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AN APPROPRIATE METHOD FOR
INTEGRATION OF THE MOTION
OF PERIODIC COMETS

BY

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With an Auxiliary Table



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When the method of numerical integration is used to calculate the perturbed motion of a planet or comet, a certain difficulty arises if it is desired to take the effect of the four inner planets into account.

First of all, the mass of Mercury is so small that, except for very rare cases, it can safely be included in that of the Sun. We shall assume that this procedure is adopted throughout this paper. Thus, no distinction is made between heliocentric co-ordinates and co-ordinates referred to the centre of mass of the Sun and Mercury. However, even the planets Venus, the Earth, and Mars cause difficulties. These planets revolve so rapidly around the Sun that the use of an interval exceeding 10 or 20 days is impossible if the differences are going to remain manageable.

When the objects are more than four or five astronomical units from the Sun this problem is solved by including the masses of the four inner planets into that of the Sun, and neglecting the attractions of the inner planets on the Sun. Though this does seem to be generally recognized, such a procedure assumes the use of a system of co-ordinates originating in the gravity centre of the Sun and the four inner planets.

At smaller distances from the Sun the attractions from Venus, the Earth and Mars on the object as well as on the Sun must be taken rigorously into account.

For objects moving in highly elliptical orbits the usual practice is to use both of these methods alternately. This, however, requires some care at the point where the transition from one method to the other is made, if discontinuities are not to be introduced in the co-ordinates.

The method proposed in this paper is designed to avoid this difficulty. The point of the method is to use a co-ordinate system with its origin in the centre of mass of the Sun + Mercury, Venus,

the Earth, and Mars in the summation schemes at all times, and to omit the attractions on the Sun from these planets. The particular advantages of this choice are the following two:

1. The differences in the summation schemes must always remain smooth, even at the point of changing over from one procedure to the other.
2. The distance of the Sun from the origin of the co-ordinate system will never exceed $5 \cdot 10^{-6}$ astronomical units. Thus, the correction necessary to reduce the co-ordinates, and the attractions on the Sun from the outer planets, to the chosen system from the heliocentric system, in which they generally are tabulated, are sufficiently small to be neglected in nearly all cases. This would not be the case if a system with its origin in the centre of mass of the whole planetary system had been chosen.

The use of a co-ordinate system such as the one proposed here requires the co-ordinates of the Sun in this system to be available. This paper gives the co-ordinates of the Sun with opposite signs for every 10 days during the years 1920–1960. The tabular values are denoted $-\bar{x}_0$, $-\bar{y}_0$, $-\bar{z}_0$ and computed by the equations:

$$-\bar{x}_0 = \frac{\sum_{i=2}^4 m_i x_i}{1 + \sum_{i=1}^4 m_i} \quad -\bar{y}_0 = \frac{\sum_{i=2}^4 m_i y_i}{1 + \sum_{i=1}^4 m_i} \quad -\bar{z}_0 = \frac{\sum_{i=2}^4 m_i z_i}{1 + \sum_{i=1}^4 m_i}$$

The masses of the inner planets, which are used in the equations, are in accordance with Astronomical Journal 1170 (G. M. CLEMENCE):

1 = Mercury	1: 6 000 000
2 = Venus	1: 408 000
3 = Earth + Moon	1: 329 406
4 = Mars	1: 3 093 500

The co-ordinates of Venus, the Earth and Mars used in the computation are those given in the "Planetary Co-ordinates 1920–1960", published by H. M. Nautical Almanac Office.

Then the numerical integration of the perturbed rectangular co-ordinates of a body can be done, either by means of the equation:

$$\left. \begin{aligned} w^2 \frac{d^2 \bar{x}}{dt^2} &= -w^2 k^2 (1 + m_1) \frac{\bar{x} - \bar{x}_0}{r^3} \\ &- \sum_{i=2}^8 w^2 k^2 m_i \frac{\bar{x} - x_i}{\Delta_i^3} \\ &- \sum_{i=5}^8 w^2 k^2 m_i \frac{\bar{x}_i}{r_i^3}. \end{aligned} \right\} 1.$$

Or, if the distance of the body from the Sun is more than 4–5 units, by means of the equation:

$$\left. \begin{aligned} w^2 \frac{d^2 \bar{x}}{dt^2} &= -w^2 k^2 \left(1 + \sum_{i=1}^4 m_i \right) \frac{\bar{x}}{r^3} \\ &- \sum_{i=5}^8 w^2 k^2 m_i \frac{\bar{x} - \bar{x}_i}{\Delta_i^3} \\ &- \sum_{i=5}^8 w^2 k^2 m_i \frac{\bar{x}_i}{r_i^3}. \end{aligned} \right\} 2.$$

In which:

$$\begin{aligned} x &= \bar{x} - \bar{x}_0 & r^2 &= (\bar{x} - \bar{x}_0)^2 + (\bar{y} - \bar{y}_0)^2 + (\bar{z} - \bar{z}_0)^2 \\ y &= \bar{y} - \bar{y}_0 & \Delta_i^2 &= (x - x_i)^2 + (y - y_i)^2 + (z - z_i)^2 \\ z &= \bar{z} - \bar{z}_0 & \Delta_i^2 &= (\bar{x} - \bar{x}_i)^2 + (\bar{y} - \bar{y}_i)^2 + (\bar{z} - \bar{z}_i)^2 \\ && \bar{r}_i^2 &= \bar{x}_i^2 + \bar{y}_i^2 + \bar{z}_i^2 \end{aligned}$$

x , y , z are co-ordinates referred to the centre of mass of the Sun + Mercury.

\bar{x} , \bar{y} , \bar{z} are co-ordinates referred to the centre of mass of the Sun + the four inner planets.

Instructions for the use of the method.

Given are the osculating elements: M , e , a , P_x , P_y , P_z , Q_x , Q_y , Q_z , $k\sqrt{1+m_1}$. We adopt the elements to be referred to the barycentre Sun + Mercury. With these elements we compute the rectangular co-ordinates and velocities for the osculating date: x , y , z , $w \frac{dx}{dt}$, $w \frac{dy}{dt}$, $w \frac{dz}{dt}$.

From these we then have to subtract: $-\bar{x}_0$, $-\bar{y}_0$, $-\bar{z}_0$, $-w \frac{d\bar{x}_0}{dt}$, $-w \frac{d\bar{y}_0}{dt}$, $-w \frac{d\bar{z}_0}{dt}$ where the negative velocities of the Sun are deduced from the table by:

$$10 \frac{df}{dt} = \frac{1}{60} (-f_{-3} + 9f_{-2} - 45f_{-1} + 45f_{+1} - 9f_{+2} + f_{+3}).$$

We then get \bar{x} , \bar{y} , \bar{z} , $w \frac{d\bar{x}}{dt}$, $w \frac{d\bar{y}}{dt}$, $w \frac{d\bar{z}}{dt}$ and from these values the integration schemes can be built up.

If the radius vector of the body is less than 4—5 units we use equation 1; if it is greater, equation 2.

If the interval is greater than 80 days, the heliocentric co-ordinates for Jupiter and Saturn given in "Planetary Co-ordinates 1920—1960" will not be sufficient for computing the third terms in the two equations accurately by 9 decimals.

In the rare cases when a comet passes very close to one of the outer planets, the second terms must also be computed by means of six or more decimals. So the co-ordinates for the five outer planets given in the "Astronomical Papers" Vol. XII will be well suited.

These co-ordinates are integrated by means of an equation similar to equation 2, thus they are also referred to the origin in the centre of mass of the Sun and the four inner planets. Consequently the co-ordinates of the comet in the second term of equation 1 must not be made heliocentric by adding the tabular values $-\bar{x}_0$, $-\bar{y}_0$, $-\bar{z}_0$.

If equation 2 is used both the co-ordinates of the outer planets and those of the comet are referred to the same origin.

When computing an accurate geocentric ephemeris, the tabular values $-\bar{x}_0$, $-\bar{y}_0$, $-\bar{z}_0$ must always be added to the

barycentric co-ordinates of the body \bar{x} , \bar{y} , \bar{z} . The resulting co-ordinates x , y , z cannot in any case be distinguished from true heliocentric co-ordinates by observation.

If osculating elements are to be derived for some date, the barycentric co-ordinates and velocities derived from the schemes have of course to be changed to the heliocentric system by adding $-\bar{x}_0$, $-\bar{y}_0$, $-\bar{z}_0$, $-w \frac{d\bar{x}_0}{dt}$, $-w \frac{d\bar{y}_0}{dt}$, $-w \frac{d\bar{z}_0}{dt}$.

As an illustration of the use of the two equations, we compute the acceleration of the periodic comet Schwassmann-Wachmann (2) for 1940 June 20.0 (Interval 20 days).

This date is chosen because Venus and the Earth have then almost the same heliocentric longitude. Thus the disagreement between the results obtained will be particularly great, but all the same only a few units in the 9th decimal.

Numerical examples.

EQUATION 1.

"F	+ 3.95361694 5	- 0.39710974 7	- 0.37222441 1	\bar{r}^2	15.92613559
F : 12	- 61366	+ 6249	+ 5895		
\bar{F}'' : 240	+ 4	+ 9	+ 3	r	3.99075627
$\bar{x}_0, \bar{y}_0, \bar{z}_0$	- 56	- 406	- 176	$w^2 k^2 (1 + \sum_{i=1}^4 m_i)$	
x, y, z	+ 3.95300276	- 0.39705123	- 0.37716719	\bar{r}^3	0.0018623329

Planet No.	2	3	4	5	6	7	8
x - x_i	+ 4.025	+ 3.977	+ 4.908	- 0.40914	- 3.4668	- 7.95	+ 34.05
y - y_i	+ 0.264	+ 0.535	- 1.603	- 2.59555	- 5.5935	- 14.70	- 2.63
z - z_i	+ 0.084	+ 0.027	- 0.956	- 1.21364	- 2.2054	- 6.48	- 2.05
Δ_i^2	16.277	16.103	27.572	8.37720	48.1697	321.28	1170.52
$10^8 w^2 k^2 m_i$	29.011	35.933	3.826	11301.31	3380.31	517.6	612.8
$10^8 w^2 k^2 m_i : \Delta_i^3$	0.442	0.556	0.026	466.102	10.111	0.0899	0.015
1. Term	- 0.00736180 74		+ 0.00073944 16		+ 0.00070241 09		
2. Term	+ 221 83		+ 1267 34		+ 588 57		
3. Term	- 436 94		- 227 42		- 85 96		
Acceleration	- 0.00736395 8		+ 0.00074984 1		+ 0.00070743 7		
$-\bar{F}$ (May 31.0)	- 3.98820410 0		+ 0.53999358 2		+ 0.43472291 1		
$2\bar{F}$ (June 20.0)	+ 7.90723389 0		- 0.79421949 4		- 0.75444882 2		
$-\bar{F}$ (July 10.0)	+ 3.91166583 2		- 0.25347607 1		- 0.31901847 4		

EQUATION 2.

"F	+ 3.95361694 5	- 0.39710974 7	- 0.37722441 1	\bar{r}^2	15.92613546
F : 12	- 61366	+ 6249	+ 5895	\bar{r}	3.99075625
\bar{F}'' : 240	+ 4	+ 9	+ 3	$w^2 k^2 (1 + \sum_{i=1}^4 m_i)$	
$\bar{x}, \bar{y}, \bar{z}$	+ 3.95300332	- 0.39704717	- 0.37716543	\bar{r}^3	0.0018623433
Planet No.		5	6	7	8
$\bar{x} - \bar{x}_i$		- 0.40914	- 3.4668	- 7.95	+ 34.05
$\bar{y} - \bar{y}_i$		- 2.59555	- 5.5935	- 14.70	- 2.63
$\bar{z} - \bar{z}_i$		- 1.21364	- 2.2054	- 6.48	- 2.05
Δ_i^2		8.37720	48.1697	321.28	1170.52
$10^8 w^2 k^2 m_i$		11301.31	3380.31	517.6	612.8
$10^8 w^2 k^2 m_i : \Delta_i^3$		466.102	10.111	0.0899	0.015
1. Term	- 0.00736185 13		+ 0.00073943 83		+ 0.00070241 17
2. Term	+ 225 95		+ 1267 71		+ 588 59
3. Term	- 436 94		- 227 42		- 85 96
Acceleration	- 0.00736396 1		+ 0.00074984 1		+ 0.00070743 8
$-\bar{F}$ (May 31.0)	- 3.98820410 0		+ 0.53999358 2		+ 0.43472291 1
$2\bar{F}$ (June 20.0)	+ 7.90723389 0		- 0.79421949 4		- 0.75444882 2
$-\bar{F}$ (July 10.0)	+ 3.91166582 9		- 0.25347607 1		- 0.31901847 3

	Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1919 Oct.	8.5.....	2422240.5	+ 415.20	+ 198.59	+ 79.78
	18.5.....	250.5	+ 361.81	+ 275.41	+ 115.68
	28.5.....	260.5	+ 291.05	+ 339.08	+ 146.30
Nov.	7.5.....	270.5	+ 206.80	+ 386.35	+ 170.02
	17.5.....	280.5	+ 113.73	+ 415.00	+ 185.59
	27.5.....	290.5	+ 16.94	+ 423.96	+ 192.32
Dec.	7.5.....	300.5	- 78.34	+ 413.36	+ 190.04
	17.5.....	310.5	- 167.14	+ 384.56	+ 179.14
	27.5.....	320.5	- 245.10	+ 339.94	+ 160.54
1920 Jan.	6.5.....	330.5	- 308.75	+ 282.76	+ 135.59
	16.5.....	340.5	- 355.68	+ 216.83	+ 105.94
	26.5.....	350.5	- 384.72	+ 146.27	+ 73.48
Feb.	5.5.....	360.5	- 395.84	+ 75.14	+ 40.10
	15.5.....	370.5	- 390.18	+ 7.20	+ 7.62
	25.5.....	380.5	- 369.80	- 54.33	- 22.32
Mar.	6.5.....	390.5	- 337.51	- 106.97	- 48.41
	16.5.....	400.5	- 296.60	- 149.08	- 69.70
	26.5.....	410.5	- 250.57	- 179.94	- 85.66
Apr.	5.5.....	420.5	- 202.86	- 199.67	- 96.14
	15.5.....	430.5	- 156.60	- 209.22	- 101.43
	25.5.....	440.5	- 114.42	- 210.20	- 102.14
May	5.5.....	450.5	- 78.21	- 204.73	- 99.18
	15.5.....	460.5	- 49.07	- 195.21	- 93.64
	25.5.....	470.5	- 27.22	- 184.09	- 86.71
June	4.5.....	480.5	- 12.03	- 173.67	- 79.54
	14.5.....	490.5	- 2.09	- 165.81	- 73.17
	24.5.....	500.5	+ 4.58	- 161.80	- 68.38
July	4.5.....	510.5	+ 10.34	- 162.20	- 65.68
	14.5.....	520.5	+ 17.62	- 166.74	- 65.19
	24.5.....	530.5	+ 28.66	- 174.39	- 66.66
	Aug.	540.5	+ 45.23	- 183.45	- 69.52
	13.5.....	550.5	+ 68.39	- 191.72	- 72.90
	23.5.....	560.5	+ 98.35	- 196.71	- 75.74
Sept.	2.5.....	570.5	+ 134.40	- 195.96	- 76.93
	12.5.....	580.5	+ 174.92	- 187.29	- 75.40
	22.5.....	590.5	+ 217.52	- 168.99	- 70.25
Oct.	2.5.....	600.5	+ 259.25	- 140.10	- 60.83
	12.5.....	610.5	+ 296.79	- 100.48	- 46.86
	22.5.....	620.5	+ 326.75	- 50.87	- 28.40
	Nov.	630.5	+ 345.95	+ 7.06	- 5.96
	11.5.....	640.5	+ 351.67	+ 70.89	+ 19.63
	21.5.....	650.5	+ 341.91	+ 137.48	+ 47.16
Dec.	1.5.....	660.5	+ 315.54	+ 203.24	+ 75.19
	11.5.....	670.5	+ 272.46	+ 264.31	+ 102.07
	21.5.....	680.5	+ 213.67	+ 316.81	+ 126.11
	31.5.....	690.5	+ 141.28	+ 357.16	+ 145.66
1921 Jan.	10.5.....	700.5	+ 58.43	+ 382.27	+ 159.23
	20.5.....	710.5	- 30.90	+ 389.84	+ 165.64

