23	274.70	6.319E-18	-17.199
640.0	599.8			4.0612		5.7210	6.0224	2.11	292.39	5.564E-18	-17.255
660.0	599.8			3.8363		5.6648	6.0082	2.01	308.71	4.959E-18	-17.305
680.0	599.8			3.6127		5.6088	5.9941	1.92	324.08	4.460E-18	-17.351
700.0	599.9			3.3903		5.5532	5.9800	1.85	338.80	4.039E-18	-17.394
720.0	599.9			3.1692		5.4978	5.9661	1.79	353.11	3.678E-18	-17.434
740.0	599.9			2.9493		5.4428	5.9522	1.73	367.16	3.365E-18	-17.473
760.0	599.9			2.7307		5.3881	5.9385	1.67	381.06	3.091E-18	-17.510
780.0	599.9			2.5133		5.3338	5.9248	1.62	394.86	2.849E-18	-17.545
800.0	599.9			2.2972		5.2797	5.9111	1.58	408.57	2.635E-18	-17.579
820.0	599.9			2.0822		5.2259	5.8976	1.54	422.20	2.443E-18	-17.612
840.0	599.9			1.8684		5.1724	5.8841	1.50	435.74	2.272E-18	-17.644
860.0	599.9			1.6559		5.1192	5.8707	1.46	449.17	2.119E-18	-17.674
880.0	599.9			1.4445		5.0663	5.8574	1.43	462.46	1.980E-18	-17.703
900.0	600.0			1.2343		5.0138	5.8441	1.39	475.58	1.855E-18	-17.732
920.0	600.0			1.0252		4.9615	5.8310	1.36	488.50	1.742E-18	-17.759
940.0	600.0			.8173		4.9094	5.8179	1.34	501.20	1.640E-18	-17.785
960.0	600.0			.6105		4.8577	5.8048	1.31	513.66	1.547E-18	-17.811
980.0	600.0			.4048		4.8063	5.7919	1.29	525.85	1.462E-18	-17.835
1000.0	600.0			.2003		4.7551	5.7790	1.27	537.76	1.384E-18	-17.859
1050.0	600.0					4.6284	5.7471	1.22	566.19	1.217E-18	-17.915
1100.0	600.0					4.5034	5.7156	1.18	592.65	1.081E-18	-17.966
1150.0	600.0					4.3800	5.6845	1.15	617.12	9.689E-19	-18.014
1200.0	600.0					4.2583	5.6539	1.12	639.70	8.747E-19	-18.058
1250.0	600.0					4.1382	5.6236	1.10	660.51	7.949E-19	-18.100
1300.0	600.0					4.0196	5.5938	1.09	679.74	7.263E-19	-18.139
1350.0	600.0					3.9026	5.5643	1.07	697.57	6.668E-19	-18.176
1400.0	600.0					3.7871	5.5352	1.06	714.20	6.147E-19	-18.211
1450.0	600.0					3.6731	5.5065	1.05	729.80	5.686E-19	-18.245
1500.0	600.0					3.5606	5.4782	1.04	744.52	5.274E-19	-18.278
1600.0	600.0					3.3397	5.4225	1.03	771.90	4.573E-19	-18.340
1700.0	600.0					3.1243	5.3683	1.02	797.26	3.996E-19	-18.398
1800.0	600.0					2.9142	5.3154	1.02	821.29	3.514E-19	-18.454
1900.0	600.0					2.7091	5.2637	1.02	844.47	3.106E-19	-18.508
2000.0	600.0					2.5090	5.2133	1.01	867.11	2.757E-19	-18.560
2100.0	600.0					2.3136	5.1641	1.01	889.47	2.456E-19	-18.610
2200.0	600.0					2.1228	5.1161	1.01	911.69	2.195E-19	-18.659
2300.0	600.0					1.9364	5.0691	1.01	933.90	1.968E-19	-18.706
2400.0	600.0					1.7542	5.0233	1.01	956.16	1.770E-19	-18.752
2500.0	600.0					1.5762	4.9784	1.01	978.54	1.595E-19	-18.797

EXOSPHERIC TEMPERATURE = 700 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8275	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.2	13.5910	13.0068	11.7821	11.6687	8.8097	28.79	5.55	2.400E-09	-8.620
94.0	184.1	13.4312	12.8369	11.8704	11.5289	8.6498	28.65	5.61	1.661E-09	-8.780
96.0	186.0	13.2708	12.6640	11.8931	11.3486	8.4895	28.49	5.70	1.148E-09	-8.940
98.0	189.0	13.1100	12.4899	11.8703	11.1884	8.3293	28.32	5.83	7.941E-10	-9.100
100.0	193.3	12.9513	12.3159	11.8173	11.0291	8.1700	28.15	6.01	5.503E-10	-9.259
102.0	199.1	12.7937	12.1429	11.7457	10.8714	8.0124	27.98	6.23	3.828E-10	-9.417
104.0	206.5	12.6386	11.9718	11.6631	10.7164	7.8573	27.81	6.50	2.679E-10	-9.572
106.0	215.5	12.4875	11.8031	11.5721	10.5375	7.7657	27.64	6.83	1.889E-10	-9.724
108.0	226.2	12.3407	11.6384	11.4792	10.3371	7.7347	27.46	7.22	1.345E-10	-9.871
110.0	238.6	12.1981	11.4788	11.3879	10.1436	7.7033	27.28	7.67	9.681E-11	-10.014
115.0	276.4	11.8639	11.1061	11.1696	9.6942	7.6251	26.82	9.06	4.504E-11	-10.346
120.0	322.3	11.5651	10.7744	10.9704	9.2966	7.5505	26.36	10.76	2.286E-11	-10.641
125.0	373.0	11.3025	10.4835	10.7932	8.9492	7.4828	25.92	12.68	1.266E-11	-10.897
130.0	423.5	11.0741	10.2304	10.6390	8.6470	7.4238	25.50	14.66	7.606E-12	-11.119
135.0	468.8	10.8757	10.0101	10.5068	8.3829	7.3744	25.10	16.52	4.907E-12	-11.309
140.0	506.4	10.7014	9.8157	10.3929	8.1485	7.3335	24.71	18.15	3.352E-12	-11.475
145.0	536.4	10.5449	9.6405	10.2928	7.9360	7.2992	24.33	19.55	2.391E-12	-11.622
150.0	560.0	10.4012	9.4791	10.2027	7.7391	7.2697	23.96	20.76	1.759E-12	-11.755
155.0	578.8	10.2668	9.3275	10.1198	7.5535	7.2437	23.59	21.83	1.325E-12	-11.878
160.0	594.0	10.1391	9.1833	10.0420	7.3762	7.2201	23.22	22.80	1.016E-12	-11.993
170.0	616.7	9.8978	8.9099	9.8972	7.0390	7.1778	22.49	24.51	6.213E-13	-12.207
180.0	633.0	9.6691	8.6503	9.7617	6.7178	7.1398	21.79	26.05	3.948E-13	-12.404
190.0	645.2	9.4489	8.4000	9.6324	6.4072	7.1043	21.11	27.48	2.583E-13	-12.588
200.0	654.8	9.2347	8.1563	9.5074	6.1046	7.0707	20.48	28.84	1.731E-13	-12.762
210.0	662.4	9.0253	7.9177	9.3856	5.8080	7.0384	19.89	30.14	1.184E-13	-12.927
220.0	668.6	8.8195	7.6833	9.2663	5.5163	7.0070	19.34	31.37	8.240E-14	-13.084
230.0	673.6	8.6168	7.4522	9.1492	5.2287	6.9765	18.85	32.53	5.828E-14	-13.234
240.0	677.8	8.4167	7.2239	9.0337	4.9444	6.9466	18.41	33.62	4.181E-14	-13.379
250.0	681.2	8.2187	6.9981	8.9197	4.6630	6.9173	18.01	34.64	3.036E-14	-13.518
260.0	684.1	8.0225	6.7743	8.8069	4.3841	6.8884	17.66	35.59	2.230E-14	-13.652
270.0	686.5	7.8281	6.5524	8.6952	4.1074	6.8599	17.34	36.47	1.654E-14	-13.782
280.0	688.5	7.6351	6.3321	8.5844	3.8327	6.8317	17.06	37.29	1.237E-14	-13.908
290.0	690.1	7.4433	6.1132	8.4744	3.5597	6.8038	16.81	38.06	9.324E-15	-14.030
300.0	691.5	7.2527	5.8957	8.3652	3.2883	6.7762	16.58	38.78	7.074E-15	-14.150
310.0	692.7	7.0632	5.6793	8.2567	3.0183	6.7488	16.36	39.48	5.399E-15	-14.268
320.0	693.6	6.8747	5.4640	8.1487	2.7497	6.7215	16.16	40.15	4.141E-15	-14.383
330.0	694.5	6.6870	5.2498	8.0413	2.4824	6.6945	15.96	40.83	3.191E-15	-14.496
340.0	695.2	6.5002	5.0364	7.9345	2.2162	6.6676	15.76	41.52	2.469E-15	-14.607
350.0	695.8	6.3142	4.8240	7.8281	1.9511	6.6408	15.55	42.23	1.917E-15	-14.717
360.0	696.3	6.1290	4.6125	7.7221	1.6871	6.6142	15.33	42.99	1.494E-15	-14.826
370.0	696.7	5.9444	4.4017	7.6166	1.4240	6.5877	15.10	43.81	1.168E-15	-14.933
380.0	697.1	5.7606	4.1918	7.5115	1.1620	6.5613	14.84	44.73	9.152E-16	-15.038
390.0	697.4	5.5774	3.9826	7.4068	.9009	6.5351	14.56	45.75	7.195E-16	-15.143
400.0	697.7	5.3949	3.7741	7.3025	.6407	6.5089	14.25	46.90	5.671E-16	-15.246

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 700 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	698.2	5.0318	3.3593	7.0950	.1229	6.4569		13.53	49.73	3.554E-16	-15.449
440.0	698.5	4.6710	2.9472	6.8888		6.4052		12.66	53.49	2.254E-16	-15.647
460.0	698.8	4.3126	2.5378	6.6840		6.3539		11.65	58.48	1.450E-16	-15.839
480.0	699.0	3.9564	2.1310	6.4806		6.3030		10.54	65.05	9.473E-17	-16.024
500.0	699.2	3.6024	1.7267	6.2783		6.2523	5.5576	9.38	73.52	6.310E-17	-16.200
520.0	699.3	3.2506	1.3248	6.0774		6.2020	5.5449	8.25	84.12	4.300E-17	-16.367
540.0	699.4	2.9009	.9254	5.8776		6.1520	5.5322	7.20	96.90	3.008E-17	-16.522
560.0	699.5	2.5532	.5283	5.6790		6.1023	5.5197	6.29	111.61	2.167E-17	-16.664
580.0	699.6	2.2077	.1336	5.4817		6.0529	5.5072	5.53	127.74	1.611E-17	-16.793
600.0	699.6	1.8641		5.2854		6.0038	5.4948	4.91	144.56	1.236E-17	-16.908
620.0	699.7	1.5226		5.0903		5.9550	5.4825	4.43	161.28	9.773E-18	-17.010
640.0	699.7	1.1830		4.8964		5.9065	5.4702	4.05	177.26	7.946E-18	-17.100
660.0	699.7	.8454		4.7036		5.8582	5.4580	3.76	192.07	6.618E-18	-17.179
680.0	699.8	.5097		4.5118		5.8103	5.4459	3.54	205.56	5.624E-18	-17.250
700.0	699.8	.1760		4.3212		5.7626	5.4339	3.36	217.76	4.858E-18	-17.314
720.0	699.8			4.1317		5.7152	5.4220	3.21	228.83	4.251E-18	-17.371
740.0	699.8			3.9432		5.6680	5.4101	3.09	239.02	3.758E-18	-17.425
760.0	699.9			3.7558		5.6211	5.3983	2.99	248.55	3.348E-18	-17.475
780.0	699.9			3.5695		5.5745	5.3865	2.90	257.65	3.001E-18	-17.523
800.0	699.9			3.3842		5.5281	5.3748	2.82	266.48	2.703E-18	-17.568
820.0	699.9			3.1999		5.4820	5.3632	2.75	275.22	2.445E-18	-17.612
840.0	699.9			3.0167		5.4362	5.3517	2.68	283.98	2.218E-18	-17.654
860.0	699.9			2.8345		5.3906	5.3402	2.61	292.84	2.018E-18	-17.695
880.0	699.9			2.6533		5.3453	5.3288	2.55	301.88	1.841E-18	-17.735
900.0	699.9			2.4731		5.3002	5.3174	2.49	311.14	1.682E-18	-17.774
920.0	699.9			2.2939		5.2554	5.3061	2.42	320.68	1.540E-18	-17.812
940.0	699.9			2.1157		5.2108	5.2949	2.37	330.52	1.413E-18	-17.850
960.0	699.9			1.9384		5.1664	5.2837	2.31	340.67	1.299E-18	-17.886
980.0	699.9			1.7621		5.1223	5.2726	2.25	351.14	1.196E-18	-17.922
1000.0	700.0			1.5868		5.0785	5.2616	2.20	361.95	1.103E-18	-17.957
1050.0	700.0			1.1527		4.9699	5.2342	2.06	390.37	9.074E-19	-18.042
1100.0	700.0			.7243		4.8627	5.2072	1.94	420.71	7.543E-19	-18.122
1150.0	700.0			.3017		4.7570	5.1806	1.83	452.72	6.335E-19	-18.198
1200.0	700.0					4.6526	5.1543	1.73	486.07	5.375E-19	-18.270
1250.0	700.0					4.5497	5.1284	1.63	520.36	4.606E-19	-18.337
1300.0	700.0					4.4481	5.1028	1.55	555.16	3.986E-19	-18.400
1350.0	700.0					4.3478	5.0775	1.48	590.07	3.481E-19	-18.458
1400.0	700.0					4.2488	5.0526	1.41	624.68	3.068E-19	-18.513
1450.0	700.0					4.1511	5.0280	1.36	658.66	2.726E-19	-18.564
1500.0	700.0					4.0546	5.0037	1.31	691.72	2.442E-19	-18.612
1600.0	700.0					3.8652	4.9560	1.23	754.29	2.000E-19	-18.699
1700.0	700.0					3.6806	4.9095	1.17	811.42	1.677E-19	-18.775
1800.0	700.0					3.5005	4.8642	1.13	863.05	1.435E-19	-18.843
1900.0	700.0					3.3248	4.8199	1.10	909.61	1.246E-19	-18.904
2000.0	700.0					3.1532	4.7767	1.08	951.83	1.095E-19	-18.960
2100.0	700.0					2.9858	4.7345	1.06	990.50	9.726E-20	-19.012
2200.0	700.0					2.8222	4.6933	1.05	1026.36	8.702E-20	-19.060
2300.0	700.0					2.6624	4.6531	1.04	1060.08	7.835E-20	-19.106
2400.0	700.0					2.5063	4.6138	1.03	1092.17	7.091E-20	-19.149
2500.0	700.0					2.3537	4.5754	1.03	1123.06	6.446E-20	-19.191

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 800 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5909	13.0067	11.7820	11.6687	8.8096	28.79	5.56	2.400E-09	-8.620
94.0	184.3	13.4309	12.8367	11.8702	11.5087	8.6496	28.65	5.61	1.660E-09	-8.780
96.0	186.3	13.2703	12.6656	11.8926	11.3481	8.4890	28.49	5.71	1.147E-09	-8.940
98.0	189.6	13.1098	12.4851	11.8695	11.1875	8.3285	28.32	5.85	7.926E-10	-9.101
100.0	194.3	12.9501	12.3147	11.8162	11.0279	8.1688	28.15	6.04	5.488E-10	-9.261
102.0	200.7	12.7923	12.1415	11.7443	10.8701	8.0110	27.98	6.28	3.816E-10	-9.418
104.0	208.9	12.6371	11.9703	11.6616	10.7149	7.8558	27.81	6.58	2.669E-10	-9.574
106.0	218.8	12.4851	11.8019	11.5704	10.5365	7.7639	27.64	6.94	1.883E-10	-9.725
108.0	230.6	12.3397	11.6379	11.4769	10.3374	7.7321	27.47	7.36	1.342E-10	-9.872
110.0	244.2	12.1978	11.4793	11.3852	10.1457	7.6999	27.29	7.85	9.675E-11	-10.014
115.0	285.9	11.8657	11.1108	11.1668	9.7027	7.6200	26.84	9.36	4.531E-11	-10.344
120.0	336.5	11.5727	10.7851	10.9685	9.3135	7.5442	26.41	11.21	2.323E-11	-10.634
125.0	392.3	11.3160	10.5013	10.7933	8.9759	7.4757	25.99	13.30	1.303E-11	-10.885
130.0	448.3	11.0938	10.2558	10.6416	8.6838	7.4163	25.60	15.46	7.927E-12	-11.101
135.0	499.5	10.9015	10.0428	10.5116	8.4296	7.3664	25.23	17.51	5.175E-12	-11.286
140.0	543.6	10.7331	9.8557	10.3996	8.2051	7.3248	24.88	19.35	3.575E-12	-11.447
145.0	580.0	10.5829	9.6881	10.3018	8.0028	7.2899	24.53	20.97	2.578E-12	-11.589
150.0	609.7	10.4451	9.5349	10.2144	7.8169	7.2600	24.19	22.39	1.921E-12	-11.717
155.0	633.8	10.3192	9.3924	10.1346	7.6432	7.2339	23.86	23.64	1.466E-12	-11.834
160.0	653.7	10.1997	9.2578	10.0606	7.4785	7.2104	23.53	24.76	1.140E-12	-11.943
170.0	684.2	9.9793	9.0055	9.9246	7.1684	7.1690	22.88	26.73	7.186E-13	-12.143
180.0	706.4	9.7671	8.7685	9.7992	6.8760	7.1325	22.25	28.47	4.712E-13	-12.327
190.0	723.2	9.5674	8.5418	9.6807	6.5956	7.0991	21.43	30.06	3.180E-13	-12.498
200.0	736.5	9.3745	8.3226	9.5672	6.3239	7.0678	21.05	31.56	2.196E-13	-12.658
210.0	747.1	9.1858	8.1090	9.4573	6.0588	7.0380	20.49	32.98	1.546E-13	-12.811
220.0	754.7	9.0031	7.9000	9.3502	5.7990	7.0094	19.97	34.34	1.107E-13	-12.956
230.0	762.8	8.8228	7.6946	9.2455	5.5436	6.9817	19.49	35.63	8.040E-14	-13.095
240.0	768.7	8.6452	7.4922	9.1427	5.2918	6.9547	19.04	36.85	5.917E-14	-13.228
250.0	773.5	8.4700	7.2924	9.0414	5.0431	6.9284	18.64	38.01	4.406E-14	-13.356
260.0	777.6	8.2967	7.0948	8.9415	4.7969	6.9025	18.27	39.10	3.315E-14	-13.480
270.0	780.9	8.1251	6.8991	8.8427	4.5531	6.8771	17.94	40.11	2.517E-14	-13.599
280.0	783.7	7.9551	6.7051	8.7449	4.3112	6.8521	17.64	41.07	1.928E-14	-13.715
290.0	786.1	7.7863	6.5125	8.6479	4.0711	6.8274	17.36	41.96	1.487E-14	-13.828
300.0	788.0	7.6187	6.3212	8.5518	3.8326	6.8029	17.12	42.80	1.155E-14	-13.937
310.0	789.7	7.4522	6.1311	8.4563	3.5955	6.7787	16.89	43.59	9.026E-15	-14.044
320.0	791.0	7.2866	5.9421	8.3614	3.3597	6.7546	16.69	44.34	7.090E-15	-14.149
330.0	792.2	7.1219	5.7540	8.2670	3.1251	6.7308	16.49	45.06	5.595E-15	-14.252
340.0	793.2	6.9580	5.5669	8.1732	2.8916	6.7071	16.31	45.75	4.434E-15	-14.353
350.0	794.0	6.7949	5.3806	8.0798	2.6591	6.6836	16.14	46.43	3.528E-15	-14.452
360.0	794.8	6.6325	5.1951	7.9869	2.4277	6.6602	15.97	47.11	2.816E-15	-14.550
370.0	795.4	6.4707	5.0104	7.8944	2.1972	6.6369	15.80	47.79	2.255E-15	-14.647
380.0	795.9	6.3096	4.8264	7.8022	1.9676	6.6138	15.63	48.50	1.811E-15	-14.742
390.0	796.4	6.1491	4.6431	7.7105	1.7388	6.5907	15.45	49.23	1.458E-15	-14.836
400.0	796.9	5.9892	4.4605	7.6190	1.5109	6.5678	15.26	50.01	1.177E-15	-14.929

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 800 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	797.4	5.6711	4.0972	7.4372	1.0574	6.5222		14.84	51.76	7.718E-16	-15.112
440.0	797.9	5.3552	3.7364	7.2567	.6070	6.4769		14.35	53.87	5.107E-16	-15.292
460.0	798.3	5.0414	3.3779	7.0773	.1595	6.4320		13.78	56.49	3.409E-16	-15.467
480.0	798.6	4.7295	3.0218	6.8992		6.3873		13.10	59.77	2.296E-16	-15.639
500.0	798.8	4.4197	2.6678	6.7221		6.3430	5.1067	12.33	63.92	1.562E-16	-15.806
520.0	799.0	4.1117	2.3161	6.5462		6.2989	5.0955	11.47	69.14	1.075E-16	-15.969
540.0	799.1	3.8056	1.9665	6.3714		6.2552	5.0844	10.55	75.62	7.494E-17	-16.125
560.0	799.3	3.5014	1.6189	6.1976		6.2117	5.0734	9.60	83.53	5.304E-17	-16.275
580.0	799.4	3.1989	1.2735	6.0248		6.1684	5.0625	8.68	92.97	3.819E-17	-16.418
600.0	799.5	2.8983	.9301	5.8531		6.1254	5.0516	7.81	103.90	2.804E-17	-16.552
620.0	799.5	2.5994	.5886	5.6823		6.0827	5.0408	7.03	116.15	2.103E-17	-16.677
640.0	799.6	2.3022	.2492	5.5126		6.0402	5.0301	6.35	129.36	1.613E-17	-16.792
660.0	799.6	2.0068		5.3439		5.9980	5.0195	5.77	143.11	1.266E-17	-16.898
680.0	799.7	1.7130		5.1761		5.9560	5.0089	5.30	156.87	1.016E-17	-16.993
700.0	799.7	1.4210		5.0093		5.9143	4.9983	4.91	170.18	8.338E-18	-17.079
720.0	799.8	1.1306		4.8434		5.8728	4.9879	4.60	182.68	6.974E-18	-17.156
740.0	799.8	.8419		4.6785		5.8315	4.9775	4.35	194.13	5.936E-18	-17.227
760.0	799.8	.5547		4.5145		5.7905	4.9671	4.16	204.45	5.127E-18	-17.290
780.0	799.8	.2693		4.3515		5.7497	4.9568	4.00	213.67	4.483E-18	-17.348
800.0	799.8			4.1893		5.7091	4.9466	3.87	221.89	3.961E-18	-17.402
820.0	799.9			4.0281		5.6688	4.9365	3.77	229.24	3.528E-18	-17.452
840.0	799.9			3.8677		5.6287	4.9264	3.68	235.88	3.164E-18	-17.500
860.0	799.9			3.7083		5.5888	4.9163	3.61	241.98	2.852E-18	-17.545
880.0	799.9			3.5497		5.5491	4.9063	3.55	247.66	2.583E-18	-17.588
900.0	799.9			3.3921		5.5097	4.8964	3.49	253.04	2.346E-18	-17.630
920.0	799.9			3.2353		5.4705	4.8865	3.44	258.23	2.138E-18	-17.670
940.0	799.9			3.0793		5.4314	4.8766	3.39	263.31	1.953E-18	-17.709
960.0	799.9			2.9242		5.3926	4.8669	3.35	268.35	1.787E-18	-17.748
980.0	799.9			2.7700		5.3540	4.8572	3.30	273.41	1.638E-18	-17.786
1000.0	799.9			2.6166		5.3157	4.8475	3.26	278.53	1.504E-18	-17.823
1050.0	799.9			2.2367		5.2206	4.8236	3.16	291.82	1.221E-18	-17.913
1100.0	800.0			1.8619		5.1269	4.7999	3.05	306.14	9.976E-19	-18.001
1150.0	800.0			1.4921		5.0343	4.7766	2.94	321.78	8.202E-19	-18.086
1200.0	800.0			1.1272		4.9431	4.7536	2.83	338.93	6.782E-19	-18.169
1250.0	800.0			.7671		4.8530	4.7309	2.71	357.73	5.640E-19	-18.249
1300.0	800.0			.4117		4.7641	4.7086	2.60	378.30	4.717E-19	-18.326
1350.0	800.0			.0609		4.6763	4.6865	2.49	400.70	3.967E-19	-18.401
1400.0	800.0					4.5897	4.6646	2.38	424.96	3.357E-19	-18.474
1450.0	800.0					4.5042	4.6431	2.27	451.07	2.858E-19	-18.544
1500.0	800.0					4.4197	4.6218	2.16	478.99	2.448E-19	-18.611
1600.0	800.0					4.2541	4.5801	1.97	539.90	1.830E-19	-18.738
1700.0	800.0					4.0925	4.5394	1.80	606.52	1.402E-19	-18.853
1800.0	800.0					3.9349	4.4998	1.65	677.21	1.101E-19	-18.958
1900.0	800.0					3.7812	4.4610	1.53	750.04	8.854E-20	-19.053
2000.0	800.0					3.6311	4.4232	1.42	823.11	7.277E-20	-19.138
2100.0	800.0					3.4845	4.3863	1.34	894.76	6.102E-20	-19.215
2200.0	800.0					3.3414	4.3503	1.28	963.74	5.208E-20	-19.283
2300.0	800.0					3.2016	4.3151	1.22	1029.27	4.515E-20	-19.345
2400.0	800.0					3.0650	4.2807	1.18	1090.98	3.966E-20	-19.402
2500.0	800.0					2.9315	4.2471	1.15	1148.83	3.524E-20	-19.453

