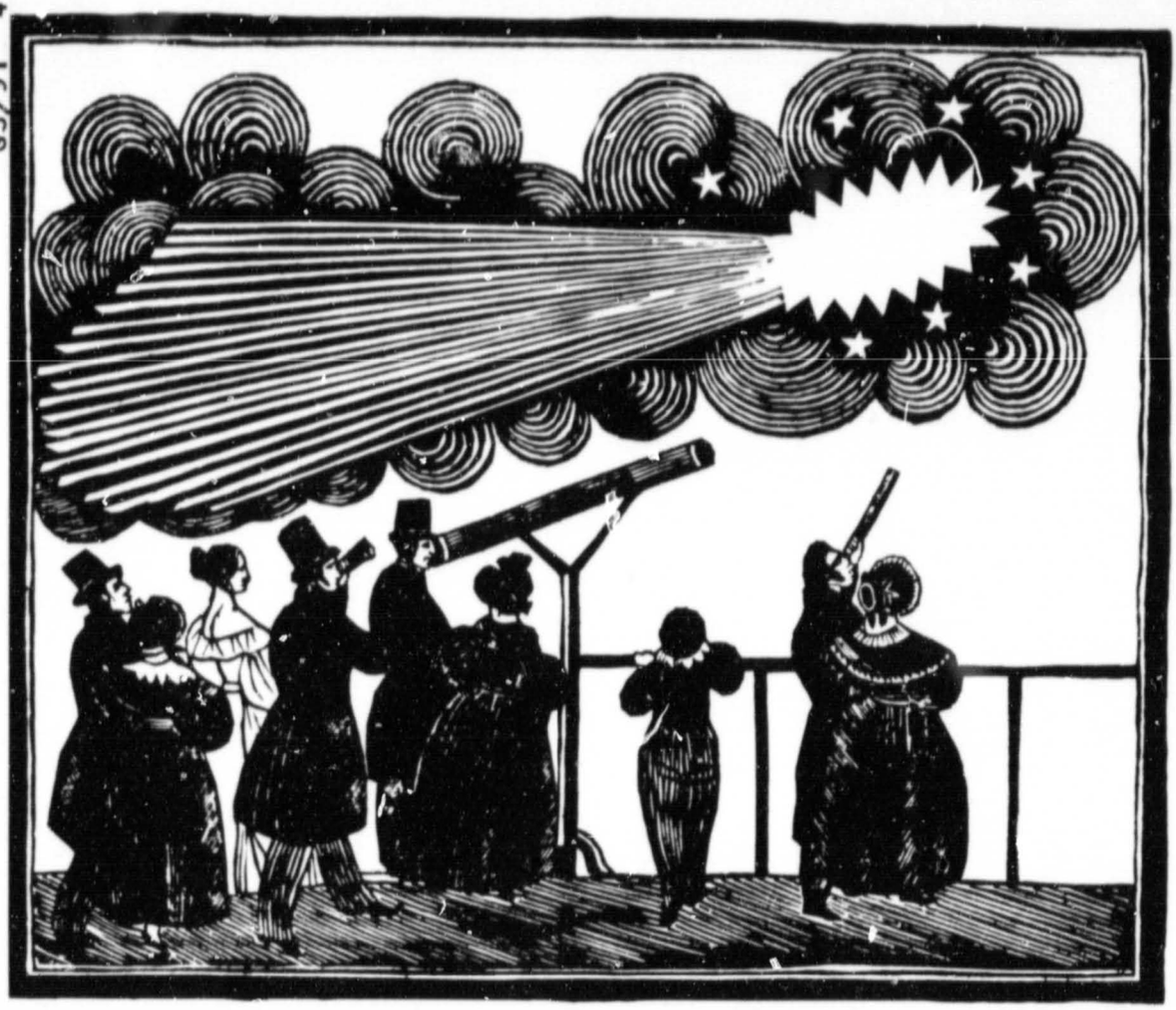
# THE COMET HALLEY HANDBOOK





## AN OBSERVER'S GUIDE

# THE COMET HALLEY HANDBOOK

## AN OBSERVER'S GUIDE

CREATED FOR THE INTERNATIONAL HALLEY WATCH
BY
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*JANUARY 15, 1981*

# Foreword

The continuing search for Comet Halley began in November 1977, when observers at two of the United States' largest telescopes unsuccessfully attempted to recover the comet more than eight years before it is due to pass perihelion. At that time, the estimated magnitude of the comet was fainter than 26. While observations of Comet Halley at great heliocentric distances are very important for characterizing its size and physical behavior, perhaps some of the incentive for these early recovery attempts was due to the historical importance of this most famous of all comets.

Comet Halley's fame is not due to its superior brightness alone: its periodic returns every 76 years act like a clock counting time in units of human lifetimes. Thus the ever-returning comet marks transitions from one era to the next. Our parents and grandparents have told us about the great comet's visit in 1910, and we will tell our children and grandchildren about its return in 1986. Once every 76 years, nearly everyone in recorded history has had the opportunity to view the comet.

Because of the unfavorable positions of the comet with respect to the earth and the sun, the coming apparition of Comet Halley will disappoint much of the waiting public. Comet Halley will not be an obvious naked-eye object. In fact, it will probably be invisible to the naked eye if the observer is located in a populous area with significant artificial lighting. Successful observers will have to equip themselves with binoculars, know where and when to observe, and seek an observing location free from aerial pollutants and artificial lighting.

Many will not make the effort. However, the curious will gladly go out of their way to pursue this once-in-a-lifetime experience. It is for these curious few, as well as for the small army of serious amateur and professional astronomers, that this Handbook is intended.



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# Contents

# Contents (contd)

**Tables**

# The Comet Halley Handbook: An Observer's Guide

## I. The Orbit of Comet Halley

Considerable portions of information in this handbook are based upon a previous work on Comet Halley's orbit.[1] The orbit determination technique used in that publication was a least-squares adjustment of the comet's motion to observational data. The observational data on Comet Halley began with a rather crude naked-eye observation by Johannes Kepler on September 28, 1607, continued through the 1607, 1682, 1759, 1835-36, and 1909-11 apparitions, and ended with a precise telescopic observation on May 24, 1911. A total of 885 observations were used in the orbit determination process. The required numerical integrations were run over various observational data arcs, with perturbations or accelerations from all nine planets taken into account at each half-day time step.

Forces other than gravity acting on a cometary nucleus often introduce an additional acceleration in its orbital motion. These so-called nongravitational accelerations are believed due to the outgassing rocket effect of the comet's icy nucleus.[2] These effects have been successfully modeled by Marsden, Sekanina, and Yeomans.[3] Yeomans included them in his computations for Comet Halley.[1]

To provide a prediction for Comet Halley's motion in 1985-86, an orbit determined from the 1759, 1835-36, and 1909-11 observations was integrated forward in time. The complete set of osculating orbit elements for 1986 is given as follows:

| | |
|---|---|
| Epoch | 1986 Feb. 19.0 (E.T.) |
| $T$ | 1986 Feb. 9.6613 (E.T.) |
| $q$ | 0.587096 (AU) |
| $e$ | 0.967267 |
| $\omega$ | 111.8534 |
| $\Omega$ | 58.1531 |
| $i$ | 162.2378 |

These orbital elements are strictly correct only for a given instant of time (Epoch). However, for many low-precision computations, they can be used for several months on either side of perihelion passage $T$. The epoch and perihelion passage time are given in ephemeris time (E.T.). The perihelion distance and eccentricity are denoted $q$ and $e$ respectively. The three angular elements are the longitude of the ascending node $\Omega$, the argument of perihelion $\omega$, and the orbital inclination $i$; they are referred to the mean ecliptic and equinox of 1950.0 and are illustrated in Figure 1.

Figure 2 illustrates an ecliptic plane projection of Comet Halley's orbit within the solar system. Figure 3 illustrates the relative positions of the comet and earth in the 1985-86 time period. The pre- and post-perihelion close approaches of the comet and earth occur on November 27, 1985 and April 11, 1986 at minimum distances of 0.62 and 0.42 AU respectively. The position of the vernal equinox on Figures 1, 2, and 3 is

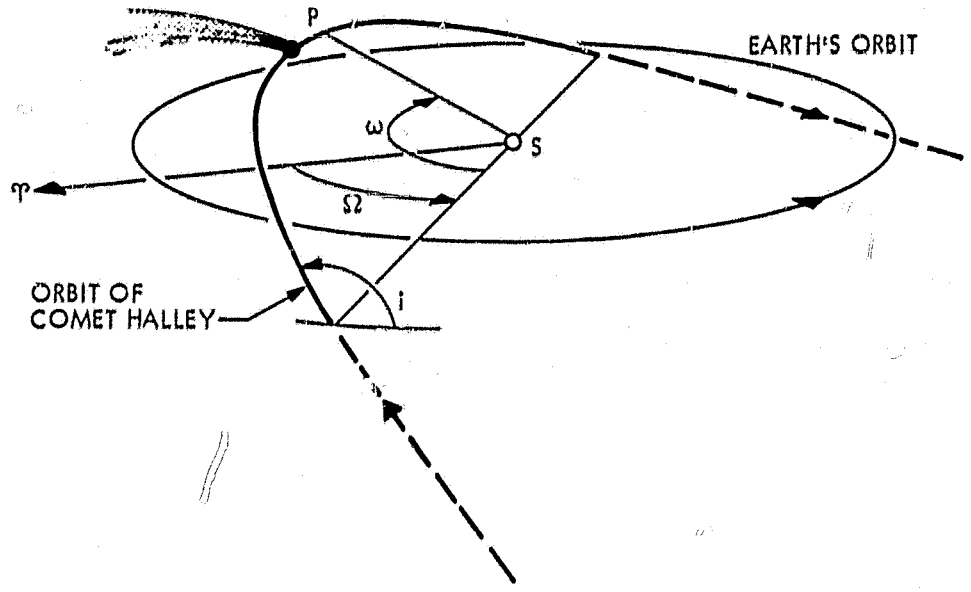



**Fig. 1. Angular Elements of the Orbit of Comet Halley. For Comet Halley, the Orbital Inclination *I* is 162°, the Longitude of the Ascending Node Ω is 58°, and the Argument of Perihelion ω is 112°.**

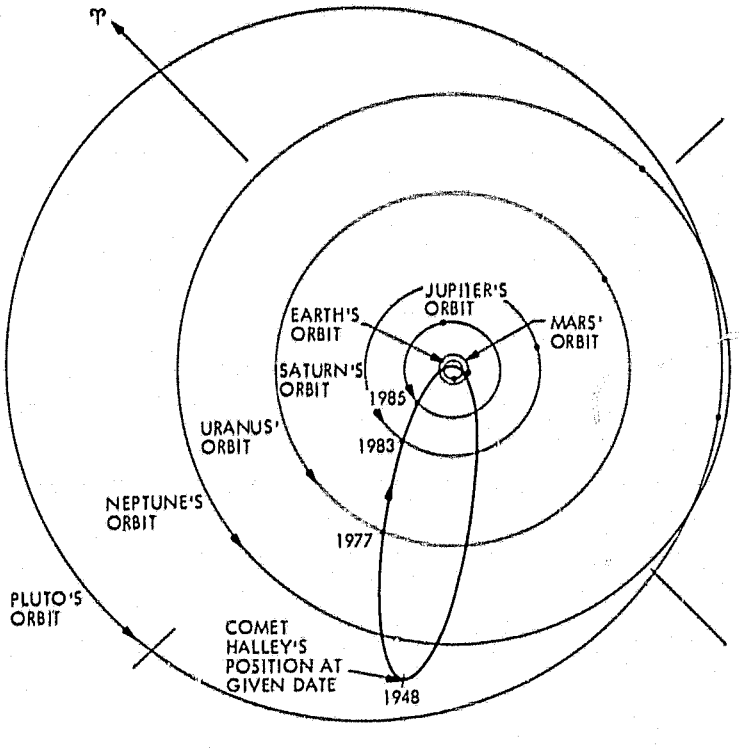





**Fig. 2. Ecliptic Plane Projection of Comet Halley's Orbit (1910–1986) Within the Solar System. The planetary positions are indicated for the time of the comet's perihelion passage.**

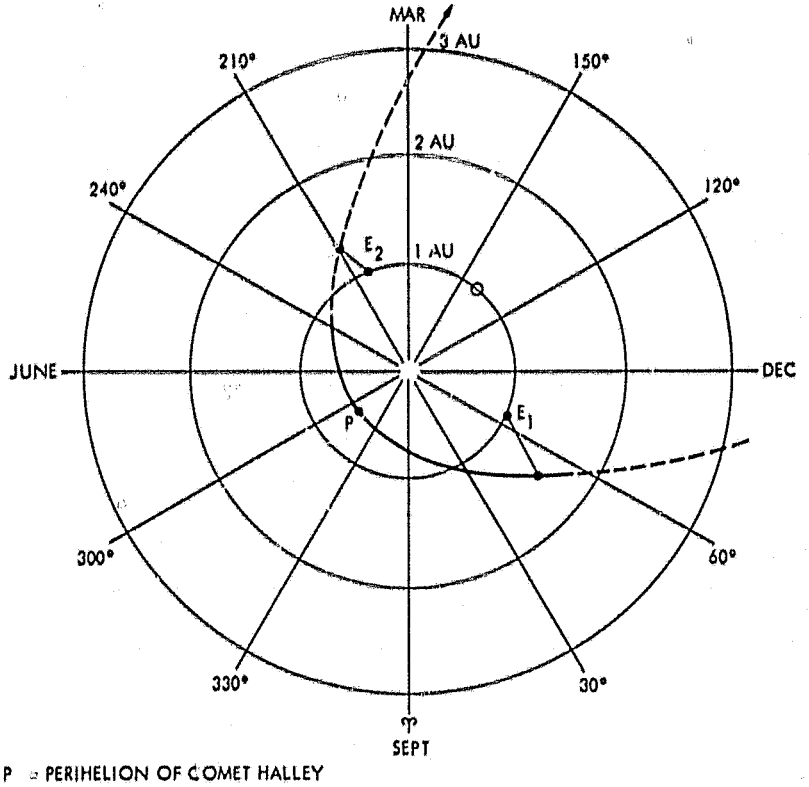



**Fig. 3. Relative Positions of Comet Halley and Earth, 1985–1986.**

denoted by the symbol ♈. Figure 4 shows the comet's path through the constellations for the period November 1985 through May 1986.

## II. The Expected Physical Behavior of Comet Halley in 1985–1986

Like other active comets, Comet Halley's physical behavior is likely to change markedly from day to day. Anyone who attempts to predict the physical behavior of an active comet is almost certain to be incorrect. Nevertheless, an analysis of Comet Halley's physical behavior during the past few apparitions has been included in the hope that this information will serve as a rough guide to the comet's behavior in 1985–86. In an effort to predict the comet's apparent brightness, tail lengths, and coma diameters in 1985–86, an analysis of existing data is presented in the following subsections.

### A. Brightness Estimates

Visual magnitude estimates of a comet depend upon the subjective judgment of the observer, the brightness of the night sky, and the aperture size of the telescope employed. For the present analysis, no observer-dependent corrections or night-sky corrections could be made with the existing data. Using an empirical correction of 0.055 magnitudes per cm for refracting telescopes, the magnitude estimates made with the naked eye and telescopic apertures ⩽33 cm were normalized to a standard aperture of 6.78 cm.[4] Since only magnitude data from refracting telescopes were used, a separate normalization law for reflecting telescopes was not required. Where magnitude data were taken with telescopic apertures greater than 33 cm, no normalization was attempted. The value 0.055 magnitudes per cm completely breaks down for large-aperture telescopes, and insufficient data were available for establishing a normalization of Comet Halley magnitude data made with large-aperture telescopes.

Traditionally, the total apparent magnitude $M_1$ of a comet is expressed as

$$M_1 = M_0 + 5 \log \Delta + n \log r \qquad (1)$$

where $\Delta$ and $r$ are respectively the geocentric and heliocentric

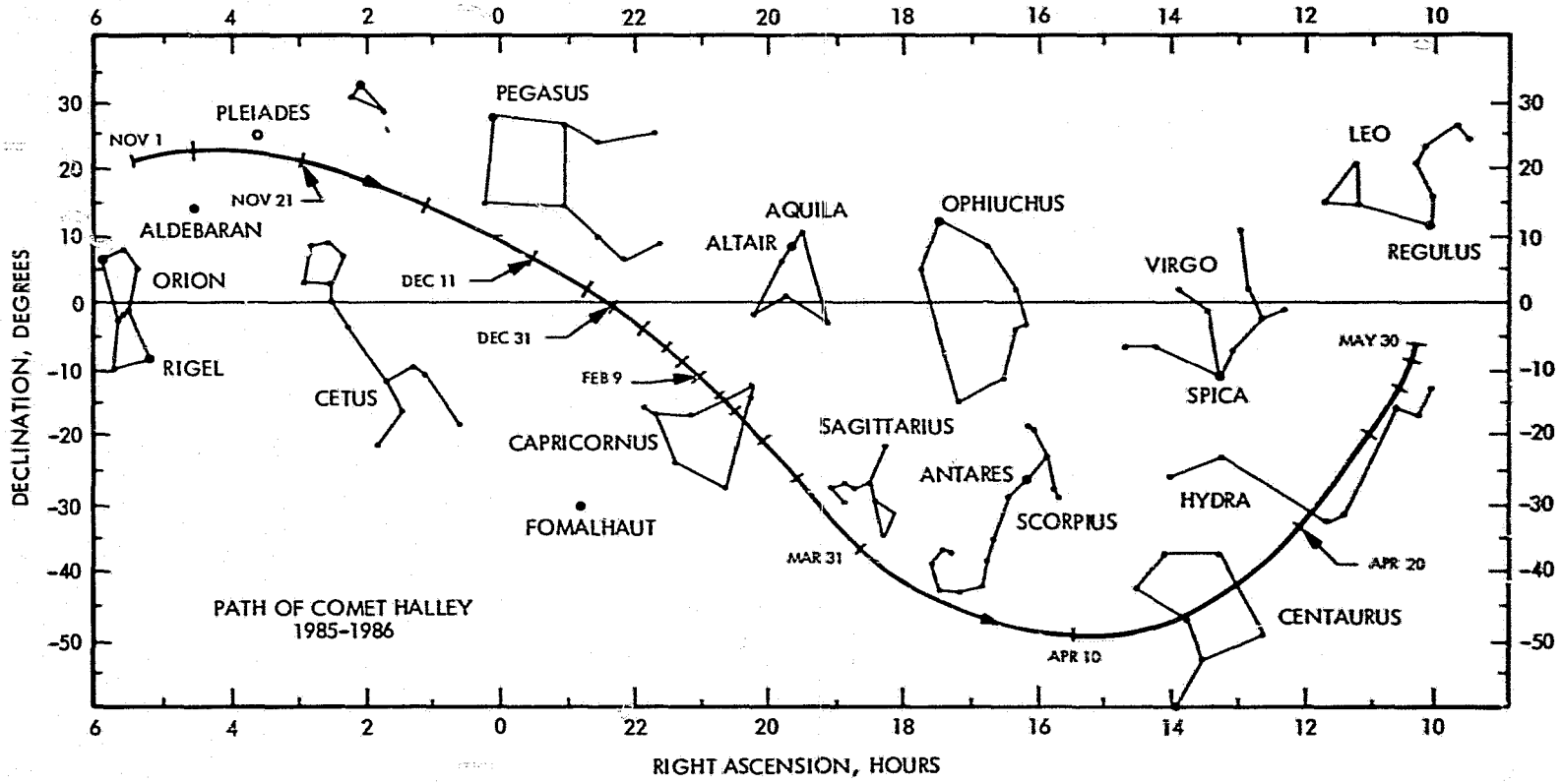



**Fig. 4. Path of Comet Halley on the Celestial Sphere During November 1985–May 1986.**

distance of the comet in AU, and $M_0$ is the total absolute magnitude of the comet ($M_1 = M_0$ when $\Delta = r = 1$). Figure 5 illustrates 1909-1910 visual apparent magnitudes plotted in a form $M_1 - 5 \log \Delta$ vs. $\log r$. For 1910, the intrinsic brightness of Comet Halley as a function of heliocentric distance was not symmetrical with respect to perihelion. Pre-perihelion, the total magnitude can be represented by the following formula of standard form:

$$M_1 = 5.0 + 5 \log \Delta + 13.1 \log r \qquad (2)$$

Post-perihelion, the total magnitude is first fainter and then substantially brighter than corresponding pre-perihelion magnitudes at the same heliocentric distance. While Comet Halley's post-perihelion brightening is well established, the 1910 post-perihelion brightness dip between 0.6 and 1 AU may have been due in part to the comet's relatively low elongation angles (i.e., the $M_1$ estimates were not made in a completely dark sky). Data gaps, due to small solar elongation angles, are present for $-0.23 < \log r < 0.02$ (pre-perihelion) and for $0.33 < \log r < 0.51$ (post-perihelion). The pre- and post-perihelion brightness curves in Figure 5 should be useful for predicting observed total magnitudes in the coming apparition of Comet Halley. The apparent total magnitude estimates predicted in Appendix B were computed by evaluating curve fits of the data in Figure 5.

A separate analysis was conducted using brightness estimates that were described in the literature as nuclear magnitudes. Nuclear magnitude estimates $M_2$ made in large telescopes at great heliocentric distances were analyzed. The data used was photographic and could be fit with the following formula:

$$M_2 = 7.5 + 5 \log \Delta + 10 \log r \qquad (3)$$

However, the earliest pre-perihelion observation of Comet Halley was made at $r = 3.6$ AU on August 25, 1909 and the latest post-perihelion observation was made at $r = 5.4$ AU on June 16, 1911; outside this range in heliocentric distance, the $M_2$ values presented in Appendix B are only extrapolated estimates. True nucleus brightness, as opposed to the apparent or photometric nucleus, must follow a $5 \log r$ behavior, of course.

### B. Tail Lengths

To obtain some idea of Comet Halley's tail evolution with heliocentric distance $r$, we collected apparent tail-length data for the last three apparitions. Only naked-eye, angular, tail-length estimates were used in our analysis, and the assumption was made that the tail was always directly anti-solar. This latter assumption is somewhat in error for dust tails, but the subjective nature of the tail-length estimates did not seem to warrant a more comprehensive analysis. Using the comet's solar-elongation angle $\beta$ and the geocentric distance of the comet $\Delta$, the actual, linear tail length $s$ may be computed from the apparent (foreshortened) angular tail length $t$ by

$$s = \frac{\Delta \sin t}{\sin (\beta - t)} \qquad (4)$$

The linear tail lengths $s$, plotted as a function of heliocentric distance, are presented in Figure 6. While the actual tail lengths observed will depend upon the observing conditions and the optical instrument used, the shape of the curve in Figure 6 is suggestive. Comparing the 1759, 1835, and 1910 data, the comet's visual tail length appears to be longest after perihelion.

### C. Coma Diameters

Figure 7 presents the linear coma diameters determined from visual observations made in 1909-11. The observed angular coma diameters, in each case, were multiplied by the geocentric distance of the comet at the time of observation to obtain the linear coma diameters. Note that the coma diameter reached a maximum value of approximately 200,000 km just after perihelion. Because the actual coma diameters will depend on the optical instrument used to observe the comet, the data given in Figure 7 are crude. Nevertheless, the curve does indicate the general evolution of the coma diameter with heliocentric distance.

## III. Observing Conditions for Comet Halley in 1985–1986

As is evident from Figures 3 and 4, the changing positions of the comet and earth in 1985-86 will cause different observing conditions for the comet before and after perihelion. In general, the pre perihelion positions of Comet Halley will allow better observing conditions for northern hemisphere observers, while southern hemisphere observations will be preferred post-perihelion.