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1921 Jan. 20.5.....	2422710.5	— 30.90	+ 389.84	+ 165.64
	30.5.....	720.5	— 122.03	+ 378.57
	Feb. 9.5.....	730.5	— 209.96	+ 348.24
	19.5.....	740.5	— 289.66	+ 299.86
	Mar. 1.5.....	750.5	— 356.42	+ 235.60
	11.5.....	760.5	— 406.22	+ 158.69
	21.5.....	770.5	— 435.99	+ 73.21
	31.5.....	780.5	— 443.90	— 16.18
	Apr. 10.5.....	790.5	— 429.42	— 104.57
	20.5.....	800.5	— 393.38	— 187.09
May 30.5.....	810.5	— 337.93	— 259.30	— 106.09
	10.5.....	820.5	— 266.31	— 317.43
	20.5.....	830.5	— 182.67	— 358.57
	30.5.....	840.5	— 91.77	— 380.90
	June 9.5.....	850.5	+ 1.36	— 383.73
	19.5.....	860.5	+ 91.68	— 367.47
	29.5.....	870.5	+ 174.45	— 333.65
	July 9.5.....	880.5	+ 245.54	— 284.70
	19.5.....	890.5	+ 301.62	— 223.88
	29.5.....	900.5	+ 340.35	— 154.98
Sept. 8.5.....	910.5	+ 360.52	— 82.12	— 42.95
	18.5.....	920.5	+ 362.06	— 9.48
	28.5.....	930.5	+ 346.06	+ 59.03
	Sept. 7.5.....	940.5	+ 314.61	+ 119.95
	17.5.....	950.5	+ 270.68	+ 170.54
	27.5.....	960.5	+ 217.81	+ 208.93
	Oct. 7.5.....	970.5	+ 159.86	+ 234.24
	17.5.....	980.5	+ 100.69	+ 246.56
	27.5.....	2422990.5	+ 43.83	+ 246.89
	Nov. 6.5.....	2423000.5	— 7.76	+ 236.99
Dec. 16.5.....	010.5	— 51.87	+ 219.16	+ 107.57
	26.5.....	020.5	— 87.20	+ 196.01
	Dec. 6.5.....	030.5	— 113.34	+ 170.18
	16.5.....	040.5	— 130.73	+ 144.13
	26.5.....	050.5	— 140.56	+ 119.92
	1922 Jan. 5.5.....	060.5	— 144.54	+ 99.08
	15.5.....	070.5	— 144.75	+ 82.48
	25.5.....	080.5	— 143.40	+ 70.35
	Feb. 4.5.....	090.5	— 142.60	+ 62.23
	14.5.....	100.5	— 144.17	+ 57.10
Mar. 24.5.....	110.5	— 149.46	+ 53.44	+ 12.42
	6.5.....	120.5	— 159.19	+ 49.41
	16.5.....	130.5	— 173.41	+ 43.01
	26.5.....	140.5	— 191.38	+ 32.32
	Apr. 5.5.....	150.5	— 211.64	+ 15.65
	15.5.....	160.5	— 232.09	— 8.21
	25.5.....	170.5	— 250.12	— 39.85
	May 5.5.....	180.5	— 262.88	— 79.04
	15.5.....	190.5	— 262.88	— 79.04
	25.5.....	200.5	— 267.46	— 124.75
June 4.5.....	210.5	— 261.28	— 175.08	— 67.46
	14.5.....	220.5	— 242.28	— 227.41
	24.5.....	230.5	— 209.24	— 278.55
	July 4.5.....	240.5	— 161.91	— 324.96
	14.5.....	250.5	— 101.14	— 363.07
	24.5.....	260.5	— 28.90	— 389.52
	Aug. 3.5.....	270.5	+ 51.88	— 401.52
	13.5.....	280.5	+ 137.42	— 396.98
	23.5.....	290.5	+ 223.37	— 374.80
	Sept. 2.5.....	300.5	+ 305.05	— 334.90
Oct. 2.5.....	310.5	+ 377.81	— 278.30	— 128.68
	12.5.....	320.5	+ 437.30	— 207.06
	22.5.....	330.5	+ 479.76	— 100.16
	21.5.....	340.5	+ 502.26	— 124.25
	11.5.....	350.5	+ 502.93	— 65.94
	21.5.....	360.5	+ 481.13	— 27.54
	11.5.....	370.5	+ 487.48	— 13.20
	21.5.....	380.5	+ 502.51	— 54.19
	Dec. 1.5.....	390.5	+ 293.51	— 152.67
	11.5.....	400.5	+ 200.49	— 238.88
1923 Jan. 10.5.....	410.5	+ 99.79	+ 439.67	— 93.31
	20.5.....	420.5	+ 314.27	— 128.44
	30.5.....	430.5	— 193.89	— 157.66
	Feb. 9.5.....	440.5	— 271.80	— 179.36
	19.5.....	450.5	— 327.42	— 123.69
	29.5.....	460.5	— 332.84	— 90.06
	30.5.....	470.5	— 374.53	— 53.93
	Mar. 1.5.....	480.5	— 395.65	— 102.97
	11.5.....	490.5	— 396.33	— 23.58
	21.5.....	500.5	— 377.93	— 17.42
Apr. 10.5.....	510.5	— 342.91	— 116.30	— 48.79
	19.5.....	520.5	— 294.55	— 170.21
	29.5.....	530.5	— 236.74	— 75.20
	30.5.....	540.5	— 173.62	— 210.53
	Mar. 1.5.....	550.5	— 109.37	— 85.78
	11.5.....	560.5	— 47.84	— 69.39
	21.5.....	570.5	— 7.63	— 52.22
	31.5.....	580.5	— 134.68	— 35.63
	Apr. 10.5.....	590.5	— 90.83	— 20.76
	19.5.....	600.5	— 116.05	— 20.76
June 9.5.....	610.5	— 130.30	— 145.93	— 8.48
	19.5.....	620.5	— 127.41	— 18.84
	29.5.....	630.5	— 134.68	— 0.72
	30.5.....	640.5	— 131.04	— 6.70
	Mar. 1.5.....	650.5	— 97.18	— 10.18
	11.5.....	660.5	— 121.78	— 33.59
	21.5.....	670.5	— 109.61	— 18.84
	31.5.....	680.5	— 97.18	— 10.18
	Apr. 10.5.....	690.5	— 130.30	— 6.70
	19.5.....	700.5	— 127.41	— 18.84

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1922 May 5.5.....	2423180.5	— 262.88	— 79.04	— 30.56
	15.5.....	190.5	— 267.46	— 47.74
	25.5.....	200.5	— 261.28	— 67.46
	June 4.5.....	210.5	— 242.28	— 88.76
	14.5.....	220.5	— 209.24	— 110.38
	24.5.....	230.5	— 161.91	— 130.84
	July 4.5.....	240.5	— 101.14	— 148.57
	14.5.....	250.5	— 28.90	— 162.02
	24.5.....	260.5	+ 51.88	— 169.82
	Aug. 3.5.....	270.5	+ 137.42	— 170.88
Sept. 2.5.....	280.5	+ 223.37	— 374.80	— 164.48
	12.5.....	290.5	+ 305.05	— 334.90
	22.5.....	300.5	+ 377.81	— 278.30
	12.5.....	310.5	+ 437.30	— 207.06
	22.5.....	320.5	+ 479.76	— 100.16
	Oct. 2.5.....	330.5	+ 502.26	— 124.25
	12.5.....	340.5	+ 502.93	— 65.94
	22.5.....	350.5	+ 481.13	— 27.54
	Nov. 1.5.....	360.5	+ 437.48	— 13.20
	11.5.....	370.5	+ 373.90	— 54.19
Dec. 1.5.....	380.5	+ 293.51	— 374.82	— 157.66
	11.5.....	390.5	+ 200.49	+ 417.34
	21.5.....	400.5	+ 99.79	+ 192.36
	21.5.....	410.5	— 3.15	+ 440.88
	31.5.....	420.5	— 102.80	+ 190.20
	21.5.....	430.5	— 193.89	— 175.44
	20.5.....	440.5	— 271.80	— 152.77
	30.5.....	450.5	— 332.84	— 123.69
	Feb. 9.5.....	460.5	— 374.53	— 90.06
	19.5.....	470.5	— 395.65	— 53.93
March 1.5.....	480.5	— 396.33	+ 23.58	+ 17.43
	11.5.....	490.5	— 377.93	+ 50.74
	21.5.....	500.5	— 342.91	+ 116.30
	31.5.....	510.5	— 294.55	+ 48.79
	Apr. 10.5.....	520.5	— 236.74	+ 75.20
	19.5.....	530.5	— 173.62	+ 210.53
	29.5.....	540.5	— 109.37	+ 99.98
	30.5.....	550.5	— 47.84	+ 245.41
	Mar. 1.5.....	560.5	— 7.63	+ 231.53
	11.5.....	570.5	+ 54.42	+ 208.39
April 10.5.....	580.5	+ 90.83	— 178.85	— 85.78
	19.5.....	590.5	+ 116.05	+ 145.93
	29.5.....	600.5	+ 130.30	+ 112.58
	30.5.....	610.5	+ 134.68	+ 81.46
	Mar. 1.5.....	620.5	+ 131.04	+ 54.66
	11.5.....	630.5	+ 121.78	+ 33.59
	21.5.....	640.5	+ 109.61	+ 18.84
	31.5.....	650.5	+ 97.18	+ 0.72
	Apr. 10.5.....	660.5	+ 130.30	+ 6.70
	19.5.....	670.5	+ 127.41	+ 18.84

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1923 Aug. 18.5.....	2423650.5	+ 97.18	- 10.18	+ 6.70
28.5.....	660.5	+ 86.90	- 6.59	+ 9.74
Sept. 7.5.....	670.5	+ 80.59	- 6.46	+ 10.42
17.5.....	680.5	+ 79.37	- 7.74	+ 9.58
27.5.....	690.5	+ 83.48	- 8.20	+ 8.22
Oct. 7.5.....	700.5	+ 92.34	- 5.70	+ 7.33
17.5.....	710.5	+ 104.58	+ 1.55	+ 7.87
27.5.....	720.5	+ 118.18	+ 14.82	+ 10.59
Nov. 6.5.....	730.5	+ 130.69	+ 34.72	+ 15.98
16.5.....	740.5	+ 139.49	+ 61.10	+ 24.20
26.5.....	750.5	+ 142.00	+ 93.01	+ 35.11
Dec. 6.5.....	760.5	+ 135.96	+ 128.80	+ 48.19
16.5.....	770.5	+ 119.62	+ 166.21	+ 62.64
26.5.....	780.5	+ 91.92	+ 202.50	+ 77.41
1924 Jan. 5.5.....	790.5	+ 52.66	+ 234.67	+ 91.24
15.5.....	800.5	+ 2.54	+ 259.64	+ 102.82
25.5.....	810.5	- 56.76	+ 274.51	+ 110.83
Feb. 4.5.....	820.5	- 122.73	+ 276.82	+ 114.05
14.5.....	830.5	- 192.03	+ 264.69	+ 111.52
24.5.....	840.5	- 260.72	+ 237.13	+ 102.56
Mar. 5.5.....	850.5	- 324.56	+ 194.06	+ 86.91
15.5.....	860.5	- 379.20	+ 136.52	+ 64.76
25.5.....	870.5	- 420.57	+ 66.56	+ 36.76
Apr. 4.5.....	880.5	- 445.19	- 12.78	+ 4.05
14.5.....	890.5	- 450.47	- 97.66	- 31.86
24.5.....	900.5	- 434.90	- 183.68	- 69.15
May 4.5.....	910.5	- 398.24	- 266.18	- 105.79
14.5.....	920.5	- 341.53	- 340.57	- 139.74
24.5.....	930.5	- 267.07	- 402.61	- 169.04
June 3.5.....	940.5	- 178.27	- 448.72	- 191.93
13.5.....	950.5	- 79.41	- 476.21	- 207.04
23.5.....	960.5	+ 24.62	- 483.43	- 213.42
July 3.5.....	970.5	+ 128.58	- 469.85	- 210.58
13.5.....	980.5	+ 227.30	- 436.14	- 198.59
23.5.....	2423990.5	+ 315.85	- 384.03	- 178.01
Aug. 2.5.....	2424000.5	+ 389.94	- 316.28	- 149.87
12.5.....	010.5	+ 446.10	- 236.47	- 115.64
22.5.....	020.5	+ 481.88	- 148.78	- 77.09
Sept. 1.5.....	030.5	+ 496.02	- 57.78	- 36.25
11.5.....	040.5	+ 488.49	+ 31.89	+ 4.79
21.5.....	050.5	+ 460.50	+ 115.80	+ 43.92
Oct. 1.5.....	060.5	+ 414.40	+ 189.97	+ 79.24
11.5.....	070.5	+ 353.51	+ 251.16	+ 109.09
21.5.....	080.5	+ 281.90	+ 297.07	+ 132.21
31.5.....	090.5	+ 204.09	+ 326.43	+ 147.82
Nov. 10.5.....	100.5	+ 124.66	+ 339.11	+ 155.64
20.5.....	110.5	+ 48.01	+ 336.04	+ 155.90
30.5.....	120.5	- 22.04	+ 319.08	+ 149.28