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 900 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5909	13.0067	11.7820	11.6687	8.8096	28.79	5.56	2.400E-09	-8.620
94.0	184.4	13.4308	12.8365	11.8700	11.5085	8.6495	28.65	5.62	1.660E-09	-8.780
96.0	186.5	13.2699	12.6632	11.8922	11.3477	8.4886	28.49	5.72	1.146E-09	-8.941
98.0	190.1	13.1091	12.4884	11.8688	11.1869	8.3278	28.32	5.87	7.914E-10	-9.102
100.0	195.2	12.9492	12.3138	11.8152	11.0270	8.1679	28.15	6.07	5.476E-10	-9.262
102.0	202.1	12.7911	12.1404	11.7431	10.8689	8.0098	27.98	6.32	3.806E-10	-9.420
104.0	210.8	12.6359	11.9690	11.6604	10.7136	7.8546	27.81	6.64	2.662E-10	-9.575
106.0	221.5	12.4850	11.8008	11.5689	10.5357	7.7623	27.64	7.02	1.878E-10	-9.726
108.0	234.3	12.3389	11.6374	11.4750	10.3377	7.7299	27.47	7.48	1.339E-10	-9.873
110.0	248.9	12.1975	11.4797	11.3830	10.1474	7.6971	27 29	8.00	9.669E-11	-10.015
115.0	293.8	11.8689	11.1145	11.1645	9.7093	7.6159	26.86	9.61	4.553E-11	-10.342
120.0	348.2	11.5785	10.7934	10.9669	9.3268	7.5391	26.44	11.59	2.353E-11	-10.628
125.0	408.4	11.3263	10.5151	10.7932	8.9965	7.4701	26.05	13.82	1.332E-11	-10.876
130.0	468.8	11.1089	10.2754	10.6434	8.7121	7.4104	25.68	16.12	8.182E-12	-11.087
135.0	525.2	10.9211	10.0678	10.5150	8.4652	7.3601	25.33	18.33	5.389E-12	-11.269
140.0	574.9	10.7569	9.8858	10.4043	8.2478	7.3178	25.00	20.37	3.752E-12	-11.426
145.0	617.3	10.6109	9.7235	10.3077	8.0528	7.2822	24.68	22.19	2.727E-12	-11.564
150.0	652.8	10.4788	9.5760	10.2218	7.8747	7.2518	24.37	23.80	2.049E-12	-11.689
155.0	682.4	10.3570	9.4397	10.1440	7.7093	7.2252	24.06	25.23	1.578E-12	-11.802
160.0	707.2	10.2432	9.3119	10.0724	7.5536	7.2015	23.76	26.52	1.240E-12	-11.907
170.0	746.1	10.0326	9.0746	9.9421	7.2632	7.1603	23.17	28.78	7.983E-13	-12.098
180.0	774.9	9.8376	8.8541	9.8237	6.9921	7.1246	22.59	30.75	5.357E-13	-12.271
190.0	797.1	9.6530	8.6451	9.7130	6.7341	7.0924	22.03	32.53	3.703E-13	-12.431
200.0	814.6	9.4760	8.4442	9.6078	6.4857	7.0626	21.50	34.18	2.619E-13	-12.582
210.0	828.8	9.3047	8.2496	9.5058	6.2446	7.0346	20.98	35.74	1.888E-13	-12.724
220.0	840.4	9.1378	8.0598	9.4089	6.0092	7.0078	20.49	37.22	1.382E-13	-12.859
230.0	849.9	8.9745	7.8740	9.3135	5.7785	6.9822	20.02	38.63	1.026E-13	-12.989
240.0	857.8	8.8143	7.6915	9.2203	5.5516	6.9574	19.59	39.98	7.714E-14	-13.113
250.0	864.3	8.6564	7.5117	9.1287	5.3280	6.9332	19.19	41.25	5.862E-14	-13.232
260.0	869.7	8.5008	7.3343	9.0387	5.1071	6.9097	18.82	42.46	4.498E-14	-13.347
270.0	874.2	8.3469	7.1588	8.9498	4.8886	6.8866	18.47	43.60	3.483E-14	-13.458
280.0	878.0	8.1945	6.9851	8.8620	4.6722	6.8640	18.16	44.68	2.718E-14	-13.566
290.0	881.2	8.0435	6.8128	8.7751	4.4575	6.8417	17.87	45.70	2.136E-14	-13.670
300.0	883.8	7.8937	6.6419	8.6890	4.2444	6.8196	17.61	46.66	1.690E-14	-13.772
310.0	886.0	7.7450	6.4722	8.6036	4.0328	6.7979	17.37	47.57	1.345E-14	-13.871
320.0	887.9	7.5972	6.3035	8.5188	3.8225	6.7763	17.15	48.42	1.076E-14	-13.968
330.0	889.5	7.4503	6.1358	8.4345	3.6133	6.7550	16.95	49.24	8.648E-15	-14.063
340.0	890.8	7.3042	5.9690	8.3508	3.4052	6.7338	16.76	50.01	6.981E-15	-14.156
350.0	891.9	7.1588	5.8030	8.2675	3.1981	6.7127	16.59	50.75	5.657E-15	-14.247
360.0	892.9	7.0141	5.6377	8.1847	2.9920	6.6918	16.42	51.47	4.601E-15	-14.337
370.0	893.8	6.8700	5.4732	8.1022	2.7867	6.6711	16.26	52.18	3.754E-15	-14.426
380.0	894.5	6.7266	5.3094	8.0201	2.5823	6.6504	16.11	52.87	3.071E-15	-14.513
390.0	895.1	6.5837	5.1463	7.9384	2.3786	6.6298	15.96	53.56	2.520E-15	-14.599
400.0	895.6	6.4414	4.9837	7.8570	2.1758	6.6094	15.81	54.26	2.072E-15	-14.684

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 900 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	896.5	6.1583	4.6605	7.6952	1.7723	6.5687		15.50	55.73	1.411E-15	-14.851
440.0	897.2	5.8772	4.3395	7.5345	1.3716	6.5284		15.17	57.33	9.683E-16	-15.014
460.0	897.7	5.5981	4.0206	7.3750	.9737	6.4884		14.79	59.16	6.695E-16	-15.174
480.0	898.1	5.3207	3.7039	7.2165	.5782	6.4487		14.36	61.31	4.661E-16	-15.332
500.0	898.4	5.0452	3.3891	7.0590	.1853	6.4092	4.7397	13.87	63.90	3.268E-16	-15.486
520.0	898.6	4.7713	3.0763	6.9026		6.3701	4.7298	13.30	67.04	2.308E-16	-15.637
540.0	898.9	4.4992	2.7654	6.7471		6.3311	4.7199	12.66	70.87	1.642E-16	-15.785
560.0	899.0	4.2287	2.4564	6.5925		6.2924	4.7101	11.95	75.54	1.179E-16	-15.929
580.0	899.2	3.9598	2.1493	6.4389		6.2540	4.7003	11.18	81.19	8.543E-17	-16.068
600.0	899.3	3.6924	1.8440	6.2862		6.2158	4.6907	10.38	87.95	6.259E-17	-16.203
620.0	899.4	3.4267	1.5404	6.1345		6.1778	4.6810	9.58	95.91	4.642E-17	-16.333
640.0	899.4	3.1625	1.2387	5.9835		6.1400	4.6715	8.79	105.12	3.490E-17	-16.457
660.0	899.5	2.8999	.9387	5.8335		6.1025	4.6620	8.04	115.33	2.664E-17	-16.575
680.0	899.6	2.6387	.6404	5.6844		6.0651	4.6526	7.36	126.98	2.066E-17	-16.685
700.0	899.6	2.3791	.3438	5.5361		6.0280	4.6432	6.75	139.25	1.630E-17	-16.788
720.0	899.7	2.1210	.0490	5.3886		5.9911	4.6339	6.22	152.00	1.309E-17	-16.883
740.0	899.7	1.8643		5.2420		5.9545	4.6247	5.77	164.88	1.070E-17	-16.971
760.0	899.7	1.6091		5.0963		5.9180	4.6155	5.39	177.53	8.889E-18	-17.051
780.0	899.8	1.3553		4.9513		5.8817	4.6063	5.07	189.63	7.505E-18	-17.125
800.0	899.8	1.1029		4.8072		5.8456	4.5972	4.81	200.94	6.429E-18	-17.192
820.0	899.8	.8520		4.6638		5.8098	4.5882	4.60	211.31	5.579E-18	-17.253
840.0	899.8	.6024		4.5213		5.7741	4.5792	4.43	220.70	4.897E-18	-17.310
860.0	899.8	.3543		4.3796		5.7387	4.5703	4.29	229.10	4.340E-18	-17.363
880.0	899.9	.1075		4.2386		5.7034	4.5614	4.18	236.58	3.878E-18	-17.411
900.0	899.9			4.0985		5.6683	4.5525	4.09	243.24	3.490E-18	-17.457
920.0	899.9			3.9591		5.6335	4.5438	4.01	249.19	3.158E-18	-17.501
940.0	899.9			3.8205		5.5988	4.5350	3.95	254.54	2.871E-18	-17.542
960.0	899.9			3.6826		5.5643	4.5263	3.90	259.39	2.621E-18	-17.582
980.0	899.9			3.5455		5.5300	4.5177	3.85	263.85	2.400E-18	-17.620
1000.0	899.9			3.4091		5.4959	4.5091	3.81	267.99	2.204E-18	-17.657
1050.0	899.9			3.0714		5.4114	4.4878	3.73	277.44	1.796E-18	-17.746
1100.0	899.9			2.7383		5.3280	4.4668	3.67	286.22	1.478E-18	-17.830
1150.0	899.9			2.4096		5.2458	4.4461	3.61	294.89	1.224E-18	-17.912
1200.0	900.0			2.0852		5.1647	4.4257	3.55	303.79	1.019E-18	-17.992
1250.0	900.0			1.7651		5.0846	4.4055	3.49	313.14	8.516E-19	-18.070
1300.0	900.0			1.4492		5.0055	4.3856	3.43	323.12	7.146E-19	-18.146
1350.0	900.0			1.1374		4.9275	4.3660	3.36	333.85	6.017E-19	-18.221
1400.0	900.0			.8296		4.8505	4.3466	3.29	345.43	5.084E-19	-18.294
1450.0	900.0			.5258		4.7745	4.3274	3.21	357.95	4.311E-19	-18.365
1500.0	900.0			.2258		4.6995	4.3085	3.14	371.52	3.668E-19	-18.436
1600.0	900.0					4.5522	4.2714	2.97	402.08	2.683E-19	-18.571
1700.0	900.0					4.4086	4.2353	2.80	437.72	1.991E-19	-18.701
1800.0	900.0					4.2685	4.2000	2.62	478.93	1.499E-19	-18.824
1900.0	900.0					4.1319	4.1656	2.45	526.04	1.145E-19	-18.941
2000.0	900.0					3.9984	4.1320	2.28	579.17	8.890E-20	-19.051
2100.0	900.0					3.8682	4.0992	2.12	638.14	7.009E-20	-19.154
2200.0	900.0					3.7410	4.0671	1.97	702.52	5.614E-20	-19.251
2300.0	900.0					3.6167	4.0358	1.83	771.57	4.567E-20	-19.340
2400.0	900.0					3.4953	4.0053	1.71	844.34	3.773E-20	-19.423
2500.0	900.0					3.3766	3.9754	1.61	919.74	3.163E-20	-19.500

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1000 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5908	13.0067	11.7820	11.6686	8.8095	28.79	5.56	2.400E-09	-8.620
94.0	184.4	13.4306	12.8363	11.8698	11.5084	8.6493	28.65	5.62	1.659E-09	-8.780
96.0	186.7	13.2696	12.6628	11.8919	11.3474	8.4883	28.49	5.73	1.145E-09	-8.941
98.0	190.5	13.1085	12.4879	11.8682	11.1863	8.3272	28.32	5.86	7.904E-10	-9.102
100.0	195.9	12.9484	12.3130	11.8144	11.0262	8.1671	28.15	6.09	5.466E-10	-9.262
102.0	203.2	12.7902	12.1394	11.7422	10.8679	8.0089	27.98	6.36	3.797E-10	-9.421
104.0	212.5	12.6348	11.9680	11.6594	10.7126	7.8535	27.81	6.69	2.655E-10	-9.576
106.0	223.8	12.4840	11.8000	11.5677	10.5350	7.7611	27.64	7.10	1.874E-10	-9.727
108.0	237.3	12.3382	11.6370	11.4735	10.3378	7.7281	27.47	7.57	1.337E-10	-9.874
110.0	252.9	12.1973	11.4800	11.3812	10.1487	7.6948	27.30	8.13	9.663E-11	-10.015
115.0	300.4	11.8706	11.1174	11.1625	9.7146	7.6125	26.88	9.82	4.570E-11	-10.340
120.0	358.1	11.5831	10.8000	10.9656	9.3373	7.5350	26.47	11.91	2.376E-11	-10.624
125.0	421.8	11.3344	10.5260	10.7931	9.0129	7.4655	26.09	14.25	1.355E-11	-10.868
130.0	486.0	11.1208	10.2907	10.6447	8.7344	7.4057	25.74	16.67	8.388E-12	-11.076
135.0	546.6	10.9363	10.0872	10.5174	8.4931	7.3549	25.41	19.02	5.562E-12	-11.255
140.0	601.3	10.7752	9.9090	10.4076	8.2810	7.3121	25.09	21.22	3.895E-12	-11.410
145.0	649.1	10.6322	9.7505	10.3117	8.0913	7.2759	24.79	23.22	2.846E-12	-11.546
150.0	690.1	10.5033	9.6070	10.2267	7.9188	7.2448	24.50	25.02	2.150E-12	-11.667
155.0	725.1	10.3852	9.4752	10.1500	7.7595	7.2176	24.21	26.64	1.667E-12	-11.778
160.0	754.9	10.2754	9.3522	10.0798	7.6103	7.1936	23.94	28.10	1.319E-12	-11.880
170.0	802.5	10.0739	9.1259	9.9534	7.3344	7.1521	23.39	30.67	8.626E-13	-12.064
180.0	838.6	9.8893	8.9178	9.8398	7.0793	7.1167	22.86	32.89	5.891E-13	-12.230
190.0	866.7	9.7162	8.7220	9.7347	6.8385	7.0851	22.35	34.88	4.148E-13	-12.382
200.0	889.2	9.5513	8.5352	9.6358	6.6081	7.0562	21.85	36.71	2.989E-13	-12.524
210.0	907.4	9.3926	8.3552	9.5414	6.3855	7.0293	21.37	38.42	2.195E-13	-12.658
220.0	922.4	9.2388	8.1806	9.4505	6.1692	7.0040	20.91	40.04	1.638E-13	-12.786
230.0	934.7	9.0889	8.0101	9.3624	5.9579	6.9798	20.47	41.57	1.238E-13	-12.907
240.0	944.9	8.9422	7.8432	9.2766	5.7507	6.9565	20.05	43.02	9.474E-14	-13.023
250.0	953.4	8.7982	7.6793	9.1926	5.5470	6.9342	19.66	44.41	7.324E-14	-13.135
260.0	960.5	8.6564	7.5178	9.1103	5.3461	6.9124	19.30	45.73	5.715E-14	-13.243
270.0	966.4	8.5165	7.3583	9.0292	5.1478	6.8911	18.95	46.98	4.497E-14	-13.347
280.0	971.3	8.3782	7.2007	8.9493	4.9515	6.8703	18.63	48.17	3.565E-14	-13.448
290.0	975.4	8.2413	7.0446	8.8704	4.7571	6.8499	18.34	49.30	2.846E-14	-13.546
300.0	978.9	8.1057	6.8899	8.7922	4.5643	6.8298	18.07	50.37	2.286E-14	-13.641
310.0	981.8	7.9711	6.7364	8.7148	4.3730	6.8099	17.82	51.39	1.846E-14	-13.734
320.0	984.2	7.8375	6.5839	8.6381	4.1829	6.7903	17.58	52.35	1.499E-14	-13.824
330.0	986.3	7.7048	6.4324	8.5619	3.9941	6.7709	17.37	53.27	1.223E-14	-13.913
340.0	988.0	7.5729	6.2818	8.4862	3.8062	6.7517	17.17	54.14	1.002E-14	-13.999
350.0	989.5	7.4416	6.1320	8.4110	3.6194	6.7326	16.99	54.97	8.238E-15	-14.084
360.0	990.8	7.3111	5.9830	8.3362	3.4335	6.7137	16.82	55.77	6.799E-15	-14.168
370.0	991.8	7.1811	5.8346	8.2618	3.2484	6.6949	16.65	56.54	5.629E-15	-14.250
380.0	992.8	7.0518	5.6869	8.1877	3.0641	6.6763	16.50	57.29	4.674E-15	-14.330
390.0	993.6	6.9230	5.5399	8.1140	2.8805	6.6577	16.36	58.01	3.892E-15	-14.410
400.0	994.3	6.7947	5.3934	8.0406	2.6977	6.6392	16.22	58.73	3.249E-15	-14.488

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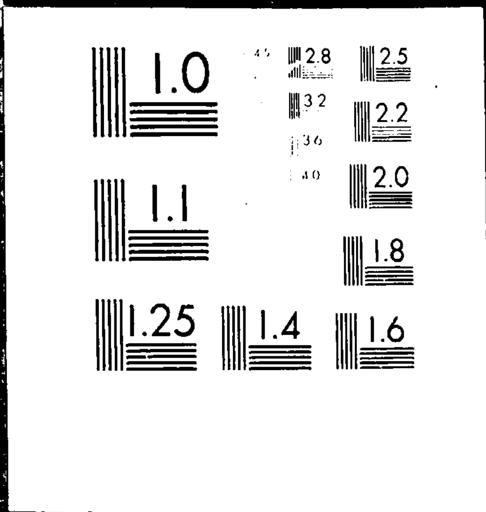

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1000 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	995.4	6.5396	5.1021	7.8947	2.3342	6.6025		15.94	60.16	2.279E-15	-14.642
440.0	996.3	6.2864	4.8129	7.7499	1.9733	6.5662		15.67	61.62	1.612E-15	-14.793
460.0	997.0	6.0350	4.5257	7.6062	1.6149	6.5301		15.39	63.17	1.148E-15	-14.940
480.0	997.5	5.7852	4.2405	7.4634	1.2588	6.4943		15.08	64.88	8.224E-16	-15.085
500.0	997.9	5.5371	3.9571	7.3217	.9050	6.4588	4.4359	14.74	66.80	5.928E-16	-15.227
520.0	998.2	5.2905	3.6754	7.1808	.5535	6.4235	4.4268	14.35	69.03	4.298E-16	-15.367
540.0	998.5	5.0455	3.3956	7.0408	.2041	6.3884	4.4179	13.91	71.64	3.134E-16	-15.504
560.0	998.7	4.8019	3.1174	6.9016		6.3536	4.4091	13.41	74.73	2.299E-16	-15.639
580.0	998.9	4.5599	2.8409	6.7633		6.3189	4.4003	12.86	78.41	1.697E-16	-15.770
600.0	999.0	4.3192	2.5660	6.6259		6.2845	4.3916	12.25	82.79	1.261E-16	-15.899
620.0	999.2	4.0800	2.2928	6.4892		6.2503	4.3829	11.60	87.97	9.439E-17	-16.025
640.0	999.3	3.8422	2.0212	6.3534		6.2163	4.3743	10.91	94.07	7.125E-17	-16.147
660.0	999.4	3.6058	1.7511	6.2184		6.1825	4.3657	10.20	101.17	5.427E-17	-16.265
680.0	999.4	3.3708	1.4827	6.0841		6.1489	4.3573	9.50	109.33	4.176E-17	-16.379
700.0	999.5	3.1371	1.2157	5.9506		6.1155	4.3488	8.81	118.56	3.248E-17	-16.488
720.0	999.6	2.9047	.9503	5.8179		6.0823	4.3404	8.15	128.80	2.557E-17	-16.592
740.0	999.6	2.6737	.6864	5.6859		6.0493	4.3321	7.55	139.96	2.039E-17	-16.691
760.0	999.6	2.4440	.4240	5.5547		6.0165	4.3238	7.00	151.84	1.648E-17	-16.783
780.0	999.7	2.2156	.1631	5.4243		5.9838	4.3156	6.51	164.21	1.350E-17	-16.870
800.0	999.7	1.9884		5.2946		5.9513	4.3074	6.08	176.79	1.121E-17	-16.950
820.0	999.7	1.7626		5.1655		5.9191	4.2993	5.71	189.31	9.441E-18	-17.025
840.0	999.8	1.5380		5.0373		5.8870	4.2912	5.39	201.50	8.052E-18	-17.094
860.0	999.8	1.3146		4.9097		5.8551	4.2831	5.13	213.13	6.951E-18	-17.158
880.0	999.8	1.0925		4.7828		5.8233	4.2751	4.90	224.04	6.068E-18	-17.217
900.0	999.8	.8716		4.6567		5.7918	4.2672	4.72	234.12	5.351E-18	-17.272
920.0	999.8	.6520		4.5312		5.7604	4.2593	4.57	243.32	4.761E-18	-17.322
940.0	999.9	.4335		4.4065		5.7291	4.2514	4.44	251.65	4.269E-18	-17.370
960.0	999.9	.2163		4.2824		5.6981	4.2436	4.33	259.15	3.855E-18	-17.414
980.0	999.9	.0002		4.1590		5.6672	4.2358	4.25	265.87	3.501E-18	-17.456
1000.0	999.9			4.0362		5.6365	4.2281	4.18	271.91	3.195E-18	-17.496
1050.0	999.9			3.7323		5.5605	4.2089	4.05	284.53	2.586E-18	-17.587
1100.0	999.9			3.4325		5.4855	4.1900	3.96	294.60	2.130E-18	-17.672
1150.0	999.9			3.1366		5.4115	4.1714	3.90	303.11	1.775E-18	-17.751
1200.0	999.9			2.8447		5.3384	4.1530	3.86	310.72	1.491E-18	-17.826
1250.0	1000.0			2.5566		5.2664	4.1348	3.82	317.90	1.260E-18	-17.900
1300.0	1000.0			2.2723		5.1952	4.1169	3.79	324.94	1.069E-18	-17.971
1350.0	1000.0			1.9917		5.1250	4.0992	3.75	332.04	9.099E-19	-18.041
1400.0	1000.0			1.7147		5.0557	4.0818	3.72	339.32	7.772E-19	-18.109
1450.0	1000.0			1.4412		4.9873	4.0645	3.69	346.89	6.656E-19	-18.177
1500.0	1000.0			1.1712		4.9198	4.0475	3.65	354.81	5.716E-19	-18.243
1600.0	1000.0			.6415		4.7872	4.0141	3.57	371.94	4.246E-19	-18.372
1700.0	1000.0			.1249		4.6580	3.9816	3.48	391.15	3.185E-19	-18.497
1800.0	1000.0					4.5319	3.9499	3.38	412.82	2.411E-19	-18.618
1900.0	1000.0					4.4089	3.9189	3.27	437.35	1.843E-19	-18.735
2000.0	1000.0					4.2888	3.8886	3.15	465.13	1.422E-19	-18.847
2100.0	1000.0					4.1716	3.8591	3.02	496.55	1.108E-19	-18.956
2200.0	1000.0					4.0571	3.8303	2.89	531.99	8.712E-20	-19.060
2300.0	1000.0					3.9453	3.8021	2.75	571.79	6.920E-20	-19.160
2400.0	1000.0					3.8360	3.7746	2.61	616.21	5.551E-20	-19.256
2500.0	1000.0					3.7291	3.7477	2.47	665.43	4.498E-20	-19.347