For a given day, the comet's observability will depend upon the observer's latitude. We have assumed that the comet will be visible to an observer if the comet is above, and the sun is simultaneously more than 18° below the local horizon. This condition assures that evening astronomical twilight has ended and morning astronomical twilight has not yet begun (i.e., the comet is seen in a dark sky). The time interval for which this condition holds is referred to as the number of available dark hours. Figure 8 plots the available dark hours vs. calendar date for an observer at 35°N and 35°S latitude. Also plotted in Figure 8 is the total apparent magnitude $M_1$ vs. calendar date. Table 1 lists the dark hours vs. calendar date for observers

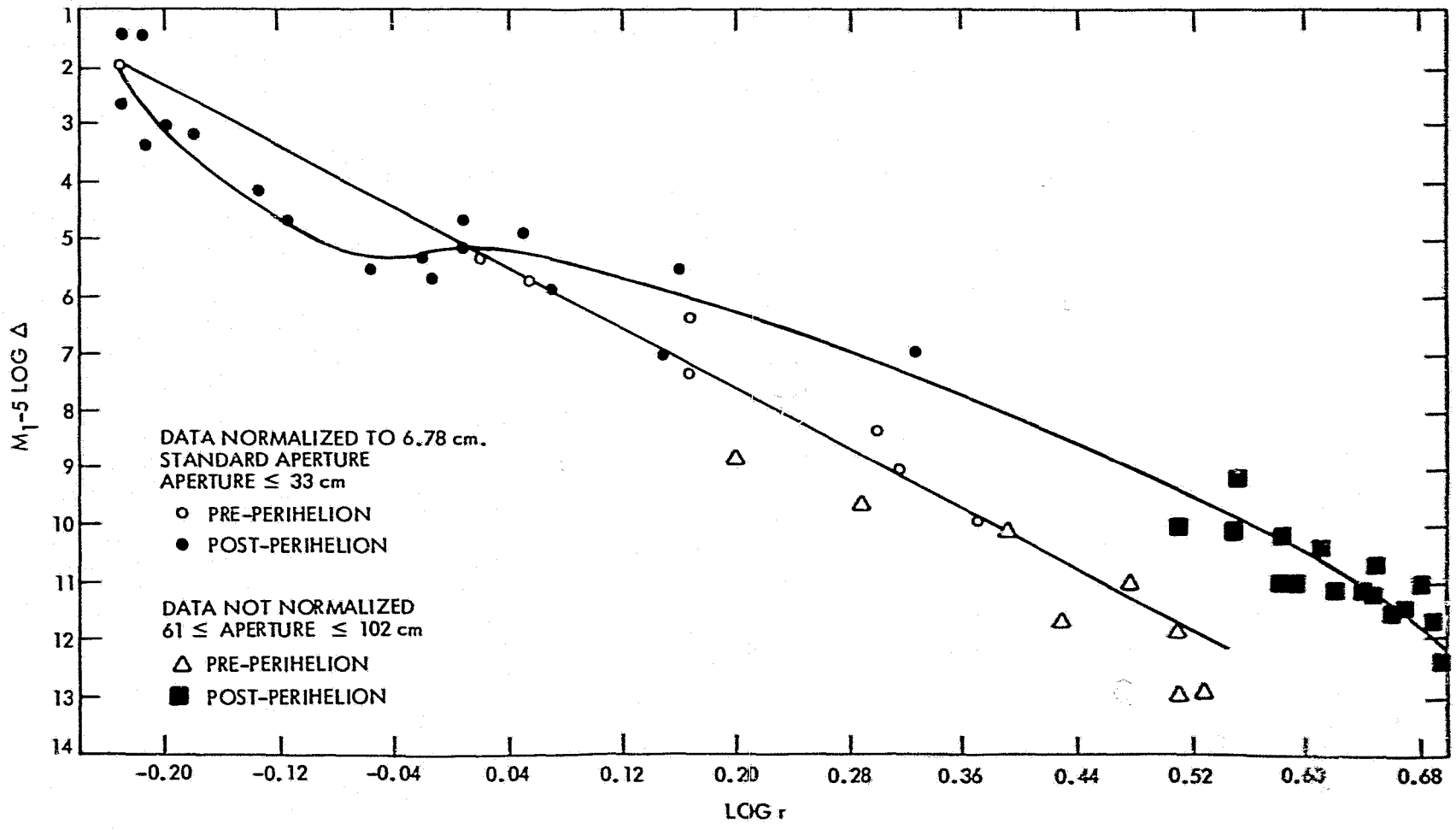



Fig. 5. Comet Halley Total Magnitude Estimates, 1909–10 Visual Estimates Only

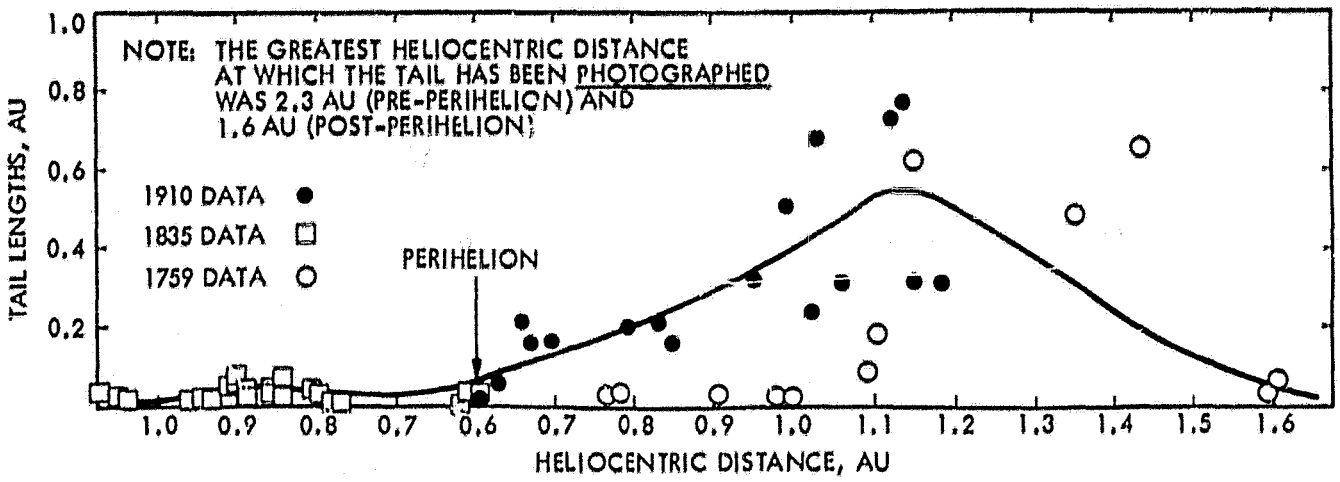



**Fig. 6. Comet Halley Lines; Tail Lengths Computed from Naked-Eye Estimates.**

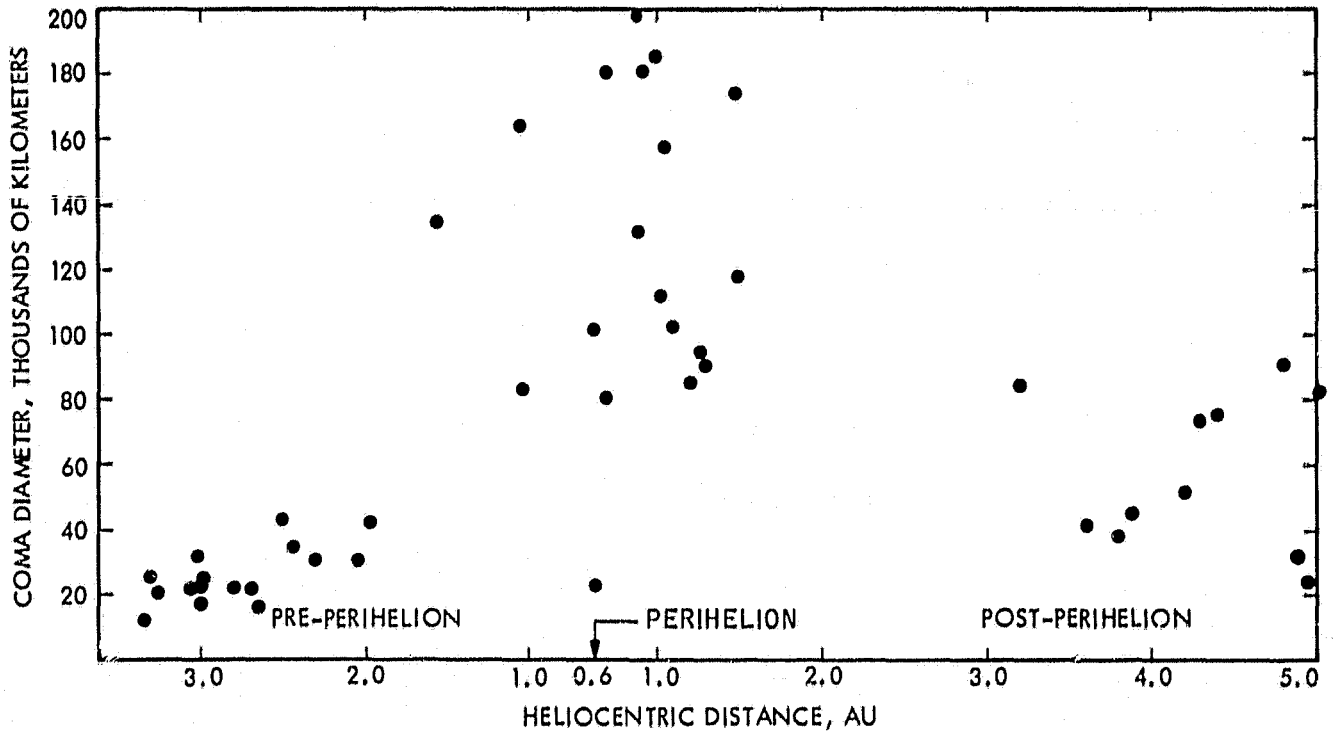
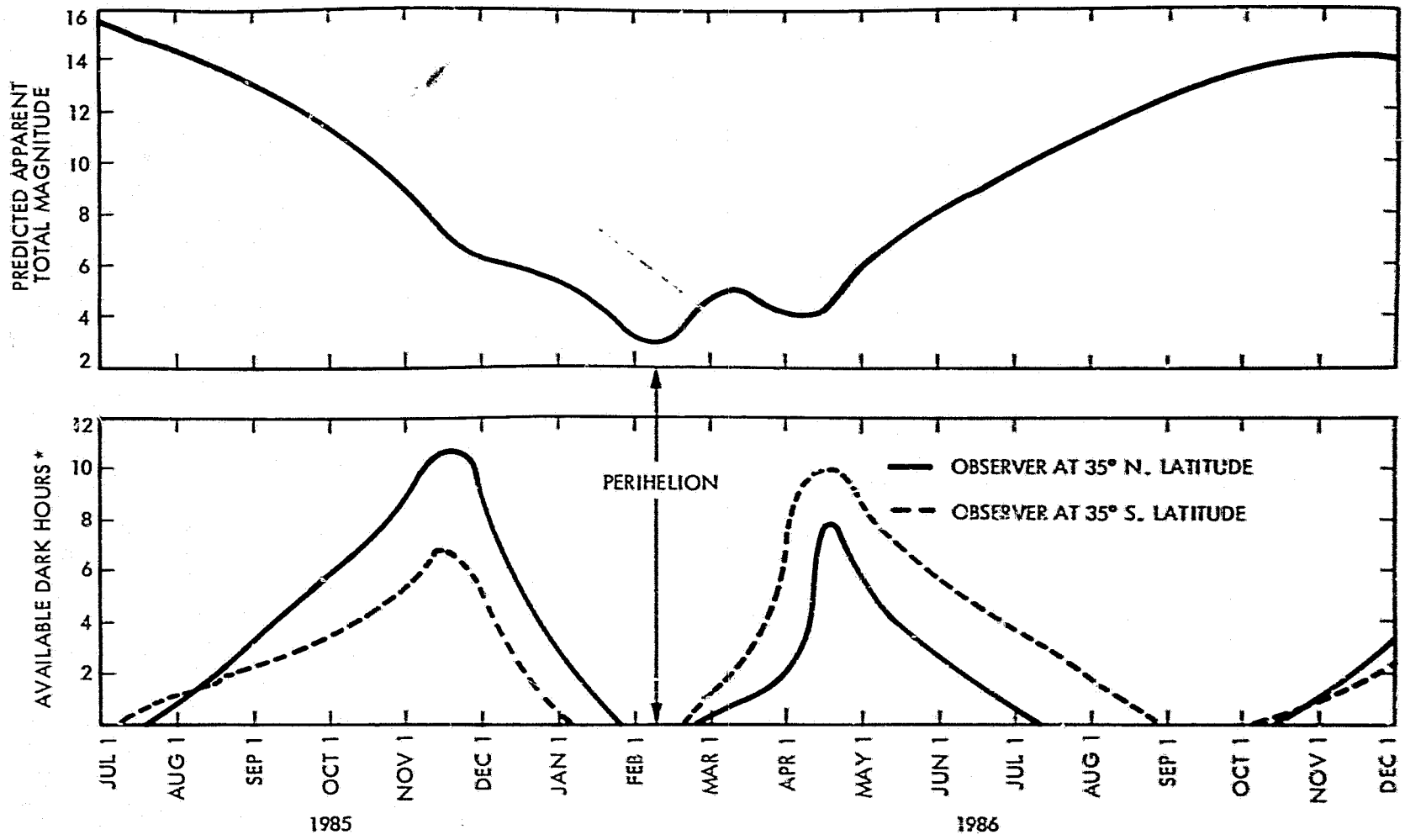



**Fig. 7. Comet Halley 1909–1911 Visual Linear Coma Diameters.**

located at 45°N, 30°N, 30°S, and 45°S. Table 1 also gives the predicted apparent total $M_1$ and nuclear $M_2$ magnitudes of the comet as a function of calendar date.

Figures 9-13 are schematic representations as to how Comet Halley may appear on various dates for observers located at latitudes of 40°N, 30°N, 20°N, 20°S, and 30°S. The comet's elevation above the local horizon and its azimuth (degrees east of north) are given for various dates. For each date, the comet's position is given for the end of astronomical twilight if the comet is in the evening sky, or the beginning of astronomical twilight if the comet is in the morning sky. These positions correspond to times approximately 70-90 minutes after sunset or 70-90 minutes before sunrise. Very




*NUMBER OF HOURS WHEN COMET IS ABOVE, AND SUN IS MORE THAN 18° BELOW, THE LOCAL HORIZON

Fig. 8. Comet Halley 1985–1986 Ground-Based Observing Conditions.

**Table 1. Ground-Based Observing Data, Comet Halley 1985–1986.**

| Date (1985) | Dark Hours: North Lat. 45° | Dark Hours: North Lat. 30° | Dark Hours: South 30° | Dark Hours: South Lat. 45° | Apparent Magnitudes: $M_1$ | Apparent Magnitudes: $M_2$ |
|---|---|---|---|---|---|---|
| Jan. 1 | 11.6 | 10.9 | 6.8 | 3.5 | | 17.9 |
| 11 | 10.7 | 10.0 | 6.9 | 3.9 | | 17.8 |
| 21 | 9.7 | 9.1 | 7.2 | 4.6 | | 17.7 |
| 31 | 8.7 | 8.1 | 5.6 | 5.3 | | 17.7 |
| Feb. 10 | 7.7 | 7.2 | 5.0 | 3.7 | | 17.6 |
| 20 | 6.8 | 6.4 | 4.4 | 3.3 | | 17.6 |
| Mar. 2 | 5.8 | 5.5 | 3.9 | 2.9 | | 17.5 |
| 12 | 4.9 | 4.7 | 3.4 | 2.5 | | 17.5 |
| 22 | 4.0 | 4.0 | 2.9 | 2.1 | | 17.4 |
| Apr. 1 | 3.2 | 3.2 | 2.4 | 1.8 | | 17.4 |
| 11 | 2.3 | 2.5 | 1.9 | 1.4 | | 17.3 |
| 21 | 1.4 | 1.7 | 1.5 | 1.0 | | 17.2 |
| May 1 | 0.5 | 1.0 | 1.0 | 0.6 | | 17.1 |
| 11 | 0 | 0.3 | 0.5 | 0.2 | | 17.0 |
| 21 | 0 | 0 | 0 | 0 | | 16.8 |
| 31 | 0 | 0 | 0 | 0 | | 16.7 |
| June 10 | 0 | 0 | 0 | 0 | | 16.5 |
| 20 | 0 | 0 | 0 | 0 | | 16.3 |
| 30 | 0 | 0 | 0 | 0 | | 16.1 |
| July 10 | 0 | 0 | 0.3 | 0.1 | | 15.9 |
| 20 | 0 | 0.5 | 0.8 | 0.5 | 14.8 | 15.7 |
| 30 | 0.5 | 1.2 | 1.3 | 0.9 | 14.4 | 15.4 |
| Aug. 9 | 1.4 | 1.9 | 1.7 | 1.3 | 14.1 | 15.1 |
| 19 | 2.3 | 2.6 | 2.1 | 1.6 | 13.7 | 14.7 |
| 29 | 3.2 | 3.3 | 2.5 | 1.9 | 13.2 | 14.4 |
| Sept. 8 | 4.1 | 4.0 | 2.9 | 2.2 | 12.7 | 13.9 |
| 18 | 5.0 | 4.8 | 3.3 | 2.5 | 12.2 | 13.5 |
| 28 | 5.9 | 5.6 | 3.8 | 2.8 | 11.6 | 12.9 |
| Oct. 8 | 6.9 | 6.4 | 4.3 | 3.1 | 10.9 | 12.3 |
| 18 | 8.0 | 7.3 | 4.9 | 3.5 | 10.1 | 11.6 |
| 28 | 9.2 | 8.5 | 5.7 | 4.1 | 9.3 | 10.8 |
| Nov. 7 | 10.7 | 10.0 | 6.8 | 5.0 | 8.3 | 10.0 |
| 17 | 11.1 | 10.6 | 7.3 | 4.9 | 7.2 | 9.0 |
| 27 | 10.6 | 9.8 | 7.0 | 4.2 | 6.4 | 8.4 |
| Dec. 7 | 7.7 | 7.1 | 4.4 | 3.6 | 6.1 | 8.1 |
| 17 | 5.5 | 5.1 | 2.8 | 1.0 | 5.9 | 8.1 |
| 27 | 3.9 | 3.6 | 1.5 | 0 | 5.6 | 8.0 |

| Date (1986) | Dark Hours: North Lat. 45° | Dark Hours: North Lat. 30° | Dark Hours: South 30° | Dark Hours: South Lat. 45° | Apparent Magnitudes: $M_1$ | Apparent Magnitudes: $M_2$ |
|---|---|---|---|---|---|---|
| Jan. 6 | 2.6 | 2.3 | 0.5 | 0 | 5.1 | 7.7 |
| 16 | 1.3 | 1.1 | 0 | 0 | 4.4 | 7.2 |
| 26 | 0 | 0 | 0 | 0 | 3.6 | 6.7 |
| Feb. 5 | 0 | 0 | 0 | 0 | 3.0 | 6.2 |
| 15 | 0 | 0 | 0 | 0 | 3.1 | 6.2 |
| 25 | 0 | 0.3 | 0.7 | 0.5 | 4.3 | 6.4 |
| Mar. 7 | 0.2 | 0.9 | 2.0 | 2.0 | 5.0 | 6.8 |
| 17 | 0.5 | 1.5 | 3.3 | 3.7 | 4.8 | 7.0 |
| 27 | 0.7 | 2.3 | 5.3 | 6.2 | 4.3 | 6.9 |
| Apr. 6 | 0 | 3.8 | 9.1 | 9.4 | 4.0 | 6.7 |
| 16 | 6.0 | 8.3 | 10.0 | 9.9 | 4.4 | 7.2 |
| 26 | 6.2 | 8.0 | 9.2 | 10.0 | 5.5 | 8.5 |
| May 6 | 5.5 | 5.1 | 7.7 | 8.3 | 6.5 | 9.7 |
| 16 | 2.7 | 4.3 | 6.7 | 7.3 | 7.3 | 10.7 |
| 26 | 1.9 | 3.5 | 6.0 | 6.5 | 7.8 | 11.4 |
| June 5 | 1.0 | 2.8 | 5.3 | 5.8 | 8.3 | 12.2 |
| 15 | 0.2 | 2.1 | 4.6 | 5.1 | 8.8 | 12.8 |
| 25 | 0 | 1.5 | 4.0 | 4.5 | 9.3 | 13.3 |
| July 5 | 0 | 0.9 | 3.4 | 3.9 | 9.8 | 13.8 |
| 15 | 0 | 0.4 | 2.7 | 3.2 | 10.3 | 14.2 |
| 25 | 0 | 0 | 2.1 | 2.5 | 10.8 | 14.6 |
| Aug. 4 | 0 | 0 | 1.5 | 1.9 | 11.3 | 14.9 |
| 14 | 0 | 0 | 0.9 | 1.2 | 11.8 | 15.2 |
| 24 | 0 | 0 | 0.3 | 0.5 | 12.3 | 15.5 |
| Sept. 3 | 0 | 0 | 0 | 0 | 12.7 | 15.7 |
| 13 | 0 | 0 | 0 | 0 | 13.1 | 16.0 |
| 23 | 0 | 0 | 0 | 0 | 13.4 | 16.2 |
| Oct. 3 | 0 | 0 | 0 | 0 | 13.6 | 16.3 |
| 13 | 0 | 0.1 | 0.4 | 0 | 13.8 | 16.5 |
| 23 | 0.4 | 0.8 | 0.8 | 0.4 | 13.9 | 16.6 |
| Nov. 2 | 1.2 | 1.5 | 1.2 | 0.7 | 14.0 | 16.8 |
| 12 | 2.0 | 2.2 | 1.7 | 1.0 | 14.1 | 16.9 |
| 22 | 2.7 | 2.8 | 2.3 | 1.4 | 14.1 | 16.9 |

Note: (1) For a particular observer's latitude, the number of dark hours is defined as the time interval during which the sun is below the local horizon by at least 18 degrees and the comet is simultaneously above the local horizon.

(2) Magnitude estimates are based upon the comet's observed behavior in 1909-10. Predictions are for ideal observing conditions.

rough indications of the comet's tail length and orientation are given for a few representative dates along with the comet's apparent total magnitude $M_1$ in parenthesis. The tail-length estimates presented in Figures 9 through 13 were obtained by solving for $t$ in formula (4) and using the data in Figure 6 and Appendix B. Only the period when the comet is brightest (January–April, 1986) is represented on Figures 9-13. Note that the comet passes near opposition in April 1986; for some latitudes, it is then observable as both an evening and morning object.