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1924 Nov. 30.5.....	2424120.5	- 22.04	+ 319.08	+ 149.28
Dec. 10.5.....	130.5	- 82.44	+ 290.83	+ 136.87
20.5.....	140.5	- 131.07	+ 254.38	+ 120.04
30.5.....	150.5	- 166.89	+ 213.01	+ 100.31
1925 Jan. 10.0.....	160.5	- 189.85	+ 169.98	+ 79.24
20.....	170.5	- 200.86	+ 128.22	+ 58.30
30.....	180.5	- 201.58	+ 90.17	+ 38.78
Feb. 9.....	190.5	- 194.26	+ 57.61	+ 21.71
19.....	200.5	- 181.48	+ 31.59	+ 7.76
Mar. 1.....	210.5	- 165.96	+ 12.40	- 2.72
11.....	220.5	- 150.24	- 0.39	- 9.74
21.....	230.5	- 136.53	- 7.86	- 13.65
31.....	240.5	- 126.52	- 11.60	- 15.08
Apr. 10.....	250.5	- 121.20	- 13.56	- 14.88
20.....	260.5	- 120.83	- 15.81	- 14.01
30.....	270.5	- 124.85	- 20.35	- 13.48
May 10.....	280.5	- 131.96	- 28.88	- 14.21
20.....	290.5	- 140.22	- 42.62	- 16.94
30.....	300.5	- 147.29	- 62.10	- 22.16
June 9.....	310.5	- 150.58	- 87.09	- 30.02
19.....	320.5	- 147.60	- 116.53	- 40.28
29.....	330.5	- 136.23	- 148.61	- 52.38
July 9.....	340.5	- 114.96	- 180.90	- 65.38
19.....	350.5	- 83.15	- 210.56	- 78.14
29.....	360.5	- 41.10	- 234.53	- 89.34
Aug. 8.....	370.5	+ 9.85	- 249.93	- 97.65
18.....	380.5	+ 67.45	- 254.22	- 101.86
28.....	390.5	+ 128.59	- 245.54	- 100.97
Sept. 7.....	400.5	+ 189.61	- 222.80	- 94.29
17.....	410.5	+ 246.49	- 185.91	- 81.53
27.....	420.5	+ 295.18	- 135.77	- 62.85
Oct. 7.....	430.5	+ 331.90	- 74.25	- 38.82
17.....	440.5	+ 353.36	- 4.12	- 10.46
27.....	450.5	+ 357.10	+ 71.07	+ 20.85
Nov. 6.....	460.5	+ 341.61	+ 147.27	+ 53.44
16.....	470.5	+ 306.55	+ 220.09	+ 85.44
26.....	480.5	+ 252.77	+ 285.13	+ 114.89
Dec. 6.....	490.5	+ 182.35	+ 338.23	+ 139.90
16.....	500.5	+ 98.51	+ 375.80	+ 158.74
26.....	510.5	+ 5.45	+ 395.03	+ 170.00
1926 Jan. 5.....	520.5	- 91.88	+ 394.18	+ 172.68
15.....	530.5	- 188.11	+ 372.71	+ 166.30
25.....	540.5	- 277.80	+ 331.32	+ 150.90
Feb. 4.....	550.5	- 355.82	+ 271.99	+ 127.16
14.....	560.5	- 417.71	+ 197.83	+ 96.23
24.....	570.5	- 459.98	+ 112.85	+ 59.76
Mar. 6.....	580.5	- 480.38	+ 21.72	+ 19.72
16.....	590.5	- 478.01	- 70.60	- 21.70

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1926 Mar. 16	2424590.5	— 478.01	— 70.60	— 21.70
26	600.5	— 453.34	— 159.19	— 62.24
Apr. 5	610.5	— 408.17	— 239.46	— 99.79
15	620.5	— 345.43	— 307.49	— 132.41
25	630.5	— 268.94	— 360.22	— 158.55
May 5	640.5	— 183.19	— 395.61	— 177.08
15	650.5	— 92.96	— 412.68	— 187.33
25	660.5	— 3.05	— 411.57	— 189.17
June 4	670.5	+ 82.04	— 393.48	— 182.92
14	680.5	+ 158.32	— 360.47	— 169.38
July 24	690.5	+ 222.58	— 315.39	— 149.70
4	700.5	+ 272.56	— 261.58	— 125.35
14	710.5	+ 307.03	— 202.68	— 97.99
24	720.5	+ 325.84	— 142.34	— 69.32
Aug. 3	730.5	+ 329.87	— 83.97	— 41.01
13	740.5	+ 320.94	— 30.50	— 14.57
23	750.5	+ 301.57	+ 15.83	+ 8.79
Sept. 2	760.5	+ 274.76	+ 53.60	+ 28.20
12	770.5	+ 243.70	+ 82.28	+ 43.20
22	780.5	+ 211.47	+ 102.20	+ 53.73
Oct. 2	790.5	+ 180.73	+ 114.49	+ 60.15
12	800.5	+ 153.55	+ 120.84	+ 63.11
22	810.5	+ 131.21	+ 123.30	+ 63.51
Nov. 1	820.5	+ 114.15	+ 124.08	+ 62.35
11	830.5	+ 102.01	+ 125.23	+ 60.66
Dec. 21	840.5	+ 93.69	+ 128.46	+ 59.39
1	850.5	+ 87.54	+ 134.99	+ 59.26
11	860.5	+ 81.56	+ 145.38	+ 60.76
21	870.5	+ 73.61	+ 159.56	+ 64.12
31	880.5	+ 61.64	+ 176.77	+ 69.20
1927 Jan. 10	890.5	+ 43.92	+ 195.63	+ 75.63
20	900.5	+ 19.19	+ 214.30	+ 82.72
30	910.5	— 13.18	+ 230.54	+ 89.61
Feb. 9	920.5	— 53.04	+ 241.98	+ 95.28
19	930.5	— 99.48	+ 246.24	+ 98.68
Mar. 1	940.5	— 150.77	+ 241.21	+ 98.76
11	950.5	— 204.45	+ 225.21	+ 94.64
21	960.5	— 257.45	+ 197.19	+ 85.65
31	970.5	— 306.31	+ 156.92	+ 71.46
Apr. 10	980.5	— 347.40	+ 105.08	+ 52.10
20	2424990.5	— 377.20	+ 43.29	+ 28.04
30	2425000.5	— 392.67	— 25.94	+ 0.15
May 10	010.5	— 391.44	— 99.32	— 30.31
20	020.5	— 372.14	— 172.99	— 61.77
30	030.5	— 334.50	— 242.78	— 92.46
June 9	040.5	— 279.44	— 304.54	— 120.54
19	050.5	— 209.09	— 354.41	— 144.24
29	060.5	— 126.62	— 389.10	— 161.95

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1927 June 29	2425060.5	— 126.62	— 389.10	— 161.95
July 9	070.5	— 36.09	— 406.15	— 172.42
19	080.5	+ 57.85	— 404.10	— 174.76
29	090.5	+ 150.19	— 382.58	— 168.57
Aug. 8	100.5	+ 235.94	— 342.34	— 153.96
18	110.5	+ 310.39	— 285.27	— 131.51
28	120.5	+ 369.41	— 214.21	— 102.30
Sept. 7	130.5	+ 409.68	— 132.86	— 67.83
17	140.5	+ 428.96	— 45.54	— 29.89
27	150.5	+ 426.16	+ 43.05	+ 9.45
Oct. 7	160.5	+ 401.50	+ 128.12	+ 48.06
17	170.5	+ 356.47	+ 205.08	+ 83.78
27	180.5	+ 293.74	+ 269.82	+ 114.66
Nov. 6	190.5	+ 217.07	+ 319.00	+ 139.02
16	200.5	+ 130.98	+ 350.27	+ 155.59
26	210.5	+ 40.50	+ 362.40	+ 163.59
Dec. 6	220.5	— 49.17	+ 355.41	+ 162.81
16	230.5	— 133.08	+ 330.47	+ 153.55
26	240.5	— 206.83	+ 289.86	+ 136.68
1928 Jan. 5	250.5	— 266.87	+ 236.70	+ 113.47
15	260.5	— 310.71	+ 174.77	+ 85.57
25	270.5	— 337.05	+ 108.10	+ 54.82
Feb. 4	280.5	— 345.79	+ 40.77	+ 23.10
14	290.5	— 337.96	— 23.45	— 7.75
24	300.5	— 315.56	— 81.30	— 36.09
Mar. 5	310.5	— 281.33	— 130.25	— 60.58
15	320.5	— 238.56	— 168.59	— 80.24
25	330.5	— 190.75	— 195.51	— 94.50
Apr. 4	340.5	— 141.38	— 211.10	— 103.19
14	350.5	— 93.65	— 216.23	— 106.56
24	360.5	— 50.26	— 212.50	— 105.21
May 4	370.5	— 13.21	— 202.02	— 100.04
14	380.5	+ 16.29	— 187.19	— 92.13
24	390.5	+ 37.92	— 170.55	— 82.69
June 3	400.5	+ 52.22	— 154.44	— 72.92
13	410.5	+ 60.52	— 140.86	— 63.87
23	420.5	+ 64.75	— 131.19	— 56.41
July 3	430.5	+ 67.26	— 126.14	— 51.09
13	440.5	+ 70.51	— 125.58	— 48.09
23	450.5	+ 76.80	— 128.63	— 47.24
Aug. 2	460.5	+ 88.01	— 133.68	— 48.01
12	470.5	+ 105.33	— 138.62	— 49.59
22	480.5	+ 129.10	— 141.01	— 50.95
Sept. 1	490.5	+ 158.78	— 138.42	— 51.01
11	500.5	+ 192.91	— 128.62	— 48.69
21	510.5	+ 229.23	— 109.90	— 43.06
Oct. 1	520.5	+ 264.90	— 81.18	— 33.48
11	530.5	+ 296.67	— 42.25	— 19.61

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1928 Oct.	2425530.5	+ 296.67	— 42.25	— 19.61
	540.5	+ 321.23	+ 6.24	— 1.48
	550.5	+ 335.41	+ 62.77	+ 20.46
	560.5	+ 336.48	+ 124.96	+ 45.41
	570.5	+ 322.40	+ 189.78	+ 72.21
	580.5	+ 291.98	+ 253.70	+ 99.44
	590.5	+ 245.07	+ 312.89	+ 125.48
	600.5	+ 182.57	+ 363.50	+ 148.66
	610.5	+ 106.52	+ 401.92	+ 167.32
	620.5	+ 19.96	+ 425.02	+ 179.96
Dec.	630.5	— 73.14	+ 430.45	+ 185.38
	640.5	— 168.15	+ 416.80	+ 182.74
	650.5	— 260.08	+ 383.77	+ 171.65
	660.5	— 343.84	+ 332.28	+ 152.26
	670.5	— 414.65	+ 264.41	+ 125.24
	680.5	— 468.37	+ 183.31	+ 91.78
	690.5	— 501.83	+ 93.02	+ 53.49
	700.5	— 513.00	— 1.80	+ 12.34
	710.5	— 501.23	— 96.19	— 29.54
	720.5	— 467.19	— 185.25	— 69.92
Mar.	730.5	— 412.88	— 264.42	— 106.68
	740.5	— 341.44	— 329.79	— 137.95
	750.5	— 256.95	— 378.31	— 162.17
	760.5	— 164.12	— 408.00	— 178.25
	770.5	— 67.98	— 417.98	— 185.56
	780.5	+ 26.36	— 408.52	— 183.99
	790.5	+ 114.13	— 380.98	— 173.95
	800.5	+ 191.07	— 337.68	— 156.31
	810.5	+ 253.73	— 281.75	— 132.33
	820.5	+ 299.62	— 216.90	— 103.62
Apr.	830.5	+ 327.35	— 147.21	— 71.99
	840.5	+ 336.70	— 76.80	— 39.34
	850.5	+ 328.57	— 9.64	— 7.57
	860.5	+ 304.93	+ 50.78	+ 21.61
	870.5	+ 268.60	+ 101.65	+ 46.73
	880.5	+ 223.01	+ 141.03	+ 66.70
	890.5	+ 171.96	+ 167.92	+ 80.84
	900.5	+ 119.26	+ 182.32	+ 88.94
	910.5	+ 68.43	+ 185.13	+ 91.25
	920.5	+ 22.45	+ 178.03	+ 88.39
Oct.	930.5	— 16.44	+ 163.27	+ 81.31
	940.5	— 46.89	+ 143.41	+ 71.16
	950.5	— 68.45	+ 121.08	+ 59.21
	960.5	— 81.52	+ 98.74	+ 46.69
	970.5	— 87.28	+ 78.49	+ 34.72
	980.5	— 87.42	+ 61.86	+ 24.21
	2425990.5	— 84.05	+ 49.77	+ 15.80
	2426000.5	— 79.41	+ 42.47	+ 9.82
1930 Jan.	2426000.5	— 79.41	+ 42.47	+ 9.82
	010.5	— 75.64	+ 39.54	+ 6.32
	020.5	— 74.65	+ 39.95	+ 5.00
	030.5	— 77.88	+ 42.18	+ 5.31
	040.5	— 86.12	+ 44.38	+ 6.50
	050.5	— 99.52	+ 44.49	+ 7.67
	060.5	— 117.43	+ 40.50	+ 7.85
	070.5	— 138.48	+ 30.65	+ 6.13
	080.5	— 160.61	+ 13.61	+ 1.74
	090.5	— 181.27	— 11.35	— 5.85
May	100.5	— 197.58	— 44.16	— 16.88
	110.5	— 206.62	— 83.92	— 31.20
	120.5	— 205.70	— 128.88	— 48.29
	130.5	— 192.68	— 176.57	— 67.24
	140.5	— 166.16	— 223.86	— 86.85
	150.5	— 125.75	— 267.29	— 105.67
	160.5	— 72.12	— 303.32	— 122.15
	170.5	— 7.04	— 328.60	— 134.75
	180.5	+ 66.72	— 340.25	— 142.10
	190.5	+ 145.54	— 336.14	— 143.07
July	200.5	+ 225.17	— 315.03	— 136.90
	210.5	+ 301.04	— 276.73	— 123.27
	220.5	+ 368.54	— 222.13	— 102.32
	230.5	+ 423.34	— 153.18	— 74.68
	240.5	+ 461.65	— 72.78	— 41.43
	250.5	+ 480.49	+ 15.32	— 4.05
	260.5	+ 477.93	+ 106.81	+ 35.65
	270.5	+ 453.22	+ 196.96	+ 75.64
	280.5	+ 406.86	+ 281.02	+ 113.81
	290.5	+ 340.67	+ 354.39	+ 148.04
Sept.	300.5	+ 257.65	+ 413.04	+ 176.40
	310.5	+ 161.90	+ 453.69	+ 197.26
	320.5	+ 58.30	+ 474.10	+ 209.41
	330.5	+ 47.74	+ 473.23	+ 212.13
	340.5	+ 150.68	+ 451.31	+ 205.30
	350.5	— 245.19	+ 409.84	+ 189.36
	360.5	— 326.56	+ 351.48	+ 165.29
	370.5	— 390.99	+ 279.83	+ 134.57
	380.5	— 435.84	+ 199.16	+ 99.04
	390.5	— 459.75	+ 114.11	+ 60.74
Oct.	400.5	— 462.70	+ 29.33	+ 21.81
	410.5	— 445.92	— 50.83	— 15.68
	420.5	— 411.74	— 122.57	— 49.88
	430.5	— 363.38	— 182.87	— 79.25
	440.5	— 304.66	— 229.65	— 102.62
	450.5	— 239.72	— 261.83	— 119.31
	460.5	— 172.75	— 279.32	— 129.06
	470.5	— 107.66	— 282.98	— 132.10
1931 Jan.	450.5	— 239.72	— 261.83	— 119.31
	460.5	— 172.75	— 279.32	— 129.06
	470.5	— 107.66	— 282.98	— 132.10