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1100 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5908	13.0066	11.7819	11.6686	8.8095	28.79	5.56	2.399E-09	-8.620
94.0	184.5	13.4305	12.8362	11.8697	11.5083	8.6492	28.65	5.62	1.659E-09	-8.780
96.0	186.9	13.2693	12.6625	11.8916	11.3471	8.4880	28.49	5.73	1.144E-09	-8.941
98.0	190.9	13.1081	12.4874	11.8678	11.1859	8.3268	28.32	5.89	7.895E-10	-9.103
100.0	196.5	12.9477	12.3124	11.8138	11.0255	8.1664	28.15	6.11	5.458E-10	-9.263
102.0	204.2	12.7894	12.1386	11.7414	10.8671	8.0080	27.98	6.39	3.790E-10	-9.421
104.0	213.9	12.6340	11.9671	11.6585	10.7117	7.8527	27.81	6.74	2.650E-10	-9.577
106.0	225.8	12.4832	11.7992	11.5666	10.5344	7.7600	27.64	7.16	1.870E-10	-9.728
108.0	239.9	12.3376	11.6366	11.4722	10.3380	7.7266	27.47	7.66	1.335E-10	-9.874
110.0	256.2	12.1971	11.4802	11.3797	10.1498	7.6929	27.31	8.23	9.659E-11	-10.015
115.0	305.9	11.8720	11.1198	11.1610	9.7190	7.6097	26.89	10.00	4.584E-11	-10.339
120.0	366.4	11.5869	10.8053	10.9645	9.3457	7.5316	26.49	12.17	2.395E-11	-10.621
125.0	433.1	11.3409	10.5347	10.7929	9.0260	7.4618	26.13	14.61	1.374E-11	-10.862
130.0	500.5	11.1302	10.3029	10.6456	8.7522	7.4017	25.79	17.13	8.557E-12	-11.068
135.0	564.7	10.9484	10.1027	10.5193	8.5153	7.3507	25.47	19.61	5.703E-12	-11.244
140.0	623.7	10.7896	9.9274	10.4101	8.3072	7.3075	25.17	21.95	4.011E-12	-11.397
145.0	676.3	10.6489	9.7717	10.3147	8.1215	7.2706	24.88	24.11	2.943E-12	-11.531
150.0	722.4	10.5223	9.6311	10.2301	7.9532	7.2388	24.60	26.08	2.233E-12	-11.651
155.0	762.4	10.4067	9.5025	10.1540	7.7984	7.2111	24.34	27.87	1.738E-12	-11.760
160.0	797.2	10.2997	9.3831	10.0846	7.6541	7.1866	24.07	29.51	1.382E-12	-11.860
170.0	853.9	10.1049	9.1648	9.9606	7.3891	7.1446	23.57	32.39	9.143E-13	-12.039
180.0	897.6	9.9282	8.9660	9.8503	7.1462	7.1089	23.07	34.88	6.326E-13	-12.199
190.0	932.2	9.7637	8.7805	9.7494	6.9187	7.0776	22.60	37.10	4.518E-13	-12.345
200.0	960.1	9.6082	8.6047	9.6551	6.7024	7.0493	22.13	39.13	3.306E-13	-12.481
210.0	982.9	9.4595	8.4362	9.5657	6.[illegible]946	7.0232	21.68	41.01	2.465E-13	-12.608
220.0	1001.7	9.3160	8.2735	9.4802	6.2935	6.9988	21.25	42.77	1.867E-13	-12.729
230.0	1017.3	9.1767	8.1153	9.3978	6.0978	6.9757	20.84	44.44	1.433E-13	-12.844
240.0	1030.2	9.0409	7.9610	9.3179	5.9064	6.9536	20.44	46.01	1.113E-13	-12.953
250.0	1040.9	8.9079	7.8098	9.2400	5.7187	6.9325	20.07	47.50	8.732E-14	-13.059
260.0	1049.9	8.7774	7.6611	9.1639	5.5341	6.9121	19.71	48.93	6.911E-14	-13.160
270.0	1057.4	8.6488	7.5147	9.0891	5.3521	6.8922	19.38	50.28	5.514E-14	-13.259
280.0	1063.6	8.5219	7.3701	9.0156	5.1722	6.8729	19.06	51.57	4.431E-14	-13.353
290.0	1068.8	8.3965	7.2272	8.9430	4.9943	6.6539	18.76	52.80	3.584E-14	-13.446
300.0	1073.2	8.2724	7.0856	8.8714	4.8180	6.8354	18.49	53.97	2.916E-14	-13.535
310.0	1076.8	8.1494	6.9453	8.8005	4.6433	6.8171	18.23	55.09	2.386E-14	-13.622
320.0	1079.9	8.0273	6.8061	8.7302	4.4698	6.7990	17.99	56.15	1.961E-14	-13.707
330.0	1082.5	7.9062	6.6679	8.6606	4.2974	6.7812	17.77	57.16	1.620E-14	-13.791
340.0	1084.8	7.7858	6.5305	8.5915	4.1261	6.7636	17.56	58.13	1.343E-14	-13.872
350.0	1086.6	7.6661	6.3939	8.5228	3.9558	6.7461	17.37	59.06	1.118E-14	-13.952
360.0	1088.3	7.5471	6.2581	8.4545	3.7864	6.7288	17.19	59.94	9.337E-15	-14.030
370.0	1089.6	7.4287	6.1229	8.3867	3.6178	6.7116	17.02	60.79	7.825E-15	-14.107
380.0	1090.8	7.3109	5.9884	8.3192	3.4499	6.6946	16.86	61.61	6.576E-15	-14.182
390.0	1091.8	7.1936	5.8544	8.2520	3.2828	6.6776	16.71	62.41	5.542E-15	-14.256
400.0	1092.7	7.0768	5.7210	8.1851	3.1[illegible]54	6.6608	16.57	63.18	4.682E-15	-14.330

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1100 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1094.2	6.8446	5.4559	8.0523	2.7855	6.6273		16.30	64.68	3.365E-15	-14.473
440.0	1095.3	6.6141	5.1928	7.9205	2.4571	6.5942		16.05	66.15	2.438E-15	-14.613
460.0	1096.1	6.3854	4.9315	7.7897	2.1310	6.5613		15.80	67.63	1.779E-15	-14.750
480.0	1096.8	6.1582	4.6720	7.6598	1.8071	6.5288		15.55	69.17	1.306E-15	-14.884
500.0	1097.3	5.9325	4.4142	7.5308	1.4854	6.4964	4.1808	15.28	70.82	9.639E-16	-15.016
520.0	1097.8	5.7082	4.1581	7.4027	1.1656	6.4643	4.1726	15.00	72.63	7.153E-16	-15.146
540.0	1098.1	5.4854	3.9035	7.2753	.8479	6.4324	4.1644	14.68	74.65	5.334E-16	-15.273
560.0	1098.4	5.2639	3.6506	7.1488	.5321	6.4007	4.1563	14.33	76.96	3.997E-16	-15.398
580.0	1098.6	5.0438	3.3991	7.0230	.2183	6.3692	4.1483	13.93	79.62	3.010E-16	-15.521
600.0	1098.8	4.8250	3.1492	6.8980		6.3379	4.1404	13.49	82.70	2.277E-16	-15.643
620.0	1098.9	4.6075	2.9008	6.7738		6.3068	4.1325	13.01	86.30	1.732E-16	-15.761
640.0	1099.1	4.3912	2.6538	6.6503		6.2759	4.1247	12.48	90.49	1.325E-16	-15.878
660.0	1099.2	4.1763	2.4083	6.5275		6.2451	4.1169	11.91	95.38	1.019E-16	-15.992
680.0	1099.3	3.9626	2.1642	6.4054		6.2146	4.1092	11.30	101.03	7.892E-17	-16.103
700.0	1099.4	3.7501	1.9215	6.2840		6.1842	4.1015	10.68	107.54	6.154E-17	-16.211
720.0	1099.4	3.5389	1.6802	6.1634		6.1540	4.0939	10.05	114.96	4.836E-17	-16.316
740.0	1099.5	3.3288	1.4403	6.0434		6.1240	4.0863	9.42	123.33	3.832E-17	-16.417
760.0	1099.6	3.1199	1.2017	5.9241		6.0941	4.0787	8.81	132.64	3.064E-17	-16.514
780.0	1099.6	2.9123	.9645	5.8055		6.0645	4.0713	8.23	142.86	2.474E-17	-16.607
800.0	1099.6	2.7058	.7286	5.6876		6.0349	4.0638	7.68	153.88	2.018E-17	-16.695
820.0	1099.7	2.5004	.4940	5.5703		6.0056	4.0564	7.18	165.57	1.664E-17	-16.779
840.0	1099.7	2.2962	.2608	5.4536		5.9764	4.0491	6.72	177.75	1.387E-17	-16.858
860.0	1099.7	2.0932	.0289	5.3377		5.9474	4.0417	6.32	190.22	1.169E-17	-16.932
880.0	1099.8	1.8913		5.2223		5.9185	4.0345	5.96	202.74	9.964E-18	-17.002
900.0	1099.8	1.6905		5.1076		5.8899	4.0272	5.65	215.09	8.581E-18	-17.066
920.0	1099.8	1.4908		4.9936		5.8613	4.0200	5.38	227.09	7.466E-18	-17.127
940.0	1099.8	1.2922		4.8802		5.8329	4.0129	5.15	238.56	6.558E-18	-17.183
960.0	1099.8	1.0947		4.7673		5.8047	4.0058	4.95	249.37	5.811E-18	-17.236
980.0	1099.8	.8982		4.6552		5.7766	3.9987	4.79	259.46	5.192E-18	-17.285
1000.0	1099.9	.7029		4.5436		5.7487	3.9917	4.65	268.76	4.672E-18	-17.331
1050.0	1099.9	.2191		4.2673		5.6796	3.9742	4.39	288.68	3.685E-18	-17.434
1100.0	1099.9			3.9947		5.6114	3.9571	4.22	304.34	2.994E-18	-17.524
1150.0	1099.9			3.7257		5.5441	3.9401	4.11	316.71	2.482E-18	-17.6[illegible]
1200.0	1099.9			3.4604		5.4777	3.9234	4.03	326.76	2.087E-18	-17.68[illegible]
1250.0	1099.9			3.1985		5.4122	3.9069	3.98	335.26	1.772E-18	-17.751
1300.0	1099.9			2.9400		5.3475	3.8906	3.95	342.78	1.516E-18	-17.819
1350.0	1100.0			2.6849		5.2837	3.8745	3.92	349.72	1.303E-18	-17.885
1400.0	1100.0			2.4330		5.2207	3.8587	3.90	356.34	1.124E-18	-17.949
1450.0	1100.0			2.1844		5.1585	3.8430	3.88	362.82	9.731E-19	-18.012
1500.0	1100.0			1.9390		5.0971	3.8275	3.86	369.28	8.447E-19	-18.073
1600.0	1100.0			1.4574		4.9766	3.7972	3.82	382.47	6.410E-19	-18.193
1700.0	1100.0			.9877		4.8591	3.7676	3.78	396.35	4.905E-19	-18.309
1800.0	1100.0			.5296		4.7445	3.7387	3.73	411.19	3.783E-19	-18.422
1900.0	1100.0			.0826		4.6327	3.7106	3.68	427.22	2.939E-19	-18.532
2000.0	1100.0					4.5235	3.6831	3.62	444.63	2.299E-19	-18.638
2100.0	1100.0					4.4169	3.6562	3.56	463.65	1.812E-19	-18.742
2200.0	1100.0					4.3129	3.6300	3.49	484.49	1.437E-19	-18.842
2300.0	1100.0					4.2112	3.6044	3.41	507.37	1.148E-19	-18.940
2400.0	1100.0					4.1118	3.5794	3.32	532.55	9.233E-20	-19.035
2500.0	1100.0					4.0147	3.5549	3.23	560.27	7.476E-20	-19.126

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1200 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5908	13.0066	11.7819	11.6686	8.8095	28.79	5.56	2.399E-09	-8.620
94.0	184.6	13.4304	12.8361	11.8696	11.5082	8.6491	28.65	5.62	1.658E-09	-8.780
96.0	187.1	13.2691	12.6623	11.8914	11.3469	8.4878	28.49	5.74	1.144E-09	-8.942
98.0	191.2	13.1077	12.4870	11.8674	11.1855	8.3264	28.32	5.90	7.888E-10	-9.103
100.0	197.1	12.9472	12.3118	11.8132	11.0250	8.1659	28.15	6.12	5.451E-10	-9.264
102.0	205.0	12.7887	12.1379	11.7407	10.8664	8.0074	27.98	6.41	3.784E-10	-9.422
104.0	215.1	12.6332	11.9664	11.6578	10.7110	7.8519	27.81	6.77	2.646E-10	-9.577
106.0	227.4	12.4825	11.7986	11.5658	10.5339	7.7591	27.64	7.21	1.868E-10	-9.729
108.0	242.1	12.3371	11.6363	11.4711	10.3380	7.7254	27.48	7.73	1.334E-10	-9.875
110.0	259.0	12.1969	11.4804	11.3784	10.1506	7.6914	27.31	8.32	9.654E-11	-10.015
115.0	310.7	11.8731	11.1217	11.1596	9.7225	7.6074	26.90	10.15	4.595E-11	-10.338
120.0	373.4	11.5899	10.8096	10.9636	9.3527	7.5288	26.51	12.40	2.411E-11	-10.618
125.0	442.7	11.3462	10.5418	10.7927	9.0367	7.4587	26.16	14.92	1.389E-11	-10.857
130.0	512.7	11.1378	10.3128	10.6464	8.7668	7.3985	25.82	17.53	8.696E-12	-11.061
135.0	580.1	10.9582	10.1152	10.5208	8.5334	7.3473	25.52	20.10	5.821E-12	-11.235
140.0	642.7	10.8012	9.9422	10.4120	8.3285	7.3036	25.23	22.56	4.108E-12	-11.386
145.0	699.6	10.6621	9.7886	10.3168	8.1458	7.2662	24.95	24.87	3.023E-12	-11.519
150.0	750.3	10.5372	9.6503	10.2324	7.9807	7.2338	24.69	27.00	2.300E-12	-11.638
155.0	795.2	10.4234	9.5239	10.1566	7.8292	7.2055	24.43	28.96	1.796E-12	-11.746
160.0	834.7	10.3186	9.4071	10.0877	7.6886	7.1805	24.18	30.75	1.433E-12	-11.844
170.0	900.4	10.1287	9.1949	9.9651	7.4318	7.1377	23.70	33.95	9.558E-13	-12.020
180.0	952.2	9.9578	9.0032	9.8571	7.1985	7.1017	23.24	36.73	6.679E-13	-12.175
190.0	993.7	9.8001	8.8256	9.7591	6.9815	7.0703	22.80	39.20	4.824E-13	-12.317
200.0	1027.5	9.6519	8.6585	9.6683	6.7764	7.0422	22.36	41.44	3.571E-13	-12.447
210.0	1055.3	9.5111	8.4992	9.5828	6.5805	7.0165	21.94	43.51	2.696E-13	-12.569
220.0	1078.3	9.3759	8.3461	9.5016	6.3917	6.9927	21.54	45.44	2.069E-13	-12.684
230.0	1097.5	9.2452	8.1980	9.4237	6.2086	6.9704	21.15	47.24	1.608E-13	-12.794
240.0	1113.4	9.1183	8.0539	9.3485	6.0302	6.9493	20.77	48.94	1.265E-13	-12.898
250.0	1126.7	8.9943	7.9131	9.2755	5.8557	6.9291	20.41	50.55	1.005E-13	-12.998
260.0	1137.8	8.8730	7.7750	9.2044	5.6845	6.9097	20.07	52.08	8.050E-14	-13.094
270.0	1147.1	8.7537	7.6393	9.1347	5.5159	6.8910	19.74	53.53	6.500E-14	-13.187
280.0	1154.8	8.6362	7.5055	9.0664	5.3496	6.8729	19.44	54.91	5.285E-14	-13.277
290.0	1161.3	8.5203	7.3734	8.9992	5.1853	6.8551	19.14	56.23	4.324E-14	-13.364
300.0	1166.7	8.4057	7.2428	8.9328	5.0228	6.8378	18.87	57.49	3.558E-14	-13.449
310.0	1171.2	8.2923	7.1135	8.8673	4.8617	6.8208	18.61	58.70	2.943E-14	-13.531
320.0	1175.1	8.1798	6.9852	8.8025	4.7019	6.8040	18.36	59.85	2.445E-14	-13.612
330.0	1178.3	8.0682	6.8579	8.7382	4.5434	6.7875	18.14	60.95	2.041E-14	-13.690
340.0	1181.1	7.9575	6.7316	8.6745	4.3858	6.7712	17.92	62.01	1.710E-14	-13.767
350.0	1183.4	7.8474	6.6060	8.6113	4.2292	6.7551	17.72	63.02	1.438E-14	-13.842
360.0	1185.4	7.7380	6.4811	8.5485	4.0735	6.7391	17.53	63.99	1.214E-14	-13.916
370.0	1187.1	7.6292	6.3569	8.4861	3.9186	6.7232	17.36	64.93	1.027E-14	-13.988
380.0	1188.6	7.5209	6.2333	8.4240	3.7645	6.7075	17.19	65.83	8.722E-15	-14.059
390.0	1189.9	7.4132	6.1103	8.3623	3.6111	6.6919	17.04	66.70	7.424E-15	-14.129
400.0	1191.0	7.3059	5.9879	8.3009	3.4583	6.6764	16.89	67.54	6.336E-15	-14.198

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1200 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1192.8	7.0928	5.7445	8.1789	3.1546	6.6456		16.62	69.15	4.645E-15	-14.333
440.0	1194.1	6.8813	5.5030	8.0579	2.8533	6.6152		16.37	70.70	3.434E-15	-14.464
460.0	1195.2	6.6714	5.2633	7.9378	2.5541	6.5850		16.14	72.22	2.556E-15	-14.592
480.0	1196.0	6.4630	5.0253	7.8187	2.2570	6.5551		15.91	73.73	1.914E-15	-14.718
500.0	1196.7	6.2560	4.7888	7.7003	1.9619	6.5254	3.9644	15.68	75.29	1.442E-15	-14.841
520.0	1197.2	6.0503	4.5539	7.5828	1.6687	6.4959	3.9568	15.44	76.92	1.091E-15	-14.962
540.0	1197.6	5.8460	4.3205	7.4660	1.3773	6.4666	3.9493	15.19	78.66	8.300E-16	-15.081
560.0	1198.0	5.6429	4.0886	7.3499	1.0878	6.4376	3.9419	14.92	80.58	6.340E-16	-15.198
580.0	1198.3	5.4410	3.8580	7.2346	.8000	6.4087	3.9345	14.63	82.70	4.863E-16	-15.313
600.0	1198.5	5.2404	3.6289	7.120C	.5139	6.3800	3.9272	14.30	85.08	3.745E-16	-15.427
620.0	1198.7	5.0410	3.4011	7.0061	.2296	6.3514	3.9200	13.94	87.79	2.896E-16	-15.538
640.0	1198.9	4.8428	3.1747	6.8929		6.3231	3.9128	13.55	90.89	2.249E-16	-15.648
660.0	1199.0	4.6457	2.9496	6.7803		6.2949	3.9056	13.12	94.44	1.754E-16	-15.756
680.0	1199.1	4.4498	2.7258	6.6684		6.2669	3.8985	12.65	98.52	1.374E-16	-15.862
700.0	1199.2	4.2550	2.5033	6.5571		6.2390	3.8915	12.14	103.19	1.082E-16	-15.966
720.0	1199.3	4.0613	2.2821	6.4465		6.2113	3.8845	11.61	108.53	8.564E-17	-16.067
740.0	1199.4	3.8687	2.0621	6.3365		6.1838	3.8775	11.06	114.61	6.816E-17	-16.166
760.0	1199.4	3.6773	1.8434	6.2271		6.1564	3.8706	10.49	121.48	5.458E-17	-16.263
780.0	1199.5	3.4869	1.6259	6.1184		6.1292	3.8638	9.92	129.18	4.400E-17	-16.357
800.0	1199.5	3.2976	1.4097	6.0102		6.1022	3.8569	9.36	137.75	3.571E-17	-16.447
820.0	1199.6	3.1094	1.1947	5.9027		6.0753	3.8501	8.81	147.15	2.921E-17	-16.534
840.0	1199.6	2.9222	.9809	5.7958		6.0485	3.8434	8.28	157.37	2.408E-17	-16.618
860.0	1199.7	2.7360	.7683	5.6895		6.0219	3.8367	7.79	168.32	2.002E-17	-16.698
880.0	1199.7	2.5509	.5568	5.5838		5.9955	3.8300	7.33	179.90	1.679E-17	-16.775
900.0	1199.7	2.3668	.3465	5.4786		5.9692	3.8234	6.91	191.97	1.421E-17	-16.847
920.0	1199.7	2.1838	.1374	5.3741		5.9430	3.8168	6.52	204.36	1.213E-17	-16.916
940.0	1199.8	2.0017		5.2701		5.9170	3.8102	6.18	216.90	1.045E-17	-16.981
960.0	1199.8	1.8207		5.1667		5.8911	3.8037	5.87	229.41	9.086E-18	-17.042
980.0	1199.8	1.6406		5.0638		5.8654	3.7972	5.61	241.71	7.964E-18	-17.099
1000.0	1199.8	1.4615		4.9616		5.8398	3.7908	5.37	253.65	7.039E-18	-17.152
1050.0	1199.8	1.0181		4.7083		5.7764	3.7748	4.91	281.17	5.339E-18	-17.273
1100.0	1199.9	.5806		4.4584		5.7139	3.7591	4.60	304.56	4.212E-18	-17.375
1150.0	1199.9	.1489		4.2118		5.6522	3.7435	4.38	323.72	3.426E-18	-17.465
1200.0	1199.9			3.9686		5.5914	3.7282	4.24	339.18	2.850E-18	-17.545
1250.0	1199.9			3.7285		5.5313	3.7131	4.14	351.73	2.410E-18	-17.618
1300.0	1199.9			3.4916		5.4720	3.6981	4.08	362.14	2.061E-18	-17.686
1350.0	1199.9			3.2577		5.4135	3.6834	4.03	371.06	1.778E-18	-17.750
1400.0	1200.0			3.0269		5.3558	3.6688	4.00	378.95	1.544E-18	-17.811
1450.0	1200.0			2.7990		5.2988	3.6545	3.97	386.17	1.347E-18	-17.871
1500.0	1200.0			2.5740		5.2425	3.6403	3.95	392.98	1.179E-18	-17.929
1600.0	1200.0			2.1325		5.1320	3.6125	3.93	405.95	9.112E-19	-18.040
1700.0	1200.0			1.7020		5.0243	3.5854	3.90	418.73	7.107E-19	-18.148
1800.0	1200.0			1.2821		4.9193	3.5589	3.88	431.72	5.584E-19	-18.253
1900.0	1200.0			.8723		4.8167	3.5331	3.86	445.16	4.417E-19	-18.355
2000.0	1200.0			.4723		4.7167	3.5079	3.83	459.21	3.516E-19	-18.454
2100.0	1200.0			.0818		4.6190	3.4833	3.80	474.00	2.815E-19	-18.550
2200.0	1200.0					4.5236	3.4593	3.77	489.62	2.267E-19	-18.645
2300.0	1200.0					4.4304	3.4358	3.73	506.20	1.836E-19	-18.736
2400.0	1200.0					4.3393	3.4128	3.69	523.85	1.495E-19	-18.825
2500.0	1200.0					4.2503	3.3904	3.64	542.69	1.224E-19	-18.912

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1300 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5908	13.0066	11.7819	11.6685	8.8095	28.79	5.56	2.399E-09	-8.620
94.0	184.6	13.4303	12.8360	11.8695	11.5081	8.6490	28.65	5.63	1.658E-09	-8.780
96.0	187.2	13.2689	12.6621	11.8912	11.3466	8.4876	28.49	5.74	1.143E-09	-8.942
98.0	191.4	13.1073	12.4867	11.8670	11.1851	8.3260	28.32	5.91	7.882E-10	-9.103
100.0	197.5	12.9467	12.3113	11.8127	11.0245	8.1654	28.15	6.14	5.445E-10	-9.264
102.0	205.7	12.7881	12.1374	11.7401	10.8659	8.0068	27.98	6.43	3.779E-10	-9.423
104.0	216.1	12.6326	11.9658	11.6571	10.7104	7.8513	27.81	6.81	2.642E-10	-9.578
106.0	228.8	12.4820	11.7981	11.5650	10.5335	7.7583	27.64	7.25	1.865E-10	-9.729
108.0	243.9	12.3367	11.6361	11.4702	10.3381	7.7243	27.48	7.78	1.333E-10	-9.875
110.0	261.4	12.1967	11.4805	11.3774	10.1514	7.6900	27.31	8.40	9.651E-11	-10.015
115.0	314.7	11.8740	11.1233	11.1585	9.7255	7.6055	26.91	10.28	4.604E-11	-10.337
120.0	379.4	11.5924	10.8132	10.9628	9.3585	7.5264	26.53	12.59	2.424E-11	-10.615
125.0	450.9	11.3506	10.5476	10.7926	9.0456	7.4562	26.18	15.18	1.402E-11	-10.853
130.0	523.2	11.1441	10.3211	10.6469	8.7787	7.3958	25.86	17.87	8.813E-12	-11.055
135.0	593.2	10.9662	10.1255	10.5219	8.5482	7.3444	25.56	20.52	5.920E-12	-11.228
140.0	659.0	10.8107	9.9544	10.4135	8.3459	7.3004	25.28	23.09	4.190E-12	-11.378
145.0	719.6	10.6729	9.8025	10.3185	8.1657	7.2625	25.01	25.52	3.090E-12	-11.510
150.0	774.5	10.5493	9.6658	10.2341	8.0030	7.2296	24.76	27.79	2.356E-12	-11.628
155.0	823.8	10.4368	9.5412	10.1584	7.8541	7.2007	24.51	29.90	1.844E-12	-11.734
160.0	867.9	10.3335	9.4263	10.0897	7.7163	7.1751	24.27	31.86	1.474E-12	-11.831
170.0	942.5	10.1472	9.2186	9.9679	7.4660	7.1314	23.82	35.37	9.895E-13	-12.005
180.0	1002.5	9.9808	9.0323	9.8614	7.2400	7.0949	23.38	38.44	6.965E-13	-12.157
190.0	1051.2	9.8283	8.8611	9.7655	7.0314	7.0632	22.96	41.17	5.074E-13	-12.295
200.0	1091.3	9.6860	8.7008	9.6772	6.8354	7.0351	22.55	43.65	3.792E-13	-12.421
210.0	1124.6	9.5514	8.5490	9.5948	6.6490	7.0097	22.16	45.92	2.893E-13	-12.539
220.0	1152.3	9.4230	8.4038	9.5169	6.4704	6.9863	21.78	48.02	2.242E-13	-12.649
230.0	1175.4	9.2993	8.2638	9.4426	6.2978	6.9645	21.41	49.98	1.762E-13	-12.754
240.0	1194.7	9.1797	8.1281	9.3712	6.1301	6.9441	21.05	51.82	1.401E-13	-12.854
250.0	1210.8	9.0633	7.9960	9.3022	5.9466	6.9246	20.71	53.55	1.125E-13	-12.949
260.0	1224.3	8.9496	7.8668	9.2352	5.8065	6.9061	20.38	55.18	9.108E-14	-13.041
270.0	1235.5	8.8381	7.7400	9.1698	5.6492	6.8883	20.07	56.73	7.432E-14	-13.129
280.0	1244.9	8.7285	7.6153	9.1058	5.4943	6.8711	19.77	58.21	6.105E-14	-13.214
290.0	1252.8	8.6205	7.4923	9.0430	5.3415	6.8543	19.48	59.61	5.046E-14	-13.297
300.0	1259.4	8.5139	7.3709	8.9811	5.1905	6.8380	19.21	60.96	4.193E-14	-13.377
310.0	1265.0	8.4085	7.2507	8.9201	5.0410	6.8220	18.95	62.24	3.501E-14	-13.456
320.0	1269.6	8.3041	7.1317	8.8598	4.8928	6.8063	18.71	63.48	2.937E-14	-13.532
330.0	1273.6	8.2006	7.0137	8.8001	4.7458	6.7909	18.48	64.66	2.474E-14	-13.607
340.0	1276.9	8.0979	6.8966	8.7410	4.5998	6.7757	18.26	65.80	2.092E-14	-13.679
350.0	1279.8	7.9960	6.7803	8.6823	4.4549	6.7607	18.06	66.89	1.775E-14	-13.751
360.0	1282.2	7.8947	6.6647	8.6241	4.3108	6.7458	17.86	67.94	1.511E-14	-13.821
370.0	1284.3	7.7940	6.5497	8.5663	4.1674	6.7311	17.68	68.96	1.291E-14	-13.889
380.0	1286.1	7.6938	6.4354	8.5088	4.0249	6.7165	17.51	69.93	1.105E-14	-13.957
390.0	1287.7	7.5941	6.3216	8.4517	3.8830	6.7020	17.35	70.88	9.489E-15	-14.023
400.0	1289.0	7.4950	6.2084	8.3949	3.7417	6.6876	17.20	71.79	8.167E-15	-14.088