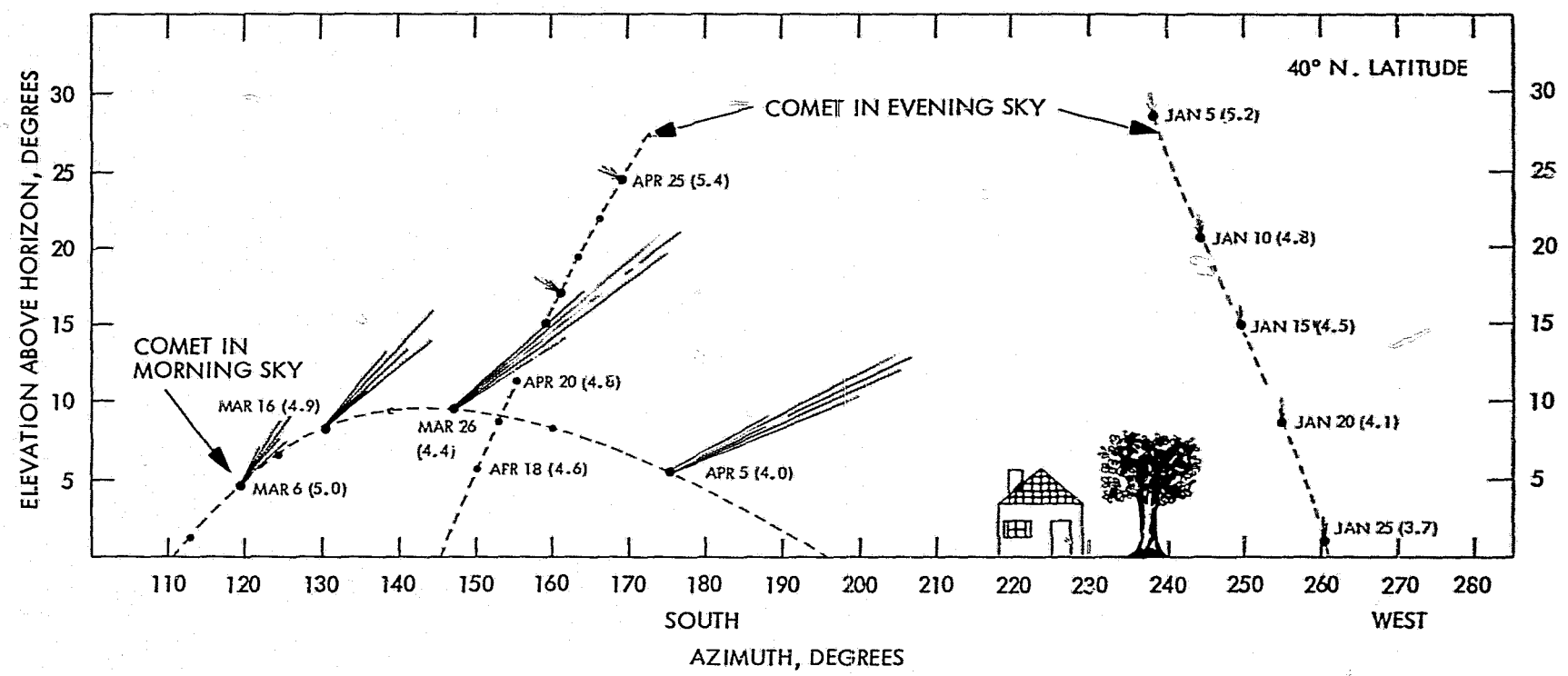



**Fig. 9. Comet Halley Observing Conditions in 1986 for Observers Located at 40° North Latitude. Comet Positions are Given for Beginning of Morning Astronomical Twilight or End of Evening Astronomical Twilight. Approximate Total Visual Magnitudes are Given in Parentheses Following Dates. Viewing with Binoculars and Ideal Observing Conditions are Assumed.**

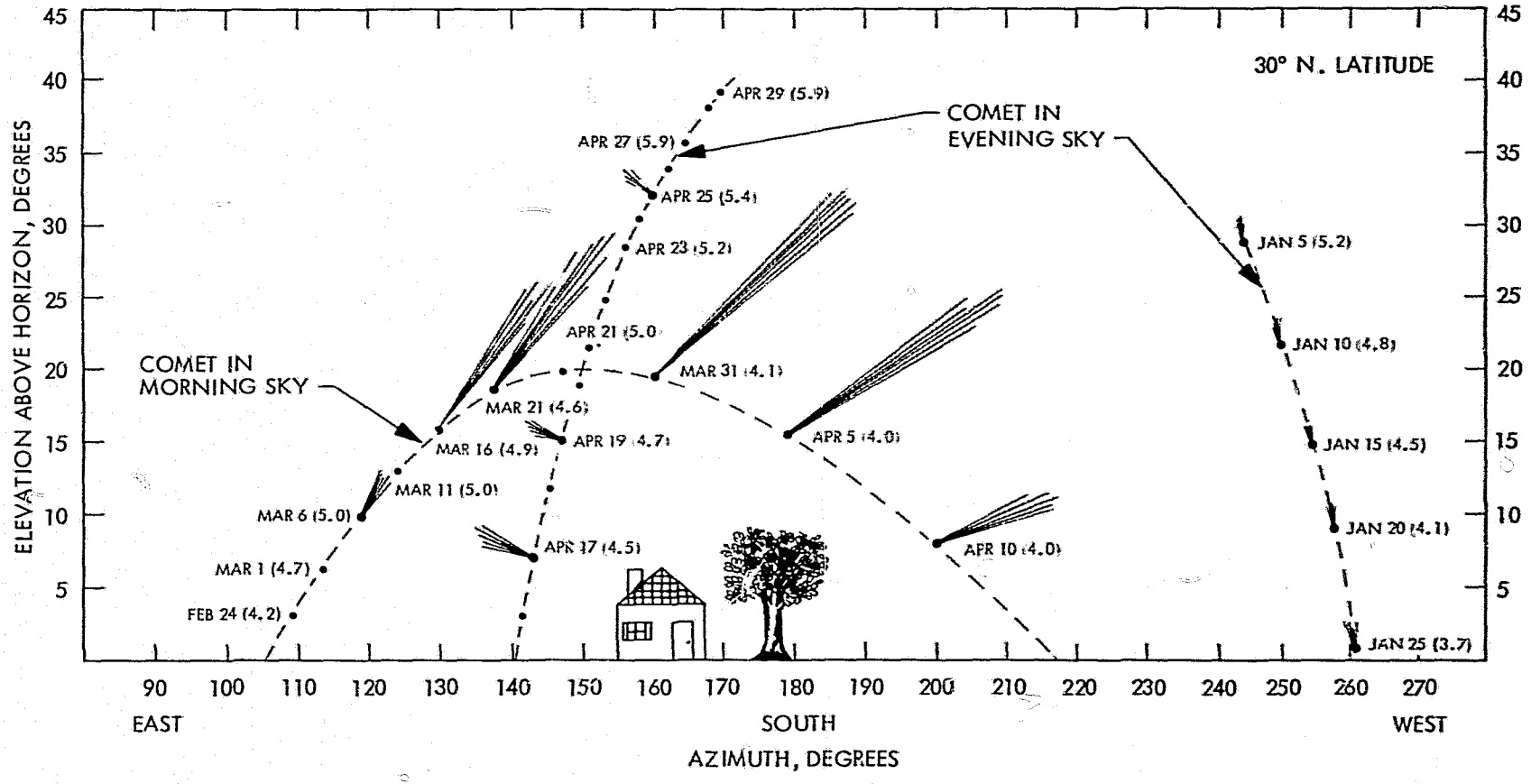



**Fig. 10. Comet Halley Observing Conditions in 1986 for Observers Located at 30° North Latitude. Comet Positions are Given for Beginning of Morning Astronomical Twilight or End of Evening Astronomical Twilight. Approximate Total Visual Magnitudes are Given in Parentheses Following Dates. Viewing with Binoculars and Ideal Observing Conditions are Assumed.**

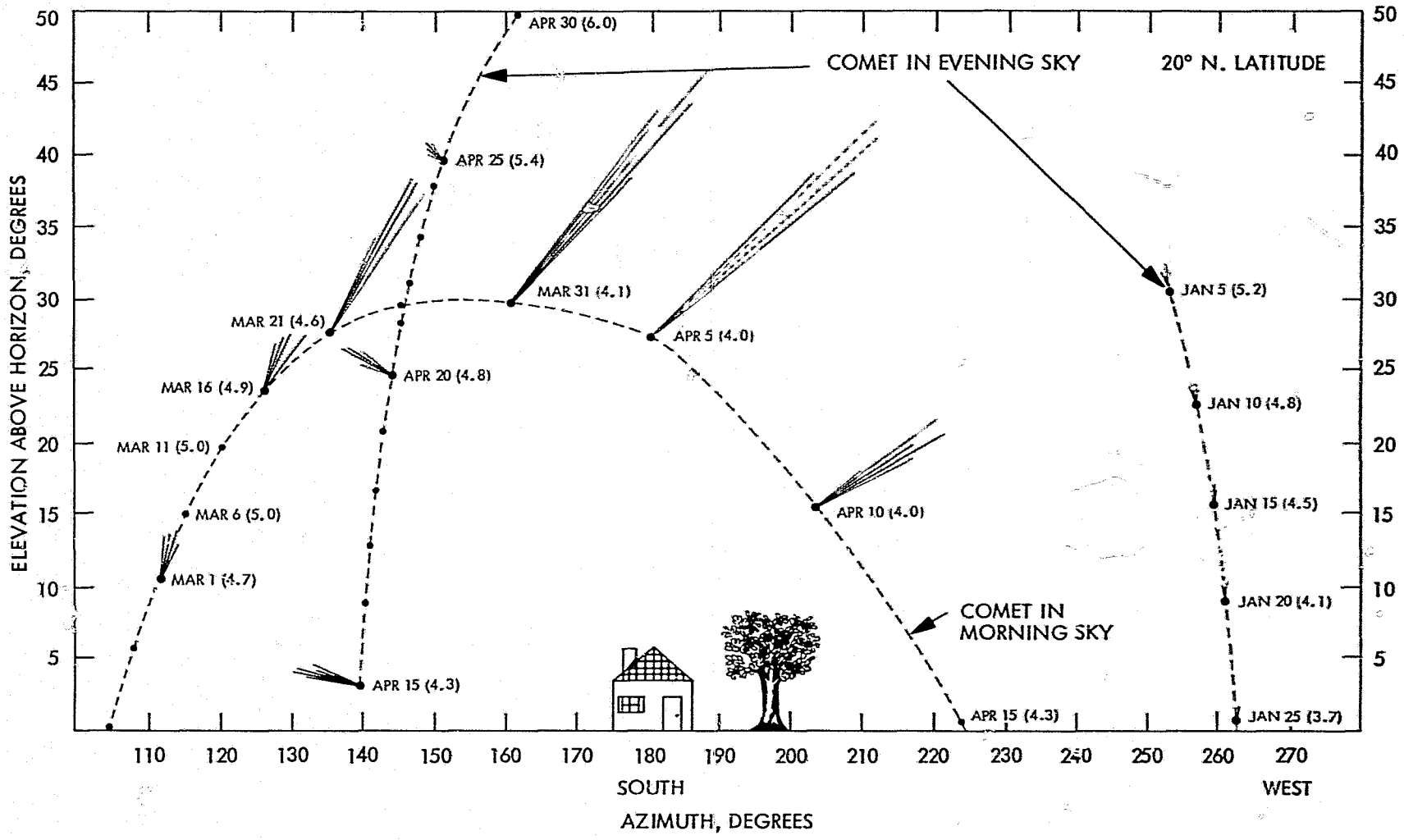



**Fig. 11. Comet Halley Observing Conditions in 1986 for Observers Located at 20° North Latitude. Comet Positions are Given for Beginning of Morning Astronomical Twilight or End of Evening Astronomical Twilight. Approximate Total Visual Magnitudes are Given in Parentheses Following Dates. Viewing with Binoculars and Ideal Observing Conditions are Assumed.**

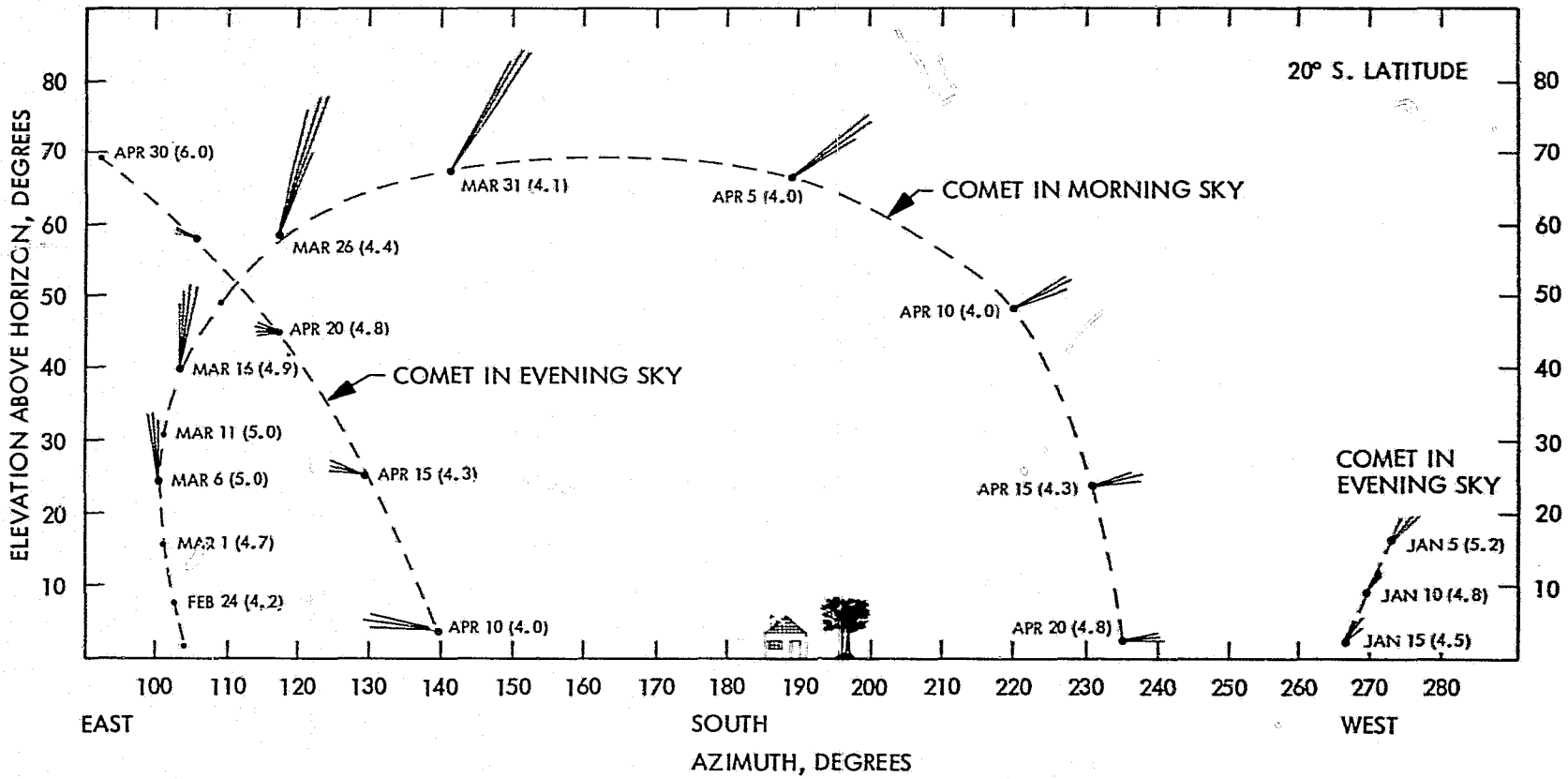



**Fig. 12. Comet Halley Observing Conditions in 1986 for Observers Located at 20° South Latitude. Comet Positions are Given for Beginning of Morning Astronomical Twilight or End of Evening Astronomical Twilight. Approximate Total Visual Magnitudes are Given in Parentheses Following Dates. Viewing with Binoculars and Ideal Observing Conditions are Assumed.**

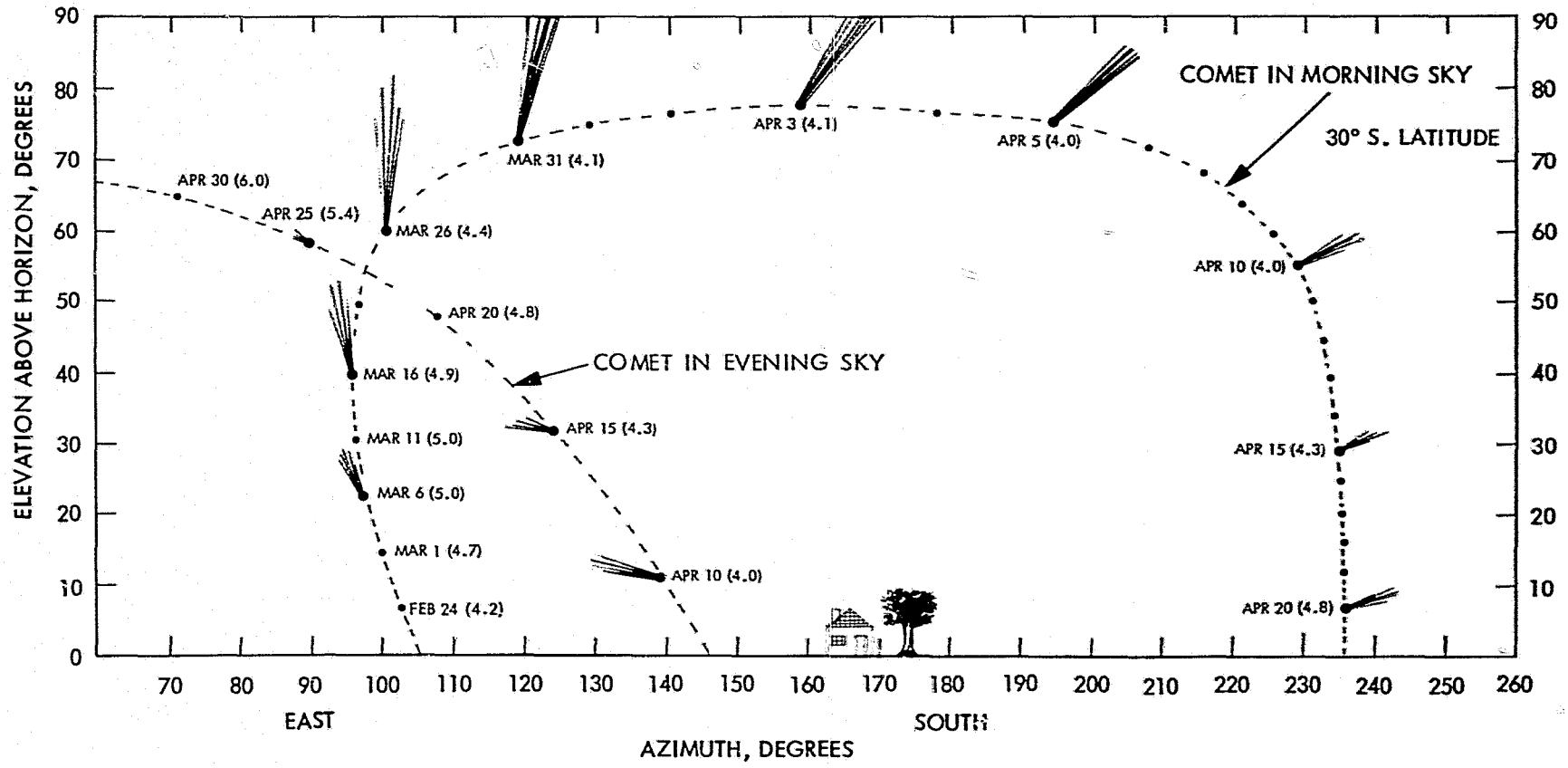



**Fig. 13. Comet Halley Observing Conditions in 1986 for Observers Located at 30° South Latitude. Comet Positions are Given for Beginning of Morning Astronomical Twilight or End of Evening Astronomical Twilight. Approximate Total Visual Magnitudes are Given in Parentheses Following Dates. Viewing with Binoculars and Ideal Observing Conditions are Assumed.**

## References


1. Yeomans, D. K. (1977) *Astronomical Journal*, v. 82, p. 435.
2. Whipple, F. L. (1950) *Astrophysical Journal*, v. 111, p. 375.
3. Marsden, B. G., Sekanina, Z., and Yeomans, D. K. (1973) *Astronomical Journal*, v. 78, p. 211.
4. Morris, C. S. (1973) *Publications of the Astronomical Society of the Pacific*, v. 85, p. 470.

# Appendix A

# Historical, Physical, and Orbital Data

# Historical, Physical, and Orbital Data

## Historical Data

| | |
|---|---|
| Earliest probable recorded apparition | 240 B.C. |
| Number of recorded apparitions From 240 B.C. to 1910 A.D., only the 164 B.C. apparition was not recorded. | 28 |
| Shortest period between returns to perihelion | 74.42 years (1835-1910) |
| Longest period between returns to perihelion | 79.25 years (451-530) |
| Closest approach to the earth | 0.04 AU (April 11, 837) |
| Longest angular tail length recorded | 93° (mid-April 837) |
| Brightest apparent magnitude recorded (approximate) | -3.5 (April 11, 837) |

## Physical Characteristics

| | |
|---|---|
| Estimated diameter of nucleus | 5 km |
| Estimated density of nucleus | 1 g/cm$^3$ |
| Estimated rotation period[A-1] | 10.3 hours, direct |
| Observed spectra in 1910[A-2] | CH, CN, $C_2$, $C_3$, Na D, $CO^+$, $N_2^+$ |
| Observed tails | Type I ion and Type II dust |
| Associated meteor streams | $\eta$ Aquarid (Early May) and Orionid (late October) |

## Orbital Characteristics

| | |
|---|---|
| Location of orbit pole | $\lambda = \Omega - 90° = 328.15°$<br>$\beta = 90° - i = -72.24°$ |
| Location of perihelion | $\lambda = \Omega + \tan^{-1}(\tan \omega \cos i) = 305.32$<br>$\beta = \sin^{-1}(\sin \omega \sin i) = 16.45°$ |
| Heliocentric distance of orbit nodes | $r(\Omega) = q(1 + e)/(1 + e \cos \omega) = 1.81$ AU<br>$r(\mho) = q(1 + e)/(1 - e \cos \omega) = 0.85$ AU |
| Distance of perihelion and aphelion above or below orbit plane (in AU) | $Z(q) = q \sin \omega \sin i = 0.17$ AU<br>$Z(Q) = Q \sin \omega \sin i = 9.99$ AU |

Orbital velocity (in km/sec)

$$V = 29.8 \left[\frac{2}{r} - \frac{1}{a}\right]^{1/2}$$

$$= 29.8 \left[\frac{2}{r} - 0.0558\right]^{1/2}$$

At perihelion $r = q$ $V = 54.55$ km/sec

At aphelion $r = Q$ $V = 0.91$ km/sec

## Definitions

| | |
|---|---|
| $\lambda, \beta$ | ecliptic longitude, latitude |
| $\Omega, \mho$ | longitude of the ascending, descending node |
| $\omega$ | argument of perihelion |
| $i$ | inclination of orbit plane with respect to the ecliptic |
| $q, Q$ | perihelion, aphelion distance in AU |
| $e$ | orbital eccentricity |
| $a$ | semimajor axis in AU |

## References


A-1. Whipple, F. L., private communication, March 1, 1980.

A-2. Bobrovnikoff, N. T. (1931) *Publications of the Lick Observatory*, v. 17, part II.