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
Feb.	2426000.5	— 79.41	+ 42.47	+ 9.82
	010.5	— 75.64	+ 39.54	+ 6.32
	020.5	— 74.65	+ 39.95	+ 5.00
	030.5	— 77.88	+ 42.18	+ 5.31
	040.5	— 86.12	+ 44.38	+ 6.50
	050.5	— 99.52	+ 44.49	+ 7.67
	060.5	— 117.43	+ 40.50	+ 7.85
	070.5	— 138.48	+ 30.65	+ 6.13
	080.5	— 160.61	+ 13.61	+ 1.74
	090.5	— 181.27	— 11.35	— 5.85
May	100.5	— 197.58	— 44.16	— 16.88
	110.5	— 206.62	— 83.92	— 31.20
	120.5	— 205.70	— 128.88	— 48.29
	130.5	— 192.68	— 176.57	— 67.24
	140.5	— 166.16	— 223.86	— 86.85
	150.5	— 125.75	— 267.29	— 105.67
	160.5	— 72.12	— 303.32	— 122.15
	170.5	— 7.04	— 328.60	— 134.75
	180.5	+ 66.72	— 340.25	— 142.10
	190.5	+ 145.54	— 336.14	— 143.07
June	200.5	+ 225.17	— 315.03	— 136.90
	210.5	+ 301.04	— 276.73	— 123.27
	220.5	+ 368.54	— 222.13	— 102.32
	230.5	+ 423.34	— 153.18	— 74.68
	240.5	+ 461.65	— 72.78	— 41.43
	250.5	+ 480.49	+ 15.32	— 4.05
	260.5	+ 477.93	+ 106.81	+ 35.65
	270.5	+ 453.22	+ 196.96	+ 75.64
	280.5	+ 406.86	+ 281.02	+ 113.81
	290.5	+ 340.67	+ 354.39	+ 148.04
July	300.5	+ 257.65	+ 413.04	+ 176.40
	310.5	+ 161.90	+ 453.69	+ 197.26
	320.5	+ 58.30	+ 474.10	+ 209.41
	330.5	+ 47.74	+ 473.23	+ 212.13
	340.5	+ 150.68	+ 451.31	+ 205.30
	350.5	— 245.19	+ 409.84	+ 189.36
	360.5	— 326.56	+ 351.48	+ 165.29
	370.5	— 390.99	+ 279.83	+ 134.57
	380.5	— 435.84	+ 199.16	+ 99.04
	390.5	— 459.75	+ 114.11	+ 60.74
Aug.	400.5	— 462.70	+ 29.33	+ 21.81
	410.5	— 445.92	— 50.83	— 15.68
	420.5	— 411.74	— 122.57	— 49.88
	430.5	— 363.38	— 182.87	— 79.25
	440.5	— 304.66	— 229.65	— 102.62
	450.5	— 239.72	— 261.83	— 119.31
	460.5	— 172.75	— 279.32	— 129.06
	470.5	— 107.66	— 282.98	— 132.10
Sept.	480.5	— 87.42	+ 61.86	+ 24.21
	490.5	— 84.05	+ 49.77	+ 15.80
	500.5	— 79.41	+ 42.47	+ 9.82
	510.5	— 75.64	+ 39.54	+ 6.32
	520.5	— 74.65	+ 39.95	+ 5.00
	530.5	— 77.88	+ 42.18	+ 5.31
	540.5	— 86.12	+ 44.38	+ 6.50
	550.5	— 99.52	+ 44.49	+ 7.67
	560.5	— 117.43	+ 40.50	+ 7.85
	570.5	— 138.48	+ 30.65	+ 6.13
Oct.	580.5	— 160.61	+ 13.61	+ 1.74
	590.5	— 181.27	— 11.35	— 5.85
	600.5	— 200.5	— 225.17	— 315.03
	610.5	— 210.5	— 301.04	— 276.73
	620.5	— 220.5	— 368.54	— 222.13
	630.5	— 230.5	— 423.34	— 153.18
	640.5	— 240.5	— 461.65	— 72.78
	650.5	— 250.5	— 257.65	— 413.04
	660.5	— 260.5	— 161.90	— 453.69
	670.5	— 270.5	— 58.30	— 474.10
Nov.	680.5	— 280.5	— 47.74	— 473.23
	690.5	— 290.5	— 150.68	— 451.31

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1931 May 9	2426470.5	— 107.66	— 282.98	— 132.10
19	480.5	— 47.86	— 274.49	— 129.05
29	490.5	+ 3.93	— 256.20	— 120.87
June 8	500.5	+ 45.85	— 230.88	— 108.80
18	510.5	+ 77.01	— 201.53	— 94.22
July 28	520.5	+ 97.48	— 171.08	— 78.56
8	530.5	+ 108.23	— 142.20	— 63.16
18	540.5	+ 111.01	— 117.02	— 49.18
28	550.5	+ 108.15	— 97.01	— 37.51
Aug. 7	560.5	+ 102.28	— 82.83	— 28.68
17	570.5	+ 96.03	— 74.30	— 22.84
27	580.5	+ 91.81	— 70.48	— 19.76
Sept. 6	590.5	+ 91.47	— 69.78	— 18.88
16	600.5	+ 96.14	— 70.18	— 19.36
26	610.5	+ 106.14	— 69.44	— 20.23
Oct. 6	620.5	+ 120.89	— 65.42	— 20.48
16	630.5	+ 139.03	— 56.25	— 19.13
26	640.5	+ 158.56	— 40.61	— 15.42
Nov. 5	650.5	+ 176.99	— 17.83	— 8.84
15	660.5	+ 191.65	+ 12.00	+ 0.84
25	670.5	+ 199.86	+ 48.00	+ 13.46
Dec. 5	680.5	+ 199.27	+ 88.57	+ 28.55
15	690.5	+ 187.98	+ 131.44	+ 45.30
25	700.5	+ 164.82	+ 173.86	+ 62.68
1932 Jan. 4	710.5	+ 129.42	+ 212.81	+ 79.42
14	720.5	+ 82.37	+ 245.13	+ 94.18
24	730.5	+ 25.16	+ 267.83	+ 105.60
Feb. 3	740.5	— 39.76	+ 278.30	+ 112.44
13	750.5	— 109.18	+ 274.54	+ 113.63
23	760.5	— 179.20	+ 255.35	+ 108.45
Mar. 4	770.5	— 245.60	+ 220.49	+ 96.55
14	780.5	— 304.00	+ 170.77	+ 78.03
24	790.5	— 350.26	+ 108.08	+ 53.47
Apr. 3	800.5	— 380.80	+ 35.28	+ 23.90
13	810.5	— 392.84	— 43.92	— 9.21
23	820.5	— 384.71	— 125.25	— 44.12
May 3	830.5	— 355.95	— 204.10	— 78.83
13	840.5	— 307.40	— 275.90	— 111.31
23	850.5	— 241.16	— 336.40	— 139.61
June 2	860.5	— 160.42	— 381.96	— 161.97
12	870.5	— 69.32	— 409.80	— 176.97
22	880.5	+ 27.38	— 418.15	— 183.61
July 2	890.5	+ 124.59	— 406.38	— 181.36
12	900.5	+ 217.15	— 374.98	— 170.23
22	910.5	+ 300.20	— 325.58	— 150.70
Aug. 1	920.5	+ 369.42	— 260.79	— 123.77
11	930.5	+ 421.31	— 184.08	— 90.83
21	940.5	+ 453.36	— 99.52	— 53.61

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1932 Aug. 21	2426940.5	+ 453.36	— 99.52	— 53.61
31	950.5	+ 464.23	— 11.61	— 14.09
Sept. 10	960.5	+ 453.80	+ 75.06	+ 25.65
20	970.5	+ 423.16	+ 156.08	+ 63.54
30	980.5	+ 374.57	+ 227.46	+ 97.64
Oct. 10	2426990.5	+ 311.28	+ 285.92	+ 126.31
20	2427000.5	+ 237.30	+ 329.10	+ 148.27
30	010.5	+ 157.09	+ 355.67	+ 162.68
Nov. 9	020.5	+ 75.25	+ 365.42	+ 169.25
19	030.5	— 3.81	+ 359.20	+ 168.16
Dec. 9	040.5	— 76.21	+ 338.82	+ 160.06
19	050.5	— 138.80	+ 306.83	+ 146.02
29	060.5	— 189.40	+ 266.29	+ 127.39
1933 Jan. 8	080.5	— 251.05	+ 172.81	+ 82.49
18	090.5	— 262.76	+ 126.13	+ 59.29
28	100.5	— 263.63	+ 82.98	+ 37.41
Feb. 7	110.5	— 255.83	+ 45.25	+ 17.90
17	120.5	— 241.94	+ 14.09	+ 1.49
27	130.5	— 224.67	— 10.13	— 11.42
Mar. 9	140.5	— 206.59	— 27.75	— 20.81
19	150.5	— 189.96	— 39.76	— 26.98
29	160.5	— 176.53	— 47.69	— 30.52
Apr. 8	170.5	— 167.40	— 53.43	— 32.25
18	180.5	— 162.88	— 59.03	— 33.12
May 8	190.5	— 162.52	— 66.49	— 34.11
18	200.5	— 165.11	— 77.52	— 36.16
28	210.5	— 168.79	— 93.38	— 40.01
June 7	220.5	— 171.25	— 114.64	— 46.18
	230.5	— 169.94	— 141.14	— 54.83
17	240.5	— 162.38	— 171.87	— 65.78
27	250.5	— 146.40	— 205.10	— 78.44
July 7	260.5	— 120.46	— 238.40	— 91.95
17	270.5	— 83.84	— 268.93	— 105.14
27	280.5	— 36.77	— 293.65	— 116.70
Aug. 6	290.5	+ 19.48	— 309.60	— 125.29
16	300.5	+ 82.68	— 314.18	— 129.67
26	310.5	+ 149.80	— 305.41	— 128.79
Sept. 5	320.5	+ 217.12	— 282.13	— 121.93
15	330.5	+ 280.63	— 244.10	— 108.75
25	340.5	+ 336.18	— 192.11	— 89.35
Oct. 5	350.5	+ 379.86	— 127.94	— 64.26
15	360.5	+ 408.28	— 54.30	— 34.46
25	370.5	+ 418.79	+ 25.36	— 1.30
Nov. 4	380.5	+ 409.69	+ 106.96	+ 33.57
14	390.5	+ 380.44	+ 186.12	+ 68.26
24	400.5	+ 331.69	+ 258.36	+ 100.82
Dec. 4	410.5	+ 265.33	+ 319.42	+ 129.30

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1933 Dec. 4	2427410.5	+ 265.33	+ 319.42	+ 129.30
14	420.5	+ 184.41	+ 365.56	+ 151.92
24	430.5	+ 92.99	+ 393.83	+ 167.20
1934 Jan. 3	440.5	- 4.08	+ 402.25	+ 174.05
13	450.5	- 101.49	+ 390.04	+ 171.88
Feb. 23	460.5	- 193.78	+ 357.70	+ 160.66
2	470.5	- 275.76	+ 306.98	+ 140.92
12	480.5	- 342.86	+ 240.77	+ 113.75
22	490.5	- 391.45	+ 162.91	+ 80.70
Mar. 4	500.5	- 419.06	+ 77.93	+ 43.67
14	510.5	- 424.58	- 9.31	+ 4.80
Apr. 3	520.5	- 408.28	- 93.90	- 33.69
13	530.5	- 371.72	- 171.30	- 69.67
13	540.5	- 317.62	- 237.53	- 101.22
23	550.5	- 249.66	- 289.45	- 126.76
May 3	560.5	- 172.14	- 324.93	- 145.11
13	570.5	- 89.73	- 342.90	- 155.57
23	580.5	- 7.15	- 343.38	- 157.93
June 2	590.5	+ 71.14	- 327.41	- 152.49
12	600.5	+ 141.18	- 296.97	- 139.97
July 22	610.5	+ 199.76	- 254.79	- 121.48
2	620.5	+ 244.57	- 204.12	- 98.45
12	630.5	+ 274.34	- 148.54	- 72.48
22	640.5	+ 288.86	- 91.65	- 45.28
Aug. 1	650.5	+ 288.97	- 36.83	- 18.48
11	660.5	+ 276.42	+ 12.97	+ 6.41
21	670.5	+ 253.69	+ 55.52	+ 28.17
Sept. 10	680.5	+ 223.77	+ 89.36	+ 45.92
31	690.5	+ 189.86	+ 113.93	+ 59.17
20	700.5	+ 155.03	+ 129.54	+ 67.88
Oct. 30	710.5	+ 122.02	+ 137.29	+ 72.37
10	720.5	+ 92.93	+ 138.88	+ 73.28
20	730.5	+ 69.13	+ 136.39	+ 71.52
30	740.5	+ 51.12	+ 132.04	+ 68.11
Nov. 9	750.5	+ 38.57	+ 127.97	+ 64.11
19	760.5	+ 30.43	+ 125.96	+ 60.46
Dec. 29	770.5	+ 25.08	+ 127.30	+ 57.94
9	780.5	+ 20.49	+ 132.67	+ 57.10
19	790.5	+ 14.50	+ 142.05	+ 58.16
29	800.5	+ 5.02	+ 154.76	+ 61.07
1935 Jan. 8	810.5	- 9.77	+ 169.51	+ 65.44
18	820.5	- 31.19	+ 184.48	+ 70.66
28	830.5	- 59.97	+ 197.48	+ 75.85
Feb. 7	840.5	- 96.06	+ 206.13	+ 80.02
17	850.5	- 138.65	+ 208.06	+ 82.12
Mar. 27	860.5	- 186.09	+ 201.10	+ 81.10
9	870.5	- 236.00	+ 183.53	+ 76.04
19	880.5	- 285.39	+ 154.23	+ 66.28