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1300 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1291.2	7.2979	5.9835	8.2820	3.4610	6.6591		16.92	73.54	6.091E-15	-14.215
440.0	1292.9	7.1025	5.7603	8.1701	3.1826	6.6309		16.66	75.20	4.579E-15	-14.339
460.0	1294.1	6.9085	5.5388	8.0592	2.9062	6.6030		16.43	76.80	3.466E-15	-14.460
480.0	1295.2	6.7160	5.3189	7.9491	2.6318	6.5753		16.21	78.36	2.641E-15	-14.578
500.0	1296.0	6.5248	5.1006	7.8397	2.3592	6.5479	3.7791	16.00	79.92	2.023E-15	-14.694
520.0	1296.6	6.3349	4.8836	7.7312	2.0805	6.5206	3.7721	15.79	81.50	1.557E-15	-14.808
540.0	1297.1	6.1461	4.6681	7.6233	1.8194	6.4936	3.7651	15.57	83.13	1.204E-15	-14.919
560.0	1297.5	5.9586	4.4539	7.5162	1.5520	6.4667	3.7583	15.35	84.85	9.352E-16	-15.029
580.0	1297.9	5.7722	4.2410	7.4097	1.2863	6.4400	3.7514	15.11	86.70	7.291E-16	-15.137
600.0	1298.2	5.5870	4.0294	7.3038	1.0222	6.4135	3.7447	14.86	88.71	5.705E-16	-15.244
620.0	1298.4	5.4029	3.8191	7.1986	.7597	6.3872	3.7380	14.58	90.93	4.480E-16	-15.349
640.0	1298.6	5.2198	3.6101	7.0941	.4987	6.3610	3.7313	14.28	93.39	3.531E-16	-15.452
660.0	1298.8	5.0379	3.4023	6.9901	.2393	6.3350	3.7247	13.95	96.16	2.793E-16	-15.554
680.0	1298.9	4.8570	3.1957	6.8868		6.3091	3.7182	13.59	99.28	2.217E-16	-15.654
700.0	1299.0	4.6772	2.9903	6.7841		6.2834	3.7117	13.20	102.80	1.766E-16	-15.753
720.0	1299.2	4.4984	2.7860	6.6819		6.2578	3.7052	12.78	106.79	1.413E-16	-15.850
740.0	1299.2	4.3206	2.5830	6.5804		6.2324	3.6988	12.33	111.31	1.134E-16	-15.945
760.0	1299.3	4.1439	2.3811	6.4794		6.2071	3.6924	11.86	116.42	9.150E-17	-16.039
780.0	1299.4	3.9681	2.1803	6.3791		6.1820	3.6860	11.37	122.17	7.414E-17	-16.130
800.0	1299.5	3.7934	1.9807	6.2792		6.1570	3.6797	10.86	128.61	6.037E-17	-16.219
820.0	1299.5	3.6196	1.7822	6.1800		6.1322	3.6735	10.34	135.80	4.942E-17	-16.306
840.0	1299.6	3.4468	1.5849	6.0813		6.1075	3.6672	9.82	143.75	4.069E-17	-16.391
860.0	1299.6	3.2750	1.3886	5.9831		6.0830	3.6610	9.31	152.48	3.370E-17	-16.472
880.0	1299.6	3.1041	1.1934	5.8855		6.0585	3.6549	8.82	161.98	2.808E-17	-16.552
900.0	1299.7	2.9342	.9993	5.7885		6.0342	3.6488	8.34	172.21	2.356E-17	-16.628
920.0	1299.7	2.7652	.8063	5.6920		6.0101	3.6427	7.89	183.12	1.991E-17	-16.701
940.0	1299.7	2.5971	.6143	5.5960		5.9861	3.6366	7.46	194.62	1.694E-17	-16.771
960.0	1299.7	2.4300	.4234	5.5005		5.9622	3.6306	7.07	206.60	1.452E-17	-16.838
980.0	1299.8	2.2638	.2335	5.4056		5.9384	3.6246	6.70	218.94	1.254E-17	-16.902
1000.0	1299.8	2.0985	.0447	5.3112		5.9148	3.6186	6.38	231.49	1.091E-17	-16.962
1050.0	1299.8	1.6891		5.0774		5.8563	3.6039	5.69	262.82	7.957E-18	-17.099
1100.0	1299.8	1.2852		4.8467		5.7986	3.5894	5.19	292.44	6.054E-18	-17.218
1150.0	1299.9	.8868		4.6191		5.7417	3.5750	4.82	318.85	4.778E-18	-17.321
1200.0	1299.9	.4936		4.3946		5.6855	3.5609	4.56	341.44	3.887E-18	-17.410
1250.0	1299.9	.1056		4.1730		5.6301	3.5469	4.38	360.27	3.237E-18	-17.490
1300.0	1299.9			3.9542		5.5753	3.5331	4.25	375.86	2.745E-18	-17.562
1350.0	1299.9			3.7384		5.5213	3.5195	4.17	388.83	2.358E-18	-17.627
1400.0	1299.9			3.5253		5.4680	3.5061	4.10	399.81	2.047E-18	-17.689
1450.0	1299.9			3.3149		5.4154	3.4928	4.06	409.34	1.790E-18	-17.747
1500.0	1300.0			3.1072		5.3634	3.4797	4.03	417.83	1.574E-18	-17.803
1600.0	1300.0			2.6997		5.2615	3.4541	3.99	432.88	1.232E-18	-17.910
1700.0	1300.0			2.3023		5.1621	3.4290	3.96	446.58	9.750E-19	-18.011
1800.0	1300.0			1.9147		5.0651	3.4046	3.95	459.78	7.785E-19	-18.109
1900.0	1300.0			1.5364		4.9705	3.3808	3.93	472.93	6.258E-19	-18.204
2000.0	1300.0			1.1672		4.8781	3.3575	3.92	486.26	5.061E-19	-18.296
2100.0	1300.0			.8067		4.7879	3.3348	3.90	499.92	4.116E-19	-18.386
2200.0	1300.0			.4547		4.6998	3.3126	3.89	514.00	3.365E-19	-18.473
2300.0	1300.0			.1108		4.6138	3.2909	3.87	528.58	2.764E-19	-18.558
2400.0	1300.0					4.5297	3.2698	3.85	543.71	2.282E-19	-18.642
2500.0	1300.0					4.4476	3.2491	3.82	559.45	1.892E-19	-18.723

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1400 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.3	13.5907	13.0066	11.7819	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.7	13.4302	12.8359	11.8694	11.5080	8.6489	28.65	5.63	1.658E-09	-8.780
96.0	187.3	13.2687	12.6619	11.8910	11.3465	8.4874	28.49	5.74	1.143E-09	-8.942
98.0	191.6	13.1070	12.4864	11.8667	11.1848	8.3257	28.32	5.91	7.877E-10	-9.104
100.0	197.9	12.9463	12.3109	11.8123	11.0241	8.1650	28.15	6.15	5.440E-10	-9.264
102.0	206.3	12.7876	12.1369	11.7396	10.8654	8.0063	27.98	6.45	3.775E-10	-9.423
104.0	217.0	12.6321	11.9652	11.6566	10.7099	7.8508	27.81	6.83	2.639E-10	-9.579
106.0	230.0	12.4814	11.7976	11.5644	10.5331	7.7577	27.64	7.29	1.863E-10	-9.730
108.0	245.5	12.3363	11.6358	11.4694	10.3382	7.7234	27.48	7.84	1.331E-10	-9.876
110.0	263.5	12.1966	11.4806	11.3765	10.1520	7.6889	27.32	8.46	9.647E-11	-10.016
115.0	318.2	11.8748	11.1247	11.1575	9.7280	7.6038	26.92	10.39	4.612E-11	-10.336
120.0	384.6	11.5945	10.8162	10.9621	9.3634	7.5244	26.54	12.76	2.435E-11	-10.613
125.0	458.0	11.3542	10.5526	10.7924	9.0531	7.4539	26.20	15.41	1.413E-11	-10.850
130.0	532.3	11.1494	10.3279	10.6474	8.7888	7.3935	25.88	18.16	8.913E-12	-11.050
135.0	604.5	10.9729	10.1342	10.5229	8.5607	7.3419	25.59	20.89	6.004E-12	-11.222
140.0	673.1	10.8186	9.9646	10.4147	8.3605	7.2976	25.32	23.55	4.259E-12	-11.371
145.0	737.0	10.6819	9.8140	10.3198	8.1823	7.2593	25.06	26.09	3.147E-12	-11.502
150.0	795.6	10.5592	9.6786	10.2354	8.0215	7.2259	24.81	28.49	2.403E-12	-11.619
155.0	849.0	10.4478	9.5553	10.1597	7.8747	7.1965	24.58	30.74	1.884E-12	-11.725
160.0	897.4	10.3455	9.4419	10.0910	7.7390	7.1704	24.35	32.84	1.509E-12	-11.821
170.0	980.6	10.1619	9.2377	9.9696	7.4937	7.1258	23.91	36.65	1.017E-12	-11.993
180.0	1048.8	9.9989	9.0556	9.8640	7.2736	7.0886	23.50	40.02	7.199E-13	-12.143
190.0	1105.0	9.8505	8.8893	9.7695	7.0716	7.0566	23.10	43.03	5.279E-13	-12.277
200.0	1151.8	9.7128	8.7346	9.6831	6.8830	7.0283	22.71	45.75	3.976E-13	-12.401
210.0	1190.9	9.5834	8.5888	9.6030	6.7046	7.0029	22.34	48.24	3.057E-13	-12.515
220.0	1223.6	9.4604	8.4501	9.5277	6.5343	6.9797	21.98	50.53	2.391E-13	-12.621
230.0	1251.1	9.3426	8.3169	9.4563	6.3704	6.9583	21.63	52.66	1.896E-13	-12.722
240.0	1274.0	9.2291	8.1883	9.3881	6.2118	6.9383	21.29	54.64	1.521E-13	-12.818
250.0	1293.3	9.1189	8.0634	9.3224	6.0575	6.9195	20.96	56.50	1.233E-13	-12.909
260.0	1309.3	9.0116	7.9416	9.2588	5.9068	6.9016	20.65	58.25	1.007E-13	-12.997
270.0	1322.8	8.9068	7.8224	9.1970	5.7591	6.8845	20.35	59.90	8.296E-14	-13.081
280.0	1334.0	8.8038	7.7054	9.1366	5.6139	6.8680	20.06	61.46	6.877E-14	-13.163
290.0	1343.4	8.7026	7.5902	9.0775	5.4709	6.8521	19.78	62.96	5.734E-14	-13.242
300.0	1351.4	8.6028	7.4766	9.0194	5.3296	6.8366	19.52	64.38	4.807E-14	-13.318
310.0	1358.0	8.5042	7.3643	8.9622	5.1900	6.8215	19.26	65.74	4.049E-14	-13.393
320.0	1363.6	8.4067	7.2531	8.9057	5.0517	6.8067	19.02	67.05	3.425E-14	-13.465
330.0	1368.3	8.3101	7.1430	8.8499	4.9146	6.7922	18.79	68.31	2.909E-14	-13.536
340.0	1372.4	8.2144	7.0338	8.7947	4.7786	6.7779	18.57	69.52	2.480E-14	-13.606
350.0	1375.8	8.1193	6.9254	8.7399	4.6435	6.7638	18.37	70.69	2.121E-14	-13.673
360.0	1378.7	8.0249	6.8177	8.6857	4.5093	6.7499	18.17	71.81	1.820E-14	-13.740
370.0	1381.2	7.9312	6.7107	8.6317	4.3759	6.7361	17.99	72.90	1.566E-14	-13.805
380.0	1383.4	7.8379	6.6043	8.5782	4.2432	6.7225	17.81	73.95	1.351E-14	-13.869
390.0	1385.2	7.7452	6.4985	8.5250	4.1112	6.7089	17.65	74.96	1.169E-14	-13.932
400.0	1386.8	7.6529	6.3931	8.4721	3.9798	6.6955	17.49	75.95	1.013E-14	-13.994

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1400 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1389.4	7.4696	6.1839	8.3670	3.7188	6.6689		17.20	77.83	7.669E-15	-14.115
440.0	1391.4	7.2879	5.9764	8.2630	3.4600	6.6427		16.94	79.61	5.850E-15	-14.233
460.0	1393.0	7.1077	5.7706	8.1598	3.2031	6.6167		16.70	81.32	4.493E-15	-14.347
480.0	1394.2	6.9287	5.5663	8.0575	2.9481	6.5910		16.48	82.96	3.473E-15	-14.459
500.0	1395.2	6.7511	5.3633	7.9559	2.6949	6.5654	3.6195	16.27	84.58	2.699E-15	-14.569
520.0	1395.9	6.5746	5.1618	7.8550	2.4433	6.5401	3.6129	16.07	86.17	2.108E-15	-14.676
540.0	1396.5	6.3993	4.9616	7.7548	2.1934	6.5149	3.6064	15.88	87.79	1.654E-15	-14.782
560.0	1397.0	6.2251	4.7626	7.6552	1.9451	6.4900	3.6000	15.68	89.44	1.303E-15	-14.885
580.0	1397.5	6.0519	4.5649	7.5563	1.6982	6.4652	3.5936	15.48	91.16	1.030E-15	-14.987
600.0	1397.8	5.8799	4.3684	7.4580	1.4529	6.4406	3.5873	15.27	92.98	8.174E-16	-15.088
620.0	1398.1	5.7089	4.1730	7.3603	1.2091	6.4161	3.5811	15.04	94.92	6.509E-16	-15.187
640.0	1398.3	5.5389	3.9789	7.2631	.9667	6.3918	3.5749	14.80	97.03	5.199E-16	-15.284
660.0	1398.5	5.3699	3.7859	7.1666	.7258	6.3676	3.5687	14.54	99.33	4.166E-16	-15.380
680.0	1398.7	5.2019	3.5940	7.0706	.4863	6.3435	3.5627	14.26	101.88	3.349E-16	-15.475
700.0	1398.9	5.0349	3.4032	6.9752	.2481	6.3197	3.5566	13.96	104.70	2.700E-16	-15.569
720.0	1399.0	4.8689	3.2136	6.8804	.0114	6.2959	3.5506	13.63	107.84	2.184E-16	-15.661
740.0	1399.1	4.7038	3.0250	6.7861		6.2723	3.5446	13.28	111.36	1.772E-16	-15.752
760.0	1399.2	4.5397	2.8375	6.6923		6.2489	3.5387	12.90	115.29	1.443E-16	-15.841
780.0	1399.3	4.3764	2.6511	6.5991		6.2255	3.5328	12.49	119.70	1.178E-16	-15.929
800.0	1399.3	4.2142	2.4657	6.5064		6.2023	3.5269	12.07	124.62	9.663E-17	-16.015
820.0	1399.4	4.0528	2.2814	6.4142		6.1793	3.5211	11.62	130.11	7.954E-17	-16.099
840.0	1399.5	3.8923	2.0981	6.3226		6.1563	3.5153	11.16	135.22	6.574E-17	-16.182
860.0	1399.5	3.7328	1.9158	6.2315		6.1335	3.5095	10.70	142.99	5.457E-17	-16.263
880.0	1399.6	3.5741	1.7346	6.1408		6.1108	3.5038	10.22	150.44	4.550E-17	-16.342
900.0	1399.6	3.4163	1.5544	6.0507		6.0883	3.4981	9.75	158.60	3.813E-17	-16.419
920.0	1399.6	3.2594	1.3751	5.9611		6.0659	3.4925	9.29	167.47	3.211E-17	-16.493
940.0	1399.7	3.1033	1.1969	5.8719		6.0436	3.4868	8.83	177.05	2.719E-17	-16.566
960.0	1399.7	2.9481	1.0196	5.7833		6.0214	3.4813	8.39	187.30	2.316E-17	-16.635
980.0	1399.7	2.7938	.8433	5.6951		5.9993	3.4757	7.98	198.18	1.984E-17	-16.703
1000.0	1399.7	2.6403	.6679	5.6075		5.9774	3.4702	7.58	209.62	1.709E-17	-16.767
1050.0	1399.8	2.2601	.2337	5.3903		5.9231	3.4565	6.71	240.06	1.211E-17	-16.917
1100.0	1399.8	1.8851		5.1761		5.8695	3.4430	6.01	271.72	8.914E-18	-17.050
1150.0	1399.8	1.5151		4.9648		5.8166	3.4297	5.47	302.74	6.813E-18	-17.167
1200.0	1399.9	1.1500		4.7563		5.7644	3.4165	5.06	331.55	5.384E-18	-17.269
1250.0	1399.9	.7897		4.5505		5.7130	3.4035	4.76	357.21	4.380E-18	-17.359
1300.0	1399.9	.4341		4.3474		5.6621	3.3907	4.54	379.37	3.648E-18	-17.438
1350.0	1399.9	.0831		4.1469		5.6120	3.3781	4.38	398.19	3.097E-18	-17.509
1400.0	1399.9			3.9491		5.5625	3.3656	4.27	414.11	2.667E-18	-17.574
1450.0	1399.9			3.7537		5.5136	3.3533	4.19	427.65	2.323E-18	-17.634
1500.0	1399.9			3.5609		5.4654	3.3412	4.13	439.33	2.041E-18	-17.690
1600.0	1400.0			3.1825		5.3707	3.3173	4.05	458.81	1.604E-18	-17.795
1700.0	1400.0			2.8135		5.2784	3.2941	4.01	475.17	1.282E-18	-17.892
1800.0	1400.0			2.4535		5.1883	3.2714	3.99	489.97	1.036E-18	-17.985
1900.0	1400.0			2.1023		5.1005	3.2493	3.97	504.04	8.439E-19	-18.074
2000.0	1400.0			1.7594		5.0147	3.2277	3.96	517.87	6.918E-19	-18.160
2100.0	1400.0			1.4247		4.9310	3.2066	3.95	531.71	5.703E-19	-18.244
2200.0	1400.0			1.0978		4.8492	3.1860	3.94	545.72	4.725E-19	-18.326
2300.0	1400.0			.7785		4.7693	3.1659	3.93	559.97	3.933E-19	-18.405
2400.0	1400.0			.4664		4.6912	3.1462	3.92	574.55	3.288E-19	-18.483
2500.0	1400.0			.1614		4.6149	3.1270	3.91	589.49	2.761E-19	-18.559

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1500 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.4	13.5907	13.0066	11.7818	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.7	13.4301	12.8359	11.8693	11.5079	8.6488	28.65	5.63	1.657E-09	-8.781
96.0	187.4	13.2685	12.6618	11.8909	11.3463	8.4872	28.49	5.75	1.142E-09	-8.942
98.0	191.8	13.1068	12.4861	11.8665	11.1846	8.3255	28.32	5.92	7.872E-10	-9.104
100.0	198.2	12.9459	12.3106	11.8120	11.0237	8.1646	28.15	6.16	5.435E-10	-9.265
102.0	206.8	12.7872	12.1364	11.7392	10.8649	8.0058	27.98	6.47	3.771E-10	-9.424
104.0	217.7	12.6316	11.9648	11.6561	10.7094	7.8503	27.81	6.86	2.636E-10	-9.579
106.0	231.1	12.4810	11.7972	11.5639	10.5328	7.7571	27.64	7.33	1.861E-10	-9.730
108.0	247.0	12.3360	11.6356	11.4687	10.3382	7.7226	27.48	7.88	1.330E-10	-9.876
110.0	265.3	12.1965	11.4807	11.3757	10.1525	7.6879	27.32	8.52	9.645E-11	-10.016
115.0	321.2	11.8755	11.1259	11.1567	9.7301	7.6024	26.92	10.48	4.618E-11	-10.336
120.0	389.2	11.5963	10.8188	10.9615	9.3675	7.5227	26.55	12.90	2.445E-11	-10.612
125.0	464.2	11.3573	10.5568	10.7922	9.0594	7.4521	26.21	15.61	1.423E-11	-10.847
130.0	540.2	11.1539	10.3338	10.6478	8.7974	7.3915	25.90	18.41	8.998E-12	-11.046
135.0	614.4	10.9786	10.1415	10.5237	8.5712	7.3398	25.62	21.21	6.076E-12	-11.216
140.0	685.4	10.8253	9.9731	10.4158	8.3729	7.2953	25.35	23.94	4.318E-12	-11.365
145.0	752.1	10.6895	9.8237	10.3209	8.1963	7.2566	25.10	26.58	3.196E-12	-11.495
150.0	814.2	10.5675	9.6893	10.2365	8.0371	7.2228	24.86	29.09	2.443E-12	-11.612
155.0	871.3	10.4569	9.5671	10.1606	7.8919	7.1929	24.63	31.47	1.918E-12	-11.717
160.0	923.6	10.3554	9.4549	10.0918	7.7580	7.1663	24.41	33.71	1.538E-12	-11.813
170.0	1015.1	10.1739	9.2533	9.9706	7.5166	7.1208	23.99	37.82	1.040E-12	-11.983
180.0	1091.4	10.0134	9.[illegible]745	9.8654	7.3012	7.0829	23.59	41.48	7.391E-13	-12.131
190.0	1155.3	9.8682	8.[illegible]	9.7719	7.1046	7.0503	23.21	44.76	5.448E-13	-12.264
200.0	1209.0	9.7342	8.7[illegible]9	9.6869	6.9219	7.0218	22.84	47.74	4.128E-13	-12.384
210.0	1254.2	9.6090	8.6211	9.6085	6.7501	6.9963	22.49	50.46	3.195E-13	-12.495
220.0	1292.3	9.4906	8.4877	9.5353	6.5868	6.9732	22.15	52.96	2.517E-13	-12.599
230.0	13[illegible]4.4	9.3776	8.3602	9.4663	6.4303	6.9519	21.81	55.27	2.011E-13	-12.697
240.0	1351.4	9.2692	8.2376	9.4006	6.2794	6.9323	21.49	57.41	1.626E-13	-12.789
250.0	1374.0	9.1644	8.1189	9.3376	6.1330	6.9139	21.18	59.40	1.328E-13	-12.877
260.0	1392.9	9.0626	8.0034	9.2769	5.9903	6.8965	20.88	61.27	1.095E-13	-12.961
270.0	1408.8	8.9633	7.8907	9.2181	5.8508	6.8799	20.59	63.03	9.086E-14	-13.042
280.0	1422.0	8.8660	7.7802	9.1608	5.7139	6.8641	20.32	64.69	7.593E-14	-13.120
290.0	1433.2	8.7706	7.6717	9.1048	5.5792	6.8489	20.05	66.27	6.381E-14	-13.195
300.0	1442.5	8.6766	7.5648	9.0500	5.4465	6.8341	19.79	67.77	5.391E-14	-13.268
310.0	1450.3	8.5840	7.4594	8.9960	5.3153	6.8197	19.54	69.21	4.576E-14	-13.340
320.0	1457.0	8.4924	7.3549	8.9429	5.1855	6.8057	19.31	70.59	3.900E-14	-13.409
330.0	1462.6	8.4017	7.2516	8.8904	5.0570	6.7919	19.08	71.92	3.337E-14	-13.477
340.0	1467.3	8.3119	7.1492	8.8385	4.9295	6.7784	18.86	73.19	2.865E-14	-13.543
350.0	1471.4	8.2229	7.0477	8.7871	4.8031	6.7651	18.66	74.43	2.468E-14	-13.608
360.0	1474.8	8.1345	6.9468	8.7362	4.6774	6.7520	18.46	75.62	2.132E-14	-13.671
370.0	1477.8	8.0467	6.8467	8.6857	4.5526	6.7391	18.27	76.77	1.847E-14	-13.733
380.0	1480.3	7.9594	6.7471	8.6355	4.4285	6.7262	18.10	77.89	1.605E-14	-13.795
390.0	1482.5	7.8727	6.6481	8.5857	4.3050	6.7135	17.93	78.97	1.398E-14	-13.855
400.0	1484.4	7.7864	6.5496	8.5362	4.1822	6.7009	17.77	80.02	1.220E-14	-13.914