# Appendix B

# Ephemeris Data 1981–1987

## Explanation of Symbols

| | |
|---|---|
| J. D. | = Julian Date (Ephemeris Time) |
| R. A. 1950.0 DEC. | = Geocentric right ascension and declination referred to the mean equator and equinox of 1950.0. Light time corrections have been applied |
| R. A. APPN DEC. | = Apparent geocentric right ascension and declination. Light time, annual aberration, and nutation corrections have been applied, and R. A. and Dec. have been precessed to the ephemeris date. |
| DELTA | = Geocentric distance of comet in AU |
| DELDOT | = Geocentric velocity of comet in km/sec |
| R | = Heliocentric distance of comet in AU |
| RDOT | = Heliocentric velocity of comet in km/sec |
| $M_1$ | = Total magnitude = 5.0 + 5.0*log (Delta) + 13.1*log (R), pre-perihelion. Post-perihelion, $M_1$ is determined empirically from the 1910-11 magnitude estimates (see Figure 5) |
| $M_2$ | = Nuclear magnitude = 7.5 + 5.0*log (Delta) + 10.0*log (R) |
| NOTE: | In cases where $M_1$ is not computed, the corresponding column is filled with zeros (0.0). |
| THETA | = Sun-Earth-Comet angle in degrees |
| BETA | = Sun-Comet-Earth angle in degrees |
| MOON | = Comet-Earth-Moon angle in degrees |

NOTES:

1. The following osculating orbital elements are consistent with the following ephemeris:

| | | | | |
|---|---|---|---|---|
| Epoch | 2446480.50000 | 1986 | FEB. | 19.00000 (E.T.) |
| Perihelion Passage | 2446471.16128 | 1986 | FEB. | 9.66128 (E.T.) |
| Perihelion Distance in AU | 0.5870959 | | | |
| Eccentricity | 0.9672671 | | | |
| Argument of Perihelion | 111.85336 | | | |
| Longitude of Ascending Node | 58.15313 | | | |
| Inclination | 162.23779 | | | |

2. Angles are in degrees and are referred to the ecliptic and equinox of 1950.0.

**Table B-1. Ephemeris (with Perturbations) for Comet Halley at 10-Day Intervals from December 25, 1980 to June 8, 1982.**

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | 12 | 25 | .0 | 2444598.5 | 7 10.465 + 7 | 51.28 | 7 12.152 + 7 | 48.01 | 13.60 | -15.87 | 14.53 | -8.26 | .0 | 24.8 | 159.2 | 1.4 | 29 |
| 1981 | 1 | 4 | .0 | 2444608.5 | 7 7.336 + 7 | 55.57 | 7 9.026 + 7 | 52.41 | 13.53 | -19.41 | 14.48 | -8.28 | .0 | 24.8 | 164.9 | 1.0 | 147 |
| 1981 | 1 | 14 | .0 | 2444618.5 | 7 4.155 + 8 | 1.80 | 7 5.849 + 7 | 58.77 | 13.48 | -4.85 | 14.43 | -8.30 | .0 | 24.7 | 164.0 | 1.1 | 75 |
| 1981 | 1 | 24 | .0 | 2444628.5 | 7 1.035 + 8 | 9.79 | 7 2.734 + 8 | 6.88 | 13.47 | .54 | 14.38 | -8.32 | .0 | 24.7 | 157.2 | 1.5 | 63 |
| 1981 | 2 | 3 | .0 | 2444638.5 | 6 58.092 + 8 | 19.26 | 6 59.789 + 8 | 16.47 | 13.49 | 5.61 | 14.33 | -8.35 | .0 | 24.7 | 149.1 | 2.1 | 166 |
| 1981 | 2 | 13 | .0 | 2444648.5 | 6 55.418 + 8 | 29.90 | 6 57.116 + 8 | 27.22 | 13.53 | 10.13 | 14.29 | -8.37 | .0 | 24.7 | 139.3 | 2.6 | 35 |
| 1981 | 2 | 23 | .0 | 2444658.5 | 6 53.102 + 8 | 41.36 | 6 54.801 + 8 | 38.78 | 13.60 | 13.94 | 14.24 | -8.39 | .0 | 24.7 | 128.3 | 3.1 | 96 |
| 1981 | 3 | 5 | .0 | 2444668.5 | 6 51.207 + 8 | 53.26 | 6 52.907 + 8 | 50.76 | 13.69 | 16.98 | 14.19 | -8.42 | .0 | 24.7 | 118.2 | 3.5 | 136 |
| 1981 | 3 | 15 | .0 | 2444678.5 | 6 49.782 + 9 | 5.25 | 6 51.482 + 9 | 2.82 | 13.80 | 19.11 | 14.14 | -8.44 | .0 | 24.7 | 108.2 | 3.8 | 13 |
| 1981 | 3 | 25 | .0 | 2444688.5 | 6 48.852 + 9 | 16.99 | 6 50.558 + 9 | 14.60 | 13.91 | 20.33 | 14.09 | -8.46 | .0 | 24.7 | 98.3 | 4.0 | 128 |
| 1981 | 4 | 4 | .0 | 2444698.5 | 6 48.420 + 9 | 28.16 | 6 50.117 + 9 | 25.79 | 14.02 | 20.67 | 14.04 | -8.49 | .0 | 24.7 | 88.6 | 4.1 | 99 |
| 1981 | 4 | 14 | .0 | 2444708.5 | 6 48.478 + 9 | 38.48 | 6 50.175 + 9 | 36.12 | 14.15 | 20.09 | 13.99 | -8.51 | .0 | 24.7 | 79.1 | 4.0 | 43 |
| 1981 | 4 | 24 | .0 | 2444718.5 | 6 49.001 + 9 | 47.73 | 6 50.697 + 9 | 45.34 | 14.26 | 18.73 | 13.94 | -8.54 | .0 | 24.7 | 69.7 | 3.9 | 159 |
| 1981 | 5 | 4 | .0 | 2444728.5 | 6 49.952 + 9 | 55.70 | 6 51.647 + 9 | 53.29 | 14.36 | 16.65 | 13.90 | -8.56 | .0 | 24.7 | 60.5 | 3.6 | 62 |
| 1981 | 5 | 14 | .0 | 2444738.5 | 6 51.289 +10 | 2.25 | 6 52.984 + 9 | 59.78 | 14.45 | 13.88 | 13.85 | -8.58 | .0 | 24.7 | 51.4 | 3.3 | 75 |
| 1981 | 5 | 24 | .0 | 2444748.5 | 6 52.960 +10 | 7.26 | 6 54.655 +10 | 4.72 | 14.52 | 10.59 | 13.80 | -8.61 | .0 | 24.7 | 42.6 | 2.9 | 161 |
| 1981 | 6 | 3 | .0 | 2444758.5 | 6 54.912 +10 | 10.65 | 6 56.606 +10 | 8.04 | 14.57 | 6.84 | 13.75 | -8.63 | .0 | 24.7 | 34.1 | 2.4 | 26 |
| 1981 | 6 | 13 | .0 | 2444768.5 | 6 57.087 +10 | 12.38 | 6 58.782 +10 | 9.69 | 14.60 | 2.72 | 13.70 | -8.66 | .0 | 24.7 | 26.0 | 1.9 | 106 |
| 1981 | 6 | 23 | .0 | 2444778.5 | 6 59.424 +10 | 12.45 | 7 1.120 +10 | 9.67 | 14.61 | -1.63 | 13.65 | -8.68 | .0 | 24.7 | 18.6 | 1.4 | 129 |
| 1981 | 7 | 3 | .0 | 2444788.5 | 7 1.864 +10 | 10.89 | 7 3.561 +10 | 8.01 | 14.58 | -6.16 | 13.60 | -8.71 | .0 | 24.7 | 13.4 | 1.0 | 16 |
| 1981 | 7 | 13 | .0 | 2444798.5 | 7 4.345 +10 | 7.74 | 7 6.042 +10 | 4.77 | 14.53 | -10.74 | 13.55 | -8.73 | .0 | 24.6 | 13.0 | 1.0 | 135 |
| 1981 | 7 | 23 | .0 | 2444808.5 | 7 6.804 +10 | 3.10 | 7 8.502 +10 | .03 | 14.46 | -15.25 | 13.50 | -8.76 | .0 | 24.6 | 17.7 | 1.3 | 94 |
| 1981 | 8 | 2 | .0 | 2444818.5 | 7 9.179 + 9 | 57.09 | 7 10.879 + 9 | 53.93 | 14.36 | -19.66 | 13.44 | -8.79 | .0 | 24.6 | 24.9 | 1.8 | 46 |
| 1981 | 8 | 12 | .0 | 2444828.5 | 7 11.406 + 9 | 49.86 | 7 13.107 + 9 | 46.61 | 14.23 | -23.81 | 13.39 | -8.81 | .0 | 24.5 | 33.0 | 2.4 | 163 |
| 1981 | 8 | 22 | .0 | 2444838.5 | 7 13.423 + 9 | 41.59 | 7 15.125 + 9 | 38.27 | 14.08 | -27.60 | 13.34 | -8.84 | .0 | 24.5 | 41.5 | 2.9 | 58 |
| 1981 | 9 | 1 | .0 | 2444848.5 | 7 15.169 + 9 | 32.50 | 7 16.873 + 9 | 29.10 | 13.91 | -31.00 | 13.29 | -8.86 | .0 | 24.5 | 50.2 | 3.3 | 78 |
| 1981 | 9 | 11 | .0 | 2444858.5 | 7 16.581 + 9 | 22.82 | 7 18.287 + 9 | 19.37 | 13.73 | -33.81 | 13.24 | -8.89 | .0 | 24.4 | 59.2 | 3.7 | 157 |
| 1981 | 9 | 21 | .0 | 2444868.5 | 7 17.603 + 9 | 12.85 | 7 19.311 + 9 | 9.36 | 13.53 | -36.01 | 13.19 | -8.92 | .0 | 24.4 | 68.4 | 4.1 | 22 |
| 1981 | 10 | 1 | .0 | 2444878.5 | 7 18.122 + 9 | 2.88 | 7 19.893 + 8 | 59.35 | 13.31 | -37.50 | 13.14 | -8.94 | .0 | 24.3 | 77.8 | 4.3 | 109 |
| 1981 | 10 | 11 | .0 | 2444888.5 | 7 18.271 + 8 | 52.23 | 7 19.985 + 8 | 49.70 | 13.09 | -38.15 | 13.09 | -8.97 | .0 | 24.3 | 87.4 | 4.4 | 125 |
| 1981 | 10 | 21 | .0 | 2444898.5 | 7 17.836 + 8 | 44.25 | 7 19.553 + 8 | 41.72 | 12.87 | -37.97 | 13.03 | -9.00 | .0 | 24.2 | 97.1 | 4.3 | 22 |
| 1981 | 10 | 31 | .0 | 2444908.5 | 7 16.851 + 8 | 36.28 | 7 18.572 + 8 | 33.78 | 12.66 | -36.87 | 12.98 | -9.03 | .0 | 24.1 | 107.0 | 4.2 | 140 |
| 1981 | 11 | 10 | .0 | 2444918.5 | 7 15.312 + 8 | 29.66 | 7 17.036 + 8 | 26.21 | 12.45 | -34.83 | 12.93 | -9.06 | .0 | 24.1 | 117.0 | 3.9 | 88 |
| 1981 | 11 | 20 | .0 | 2444928.5 | 7 13.235 + 8 | 24.71 | 7 14.964 + 8 | 21.33 | 12.26 | -31.93 | 12.88 | -9.08 | .0 | 24.0 | 127.2 | 3.5 | 56 |
| 1981 | 11 | 30 | .0 | 2444938.5 | 7 10.655 + 8 | 21.68 | 7 12.389 + 8 | 18.40 | 12.08 | -28.15 | 12.82 | -9.11 | .0 | 24.0 | 137.3 | 3.0 | 166 |
| 1981 | 12 | 10 | .0 | 2444948.5 | 7 7.638 + 8 | 20.81 | 7 9.376 + 8 | 17.63 | 11.93 | -23.65 | 12.77 | -9.14 | .0 | 23.9 | 147.3 | 2.4 | 49 |
| 1981 | 12 | 20 | .0 | 2444958.5 | 7 4.273 + 8 | 22.19 | 7 6.015 + 8 | 19.15 | 11.81 | -18.60 | 12.72 | -9.17 | .0 | 23.9 | 156.6 | 1.8 | 92 |
| 1981 | 12 | 30 | .0 | 2444968.5 | 7 .666 + 8 | 25.86 | 7 2.413 + 8 | 22.96 | 11.72 | -13.83 | 12.67 | -9.20 | .0 | 23.9 | 163.9 | 1.2 | 144 |
| 1982 | 1 | 9 | .0 | 2444978.5 | 6 56.947 + 8 | 31.77 | 6 58.698 + 8 | 29.02 | 11.66 | -7.52 | 12.61 | -9.23 | .0 | 23.8 | 165.4 | 1.1 | 15 |
| 1982 | 1 | 19 | .0 | 2444988.5 | 6 53.250 + 8 | 39.72 | 6 55.003 + 8 | 37.12 | 11.63 | -1.97 | 12.56 | -9.26 | .0 | 23.8 | 159.8 | 1.6 | 126 |
| 1982 | 1 | 29 | .0 | 2444998.5 | 6 49.706 + 8 | 49.47 | 6 51.462 + 8 | 47.02 | 11.64 | 3.31 | 12.51 | -9.29 | .0 | 23.8 | 151.0 | 2.2 | 108 |
| 1982 | 2 | 8 | .0 | 2445008.5 | 6 46.444 + 9 | .69 | 6 48.202 + 8 | 58.38 | 11.67 | 8.05 | 12.45 | -9.32 | .0 | 23.8 | 141.1 | 2.8 | 35 |
| 1982 | 2 | 18 | .0 | 2445018.5 | 6 43.570 + 9 | 12.99 | 6 45.329 + 9 | 10.82 | 11.73 | 12.14 | 12.40 | -9.35 | .0 | 23.8 | 131.0 | 3.4 | 157 |
| 1982 | 2 | 28 | .0 | 2445028.5 | 6 41.170 + 9 | 26.00 | 6 42.929 + 9 | 23.93 | 11.81 | 15.44 | 12.34 | -9.38 | .0 | 23.8 | 120.8 | 4.0 | 69 |
| 1982 | 3 | 10 | .0 | 2445038.5 | 6 39.307 + 9 | 39.30 | 6 41.066 + 9 | 37.32 | 11.90 | 17.80 | 12.29 | -9.41 | .0 | 23.8 | 110.7 | 4.3 | 71 |
| 1982 | 3 | 20 | .0 | 2445048.5 | 6 38.012 + 9 | 52.51 | 6 39.772 + 9 | 50.59 | 12.01 | 19.28 | 12.24 | -9.44 | .0 | 23.8 | 100.7 | 4.6 | 160 |
| 1982 | 3 | 30 | .0 | 2445058.5 | 6 37.302 +10 | 5.29 | 6 39.061 +10 | 3.40 | 12.12 | 19.82 | 12.18 | -9.47 | .0 | 23.8 | 90.9 | 4.7 | 31 |
| 1982 | 4 | 9 | .0 | 2445068.5 | 6 37.166 +10 | 17.30 | 6 38.925 +10 | 15.43 | 12.24 | 19.44 | 12.13 | -9.50 | .0 | 23.8 | 81.2 | 4.7 | 105 |
| 1982 | 4 | 19 | .0 | 2445078.5 | 6 37.577 +10 | 28.28 | 6 39.336 +10 | 26.39 | 12.35 | 18.27 | 12.07 | -9.53 | .0 | 23.8 | 71.8 | 4.5 | 131 |
| 1982 | 4 | 29 | .0 | 2445088.5 | 6 38.498 +10 | 37.99 | 6 40.257 +10 | 36.07 | 12.45 | 16.30 | 12.02 | -9.56 | .0 | 23.8 | 62.5 | 4.3 | 15 |
| 1982 | 5 | 9 | .0 | 2445098.5 | 6 39.879 +10 | 46.25 | 6 41.637 +10 | 44.27 | 12.53 | 13.68 | 11.96 | -9.60 | .0 | 23.8 | 53.4 | 3.9 | 137 |
| 1982 | 5 | 19 | .0 | 2445108.5 | 6 41.661 +10 | 52.91 | 6 43.419 +10 | 50.86 | 12.60 | 10.51 | 11.91 | -9.63 | .0 | 23.8 | 44.6 | 3.4 | 98 |
| 1982 | 5 | 29 | .0 | 2445118.5 | 6 43.786 +10 | 57.86 | 6 45.544 +10 | 55.72 | 12.65 | 6.83 | 11.85 | -9.66 | .0 | 23.7 | 35.9 | 2.9 | 47 |
| 1982 | 6 | 8 | .0 | 2445128.5 | 6 46.186 +11 | 1.04 | 6 47.945 +10 | 58.80 | 12.68 | 2.80 | 11.79 | -9.69 | .0 | 23.7 | 27.7 | 2.3 | 164 |

**Table B-2. Ephemeris (with Perturbations) for Comet Halley at 5-Day Intervals from June 18, 1982 to September 30, 1984.**

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1982 | 6 | 18 | .0 | 2445138.5 | 6 48.796 +11 | 2.42 | 6 50.555 +11 | .07 | 12.69 | -1.49 | 11.74 | -9.73 | .0 | 23.7 | 20.0 | 1.7 | 65 |
| 1982 | 6 | 23 | .0 | 2445143.5 | 6 50.159 +11 | 2.43 | 6 51.919 +11 | .03 | 12.68 | -3.73 | 11.71 | -9.74 | .0 | 23.7 | 16.7 | 1.4 | 15 |
| 1982 | 6 | 28 | .0 | 2445148.5 | 6 51.549 +11 | 1.99 | 6 53.310 +10 | 59.53 | 12.67 | -5.99 | 11.68 | -9.76 | .0 | 23.7 | 13.9 | 1.2 | 80 |
| 1982 | 7 | 3 | .0 | 2445153.5 | 6 52.956 +11 | 1.11 | 6 54.717 +10 | 58.60 | 12.64 | -8.26 | 11.65 | -9.78 | .0 | 23.7 | 12.2 | 1.1 | 140 |
| 1982 | 7 | 8 | .0 | 2445158.5 | 6 54.373 +10 | 59.60 | 6 56.134 +10 | 57.22 | 12.62 | -10.53 | 11.62 | -9.79 | .0 | 23.7 | 11.9 | 1.0 | 156 |
| 1982 | 7 | 13 | .0 | 2445163.5 | 6 55.790 +10 | 58.06 | 6 57.552 +10 | 55.43 | 12.58 | -12.80 | 11.60 | -9.81 | .0 | 23.6 | 13.2 | 1.1 | 97 |
| 1982 | 7 | 18 | .0 | 2445168.5 | 6 57.200 +10 | 55.92 | 6 58.962 +10 | 53.23 | 12.54 | -15.07 | 11.57 | -9.83 | .0 | 23.6 | 15.6 | 1.4 | 30 |
| 1982 | 7 | 23 | .0 | 2445173.5 | 6 58.593 +10 | 53.37 | 7 .357 +10 | 50.63 | 12.50 | -17.32 | 11.54 | -9.85 | .0 | 23.6 | 18.8 | 1.6 | 47 |
| 1982 | 7 | 28 | .0 | 2445178.5 | 6 59.960 +10 | 50.45 | 7 1.724 +10 | 47.64 | 12.44 | -19.51 | 11.51 | -9.86 | .0 | 23.6 | 22.4 | 1.9 | 111 |
| 1982 | 8 | 2 | .0 | 2445183.5 | 7 1.292 +10 | 47.16 | 7 3.056 +10 | 44.30 | 12.38 | -21.64 | 11.48 | -9.88 | .0 | 23.6 | 26.2 | 2.2 | 165 |
| 1982 | 8 | 7 | .0 | 2445188.5 | 7 2.580 +10 | 43.52 | 7 4.344 +10 | 40.61 | 12.32 | -23.71 | 11.45 | -9.90 | .0 | 23.5 | 30.2 | 2.6 | 126 |
| 1982 | 8 | 12 | .0 | 2445193.5 | 7 3.815 +10 | 39.57 | 7 5.580 +10 | 36.61 | 12.25 | -25.71 | 11.43 | -9.92 | .0 | 23.5 | 34.4 | 2.9 | 63 |
| 1982 | 8 | 17 | .0 | 2445198.5 | 7 4.990 +10 | 35.33 | 7 6.756 +10 | 32.32 | 12.17 | -27.63 | 11.40 | -9.93 | .0 | 23.5 | 38.6 | 3.2 | 14 |
| 1982 | 8 | 22 | .0 | 2445203.5 | 7 6.093 +10 | 30.81 | 7 7.860 +10 | 27.76 | 12.09 | -29.46 | 11.37 | -9.95 | .0 | 23.5 | 42.9 | 3.5 | 80 |
| 1982 | 8 | 27 | .0 | 2445208.5 | 7 7.116 +10 | 26.06 | 7 8.883 +10 | 22.96 | 12.00 | -31.15 | 11.34 | -9.97 | .0 | 23.4 | 47.3 | 3.8 | 141 |
| 1982 | 9 | 1 | .0 | 2445213.5 | 7 8.050 +10 | 21.13 | 7 9.818 +10 | 17.96 | 11.91 | -32.72 | 11.31 | -9.99 | .0 | 23.4 | 51.7 | 4.0 | 154 |
| 1982 | 9 | 6 | .0 | 2445218.5 | 7 8.886 +10 | 15.97 | 7 10.655 +10 | 12.80 | 11.81 | -34.15 | 11.28 | -10.01 | .0 | 23.4 | 56.2 | 4.3 | 94 |
| 1982 | 9 | 11 | .0 | 2445223.5 | 7 9.617 +10 | 10.71 | 7 11.387 +10 | 7.50 | 11.71 | -35.45 | 11.25 | -10.02 | .0 | 23.4 | 60.7 | 4.5 | 28 |
| 1982 | 9 | 16 | .0 | 2445228.5 | 7 10.232 +10 | 5.35 | 7 12.004 +10 | 2.11 | 11.61 | -36.59 | 11.22 | -10.04 | .0 | 23.3 | 65.3 | 4.7 | 47 |
| 1982 | 9 | 21 | .0 | 2445233.5 | 7 10.724 + 9 | 59.92 | 7 12.496 + 9 | 56.67 | 11.50 | -37.55 | 11.19 | -10.06 | .0 | 23.3 | 69.9 | 4.8 | 112 |
| 1982 | 9 | 26 | .0 | 2445238.5 | 7 11.084 + 9 | 54.49 | 7 12.858 + 9 | 51.21 | 11.39 | -38.32 | 11.17 | -10.08 | .0 | 23.3 | 74.6 | 5.0 | 165 |
| 1982 | 10 | 1 | .0 | 2445243.5 | 7 11.305 + 9 | 49.08 | 7 13.080 + 9 | 45.80 | 11.28 | -38.89 | 11.14 | -10.10 | .0 | 23.2 | 79.3 | 5.1 | 124 |
| 1982 | 10 | 6 | .0 | 2445248.5 | 7 11.391 + 9 | 43.76 | 7 13.156 + 9 | 40.47 | 11.17 | -39.27 | 11.11 | -10.12 | .0 | 23.2 | 84.1 | 5.1 | 58 |
| 1982 | 10 | 11 | .0 | 2445253.5 | 7 11.305 + 9 | 38.55 | 7 13.082 + 9 | 35.26 | 11.05 | -39.46 | 11.08 | -10.13 | .0 | 23.2 | 88.9 | 5.2 | 18 |
| 1982 | 10 | 16 | .0 | 2445258.5 | 7 11.071 + 9 | 33.52 | 7 12.850 + 9 | 30.23 | 10.94 | -39.41 | 11.05 | -10.15 | .0 | 23.1 | 93.8 | 5.2 | 82 |
| 1982 | 10 | 21 | .0 | 2445263.5 | 7 10.673 + 9 | 28.71 | 7 12.454 + 9 | 25.43 | 10.82 | -39.13 | 11.02 | -10.17 | .0 | 23.1 | 98.7 | 5.1 | 143 |
| 1982 | 10 | 26 | .0 | 2445268.5 | 7 10.109 + 9 | 24.17 | 7 11.892 + 9 | 20.91 | 10.71 | -38.61 | 10.99 | -10.19 | .0 | 23.1 | 103.7 | 5.0 | 158 |
| 1982 | 10 | 31 | .0 | 2445273.5 | 7 9.378 + 9 | 19.95 | 7 11.152 + 9 | 15.72 | 10.60 | -37.86 | 10.96 | -10.21 | .0 | 23.0 | 108.7 | 4.9 | 90 |
| 1982 | 11 | 5 | .0 | 2445278.5 | 7 8.478 + 9 | 16.13 | 7 10.254 + 9 | 12.90 | 10.49 | -36.88 | 10.93 | -10.23 | .0 | 23.0 | 113.8 | 4.8 | 23 |
| 1982 | 11 | 10 | .0 | 2445283.5 | 7 7.411 + 9 | 12.66 | 7 9.199 + 9 | 9.51 | 10.39 | -35.68 | 10.90 | -10.25 | .0 | 23.0 | 118.8 | 4.6 | 53 |
| 1982 | 11 | 15 | .0 | 2445288.5 | 7 6.177 + 9 | 9.68 | 7 7.968 + 9 | 6.57 | 10.29 | -34.24 | 10.87 | -10.27 | .0 | 22.9 | 124.0 | 4.3 | 117 |
| 1982 | 11 | 20 | .0 | 2445293.5 | 7 4.783 + 9 | 7.21 | 7 6.575 + 9 | 4.15 | 10.19 | -32.56 | 10.84 | -10.29 | .0 | 22.9 | 129.1 | 4.1 | 165 |
| 1982 | 11 | 25 | .0 | 2445298.5 | 7 3.234 + 9 | 5.27 | 7 5.028 + 9 | 2.28 | 10.10 | -30.67 | 10.81 | -10.31 | .0 | 22.9 | 134.3 | 3.7 | 118 |
| 1982 | 11 | 30 | .0 | 2445303.5 | 7 1.540 + 9 | 3.92 | 7 3.337 + 9 | .99 | 10.01 | -28.59 | 10.78 | -10.33 | .0 | 22.8 | 139.4 | 3.4 | 53 |
| 1982 | 12 | 5 | .0 | 2445308.5 | 6 59.712 + 9 | 3.16 | 7 1.512 + 9 | -.30 | 9.94 | -26.33 | 10.75 | -10.34 | .0 | 22.8 | 144.5 | 3.1 | 27 |
| 1982 | 12 | 10 | .0 | 2445313.5 | 6 57.763 + 9 | 3.02 | 6 59.555 + 9 | -.25 | 9.86 | -23.91 | 10.72 | -10.36 | .0 | 22.8 | 149.5 | 2.7 | 91 |
| 1982 | 12 | 15 | .0 | 2445318.5 | 6 55.706 + 9 | 3.52 | 6 57.510 + 9 | -.83 | 9.80 | -21.32 | 10.69 | -10.38 | .0 | 22.7 | 154.3 | 2.3 | 153 |
| 1982 | 12 | 20 | .0 | 2445323.5 | 6 53.559 + 9 | 4.67 | 6 55.366 + 9 | 2.08 | 9.74 | -18.62 | 10.66 | -10.40 | .0 | 22.7 | 158.8 | 1.9 | 142 |
| 1982 | 12 | 25 | .0 | 2445328.5 | 6 51.341 + 9 | 6.48 | 6 53.150 + 9 | 3.98 | 9.69 | -15.83 | 10.63 | -10.42 | .0 | 22.7 | 162.7 | 1.6 | 83 |
| 1982 | 12 | 30 | .0 | 2445333.5 | 6 49.073 + 9 | 8.93 | 6 50.884 + 9 | 6.52 | 9.65 | -12.99 | 10.60 | -10.44 | .0 | 22.7 | 165.4 | 1.3 | 18 |
| 1983 | 1 | 4 | .0 | 2445338.5 | 6 46.775 + 9 | 12.03 | 6 48.587 + 9 | 9.70 | 9.61 | -10.12 | 10.57 | -10.47 | .0 | 22.7 | 166.2 | 1.3 | 65 |
| 1983 | 1 | 9 | .0 | 2445343.5 | 6 44.467 + 9 | 15.69 | 6 46.281 + 9 | 13.49 | 9.59 | -7.24 | 10.54 | -10.49 | .0 | 22.6 | 164.9 | 1.4 | 128 |
| 1983 | 1 | 14 | .0 | 2445348.5 | 6 42.171 + 9 | 19.96 | 6 43.987 + 9 | 17.86 | 9.57 | -4.39 | 10.51 | -10.51 | .0 | 22.6 | 161.8 | 1.7 | 162 |
| 1983 | 1 | 19 | .0 | 2445353.5 | 6 39.910 + 9 | 24.78 | 6 41.728 + 9 | 22.78 | 9.56 | -1.60 | 10.48 | -10.53 | .0 | 22.6 | 157.7 | 2.0 | 108 |
| 1983 | 1 | 24 | .0 | 2445358.5 | 6 37.707 + 9 | 30.11 | 6 39.525 + 9 | 28.21 | 9.56 | 1.09 | 10.45 | -10.55 | .0 | 22.6 | 153.1 | 2.4 | 45 |
| 1983 | 1 | 29 | .0 | 2445363.5 | 6 35.580 + 9 | 35.90 | 6 37.400 + 9 | 34.10 | 9.57 | 3.64 | 10.42 | -10.57 | .0 | 22.6 | 148.2 | 2.9 | 33 |
| 1983 | 2 | 3 | .0 | 2445368.5 | 6 33.547 + 9 | 42.11 | 6 35.359 + 9 | 40.40 | 9.58 | 6.05 | 10.39 | -10.59 | .0 | 22.6 | 143.1 | 3.3 | 103 |
| 1983 | 2 | 8 | .0 | 2445373.5 | 6 31.627 + 9 | 48.68 | 6 33.449 + 9 | 47.06 | 9.61 | 8.31 | 10.37 | -10.61 | .0 | 22.6 | 138.0 | 3.7 | 160 |
| 1983 | 2 | 13 | .0 | 2445378.5 | 6 29.834 + 9 | 55.56 | 6 31.658 + 9 | 54.03 | 9.63 | 10.38 | 10.35 | -10.63 | .0 | 22.6 | 132.8 | 4.0 | 132 |
| 1983 | 2 | 18 | .0 | 2445383.5 | 6 28.184 +10 | 2.70 | 6 30.008 +10 | 1.25 | 9.67 | 12.24 | 10.33 | -10.65 | .0 | 22.6 | 127.6 | 4.4 | [illegible] |
| 1983 | 2 | 23 | .0 | 2445388.5 | 6 26.688 +10 | 10.04 | 6 28.512 +10 | 8.65 | 9.70 | 13.86 | 10.27 | -10.67 | .0 | 22.5 | 122.4 | 4.7 | [illegible] |
| 1983 | 2 | 28 | .0 | 2445393.5 | 6 25.355 +10 | 17.52 | 6 27.180 +10 | 16.20 | 9.74 | 15.25 | 10.24 | -10.73 | .0 | 22.5 | 117.2 | 4.9 | 71 |
| 1983 | 3 | 5 | .0 | 2445398.5 | 6 24.190 +10 | 25.09 | 6 26.015 +10 | 23.82 | 9.79 | 16.42 | 10.21 | -10.72 | .0 | 22.5 | 112.1 | 5.2 | 138 |
| 1983 | 3 | 10 | .0 | 2445403.5 | 6 23.200 +10 | 32.70 | 6 25.026 +10 | 31.48 | 9.84 | 17.36 | 10.17 | -10.74 | .0 | 22.5 | 107.0 | 5.4 | 155 |