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1935 Mar. 19	2427880.5	- 285.39	+ 154.23	+ 66.28
29	890.5	- 330.79	+ 112.88	+ 51.43
Apr. 8	900.5	- 368.61	+ 60.07	+ 31.49
18	910.5	- 395.30	- 2.66	+ 6.89
28	920.5	- 407.76	- 72.88	- 21.53
May 8	930.5	- 403.53	- 147.34	- 52.54
18	940.5	- 381.14	- 222.22	- 84.59
28	950.5	- 340.22	- 293.35	- 115.92
June 7	960.5	- 281.56	- 356.52	- 144.66
17	970.5	- 207.20	- 407.81	- 169.02
July 7	980.5	- 120.24	- 443.82	- 187.37
17	2427990.5	- 24.67	- 461.98	- 198.39
27	2428000.5	+ 74.84	- 460.68	- 201.15
27	010.5	+ 173.30	- 439.41	- 195.17
Aug. 6	020.5	+ 265.62	- 398.79	- 180.50
16	030.5	+ 346.99	- 340.57	- 157.67
26	040.5	+ 413.14	- 267.48	- 127.69
Sept. 5	050.5	+ 460.60	- 183.16	- 92.02
15	060.5	+ 486.92	- 91.86	- 52.45
Oct. 5	070.5	+ 490.83	+ 1.72	- 11.00
15	080.5	+ 472.30	+ 92.76	+ 30.16
25	090.5	+ 432.63	+ 176.60	+ 68.88
Nov. 4	100.5	+ 374.30	+ 249.00	+ 103.15
14	110.5	+ 300.89	+ 306.50	+ 131.22
Dec. 24	120.5	+ 216.81	+ 346.53	+ 151.74
4	130.5	+ 126.99	+ 367.69	+ 163.86
1936 Jan. 3	140.5	+ 36.60	+ 369.74	+ 167.24
14	150.5	- 49.41	+ 353.66	+ 162.10
24	160.5	- 126.54	+ 321.52	+ 149.20
24	170.5	- 191.14	+ 276.26	+ 129.75
Feb. 2	180.5	- 240.59	+ 221.50	+ 105.30
23	190.5	- 273.40	+ 161.18	+ 77.62
12	200.5	- 289.31	+ 99.28	+ 48.58
22	210.5	- 289.13	+ 39.55	+ 19.97
Mar. 3	220.5	- 274.71	- 14.77	- 6.57
13	230.5	- 248.64	- 61.10	- 29.68
13	240.5	- 214.04	- 97.71	- 48.38
23	250.5	- 174.31	- 123.72	- 62.06
23	260.5	- 132.85	- 139.12	- 70.52
Apr. 12	270.5	- 92.77	- 144.74	- 73.98
22	280.5	- 56.74	- 142.09	- 72.99
May 2	290.5	- 26.75	- 133.21	- 68.43
12	300.5	- 3.99	- 120.46	- 61.35
22	310.5	+ 11.20	- 106.32	- 52.94
22	320.5	+ 19.37	- 93.12	- 44.36
June 1	330.5	+ 21.82	- 82.84	- 36.69
11	340.5	+ 20.50	- 76.89	- 30.77
July 1	350.5	+ 17.77	- 75.98	- 27.17

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1936 July 1	2428350.5	+ 17.77	- 75.98	- 27.17
11	360.5	+ 16.14	- 80.01	- 26.08
21	370.5	+ 17.98	- 88.09	- 27.34
31	380.5	+ 25.21	- 98.61	- 30.42
Aug. 10	390.5	+ 39.14	- 109.43	- 34.50
20	400.5	+ 60.21	- 118.08	- 38.55
30	410.5	+ 87.95	- 122.03	- 41.43
Sept. 9	420.5	+ 120.97	- 118.96	- 42.05
19	430.5	+ 157.08	- 107.02	- 39.44
29	440.5	+ 193.43	- 85.02	- 32.88
Oct. 9	450.5	+ 226.80	- 52.59	- 21.96
19	460.5	+ 253.80	- 10.26	- 6.69
29	470.5	+ 271.19	+ 40.57	+ 12.57
Nov. 8	480.5	+ 276.14	+ 97.65	+ 35.06
18	490.5	+ 266.47	+ 158.02	+ 59.66
28	500.5	+ 240.85	+ 218.19	+ 84.98
Dec. 8	510.5	+ 198.95	+ 274.37	+ 109.42
18	520.5	+ 141.55	+ 322.68	+ 131.32
28	530.5	+ 70.50	+ 359.48	+ 149.00
1937 Jan. 7	540.5	- 11.28	+ 381.57	+ 160.95
17	550.5	- 99.92	+ 386.47	+ 165.91
27	560.5	- 190.89	+ 372.67	+ 162.99
Feb. 6	570.5	- 279.22	+ 339.73	+ 151.76
16	580.5	- 359.82	+ 288.41	+ 132.29
26	590.5	- 427.86	+ 220.68	+ 105.22
Mar. 8	600.5	- 479.14	+ 139.57	+ 71.66
18	610.5	- 510.33	+ 49.05	+ 33.19
28	620.5	- 519.30	- 46.27	- 8.25
Apr. 7	630.5	- 505.23	- 141.45	- 50.53
17	640.5	- 468.66	- 231.53	- 91.41
27	650.5	- 411.46	- 311.88	- 128.77
May 7	660.5	- 336.67	- 378.50	- 160.66
17	670.5	- 248.29	- 428.22	- 185.51
27	680.5	- 151.00	- 458.91	- 202.13
June 6	690.5	- 49.86	- 469.55	- 209.85
16	700.5	+ 50.02	- 460.26	- 208.48
26	710.5	+ 143.75	- 432.26	- 198.38
July 6	720.5	+ 226.96	- 387.78	- 180.35
16	730.5	+ 296.06	- 329.85	- 155.63
26	740.5	+ 348.39	- 262.13	- 125.76
Aug. 5	750.5	+ 382.37	- 188.66	- 92.56
15	760.5	+ 397.60	- 113.62	- 57.93
25	770.5	+ 394.80	- 40.98	- 23.77
Sept. 4	780.5	+ 375.76	+ 25.67	+ 8.16
14	790.5	+ 343.14	+ 83.39	+ 36.36
24	800.5	+ 300.29	+ 130.09	+ 59.65
Oct. 4	810.5	+ 250.91	+ 164.63	+ 77.31
14	820.5	+ 198.78	+ 186.82	+ 89.03

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1937 Oct. 14	2428820.5	+ 198.78	+ 186.82	+ 89.03
24	830.5	+ 147.41	+ 197.41	+ 94.99
Nov. 3	840.5	+ 99.84	+ 197.93	+ 95.73
13	850.5	+ 58.37	+ 190.49	+ 92.13
23	860.5	+ 24.43	+ 177.54	+ 85.30
Dec. 3	870.5	- 1.42	+ 161.63	+ 76.45
13	880.5	- 19.48	+ 145.16	+ 66.77
23	890.5	- 30.79	+ 130.18	+ 57.37
1938 Jan. 2	900.5	- 36.98	+ 118.21	+ 49.13
12	910.5	- 40.05	+ 110.15	+ 42.70
22	920.5	- 42.15	+ 106.27	+ 38.41
Feb. 1	930.5	- 45.38	+ 106.14	+ 36.29
11	940.5	- 51.56	+ 108.75	+ 36.08
21	950.5	- 62.08	+ 112.60	+ 37.22
Mar. 3	960.5	- 77.75	+ 115.82	+ 38.98
13	970.5	- 98.64	+ 116.40	+ 40.44
23	980.5	- 124.09	+ 112.29	+ 40.66
Apr. 2	2428990.5	- 152.71	+ 101.71	+ 38.72
12	2429000.5	- 182.40	+ 83.31	+ 33.84
22	010.5	- 210.58	+ 56.34	+ 25.47
May 2	020.5	- 234.29	+ 20.81	+ 13.36
12	030.5	- 250.53	- 22.40	- 2.35
22	040.5	- 256.53	- 71.57	- 21.16
June 1	050.5	- 249.99	- 124.21	- 42.17
11	060.5	- 229.41	- 177.21	- 64.16
21	070.5	- 194.24	- 227.04	- 85.69
July 1	080.5	- 145.02	- 270.08	- 105.16
11	090.5	- 83.37	- 302.85	- 121.01
21	100.5	- 11.98	- 322.37	- 131.79
31	110.5	+ 65.59	- 326.32	- 136.32
Aug. 10	120.5	+ 145.14	- 313.29	- 133.77
20	130.5	+ 222.10	- 282.92	- 123.73
30	140.5	+ 291.80	- 235.93	- 106.26
Sept. 9	150.5	+ 349.83	- 174.09	- 81.93
19	160.5	+ 392.28	- 100.17	- 51.74
29	170.5	+ 416.04	- 17.79	- 17.11
Oct. 9	180.5	+ 419.00	+ 68.80	+ 20.19
19	190.5	+ 400.19	+ 154.96	+ 58.17
29	200.5	+ 359.96	+ 235.92	+ 94.70
Nov. 8	210.5	+ 299.92	+ 307.07	+ 127.70
18	220.5	+ 222.89	+ 364.30	+ 155.20
28	230.5	+ 132.82	+ 404.23	+ 175.53
Dec. 8	240.5	+ 34.47	+ 424.50	+ 187.43
18	250.5	- 66.82	+ 423.92	+ 190.12
28	260.5	- 165.53	+ 402.56	+ 183.39
1939 Jan. 7	270.5	- 256.34	+ 361.78	+ 167.63
17	280.5	- 334.45	+ 304.09	+ 143.76
27	290.5	- 395.99	+ 232.98	+ 113.20

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1939 Jan. 27	2429290.5	— 395.99	+ 232.98	+ 113.20
Feb. 6	300.5	— 438.17	+ 152.67	+ 77.74
16	310.5	— 459.51	+ 67.76	+ 39.43
26	320.5	— 459.84	— 17.11	+ 0.38
Mar. 8	330.5	— 440.26	— 97.52	— 37.32
18	340.5	— 403.01	— 169.60	— 71.78
28	350.5	— 351.21	— 230.24	— 101.41
Apr. 7	360.5	— 288.66	— 277.25	— 125.02
17	370.5	— 219.49	— 309.41	— 141.84
27	380.5	— 147.90	— 326.53	— 151.59
May 7	390.5	— 77.87	— 329.35	— 154.42
17	400.5	— 12.92	— 319.46	— 150.90
27	410.5	+ 44.13	— 299.13	— 141.97
June 6	420.5	+ 91.28	— 271.10	— 128.82
16	430.5	+ 127.48	— 238.34	— 112.84
July 6	440.5	+ 152.66	— 203.83	— 95.44
16	450.5	+ 167.66	— 170.26	— 78.00
26	460.5	+ 174.09	— 139.86	— 61.70
Aug. 5	470.5	+ 174.18	— 114.20	— 47.47
15	480.5	+ 170.48	— 94.04	— 35.90
Sept. 4	490.5	+ 165.62	— 79.36	— 27.19
25	500.5	+ 161.98	— 69.32	— 21.18
14	510.5	+ 161.44	— 62.44	— 17.35
24	520.5	+ 165.19	— 56.80	— 14.93
24	530.5	+ 173.60	— 50.23	— 12.98
Oct. 4	540.5	+ 186.20	— 40.63	— 10.50
14	550.5	+ 201.67	— 26.15	— 6.56
24	560.5	+ 218.08	— 5.49	— 0.40
Nov. 3	570.5	+ 232.99	+ 22.03	+ 8.51
13	580.5	+ 243.75	+ 56.32	+ 20.36
Dec. 3	590.5	+ 247.73	+ 96.54	+ 35.02
13	600.5	+ 242.54	+ 141.04	+ 52.00
23	610.5	+ 226.30	+ 187.60	+ 70.53
1940 Jan. 2	620.5	+ 197.81	+ 233.45	+ 89.54
12	630.5	+ 156.68	+ 275.50	+ 107.77
Feb. 1	640.5	+ 103.48	+ 310.58	+ 123.85
11	650.5	+ 39.69	+ 335.64	+ 136.41
21	660.5	— 32.24	+ 347.98	+ 144.18
22	670.5	— 109.07	+ 345.52	+ 146.06
Mar. 2	680.5	— 186.89	+ 326.96	+ 141.27
12	690.5	— 261.38	+ 291.97	+ 129.45
22	700.5	— 328.07	+ 241.28	+ 110.64
Apr. 1	710.5	— 382.71	+ 176.69	+ 85.38
11	720.5	— 421.54	+ 101.01	+ 54.70
21	730.5	— 441.63	+ 17.92	+ 20.03
May 1	740.5	— 441.10	— 68.28	— 16.89
11	750.5	— 419.30	— 152.95	— 54.04
	760.5	— 376.90	— 231.42	— 89.36

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1940 Apr. 1	2429720.5	— 421.54	+ 101.01	+ 54.70
11	730.5	— 441.63	+ 17.92	+ 20.03
21	740.5	— 441.10	— 68.28	— 16.89
May 1	750.5	— 419.30	— 152.95	— 54.04
11	760.5	— 376.90	— 231.42	— 89.36
21	770.5	— 315.83	— 299.31	— 120.86
31	780.5	— 239.17	— 352.84	— 146.70
June 10	790.5	— 150.93	— 389.04	— 165.40
20	800.5	— 55.83	— 405.97	— 175.86
30	810.5	+ 41.04	— 402.78	— 177.50
July 10	820.5	+ 134.50	— 379.80	— 170.21
20	830.5	+ 219.62	— 338.46	— 154.40
30	840.5	+ 291.99	— 281.22	— 130.99
Aug. 9	850.5	+ 347.97	— 211.40	— 101.31
19	860.5	+ 384.89	— 133.00	— 67.03
29	870.5	+ 401.24	— 50.42	— 30.10
Sept. 8	880.5	+ 396.70	+ 31.79	+ 7.43
18	890.5	+ 372.20	+ 109.18	+ 43.50
28	900.5	+ 329.82	+ 177.76	+ 76.16
Oct. 8	910.5	+ 272.67	+ 234.18	+ 103.73
18	920.5	+ 204.62	— 275.96	+ 124.91
28	930.5	+ 130.05	+ 301.69	+ 138.81
Nov. 7	940.5	+ 53.51	+ 311.03	+ 145.07
17	950.5	— 20.60	+ 304.70	+ 143.82
27	960.5	— 88.36	+ 284.41	+ 135.67
Dec. 7	970.5	— 146.59	+ 252.64	+ 121.64
17	980.5	— 193.03	+ 212.40	+ 103.05
27	2429990.5	— 226.44	+ 166.97	+ 81.41
1941 Jan. 6	2430000.5	— 246.60	+ 119.62	+ 58.27
16	010.5	— 254.26	+ 73.36	+ 35.14
26	020.5	— 250.97	+ 30.76	+ 13.36
Feb. 5	030.5	— 238.89	— 6.26	— 6.00
15	040.5	— 220.57	— 36.49	— 22.16
25	050.5	— 198.73	— 59.45	— 34.69
Mar. 7	060.5	— 175.97	— 75.44	— 43.55
17	070.5	— 154.63	— 85.38	— 48.99
27	080.5	— 136.53	— 90.77	— 51.58
Apr. 6	090.5	— 122.86	— 93.45	— 52.12
16	100.5	— 114.04	— 95.47	— 51.54
26	110.5	— 109.74	— 98.85	— 50.85
May 6	120.5	— 108.85	— 105.37	— 50.96
16	130.5	— 109.60	— 116.32	— 52.68
26	140.5	— 109.76	— 132.41	— 56.54
June 5	150.5	— 106.82	— 153.55	— 62.76
15	160.5	— 98.32	— 178.86	— 71.20
25	170.5	— 82.07	— 206.70	— 81.33
July 5	180.5	— 56.50	— 234.75	— 92.33
15	190.5	— 20.80	— 260.24	— 103.08

	Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1941	July 15	2430190.5	— 20.80	— 260.24	— 103.08
	25	200.5	+ 24.86	— 280.19	— 112.30
	Aug. 4	210.5	+ 79.32	— 291.65	— 118.67
	14	220.5	+ 140.44	— 292.04	— 120.95
	24	230.5	+ 205.25	— 279.34	— 118.09
	Sept. 3	240.5	+ 270.10	— 252.35	— 109.37
	13	250.5	+ 331.00	— 210.78	— 94.42
	23	260.5	+ 383.81	— 155.38	— 73.31
	Oct. 3	270.5	+ 424.61	— 87.87	— 46.57
	13	280.5	+ 449.98	— 10.90	— 15.16
	23	290.5	+ 457.19	+ 72.06	+ 19.61
	Nov. 2	300.5	+ 444.48	+ 156.96	+ 56.05
	12	310.5	+ 411.25	+ 239.39	+ 92.31
	22	320.5	+ 358.05	+ 314.84	+ 126.39
	Dec. 2	330.5	+ 286.71	+ 378.96	+ 156.33
	12	340.5	+ 200.23	+ 427.93	+ 180.32
	22	350.5	+ 102.65	+ 458.64	+ 196.82
1942	Jan. 1	360.5	— 1.20	+ 469.03	+ 204.67
	11	370.5	— 105.93	+ 458.16	+ 203.24
	21	380.5	— 206.03	+ 426.38	+ 192.43
	31	390.5	— 296.17	+ 375.33	+ 172.72
	Feb. 10	400.5	— 371.62	+ 307.81	+ 145.13
	20	410.5	— 428.54	+ 227.60	+ 111.20
	Mar. 2	420.5	— 464.28	+ 139.20	+ 72.81
	12	430.5	— 477.52	+ 47.52	+ 32.11
	22	440.5	— 468.29	— 42.50	— 8.67
	Apr. 1	450.5	— 438.00	— 126.18	— 47.36
	11	460.5	— 389.21	— 199.41	— 81.98
	21	470.5	— 325.47	— 258.89	— 110.86
	May 1	480.5	— 251.01	— 302.30	— 132.77
	11	490.5	— 170.47	— 328.39	— 146.91
	21	500.5	— 88.58	— 337.00	— 153.00
	31	510.5	— 9.84	— 329.00	— 151.24
	June 10	520.5	+ 61.71	— 306.23	— 142.28
	20	530.5	+ 122.74	— 271.26	— 127.19
	30	540.5	+ 170.83	— 227.28	— 107.32
July	10	550.5	+ 204.55	— 177.75	— 84.24
	20	560.5	+ 223.56	— 126.28	— 59.64
	30	570.5	+ 228.54	— 76.22	— 35.14
Aug.	9	580.5	+ 221.09	— 30.53	— 12.26
	19	590.5	+ 203.62	+ 8.48	+ 7.78
	29	600.5	+ 179.02	+ 39.30	+ 24.06
Sept.	8	610.5	+ 150.41	+ 61.30	+ 36.07
	18	620.5	+ 120.88	+ 74.73	+ 43.70
	28	630.5	+ 93.14	+ 80.61	+ 47.27
Oct.	8	640.5	+ 69.35	+ 80.60	+ 47.41
	18	650.5	+ 50.89	+ 76.78	+ 44.98
	28	660.5	+ 38.31	+ 71.36	+ 41.01

	Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1942	Oct. 28	2430660.5	+ 38.31	+ 71.36	+ 41.01
	Nov. 7	670.5	+ 31.32	+ 66.49	+ 36.55
	17	680.5	+ 28.90	+ 64.01	+ 32.58
	27	690.5	+ 29.41	+ 65.26	+ 29.88
	Dec. 7	700.5	+ 30.84	+ 70.97	+ 29.03
	17	710.5	+ 30.98	+ 81.19	+ 30.29
	27	720.5	+ 27.67	+ 95.30	+ 33.61
1943	Jan. 6	730.5	+ 19.03	+ 112.03	+ 38.66
	16	740.5	+ 3.63	+ 129.60	+ 44.81
	26	750.5	— 19.35	+ 145.83	+ 51.22
	Feb. 5	760.5	— 49.99	+ 158.33	+ 56.90
	15	770.5	— 87.56	+ 164.68	+ 60.77
	25	780.5	— 130.55	+ 162.68	+ 61.78
	Mar. 7	790.5	— 176.66	+ 150.50	+ 58.99
	17	800.5	— 222.98	+ 126.94	+ 51.68
	27	810.5	— 266.12	+ 91.56	+ 39.44
	Apr. 6	820.5	— 302.48	+ 44.83	+ 22.20
	16	830.5	— 328.54	— 11.86	+ 0.33
	26	840.5	— 341.15	— 76.19	— 25.39
	May 6	850.5	— 337.78	— 145.03	— 53.77
	16	860.5	— 316.87	— 214.63	— 83.31
	26	870.5	— 277.92	— 280.89	— 112.28
	June 5	880.5	— 221.64	— 339.63	— 138.84
	15	890.5	— 149.92	— 386.93	— 161.22
	25	900.5	— 65.75	— 419.36	— 177.76
	July 5	910.5	+ 26.94	— 434.30	— 187.14
	15	920.5	+ 123.58	— 430.07	— 188.39
	25	930.5	+ 219.17	— 406.10	— 181.02
	Aug. 4	940.5	+ 308.68	— 362.93	— 165.04
	14	950.5	+ 387.26	— 302.23	— 140.95
	24	960.5	+ 450.59	— 226.69	— 109.74
	Sept. 3	970.5	+ 495.16	— 139.88	— 72.83
	13	980.5	+ 518.44	— 46.05	— 32.00
	23	2430990.5	+ 519.06	+ 50.12	+ 10.72
	Oct. 3	2431000.5	+ 496.92	+ 143.77	+ 53.16
	13	010.5	+ 453.22	+ 230.19	+ 93.16
	23	020.5	+ 390.39	+ 305.07	+ 128.66
	Nov. 2	030.5	+ 311.95	+ 364.83	+ 157.89
	12	040.5	+ 222.28	+ 406.80	+ 179.44
	22	050.5	+ 126.34	+ 429.43	+ 192.38
	Dec. 2	060.5	+ 29.35	+ 432.37	+ 196.34
	12	070.5	— 63.64	+ 416.49	+ 191.49
	22	080.5	— 148.01	+ 383.74	+ 178.50
1944	Jan. 1	090.5	— 219.97	+ 337.02	+ 158.58
	11	100.5	— 276.69	+ 279.89	+ 133.23
	21	110.5	— 316.54	+ 216.31	+ 104.24
	31	120.5	— 339.04	+ 150.30	+ 73.48
	Feb. 10	130.5	— 344.89	+ 85.70	+ 42.78

Nr. 10

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1944 Feb. 10	2431130.5	— 344.89	+ 85.70	+ 42.78
20	140.5	— 335.77	+ 25.84	+ 13.81
Mar. 1	150.5	— 314.17	— 26.58	— 12.02
11	160.5	— 283.14	— 69.67	— 33.65
21	170.5	— 246.05	— 102.41	— 50.41
31	180.5	— 206.27	— 124.67	— 62.04
Apr. 10	190.5	— 166.98	— 137.12	— 68.68
20	200.5	— 130.87	— 141.15	— 70.84
30	210.5	— 100.02	— 138.70	— 69.31
May 10	220.5	— 75.74	— 132.07	— 65.15
20	230.5	— 58.44	— 123.68	— 59.48
30	240.5	— 47.70	— 115.86	— 53.47
June 9	250.5	— 42.30	— 110.58	— 48.18
19	260.5	— 40.39	— 109.28	— 44.47
29	270.5	— 39.66	— 112.71	— 42.92
July 9	280.5	— 37.63	— 120.82	— 43.75
19	290.5	— 31.94	— 132.78	— 46.82
29	300.5	— 20.61	— 147.00	— 51.62
Aug. 8	310.5	— 2.33	— 161.38	— 57.34
18	320.5	+ 23.41	— 173.43	— 62.96
28	330.5	+ 56.22	— 180.59	— 67.34
Sept. 7	340.5	+ 94.74	— 180.48	— 69.35
17	350.5	+ 136.82	— 171.18	— 68.00
27	360.5	+ 179.65	— 151.38	— 62.54
Oct. 7	370.5	+ 219.94	— 120.63	— 52.51
17	380.5	+ 254.28	— 79.32	— 37.86
27	390.5	+ 279.33	— 28.78	— 18.91
Nov. 6	400.5	+ 292.16	+ 28.84	+ 3.60
16	410.5	+ 290.44	+ 90.64	+ 28.62
26	420.5	+ 272.68	+ 153.17	+ 54.75
Dec. 6	430.5	+ 238.39	+ 212.63	+ 80.43
16	440.5	+ 188.16	+ 265.14	+ 103.96
26	450.5	+ 123.70	+ 306.95	+ 123.67
1945 Jan. 5	460.5	+ 47.76	+ 334.79	+ 138.00
15	470.5	— 35.94	+ 346.06	+ 145.64
25	480.5	— 122.96	+ 339.08	+ 145.65
Feb. 4	490.5	— 208.37	+ 313.26	+ 137.52
14	500.5	— 287.13	+ 269.19	+ 121.26
24	510.5	— 354.38	+ 208.64	+ 97.41
Mar. 6	520.5	— 405.85	+ 134.50	+ 67.02
16	530.5	— 438.13	+ 50.61	+ 31.61
26	540.5	— 448.94	— 38.54	— 6.94
Apr. 5	550.5	— 437.34	— 128.06	— 46.54
15	560.5	— 403.71	— 213.04	— 84.98
25	570.5	— 349.78	— 288.85	— 120.12
May 5	580.5	— 278.48	— 351.44	— 150.04
15	590.5	— 193.70	— 397.61	— 173.12
25	600.5	— 100.03	— 425.14	— 188.16

Nr. 10

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1945 May 25	2431600.5	— 100.03	— 425.14	— 188.16
June 4	610.5	— 2.50	— 432.95	— 194.46
14	620.5	+ 93.81	— 421.10	— 191.80
24	630.5	+ 184.00	— 390.72	— 180.50
July 4	640.5	+ 263.69	— 343.97	— 161.32
14	650.5	+ 329.22	— 283.86	— 135.49
24	660.5	+ 377.88	— 214.03	— 104.55
Aug. 3	670.5	+ 408.03	— 138.50	— 70.30
13	680.5	+ 419.19	— 61.46	— 34.64
23	690.5	+ 412.03	+ 13.03	+ 0.51
Sept. 2	700.5	+ 388.29	+ 81.35	+ 33.36
12	710.5	+ 350.62	+ 140.47	+ 62.36
22	720.5	+ 302.36	+ 188.22	+ 86.33
Oct. 2	730.5	+ 247.24	+ 223.34	+ 104.46
12	740.5	+ 189.09	+ 245.59	+ 116.43
22	750.5	+ 131.55	+ 255.63	+ 122.36
Nov. 1	760.5	+ 77.74	+ 254.93	+ 122.77
11	770.5	+ 30.09	+ 245.59	+ 118.52
21	780.5	— 9.81	+ 230.07	+ 110.72
Dec. 1	790.5	— 41.30	+ 210.95	+ 100.58
11	800.5	— 64.56	+ 190.68	+ 89.33
21	810.5	— 80.54	+ 171.41	+ 78.08
31	820.5	— 90.79	+ 154.75	+ 67.78
1946 Jan. 10	830.5	— 97.26	+ 141.70	+ 59.10
20	840.5	— 102.08	+ 132.63	+ 52.44
30	850.5	— 107.36	+ 127.22	+ 47.87
Feb. 9	860.5	— 114.96	+ 124.54	+ 45.17
19	870.5	— 126.31	+ 123.18	+ 43.84
Mar. 1	880.5	— 142.26	+ 121.34	+ 43.15
11	890.5	— 162.98	+ 117.01	+ 42.25
21	900.5	— 187.90	+ 108.20	+ 40.20
31	910.5	— 215.67	+ 93.12	+ 36.07
Apr. 10	920.5	— 244.29	+ 70.39	+ 29.10
20	930.5	— 271.20	+ 39.22	+ 18.71
30	940.5	— 293.50	— 0.42	+ 4.64
May 10	950.5	— 308.18	— 47.74	— 13.01
20	960.5	— 312.42	— 101.05	— 33.74
30	970.5	— 303.91	— 157.91	— 56.69
June 9	980.5	— 281.04	— 215.22	— 80.66
19	2431990.5	— 243.17	— 269.48	— 104.20
29	2432000.5	— 190.74	— 317.00	— 125.72
July 9	010.5	— 125.29	— 354.26	— 143.62
19	020.5	— 49.43	— 378.16	— 156.43
29	030.5	+ 83.34	— 386.27	— 162.91
Aug. 8	040.5	+ 118.84	— 377.06	— 162.17
18	050.5	+ 202.48	— 350.02	— 153.76
28	060.5	+ 279.56	— 305.70	— 137.65
Sept. 7	070.5	+ 345.54	— 245.77	— 114.36

Nr. 10

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1946 Sept. 7	2432070.5	+ 345.54	- 245.77	- 114.36
17	080.5	+ 396.42	- 172.86	- 84.83
27	090.5	+ 428.92	- 90.50	- 50.43
Oct. 7	100.5	+ 440.75	- 2.86	- 12.90
17	110.5	+ 430.76	+ 85.44	+ 25.80
27	120.5	+ 399.07	+ 169.62	+ 63.56
Nov. 6	130.5	+ 347.08	+ 245.03	+ 98.25
16	140.5	+ 277.46	+ 307.48	+ 127.90
26	150.5	+ 193.94	+ 353.47	+ 150.79
Dec. 6	160.5	+ 101.17	+ 380.48	+ 165.57
16	170.5	+ 4.38	+ 387.15	+ 171.43
26	180.5	- 90.98	+ 373.37	+ 168.05
1947 Jan. 5	190.5	- 179.57	+ 340.29	+ 155.74
15	200.5	- 256.58	+ 290.27	+ 135.34
25	210.5	- 318.04	+ 226.65	+ 108.20
Feb. 4	220.5	- 361.08	+ 153.50	+ 76.03
14	230.5	- 384.06	+ 75.32	+ 40.85
24	240.5	- 386.71	- 3.27	+ 4.73
Mar. 6	250.5	- 369.97	- 77.91	- 30.26
16	260.5	- 335.98	- 144.72	- 62.22
26	270.5	- 287.76	- 200.56	- 89.58
Apr. 5	280.5	- 229.00	- 243.20	- 111.10
15	290.5	- 163.82	- 271.37	- 126.02
25	300.5	- 96.36	- 284.82	- 134.02
May 5	310.5	- 30.60	- 284.27	- 135.22
15	320.5	+ 29.93	- 271.27	- 130.20
25	330.5	+ 82.38	- 248.06	- 119.86
June 4	340.5	+ 124.72	- 217.38	- 105.41
14	350.5	+ 155.87	- 182.23	- 88.21
24	360.5	+ 175.72	- 145.60	- 69.71
July 4	370.5	+ 185.07	- 110.26	- 51.30
14	380.5	+ 185.56	- 78.50	- 34.19
24	390.5	+ 179.43	- 51.97	- 19.36
Aug. 3	400.5	+ 169.28	- 31.52	- 7.41
13	410.5	+ 157.83	- 17.16	+ 1.40
23	420.5	+ 147.54	- 8.14	+ 7.22
Sept. 2	430.5	+ 140.44	- 3.00	+ 10.52
12	440.5	+ 137.86	+ .19	+ 12.10
22	450.5	+ 140.31	+ 3.63	+ 12.88
Oct. 2	460.5	+ 147.42	+ 9.48	+ 13.89
12	470.5	+ 158.02	+ 19.68	+ 16.08
22	480.5	+ 170.24	+ 35.67	+ 20.29
Nov. 1	490.5	+ 181.70	+ 58.24	+ 27.06
11	500.5	+ 189.78	+ 87.43	+ 36.66
21	510.5	+ 191.80	+ 122.51	+ 49.02
Dec. 1	520.5	+ 185.35	+ 162.00	+ 63.70
11	530.5	+ 168.47	+ 203.72	+ 79.98
21	540.5	+ 139.86	+ 245.01	+ 96.82