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1500 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1487.5	7.6150	6.3540	8.4379	3.9382	6.6760		17.47	82.04	9.351E-15	-14.029
440.0	1489.9	7.4452	6.1601	8.3407	3.6964	6.6514		17.20	83.94	7.224E-15	-14.141
460.0	1491.7	7.2768	5.9678	8.2442	3.4564	6.6271		16.96	85.76	5.619E-15	-14.250
480.0	1493.1	7.1096	5.7770	8.1486	3.2182	6.6030		16.73	87.51	4.398E-15	-14.357
500.0	1494.3	6.9437	5.5874	8.0537	2.9817	6.5792	3.4810	16.52	89.20	3.460E-15	-14.461
520.0	1495.2	6.7789	5.3992	7.9594	2.7468	6.5555	3.4748	16.33	90.86	2.736E-15	-14.563
540.0	1495.9	6.6152	5.2123	7.8658	2.5135	6.5320	3.4687	16.14	92.51	2.174E-15	-14.663
560.0	1496.5	6.4525	5.0265	7.7729	2.2816	6.5087	3.4627	15.95	94.16	1.734E-15	-14.761
580.0	1497.0	6.2909	4.8419	7.6805	2.0512	6.4855	3.4567	15.77	95.84	1.388E-15	-14.858
600.0	1497.4	6.1303	4.6584	7.5887	1.8222	6.4625	3.4509	15.58	97.57	1.115E-15	-14.953
620.0	1497.7	5.9706	4.4761	7.4975	1.5945	6.4397	3.4450	15.39	99.38	8.986E-16	-15.046
640.0	1498.0	5.8119	4.2948	7.4068	1.3683	6.4169	3.4392	15.19	101.29	7.264E-16	-15.139
660.0	1498.3	5.6542	4.1147	7.3167	1.1434	6.3944	3.4335	14.98	103.33	5.890E-16	-15.230
680.0	1498.5	5.4974	3.9355	7.2271	.9198	6.3719	3.4278	14.75	105.53	4.789E-16	-15.320
700.0	1498.6	5.3415	3.7575	7.1380	.6975	6.3496	3.4221	14.51	107.92	3.904E-16	-15.408
720.0	1498.8	5.1865	3.5804	7.0495	.4765	6.3275	3.4165	14.25	110.53	3.192E-16	-15.496
740.0	1498.9	5.0324	3.4044	6.9615	.2567	6.3054	3.4109	13.97	113.41	2.617E-16	-15.582
760.0	1499.0	4.8792	3.2294	6.8740	.0383	6.2835	3.4054	13.66	116.59	2.151E-16	-15.667
780.0	1499.1	4.7268	3.0554	6.7869		6.2617	3.3999	13.34	120.10	1.773E-16	-15.751
800.0	1499.2	4.5754	2.8824	6.7004		6.2401	3.3944	12.99	123.99	1.466E-16	-15.834
820.0	1499.3	4.4247	2.7103	6.6144		6.2186	3.3890	12.63	128.31	1.216E-16	-15.915
840.0	1499.4	4.2750	2.5393	6.5288		6.1971	3.3835	12.24	133.09	1.011E-16	-15.995
860.0	1499.4	4.1260	2.3691	6.4438		6.1759	3.3782	11.84	138.38	8.441E-17	-16.074
880.0	1499.5	3.9779	2.2000	6.3592		6.1547	3.3728	11.42	144.22	7.069E-17	-16.151
900.0	1499.5	3.8306	2.0317	6.2750		6.1336	3.3675	11.00	150.65	5.941E-17	-16.226
920.0	1499.6	3.6842	1.8644	6.1914		6.1127	3.3622	10.57	157.69	5.012E-17	-16.300
940.0	1499.6	3.5385	1.6980	6.1082		6.0919	3.3570	10.13	165.37	4.246E-17	-16.372
960.0	1499.6	3.3936	1.5326	6.0254		6.0712	3.3518	9.70	173.70	3.612E-17	-16.442
980.0	1499.7	3.2496	1.3680	5.9432		6.0506	3.3466	9.27	182.70	3.086E-17	-16.511
1000.0	1499.7	3.1063	1.2044	5.8613		6.0301	3.3414	8.85	192.34	2.649E-17	-16.577
1050.0	1499.7	2.7515	.7991	5.6587		5.9794	3.3286	7.88	219.09	1.847E-17	-16.733
1100.0	1499.8	2.4015	.3993	5.4588		5.9294	3.3160	7.03	248.91	1.330E-17	-16.876
1150.0	1499.8	2.0561	.0048	5.2615		5.8800	3.3036	6.32	280.52	9.902E-18	-17.004
1200.0	1499.8	1.7153		5.0669		5.8314	3.2913	5.75	312.36	7.612E-18	-17.118
1250.0	1499.9	1.3791		4.8748		5.7833	3.2792	5.31	342.94	6.031E-18	-17.220
1300.0	1499.9	1.0472		4.6853		5.7359	3.2673	4.97	371.13	4.908E-18	-17.309
1350.0	1499.9	.7196		4.4982		5.6891	3.2555	4.72	396.32	4.088E-18	-17.388
1400.0	1499.9	.3963		4.3135		5.6429	3.2438	4.53	418.35	3.470E-18	-17.460
1450.0	1499.9	.0770		4.1312		5.5973	3.2323	4.39	437.38	2.991E-18	-17.524
1500.0	1499.9			3.9512		5.5522	3.2210	4.28	453.78	2.611E-18	-17.583
1600.0	1499.9			3.5980		5.4639	3.1987	4.15	480.45	2.042E-18	-17.690
1700.0	1500.0			3.2535		5.3777	3.1770	4.07	501.57	1.636E-18	-17.786
1800.0	1500.0			2.9176		5.2937	3.1559	4.03	519.45	1.331E-18	-17.876
1900.0	1500.0			2.5898		5.2117	3.1352	4.01	535.57	1.095E-18	-17.961
2000.0	1500.0			2.2698		5.1316	3.1151	3.99	550.78	9.070E-19	-18.042
2100.0	1500.0			1.9574		5.0534	3.0954	3.98	565.59	7.561E-19	-18.121
2200.0	1500.0			1.6523		4.9771	3.0762	3.97	580.27	6.337E-19	-18.198
2300.0	1500.0			1.3542		4.9025	3.0574	3.96	595.01	5.335E-19	-18.273
2400.0	1500.0			1.0630		4.8297	3.0390	3.96	609.89	4.511E-19	-18.346
2500.0	1500.0			.7783		4.7585	3.0211	3.95	624.99	3.830E-19	-18.417

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1600 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.4	13.5907	13.0065	11.7818	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.7	13.4301	12.8358	11.8693	11.5079	8.6488	28.65	5.63	1.657E-09	-8.781
96.0	187.5	13.2684	12.6616	11.8907	11.3462	8.4871	28.49	5.75	1.142E-09	-8.942
98.0	192.0	13.1066	12.4859	11.8663	11.1843	8.3252	28.32	5.93	7.868E-10	-9.104
100.0	198.5	12.9456	12.3102	11.8117	11.0234	8.1643	28.15	6.17	5.431E-10	-9.265
102.0	207.3	12.7868	12.1360	11.7388	10.8645	8.0055	27.98	6.48	3.768E-10	-9.424
104.0	218.4	12.6312	11.9644	11.6557	10.7090	7.8499	27.81	6.88	2.633E-10	-9.580
106.0	232.0	12.4806	11.7969	11.5634	10.5325	7.7566	27.64	7.36	1.859E-10	-9.731
108.0	248.2	12.3357	11.6355	11.4681	10.3382	7.7220	27.48	7.92	1.330E-10	-9.876
110.0	266.9	12.1963	11.4808	11.3750	10.1530	7.6870	27.32	8.57	9.642E-11	-10.016
115.0	323.9	11.8760	11.1269	11.1560	9.7320	7.6011	26.93	10.57	4.624E-11	-10.335
120.0	393.2	11.5978	10.8211	10.9610	9.3712	7.5212	26.56	13.03	2.453E-11	-10.610
125.0	469.6	11.3600	10.5604	10.7921	9.0649	7.4504	26.23	15.78	1.431E-11	-10.844
130.0	547.2	11.1578	10.3388	10.6481	8.8048	7.3898	25.92	18.63	9.072E-12	-11.042
135.0	623.1	10.9835	10.1478	10.5243	8.5804	7.3380	25.64	21.49	6.139E-12	-11.212
140.0	696.2	10.8311	9.9806	10.4166	8.3835	7.2932	25.38	24.29	4.370E-12	-11.359
145.0	765.5	10.6959	9.8320	10.3218	8.2083	7.2543	25.13	27.01	3.239E-12	-11.490
150.0	830.5	10.5747	9.6985	10.2373	8.0505	7.2201	24.90	29.63	2.479E-12	-11.606
155.0	891.0	10.4646	9.5772	10.1614	7.9066	7.1898	24.68	32.12	1.947E-12	-11.711
160.0	947.0	10.3638	9.4658	10.0924	7.7741	7.1627	24.46	34.50	1.563E-12	-11.806
170.0	1046.4	10.1838	9.2663	9.9710	7.5358	7.1163	24.06	38.88	1.059E-12	-11.975
180.0	1130.7	10.0253	9.0901	9.8661	7.3242	7.0776	23.67	42.82	7.551E-13	-12.122
190.0	1202.3	9.8826	8.9309	9.7731	7.1320	7.0445	23.31	46.39	5.588E-13	-12.253
200.0	1263.1	9.7516	8.7843	9.6892	6.9543	7.0156	22.96	49.63	4.254E-13	-12.371
210.0	1314.7	9.6298	8.6476	9.6121	6.7880	6.9899	22.62	52.59	3.311E-13	-12.480
220.0	1358.5	9.5151	8.5187	9.5405	6.6306	6.9667	22.29	55.31	2.624E-13	-12.581
230.0	1395.6	9.4063	8.3960	9.4733	6.4803	6.9456	21.98	57.81	2.110E-13	-12.676
240.0	1426.8	9.3021	8.2784	9.4097	6.3359	6.9261	21.67	60.12	1.718E-13	-12.765
250.0	1453.0	9.2018	8.1650	9.3491	6.1963	6.9080	21.37	62.26	1.413E-13	-12.850
260.0	1475.1	9.1047	8.0550	9.2908	6.0605	6.8910	21.09	64.25	1.172E-13	-12.931
270.0	1493.5	9.0102	7.9478	9.2345	5.9281	6.8749	20.81	66.12	9.803E-14	-13.009
280.0	1509.0	8.9179	7.8430	9.1799	5.7984	6.8596	20.54	67.88	8.250E-14	-13.084
290.0	1521.9	8.8275	7.7402	9.1266	5.6710	6.8449	20.28	69.55	6.983E-14	-13.156
300.0	1532.8	8.7386	7.6391	9.0745	5.5456	6.8307	20.03	71.13	5.940E-14	-13.226
310.0	1542.0	8.6510	7.5395	9.0234	5.4218	6.8170	19.79	72.65	5.077E-14	-13.294
320.0	1549.7	8.5646	7.4411	8.9731	5.2995	6.8036	19.56	74.10	4.356E-14	-13.361
330.0	1556.3	8.4792	7.3437	8.9235	5.1784	6.7905	19.34	75.49	3.752E-14	-13.426
340.0	1561.8	8.3946	7.2473	8.8746	5.0584	6.7777	19.13	76.83	3.243E-14	-13.489
350.0	1566.5	8.3107	7.1517	8.8261	4.9394	6.7651	18.92	78.13	2.811E-14	-13.551
360.0	1570.6	8.2275	7.0569	8.7781	4.8213	6.7527	18.73	79.38	2.444E-14	-13.612
370.0	1574.0	8.1450	6.9627	8.7306	4.7039	6.7404	18.54	80.60	2.131E-14	-13.671
380.0	1577.0	8.0629	6.8691	8.6834	4.5873	6.7283	18.36	81.77	1.862E-14	-13.730
390.0	1579.6	7.9814	6.7760	8.6365	4.4713	6.7163	18.19	82.92	1.631E-14	-13.787
400.0	1581.8	7.9003	6.6835	8.5899	4.3560	6.7044	18.03	84.03	1.432E-14	-13.844

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1600 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1585.4	7.7394	6.4998	8.4976	4.1269	6.6810		17.73	86.17	1.111E-14	-13.954
440.0	1588.2	7.5800	6.3179	8.4062	3.8999	6.6578		17.45	88.19	8.678E-15	-14.062
460.0	1590.3	7.4219	6.1374	8.3157	3.6747	6.6350		17.20	90.13	6.826E-15	-14.166
480.0	1592.0	7.2651	5.9583	8.2259	3.4512	6.6123		16.97	91.98	5.401E-15	-14.268
500.0	1593.3	7.1094	5.7805	8.1368	3.2294	6.5899	3.3604	16.76	93.77	4.297E-15	-14.367
520.0	1594.4	6.9548	5.6039	8.0484	3.0090	6.5677	3.3545	16.56	95.51	3.435E-15	-14.464
540.0	1595.2	6.8012	5.4286	7.9606	2.7902	6.5456	3.3488	16.38	97.22	2.758E-15	-14.559
560.0	1595.9	6.6486	5.2543	7.8734	2.5727	6.5238	3.3431	16.20	98.91	2.224E-15	-14.653
580.0	1596.5	6.4971	5.0812	7.7867	2.3566	6.5020	3.3375	16.02	100.60	1.799E-15	-14.745
600.0	1597.0	6.3464	4.9092	7.7007	2.1419	6.4804	3.3320	15.85	102.31	1.461E-15	-14.835
620.0	1597.4	6.1967	4.7382	7.6151	1.9284	6.4590	3.3265	15.68	104.06	1.190E-15	-14.924
640.0	1597.7	6.0479	4.5682	7.5301	1.7162	6.4377	3.3210	15.50	105.88	9.725E-16	-15.012
660.0	1598.0	5.9000	4.3993	7.4456	1.5054	6.4165	3.3156	15.32	107.77	7.968E-16	-15.099
680.0	1598.2	5.7530	4.2313	7.3616	1.2957	6.3955	3.3103	15.13	109.78	6.546E-16	-15.184
700.0	1598.4	5.6068	4.0644	7.2781	1.0873	6.3746	3.3050	14.92	111.91	5.391E-16	-15.268
720.0	1598.6	5.4615	3.8984	7.1950	.8801	6.3538	3.2997	14.71	114.20	4.452E-16	-15.351
740.0	1598.7	5.3170	3.7333	7.1125	.6741	6.3331	3.2944	14.48	116.67	3.685E-16	-15.434
760.0	1598.9	5.1733	3.5693	7.0304	.4692	6.3126	3.2892	14.24	119.36	3.057E-16	-15.515
780.0	1599.0	5.0305	3.4061	6.9489	.2655	6.2922	3.2841	13.97	122.29	2.543E-16	-15.595
800.0	1599.1	4.8885	3.2439	6.8677	.0630	6.2719	3.2789	13.69	125.50	2.120E-16	-15.674
820.0	1599.2	4.7473	3.0826	6.7871		6.2517	3.2738	13.40	129.02	1.772E-16	-15.751
840.0	1599.3	4.6069	2.9222	6.7069		6.2316	3.2688	13.08	132.88	1.485E-16	-15.828
860.0	1599.3	4.4672	2.7627	6.6271		6.2116	3.2637	12.74	137.13	1.248E-16	-15.904
880.0	1599.4	4.3284	2.6041	6.5478		6.1918	3.2587	12.39	141.80	1.051E-16	-15.978
900.0	1599.4	4.1903	2.4464	6.4689		6.1720	3.2537	12.03	146.93	8.882E-17	-16.051
920.0	1599.5	4.0530	2.2895	6.3905		6.1524	3.2488	11.65	152.55	7.526E-17	-16.123
940.0	1599.5	3.9164	2.1335	6.3125		6.1329	3.2438	11.26	158.69	6.397E-17	-16.194
960.0	1599.6	3.7806	1.9784	6.2349		6.1135	3.2389	10.86	165.39	5.455E-17	-16.263
980.0	1599.6	3.6455	1.8241	6.1578		6.0942	3.2341	10.46	172.67	4.667E-17	-16.331
1000.0	1599.6	3.5112	1.6707	6.0810		6.0750	3.2292	10.06	180.54	4.007E-17	-16.397
1050.0	1599.7	3.1786	1.2907	5.8911		6.0275	3.2173	9.08	202.89	2.783E-17	-16.556
1100.0	1599.7	2.8504	.9159	5.7036		5.9806	3.2054	8.15	228.92	1.982E-17	-16.703
1150.0	1599.8	2.5266	.5460	5.5187		5.9343	3.1938	7.33	258.07	1.450E-17	-16.839
1200.0	1599.8	2.2071	.1811	5.3362		5.8887	3.1823	6.62	289.38	1.091E-17	-16.962
1250.0	1599.8	1.8919		5.1562		5.8436	3.1709	6.04	321.57	8.449E-18	-17.073
1300.0	1599.9	1.5807		4.9785		5.7991	3.1597	5.57	353.33	6.717E-18	-17.173
1350.0	1599.9	1.2736		4.8031		5.7552	3.1487	5.20	383.50	5.474E-18	-17.262
1400.0	1599.9	.9705		4.6299		5.7119	3.1378	4.91	411.29	4.559E-18	-17.341
1450.0	1599.9	.6712		4.4590		5.6692	3.1270	4.69	436.27	3.870E-18	-17.412
1500.0	1599.9	.3758		4.2903		5.6270	3.1164	4.52	458.38	3.336E-18	-17.477
1600.0	1599.9			3.9592		5.5441	3.0955	4.30	494.79	2.570E-18	-17.590
1700.0	1600.0			3.6363		5.4633	3.0751	4.17	523.06	2.049E-18	-17.689
1800.0	1600.0			3.3213		5.3845	3.0553	4.09	545.93	1.669E-18	-17.778
1900.0	1600.0			3.0140		5.3077	3.0359	4.05	565.48	1.379E-18	-17.860
2000.0	1600.0			2.7140		5.2326	3.0170	4.02	583.09	1.151E-18	-17.939
2100.0	1600.0			2.4211		5.1593	2.9986	4.00	599.63	9.679E-19	-18.014
2200.0	1600.0			2.1350		5.0878	2.9806	3.99	615.61	8.187E-19	-18.087
2300.0	1600.0			1.8556		5.0179	2.9630	3.98	631.35	6.960E-19	-18.157
2400.0	1600.0			1.5826		4.9496	2.9458	3.98	647.05	5.942E-19	-18.226
2500.0	1600.0			1.3157		4.8828	2.9289	3.97	662.82	5.094E-19	-18.293

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1700 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.4	13.5907	13.0065	11.7818	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.8	13.4300	12.8358	11.8692	11.5078	8.6487	28.65	5.63	1.657E-09	-8.781
96.0	187.6	13.2663	12.6615	11.8906	11.3461	8.4870	28.49	5.75	1.142E-09	-8.942
98.0	192.2	13.1063	12.4857	11.8661	11.1841	8.3250	28.32	5.93	7.864E-10	-9.104
100.0	198.8	12.9453	12.3100	11.8114	11.0231	8.1640	28.15	6.18	5.428E-10	-9.265
102.0	207.7	12.7864	12.1357	11.7385	10.8642	8.0051	27.98	6.50	3.765E-10	-9.424
104.0	219.0	12.6308	11.9640	11.6554	10.7086	7.8495	27.81	6.90	2.631E-10	-9.580
106.0	232.9	12.4803	11.7966	11.5630	10.5322	7.7562	27.64	7.38	1.858E-10	-9.731
108.0	249.3	12.3354	11.6353	11.4675	10.3383	7.7213	27.48	7.95	1.329E-10	-9.877
110.0	268.3	12.1962	11.4808	11.3744	10.1534	7.6862	27.32	8.62	9.639E-11	-10.016
115.0	326.3	11.8765	11.1277	11.1553	9.7337	7.6000	26.93	10.65	4.629E-11	-10.335
120.0	396.7	11.5992	10.8230	10.9505	9.3743	7.5199	26.57	13.14	2.460E-11	-10.609
125.0	474.5	11.3624	10.5636	10.7919	9.0698	7.4490	26.24	15.94	1.438E-11	-10.842
130.0	553.4	11.1611	10.3432	10.6483	8.8113	7.3883	25.94	18.83	9.137E-12	-11.039
135.0	630.9	10.9878	10.1534	10.5249	8.5883	7.3364	25.66	21.74	6.195E-12	-11.208
140.0	705.8	10.8362	9.9870	10.4174	8.3928	7.2915	25.41	24.60	4.416E-12	-11.355
145.0	777.4	10.7016	9.8393	10.3226	8.2188	7.2522	25.16	27.40	3.276E-12	-11.485
150.0	845.1	10.5809	9.7066	10.2381	8.0621	7.2177	24.94	30.11	2.510E-12	-11.600
155.0	908.7	10.4713	9.5859	10.1620	7.9193	7.1870	24.72	32.71	1.973E-12	-11.705
160.0	968.1	10.3710	9.4752	10.0929	7.7880	7.1596	24.51	35.20	1.585E-12	-11.800
170.0	1074.8	10.1922	9.2774	9.9713	7.5523	7.1123	24.11	39.84	1.076E-12	-11.968
180.0	1166.9	10.0353	9.1033	9.8663	7.3437	7.0729	23.74	44.06	7.687E-13	-12.114
190.0	1246.2	9.8945	8.9465	9.7737	7.1551	7.0391	23.39	47.91	5.706E-13	-12.244
200.0	1314.2	9.7659	8.8029	9.6903	6.9816	7.0097	23.05	51.42	4.360E-13	-12.361
210.0	1372.6	9.6468	8.6696	9.6143	6.8199	6.9837	22.73	54.63	3.409E-13	-12.467
220.0	1422.3	9.5353	8.5444	9.5439	6.6674	6.9604	22.42	57.58	2.715E-13	-12.566
230.0	1464.6	9.4299	8.4258	9.4783	6.5225	6.9393	22.12	60.28	2.195E-13	-12.659
240.0	1500.3	9.3294	8.3126	9.4164	6.3837	6.9199	21.83	62.77	1.797E-13	-12.745
250.0	1530.5	9.2330	8.2037	9.3577	6.2499	6.9020	21.54	65.06	1.487E-13	-12.828
260.0	1555.8	9.1400	8.0984	9.3014	6.1202	6.8853	21.27	67.20	1.242E-13	-12.906
270.0	1577.0	9.0497	7.9961	9.2473	5.9940	6.8696	21.00	69.18	1.045E-13	-12.981
280.0	1594.9	8.9616	7.8962	9.1950	5.8706	6.8547	20.74	71.05	8.848E-14	-13.053
290.0	1609.8	8.8756	7.7985	9.1441	5.7495	6.8405	20.50	72.81	7.537E-14	-13.123
300.0	1622.4	8.7911	7.7025	9.0944	5.6305	6.8268	20.25	74.47	6.452E-14	-13.190
310.0	1633.0	8.7080	7.6080	9.0457	5.5133	6.8136	20.02	76.06	5.548E-14	-13.256
320.0	1641.9	8.6261	7.5147	8.9979	5.3974	6.8008	19.80	77.58	4.790E-14	-13.320
330.0	1649.5	8.5452	7.4226	8.9508	5.2829	6.7882	19.58	79.04	4.150E-14	-13.382
340.0	1655.9	8.4652	7.3314	8.9044	5.1695	6.7760	19.37	80.44	3.608E-14	-13.443
350.0	1661.3	8.3859	7.2411	8.8585	5.0571	6.7640	19.17	81.79	3.146E-14	-13.502
360.0	1666.0	8.3073	7.1515	8.8131	4.9455	6.7522	18.98	83.10	2.751E-14	-13.560
370.0	1670.0	8.2293	7.0626	8.7682	4.8348	6.7406	18.79	84.38	2.412E-14	-13.618
380.0	1673.4	8.1519	6.9743	8.7235	4.7247	6.7291	18.61	85.61	2.120E-14	-13.674
390.0	1676.4	8.0750	6.8865	8.6793	4.6154	6.7177	18.44	86.81	1.867E-14	-13.729
400.0	1679.0	7.9985	6.7992	8.6353	4.5066	6.7065	18.28	87.98	1.648E-14	-13.783