**Table B-2 (contd)**

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1983 | 3 | 15 | .0 | 2445406.5 | 6 22.388 | +10 40.29 | 6 24.214 | +10 39.11 | 9.89 | 18.05 | 10.14 | -10.76 | .0 | 22.5 | 102.0 | 5.5 | 98 |
| 1983 | 3 | 20 | .0 | 2445413.5 | 6 21.755 | +10 47.62 | 6 23.582 | +10 46.67 | 9.94 | 18.48 | 10.11 | -10.78 | .0 | 22.5 | 95.9 | 5.6 | 35 |
| 1983 | 3 | 25 | .0 | 2445418.5 | 6 21.304 | +10 55.23 | 6 23.130 | +10 54.10 | 10.00 | 18.67 | 10.08 | -10.81 | .0 | 22.5 | 92.0 | 5.7 | 39 |
| 1983 | 3 | 30 | .0 | 2445423.5 | 6 21.027 | +11 2.48 | 6 22.853 | +11 1.37 | 10.05 | 18.64 | 10.05 | -10.83 | .0 | 22.5 | 87.1 | 5.7 | 108 |
| 1983 | 4 | 4 | .0 | 2445428.5 | 6 20.924 | +11 9.53 | 6 22.750 | +11 8.43 | 10.10 | 18.41 | 10.02 | -10.85 | .0 | 22.5 | 82.2 | 5.7 | 165 |
| 1983 | 4 | 9 | .0 | 2445433.5 | 6 20.989 | +11 16.35 | 6 22.816 | +11 15.25 | 10.16 | 17.95 | 9.99 | -10.87 | .0 | 22.5 | 77.4 | 5.6 | 125 |
| 1983 | 4 | 14 | .0 | 2445438.5 | 6 21.216 | +11 22.89 | 6 23.045 | +11 21.78 | 10.21 | 17.29 | 9.95 | -10.90 | .0 | 22.5 | 72.7 | 5.5 | 64 |
| 1983 | 4 | 19 | .0 | 2445443.5 | 6 21.605 | +11 29.13 | 6 23.432 | +11 28.00 | 10.26 | 16.42 | 9.92 | -10.92 | .0 | 22.5 | 68.0 | 5.4 | 13 |
| 1983 | 4 | 24 | .0 | 2445448.5 | 6 22.142 | +11 35.02 | 6 23.969 | +11 33.87 | 10.30 | 15.36 | 9.89 | -10.94 | .0 | 22.5 | 63.4 | 5.2 | 76 |
| 1983 | 4 | 29 | .0 | 2445453.5 | 6 22.820 | +11 40.55 | 6 24.647 | +11 39.37 | 10.35 | 14.16 | 9.86 | -10.97 | .0 | 22.5 | 58.8 | 5.0 | 141 |
| 1983 | 5 | 4 | .0 | 2445458.5 | 6 23.631 | +11 45.68 | 6 25.458 | +11 44.47 | 10.38 | 12.80 | 9.83 | -10.99 | .0 | 22.5 | 54.2 | 4.8 | 152 |
| 1983 | 5 | 9 | .0 | 2445463.5 | 6 24.557 | +11 50.41 | 6 26.394 | +11 49.16 | 10.42 | 11.30 | 9.80 | -11.01 | .0 | 22.5 | 49.8 | 4.5 | 94 |
| 1983 | 5 | 14 | .0 | 2445468.5 | 6 25.619 | +11 54.71 | 6 27.447 | +11 53.40 | 10.45 | 9.65 | 9.77 | -11.04 | .0 | 22.5 | 45.3 | 4.2 | 30 |
| 1983 | 5 | 19 | .0 | 2445473.5 | 6 26.779 | +11 58.55 | 6 28.607 | +11 57.20 | 10.47 | 7.87 | 9.73 | -11.06 | .0 | 22.5 | 41.0 | 3.9 | 44 |
| 1983 | 5 | 24 | .0 | 2445478.5 | 6 28.035 | +12 1.93 | 6 29.853 | +12 .52 | 10.50 | 6.01 | 9.70 | -11.08 | .0 | 22.5 | 36.7 | 3.6 | 111 |
| 1983 | 5 | 29 | .0 | 2445483.5 | 6 29.377 | +12 4.83 | 6 31.207 | +12 3.36 | 10.51 | 4.06 | 9.67 | -11.11 | .0 | 22.5 | 32.5 | 3.2 | 166 |
| 1983 | 6 | 3 | .0 | 2445488.5 | 6 30.798 | +12 7.25 | 6 32.628 | +12 5.72 | 10.52 | 2.03 | 9.64 | -11.13 | .0 | 22.4 | 28.4 | 2.9 | 124 |
| 1983 | 6 | 8 | .0 | 2445493.5 | 6 32.287 | +12 9.18 | 6 34.117 | +12 7.58 | 10.52 | -.08 | 9.61 | -11.16 | .0 | 22.4 | 24.4 | 2.5 | 63 |
| 1983 | 6 | 13 | .0 | 2445498.5 | 6 33.835 | +12 10.61 | 6 35.665 | +12 8.94 | 10.52 | -2.25 | 9.57 | -11.18 | .0 | 22.4 | 20.5 | 2.1 | 14 |
| 1983 | 6 | 18 | .0 | 2445503.5 | 6 35.431 | +12 11.53 | 6 37.262 | +12 9.80 | 10.51 | -4.48 | 9.54 | -11.20 | .0 | 22.4 | 17.0 | 1.8 | 85 |
| 1983 | 6 | 23 | .0 | 2445508.5 | 6 37.054 | +12 11.96 | 6 38.896 | +12 10.15 | 10.49 | -6.72 | 9.51 | -11.23 | .0 | 22.4 | 13.9 | 1.5 | 143 |
| 1983 | 6 | 28 | .0 | 2445513.5 | 6 38.725 | +12 11.89 | 6 40.558 | +12 10.01 | 10.47 | -8.97 | 9.48 | -11.25 | .0 | 22.4 | 11.7 | 1.3 | 151 |
| 1983 | 7 | 3 | .0 | 2445518.5 | 6 40.405 | +12 11.33 | 6 42.238 | +12 9.38 | 10.44 | -11.24 | 9.44 | -11.28 | .0 | 22.3 | 10.9 | 1.2 | 95 |
| 1983 | 7 | 8 | .0 | 2445523.5 | 6 42.094 | +12 10.28 | 6 43.927 | +12 8.26 | 10.40 | -13.52 | 9.41 | -11.30 | .0 | 22.3 | 11.7 | 1.3 | 31 |
| 1983 | 7 | 13 | .0 | 2445528.5 | 6 43.781 | +12 8.76 | 6 45.615 | +12 6.65 | 10.36 | -15.79 | 9.38 | -11.33 | .0 | 22.3 | 13.9 | 1.5 | 45 |
| 1983 | 7 | 18 | .0 | 2445533.5 | 6 45.455 | +12 6.76 | 6 47.289 | +12 4.58 | 10.31 | -18.03 | 9.35 | -11.36 | .0 | 22.3 | 16.9 | 1.8 | 113 |
| 1983 | 7 | 23 | .0 | 2445538.5 | 6 47.105 | +12 4.31 | 6 48.941 | +12 2.36 | 10.26 | -20.22 | 9.31 | -11.38 | .0 | 22.2 | 20.4 | 2.2 | 167 |
| 1983 | 7 | 28 | .0 | 2445543.5 | 6 48.723 | +12 1.42 | 6 50.559 | +11 59.11 | 10.20 | -22.36 | 9.28 | -11.41 | .0 | 22.2 | 24.2 | 2.6 | 123 |
| 1983 | 8 | 2 | .0 | 2445548.5 | 6 50.297 | +11 58.12 | 6 52.133 | +11 55.73 | 10.13 | -24.45 | 9.25 | -11.43 | .0 | 22.2 | 28.2 | 3.0 | 64 |
| 1983 | 8 | 7 | .0 | 2445553.5 | 6 51.817 | +11 54.42 | 6 53.655 | +11 51.96 | 10.06 | -26.50 | 9.21 | -11.46 | .0 | 22.2 | 32.3 | 3.4 | 13 |
| 1983 | 8 | 12 | .0 | 2445558.5 | 6 53.273 | +11 50.34 | 6 55.111 | +11 47.82 | 9.98 | -28.46 | 9.18 | -11.49 | .0 | 22.1 | 35.5 | 3.8 | 80 |
| 1983 | 8 | 17 | .0 | 2445563.5 | 6 54.651 | +11 45.91 | 6 56.489 | +11 43.33 | 9.89 | -30.31 | 9.15 | -11.51 | .0 | 22.1 | 40.7 | 4.1 | 144 |
| 1983 | 8 | 22 | .0 | 2445568.5 | 6 55.941 | +11 41.16 | 6 57.781 | +11 38.52 | 9.80 | -32.05 | 9.11 | -11.54 | .0 | 22.1 | 45.0 | 4.5 | 150 |
| 1983 | 8 | 27 | .0 | 2445573.5 | 6 57.133 | +11 36.13 | 6 58.973 | +11 33.44 | 9.71 | -33.68 | 9.08 | -11.57 | .0 | 22.0 | 49.4 | 4.8 | 93 |
| 1983 | 9 | 1 | .0 | 2445578.5 | 6 58.215 | +11 30.84 | 7 .056 | +11 28.10 | 9.61 | -35.20 | 9.05 | -11.59 | .0 | 22.0 | 53.8 | 5.2 | 32 |
| 1983 | 9 | 6 | .0 | 2445583.5 | 6 59.177 | +11 25.33 | 7 1.019 | +11 22.54 | 9.50 | -36.58 | 9.01 | -11.62 | .0 | 21.9 | 58.3 | 5.5 | 44 |
| 1983 | 9 | 11 | .0 | 2445588.5 | 7 .006 | +11 19.63 | 7 1.848 | +11 16.82 | 9.40 | -37.81 | 8.98 | -11.65 | .0 | 21.9 | 62.8 | 5.7 | 114 |
| 1983 | 9 | 16 | .0 | 2445593.5 | 7 .639 | +11 13.81 | 7 2.532 | +11 10.96 | 9.28 | -38.86 | 8.95 | -11.68 | .0 | 21.9 | 67.4 | 6.0 | 166 |
| 1983 | 9 | 21 | .0 | 2445598.5 | 7 1.217 | +11 7.90 | 7 3.061 | +11 5.02 | 9.17 | -39.73 | 8.91 | -11.70 | .0 | 21.8 | 72.0 | 6.2 | 120 |
| 1983 | 9 | 26 | .0 | 2445603.5 | 7 1.579 | +11 1.94 | 7 3.424 | +10 59.05 | 9.06 | -40.43 | 8.88 | -11.73 | .0 | 21.8 | 76.7 | 6.3 | 61 |
| 1983 | 10 | 1 | .0 | 2445608.5 | 7 1.765 | +10 55.99 | 7 3.611 | +10 53.08 | 8.94 | -40.95 | 8.85 | -11.76 | .0 | 21.7 | 81.5 | 6.4 | 15 |
| 1983 | 10 | 6 | .0 | 2445613.5 | 7 1.763 | +10 50.10 | 7 3.611 | +10 47.19 | 8.82 | -41.25 | 8.81 | -11.79 | .0 | 21.7 | 86.3 | 6.5 | 80 |
| 1983 | 10 | 11 | .0 | 2445618.5 | 7 1.564 | +10 44.32 | 7 3.413 | +10 41.42 | 8.70 | -41.33 | 8.78 | -11.82 | .0 | 21.6 | 91.2 | 6.5 | 146 |
| 1983 | 10 | 16 | .0 | 2445623.5 | 7 1.158 | +10 38.71 | 7 3.009 | +10 35.83 | 8.58 | -41.17 | 8.74 | -11.85 | .0 | 21.6 | 96.1 | 6.5 | 146 |
| 1983 | 10 | 21 | .0 | 2445628.5 | 7 .541 | +10 33.34 | 7 2.393 | +10 30.48 | 8.46 | -40.78 | 8.71 | -11.88 | .0 | 21.5 | 101.1 | 6.4 | 68 |
| 1983 | 10 | 26 | .0 | 2445633.5 | 6 59.705 | +10 28.25 | 7 1.559 | +10 25.42 | 8.35 | -40.17 | 8.67 | -11.90 | .0 | 21.5 | 106.1 | 6.3 | 27 |
| 1983 | 10 | 31 | .0 | 2445638.5 | 6 58.647 | +10 23.51 | 7 .503 | +10 20.72 | 8.23 | -39.32 | 8.64 | -11.93 | .0 | 21.4 | 111.2 | 6.1 | 48 |
| 1983 | 11 | 5 | .0 | 2445643.5 | 6 57.362 | +10 19.16 | 6 59.219 | +10 16.43 | 8.12 | -38.22 | 8.61 | -11.96 | .0 | 21.4 | 116.4 | 5.9 | 117 |
| 1983 | 11 | 10 | .0 | 2445648.5 | 6 55.850 | +10 15.28 | 6 57.710 | +10 12.61 | 8.01 | -36.85 | 8.57 | -11.99 | .0 | 21.3 | 121.6 | 5.6 | 164 |
| 1983 | 11 | 15 | .0 | 2445653.5 | 6 54.114 | +10 11.92 | 6 55.976 | +10 9.33 | 7.91 | -35.25 | 8.54 | -12.02 | .0 | 21.3 | 126.9 | 5.3 | 114 |
| 1983 | 11 | 20 | .0 | 2445658.5 | 6 52.161 | +10 9.13 | 6 54.025 | +10 6.62 | 7.81 | -33.43 | 8.50 | -12.05 | .0 | 21.3 | 132.1 | 4.9 | 53 |
| 1983 | 11 | 25 | .0 | 2445663.5 | 6 49.999 | +10 6.94 | 6 51.865 | +10 4.53 | 7.71 | -31.39 | 8.47 | -12.09 | .0 | 21.2 | 137.4 | 4.5 | 23 |
| 1983 | 11 | 30 | .0 | 2445668.5 | 6 47.637 | +10 5.41 | 6 49.506 | +10 3.10 | 7.63 | -29.14 | 8.43 | -12.12 | .0 | 21.2 | 142.7 | 4.1 | 88 |
| 1983 | 12 | 5 | .0 | 2445673.5 | 6 45.092 | +10 4.57 | 6 46.962 | +10 2.37 | 7.54 | -26.69 | 8.40 | -12.15 | .0 | 21.1 | 148.0 | 3.6 | 152 |
| 1983 | 12 | 10 | .0 | 2445678.5 | 6 42.380 | +10 4.45 | 6 44.253 | +10 2.38 | 7.47 | -24.07 | 8.35 | -12.18 | .0 | 21.1 | 153.1 | 3.1 | 138 |
| 1983 | 12 | 15 | .0 | 2445683.5 | 6 39.526 | +10 5.07 | 6 41.401 | +10 3.13 | 7.41 | -21.31 | 8.33 | -12.21 | .0 | 21.1 | 157.9 | 2.5 | 60 |
| 1983 | 12 | 20 | .0 | 2445688.5 | 6 36.554 | +10 6.45 | 6 38.431 | +10 4.64 | 7.35 | -18.45 | 8.29 | -12.24 | .0 | 21.0 | 162.2 | 2.1 | 19 |