Nr. 10

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1947 Dec. 21	2432540.5	+ 139.86	+ 245.01	+ 96.82
31	550.5	+ 99.02	+ 282.82	+ 112.99
1948 Jan. 10	560.5	+ 46.42	+ 314.00	+ 127.16
20	570.5	- 16.59	+ 335.48	+ 137.95
30	580.5	- 87.67	+ 344.54	+ 144.06
Feb. 9	590.5	- 163.66	+ 339.03	+ 144.40
19	600.5	- 240.70	+ 317.58	+ 138.17
29	610.5	- 314.53	+ 279.74	+ 124.94
Mar. 10	620.5	- 380.67	+ 226.16	+ 104.72
20	630.5	- 434.83	+ 158.53	+ 78.02
30	640.5	- 473.18	+ 79.59	+ 45.80
Apr. 9	650.5	- 492.68	- 7.06	+ 9.47
19	660.5	- 491.34	- 97.15	- 29.22
29	670.5	- 468.36	- 186.02	- 68.30
May 9	680.5	- 424.29	- 268.97	- 105.67
19	690.5	- 360.90	- 341.54	- 139.32
29	700.5	- 281.20	- 399.84	- 167.37
June 8	710.5	- 189.12	- 440.77	- 188.28
18	720.5	- 89.32	- 462.24	- 200.89
28	730.5	+ 13.08	- 463.24	- 204.55
July 8	740.5	+ 112.90	- 443.95	- 199.07
18	750.5	+ 205.12	- 405.64	- 184.81
28	760.5	+ 285.22	- 350.65	- 162.61
Aug. 7	770.5	+ 349.40	- 282.18	- 133.75
17	780.5	+ 394.86	- 204.14	- 99.86
27	790.5	+ 419.88	- 120.88	- 62.84
Sept. 6	800.5	+ 423.96	- 36.96	- 24.75
16	810.5	+ 407.84	+ 43.20	+ 12.36
26	820.5	+ 373.42	+ 115.52	+ 46.53
Oct. 6	830.5	+ 323.61	+ 176.56	+ 76.04
16	840.5	+ 262.17	+ 223.76	+ 99.54
26	850.5	+ 193.36	+ 255.53	+ 116.08
Nov. 5	860.5	+ 121.66	+ 271.40	+ 125.24
15	870.5	+ 51.44	+ 271.96	+ 127.07
25	880.5	- 13.40	+ 258.76	+ 122.14
Dec. 5	890.5	- 69.63	+ 234.15	+ 111.37
15	900.5	- 114.94	+ 201.04	+ 96.05
25	910.5	- 148.04	+ 162.64	+ 77.63
1949 Jan. 4	920.5	- 168.61	+ 122.13	+ 57.64
14	930.5	- 177.35	+ 82.51	+ 37.57
24	940.5	- 175.72	+ 46.30	+ 18.74
Feb. 3	950.5	- 165.85	+ 15.44	+ 2.22
13	960.5	- 150.25	- 8.89	- 11.21
23	970.5	- 131.59	- 26.20	- 21.15
Mar. 5	980.5	- 112.48	- 36.79	- 27.52
15	2432990.5	- 95.26	- 41.60	- 30.58
25	2433000.5	- 81.76	- 42.12	- 30.92
Apr. 4	010.5	- 73.16	- 40.26	- 29.33

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1949 Apr. 4	2433010.5	— 73.16	— 40.26	— 29.33
14	020.5	— 69.92	— 38.09	— 26.77
24	030.5	— 71.70	— 37.70	— 24.25
May 4	040.5	— 77.40	— 40.93	— 22.74
14	050.5	— 85.22	— 49.19	— 23.07
24	060.5	— 92.88	— 63.24	— 25.80
June 3	070.5	— 97.81	— 83.11	— 31.21
13	080.5	— 97.40	— 108.00	— 39.19
23	090.5	— 89.37	— 136.32	— 49.27
July 3	100.5	— 71.96	— 165.80	— 60.62
13	110.5	— 44.20	— 193.68	— 72.15
23	120.5	— 6.06	— 216.93	— 82.57
Aug. 2	130.5	+ 41.45	— 232.54	— 90.54
12	140.5	+ 96.37	— 237.80	— 94.77
22	150.5	+ 155.83	— 230.58	— 94.18
Sept. 1	160.5	+ 216.30	— 209.50	— 87.95
11	170.5	+ 273.81	— 174.12	— 75.67
21	180.5	+ 324.26	— 124.98	— 57.31
Oct. 1	190.5	+ 363.68	— 63.66	— 33.34
11	200.5	+ 388.56	+ 7.36	— 4.62
21	210.5	+ 396.07	+ 84.74	+ 27.56
31	220.5	+ 384.35	+ 164.54	+ 61.62
Nov. 10	230.5	+ 352.58	+ 242.41	+ 95.70
20	240.5	+ 301.19	+ 313.86	+ 127.84
30	250.5	+ 231.82	+ 374.55	+ 156.08
Dec. 10	260.5	+ 147.32	+ 420.60	+ 178.60
20	270.5	+ 51.59	+ 448.83	+ 193.82
30	280.5	— 50.64	+ 457.05	+ 200.56
1950 Jan. 9	290.5	— 154.04	+ 444.19	+ 198.11
19	300.5	— 253.11	+ 410.49	+ 186.33
29	310.5	— 342.51	+ 357.42	+ 165.62
Feb. 8	320.5	— 417.42	+ 287.67	+ 136.97
18	330.5	— 473.90	+ 204.93	+ 101.84
28	340.5	— 509.16	+ 113.65	+ 62.10
Mar. 10	350.5	— 521.73	+ 18.70	+ 19.88
20	360.5	— 511.49	— 74.94	— 22.59
30	370.5	— 479.70	— 162.54	— 63.11
Apr. 9	380.5	— 428.81	— 239.89	— 99.67
19	390.5	— 362.27	— 303.58	— 130.55
29	400.5	— 284.27	— 351.14	— 154.46
May 9	410.5	— 199.42	— 381.18	— 170.53
19	420.5	— 112.45	— 393.39	— 178.42
29	430.5	— 27.94	— 388.52	— 178.26
June 8	440.5	+ 49.99	— 368.25	— 170.64
18	450.5	+ 117.92	— 335.09	— 156.58
28	460.5	+ 173.26	— 292.12	— 137.38
July 8	470.5	+ 214.45	— 242.77	— 114.60
18	480.5	+ 240.98	— 190.61	— 89.88

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1950 July 18	2433480.5	+ 240.98	— 190.61	— 89.88
28	490.5	+ 253.37	— 139.02	— 64.86
Aug. 7	500.5	+ 253.11	— 91.01	— 41.07
17	510.5	+ 242.44	— 48.93	— 19.77
27	520.5	+ 224.17	— 14.39	— 1.90
Sept. 6	530.5	+ 201.34	+ 11.89	+ 11.99
16	540.5	+ 176.99	+ 30.06	+ 21.74
26	550.5	+ 153.84	+ 41.04	+ 27.62
Oct. 6	560.5	+ 134.01	+ 46.43	+ 30.21
16	570.5	+ 118.93	+ 48.23	+ 30.36
26	580.5	+ 109.16	+ 48.62	+ 29.06
Nov. 5	590.5	+ 104.45	+ 49.72	+ 27.35
15	600.5	+ 103.77	+ 53.35	+ 26.18
25	610.5	+ 105.50	+ 60.86	+ 26.35
Dec. 5	620.5	+ 107.61	+ 72.96	+ 28.42
15	630.5	+ 107.86	+ 89.71	+ 32.65
25	640.5	+ 104.05	+ 110.46	+ 38.98
1951 Jan. 4	650.5	+ 94.26	+ 133.92	+ 47.08
14	660.5	+ 76.99	+ 158.27	+ 56.29
24	670.5	+ 51.38	+ 181.26	+ 65.77
Feb. 3	680.5	+ 17.33	+ 200.42	+ 74.48
13	690.5	— 24.58	+ 213.26	+ 81.32
23	700.5	— 72.75	+ 217.43	+ 85.19
Mar. 5	710.5	— 124.93	+ 211.00	+ 85.09
15	720.5	— 178.18	+ 192.62	+ 80.25
25	730.5	— 229.06	+ 161.71	+ 70.19
Apr. 4	740.5	— 273.88	+ 118.61	+ 54.79
14	750.5	— 309.00	+ 64.57	+ 34.34
24	760.5	— 331.08	+ 1.81	+ 9.61
May 4	770.5	— 337.44	— 66.62	— 18.30
14	780.5	— 326.29	— 137.01	— 47.90
24	790.5	— 296.90	— 205.27	— 77.47
June 3	800.5	— 249.75	— 267.16	— 105.16
13	810.5	— 186.53	— 318.68	— 129.16
23	820.5	— 110.06	— 356.28	— 147.78
July 3	830.5	— 24.08	— 377.17	— 159.62
13	840.5	+ 66.94	— 379.50	— 163.64
23	850.5	+ 158.07	— 362.49	— 159.28
Aug. 2	860.5	+ 244.29	— 326.48	— 146.44
12	870.5	+ 320.74	— 272.96	— 125.53
22	880.5	+ 383.06	— 204.43	— 97.48
Sept. 1	890.5	+ 427.60	— 124.30	— 63.62
11	900.5	+ 451.71	— 36.69	— 25.66
21	910.5	+ 453.86	+ 53.80	+ 14.42
Oct. 1	920.5	+ 433.80	+ 142.40	+ 54.48
11	930.5	+ 392.52	+ 224.38	+ 92.36
21	940.5	+ 332.30	+ 295.46	+ 126.03
31	950.5	+ 256.49	+ 351.96	+ 153.67

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1951 Oct. 31	2433950.5	+ 256.49	+ 351.96	+ 153.67
Nov. 10	960.5	+ 169.36	+ 391.15	+ 173.86
20	970.5	+ 75.79	+ 411.35	+ 185.62
30	980.5	- 19.09	+ 412.10	+ 188.51
Dec. 10	2433990.5	- 110.21	+ 394.14	+ 182.64
20	2434000.5	- 192.92	+ 359.30	+ 168.66
30	010.5	- 263.36	+ 310.39	+ 147.69
1952 Jan. 9	020.5	- 318.62	+ 250.91	+ 121.22
19	030.5	- 356.93	+ 184.77	+ 91.02
29	040.5	- 377.72	+ 116.01	+ 58.93
Feb. 8	050.5	- 381.56	+ 48.47	+ 26.81
18	060.5	- 370.04	- 14.43	- 3.65
28	070.5	- 345.58	- 69.92	- 31.01
Mar. 9	080.5	- 311.19	- 116.01	- 54.16
19	090.5	- 270.19	- 151.59	- 72.38
29	100.5	- 225.99	- 176.40	- 85.37
Apr. 8	110.5	- 181.80	- 191.03	- 93.21
18	120.5	- 140.37	- 196.78	- 96.37
28	130.5	- 103.89	- 195.51	- 95.62
May 8	140.5	- 73.73	- 189.47	- 91.94
18	150.5	- 50.46	- 181.07	- 86.47
28	160.5	- 33.75	- 172.62	- 80.37
June 7	170.5	- 22.50	- 166.13	- 74.70
17	180.5	- 14.95	- 163.09	- 70.33
27	190.5	- 8.86	- 164.29	- 67.88
July 7	200.5	- 1.80	- 169.79	- 67.59
17	210.5	+ 8.56	- 178.80	- 69.36
27	220.5	+ 24.21	- 189.82	- 72.71
Aug. 6	230.5	+ 46.50	- 200.79	- 76.87
16	240.5	+ 75.97	- 209.24	- 80.82
26	250.5	+ 112.26	- 212.63	- 83.44
Sept. 5	260.5	+ 154.07	- 208.55	- 83.60
15	270.5	+ 199.26	- 195.04	- 80.31
25	280.5	+ 245.00	- 170.77	- 72.77
Oct. 5	290.5	+ 287.99	- 135.20	- 60.54
15	300.5	+ 324.76	- 88.70	- 43.52
25	310.5	+ 351.90	- 32.54	- 22.03
Nov. 4	320.5	+ 366.37	+ 31.13	+ 3.22
14	330.5	+ 365.72	+ 99.41	+ 31.15
24	340.5	+ 348.34	+ 168.82	+ 60.38
Dec. 4	350.5	+ 313.62	+ 235.50	+ 89.31
14	360.5	+ 262.01	+ 295.46	+ 116.22
24	370.5	+ 195.12	+ 344.84	+ 139.36
1953 Jan. 3	380.5	+ 115.63	+ 380.21	+ 157.14
13	390.5	+ 27.21	+ 398.79	+ 168.17
23	400.5	- 65.71	+ 398.71	+ 171.41
Feb. 2	410.5	- 158.17	+ 379.17	+ 166.26
12	420.5	- 245.04	+ 340.56	+ 152.66