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1700 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1683.1	7.8468	6.6260	8.5482	4.2907	6.6843		17.97	90.23	1.291E-14	-13.889
440.0	1686.3	7.6965	6.4545	8.4620	4.0767	6.6624		17.69	92.37	1.019E-14	-13.992
460.0	1688.8	7.5475	6.2845	8.3767	3.8646	6.6408		17.44	94.42	8.097E-15	-14.092
480.0	1690.7	7.3998	6.1158	8.2921	3.6541	6.6195		17.20	96.38	6.470E-15	-14.189
500.0	1692.3	7.2531	5.9483	8.2081	3.4451	6.5983	3.2549	16.99	98.27	5.197E-15	-14.264
520.0	1693.5	7.1075	5.7820	8.1249	3.2376	6.5774	3.2493	16.79	100.11	4.1[illegible]5E-15	-14.377
540.0	1694.5	6.9629	5.6169	8.0422	3.0315	6.5566	3.2439	16.60	101.89	3.401E-15	-14.468
560.0	1695.3	6.8193	5.4529	7.9600	2.8268	6.5360	3.2385	16.42	103.64	2.768E-15	-14.558
580.0	1696.0	6.6766	5.2899	7.8785	2.6233	6.5155	3.2332	16.25	105.38	2.261E-15	-14.646
600.0	1696.5	6.5348	5.1279	7.7974	2.4212	6.4952	3.2280	16.08	1[illegible].11	1.853E-15	-14.732
620.0	1697.0	6.3938	4.9669	7.7168	2.2202	6.4750	3.2228	15.92	108.86	1.524E-15	-14.817
640.0	1697.3	6.2537	4.8069	7.6368	2.0205	6.4549	3.2177	15.76	110.64	1.257E-15	-14.901
660.0	1697.7	6.1145	4.6479	7.5572	1.8220	6.4350	3.2126	15.59	112.47	1.039E-15	-14.983
680.0	1697.9	5.9761	4.4898	7.4782	1.6247	6.4152	3.2075	15.42	114.37	8.618E-16	-15.065
700.0	1698.2	5.8385	4.3326	7.3996	1.4285	6.3955	3.2025	15.25	116.35	7.164E-16	-15.145
720.0	1698.4	5.7017	4.1764	7.3214	1.2334	6.3759	3.1976	15.07	118.44	5.968E-16	-15.224
740.0	1698.6	5.5657	4.0210	7.2437	1.0395	6.3565	3.1926	14.87	120.67	4.984E-16	-15.302
760.0	1698.7	5.4305	3.8666	7.1665	.8467	6.3371	3.1877	14.67	123.04	4.171E-16	-15.380
780.0	1698.8	5.2960	3.7130	7.0897	.6550	6.3179	3.1829	14.46	125.59	3.499E-16	-15.456
800.0	1699.0	5.1624	3.5603	7.0133	.4644	6.2988	3.1780	14.23	128.35	2.941E-16	-15.531
820.0	1699.1	5.0295	3.4085	6.9374	.2748	6.2798	3.1732	13.98	131.33	2.478E-16	-15.606
840.0	1699.1	4.8973	3.2575	6.8619	.0864	6.2609	3.1684	13.72	134.57	2.092E-16	-15.679
860.0	1699.2	4.7659	3.1074	6.7868		6.2421	3.1637	13.45	138.10	1.770E-16	-15.752
880.0	1699.3	4.6352	2.9581	6.7122		6.2234	3.1590	13.15	141.95	1.501E-16	-15.824
900.0	1699.3	4.5052	2.8097	6.6379		6.2048	3.1543	12.85	146.15	1.276E-16	-15.894
920.0	1699.4	4.3759	2.6620	6.5641		6.1864	3.1496	12.53	150.73	1.087E-16	-15.964
940.0	1699.5	4.2474	2.5152	6.4907		6.1680	3.1450	12.19	155.72	9.285E-17	-16.032
960.0	1699.5	4.1196	2.3692	6.4177		6.1497	3.1404	11.85	161.16	7.951E-17	-16.100
980.0	1699.5	3.9925	2.2240	6.3451		6.1315	3.1358	11.49	167.07	6.827E-17	-16.166
1000.0	1699.6	3.8660	2.0796	6.2729		6.1135	3.1312	11.13	173.48	5.877E-17	-16.231
1050.0	1699.6	3.5530	1.7220	6.0940		6.0687	3.1199	10.20	191.85	4.094E-17	-16.388
1100.0	1699.7	3.2441	1.3692	5.9176		6.0246	3.1088	9.28	213.72	2.909E-17	-16.536
1150.0	1699.8	2.9394	1.0211	5.7436		5.9810	3.0978	8.41	239.07	2.113E-17	-16.675
1200.0	1699.8	2.6387	.6776	5.5718		5.9381	3.0870	7.61	267.53	1.570E-17	-16.804
1250.0	1699.8	2.3419	.3387	5.4024		5.8957	3.0763	6.92	298.37	1.195E-17	-16.923
1300.0	1699.8	2.0491	.0042	5.2351		5.8538	3.0658	6.32	330.58	9.319E-18	-17.031
1350.0	1699.9	1.7600		5.0700		5.8125	3.0554	5.84	363.03	7.442E-18	-17.128
1400.0	1699.9	1.4747		4.9071		5.7718	3.0451	5.44	394.64	6.077E-18	-17.216
1450.0	1699.9	1.1931		4.7462		5.7315	3.0350	5.12	424.52	5.065E-18	-17.295
1500.0	1699.9	.9150		4.5874		5.6918	3.0250	4.87	452.10	4.298E-18	-17.367
1600.0	1699.9	.3694		4.2757		5.6138	3.0053	4.52	499.46	3.234E-18	-17.490
1700.0	1699.9			3.9718		5.5378	2.9862	4.31	537.06	2.543E-18	-17.595
1800.0	1700.0			3.6754		5.4636	2.9675	4.18	567.05	2.060E-18	-17.686
1900.0	1700.0			3.3861		5.3913	2.9493	4.11	591.79	1.702E-18	-17.769
2000.0	1700.0			3.1038		5.3206	2.9315	4.06	613.12	1.426E-18	-17.846
2100.0	1700.0			2.8282		5.2517	2.9141	4.03	632.37	1.206E-18	-17.919
2200.0	1700.0			2.5589		5.1843	2.8971	4.02	650.37	1.027E-18	-17.988
2300.0	1700.0			2.2959		5.1185	2.8806	4.00	667.68	8.797E-19	-18.056
2400.0	1700.0			2.0390		5.0542	2.8644	3.99	684.64	7.571E-19	-18.121
2500.0	1700.0			1.7878		4.9914	2.8486	3.99	701.46	6.544E-19	-18.184

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1800 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.4	13.5907	13.0065	11.7818	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.8	13.4300	12.8357	11.8692	11.5078	8.6487	28.65	5.63	1.657E-09	-8.781
96.0	187.6	13.2682	12.6614	11.8905	11.3460	8.4869	28.49	5.75	1.142E-09	-8.943
98.0	192.3	13.1062	12.4855	11.8659	11.1840	8.3249	28.32	5.93	7.861E-10	-9.105
100.0	199.0	12.9451	12.3097	11.8111	11.0229	8.1638	28.15	6.18	5.425E-10	-9.266
102.0	208.1	12.7851	12.1354	11.7381	10.8639	8.0048	27.98	6.51	3.762E-10	-9.425
104.0	219.6	12.6305	11.9637	11.6550	10.7083	7.8492	27.81	6.91	2.629E-10	-9.580
106.0	233.6	12.4800	11.7963	11.5626	10.5320	7.7558	27.65	7.41	1.857E-10	-9.731
108.0	250.3	12.3352	11.6352	11.4670	10.3383	7.7208	27.48	7.99	1.328E-10	-9.877
110.0	269.6	12.1961	11.4809	11.3738	10.1537	7.6855	27.32	8.66	9.637E-11	-10.016
115.0	328.4	11.8770	11.1285	11.1547	9.7351	7.5990	26.94	10.72	4.634E-11	-10.334
120.0	400.0	11.6004	10.8248	10.9600	9.3772	7.5187	26.58	13.24	2.466E-11	-10.608
125.0	478.9	11.3645	10.5664	10.7918	9.0740	7.4476	26.25	16.08	1.445E-11	-10.840
130.0	559.0	11.1641	10.3471	10.6485	8.8170	7.3870	25.96	19.01	9.196E-12	-11.036
135.0	637.8	10.9916	10.1582	10.5254	8.5954	7.3350	25.68	21.96	6.245E-12	-11.205
140.0	714.4	10.8406	9.9928	10.4181	8.4011	7.2899	25.43	24.88	4.458E-12	-11.351
145.0	788.0	10.7067	9.8458	10.3233	8.2282	7.2504	25.19	27.75	3.310E-12	-11.480
150.0	858.2	10.5864	9.7136	10.2387	8.0724	7.2156	24.97	30.53	2.538E-12	-11.596
155.0	924.5	10.4772	9.5936	10.1625	7.9305	7.1846	24.75	33.23	1.996E-12	-11.700
160.0	987.0	10.3773	9.4835	10.0933	7.8002	7.1567	24.55	35.83	1.604E-12	-11.795
170.0	1100.8	10.1964	9.2870	9.9713	7.5666	7.1087	24.16	40.72	1.090E-12	-11.962
180.0	1200.4	10.0437	9.1145	9.8663	7.3606	7.0685	23.80	45.21	7.804E-13	-12.108
190.0	1287.2	9.9045	8.9598	9.7737	7.1750	7.0341	23.46	49.34	5.806E-13	-12.236
200.0	1362.7	9.7778	8.8186	9.6908	7.0049	7.0043	23.14	53.12	4.450E-13	-12.352
210.0	1427.8	9.6610	8.6881	9.6154	6.8471	6.9779	22.83	56.59	3.491E-13	-12.457
220.0	1483.7	9.5522	8.5661	9.5461	6.6989	6.9544	22.53	59.77	2.792E-13	-12.554
230.0	1531.5	9.4496	8.4510	9.4816	6.5586	6.9332	22.24	62.68	2.268E-13	-12.644
240.0	1572.0	9.3523	8.3415	9.4212	6.4246	6.9138	21.96	65.36	1.867E-13	-12.729
250.0	1606.3	9.2593	8.2365	9.3640	6.2959	6.8961	21.69	67.82	1.553E-13	-12.809
260.0	1635.1	9.1697	8.1353	9.3096	6.1715	6.8796	21.43	70.10	1.303E-13	-12.885
270.0	1659.4	9.0831	8.0372	9.2573	6.0506	6.8642	21.17	72.21	1.103E-13	-12.958
280.0	1679.7	8.9988	7.9417	9.2069	5.9327	6.8496	20.93	74.18	9.392E-14	-13.027
290.0	1696.8	8.9165	7.8484	9.1581	5.8173	6.8357	20.69	76.04	8.045E-14	-13.094
300.0	1711.2	8.8360	7.7569	9.1105	5.7040	6.8225	20.45	77.79	6.926E-14	-13.160
310.0	1723.3	8.7569	7.6669	9.0640	5.5925	6.8097	20.23	79.45	5.989E-14	-13.223
320.0	1733.5	8.6789	7.5783	9.0184	5.4824	6.7974	20.01	81.04	5.200E-14	-13.284
330.0	1742.2	8.6020	7.4908	8.9735	5.3737	6.7854	19.80	82.56	4.530E-14	-13.344
340.0	1749.5	8.5260	7.4042	8.9293	5.2661	6.7736	19.59	84.02	3.959E-14	-13.402
350.0	1755.7	8.4508	7.3185	8.8857	5.1595	6.7621	19.40	85.43	3.471E-14	-13.460
360.0	1761.1	8.3763	7.2336	8.8426	5.0538	6.7509	19.20	86.80	3.051E-14	-13.516
370.0	1765.6	8.3024	7.1494	8.7999	4.9489	6.7398	19.02	88.13	2.688E-14	-13.571
380.0	1769.6	8.2291	7.0657	8.7576	4.8447	6.7288	18.85	89.41	2.374E-14	-13.624
390.0	1773.0	8.1562	6.9826	8.7156	4.7412	6.7180	18.68	90.67	2.102E-14	-13.677
400.0	1775.9	8.0838	6.9000	8.6740	4.6382	6.7073	18.51	91.89	1.864E-14	-13.730

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1800 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1780.7	7.9402	6.7362	8.5915	4.4340	6.6863		18.21	94.24	1.475E-14	-13.831
440.0	1784.3	7.7981	6.5739	8.5099	4.2317	6.6655		17.92	96.49	1.175E-14	-13.930
460.0	1787.2	7.6572	6.4131	8.4292	4.0311	6.6451		17.66	98.65	9.417E-15	-14.026
480.0	1789.4	7.5176	6.2537	8.3492	3.8321	6.6249		17.42	100.71	7.591E-15	-14.120
500.0	1791.1	7.3789	6.0954	8.2698	3.6347	6.6049	3.1624	17.20	102.71	6.151E-15	-14.211
520.0	1792.5	7.2413	5.9383	8.1911	3.4386	6.5850	3.1571	17.00	104.63	5.008E-15	-14.300
540.0	1793.7	7.1047	5.7822	8.1129	3.2438	6.5654	3.1519	16.81	106.51	4.094E-15	-14.388
560.0	1794.6	6.9690	5.6272	8.0353	3.0504	6.5459	3.1468	16.63	108.34	3.361E-15	-14.474
580.0	1795.4	6.8341	5.4732	7.9582	2.8582	6.5265	3.1418	16.46	110.14	2.769E-15	-14.558
600.0	1796.0	6.7002	5.3202	7.8816	2.6672	6.5073	3.1368	16.29	111.92	2.289E-15	-14.640
620.0	1796.5	6.5670	5.1681	7.8055	2.4774	6.4882	3.1319	16.14	113.70	1.898E-15	-14.722
640.0	1797.0	6.4347	5.0170	7.7299	2.2887	6.4693	3.1271	15.98	115.48	1.578E-15	-14.802
660.0	1797.3	6.3032	4.8668	7.6547	2.1012	6.4504	3.1222	15.83	117.30	1.316E-15	-14.881
680.0	1797.6	6.1724	4.7174	7.5800	1.9148	6.4317	3.1175	15.67	119.15	1.100E-15	-14.959
700.0	1797.9	6.0424	4.5690	7.5058	1.7295	6.4131	3.1127	15.52	121.06	9.218E-16	-15.035
720.0	1798.1	5.9132	4.4214	7.4320	1.5452	6.3946	3.1080	15.36	123.04	7.742E-16	-15.111
740.0	1798.3	5.7848	4.2747	7.3586	1.3621	6.3762	3.1033	15.19	125.11	6.517E-16	-15.186
760.0	1798.5	5.6571	4.1288	7.2856	1.1799	6.3580	3.0987	15.02	127.29	5.498E-16	-15.260
780.0	1798.7	5.5301	3.9837	7.2131	.9989	6.3398	3.0941	14.83	129.59	4.647E-16	-15.333
800.0	1798.8	5.4038	3.8395	7.1409	.8188	6.3218	3.0895	14.64	132.05	3.936E-16	-15.405
820.0	1798.9	5.2783	3.6961	7.0692	.6398	6.3038	3.0850	14.43	134.68	3.340E-16	-15.476
840.0	1799.0	5.1534	3.5535	6.9979	.4618	6.2860	3.0805	14.22	137.49	2.840E-16	-15.547
860.0	1799.1	5.0293	3.4117	6.9270	.2848	6.2682	3.0760	13.99	140.53	2.420E-16	-15.616
880.0	1799.2	4.9058	3.2707	6.8565	.1088	6.2506	3.0715	13.75	143.81	2.066E-16	-15.685
900.0	1799.3	4.7831	3.1305	6.7864		6.2330	3.0671	13.49	147.35	1.767E-16	-15.753
920.0	1799.3	4.6610	2.9911	6.7167		6.2156	3.0627	13.22	151.19	1.515E-16	-15.820
940.0	1799.4	4.5396	2.8524	6.6473		6.1982	3.0583	12.94	155.34	1.301E-16	-15.886
960.0	1799.4	4.4189	2.7145	6.5784		6.1809	3.0539	12.64	159.85	1.120E-16	-15.951
980.0	1799.5	4.2988	2.5774	6.5098		6.1638	3.0496	12.34	164.73	9.656E-17	-16.015
1000.0	1799.5	4.1794	2.4410	6.4416		6.1467	3.0453	12.02	170.02	8.347E-17	-16.078
1050.0	1799.6	3.8837	2.1032	6.2727		6.1045	3.0346	11.19	185.17	5.859E-17	-16.232
1100.0	1799.7	3.5920	1.7700	6.1061		6.0628	3.0241	10.32	203.35	4.178E-17	-16.379
1150.0	1799.7	3.3042	1.4412	5.9417		6.0217	3.0138	9.47	224.80	3.031E-17	-16.518
1200.0	1799.8	3.0202	1.1168	5.7795		5.9811	3.0035	8.64	249.53	2.240E-17	-16.650
1250.0	1799.8	2.7400	.7967	5.6194		5.9410	2.9934	7.88	277.29	1.689E-17	-16.772
1300.0	1799.8	2.4634	.4808	5.4615		5.9015	2.9835	7.20	307.56	1.300E-17	-16.886
1350.0	1799.8	2.1904	.1690	5.3056		5.8625	2.9737	6.61	339.55	1.022E-17	-16.991
1400.0	1799.9	1.9209		5.1517		5.8240	2.9639	6.10	372.31	8.204E-18	-17.086
1450.0	1799.9	1.6549		4.9997		5.7860	2.9544	5.68	404.87	6.719E-18	-17.173
1500.0	1799.9	1.3923		4.8497		5.7485	2.9449	5.34	436.35	5.606E-18	-17.251
1600.0	1799.9	.8770		4.5554		5.6748	2.9264	4.84	493.63	4.099E-18	-17.387
1700.0	1799.9	.3744		4.2684		5.6030	2.9083	4.53	541.56	3.159E-18	-17.501
1800.0	1799.9			3.9884		5.5330	2.8907	4.33	580.53	2.527E-18	-17.597
1900.0	1800.0			3.7152		5.4646	2.8734	4.20	612.36	2.076E-18	-17.683
2000.0	1800.0			3.4486		5.3979	2.8566	4.13	639.05	1.737E-18	-17.760
2100.0	1800.0			3.1882		5.3328	2.8402	4.08	662.28	1.472E-18	-17.832
2200.0	1800.0			2.9340		5.2692	2.8242	4.05	683.27	1.259E-18	-17.900
2300.0	1800.0			2.6856		5.2070	2.8086	4.03	702.87	1.084E-18	-17.965
2400.0	1800.0			2.4429		5.1463	2.7933	4.01	721.64	9.392E-19	-18.027
2500.0	1800.0			2.2056		5.0870	2.7783	4.00	739.94	8.172E-19	-18.088

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1900 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.4	13.5907	13.0065	11.7818	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.8	13.4299	12.8357	11.8691	11.5077	8.6486	28.65	5.63	1.657E-09	-8.781
96.0	187.7	13.2681	12.6613	11.8904	11.3459	8.4868	28.49	5.76	1.141E-09	-8.943
98.0	192.4	13.1060	12.4853	11.8657	11.1838	8.3247	28.32	5.94	7.858E-10	-9.105
100.0	199.2	12.9448	12.3095	11.8109	11.0226	8.1635	28.15	6.19	5.422E-10	-9.266
102.0	208.4	12.7858	12.1351	11.7379	10.8636	8.0045	27.98	6.52	3.760E-10	-9.425
104.0	220.0	12.6302	11.9634	11.6547	10.7080	7.8489	27.81	6.93	2.627E-10	-9.580
106.0	234.3	12.4797	11.7960	11.5622	10.5318	7.7554	27.65	7.43	1.855E-10	-9.732
108.0	251.2	12.3350	11.6350	11.4666	10.3383	7.7203	27.48	8.01	1.327E-10	-9.877
110.0	270.7	12.1960	11.4809	11.3733	10.1540	7.6849	27.32	8.69	9.635E-11	-10.016
115.C	330.4	11.8774	11.1292	11.1542	9.7364	7.5981	26.94	10.78	4.638E-11	-10.334
120.0	402.9	11.6014	10.8263	10.9597	9.3797	7.5176	26.59	13.34	2.472E-11	-10.607
125.0	482.9	11.3663	10.5689	10.7916	9.0779	7.4465	26.26	16.21	1.451E-11	-10.838
130.0	564.1	11.1668	10.3506	10.6487	8.8222	7.3857	25.97	19.18	9.248E-12	-11.034
135.0	644.2	10.9950	10.1627	10.5259	8.6018	7.3337	25.70	22.16	6.290E-12	-11.201
140.0	722.3	10.8447	9.9979	10.4187	8.4085	7.2885	25.45	25.13	4.445E-12	-11.347
145.0	797.7	10.7112	9.8516	10.3240	8.2365	7.2488	25.21	28.06	3.341E-12	-11.476
150.0	870.0	10.5913	9.7200	10.2393	8.0816	7.2137	24.99	30.92	2.563E-12	-11.591
155.0	938.9	10.4825	9.6005	10.1630	7.9406	7.1824	24.78	33.70	2.017E-12	-11.695
160.0	1004.3	10.3830	9.4909	10.0936	7.8111	7.1542	24.58	36.40	1.622E-12	-11.790
170.0	1124.6	10.2057	9.2955	9.9713	7.5793	7.1055	24.21	41.52	1.103E-12	-11.957
180.0	1231.4	10.0510	9.1243	9.8660	7.3754	7.0646	23.86	46.27	7.906E-13	-12.102
190.0	1325.7	9.9130	8.9712	9.7735	7.1923	7.0295	23.53	50.67	5.892E-13	-12.230
200.0	1408.5	9.7879	8.8321	9.6908	7.0251	6.9991	23.21	54.73	4.526E-13	-12.344
210.0	1480.6	9.6730	8.7040	9.6159	6.8706	6.9724	22.92	58.46	3.562E-13	-12.448
220.0	1542.9	9.5664	8.5847	9.5473	6.7260	6.9486	22.63	61.88	2.859E-13	-12.544
230.0	1596.4	9.4663	8.4725	9.4838	6.5897	6.9272	22.35	65.02	2.331E-13	-12.632
240.0	1641.9	9.3717	8.3662	9.4245	6.4600	6.9079	22.08	67.89	1.927E-13	-12.715
250.0	1680.5	9.2816	8.2646	9.3687	6.3357	6.8902	21.82	70.53	1.610E-13	-12.793
260.0	1713.1	9.1951	8.1670	9.3157	6.2159	6.8739	21.57	72.95	1.358E-13	-12.867
270.0	1740.5	9.1116	8.0727	9.2651	6.0998	6.8586	21.33	75.20	1.155E-13	-12.938
280.0	1763.6	9.0307	7.9810	9.2164	5.9868	6.8443	21.09	77.29	9.884E-14	-13.005
290.0	1782.9	8.9518	7.8916	9.1693	5.8764	6.8308	20.86	79.24	8.509E-14	-13.070
300.0	1799.2	8.8747	7.8041	9.1236	5.7681	6.8179	20.63	81.08	7.363E-14	-13.133
310.0	1813.0	8.7991	7.7181	9.0790	5.6617	6.8055	20.41	82.82	6.400E-14	-13.194
320.0	1824.5	8.7247	7.6336	9.0353	5.5568	6.7936	20.20	84.48	5.584E-14	-13.253
330.0	1834.3	8.6513	7.5502	8.9924	5.4532	6.7820	20.00	86.06	4.889E-14	-13.311
340.0	1842.7	8.5790	7.4678	8.9502	5.3508	6.7707	19.80	87.58	4.295E-14	-13.367
350.0	1849.8	8.5074	7.3862	8.9086	5.2494	6.7597	19.60	89.05	3.783E-14	-13.422
360.0	1855.8	8.4365	7.3054	8.8675	5.1489	6.7489	19.42	90.47	3.341E-14	-13.476
370.0	1861.0	8.3662	7.2253	8.8269	5.0492	6.7383	19.24	91.85	2.958E-14	-13.529
380.0	1865.5	8.2965	7.1459	8.7866	4.9503	6.7278	19.06	93.19	2.624E-14	-13.581
390.0	1869.3	8.2273	7.0669	8.7467	4.8520	6.7175	18.89	94.49	2.334E-14	-13.632
400.0	1872.6	8.1585	6.9885	8.7071	4.7542	6.7073	18.73	95.76	2.079E-14	-13.682

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 1900 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1878.1	8.0222	6.8330	8.6287	4.5604	6.6872		18.43	98.21	1.659E-14	-13.780
440.0	1882.2	7.8874	6.6791	8.5513	4.3685	6.6675		18.14	100.56	1.333E-14	-13.875
460.0	1885.4	7.7537	6.5266	[illegible]	4.1783	6.6481		17.88	102.81	1.077E-14	-13.968
480.0	1888.0	7.6213	6.3753	8.3938	3.9896	6.6288		17.64	104.98	8.754E-15	-14.058
500.0	1889.9	7.4899	6.2253	8.3235	3.8024	6.6098	3.0811	17.41	107.07	7.149E-15	-14.146
520.0	1891.5	7.3594	6.0763	8.2488	3.6165	6.5910	3.0760	17.20	109.09	5.865E-15	-14.232
540.0	1892.8	7.2299	5.9284	8.1747	3.4320	6.5724	3.0711	17.01	111.06	4.832E-15	-14.316
560.0	1893.9	7.1012	5.7815	8.1012	3.2486	6.5539	3.0662	16.83	112.97	3.997E-15	-14.398
580.0	1894.7	6.9735	5.6356	8.0281	3.0665	6.5355	3.0614	16.66	114.85	3.318E-15	-14.479
600.0	1895.4	6.8465	5.4906	7.9555	2.8855	6.5173	3.0567	16.49	116.69	2.763E-15	-14.559
620.0	1896.0	6.7203	5.3465	7.8834	2.7056	6.4992	3.0520	16.34	118.52	2.308E-15	-14.637
640.0	1896.5	6.5949	5.2032	7.8117	2.5268	6.4813	3.0474	16.19	120.35	1.934E-15	-14.714
660.0	1897.0	6.4703	5.0609	7.7405	2.3491	6.4634	3.0428	16.04	122.17	1.624E-15	-14.789
680.0	1897.3	6.3464	4.9194	7.6697	2.1725	6.4457	3.0383	15.89	124.02	1.368E-15	-14.864
700.0	1897.6	6.2232	4.7787	7.5994	1.9969	6.4280	3.0338	15.75	125.90	1.155E-15	-14.937
720.0	1897.9	6.1008	4.6389	7.5294	1.8224	6.4105	3.0293	15.60	127.83	9.770E-16	-15.010
740.0	1898.1	5.9791	4.4999	7.4599	1.6488	6.3931	3.0249	15.45	129.82	8.284E-16	-15.082
760.0	1898.3	5.8581	4.3616	7.3907	1.4763	6.3758	3.0205	15.30	131.88	7.038E-16	-15.153
780.0	1898.5	5.7378	4.2242	7.3220	1.3047	6.3586	3.0161	15.14	134.04	5.991E-16	-15.223
800.0	1898.6	5.6181	4.0876	7.2537	1.1342	6.3415	3.0118	14.97	136.30	5.110E-16	-15.292
820.0	1898.8	5.4992	3.9517	7.1857	.9645	6.3245	3.0075	14.80	138.69	4.366E-16	-15.360
840.0	1898.9	5.3809	3.8166	7.1182	.7959	6.3076	3.0032	14.61	141.22	3.737E-16	-15.427
860.0	1899.0	5.2633	3.6823	7.0510	.6282	6.2907	2.9990	14.42	143.92	3.205E-16	-15.494
880.0	1899.1	5.1464	3.5487	6.9842	.4614	6.2740	2.9947	14.21	146.80	2.753E-16	-15.560
900.0	1899.2	5.0301	3.4158	6.9177	.2956	6.2574	2.9905	14.00	149.89	2.370E-16	-15.625
920.0	1899.2	4.9144	3.2837	6.8517	.1307	6.2409	2.9863	13.77	153.20	2.043E-16	-15.690
940.0	1899.3	4.7994	3.1524	6.7860		6.2244	2.9822	13.54	156.76	1.764E-16	-15.753
960.0	1899.3	4.6850	3.0217	6.7206		6.2081	2.9781	13.29	160.59	1.527E-16	-15.816
980.0	1899.4	4.5713	2.8918	6.6557		6.1918	2.9740	13.02	164.71	1.323E-16	-15.878
1000.0	1899.4	4.4581	2.7626	6.5911		6.1756	2.9699	12.75	169.16	1.149E-16	-15.940
1050.0	1899.5	4.1780	2.4426	6.4311		6.1356	2.9598	12.02	181.83	8.148E-17	-16.089
1100.0	1899.6	3.9017	2.1269	6.2732		6.0961	2.9498	11.25	197.02	5.851E-17	-16.233
1150.0	1899.7	3.6290	1.8154	6.1175		6.0571	2.9400	10.44	215.04	4.260E-17	-16.371
1200.0	1899.7	3.3599	1.5081	5.9638		6.0187	2.9303	9.64	236.10	3.149E-17	-16.502
1250.0	1899.8	3.0944	1.2048	5.8122		5.9807	2.9207	8.86	260.25	2.366E-17	-16.626
1300.0	1899.8	2.8324	.9055	5.6625		5.9433	2.9113	8.13	287.34	1.808E-17	-16.743
1350.0	1899.8	2.5738	.6101	5.5148		5.9064	2.9020	7.47	316.99	1.407E-17	-16.852
1400.0	1899.9	2.3185	.3185	5.3690		5.8699	2.8928	6.88	348.58	1.115E-17	-16.953
1450.0	1899.9	2.0665	.0307	5.2251		5.8339	2.8837	6.37	381.35	9.001E-18	-17.046
1500.0	1899.9	1.8177		5.0830		5.7983	2.8748	5.94	414.46	7.397E-18	-17.131
1600.0	1899.9	1.3295		4.8041		5.7286	2.8572	5.27	478.51	5.252E-18	-17.280
1700.0	1899.9	.8534		4.5322		5.6605	2.8401	4.83	535.89	3.948E-18	-17.404
1800.0	1899.9	.3890		4.2670		5.5942	2.8233	4.54	584.65	3.103E-18	-17.508
1900.0	1900.0			4.0082		5.5294	2.8070	4.35	625.15	2.521E-18	-17.598
2000.0	1900.0			3.7555		5.4662	2.7911	4.23	658.90	2.097E-18	-17.678
2100.0	1900.0			3.5089		5.4045	2.7756	4.15	687.64	1.774E-18	-17.751
2200.0	1900.0			3.2680		5.3443	2.7604	4.09	712.86	1.518E-18	-17.819
2300.0	1900.0			3.0327		5.2854	2.7456	4.06	735.72	1.312E-18	-17.882
2400.0	1900.0			2.8028		5.2279	2.7311	4.04	757.03	1.141E-18	-17.943
2500.0	1900.0			2.5780		5.1716	2.7169	4.02	777.38	9.977E-19	-18.001