Table B-2 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1983 | 12 | 25 | .0 | 2445693.5 | 6 33.490 | +10 8.58 | 6 35.370 | +10 6.92 | 7.30 | -15.51 | 8.26 | -12.27 | .0 | 21.0 | 165.5 | 1.7 | 61 |
| 1983 | 12 | 30 | .0 | 2445698.5 | 6 30.363 | +10 11.46 | 6 32.245 | +10 9.94 | 7.26 | -12.52 | 8.22 | -12.31 | .0 | 21.0 | 155.9 | 1.5 | 128 |
| 1984 | 1 | 4 | .0 | 2445703.5 | 6 27.204 | +10 15.07 | 6 29.088 | +10 13.70 | 7.23 | -9.50 | 8.18 | -12.34 | .0 | 20.9 | 155.9 | 1.7 | 158 |
| 1984 | 1 | 9 | .0 | 2445708.5 | 6 24.046 | +10 19.40 | 6 25.932 | +10 18.18 | 7.20 | -6.52 | 8.15 | -12.37 | .0 | 20.9 | 162.8 | 2.0 | 103 |
| 1984 | 1 | 14 | .0 | 2445713.5 | 6 20.922 | +10 24.41 | 6 22.809 | +10 23.34 | 7.19 | -3.61 | 8.11 | -12.41 | .0 | 20.9 | 158.6 | 2.5 | 44 |
| 1984 | 1 | 19 | .0 | 2445718.5 | 6 17.863 | +10 30.07 | 6 19.752 | +10 29.14 | 7.18 | -.80 | 8.08 | -12.44 | .0 | 20.9 | 153.7 | 3.1 | 32 |
| 1984 | 1 | 24 | .0 | 2445723.5 | 6 14.898 | +10 36.32 | 6 16.789 | +10 35.53 | 7.18 | 1.88 | 8.04 | -12.47 | .0 | 20.[illegible] | 148.6 | 3.7 | 103 |
| 1984 | 1 | 29 | .0 | 2445728.5 | 6 12.056 | +10 43.11 | 6 13.947 | +10 42.46 | 7.19 | 4.42 | 8.01 | -12.51 | .0 | 20.8 | 143.3 | 4.2 | 163 |
| 1984 | 2 | 3 | .0 | 2445733.5 | 6 9.362 | +10 50.41 | 6 11.255 | +10 49.89 | 7.21 | 6.77 | 7.97 | -12.54 | .0 | 20.8 | 137.9 | 4.8 | 126 |
| 1984 | 2 | 8 | .0 | 2445738.5 | 6 6.841 | +10 58.14 | 6 8.734 | +10 57.75 | 7.23 | 8.91 | 7.93 | -12.58 | .0 | 20.8 | 132.5 | 5.3 | 68 |
| 1984 | 2 | 13 | .0 | 2445743.5 | 6 4.513 | +11 6.26 | 6 6.408 | +11 5.98 | 7.26 | 10.80 | 7.90 | -12.61 | .0 | 20.8 | 127.1 | 5.7 | 14 |
| 1984 | 2 | 18 | .0 | 2445748.5 | 6 2.394 | +11 14.68 | 6 4.290 | +11 14.51 | 7.30 | 12.46 | 7.86 | -12.65 | .0 | 20.8 | 121.7 | 6.1 | 72 |
| 1984 | 2 | 23 | .0 | 2445753.5 | 6 .495 | +11 23.37 | 6 2.392 | +11 23.29 | 7.33 | 13.88 | 7.82 | -12.68 | .0 | 20.8 | 116.4 | 6.5 | 142 |
| 1984 | 2 | 28 | .0 | 2445758.5 | 5 58.828 | +11 32.25 | 6 .25 | +11 32.25 | 7.37 | 15.05 | 7.79 | -12.72 | .0 | 20.8 | 111.1 | 6.8 | 149 |
| 1984 | 3 | 4 | .0 | 2445763.5 | 5 57.399 | +11 41.27 | 5 [illegible]6 | +11 41.34 | 7.42 | 15.95 | 7.75 | -12.75 | .0 | 20.7 | 105.9 | 7.1 | 92 |
| 1984 | 3 | 9 | .0 | 2445768.5 | 5 56.213 | +11 50.37 | 5 5[illegible] | +11 50.50 | 7.47 | 16.58 | 7.71 | -12.79 | .0 | 20.7 | 100.7 | 7.3 | 33 |
| 1984 | 3 | 14 | .0 | 2445773.5 | 5 55.270 | +11 59.49 | 5 51 | +11 59.67 | 7.52 | 16.95 | 7.68 | -12.83 | .0 | 20.7 | 95.6 | 7.4 | 38 |
| 1984 | 3 | 19 | .0 | 2445778.5 | 5 54.568 | +12 8.58 | 5 56.4[illegible] | +12 8.79 | 7.56 | 17.09 | 7.64 | -12.86 | .0 | 20.7 | 90.5 | 7.5 | 111 |
| 1984 | 3 | 24 | .0 | 2445783.5 | 5 54.102 | +12 17.58 | 5 56.002 | +12 17.82 | 7.61 | 16.99 | 7.60 | -12.90 | .0 | 20.7 | 85.5 | 7.5 | 167 |
| 1984 | 3 | 29 | .0 | 2445788.5 | 5 53.868 | +12 26.45 | 5 55.769 | +12 26.70 | 7.66 | 16.67 | 7.56 | -12.94 | .0 | 20.7 | 80.6 | 7.5 | 117 |
| 1984 | 4 | 3 | .0 | 2445793.5 | 5 53.860 | +12 35.14 | 5 55.761 | +12 35.40 | 7.71 | 16.12 | 7.53 | -12.98 | .0 | 20.7 | 75.8 | 7.4 | 59 |
| 1984 | 4 | 8 | .0 | 2445798.5 | 5 54.069 | +12 43.61 | 5 55.971 | +12 43.86 | 7.76 | 15.35 | 7.49 | -13.01 | .0 | 20.7 | 71.0 | 7.3 | 13 |
| 1984 | 4 | 13 | .0 | 2445803.5 | 5 54.486 | +12 51.82 | 5 56.388 | +12 52.05 | 7.80 | 14.39 | 7.45 | -13.05 | .0 | 20.7 | 66.3 | 7.1 | 75 |
| 1984 | 4 | 18 | .0 | 2445808.5 | 5 55.098 | +12 59.71 | 5 57.001 | +12 59.91 | 7.84 | 13.26 | 7.41 | -13.09 | .0 | 20.7 | 61.6 | 6.8 | 146 |
| 1984 | 4 | 23 | .0 | 2445813.5 | 5 55.896 | +13 7.27 | 5 57.800 | +13 7.43 | 7.87 | 11.98 | 7.38 | -13.13 | .0 | 20.7 | 57.0 | 6.6 | 144 |
| 1984 | 4 | 28 | .0 | 2445818.5 | 5 56.869 | +13 14.46 | 5 58.774 | +13 14.58 | 7.91 | 10.54 | 7.34 | -13.17 | .0 | 20.6 | 52.5 | 6.3 | 86 |
| 1984 | 5 | 3 | .0 | 2445823.5 | 5 58.006 | +13 21.25 | 5 59.912 | +13 21.32 | 7.94 | 8.95 | 7.30 | -13.21 | .0 | 20.6 | 48.0 | 5.9 | 27 |
| 1984 | 5 | 8 | .0 | 2445828.5 | 5 59.296 | +13 27.61 | 6 1.203 | +13 27.61 | 7.96 | 7.23 | 7.26 | -13.25 | .0 | 20.6 | 43.6 | 5.5 | 42 |
| 1984 | 5 | 13 | .0 | 2445833.5 | 6 .724 | +13 33.50 | 6 2.631 | +13 33.44 | 7.98 | 5.40 | 7.22 | -13.29 | .0 | 20.6 | 39.3 | 5.1 | 112 |
| 1984 | 5 | 18 | .0 | 2445838.5 | 6 2.278 | +13 38.92 | 6 4.187 | +13 38.79 | 7.99 | 3.50 | 7.19 | -13.33 | .0 | 20.6 | 35.0 | 4.6 | 167 |
| 1984 | 5 | 23 | .0 | 2445843.5 | 6 3.948 | +13 43.85 | 6 5.858 | +13 43.64 | 8.00 | 1.50 | 7.15 | -13.38 | .0 | 20.6 | 30.8 | 4.2 | 115 |
| 1984 | 5 | 28 | .0 | 2445848.5 | 6 5.722 | +13 48.26 | 6 7.633 | +13 47.97 | 8.00 | -.58 | 7.11 | -13.42 | .0 | 20.5 | 26.7 | 3.7 | 57 |
| 1984 | 6 | 2 | .0 | 2445853.5 | 6 7.588 | +13 52.15 | 6 9.500 | +13 51.76 | 7.99 | -2.73 | 7.07 | -13.46 | .0 | 20.5 | 22.7 | 3.2 | 14 |
| 1984 | 6 | 7 | .0 | 2445858.5 | 6 9.533 | +13 55.49 | 6 11.446 | +13 55.01 | 7.98 | -4.92 | 7.03 | -13.50 | .0 | 20.5 | 18.9 | 2.7 | 78 |
| 1984 | 6 | 12 | .0 | 2445863.5 | 6 11.544 | +13 58.27 | 6 13.458 | +13 57.70 | 7.97 | -7.14 | 6.99 | -13.55 | .0 | 20.5 | 15.3 | 2.2 | 146 |
| 1984 | 6 | 17 | .0 | 2445868.5 | 6 13.609 | +14 .50 | 6 15.525 | +13 59.83 | 7.94 | -9.38 | 6.95 | -13.59 | .0 | 20.4 | 12.2 | 1.8 | 145 |
| 1984 | 6 | 22 | .0 | 2445873.5 | 6 15.718 | +14 2.17 | 6 17.634 | +14 1.41 | 7.91 | -11.65 | 6.91 | -13.64 | .0 | 20.4 | 10.0 | 1.5 | 87 |
| 1984 | 6 | 27 | .0 | 2445878.5 | 6 17.858 | +14 3.28 | 6 19.776 | +14 2.41 | 7.87 | -13.93 | 6.87 | -13.68 | .0 | 20.4 | 9.3 | 1.4 | 28 |
| 1984 | 7 | 2 | .0 | 2445883.5 | 6 20.018 | +14 3.81 | 6 21.937 | +14 2.84 | 7.83 | -16.21 | 6.83 | -13.73 | .0 | 20.3 | 10.5 | 1.6 | 44 |
| 1984 | 7 | 7 | .0 | 2445888.5 | 6 22.184 | +14 3.78 | 6 24.103 | +14 2.71 | 7.78 | -18.47 | 6.79 | -13.77 | .0 | 20.3 | 13.0 | 1.9 | 113 |
| 1984 | 7 | 12 | .0 | 2445893.5 | 6 24.342 | +14 3.20 | 6 26.263 | +14 2.02 | 7.72 | -20.69 | 6.75 | -13.82 | .0 | 20.2 | 16.2 | 2.4 | 168 |
| 1984 | 7 | 17 | .0 | 2445898.5 | 6 26.481 | +14 2.06 | 6 28.403 | +14 .79 | 7.66 | -22.87 | 6.71 | -13.86 | .0 | 20.2 | 19.8 | 2.9 | 117 |
| 1984 | 7 | 22 | .0 | 2445903.5 | 6 28.589 | +14 .39 | 6 30.512 | +13 59.02 | 7.59 | -25.02 | 6.67 | -13.91 | .0 | 20.1 | 23.7 | 3.5 | 59 |
| 1984 | 7 | 27 | .0 | 2445908.5 | 6 30.653 | +13 58.19 | 6 32.577 | +13 56.72 | 7.52 | -27.13 | 6.63 | -13.96 | .0 | 20.1 | 27.6 | 4.1 | 13 |
| 1984 | 8 | 1 | .0 | 2445913.5 | 6 32.658 | +13 55.48 | 6 34.583 | +13 53.92 | 7.44 | -29.17 | 6.59 | -14.01 | .0 | 20.0 | 31.7 | 4.6 | 79 |
| 1984 | 8 | 6 | .0 | 2445918.5 | 6 34.589 | +13 52.28 | 6 36.514 | +13 50.63 | 7.35 | -31.12 | 6.55 | -14.06 | .0 | 20.0 | 35.8 | 5.2 | 146 |
| 1984 | 8 | 11 | .0 | 2445923.5 | 6 36.431 | +13 48.61 | 6 38.358 | +13 46.87 | 7.26 | -32.97 | 6.51 | -14.11 | .0 | 19.9 | 40.0 | 5.7 | 145 |
| 1984 | 8 | 16 | .0 | 2445928.5 | 6 38.172 | +13 44.51 | 6 40.099 | +13 42.69 | 7.16 | -34.74 | 6.47 | -14.16 | .0 | 19.9 | 44.2 | 6.3 | 88 |
| 1984 | 8 | 21 | .0 | 2445933.5 | 6 39.796 | +13 39.99 | 6 41.723 | +13 38.09 | 7.06 | -36.41 | 6.43 | -14.21 | .0 | 19.8 | 48.5 | 6.8 | 33 |
| 1984 | 8 | 26 | .0 | 2445938.5 | 6 41.285 | +13 35.09 | 6 43.214 | +13 33.12 | 6.95 | -37.97 | 6.39 | -14.26 | .0 | 19.8 | 52.9 | 7.2 | 42 |
| 1984 | 8 | 31 | .0 | 2445943.5 | 6 42.622 | +13 29.84 | 6 44.552 | +13 27.81 | 6.84 | -39.39 | 6.35 | -14.31 | .0 | 19.7 | 57.3 | 7.7 | 114 |
| 1984 | 9 | 5 | .0 | 2445948.5 | 6 43.790 | +13 24.28 | 6 45.720 | +13 22.20 | 6.72 | -40.65 | 6.31 | -14.36 | .0 | 19.6 | 61.8 | 8.1 | 166 |
| 1984 | 9 | 10 | .0 | 2445953.5 | 6 44.770 | +13 18.47 | 6 46.701 | +13 16.34 | 6.60 | -41.77 | 6.27 | -14.41 | .0 | 19.6 | 66.3 | 8.5 | 116 |
| 1984 | 9 | 15 | .0 | 2445958.5 | 6 45.545 | +13 12.44 | 6 47.476 | +13 10.27 | 6.48 | -42.72 | 6.22 | -14.47 | .0 | 19.5 | 70.9 | 8.8 | 58 |
| 1984 | 9 | 20 | .0 | 2445963.5 | 6 46.096 | +13 6.25 | 6 48.029 | +13 4.05 | 6.35 | -43.51 | 6.18 | -14.52 | .0 | 19.4 | 75.6 | 9.1 | 14 |
| 1984 | 9 | 25 | .0 | 2445968.5 | 6 46.401 | +12 59.93 | 6 48.335 | +12 57.72 | 6.23 | -44.11 | 6.14 | -14.58 | .0 | 19.4 | 80.3 | 9.3 | 78 |
| 1984 | 9 | 30 | .0 | 2445973.5 | 6 46.440 | +12 53.56 | 6 48.375 | +12 51.34 | 6.10 | -44.49 | 6.10 | -14.63 | .0 | 19.3 | 85.1 | 9.4 | 149 |