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1953 Feb. 12	2434420.5	- 245.04	+ 340.56	+ 152.66
22	430.5	- 321.31	+ 284.48	+ 131.05
Mar. 4	440.5	- 382.52	+ 213.67	+ 102.42
14	450.5	- 425.06	+ 131.84	+ 68.21
24	460.5	- 446.40	+ 43.41	+ 30.27
Apr. 3	470.5	- 445.32	- 46.74	- 9.32
13	480.5	- 421.96	- 133.69	- 48.36
23	490.5	- 377.81	- 212.70	- 84.68
May 3	500.5	- 315.57	- 279.63	- 116.31
13	510.5	- 238.96	- 331.10	- 141.57
June 23	520.5	- 152.42	- 364.73	- 159.20
2	530.5	- 60.89	- 379.23	- 168.38
12	540.5	+ 30.59	- 374.47	- 168.82
22	550.5	+ 117.12	- 351.39	- 160.75
July 2	560.5	+ 194.29	- 311.97	- 144.86
12	570.5	+ 258.36	- 259.04	- 122.28
22	580.5	+ 306.50	- 196.11	- 94.50
Aug. 1	590.5	+ 336.97	- 127.12	- 63.24
11	600.5	+ 349.14	- 56.17	- 30.39
21	610.5	+ 343.51	+ 12.73	+ 2.16
Sept. 31	620.5	+ 321.70	+ 75.93	+ 32.63
10	630.5	+ 286.23	+ 130.41	+ 59.48
20	640.5	+ 240.33	+ 173.92	+ 81.47
30	650.5	+ 187.67	+ 205.16	+ 97.80
Oct. 10	660.5	+ 132.03	+ 223.78	+ 108.10
20	670.5	+ 77.03	+ 230.40	+ 112.45
30	680.5	+ 25.82	+ 226.42	+ 111.35
Nov. 9	690.5	- 19.13	+ 213.89	+ 105.63
19	700.5	- 56.21	+ 195.26	+ 96.38
29	710.5	- 84.67	+ 173.10	+ 84.80
Dec. 9	720.5	- 104.64	+ 149.90	+ 72.13
19	730.5	- 117.05	+ 127.82	+ 59.50
29	740.5	- 123.41	+ 108.53	+ 47.87
1954 Jan. 8	750.5	- 125.67	+ 93.10	+ 37.95
18	760.5	- 125.97	+ 81.96	+ 30.15
28	770.5	- 126.44	+ 74.84	+ 24.60
Feb. 7	780.5	- 128.99	+ 70.87	+ 21.07
17	790.5	- 135.12	+ 68.69	+ 19.11
27	800.5	- 145.76	+ 66.50	+ 18.01
Mar. 9	810.5	- 161.15	+ 62.34	+ 16.93
19	820.5	- 180.82	+ 54.20	+ 14.92
29	830.5	- 203.49	+ 40.24	+ 11.08
Apr. 8	840.5	- 227.27	+ 19.06	+ 4.61
18	850.5	- 249.63	- 10.20	- 5.08
28	860.5	- 267.72	- 47.65	- 18.30
May 8	870.5	- 278.57	- 92.56	- 34.95
18	880.5	- 279.32	- 143.35	- 54.60
28	890.5	- 267.64	- 197.64	- 76.42

	Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1954	May 28	2434890.5	— 267.64	— 197.64	— 76.42
	June 7	900.5	— 241.84	— 252.37	— 99.22
	17	910.5	— 201.23	— 304.06	— 121.57
	27	920.5	— 146.15	— 349.04	— 141.90
	July 7	930.5	— 78.08	— 383.75	— 158.59
	17	940.5	+ 0.46	— 405.03	— 170.16
	27	950.5	+ 85.95	— 410.39	— 175.35
Aug.	6	960.5	+ 174.28	— 398.19	— 173.22
	16	970.5	+ 260.80	— 367.83	— 163.27
	26	980.5	+ 340.76	— 319.79	— 145.46
	Sept. 5	2434990.5	+ 409.55	— 255.64	— 120.26
	15	2435000.5	+ 463.04	— 177.98	— 88.58
	25	010.5	+ 497.81	— 90.28	— 51.79
Oct.	5	020.5	+ 511.42	+ 3.27	— 11.59
	15	030.5	+ 502.56	+ 98.02	+ 30.02
	25	040.5	+ 471.19	+ 189.12	+ 70.91
Nov.	4	050.5	+ 418.57	+ 271.82	+ 108.93
	14	060.5	+ 347.22	+ 341.78	+ 141.98
	24	070.5	+ 260.79	+ 395.31	+ 168.40
Dec.	4	080.5	+ 163.87	+ 429.72	+ 186.64
	14	090.5	+ 61.68	+ 443.40	+ 195.82
	24	100.5	— 40.26	+ 436.05	+ 195.54
1955	Jan. 3	110.5	— 136.53	+ 408.61	+ 185.99
	13	120.5	— 222.16	+ 363.24	+ 167.93
	23	130.5	— 292.98	+ 303.15	+ 142.64
	Feb. 2	140.5	— 345.88	+ 232.30	+ 111.79
	12	150.5	— 379.00	+ 155.14	+ 77.33
	22	160.5	— 391.78	+ 76.26	+ 41.35
Mar.	4	170.5	— 384.96	+ 0.11	+ 5.92
	14	180.5	— 360.43	— 69.38	— 27.04
	24	190.5	— 321.02	— 128.94	— 55.88
Apr.	3	200.5	— 270.30	— 176.18	— 79.34
	13	210.5	— 212.24	— 209.69	— 96.55
	23	220.5	— 150.93	— 229.05	— 107.13
May	3	230.5	— 90.34	— 234.78	— 111.12
	13	240.5	— 33.98	— 228.30	— 109.02
	23	250.5	+ 15.24	— 211.71	— 101.68
June	2	260.5	+ 55.22	— 187.61	— 90.22
	12	270.5	+ 84.78	— 158.93	— 75.97
	22	280.5	+ 103.73	— 128.59	— 60.35
	July 2	290.5	+ 112.76	— 99.32	— 44.71
	12	300.5	+ 113.42	— 73.42	— 30.28
	22	310.5	+ 107.87	— 52.53	— 18.01
Aug.	1	320.5	+ 98.67	— 37.55	— 8.55
	11	330.5	+ 88.48	— 28.53	— 2.14
	21	340.5	+ 79.81	— 24.74	+ 1.32
	31	350.5	+ 74.68	— 24.75	+ 2.32
Sept. 10		360.5	+ 74.47	— 26.62	+ 1.61

	Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1955	Sept. 10	2435360.5	+ 74.47	— 26.62	+ 1.61
	20	370.5	+ 79.73	— 28.16	+ 0.15
	30	380.5	+ 90.15	— 27.12	— 1.05
	Oct. 10	390.5	+ 104.59	— 21.54	— 0.99
	20	400.5	+ 121.19	— 9.90	+ 1.18
	30	410.5	+ 137.58	+ 8.70	+ 6.05
	Nov. 9	420.5	+ 151.09	+ 34.39	+ 13.93
	19	430.5	+ 159.00	+ 66.52	+ 24.78
	29	440.5	+ 158.81	+ 103.69	+ 38.20
	Dec. 9	450.5	+ 148.44	+ 143.78	+ 53.50
	19	460.5	+ 126.49	+ 184.15	+ 69.67
	29	470.5	+ 92.34	+ 221.80	+ 85.49
1956	Jan. 8	480.5	+ 46.28	+ 253.52	+ 99.63
	18	490.5	— 10.42	+ 276.25	+ 110.70
	28	500.5	— 75.55	+ 287.17	+ 117.39
	Feb. 7	510.5	— 146.06	+ 284.06	+ 118.57
	17	520.5	— 218.18	+ 265.42	+ 113.40
	27	530.5	— 287.67	+ 230.72	+ 101.39
	Mar. 8	540.5	— 350.08	+ 180.44	+ 82.52
	18	550.5	— 401.08	+ 116.17	+ 57.23
	28	560.5	— 436.81	+ 40.54	+ 26.44
	Apr. 7	570.5	— 454.12	— 42.94	— 8.49
	17	580.5	— 450.93	— 130.04	— 45.85
	27	590.5	— 426.32	— 216.16	— 83.67
	May 7	600.5	— 380.70	— 296.56	— 119.87
	17	610.5	— 315.76	— 366.76	— 152.40
	27	620.5	— 234.40	— 422.78	— 179.39
	June 6	630.5	— 140.49	— 461.44	— 199.24
	16	640.5	— 38.69	— 480.52	— 210.76
	26	650.5	+ 65.91	— 478.94	— 213.23
	July 6	660.5	+ 168.06	— 456.74	— 206.44
	16	670.5	+ 262.67	— 415.12	— 190.69
	26	680.5	+ 345.11	— 356.34	— 166.78
	Aug. 5	690.5	+ 411.46	— 283.56	— 135.98
	15	700.5	+ 458.77	— 200.65	— 99.89
	25	710.5	+ 485.16	— 112.00	— 60.42
	Sept. 4	720.5	+ 489.99	— 22.19	— 19.65
	14	730.5	+ 473.84	+ 64.23	+ 20.34
	24	740.5	+ 438.49	+ 143.09	+ 57.55
	Oct. 4	750.5	+ 386.75	+ 210.81	+ 90.19
	14	760.5	+ 322.32	+ 264.64	+ 116.82
	24	770.5	+ 249.44	+ 302.83	+ 136.44
	Nov. 3	780.5	+ 172.63	+ 324.70	+ 148.52
	13	790.5	+ 96.31	+ 330.68	+ 153.04
	23	800.5	+ 24.52	+ 322.16	+ 150.47
	Dec. 3	810.5	— 39.37	+ 301.37	+ 141.70
	13	820.5	— 92.88	+ 271.13	+ 127.93
	23	830.5	— 134.51	+ 234.57	+ 110.60

Nr. 10

Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1956 Dec. 23	2435830.5	— 134.51	+ 234.57	+ 110.60
1957 Jan. 2	5840.5	— 163.77	+ 194.88	+ 91.23
12	850.5	— 181.09	+ 155.08	+ 71.30
22	860.5	— 187.96	+ 117.73	+ 52.14
Feb. 1	870.5	— 186.17	+ 84.85	+ 34.87
11	880.5	— 178.17	+ 57.73	+ 20.29
21	890.5	— 166.55	+ 36.95	+ 8.88
Mar. 3	900.5	— 153.86	+ 22.35	+ 0.75
13	910.5	— 142.38	+ 13.08	— 4.30
23	920.5	— 133.95	+ 7.75	— 6.80
Apr. 2	930.5	— 129.80	+ 4.58	— 7.50
12	940.5	— 130.40	+ 1.53	— 7.32
22	950.5	— 135.46	— 3.41	— 7.24
May 2	960.5	— 143.94	— 12.06	— 8.20
12	970.5	— 154.09	— 25.80	— 11.02
22	980.5	— 163.66	— 45.43	— 16.28
June 1	2435990.5	— 170.11	— 70.98	— 24.25
11	2436000.5	— 170.82	— 101.69	— 34.84
21	010.5	— 163.48	— 135.99	— 47.58
July 1	020.5	— 146.25	— 171.63	— 61.67
11	030.5	— 118.12	— 205.82	— 76.00
21	040.5	— 78.97	— 235.50	— 89.29
31	050.5	— 29.72	— 257.60	— 100.18
Aug. 10	060.5	— 27.72	— 269.34	— 107.33
20	070.5	— 90.56	— 268.45	— 109.62
30	080.5	+ 155.26	— 253.43	— 106.19
Sept. 9	090.5	+ 217.85	— 223.71	— 96.56
19	100.5	+ 274.18	— 179.68	— 80.64
29	110.5	+ 320.21	— 122.80	— 58.84
Oct. 9	120.5	+ 352.31	— 55.43	— 31.97
19	130.5	+ 367.52	+ 19.19	— 1.26
29	140.5	+ 363.78	+ 97.18	+ 31.72
Nov. 8	150.5	+ 340.13	+ 174.22	+ 65.16
18	160.5	+ 296.80	+ 245.81	+ 97.09
28	170.5	+ 235.24	+ 307.59	+ 125.56
Dec. 8	180.5	+ 158.14	+ 355.59	+ 148.69
18	190.5	+ 69.23	+ 386.53	+ 164.89
28	200.5	— 26.83	+ 398.08	+ 172.92
1958 Jan. 7	210.5	— 124.84	+ 389.02	+ 172.00
17	220.5	— 219.32	+ 359.41	+ 161.92
27	230.5	— 304.89	+ 310.58	+ 143.00
Feb. 6	240.5	— 376.71	+ 245.06	+ 116.17
16	250.5	— 430.73	+ 166.44	+ 82.84
26	260.5	— 464.05	+ 79.06	+ 44.83
Mar. 8	270.5	— 475.05	— 12.25	+ 4.24
18	280.5	— 463.50	— 102.51	— 36.72
28	290.5	— 430.51	— 186.97	— 75.82
Apr. 7	300.5	— 378.44	— 261.36	— 111.05

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Date	J. D.	$-10^8 \bar{x}_0$	$-10^8 \bar{y}_0$	$-10^8 \bar{z}_0$
1958 Apr. 7	2436300.5	— 378.44	— 261.36	— 111.05
17	310.5	— 310.66	— 322.19	— 140.65
27	320.5	— 231.32	— 366.90	— 163.28
May 7	330.5	— 145.01	— 393.99	— 178.05
17	340.5	— 56.51	— 403.06	— 184.54
27	350.5	+ 29.56	— 394.76	— 182.86
June 6	360.5	+ 108.99	— 370.74	— 173.58
16	370.5	+ 178.23	— 333.42	— 157.65
26	380.5	+ 234.59	— 285.89	— 136.40
July 6	390.5	+ 276.37	— 231.61	— 111.37
16	400.5	+ 302.94	— 174.17	— 84.24
26	410.5	+ 314.70	— 117.06	— 56.66
Aug. 5	420.5	+ 313.03	— 63.38	— 30.20
15	430.5	+ 300.12	— 15.62	— 6.19
25	440.5	+ 278.75	+ 24.48	+ 14.36
Sept. 4	450.5	+ 251.98	+ 56.03	+ 30.84
14	460.5	+ 222.88	+ 79.04	+ 43.03
24	470.5	+ 194.27	+ 94.32	+ 51.11
Oct. 4	480.5	+ 168.39	+ 103.35	+ 55.63
14	490.5	+ 146.80	+ 108.06	+ 57.38
Nov. 3	500.5	+ 130.22	+ 110.59	+ 57.33
13	510.5	+ 118.53	+ 113.07	+ 56.50
23	520.5	+ 110.86	+ 117.32	+ 55.86
Dec. 3	530.5	+ 105.71	+ 124.75	+ 56.21
13	540.5	+ 101.14	+ 136.14	+ 58.13
1959 Jan. 2	550.5	+ 94.99	+ 151.60	+ 61.92
12	560.5	+ 85.12	+ 170.59	+ 67.56
22	570.5	+ 69.62	+ 191.89	+ 74.75
Feb. 1	580.5	+ 47.01	+ 213.74	+ 82.88
11	590.5	+ 16.42	+ 233.96	+ 91.11
23	600.5	— 22.34	+ 250.14	+ 98.46
21	610.5	— 68.59	+ 259.79	+ 103.83
Mar. 3	620.5	— 120.90	+ 260.60	+ 106.14
13	630.5	— 177.01	+ 250.61	+ 104.41
23	640.5	— 234.02	+ 228.45	+ 97.84
Apr. 2	650.5	— 288.48	+ 193.50	+ 85.94
12	660.5	— 336.72	+ 146.04	+ 68.57
22	670.5	— 375.03	+ 87.29	+ 46.02
May 2	680.5	— 400.04	+ 19.41	+ 19.00
11	690.5	— 408.96	— 54.58	— 11.38
12	700.5	— 399.89	— 130.98	— 43.64
22	710.5	— 371.98	— 205.67	— 76.06
June 1	720.5	— 325.60	— 274.37	— 106.78
11	730.5	— 262.32	— 332.98	— 133.94
21	740.5	— 184.84	— 377.84	— 155.84
July 1	750.5	— 96.86	— 406.02	— 170.99
11	760.5	— 2.80	— 415.52	— 178.30
21	770.5	+ 92.42	+ 405.38	+ 177.13