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 2000 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
90.0	183.0	13.7498	13.1724	11.6094	11.8276	8.9685	28.88	5.53	3.460E-09	-8.461
92.0	183.4	13.5907	13.0065	11.7818	11.6685	8.8094	28.79	5.56	2.399E-09	-8.620
94.0	184.8	13.4299	12.8356	11.8691	11.5077	8.6486	28.65	5.63	1.657E-09	-8.781
96.0	187.8	13.2680	12.6612	11.8903	11.3458	8.4867	28.49	5.76	1.141E-09	-8.943
98.0	192.5	13.1058	12.4852	11.8656	11.1836	8.3245	28.32	5.94	7.855E-10	-9.105
100.0	199.4	12.9446	12.3093	11.8107	11.0224	8.1633	28.15	6.20	5.419E-10	-9.266
102.0	208.7	12.7856	12.1348	11.7376	10.8634	8.0043	27.98	6.53	3.757E-10	-9.425
104.0	220.5	12.6299	11.9631	11.6545	10.7077	7.8486	27.81	6.94	2.626E-10	-9.581
106.0	234.9	12.4794	11.7958	11.5619	10.5316	7.7551	27.65	7.45	1.854E-10	-9.732
108.0	252.0	12.3348	11.6349	11.4662	10.3383	7.7198	27.49	8.04	1.327E-10	-9.877
110.0	271.8	12.1960	11.4810	11.3728	10.1543	7.6843	27.33	8.73	9.633E-11	-10.016
115.0	332.2	11.8777	11.1299	11.1537	9.7376	7.5973	26.94	10.84	4.641E-11	-10.333
120.0	405.6	11.6024	10.8277	10.9593	9.3820	7.5166	26.59	13.42	2.477E-11	-10.606
125.0	486.6	11.3680	10.5712	10.7915	9.0814	7.4454	26.27	16.33	1.456E-11	-10.837
130.0	568.8	11.1693	10.3538	10.6489	8.8269	7.3846	25.98	19.33	9.297E-12	-11.032
135.0	650.1	10.9982	10.1666	10.5263	8.6076	7.3325	25.71	22.35	6.331E-12	-11.199
140.0	729.5	10.8483	10.0026	10.4195	8.4153	7.2872	25.47	25.37	4.530E-12	-11.344
145.0	806.6	10.7153	9.8569	10.3246	8.2441	7.2474	25.24	28.35	3.370E-12	-11.472
150.0	880.8	10.5958	9.7258	10.2399	8.0900	7.2121	25.02	31.28	2.586E-12	-11.587
155.0	952.1	10.4873	9.6067	10.1635	7.9497	7.1805	24.81	34.14	2.037E-12	-11.691
160.0	1020.1	10.3881	9.4976	10.0940	7.8209	7.1520	24.62	36.93	1.638E-12	-11.786
170.0	1146.5	10.2115	9.3031	9.9713	7.5907	7.1025	24.25	42.26	1.115E-12	-11.953
180.0	1260.2	10.0575	9.1330	9.8658	7.3886	7.0609	23.91	47.26	7.998E-13	-12.097
190.0	1361.9	9.9205	8.9813	9.7731	7.2076	7.0253	23.59	51.93	5.969E-13	-12.224
200.0	1452.0	9.7966	8.8439	9.6904	7.0429	6.9943	23.28	56.25	4.594E-13	-12.338
210.0	1531.1	9.6833	8.7177	9.6158	6.8911	6.9672	22.99	60.25	3.624E-13	-12.441
220.0	1600.0	9.5785	8.6007	9.5478	6.7498	6.9430	22.72	63.92	2.916E-13	-12.535
230.0	1659.3	9.4806	8.4911	9.4850	6.6168	6.9215	22.45	67.28	2.386E-13	-12.622
240.0	1710.1	9.3883	8.3875	9.4267	6.4908	6.9021	22.19	70.36	1.979E-13	-12.704
250.0	1753.3	9.3007	8.2890	9.3720	6.3705	6.8844	21.94	73.18	1.661E-13	-12.780
260.0	1789.8	9.2169	8.1945	9.3203	6.2548	6.8682	21.70	75.77	1.407E-13	-12.852
270.0	1820.5	9.1362	8.1034	9.2711	6.1429	6.8531	21.46	78.15	1.201E-13	-12.920
280.0	1846.4	9.0582	8.0152	9.2239	6.0343	6.8390	21.23	80.36	1.033E-13	-12.986
290.0	1868.2	8.9823	7.9293	9.1784	5.9283	6.8258	21.01	82.42	8.934E-14	-13.049
300.0	1886.5	8.9083	7.8453	9.1343	5.8245	6.8131	20.79	84.35	7.756E-14	-13.110
310.0	1902.0	8.8358	7.7630	9.0914	5.7226	6.8011	20.58	86.17	6.781E-14	-13.169
320.0	1915.0	8.7646	7.6821	9.0494	5.6223	6.7895	20.38	87.90	5.944E-14	-13.226
330.0	1926.0	8.6944	7.6023	9.0083	5.5234	6.7783	20.18	89.55	5.228E-14	-13.282
340.0	1935.4	8.6253	7.5236	8.9679	5.4256	6.7674	19.98	91.13	4.613E-14	-13.336
350.0	1943.4	8.5569	7.4458	8.9281	5.3289	6.7568	19.80	92.65	4.082E-14	-13.389
360.0	1950.2	8.4893	7.3687	8.8888	5.2331	6.7464	19.61	94.12	3.621E-14	-13.441
370.0	1956.1	8.4223	7.2924	8.8500	5.1381	6.7362	19.44	95.55	3.219E-14	-13.492
380.0	1961.1	8.3558	7.2166	8.8115	5.0438	6.7262	19.26	96.93	2.869E-14	-13.542
390.0	1965.4	8.2899	7.1415	8.7735	4.9502	6.7163	19.10	98.28	2.561E-14	-13.592
400.0	1969.2	8.2244	7.0668	8.7357	4.8572	6.7065	18.94	99.60	2.291E-14	-13.640

Table 5 (Cont.)

EXOSPHERIC TEMPERATURE = 2000 DEGREES

HEIGHT KM	TEMP DEG K	LOG N(N2) /CM3	LOG N(O2) /CM3	LOG N(O) /CM3	LOG N(A) /CM3	LOG N(HE) /CM3	LOG N(H) /CM3	MEAN MOL WT	SCALE HT KM	DENSITY GM/CM3	LOG DEN GM/CM3
420.0	1975.3	8.0947	6.9188	8.6610	4.6727	6.6874		18.63	102.14	1.843E-14	-13.734
440.0	1980.0	7.9663	6.7723	8.5873	4.4902	6.6685		18.35	104.58	1.492E-14	-13.826
460.0	1983.6	7.8392	6.6273	8.5144	4.3093	6.6500		18.09	106.93	1.215E-14	-13.915
480.0	1986.4	7.7133	6.4834	8.4422	4.1299	6.6317		17.84	109.19	9.948E-15	-14.002
500.0	1988.7	7.5883	6.3408	8.3706	3.9519	6.6136	3.0095	17.61	111.38	8.183E-15	-14.087
520.0	1990.5	7.4643	6.1992	8.2996	3.7752	6.5957	3.0046	17.40	113.49	6.761E-15	-14.170
540.0	1991.9	7.3412	6.0586	8.2291	3.5998	6.5780	2.9999	17.20	115.55	5.609E-15	-14.251
560.0	1993.1	7.2189	5.9190	8.1592	3.4255	6.5604	2.9952	17.02	117.55	4.671E-15	-14.331
580.0	1994.1	7.0975	5.7803	8.0897	3.2524	6.5429	2.9907	16.85	119.51	3.904E-15	-14.409
600.0	1994.9	6.9768	5.6425	8.0207	3.0804	6.5256	2.9862	16.68	121.43	3.273E-15	-14.485
620.0	1995.5	6.8569	5.5055	7.9522	2.9095	6.5084	2.9817	16.53	123.32	2.753E-15	-14.560
640.0	1996.1	6.7377	5.3694	7.8841	2.7397	6.4913	2.9773	16.38	125.19	2.322E-15	-14.634
660.0	1996.6	6.6193	5.2342	7.8164	2.5708	6.4743	2.9729	16.23	127.06	1.963E-15	-14.707
680.0	1997.0	6.5016	5.0997	7.7492	2.4030	6.4575	2.9686	16.09	128.93	1.664E-15	-14.779
700.0	1997.3	6.3846	4.9661	7.6823	2.2362	6.4407	2.9643	15.95	130.82	1.414E-15	-14.849
720.0	1997.6	6.2683	4.8332	7.6158	2.0703	6.4241	2.9601	15.81	132.73	1.204E-15	-14.919
740.0	1997.9	6.1526	4.7011	7.5497	1.9054	6.4075	2.9559	15.68	134.68	1.028E-15	-14.988
760.0	1998.1	6.0376	4.5698	7.4841	1.7415	6.3911	2.9517	15.53	136.68	8.789E-16	-15.056
780.0	1998.3	5.9233	4.4392	7.4188	1.5785	6.3747	2.9475	15.39	138.75	7.530E-16	-15.123
800.0	1998.5	5.8097	4.3094	7.3538	1.4164	6.3585	2.9434	15.24	140.90	6.463E-16	-15.190
820.0	1998.6	5.6967	4.1803	7.2893	1.2553	6.3423	2.9393	15.09	143.13	5.557E-16	-15.255
840.0	1998.7	5.5843	4.0520	7.2251	1.0951	6.3262	2.9352	14.93	145.48	4.786E-16	-15.320
860.0	1998.9	5.4726	3.9243	7.1613	.9357	6.3103	2.9312	14.76	147.95	4.129E-16	-15.384
880.0	1999.0	5.3615	3.7974	7.0978	.7773	6.2944	2.9272	14.59	150.56	3.569E-16	-15.447
900.0	1999.0	5.2510	3.6712	7.0347	.6197	6.2786	2.9232	14.41	153.32	3.089E-16	-15.510
920.0	1999.1	5.1411	3.5457	6.9719	.4631	6.2629	2.9192	14.21	156.26	2.678E-16	-15.572
940.0	1999.2	5.0318	3.4209	6.9095	.3073	6.2473	2.9153	14.01	159.40	2.326E-16	-15.633
960.0	1999.3	4.9232	3.2968	6.8474	.1523	6.2317	2.9113	13.80	162.74	2.023E-16	-15.694
980.0	1999.3	4.8151	3.1734	6.7857		6.2163	2.9074	13.58	166.32	1.762E-16	-15.754
1000.0	1999.4	4.7076	3.0506	6.7243		6.2009	2.9036	13.34	170.15	1.538E-16	-15.813
1050.0	1999.5	4.4415	2.7466	6.5723		6.1629	2.8940	12.72	180.96	1.102E-16	-15.958
1100.0	1999.6	4.1789	2.4467	6.4224		6.1254	2.8845	12.04	193.82	7.984E-17	-16.098
1150.0	1999.6	3.9199	2.1508	6.2744		6.0883	2.8752	11.31	209.04	5.851E-17	-16.233
1200.0	1999.7	3.6643	1.8588	6.1284		6.0518	2.8660	10.56	226.91	4.341E-17	-16.362
1250.0	1999.7	3.4121	1.5707	5.9844		6.0158	2.8569	9.80	247.61	3.264E-17	-16.486
1300.0	1999.8	3.1631	1.2864	5.8422		5.9802	2.8479	9.07	271.22	2.489E-17	-16.604
1350.0	1999.8	2.9174	1.0057	5.7019		5.9451	2.8391	8.37	297.67	1.927E-17	-16.715
1400.0	1999.8	2.6749	.7287	5.5633		5.9104	2.8303	7.73	326.67	1.515E-17	-16.820
1450.0	1999.9	2.4355	.4552	5.4266		5.8762	2.8217	7.15	357.75	1.211E-17	-16.917
1500.0	1999.9	2.1991	.1853	5.2916		5.8424	2.8132	6.64	390.31	9.831E-18	-17.007
1600.0	1999.9	1.7353		5.0267		5.7762	2.7965	5.81	456.98	6.798E-18	-17.168
1700.0	1999.9	1.2831		4.7684		5.7116	2.7802	5.23	521.15	4.981E-18	-17.303
1800.0	1999.9	.8419		4.5164		5.6485	2.7644	4.82	578.91	3.832E-18	-17.417
1900.0	1999.9	.4114		4.2705		5.5870	2.7489	4.55	628.71	3.064E-18	-17.514
2000.0	2000.0			4.0305		5.5269	2.7337	4.37	670.87	2.522E-18	-17.598
2100.0	2000.0			3.7962		5.4683	2.7190	4.25	706.63	2.121E-18	-17.673
2200.0	2000.0			3.5674		5.4111	2.7046	4.17	737.49	1.812E-18	-17.742
2300.0	2000.0			3.3438		5.3552	2.6905	4.11	764.80	1.565E-18	-17.805
2400.0	2000.0			3.1254		5.3005	2.6767	4.07	789.62	1.364E-18	-17.865
2500.0	2000.0			2.9119		5.2471	2.6633	4.05	812.77	1.196E-18	-17.922

Table 6. Atmospheric density as a function of height and exospheric temperature (decimal logarithms, g/cm^3).

SUMMARY OF LOG DENSITIES

	600	650	700	750	800	850	900	950	1000	1050
90	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461
92	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620
94	-8.779	-8.779	-8.780	-8.780	-8.780	-8.780	-8.780	-8.780	-8.780	-8.780
96	-8.939	-8.940	-8.940	-8.940	-8.940	-8.941	-8.941	-8.941	-8.941	-8.941
98	-9.099	-9.100	-9.100	-9.101	-9.101	-9.101	-9.102	-9.102	-9.102	-9.102
100	-9.258	-9.259	-9.259	-9.260	-9.261	-9.261	-9.262	-9.262	-9.262	-9.263
102	-9.415	-9.416	-9.417	-9.418	-9.418	-9.419	-9.420	-9.420	-9.421	-9.421
104	-9.570	-9.571	-9.572	-9.573	-9.574	-9.574	-9.575	-9.575	-9.576	-9.576
106	-9.722	-9.723	-9.724	-9.725	-9.725	-9.726	-9.726	-9.727	-9.727	-9.728
108	-9.870	-9.871	-9.871	-9.872	-9.872	-9.873	-9.873	-9.873	-9.874	-9.874
110	-10.014	-10.014	-10.014	-10.014	-10.014	-10.015	-10.015	-10.015	-10.015	-10.015
115	-10.350	-10.348	-10.346	-10.345	-10.344	-10.343	-10.342	-10.341	-10.340	-10.339
120	-10.650	-10.645	-10.641	-10.637	-10.634	-10.631	-10.628	-10.626	-10.624	-10.622
125	-10.914	-10.905	-10.897	-10.891	-10.885	-10.880	-10.876	-10.872	-10.868	-10.865
130	-11.143	-11.130	-11.119	-11.109	-11.101	-11.094	-11.087	-11.081	-11.076	-11.072
135	-11.340	-11.324	-11.309	-11.297	-11.286	-11.277	-11.269	-11.261	-11.255	-11.249
140	-11.513	-11.492	-11.475	-11.460	-11.447	-11.436	-11.426	-11.417	-11.410	-11.403
145	-11.667	-11.642	-11.622	-11.604	-11.589	-11.576	-11.564	-11.554	-11.546	-11.538
150	-11.808	-11.779	-11.755	-11.734	-11.717	-11.701	-11.689	-11.677	-11.667	-11.659
155	-11.940	-11.906	-11.878	-11.854	-11.834	-11.817	-11.802	-11.789	-11.778	-11.768
160	-12.064	-12.025	-11.993	-11.966	-11.943	-11.923	-11.907	-11.892	-11.880	-11.869
170	-12.296	-12.248	-12.207	-12.172	-12.143	-12.119	-12.098	-12.080	-12.064	-12.051
180	-12.512	-12.453	-12.404	-12.362	-12.327	-12.297	-12.271	-12.249	-12.230	-12.213
190	-12.714	-12.645	-12.588	-12.539	-12.498	-12.462	-12.431	-12.405	-12.382	-12.362
200	-12.904	-12.827	-12.762	-12.706	-12.658	-12.617	-12.582	-12.551	-12.524	-12.501
210	-13.085	-13.000	-12.927	-12.864	-12.811	-12.764	-12.724	-12.689	-12.658	-12.632
220	-13.258	-13.164	-13.084	-13.015	-12.956	-12.904	-12.859	-12.820	-12.786	-12.755
230	-13.422	-13.321	-13.234	-13.160	-13.095	-13.038	-12.989	-12.945	-12.907	-12.873
240	-13.581	-13.472	-13.379	-13.298	-13.228	-13.167	-13.113	-13.065	-13.023	-12.986
250	-13.733	-13.617	-13.518	-13.431	-13.356	-13.290	-13.232	-13.181	-13.135	-13.095
260	-13.881	-13.758	-13.652	-13.560	-13.480	-13.409	-13.347	-13.292	-13.243	-13.199
270	-14.024	-13.894	-13.782	-13.684	-13.599	-13.524	-13.458	-13.399	-13.347	-13.300
280	-14.164	-14.026	-13.908	-13.805	-13.715	-13.636	-13.566	-13.504	-13.448	-13.398
290	-14.300	-14.155	-14.030	-13.922	-13.828	-13.744	-13.670	-13.605	-13.546	-13.493
300	-14.434	-14.281	-14.150	-14.037	-13.937	-13.850	-13.772	-13.703	-13.641	-13.585
310	-14.565	-14.405	-14.268	-14.149	-14.044	-13.953	-13.871	-13.799	-13.734	-13.675
320	-14.694	-14.527	-14.383	-14.258	-14.149	-14.053	-13.968	-13.892	-13.824	-13.763
330	-14.821	-14.646	-14.496	-14.366	-14.252	-14.152	-14.063	-.3.984	-13.913	-13.849
340	-14.947	-14.764	-14.607	-14.472	-14.353	-14.249	-14.156	-14.073	-13.999	-13.932
350	-15.070	-14.880	-14.717	-14.576	-14.452	-14.344	-14.247	-14.161	-14.084	-14.015
360	-15.192	-14.995	-14.826	-14.679	-14.550	-14.437	-14.337	-14.248	-14.168	-14.095
370	-15.313	-15.109	-14.933	-14.780	-14.647	-14.530	-14.426	-14.333	-14.250	-14.175
380	-15.431	-15.221	-15.038	-14.880	-14.742	-14.620	-14.513	-14.417	-14.330	-14.252
390	-15.548	-15.331	-15.143	-14.979	-14.836	-14.710	-14.599	-14.499	-14.410	-14.329
400	-15.662	-15.440	-15.246	-15.077	-14.929	-14.799	-14.684	-14.581	-14.488	-14.405

Table 6 (Cont.)

SUMMARY OF LOG DENSITIES

	600	650	700	750	800	850	900	950	1000	1050
[illegible]	-15.884	-15.654	-15.469	-15.270	-15.112	-14.974	-14.851	-14.741	-14.642	-14.553
[illegible]	-16.094	-15.860	-15.647	-15.458	-15.292	-15.145	-15.014	-14.897	-14.793	-14.698
[illegible]	-16.290	-16.057	-15.839	-15.642	-15.467	-15.312	-15.174	-15.051	-14.940	-14.840
[illegible]	-16.458	-16.244	-16.024	-15.821	-15.639	-15.477	-15.332	-15.202	-15.085	-14.980
[illegible]	-16.627	-16.418	-16.200	-15.994	-15.806	-15.637	-15.484	-15.350	-15.227	-15.116
[illegible]	-16.765	-16.578	-16.367	-16.160	-15.969	-15.794	-15.637	-15.495	-15.367	-15.251
[illegible]	-16.882	-16.721	-16.522	-16.319	-16.125	-15.947	-15.785	-15.637	-15.504	-15.383
[illegible]	-16.982	-16.848	-16.564	-16.468	-16.275	-16.095	-15.929	-15.777	-15.639	-15.513
[illegible]	-17.065	-16.958	-16.793	-16.607	-16.418	-16.237	-16.068	-15.913	-15.770	-15.640
[illegible]	-17.137	-17.054	-16.908	-16.734	-16.552	-16.373	-16.203	-16.045	-15.899	-15.765
[illegible]	-17.199	-17.137	-17.010	-16.850	-16.677	-16.502	-16.333	-16.174	-16.025	-15.888
[illegible]	-17.255	-17.210	-17.100	-16.955	-16.792	-16.624	-16.457	-16.297	-16.147	-16.007
[illegible]	-17.305	-17.274	-17.179	-17.049	-16.898	-16.737	-16.575	-16.416	-16.265	-16.124
[illegible]	-17.351	-17.332	-17.250	-17.132	-16.993	-16.841	-16.685	-16.529	-16.379	-16.237
[illegible]	-17.394	-17.386	-17.314	-17.207	-17.079	-16.937	-16.788	-16.637	-16.488	-16.346
[illegible]	-17.434	-17.435	-17.371	-17.274	-17.156	-17.024	-16.883	-16.737	-16.592	-16.451
[illegible]	-17.473	-17.482	-17.425	-17.335	-17.227	-17.104	-16.971	-16.832	-16.691	-16.551
760	-17.510	-17.523	-17.475	-17.392	-17.290	-17.176	-17.051	-16.919	-16.783	-16.647
780	-17.545	-17.563	-17.523	-17.444	-17.348	-17.241	-17.125	-17.000	-16.870	-16.738
800	-17.579	-17.610	-17.568	-17.493	-17.402	-17.302	-17.192	-17.074	-16.950	-16.823
820	-17.612	-17.650	-17.612	-17.540	-17.452	-17.357	-17.253	-17.143	-17.025	-16.903
840	-17.644	-17.688	-17.654	-17.584	-17.500	-17.408	-17.310	-17.205	-17.094	-16.978
860	-17.674	-17.725	-17.695	-17.627	-17.545	-17.456	-17.363	-17.263	-17.158	-17.047
880	-17.703	-17.761	-17.735	-17.669	-17.588	-17.501	-17.411	-17.317	-17.217	-17.112
900	-17.732	-17.797	-17.774	-17.710	-17.630	-17.545	-17.457	-17.367	-17.272	-17.171
920	-17.759	-17.831	-17.812	-17.749	-17.670	-17.586	-17.501	-17.413	-17.322	-17.227
940	-17.785	-17.864	-17.850	-17.788	-17.709	-17.626	-17.542	-17.457	-17.370	-17.279
960	-17.811	-17.896	-17.886	-17.827	-17.748	-17.665	-17.582	-17.498	-17.414	-17.327
980	-17.835	-17.928	-17.922	-17.864	-17.786	-17.703	-17.620	-17.538	-17.456	-17.372
1000	-17.859	-17.958	-17.957	-17.901	-17.823	-17.739	-17.657	-17.576	-17.496	-17.414
1050	-17.915	-18.030	-18.042	-17.991	-17.913	-17.829	-17.746	-17.665	-17.587	-17.511
1100	-17.966	-18.097	-18.122	-18.078	-18.001	-17.915	-17.830	-17.749	-17.672	-17.597
1150	-18.014	-18.159	-18.198	-18.161	-18.086	-17.999	-17.912	-17.829	-17.751	-17.677
1200	-18.058	-18.217	-18.270	-18.241	-18.169	-18.081	-17.992	-17.907	-17.826	-17.751
1250	-18.100	-18.270	-18.337	-18.317	-18.249	-18.161	-18.070	-17.982	-17.900	-17.823
1300	-18.139	-18.319	-18.400	-18.391	-18.326	-18.239	-18.146	-18.056	-17.971	-17.893
1350	-18.176	-18.365	-18.458	-18.460	-18.401	-18.315	-18.221	-18.128	-18.041	-17.960
1400	-18.211	-18.408	-18.513	-18.526	-18.474	-18.389	-18.294	-18.199	-18.109	-18.026
1450	-18.245	-18.448	-18.564	-18.589	-18.544	-18.461	-18.365	-18.269	-18.177	-18.091
1500	-18.278	-18.485	-18.612	-18.649	-18.611	-18.532	-18.436	-18.337	-18.243	-18.155
1600	-18.340	-18.554	-18.699	-18.758	-18.738	-18.666	-18.571	-18.471	-18.372	-18.279
1700	-18.398	-18.617	-18.775	-18.855	-18.853	-18.793	-18.701	-18.599	-18.497	-18.400
1800	-18.454	-18.675	-18.843	-18.940	-18.958	-18.910	-18.824	-18.722	-18.618	-18.517
1900	-18.508	-18.729	-18.904	-19.017	-19.053	-19.020	-18.941	-18.841	-18.735	-18.630
2000	-18.560	-18.781	-18.960	-19.085	-19.138	-19.121	-19.051	-18.954	-18.847	-18.740
2100	-18.610	-18.829	-19.012	-19.146	-19.215	-19.213	-19.154	-19.062	-18.956	-18.847
2200	-18.659	-18.876	-19.060	-19.201	-19.283	-19.297	-19.251	-19.165	-19.060	-18.950
2300	-18.706	-18.921	-19.106	-19.252	-19.345	-19.374	-19.340	-19.262	-19.160	-19.050
2400	-18.752	-18.965	-19.149	-19.299	-19.402	-19.444	-19.423	-19.354	-19.256	-19.146
2500	-18.797	-19.007	-19.191	-19.343	-19.453	-19.507	-19.500	-19.440	-19.347	-19.239

Table 6 (Cont.)