## Table B-3. Ephemeris (with Perturbations) for Comet Halley at Daily Intervals from October 5, 1984 to March 23, 1987.

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1984 | 10 | 5 | .0 | 2445978.5 | 6 46.193 | +12 47.20 | 6 48.129 | +12 44.99 | 5.97 | -44.64 | 6.05 | -14.69 | .0 | 19.2 | 90.0 | 9.5 | 142 |
| 1984 | 10 | 6 | .0 | 2445979.5 | 6 46.107 | +12 45.93 | 6 48.044 | +12 43.73 | 5.95 | -44.65 | 6.05 | -14.70 | .0 | 19.2 | 91.0 | 9.5 | 130 |
| 1984 | 10 | 7 | .0 | 2445980.5 | 6 46.009 | +12 44.67 | 6 47.946 | +12 42.47 | 5.92 | -44.64 | 6.04 | -14.71 | .0 | 19.2 | 92.0 | 9.5 | 119 |
| 1984 | 10 | 8 | .0 | 2445981.5 | 6 45.899 | +12 43.41 | 6 47.836 | +12 41.22 | 5.89 | -44.63 | 6.03 | -14.72 | .0 | 19.2 | 93.0 | 9.5 | 107 |
| 1984 | 10 | 9 | .0 | 2445982.5 | 6 45.776 | +12 42.16 | 6 47.713 | +12 39.97 | 5.87 | -44.61 | 6.02 | -14.73 | .0 | 19.1 | 94.0 | 9.5 | 96 |
| 1984 | 10 | 10 | .0 | 2445983.5 | 6 45.640 | +12 40.91 | 6 47.578 | +12 38.73 | 5.84 | -44.58 | 6.01 | -14.74 | .0 | 19.1 | 95.0 | 9.5 | 84 |
| 1984 | 10 | 11 | .0 | 2445984.5 | 6 45.492 | +12 39.66 | 6 47.429 | +12 37.49 | 5.82 | -44.54 | 6.00 | -14.76 | .0 | 19.1 | 96.0 | 9.5 | 73 |
| 1984 | 10 | 12 | .0 | 2445985.5 | 6 45.330 | +12 38.43 | 6 47.268 | +12 36.26 | 5.79 | -44.49 | 6.00 | -14.77 | .0 | 19.1 | 97.0 | 9.5 | 61 |
| 1984 | 10 | 13 | .0 | 2445986.5 | 6 45.155 | +12 37.19 | 6 47.093 | +12 35.03 | 5.77 | -44.43 | 5.99 | -14.78 | .0 | 19.1 | 98.0 | 9.5 | 50 |
| 1984 | 10 | 14 | .0 | 2445987.5 | 6 44.966 | +12 35.97 | 6 46.905 | +12 33.82 | 5.74 | -44.36 | 5.98 | -14.79 | .0 | 19.1 | 99.0 | 9.5 | 38 |
| 1984 | 10 | 15 | .0 | 2445988.5 | 6 44.764 | +12 34.75 | 6 46.703 | +12 32.61 | 5.71 | -44.28 | 5.97 | -14.80 | .0 | 19.0 | 100.1 | 9.5 | 27 |
| 1984 | 10 | 16 | .0 | 2445989.5 | 6 44.548 | +12 33.54 | 6 46.488 | +12 31.40 | 5.69 | -44.20 | 5.96 | -14.81 | .0 | 19.0 | 101.1 | 9.4 | 17 |
| 1984 | 10 | 17 | .0 | 2445990.5 | 6 44.319 | +12 32.34 | 6 46.258 | +12 30.21 | 5.66 | -44.10 | 5.95 | -14.83 | .0 | 19.0 | 102.1 | 9.4 | 14 |
| 1984 | 10 | 18 | .0 | 2445991.5 | 6 44.075 | +12 31.14 | 6 46.015 | +12 29.03 | 5.64 | -43.99 | 5.94 | -14.84 | .0 | 19.0 | 103.1 | 9.4 | 20 |
| 1984 | 10 | 19 | .0 | 2445992.5 | 6 43.817 | +12 29.96 | 6 45.758 | +12 27.86 | 5.61 | -43.87 | 5.94 | -14.85 | .0 | 19.0 | 104.2 | 9.4 | 31 |
| 1984 | 10 | 20 | .0 | 2445993.5 | 6 43.545 | +12 28.79 | 6 45.486 | +12 26.70 | 5.59 | -43.74 | 5.93 | -14.86 | .0 | 19.0 | 105.2 | 9.3 | 44 |
| 1984 | 10 | 21 | .0 | 2445994.5 | 6 43.258 | +12 27.62 | 6 45.199 | +12 25.55 | 5.56 | -43.60 | 5.92 | -14.87 | .0 | 18.9 | 106.3 | 9.3 | 58 |
| 1984 | 10 | 22 | .0 | 2445995.5 | 6 42.957 | +12 26.47 | 6 44.898 | +12 24.41 | 5.54 | -43.45 | 5.91 | -14.88 | .0 | 18.9 | 107.3 | 9.3 | 73 |
| 1984 | 10 | 23 | .0 | 2445996.5 | 6 42.641 | +12 25.33 | 6 44.582 | +12 23.29 | 5.51 | -43.29 | 5.90 | -14.90 | .0 | 18.9 | 108.4 | 9.2 | 87 |
| 1984 | 10 | 24 | .0 | 2445997.5 | 6 42.310 | +12 24.20 | 6 44.252 | +12 22.17 | 5.49 | -43.12 | 5.89 | -14.91 | .0 | 18.9 | 109.4 | 9.2 | 102 |
| 1984 | 10 | 25 | .0 | 2445998.5 | 6 41.964 | +12 23.09 | 6 43.906 | +12 21.08 | 5.46 | -42.93 | 5.88 | -14.92 | .0 | 18.9 | 110.5 | 9.1 | 117 |
| 1984 | 10 | 26 | .0 | 2445999.5 | 6 41.603 | +12 21.99 | 6 43.545 | +12 19.99 | 5.44 | -42.74 | 5.88 | -14.93 | .0 | 18.9 | 111.5 | 9.1 | 131 |
| 1984 | 10 | 27 | .0 | 2446000.5 | 6 41.227 | +12 20.90 | 6 43.170 | +12 18.92 | 5.41 | -42.53 | 5.87 | -14.94 | .0 | 18.9 | 112.6 | 9.0 | 144 |
| 1984 | 10 | 28 | .0 | 2446001.5 | 6 40.835 | +12 19.83 | 6 42.779 | +12 17.86 | 5.39 | -42.31 | 5.86 | -14.96 | .0 | 18.8 | 113.7 | 8.9 | 156 |
| 1984 | 10 | 29 | .0 | 2446002.5 | 6 40.429 | +12 18.77 | 6 42.372 | +12 16.83 | 5.36 | -42.08 | 5.85 | -14.97 | .0 | 18.8 | 114.7 | 8.9 | 164 |
| 1984 | 10 | 30 | .0 | 2446003.5 | 6 40.006 | +12 17.73 | 6 41.950 | +12 15.81 | 5.34 | -41.84 | 5.84 | -14.98 | .0 | 18.8 | 115.8 | 8.8 | 163 |
| 1984 | 10 | 31 | .0 | 2446004.5 | 6 39.569 | +12 16.70 | 6 41.513 | +12 14.80 | 5.32 | -41.59 | 5.83 | -14.99 | .0 | 18.8 | 116.9 | 8.7 | 154 |
| 1984 | 11 | 1 | .0 | 2446005.5 | 6 39.115 | +12 15.70 | 6 41.060 | +12 13.82 | 5.29 | -41.33 | 5.82 | -15.00 | .0 | 18.8 | 118.0 | 8.7 | 143 |
| 1984 | 11 | 2 | .0 | 2446006.5 | 6 38.647 | +12 14.71 | 6 40.592 | +12 12.85 | 5.27 | -41.05 | 5.81 | -15.02 | .0 | 18.8 | 119.1 | 8.6 | 131 |
| 1984 | 11 | 3 | .0 | 2446007.5 | 6 38.162 | +12 13.73 | 6 40.108 | +12 11.90 | 5.24 | -40.77 | 5.81 | -15.03 | .0 | 18.7 | 120.2 | 8.5 | 120 |
| 1984 | 11 | 4 | .0 | 2446008.5 | 6 37.662 | +12 12.78 | 6 39.608 | +12 10.97 | 5.22 | -40.48 | 5.80 | -15.04 | .0 | 18.7 | 121.3 | 8.4 | 108 |
| 1984 | 11 | 5 | .0 | 2446009.5 | 6 37.146 | +12 11.85 | 6 39.092 | +12 10.06 | 5.20 | -40.17 | 5.79 | -15.05 | .0 | 18.7 | 122.4 | 8.3 | 97 |
| 1984 | 11 | 6 | .0 | 2446010.5 | 6 36.614 | +12 10.93 | 6 38.561 | +12 9.17 | 5.17 | -39.86 | 5.78 | -15.06 | .0 | 18.7 | 123.5 | 8.2 | 85 |
| 1984 | 11 | 7 | .0 | 2446011.5 | 6 36.067 | +12 10.03 | 6 38.014 | +12 8.30 | 5.15 | -39.53 | 5.77 | -15.08 | .0 | 18.7 | 124.6 | 8.1 | 74 |
| 1984 | 11 | 8 | .0 | 2446012.5 | 6 35.504 | +12 9.16 | 6 37.451 | +12 7.45 | 5.13 | -39.20 | 5.76 | -15.09 | .0 | 18.7 | 125.7 | 8.0 | 62 |
| 1984 | 11 | 9 | .0 | 2446013.5 | 6 34.925 | +12 8.30 | 6 36.872 | +12 6.62 | 5.11 | -38.85 | 5.75 | -15.10 | .0 | 18.6 | 126.8 | 7.9 | 50 |
| 1984 | 11 | 10 | .0 | 2446014.5 | 6 34.330 | +12 7.47 | 6 36.277 | +12 5.82 | 5.08 | -38.49 | 5.75 | -15.11 | .0 | 18.6 | 127.9 | 7.8 | 39 |
| 1984 | 11 | 11 | .0 | 2446015.5 | 6 33.719 | +12 6.66 | 6 35.667 | +12 5.03 | 5.06 | -38.12 | 5.74 | -15.13 | .0 | 18.6 | 129.0 | 7.7 | 27 |
| 1984 | 11 | 12 | .0 | 2446016.5 | 6 33.092 | +12 5.87 | 6 35.041 | +12 4.27 | 5.04 | -37.75 | 5.73 | -15.14 | .0 | 18.6 | 130.1 | 7.6 | 18 |
| 1984 | 11 | 13 | .0 | 2446017.5 | 6 32.450 | +12 5.10 | 6 34.399 | +12 3.54 | 5.02 | -37.36 | 5.72 | -15.15 | .0 | 18.6 | 131.3 | 7.5 | 14 |
| 1984 | 11 | 14 | .0 | 2446018.5 | 6 31.792 | +12 4.36 | 6 33.741 | +12 2.83 | 5.00 | -36.96 | 5.71 | -15.16 | .0 | 18.6 | 132.4 | 7.4 | 20 |
| 1984 | 11 | 15 | .0 | 2446019.5 | 6 31.117 | +12 3.64 | 6 33.068 | +12 2.14 | 4.98 | -36.55 | 5.70 | -15.18 | .0 | 18.5 | 133.5 | 7.2 | 31 |
| 1984 | 11 | 16 | .0 | 2446020.5 | 6 30.428 | +12 2.94 | 6 32.378 | +12 1.48 | 4.95 | -36.13 | 5.69 | -15.19 | .0 | 18.5 | 134.6 | 7.1 | 44 |
| 1984 | 11 | 17 | .0 | 2446021.5 | 6 29.722 | +12 2.27 | 6 31.673 | +12 .84 | 4.93 | -35.69 | 5.68 | -15.20 | .0 | 18.5 | 135.8 | 7.0 | 57 |
| 1984 | 11 | 18 | .0 | 2446022.5 | 6 29.001 | +12 1.62 | 6 30.953 | +12 .23 | 4.91 | -35.25 | 5.68 | -15.21 | .0 | 18.5 | 136.9 | 6.8 | 71 |
| 1984 | 11 | 19 | .0 | 2446023.5 | 6 28.264 | +12 1.00 | 6 30.216 | +11 59.64 | 4.89 | -34.80 | 5.67 | -15.23 | .0 | 18.5 | 138.0 | 6.7 | 85 |
| 1984 | 11 | 20 | .0 | 2446024.5 | 6 27.512 | +12 .40 | 6 29.464 | +11 59.08 | 4.87 | -34.33 | 5.66 | -15.24 | .0 | 18.5 | 139.2 | 6.6 | 100 |
| 1984 | 11 | 21 | .0 | 2446025.5 | 6 26.745 | +11 59.83 | 6 28.697 | +11 58.54 | 4.85 | -33.85 | 5.65 | -15.25 | .0 | 18.4 | 140.3 | 6.4 | 114 |
| 1984 | 11 | 22 | .0 | 2446026.5 | 6 25.962 | +11 59.29 | 6 27.915 | +11 58.04 | 4.83 | -33.37 | 5.64 | -15.26 | .0 | 18.4 | 141.5 | 6.3 | 128 |
| 1984 | 11 | 23 | .0 | 2446027.5 | 6 25.165 | +11 58.77 | 6 27.118 | +11 57.56 | 4.81 | -32.87 | 5.63 | -15.28 | .0 | 18.4 | 142.6 | 6.1 | 142 |
| 1984 | 11 | 24 | .0 | 2446028.5 | 6 24.352 | +11 58.28 | 6 26.306 | +11 57.11 | 4.80 | -32.36 | 5.62 | -15.29 | .0 | 18.4 | 143.8 | 6.0 | 155 |
| 1984 | 11 | 25 | .0 | 2446029.5 | 6 23.525 | +11 57.82 | 6 25.480 | +11 56.69 | 4.78 | -31.85 | 5.61 | -15.30 | .0 | 18.4 | 144.9 | 5.8 | 164 |
| 1984 | 11 | 26 | .0 | 2446030.5 | 6 22.684 | +11 57.39 | 6 24.639 | +11 56.29 | 4.76 | -31.32 | 5.60 | -15.32 | .0 | 18.4 | 146.0 | 5.6 | 163 |
| 1984 | 11 | 27 | .0 | 2446031.5 | 6 21.828 | +11 56.98 | 6 23.783 | +11 55.93 | 4.74 | -30.78 | 5.60 | -15.33 | .0 | 18.4 | 147.2 | 5.5 | 154 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1984 | 11 | 28 | .0 | 2446032.5 | 6 20.958 | +11 56.61 | 6 22.914 | +11 55.60 | 4.72 | -30.24 | 5.59 | -15.34 | .0 | 18.3 | 148.3 | 5.3 | 142 |
| 1984 | 11 | 29 | .0 | 2446033.5 | 6 20.075 | +11 56.26 | 6 22.031 | +11 55.30 | 4.71 | -29.69 | 5.58 | -15.36 | .0 | 18.3 | 149.4 | 5.2 | 131 |
| 1984 | 11 | 30 | .0 | 2446034.5 | 6 19.178 | +11 55.94 | 6 21.135 | +11 55.02 | 4.69 | -29.13 | 5.57 | -15.37 | .0 | 18.3 | 150.6 | 5.0 | 119 |
| 1984 | 12 | 1 | .0 | 2446035.5 | 6 18.268 | +11 55.66 | 6 20.225 | +11 54.78 | 4.67 | -28.56 | 5.56 | -15.38 | .0 | 18.3 | 151.7 | 4.8 | 107 |
| 1984 | 12 | 2 | .0 | 2446036.5 | 6 17.345 | +11 55.40 | 6 19.302 | +11 54.57 | 4.66 | -27.98 | 5.55 | -15.39 | .0 | 18.3 | 152.8 | 4.7 | 96 |
| 1984 | 12 | 3 | .0 | 2446037.5 | 6 16.409 | +11 55.17 | 6 18.366 | +11 54.39 | 4.64 | -27.40 | 5.54 | -15.41 | .0 | 18.3 | 153.9 | 4.5 | 84 |
| 1984 | 12 | 4 | .0 | 2446038.5 | 6 15.461 | +11 54.97 | 6 17.418 | +11 54.24 | 4.62 | -26.81 | 5.53 | -15.42 | .0 | 18.3 | 155.0 | 4.3 | 72 |
| 1984 | 12 | 5 | .0 | 2446039.5 | 6 14.500 | +11 54.81 | 6 16.459 | +11 54.12 | 4.61 | -26.21 | 5.52 | -15.43 | .0 | 18.2 | 156.1 | 4.1 | 60 |
| 1984 | 12 | 6 | .0 | 2446040.5 | 6 13.529 | +11 54.67 | 6 15.487 | +11 54.03 | 4.59 | -25.61 | 5.52 | -15.45 | .0 | 18.2 | 157.2 | 4.0 | 49 |
| 1984 | 12 | 7 | .0 | 2446041.5 | 6 12.545 | +11 54.57 | 6 14.504 | +11 53.97 | 4.58 | -25.00 | 5.51 | -15.46 | .0 | 18.2 | 158.3 | 3.8 | 37 |
| 1984 | 12 | 8 | .0 | 2446042.5 | 6 11.551 | +11 54.49 | 6 13.510 | +11 53.95 | 4.57 | -24.38 | 5.50 | -15.47 | .0 | 18.2 | 159.3 | 3.6 | 26 |
| 1984 | 12 | 9 | .0 | 2446043.5 | 6 10.546 | +11 54.45 | 6 12.506 | +11 53.96 | 4.55 | -23.76 | 5.49 | -15.49 | .0 | 18.2 | 160.4 | 3.5 | 17 |
| 1984 | 12 | 10 | .0 | 2446044.5 | 6 9.531 | +11 54.44 | 6 11.491 | +11 53.99 | 4.54 | -23.13 | 5.48 | -15.50 | .0 | 18.2 | 161.4 | 3.3 | 15 |
| 1984 | 12 | 11 | .0 | 2446045.5 | 6 8.505 | +11 54.46 | 6 10.466 | +11 54.06 | 4.52 | -22.50 | 5.47 | -15.51 | .0 | 18.2 | 162.3 | 3.1 | 22 |
| 1984 | 12 | 12 | .0 | 2446046.5 | 6 7.470 | +11 54.51 | 6 9.432 | +11 54.17 | 4.51 | -21.86 | 5.46 | -15.53 | .0 | 18.1 | 163.3 | 3.0 | 34 |
| 1984 | 12 | 13 | .0 | 2446047.5 | 6 6.426 | +11 54.59 | 6 8.388 | +11 54.30 | 4.50 | -21.22 | 5.45 | -15.54 | .0 | 18.1 | 164.2 | 2.8 | 47 |
| 1984 | 12 | 14 | .0 | 2446048.5 | 6 5.374 | +11 54.70 | 6 7.336 | +11 54.47 | 4.49 | -20.57 | 5.44 | -15.55 | .0 | 18.1 | 165.0 | 2.7 | 60 |
| 1984 | 12 | 15 | .0 | 2446049.5 | 6 4.313 | +11 54.85 | 6 6.275 | +11 54.67 | 4.48 | -19.92 | 5.44 | -15.57 | .0 | 18.1 | 165.8 | 2.5 | 74 |
| 1984 | 12 | 16 | .0 | 2446050.5 | 6 3.244 | +11 55.03 | 6 5.206 | +11 54.90 | 4.46 | -19.26 | 5.43 | -15.58 | .0 | 18.1 | 166.5 | 2.4 | 88 |
| 1984 | 12 | 17 | .0 | 2446051.5 | 6 2.167 | +11 55.24 | 6 4.130 | +11 55.16 | 4.45 | -18.60 | 5.42 | -15.60 | .0 | 18.1 | 167.1 | 2.3 | 102 |
| 1984 | 12 | 18 | .0 | 2446052.5 | 6 1.084 | +11 55.48 | 6 3.047 | +11 55.46 | 4.44 | -17.93 | 5.41 | -15.61 | .0 | 18.1 | 167.6 | 2.2 | 116 |
| 1984 | 12 | 19 | .0 | 2446053.5 | 5 59.994 | +11 55.76 | 6 1.958 | +11 55.79 | 4.43 | -17.27 | 5.40 | -15.62 | .0 | 18.1 | 168.1 | 2.2 | 130 |
| 1984 | 12 | 20 | .0 | 2446054.5 | 5 58.899 | +11 56.06 | 6 .862 | +11 56.15 | 4.42 | -16.60 | 5.39 | -15.64 | .0 | 18.0 | 168.3 | 2.1 | 143 |
| 1984 | 12 | 21 | .0 | 2446055.5 | 5 57.798 | +11 56.40 | 5 59.762 | +11 56.54 | 4.41 | -15.92 | 5.38 | -15.65 | .0 | 18.0 | 168.5 | 2.1 | 156 |
| 1984 | 12 | 22 | .0 | 2446056.5 | 5 56.692 | +11 56.78 | 5 58.656 | +11 56.97 | 4.40 | -15.25 | 5.37 | -15.67 | .0 | 18.0 | 168.5 | 2.1 | 164 |
| 1984 | 12 | 23 | .0 | 2446057.5 | 5 55.582 | +11 57.18 | 5 57.546 | +11 57.43 | 4.40 | -14.57 | 5.36 | -15.68 | .0 | 18.0 | 168.4 | 2.1 | 163 |
| 1984 | 12 | 24 | .0 | 2446058.5 | 5 54.468 | +11 57.62 | 5 56.433 | +11 57.93 | 4.39 | -13.90 | 5.35 | -15.69 | .0 | 18.0 | 168.1 | 2.2 | 153 |
| 1984 | 12 | 25 | .0 | 2446059.5 | 5 53.350 | +11 58.09 | 5 55.316 | +11 58.46 | 4.38 | -13.22 | 5.34 | -15.71 | .0 | 18.0 | 167.7 | 2.3 | 141 |
| 1984 | 12 | 26 | .0 | 2446060.5 | 5 52.230 | +11 58.60 | 5 54.196 | +11 59.02 | 4.37 | -12.55 | 5.34 | -15.72 | .0 | 18.0 | 167.2 | 2.3 | 129 |
| 1984 | 12 | 27 | .0 | 2446061.5 | 5 51.108 | +11 59.14 | 5 53.075 | +11 59.61 | 4.37 | -11.88 | 5.33 | -15.74 | .0 | 18.0 | 166.5 | 2.5 | 117 |
| 1984 | 12 | 28 | .0 | 2446062.5 | 5 49.985 | +11 59.71 | 5 51.951 | +12 .24 | 4.36 | -11.20 | 5.32 | -15.75 | .0 | 18.0 | 165.8 | 2.6 | 104 |
| 1984 | 12 | 29 | .0 | 2446063.5 | 5 48.860 | +12 .31 | 5 50.827 | +12 .90 | 4.35 | -10.54 | 5.31 | -15.76 | .0 | 17.9 | 165.0 | 2.7 | 93 |
| 1984 | 12 | 30 | .0 | 2446064.5 | 5 47.735 | +12 .95 | 5 49.702 | +12 1.59 | 4.35 | -9.87 | 5.30 | -15.78 | .0 | 17.9 | 164.2 | 2.9 | 81 |
| 1984 | 12 | 31 | .0 | 2446065.5 | 5 46.611 | +12 1.61 | 5 48.577 | +12 2.31 | 4.34 | -9.21 | 5.29 | -15.79 | .0 | 17.9 | 163.3 | 3.1 | 69 |
| 1985 | 1 | 1 | .0 | 2446066.5 | 5 45.486 | +12 2.31 | 5 47.453 | +12 3.07 | 4.34 | -8.55 | 5.28 | -15.81 | .0 | 17.9 | 162.3 | 3.2 | 57 |
| 1985 | 1 | 2 | .0 | 2446067.5 | 5 44.363 | +12 3.05 | 5 46.330 | +12 3.86 | 4.33 | -7.89 | 5.27 | -15.82 | .0 | 17.9 | 161.3 | 3.4 | 46 |
| 1985 | 1 | 3 | .0 | 2446068.5 | 5 43.242 | +12 3.81 | 5 45.209 | +12 4.68 | 4.33 | -7.24 | 5.26 | -15.84 | .0 | 17.9 | 160.3 | 3.6 | 34 |
| 1985 | 1 | 4 | .0 | 2446069.5 | 5 42.123 | +12 4.61 | 5 44.091 | +12 5.53 | 4.32 | -6.59 | 5.25 | -15.85 | .0 | 17.9 | 159.2 | 3.8 | 23 |
| 1985 | 1 | 5 | .0 | 2446070.5 | 5 41.007 | +12 5.44 | 5 42.975 | +12 6.42 | 4.32 | -5.95 | 5.24 | -15.86 | .0 | 17.9 | 158.1 | 4.0 | 15 |
| 1985 | 1 | 6 | .0 | 2446071.5 | 5 39.894 | +12 6.30 | 5 41.862 | +12 7.33 | 4.32 | -5.31 | 5.24 | -15.88 | .0 | 17.9 | 157.0 | 4.2 | 15 |
| 1985 | 1 | 7 | .0 | 2446072.5 | 5 38.785 | +12 7.19 | 5 40.754 | +12 8.28 | 4.31 | -4.68 | 5.23 | -15.89 | .0 | 17.8 | 155.9 | 4.4 | 24 |
| 1985 | 1 | 8 | .0 | 2446073.5 | 5 37.681 | +12 8.12 | 5 39.649 | +12 9.26 | 4.31 | -4.05 | 5.22 | -15.91 | .0 | 17.8 | 154.8 | 4.6 | 37 |
| 1985 | 1 | 9 | .0 | 2446074.5 | 5 36.581 | +12 9.07 | 5 38.550 | +12 10.27 | 4.31 | -3.43 | 5.21 | -15.92 | .0 | 17.8 | 153.6 | 4.8 | 50 |
| 1985 | 1 | 10 | .0 | 2446075.5 | 5 35.487 | +12 10.06 | 5 37.456 | +12 11.31 | 4.31 | -2.81 | 5.20 | -15.94 | .0 | 17.8 | 152.5 | 5.0 | 64 |
| 1985 | 1 | 11 | .0 | 2446076.5 | 5 34.399 | +12 11.08 | 5 36.368 | +12 12.39 | 4.31 | -2.21 | 5.19 | -15.95 | .0 | 17.8 | 151.3 | 5.2 | 78 |
| 1985 | 1 | 12 | .0 | 2446077.5 | 5 33.317 | +12 12.13 | 5 35.286 | +12 13.49 | 4.30 | -1.60 | 5.18 | -15.97 | .0 | 17.8 | 150.2 | 5.4 | 92 |
| 1985 | 1 | 13 | .0 | 2446078.5 | 5 32.242 | +12 13.21 | 5 34.211 | +12 14.63 | 4.30 | -1.01 | 5.17 | -15.98 | .0 | 17.8 | 149.0 | 5.6 | 106 |
| 1985 | 1 | 14 | .0 | 2446079.5 | 5 31.174 | +12 14.32 | 5 33.143 | +12 15.79 | 4.30 | -.42 | 5.16 | -16.00 | .0 | 17.8 | 147.8 | 5.8 | 120 |
| 1985 | 1 | 15 | .0 | 2446080.5 | 5 30.114 | +12 15.46 | 5 32.083 | +12 16.98 | 4.30 | .16 | 5.15 | -16.01 | .0 | 17.8 | 146.6 | 6.0 | 133 |
| 1985 | 1 | 16 | .0 | 2446081.5 | 5 29.063 | +12 16.63 | 5 31.032 | +12 18.21 | 4.30 | .73 | 5.14 | -16.03 | .0 | 17.8 | 145.4 | 6.2 | 147 |
| 1985 | 1 | 17 | .0 | 2446082.5 | 5 28.020 | +12 17.84 | 5 29.990 | +12 19.47 | 4.30 | 1.30 | 5.13 | -16.04 | .0 | 17.8 | 144.2 | 6.4 | 159 |
| 1985 | 1 | 18 | .0 | 2446083.5 | 5 26.987 | +12 19.07 | 5 28.957 | +12 20.75 | 4.30 | 1.85 | 5.12 | -16.06 | .0 | 17.8 | 143.0 | 6.6 | 166 |
| 1985 | 1 | 19 | .0 | 2446084.5 | 5 25.964 | +12 20.34 | 5 27.933 | +12 22.07 | 4.31 | 2.40 | 5.12 | -16.07 | .0 | 17.8 | 141.8 | 6.8 | 162 |
| 1985 | 1 | 20 | .0 | 2446085.5 | 5 24.951 | +12 21.63 | 5 26.920 | +12 23.41 | 4.31 | 2.94 | 5.11 | -16.09 | .0 | 17.8 | 140.6 | 7.0 | 151 |
| 1985 | 1 | 21 | .0 | 2446086.5 | 5 23.948 | +12 22.96 | 5 25.918 | +12 24.79 | 4.31 | 3.46 | 5.10 | -16.10 | .0 | 17.7 | 139.4 | 7.2 | 139 |
| 1985 | 1 | 22 | .0 | 2446087.5 | 5 22.957 | +12 24.32 | 5 24.927 | +12 26.20 | 4.31 | 3.98 | 5.09 | -16.12 | .0 | 17.7 | 138.2 | 7.4 | 127 |
| 1985 | 1 | 23 | .0 | 2446088.5 | 5 21.977 | +12 25.70 | 5 23.947 | +12 27.63 | 4.31 | 4.48 | 5.08 | -16.13 | .0 | 17.7 | 137.0 | 7.6 | 114 |