SUMMARY OF LOG DENSITIES

	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550
90	-8.451	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461
92	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620
94	-8.780	-8.780	-8.780	-8.780	-8.780	-8.780	-8.780	-8.781	-8.781	-8.781
96	-8.941	-8.942	-8.942	-8.942	-8.942	-8.942	-8.942	-8.942	-8.942	-8.942
98	-9.103	-9.103	-9.103	-9.103	-9.103	-9.104	-9.104	-9.104	-9.104	-9.104
100	-9.263	-9.263	-9.264	-9.264	-9.264	-9.264	-9.264	-9.265	-9.265	-9.265
102	-9.421	-9.422	-9.422	-9.422	-9.423	-9.423	-9.423	-9.423	-9.424	-9.424
104	-9.577	-9.577	-9.577	-9.578	-9.578	-9.578	-9.579	-9.579	-9.579	-9.579
106	-9.728	-9.728	-9.729	-9.729	-9.729	-9.730	-9.730	-9.730	-9.730	-9.730
108	-9.874	-9.875	-9.875	-9.875	-9.875	-9.876	-9.876	-9.876	-9.876	-9.876
110	-10.015	-10.015	-10.015	-10.015	-10.015	-10.016	-10.016	-10.016	-10.016	-10.016
115	-10.339	-10.338	-10.338	-10.337	-10.337	-10.336	-10.336	-10.336	-10.336	-10.335
120	-10.621	-10.619	-10.618	-10.617	-10.615	-10.614	-10.613	-10.613	-10.612	-10.611
125	-10.862	-10.860	-10.857	-10.855	-10.853	-10.851	-10.850	-10.848	-10.847	-10.846
130	-11.068	-11.064	-11.061	-11.058	-11.055	-11.052	-11.050	-11.048	-11.046	-11.044
135	-11.244	-11.239	-11.235	-11.231	-11.228	-11.225	-11.222	-11.219	-11.216	-11.21[illegible]
140	-11.397	-11.391	-11.386	-11.382	-11.378	-11.374	-11.371	-11.368	-11.365	-11.362
145	-11.531	-11.525	-11.519	-11.515	-11.510	-11.506	-11.502	-11.499	-11.495	-11.492
150	-11.651	-11.644	-11.638	-11.633	-11.628	-11.623	-11.619	-11.615	-11.612	-11.609
155	-11.760	-11.752	-11.746	-11.740	-11.734	-11.729	-11.725	-11.721	-11.717	-11.714
160	-11.860	-11.851	-11.844	-11.837	-11.831	-11.826	-11.821	-11.817	-11.8[illegible]3	-11.809
170	-12.039	-12.029	-12.020	-12.012	-12.005	-11.998	-11.993	-11.988	-11.983	-11.979
180	-12.199	-12.186	-12.175	-12.166	-12.157	-12.149	-12.143	-12.137	-12.131	-12.126
190	-12.345	-12.330	-12.317	-12.305	-12.295	-12.286	-12.277	-12.270	-12.264	-12.258
200	-12.481	-12.463	-12.447	-12.433	-12.421	-12.410	-12.401	-12.392	-12.384	-12.377
210	-12.608	-12.587	-12.569	-12.553	-12.539	-12.526	-12.515	-12.505	-12.495	-12.487
220	-12.729	-12.705	-12.684	-12.666	-12.649	-12.635	-12.621	-12.610	-12.599	-12.590
230	-12.844	-12.817	-12.794	-12.773	-12.754	-12.737	-12.722	-12.709	-12.697	-12.686
240	-12.953	-12.924	-12.898	-12.875	-12.854	-12.835	-12.818	-12.803	-12.789	-12.776
250	-13.059	-13.027	-12.998	-12.972	-12.949	-12.928	-12.909	-12.892	-12.877	-12.863
260	-13.160	-13.126	-13.094	-13.066	-13.041	-13.018	-12.997	-12.978	-12.961	-12.945
270	-13.259	-13.221	-13.187	-13.157	-13.129	-13.104	-13.081	-13.060	-13.042	-13.024
280	-13.353	-13.313	-13.277	-13.244	-13.214	-13.187	-13.163	-13.140	-13.120	-13.101
290	-13.446	-13.403	-13.364	-13.329	-13.297	-13.268	-13.242	-13.217	-13.195	-13.175
300	-13.535	-13.490	-13.449	-13.411	-13.377	-13.346	-13.318	-13.292	-13.268	-13.246
310	-13.622	-13.575	-13.531	-13.492	-13.456	-13.423	-13.393	-13.365	-13.340	-13.316
320	-13.707	-13.657	-13.612	-13.570	-13.532	-13.497	-13.465	-13.436	-13.409	-13.384
330	-13.791	-13.738	-13.690	-13.647	-13.607	-13.570	-13.536	-13.505	-13.477	-13.450
340	-13.872	-13.817	-13.767	-13.721	-13.679	-13.641	-13.606	-13.573	-13.543	-13.515
350	-13.952	-13.894	-13.842	-13.794	-13.751	-13.711	-13.673	-13.639	-13.608	-13.578
360	-14.030	-13.970	-13.916	-13.866	-13.821	-13.779	-13.740	-13.704	-13.671	-13.640
370	-14.107	-14.045	-13.988	-13.937	-13.889	-13.846	-13.805	-13.768	-13.733	-13.701
380	-14.182	-14.118	-14.059	-14.006	-13.957	-13.911	-13.869	-13.831	-13.795	-13.761
390	-14.256	-14.190	-14.129	-14.074	-14.023	-13.976	-13.932	-13.892	-13.855	-13.820
400	-14.330	-14.261	-14.198	-14.141	-14.088	-14.039	-13.994	-13.952	-13.914	-13.878

Table 6 (Cont.)

SUMMARY OF LOG DENSITIES

	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550
420	-14.473	-14.400	-14.333	-14.272	-14.215	-14.163	-14.115	-14.071	-14.029	-13.990
440	-14.613	-14.535	-14.464	-14.399	-14.339	-14.284	-14.233	-14.185	-14.141	-14.100
460	-14.750	-14.668	-14.592	-14.524	-14.460	-14.402	-14.347	-14.297	-14.250	-14.207
480	-14.884	-14.797	-14.718	-14.645	-14.578	-14.517	-14.459	-14.406	-14.357	-14.311
500	-15.016	-14.925	-14.841	-14.765	-14.694	-14.629	-14.569	-14.513	-14.461	-14.412
520	-15.146	-15.050	-14.962	-14.882	-14.808	-14.739	-14.676	-14.617	-14.563	-14.512
540	-15.273	-15.173	-15.081	-14.997	-14.919	-14.848	-14.782	-14.720	-14.663	-14.609
560	-15.398	-15.294	-15.198	-15.110	-15.029	-14.954	-14.885	-14.821	-14.761	-14.705
580	-15.521	-15.413	-15.313	-15.222	-15.137	-15.059	-14.987	-14.920	-14.858	-14.799
600	-15.643	-15.530	-15.427	-15.331	-15.244	-15.163	-15.088	-15.018	-14.953	-14.892
620	-15.761	-15.645	-15.538	-15.440	-15.349	-15.265	-15.187	-15.114	-15.046	-14.983
640	-15.878	-15.758	-15.648	-15.546	-15.452	-15.365	-15.284	-15.209	-15.139	-15.073
660	-15.992	-15.869	-15.756	-15.651	-15.554	-15.464	-15.380	-15.302	-15.230	-15.162
680	-16.103	-15.978	-15.862	-15.754	-15.654	-15.561	-15.475	-15.395	-15.320	-15.250
700	-16.211	-16.084	-15.966	-15.856	-15.753	-15.658	-15.569	-15.486	-15.408	-15.336
720	-16.316	-16.188	-16.067	-15.955	-15.850	-15.752	-15.661	-15.576	-15.496	-15.421
740	-16.417	-16.288	-16.166	-16.052	-15.945	-15.845	-15.752	-15.664	-15.582	-15.506
760	-16.514	-16.385	-16.263	-16.147	-16.039	-15.937	-15.841	-15.751	-15.667	-15.589
780	-16.607	-16.479	-16.357	-16.240	-16.130	-16.026	-15.929	-15.837	-15.751	-15.670
800	-16.695	-16.569	-16.447	-16.330	-16.219	-16.114	-16.015	-15.922	-15.834	-15.751
820	-16.779	-16.655	-16.534	-16.418	-16.306	-16.200	-16.099	-16.005	-15.915	-15.831
840	-16.858	-16.737	-16.618	-16.502	-16.391	-16.284	-16.182	-16.086	-15.995	-15.909
860	-16.932	-16.815	-16.698	-16.584	-16.472	-16.365	-16.263	-16.166	-16.074	-15.986
880	-17.002	-16.889	-16.775	-16.662	-16.552	-16.445	-16.342	-16.244	-16.151	-16.062
900	-17.066	-16.958	-16.847	-16.737	-16.628	-16.521	-16.419	-16.320	-16.226	-16.137
920	-17.127	-17.023	-16.916	-16.808	-16.701	-16.596	-16.493	-16.395	-16.300	-16.210
940	-17.183	-17.084	-16.981	-16.876	-16.771	-16.667	-16.566	-16.467	-16.372	-16.281
960	-17.236	-17.140	-17.042	-16.940	-16.838	-16.736	-16.635	-16.537	-16.442	-16.351
980	-17.285	-17.194	-17.099	-17.001	-16.902	-16.802	-16.703	-16.605	-16.511	-16.419
1000	-17.331	-17.243	-17.152	-17.058	-16.962	-16.865	-16.767	-16.671	-16.577	-16.485
1050	-17.434	-17.354	-17.273	-17.187	-17.099	-17.009	-16.917	-16.825	-16.733	-16.643
1100	-17.524	-17.450	-17.375	-17.298	-17.218	-17.135	-17.050	-16.963	-16.876	-16.789
1150	-17.603	-17.535	-17.465	-17.394	-17.321	-17.245	-17.167	-17.086	-17.004	-16.921
1200	-17.680	-17.612	-17.545	-17.478	-17.410	-17.341	-17.269	-17.195	-17.118	-17.041
1250	-17.751	-17.683	-17.618	-17.554	-17.490	-17.425	-17.359	-17.290	-17.220	-17.147
1300	-17.819	-17.751	-17.686	-17.623	-17.562	-17.500	-17.438	-17.374	-17.309	-17.242
1350	-17.885	-17.815	-17.750	-17.688	-17.627	-17.568	-17.509	-17.449	-17.388	-17.326
1400	-17.949	-17.878	-17.811	-17.749	-17.689	-17.631	-17.574	-17.517	-17.460	-17.401
1450	-18.012	-17.939	-17.871	-17.807	-17.747	-17.690	-17.634	-17.579	-17.524	-17.469
1500	-18.073	-17.998	-17.929	-17.864	-17.803	-17.745	-17.690	-17.636	-17.583	-17.530
1600	-18.193	-18.114	-18.040	-17.973	-17.910	-17.850	-17.795	-17.741	-17.690	-17.640
1700	-18.309	-18.226	-18.148	-18.077	-18.011	-17.950	-17.892	-17.838	-17.786	-17.737
1800	-18.422	-18.334	-18.253	-18.178	-18.109	-18.044	-17.985	-17.929	-17.876	-17.826
1900	-18.532	-18.440	-18.355	-18.276	-18.204	-18.136	-18.074	-18.015	-17.961	-17.909
2000	-18.638	-18.543	-18.454	-18.372	-18.296	-18.225	-18.160	-18.099	-18.042	-17.989
2100	-18.742	-18.643	-18.550	-18.465	-18.386	-18.312	-18.244	-18.181	-18.121	-18.066
2200	-18.842	-18.740	-18.645	-18.556	-18.473	-18.397	-18.326	-18.260	-18.198	-18.141
2300	-18.940	-18.835	-18.736	-18.644	-18.558	-18.479	-18.405	-18.337	-18.273	-18.213
2400	-19.035	-18.927	-18.825	-18.730	-18.642	-18.559	-18.483	-18.412	-18.346	-18.284
2500	-19.126	-19.017	-18.912	-18.814	-18.723	-18.638	-18.559	-18.485	-18.417	-18.353

Table [illegible] (Cont.)

SUMMARY OF LOG DENSITIES

	1600	1650	1700	1750	1800	1850	1900	1950	2000
90	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461	-8.461
92	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620	-8.620
94	-8.781	-8.781	-8.781	-8.781	-8.781	-8.781	-8.781	-8.781	-8.781
96	-8.942	-8.942	-8.942	-8.942	-8.943	-8.943	-8.943	-8.943	-8.943
98	-9.104	-9.104	-9.104	-9.104	-9.105	-9.105	-9.105	-9.105	-9.105
100	-9.265	-9.265	-9.265	-9.265	-9.266	-9.266	-9.266	-9.266	-9.266
102	-9.424	-9.424	-9.424	-9.424	-9.425	-9.425	-9.425	-9.425	-9.425
104	-9.580	-9.580	-9.580	-9.580	-9.580	-9.580	-9.580	-9.581	-9.581
106	-9.731	-9.731	-9.731	-9.731	-9.731	-9.731	-9.732	-9.732	-9.732
108	-9.876	-9.876	-9.877	-9.877	-9.877	-9.877	-9.877	-9.877	-9.877
110	-10.016	-10.016	-10.016	-10.016	-10.016	-10.016	-10.016	-10.016	-10.016
115	-10.335	-10.335	-10.335	-10.334	-10.334	-10.334	-10.334	-10.334	-10.333
120	-10.610	-10.610	-10.609	-10.608	-10.608	-10.607	-10.607	-10.606	-10.606
125	-10.844	-10.843	-10.842	-10.841	-10.840	-10.839	-10.838	-10.838	-10.837
130	-11.042	-11.041	-11.039	-11.038	-11.036	-11.035	-11.034	-11.033	-11.032
135	-11.212	-11.210	-11.208	-11.206	-11.205	-11.203	-11.201	-11.200	-11.199
140	-11.359	-11.357	-11.355	-11.353	-11.351	-11.349	-11.347	-11.346	-11.344
145	-11.490	-11.487	-11.485	-11.482	-11.480	-11.478	-11.476	-11.474	-11.472
150	-11.606	-11.603	-11.600	-11.598	-11.596	-11.593	-11.591	-11.589	-11.587
155	-11.711	-11.708	-11.705	-11.702	-11.700	-11.697	-11.695	-11.693	-11.691
160	-11.806	-11.803	-11.800	-11.797	-11.795	-11.792	-11.790	-11.788	-11.786
170	-11.975	-11.972	-11.968	-11.965	-11.962	-11.960	-11.957	-11.955	-11.953
180	-12.122	-12.118	-12.114	-12.111	-12.108	-12.105	-12.102	-12.099	-12.097
190	-12.253	-12.248	-12.244	-12.240	-12.236	-12.233	-12.230	-12.227	-12.224
200	-12.371	-12.366	-12.361	-12.356	-12.352	-12.348	-12.344	-12.341	-12.338
210	-12.480	-12.473	-12.467	-12.462	-12.457	-12.452	-12.448	-12.444	-12.441
220	-12.581	-12.573	-12.566	-12.560	-12.554	-12.549	-12.544	-12.539	-12.535
230	-12.676	-12.667	-12.659	-12.651	-12.644	-12.638	-12.632	-12.627	-12.622
240	-12.765	-12.755	-12.745	-12.737	-12.729	-12.722	-12.715	-12.709	-12.704
250	-12.850	-12.838	-12.828	-12.818	-12.809	-12.801	-12.793	-12.786	-12.780
260	-12.931	-12.918	-12.906	-12.895	-12.885	-12.876	-12.867	-12.859	-12.852
270	-13.009	-12.994	-12.981	-12.969	-12.958	-12.947	-12.938	-12.929	-12.920
280	-13.084	-13.068	-13.053	-13.040	-13.027	-13.016	-13.005	-12.995	-12.986
290	-13.156	-13.139	-13.123	-13.108	-13.094	-13.082	-13.070	-13.059	-13.049
300	-13.226	-13.208	-13.190	-13.174	-13.160	-13.146	-13.133	-13.121	-13.110
310	-13.294	-13.274	-13.256	-13.239	-13.223	-13.208	-13.194	-13.181	-13.169
320	-13.361	-13.340	-13.320	-13.301	-13.284	-13.268	-13.253	-13.239	-13.226
330	-13.426	-13.403	-13.382	-13.362	-13.344	-13.327	-13.311	-13.296	-13.282
340	-13.489	-13.465	-13.443	-13.422	-13.402	-13.384	-13.367	-13.351	-13.336
350	-13.551	-13.526	-13.502	-13.480	-13.460	-13.440	-13.422	-13.405	-13.389
360	-13.612	-13.585	-13.560	-13.537	-13.516	-13.495	-13.476	-13.458	-13.441
370	-13.671	-13.644	-13.618	-13.593	-13.571	-13.549	-13.529	-13.510	-13.492
380	-13.730	-13.701	-13.674	-13.648	-13.624	-13.602	-13.581	-13.561	-13.542
390	-13.787	-13.757	-13.729	-13.702	-13.677	-13.654	-13.632	-13.611	-13.592
400	-13.844	-13.813	-13.783	-13.755	-13.730	-13.705	-13.682	-13.660	-13.640

Table 6 (Cont.)

SUMMARY OF LOG DENSITIES

	1600	1650	1700	1750	1800	1850	1900	1950	2000
420	-13.954	-13.921	-13.889	-13.859	-13.831	-13.805	-13.780	-13.757	-13.734
440	-14.062	-14.026	-13.992	-13.960	-13.930	-13.902	-13.875	-13.850	-13.826
460	-14.166	-14.128	-14.092	-14.058	-14.026	-13.996	-13.968	-13.941	-13.915
480	-14.268	-14.227	-14.189	-14.153	-14.120	-14.088	-14.058	-14.029	-14.002
500	-14.367	-14.324	-14.284	-14.247	-14.211	-14.177	-14.146	-14.116	-14.087
520	-14.464	-14.419	-14.377	-14.338	-14.300	-14.265	-14.232	-14.200	-14.170
540	-14.559	-14.513	-14.468	-14.427	-14.388	-14.351	-14.316	-14.283	-14.251
560	-14.653	-14.604	-14.558	-14.515	-14.474	-14.435	-14.398	-14.364	-14.331
580	-14.745	-14.694	-14.646	-14.600	-14.558	-14.517	-14.479	-14.443	-14.409
600	-14.835	-14.782	-14.732	-14.685	-14.640	-14.598	-14.559	-14.521	-14.485
620	-14.924	-14.869	-14.817	-14.768	-14.722	-14.673	-14.637	-14.598	-14.560
640	-15.012	-14.955	-14.901	-14.850	-14.802	-14.757	-14.714	-14.673	-14.634
660	-15.099	-15.039	-14.983	-14.931	-14.881	-14.834	-14.789	-14.747	-14.707
680	-15.184	-15.122	-15.065	-15.010	-14.959	-14.910	-14.864	-14.820	-14.779
700	-15.268	-15.205	-15.145	-15.089	-15.035	-14.985	-14.937	-14.892	-14.849
720	-15.351	-15.286	-15.224	-15.166	-15.111	-15.059	-15.010	-14.964	-14.919
740	-15.434	-15.366	-15.302	-15.242	-15.186	-15.132	-15.082	-15.034	-14.988
760	-15.515	-15.445	-15.380	-15.318	-15.260	-15.205	-15.153	-15.103	-15.056
780	-15.595	-15.523	-15.456	-15.393	-15.333	-15.276	-15.223	-15.172	-15.123
800	-15.674	-15.600	-15.531	-15.466	-15.405	-15.347	-15.292	-15.239	-15.190
820	-15.751	-15.677	-15.606	-15.539	-15.476	-15.416	-15.360	-15.306	-15.255
840	-15.828	-15.752	-15.679	-15.611	-15.547	-15.485	-15.427	-15.372	-15.320
860	-15.904	-15.826	-15.752	-15.682	-15.616	-15.554	-15.494	-15.438	-15.384
880	-15.978	-15.899	-15.824	-15.752	-15.685	-15.621	-15.560	-15.502	-15.447
900	-16.051	-15.971	-15.894	-15.822	-15.753	-15.687	-15.625	-15.566	-15.510
920	-16.123	-16.042	-15.964	-15.890	-15.820	-15.753	-15.690	-15.629	-15.572
940	-16.194	-16.111	-16.032	-15.957	-15.886	-15.818	-15.753	-15.692	-15.633
960	-16.263	-16.179	-16.100	-16.023	-15.951	-15.882	-15.816	-15.754	-15.694
980	-16.331	-16.247	-16.166	-16.089	-16.015	-15.945	-15.878	-15.815	-15.754
1000	-16.397	-16.312	-16.231	-16.153	-16.078	-16.007	-15.940	-15.875	-15.813
1050	-16.556	-16.470	-16.388	-16.308	-16.232	-16.159	-16.089	-16.022	-15.958
1100	-16.703	-16.619	-16.535	-16.456	-16.379	-16.304	-16.233	-16.164	-16.098
1150	-16.839	-16.756	-16.675	-16.596	-16.518	-16.443	-16.371	-16.300	-16.233
1200	-16.962	-16.883	-16.804	-16.726	-16.650	-16.575	-16.502	-16.431	-16.362
1250	-17.073	-16.998	-16.923	-16.847	-16.772	-16.699	-16.626	-16.555	-16.486
1300	-17.173	-17.102	-17.031	-16.958	-16.886	-16.814	-16.743	-16.673	-16.604
1350	-17.262	-17.196	-17.128	-17.060	-16.991	-16.921	-16.852	-16.783	-16.715
1400	-17.341	-17.279	-17.216	-17.152	-17.086	-17.020	-16.953	-16.886	-16.820
1450	-17.412	-17.355	-17.295	-17.235	-17.173	-17.110	-17.046	-16.981	-16.917
1500	-17.477	-17.422	-17.367	-17.310	-17.251	-17.192	-17.131	-17.069	-17.007
1600	-17.590	-17.540	-17.490	-17.439	-17.387	-17.334	-17.280	-17.224	-17.168
1700	-17.689	-17.641	-17.595	-17.548	-17.501	-17.453	-17.404	-17.354	-17.303
1800	-17.778	-17.731	-17.686	-17.642	-17.597	-17.553	-17.508	-17.463	-17.417
1900	-17.860	-17.814	-17.769	-17.725	-17.683	-17.641	-17.598	-17.556	-17.514
2000	-17.939	-17.891	-17.846	-17.802	-17.760	-17.719	-17.678	-17.638	-17.598
2100	-18.014	-17.965	-17.919	-17.874	-17.832	-17.791	-17.751	-17.712	-17.673
2200	-18.087	-18.036	-17.988	-17.943	-17.900	-17.859	-17.819	-17.780	-17.742
2300	-18.157	-18.105	-18.056	-18.009	-17.965	-17.923	-17.882	-17.843	-17.805
2400	-18.226	-18.172	-18.121	-18.073	-18.027	-17.984	-17.943	-17.903	-17.865
2500	-18.293	-18.237	-18.184	-18.135	-18.088	-18.043	-18.001	-17.961	-17.922

BIOGRAPHICAL NOTE

LUIGI G. JACCHIA received his doctorate from the University of Bologna in 1932. He continued working with the university as an astronomer at its observatory.

Dr. Jacchia's affiliation with Harvard College Observatory began with his appointment as research associate in 1939. At that time he was studying variable stars. Since joining SAO as a physicist in 1956, most of Dr. Jacchia's work has been on meteors and upper atmospheric research.