**Table B-3 (contd)**

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 1 | 24 | .0 | 2446089.5 | 5 21.009 | +12 27.12 | 5 22.979 | +12 29.10 | 4.32 | 4.97 | 5.07 | -16.15 | .0 | 17.7 | 135.8 | 7.8 | 102 |
| 1985 | 1 | 25 | .0 | 2446090.5 | 5 20.053 | +12 28.56 | 5 22.023 | +12 30.59 | 4.32 | 5.45 | 5.06 | -16.16 | .0 | 17.7 | 134.6 | 8.0 | 90 |
| 1985 | 1 | 26 | .0 | 2446091.5 | 5 19.110 | +12 30.04 | 5 21.080 | +12 32.11 | 4.32 | 5.92 | 5.05 | -16.18 | .0 | 17.7 | 133.4 | 8.1 | 78 |
| 1985 | 1 | 27 | .0 | 2446092.5 | 5 18.180 | +12 31.54 | 5 20.150 | +12 33.66 | 4.33 | 6.38 | 5.04 | -16.19 | .0 | 17.7 | 132.2 | 8.3 | 66 |
| 1985 | 1 | 28 | .0 | 2446093.5 | 5 17.264 | +12 33.07 | 5 19.233 | +12 35.24 | 4.33 | 6.82 | 5.03 | -16.21 | .0 | 17.7 | 131.0 | 8.5 | 54 |
| 1985 | 1 | 29 | .0 | 2446094.5 | 5 16.360 | +12 34.63 | 5 18.330 | +12 36.84 | 4.33 | 7.26 | 5.02 | -16.23 | .0 | 17.7 | 129.8 | 8.7 | 43 |
| 1985 | 1 | 30 | .0 | 2446095.5 | 5 15.471 | +12 36.22 | 5 17.441 | +12 38.48 | 4.34 | 7.68 | 5.01 | -16.24 | .0 | 17.7 | 128.6 | 8.8 | 31 |
| 1985 | 1 | 31 | .0 | 2446096.5 | 5 14.596 | +12 37.84 | 5 16.566 | +12 40.13 | 4.34 | 8.09 | 5.00 | -16.26 | .0 | 17.7 | 127.4 | 9.0 | 21 |
| 1985 | 2 | 1 | .0 | 2446097.5 | 5 13.735 | +12 39.48 | 5 15.705 | +12 41.82 | 4.35 | 8.48 | 4.99 | -16.27 | .0 | 17.7 | 126.2 | 9.2 | 13 |
| 1985 | 2 | 2 | .0 | 2446098.5 | 5 12.889 | +12 41.15 | 5 14.859 | +12 43.53 | 4.35 | 8.87 | 4.98 | -16.29 | .0 | 17.7 | 125.1 | 9.3 | 14 |
| 1985 | 2 | 3 | .0 | 2446099.5 | 5 12.058 | +12 42.85 | 5 14.028 | +12 45.27 | 4.36 | 9.24 | 4.98 | -16.30 | .0 | 17.7 | 123.9 | 9.5 | 24 |
| 1985 | 2 | 4 | .0 | 2446100.5 | 5 11.241 | +12 44.57 | 5 13.212 | +12 47.03 | 4.36 | 9.60 | 4.97 | -16.32 | .0 | 17.7 | 122.7 | 9.6 | 37 |
| 1985 | 2 | 5 | .0 | 2446101.5 | 5 10.440 | +12 46.32 | 5 12.411 | +12 48.82 | 4.37 | 9.95 | 4.96 | -16.34 | .0 | 17.7 | 121.5 | 9.8 | 50 |
| 1985 | 2 | 6 | .0 | 2446102.5 | 5 9.655 | +12 48.09 | 5 11.625 | +12 50.64 | 4.38 | 10.28 | 4.95 | -16.35 | .0 | 17.6 | 120.3 | 9.9 | 65 |
| 1985 | 2 | 7 | .0 | 2446103.5 | 5 8.884 | +12 49.89 | 5 10.855 | +12 52.48 | 4.38 | 10.61 | 4.94 | -16.37 | .0 | 17.6 | 119.2 | 10.0 | 79 |
| 1985 | 2 | 8 | .0 | 2446104.5 | 5 8.130 | +12 51.72 | 5 10.101 | +12 54.34 | 4.39 | 10.92 | 4.93 | -16.38 | .0 | 17.6 | 118.0 | 10.2 | 93 |
| 1985 | 2 | 9 | .0 | 2446105.5 | 5 7.392 | +12 53.57 | 5 9.362 | +12 56.23 | 4.39 | 11.22 | 4.92 | -16.40 | .0 | 17.6 | 116.8 | 10.3 | 108 |
| 1985 | 2 | 10 | .0 | 2446106.5 | 5 6.669 | +12 55.45 | 5 8.640 | +12 58.14 | 4.40 | 11.50 | 4.91 | -16.42 | .0 | 17.6 | 115.7 | 10.4 | 122 |
| 1985 | 2 | 11 | .0 | 2446107.5 | 5 5.963 | +12 57.35 | 5 7.934 | +13 .07 | 4.41 | 11.78 | 4.90 | -16.43 | .0 | 17.6 | 114.5 | 10.6 | 136 |
| 1985 | 2 | 12 | .0 | 2446108.5 | 5 5.273 | +12 59.27 | 5 7.244 | +13 2.03 | 4.41 | 12.04 | 4.89 | -16.45 | .0 | 17.6 | 113.4 | 10.7 | 150 |
| 1985 | 2 | 13 | .0 | 2446109.5 | 5 4.600 | +13 1.22 | 5 6.570 | +13 4.01 | 4.42 | 12.29 | 4.88 | -16.47 | .0 | 17.6 | 112.2 | 10.8 | 162 |
| 1985 | 2 | 14 | .0 | 2446110.5 | 5 3.943 | +13 3.19 | 5 5.914 | +13 6.01 | 4.43 | 12.53 | 4.87 | -16.48 | .0 | 17.6 | 111.1 | 10.9 | 168 |
| 1985 | 2 | 15 | .0 | 2446111.5 | 5 3.303 | +13 5.18 | 5 5.273 | +13 8.04 | 4.44 | 12.76 | 4.86 | -16.50 | .0 | 17.6 | 109.9 | 11.0 | 162 |
| 1985 | 2 | 16 | .0 | 2446112.5 | 5 2.679 | +13 7.20 | 5 4.650 | +13 10.09 | 4.44 | 12.97 | 4.85 | -16.52 | .0 | 17.6 | 108.8 | 11.1 | 150 |
| 1985 | 2 | 17 | .0 | 2446113.5 | 5 2.073 | +13 9.24 | 5 4.044 | +13 12.16 | 4.45 | 13.17 | 4.84 | -16.53 | .0 | 17.6 | 107.7 | 11.2 | 138 |
| 1985 | 2 | 18 | .0 | 2446114.5 | 5 1.483 | +13 11.30 | 5 3.454 | +13 14.25 | 4.46 | 13.35 | 4.83 | -16.55 | .0 | 17.6 | 106.5 | 11.3 | 126 |
| 1985 | 2 | 19 | .0 | 2446115.5 | 5 .910 | +13 13.39 | 5 2.881 | +13 16.36 | 4.47 | 13.52 | 4.82 | -16.57 | .0 | 17.6 | 105.4 | 11.4 | 113 |
| 1985 | 2 | 20 | .0 | 2446116.5 | 5 .354 | +13 15.49 | 5 2.325 | +13 18.49 | 4.47 | 13.68 | 4.81 | -16.58 | .0 | 17.6 | 104.3 | 11.5 | 101 |
| 1985 | 2 | 21 | .0 | 2446117.5 | 4 59.815 | +13 17.62 | 5 1.787 | +13 20.65 | 4.48 | 13.83 | 4.80 | -16.60 | .0 | 17.6 | 103.2 | 11.6 | 89 |
| 1985 | 2 | 22 | .0 | 2446118.5 | 4 59.293 | +13 19.76 | 5 1.265 | +13 22.82 | 4.49 | 13.96 | 4.79 | -16.62 | .0 | 17.6 | 102.0 | 11.6 | 77 |
| 1985 | 2 | 23 | .0 | 2446119.5 | 4 58.788 | +13 21.93 | 5 .760 | +13 25.01 | 4.50 | 14.08 | 4.79 | -16.63 | .0 | 17.6 | 100.9 | 11.7 | 65 |
| 1985 | 2 | 24 | .0 | 2446120.5 | 4 58.301 | +13 24.12 | 5 .272 | +13 27.22 | 4.51 | 14.19 | 4.78 | -16.65 | .0 | 17.6 | 99.8 | 11.8 | 53 |
| 1985 | 2 | 25 | .0 | 2446121.5 | 4 57.830 | +13 26.32 | 4 59.801 | +13 29.45 | 4.51 | 14.29 | 4.77 | -16.67 | .0 | 17.6 | 98.7 | 11.8 | 42 |
| 1985 | 2 | 26 | .0 | 2446122.5 | 4 57.376 | +13 28.55 | 4 59.347 | +13 31.69 | 4.52 | 14.37 | 4.76 | -16.68 | .0 | 17.5 | 97.6 | 11.9 | 31 |
| 1985 | 2 | 27 | .0 | 2446123.5 | 4 56.938 | +13 30.79 | 4 58.910 | +13 33.96 | 4.53 | 14.44 | 4.75 | -16.70 | .0 | 17.5 | 96.5 | 12.0 | 20 |
| 1985 | 2 | 28 | .0 | 2446124.5 | 4 56.518 | +13 33.05 | 4 58.489 | +13 36.24 | 4.54 | 14.50 | 4.74 | -16.72 | .0 | 17.5 | 95.4 | 12.0 | 12 |
| 1985 | 3 | 1 | .0 | 2446125.5 | 4 56.114 | +13 35.33 | 4 58.086 | +13 38.53 | 4.55 | 14.54 | 4.73 | -16.74 | .0 | 17.5 | 94.4 | 12.1 | 13 |
| 1985 | 3 | 2 | .0 | 2446126.5 | 4 55.727 | +13 37.62 | 4 57.699 | +13 40.85 | 4.56 | 14.58 | 4.72 | -16.75 | .0 | 17.5 | 93.3 | 12.1 | 23 |
| 1985 | 3 | 3 | .0 | 2446127.5 | 4 55.357 | +13 39.93 | 4 57.329 | +13 43.17 | 4.56 | 14.60 | 4.71 | -16.77 | .0 | 17.5 | 92.2 | 12.1 | 35 |
| 1985 | 3 | 4 | .0 | 2446128.5 | 4 55.003 | +13 42.25 | 4 56.975 | +13 45.52 | 4.57 | 14.61 | 4.70 | -16.79 | .0 | 17.5 | 91.1 | 12.2 | 48 |
| 1985 | 3 | 5 | .0 | 2446129.5 | 4 54.665 | +13 44.60 | 4 56.638 | +13 47.88 | 4.58 | 14.61 | 4.69 | -16.81 | .0 | 17.5 | 90.1 | 12.2 | 62 |
| 1985 | 3 | 6 | .0 | 2446130.5 | 4 54.344 | +13 46.95 | 4 56.317 | +13 50.25 | 4.59 | 14.60 | 4.68 | -16.82 | .0 | 17.5 | 89.0 | 12.2 | 76 |
| 1985 | 3 | 7 | .0 | 2446131.5 | 4 54.039 | +13 49.32 | 4 56.011 | +13 52.63 | 4.60 | 14.58 | 4.67 | -16.84 | .0 | 17.5 | 87.9 | 12.3 | 90 |
| 1985 | 3 | 8 | .0 | 2446132.5 | 4 53.749 | +13 51.70 | 4 55.722 | +13 55.03 | 4.61 | 14.55 | 4.66 | -16.86 | .0 | 17.5 | 86.9 | 12.3 | 105 |
| 1985 | 3 | 9 | .0 | 2446133.5 | 4 53.476 | +13 54.10 | 4 55.449 | +13 57.44 | 4.61 | 14.51 | 4.65 | -16.88 | .0 | 17.5 | 85.8 | 12.3 | 120 |
| 1985 | 3 | 10 | .0 | 2446134.5 | 4 53.219 | +13 56.51 | 4 55.192 | +13 59.86 | 4.62 | 14.46 | 4.64 | -16.89 | .0 | 17.5 | 84.8 | 12.3 | 135 |
| 1985 | 3 | 11 | .0 | 2446135.5 | 4 52.977 | +13 58.93 | 4 54.951 | +14 2.30 | 4.63 | 14.40 | 4.63 | -16.91 | .0 | 17.5 | 83.8 | 12.3 | 149 |
| 1985 | 3 | 12 | .0 | 2446136.5 | 4 52.752 | +14 1.37 | 4 54.725 | +14 4.74 | 4.64 | 14.33 | 4.62 | -16.93 | .0 | 17.5 | 82.7 | 12.3 | 162 |
| 1985 | 3 | 13 | .0 | 2446137.5 | 4 52.541 | +14 3.82 | 4 54.515 | +14 7.20 | 4.65 | 14.25 | 4.61 | -16.95 | .0 | 17.5 | 81.7 | 12.3 | 169 |
| 1985 | 3 | 14 | .0 | 2446138.5 | 4 52.347 | +14 6.27 | 4 54.321 | +14 9.67 | 4.66 | 14.16 | 4.60 | -16.97 | .0 | 17.5 | 80.7 | 12.3 | 163 |
| 1985 | 3 | 15 | .0 | 2446139.5 | 4 52.167 | +14 8.74 | 4 54.142 | +14 12.14 | 4.66 | 14.06 | 4.59 | -16.98 | .0 | 17.5 | 79.6 | 12.3 | 151 |
| 1985 | 3 | 16 | .0 | 2446140.5 | 4 52.003 | +14 11.22 | 4 53.978 | +14 14.63 | 4.67 | 13.95 | 4.58 | -17.00 | .0 | 17.5 | 78.6 | 12.3 | 139 |
| 1985 | 3 | 17 | .0 | 2446141.5 | 4 51.854 | +14 13.71 | 4 53.829 | +14 17.13 | 4.68 | 13.83 | 4.57 | -17.02 | .0 | 17.5 | 77.6 | 12.3 | 127 |
| 1985 | 3 | 18 | .0 | 2446142.5 | 4 51.720 | +14 16.22 | 4 53.696 | +14 19.64 | 4.69 | 13.70 | 4.56 | -17.04 | .0 | 17.4 | 76.6 | 12.3 | 114 |
| 1985 | 3 | 19 | .0 | 2446143.5 | 4 51.601 | +14 18.72 | 4 53.577 | +14 22.16 | 4.70 | 13.56 | 4.55 | -17.06 | .0 | 17.4 | 75.6 | 12.2 | 102 |
| 1985 | 3 | 20 | .0 | 2446144.5 | 4 51.497 | +14 21.24 | 4 53.473 | +14 24.68 | 4.70 | 13.40 | 4.54 | -17.08 | .0 | 17.4 | 74.6 | 12.2 | 90 |
| 1985 | 3 | 21 | .0 | 2446145.5 | 4 51.407 | +14 23.77 | 4 53.383 | +14 27.21 | 4.71 | 13.24 | 4.53 | -17.09 | .0 | 17.4 | 73.6 | 12.2 | 78 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D$_t$ | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 3 | 22 | .0 | 2446146.5 | 4 51.332 | +14 26.30 | 4 53.30E | +14 29.75 | 4.72 | 13.07 | 4.52 | -17.11 | .0 | 17.4 | 72.6 | 12.1 | 67 |
| 1985 | 3 | 23 | .0 | 2446147.5 | 4 51.272 | +14 28.85 | 4 53.24E | +14 32.29 | 4.73 | 12.89 | 4.51 | -17.13 | .0 | 17.4 | 71.6 | 12.1 | 55 |
| 1985 | 3 | 24 | .0 | 2446148.5 | 4 51.225 | +14 31.39 | 4 53.201 | +14 34.84 | 4.73 | 12.71 | 4.50 | -17.15 | .0 | 17.4 | 70.6 | 12.1 | 44 |
| 1985 | 3 | 25 | .0 | 2446149.5 | 4 51.192 | +14 33.95 | 4 53.16S | +14 37.40 | 4.74 | 12.51 | 4.49 | -17.17 | .0 | 17.4 | 69.6 | 12.0 | 32 |
| 1985 | 3 | 26 | .0 | 2446150.5 | 4 51.173 | +14 36.51 | 4 53.15C | +14 39.96 | 4.75 | 12.30 | 4.48 | -17.19 | .0 | 17.4 | 68.6 | 12.0 | 21 |
| 1985 | 3 | 27 | .0 | 2446151.5 | 4 51.168 | +14 39.07 | 4 53.14E | +14 42.52 | 4.76 | 12.09 | 4.47 | -17.21 | .0 | 17.4 | 67.6 | 11.9 | 12 |
| 1985 | 3 | 28 | .0 | 2446152.5 | 4 51.177 | +14 41.64 | 4 53.155 | +14 45.09 | 4.76 | 11.86 | 4.46 | -17.23 | .0 | 17.4 | 66.7 | 11.9 | 10 |
| 1985 | 3 | 29 | .0 | 2446153.5 | 4 51.198 | +14 44.22 | 4 53.177 | +14 47.67 | 4.77 | 11.63 | 4.45 | -17.24 | .0 | 17.4 | 65.7 | 11.8 | 19 |
| 1985 | 3 | 30 | .0 | 2446154.5 | 4 51.233 | +14 46.80 | 4 53.21Z | +14 50.24 | 4.78 | 11.39 | 4.44 | -17.26 | .0 | 17.4 | 64.7 | 11.7 | 31 |
| 1985 | 3 | 31 | .0 | 2446155.5 | 4 51.281 | +14 49.38 | 4 53.26C | +14 52.82 | 4.78 | 11.15 | 4.43 | -17.28 | .0 | 17.4 | 63.8 | 11.7 | 43 |
| 1985 | 4 | 1 | .0 | 2446156.5 | 4 51.342 | +14 51.96 | 4 53.32Z | +14 55.40 | 4.79 | 10.90 | 4.42 | -17.30 | .0 | 17.4 | 62.8 | 11.6 | 56 |
| 1985 | 4 | 2 | .0 | 2446157.5 | 4 51.415 | +14 54.55 | 4 53.39E | +14 57.99 | 4.80 | 10.64 | 4.41 | -17.32 | .0 | 17.4 | 61.8 | 11.5 | 70 |
| 1985 | 4 | 3 | .0 | 2446158.5 | 4 51.501 | +14 57.13 | 4 53.48Z | +15 .57 | 4.80 | 10.37 | 4.40 | -17.34 | .0 | 17.3 | 60.9 | 11.4 | 84 |
| 1985 | 4 | 4 | .0 | 2446159.5 | 4 51.600 | +14 59.72 | 4 53.58C | +15 3.16 | 4.81 | 10.10 | 4.39 | -17.36 | .0 | 17.3 | 59.9 | 11.4 | 99 |
| 1985 | 4 | 5 | .0 | 2446160.5 | 4 51.710 | +15 2.31 | 4 53.691 | +15 5.74 | 4.81 | 9.82 | 4.38 | -17.38 | .0 | 17.3 | 59.0 | 11.3 | 114 |
| 1985 | 4 | 6 | .0 | 2446161.5 | 4 51.833 | +15 4.90 | 4 53.814 | +15 8.32 | 4.82 | 9.53 | 4.37 | -17.40 | .0 | 17.3 | 58.1 | 11.2 | 129 |
| 1985 | 4 | 7 | .0 | 2446162.5 | 4 51.967 | +15 7.49 | 4 53.94S | +15 10.91 | 4.82 | 9.24 | 4.36 | -17.42 | .0 | 17.3 | 57.1 | 11.1 | 143 |
| 1985 | 4 | 8 | .0 | 2446163.5 | 4 52.113 | +15 10.08 | 4 54.09S | +15 13.49 | 4.83 | 8.95 | 4.35 | -17.44 | .0 | 17.3 | 56.2 | 11.0 | 157 |
| 1985 | 4 | 9 | .0 | 2446164.5 | 4 52.271 | +15 12.67 | 4 54.253 | +15 16.07 | 4.83 | 8.64 | 4.34 | -17.46 | .0 | 17.3 | 55.3 | 10.9 | 169 |
| 1985 | 4 | 10 | .0 | 2446165.5 | 4 52.440 | +15 15.26 | 4 54.42Z | +15 18.65 | 4.84 | 8.33 | 4.33 | -17.48 | .0 | 17.3 | 54.3 | 10.8 | 167 |
| 1985 | 4 | 11 | .0 | 2446166.5 | 4 52.620 | +15 17.85 | 4 54.604 | +15 21.23 | 4.84 | 8.02 | 4.32 | -17.50 | .0 | 17.3 | 53.4 | 10.7 | 155 |
| 1985 | 4 | 12 | .0 | 2446167.5 | 4 52.812 | +15 20.44 | 4 54.797 | +15 23.81 | 4.85 | 7.70 | 4.31 | -17.52 | .0 | 17.3 | 52.5 | 10.6 | 143 |
| 1985 | 4 | 13 | .0 | 2446168.5 | 4 53.015 | +15 23.02 | 4 55.00C | +15 26.39 | 4.85 | 7.37 | 4.30 | -17.54 | .0 | 17.3 | 51.6 | 10.5 | 130 |
| 1985 | 4 | 14 | .0 | 2446169.5 | 4 53.229 | +15 25.61 | 4 55.214 | +15 28.96 | 4.86 | 7.04 | 4.29 | -17.56 | .0 | 17.3 | 50.7 | 10.4 | 118 |
| 1985 | 4 | 15 | .0 | 2446170.5 | 4 53.453 | +15 28.19 | 4 55.43S | +15 31.53 | 4.86 | 6.70 | 4.28 | -17.58 | .0 | 17.2 | 49.7 | 10.3 | 106 |
| 1985 | 4 | 16 | .0 | 2446171.5 | 4 53.688 | +15 30.76 | 4 55.67S | +15 34.10 | 4.86 | 6.35 | 4.27 | -17.60 | .0 | 17.2 | 48.8 | 10.2 | 94 |
| 1985 | 4 | 17 | .0 | 2446172.5 | 4 53.934 | +15 33.34 | 4 55.92I | +15 36.66 | 4.87 | 6.00 | 4.26 | -17.62 | .0 | 17.2 | 47.9 | 10.1 | 82 |
| 1985 | 4 | 18 | .0 | 2446173.5 | 4 54.190 | +15 35.91 | 4 56.177 | +15 39.22 | 4.87 | 5.64 | 4.25 | -17.64 | .0 | 17.2 | 47.0 | 10.0 | 70 |
| 1985 | 4 | 19 | .0 | 2446174.5 | 4 54.456 | +15 38.47 | 4 56.44A | +15 41.77 | 4.87 | 5.28 | 4.24 | -17.66 | .0 | 17.2 | 46.1 | 9.8 | 59 |
| 1985 | 4 | 20 | .0 | 2446175.5 | 4 54.732 | +15 41.03 | 4 56.72C | +15 44.31 | 4.88 | 4.91 | 4.23 | -17.68 | .0 | 17.2 | 45.2 | 9.7 | 47 |
| 1985 | 4 | 21 | .0 | 2446176.5 | 4 55.018 | +15 43.58 | 4 57.007 | +15 46.85 | 4.88 | 4.54 | 4.22 | -17.70 | .0 | 17.2 | 44.3 | 9.6 | 36 |
| 1985 | 4 | 22 | .0 | 2446177.5 | 4 55.314 | +15 46.13 | 4 57.303 | +15 49.39 | 4.88 | 4.16 | 4.21 | -17.73 | .0 | 17.2 | 43.4 | 9.4 | 25 |
| 1985 | 4 | 23 | .0 | 2446178.5 | 4 55.619 | +15 48.68 | 4 57.60S | +15 51.92 | 4.89 | 3.77 | 4.20 | -17.75 | .0 | 17.2 | 42.6 | 9.3 | 14 |
| 1985 | 4 | 24 | .0 | 2446179.5 | 4 55.934 | +15 51.21 | 4 57.92A | +15 54.44 | 4.89 | 3.39 | 4.19 | -17.77 | .0 | 17.2 | 41.7 | 9.2 | 9 |
| 1985 | 4 | 25 | .0 | 2446180.5 | 4 56.258 | +15 53.74 | 4 58.24S | +15 56.95 | 4.89 | 2.99 | 4.18 | -17.79 | .0 | 17.2 | 40.8 | 9.0 | 15 |
| 1985 | 4 | 26 | .0 | 2446181.5 | 4 56.590 | +15 56.26 | 4 58.58Z | +15 59.46 | 4.89 | 2.60 | 4.17 | -17.81 | .0 | 17.1 | 39.9 | 8.9 | 26 |
| 1985 | 4 | 27 | .0 | 2446182.5 | 4 56.932 | +15 58.78 | 4 58.92S | +16 1.96 | 4.89 | 2.20 | 4.16 | -17.83 | .0 | 17.1 | 39.0 | 8.8 | 38 |
| 1985 | 4 | 28 | .0 | 2446183.5 | 4 57.283 | +16 1.28 | 4 59.27E | +16 4.45 | 4.89 | 1.79 | 4.15 | -17.85 | .0 | 17.1 | 38.2 | 8.6 | 50 |
| 1985 | 4 | 29 | .0 | 2446184.5 | 4 57.642 | +16 3.78 | 4 59.63E | +16 6.93 | 4.89 | 1.39 | 4.14 | -17.87 | .0 | 17.1 | 37.3 | 8.5 | 63 |
| 1985 | 4 | 30 | .0 | 2446185.5 | 4 58.010 | +16 6.27 | 5 .00A | +16 9.40 | 4.89 | .98 | 4.13 | -17.90 | .0 | 17.1 | 36.4 | 8.3 | 77 |
| 1985 | 5 | 1 | .0 | 2446186.5 | 4 58.386 | +16 8.75 | 5 .38C | +16 11.86 | 4.90 | .56 | 4.12 | -17.92 | .0 | 17.1 | 35.6 | 8.2 | 91 |
| 1985 | 5 | 2 | .0 | 2446187.5 | 4 58.770 | +16 11.22 | 5 .76S | +16 14.31 | 4.90 | .15 | 4.11 | -17.94 | .0 | 17.1 | 34.7 | 8.0 | 105 |
| 1985 | 5 | 3 | .0 | 2446188.5 | 4 59.162 | +16 13.68 | 5 1.15E | +16 16.76 | 4.90 | -.27 | 4.10 | -17.96 | .0 | 17.1 | 33.8 | 7.9 | 120 |
| 1985 | 5 | 4 | .0 | 2446189.5 | 4 59.562 | +16 16.13 | 5 1.55E | +16 19.19 | 4.90 | -.69 | 4.09 | -17.98 | .0 | 17.1 | 33.0 | 7.7 | 135 |
| 1985 | 5 | 5 | .0 | 2446190.5 | 4 59.969 | +16 18.57 | 5 1.967 | +16 21.61 | 4.89 | -1.12 | 4.08 | -18.01 | .0 | 17.1 | 32.1 | 7.6 | 149 |
| 1985 | 5 | 6 | .0 | 2446191.5 | 5 .385 | +16 21.01 | 5 2.383 | +16 24.02 | 4.89 | -1.54 | 4.07 | -18.03 | .0 | 17.0 | 31.3 | 7.4 | 163 |
| 1985 | 5 | 7 | .0 | 2446192.5 | 5 .808 | +16 23.43 | 5 2.80E | +16 26.42 | 4.89 | -1.97 | 4.06 | -18.05 | .0 | 17.0 | 30.4 | 7.2 | 171 |
| 1985 | 5 | 8 | .0 | 2446193.5 | 5 1.238 | +16 25.83 | 5 3.23Z | +16 28.81 | 4.89 | -2.40 | 4.04 | -18.07 | .0 | 17.0 | 29.6 | 7.1 | 162 |
| 1985 | 5 | 9 | .0 | 2446194.5 | 5 1.676 | +16 28.23 | 5 3.67E | +16 31.18 | 4.89 | -2.84 | 4.03 | -18.09 | .0 | 17.0 | 28.7 | 6.9 | 149 |
| 1985 | 5 | 10 | .0 | 2446195.5 | 5 2.120 | +16 30.62 | 5 4.12I | +16 33.55 | 4.89 | -3.28 | 4.02 | -18.12 | .0 | 17.0 | 27.9 | 6.7 | 137 |
| 1985 | 5 | 11 | .0 | 2446196.5 | 5 2.572 | +16 33.00 | 5 4.57A | +16 35.90 | 4.89 | -3.72 | 4.01 | -18.14 | .0 | 17.0 | 27.1 | 6.6 | 124 |
| 1985 | 5 | 12 | .0 | 2446197.5 | 5 3.031 | +16 35.36 | 5 5.03A | +16 38.25 | 4.88 | -4.16 | 4.00 | -18.16 | .0 | 17.0 | 26.2 | 6.4 | 112 |
| 1985 | 5 | 13 | .0 | 2446198.5 | 5 3.497 | +16 37.71 | 5 5.50C | +16 40.58 | 4.88 | -4.61 | 3.99 | -18.18 | .0 | 17.0 | 25.4 | 6.2 | 100 |
| 1985 | 5 | 14 | .0 | 2446199.5 | 5 3.969 | +16 40.05 | 5 5.97I | +16 42.89 | 4.88 | -5.06 | 3.98 | -18.21 | .0 | 16.9 | 24.6 | 6.1 | 88 |
| 1985 | 5 | 15 | .0 | 2446200.5 | 5 4.448 | +16 42.38 | 5 6.45I | +16 45.20 | 4.88 | -5.51 | 3.97 | -18.23 | .0 | 16.9 | 23.8 | 5.9 | 76 |
| 1985 | 5 | 16 | .0 | 2446201.5 | 5 4.934 | +16 44.69 | 5 6.93S | +16 47.48 | 4.87 | -5.96 | 3.96 | -18.25 | .0 | 16.9 | 22.9 | 5.7 | 64 |
| 1985 | 5 | 17 | .0 | 2446202.5 | 5 5.426 | +16 46.99 | 5 7.43I | +16 49.76 | 4.87 | -6.42 | 3.95 | -18.28 | .0 | 16.9 | 22.1 | 5.5 | 53 |

**Table B-3 (contd)**

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 5 | 18 | .0 | 2446203.5 | 5 5.924 | +16 49.28 | 5 7.930 | +16 52.02 | 4.87 | -6.88 | 3.94 | -18.30 | .0 | 16.9 | 21.3 | 5.4 | 41 |
| 1985 | 5 | 19 | .0 | 2446204.5 | 5 6.428 | +16 51.55 | 5 8.435 | +16 54.27 | 4.86 | -7.34 | 3.93 | -18.32 | .0 | 16.9 | 20.5 | 5.2 | 30 |
| 1985 | 5 | 20 | .0 | 2446205.5 | 5 6.938 | +16 53.81 | 5 8.945 | +16 56.50 | 4.86 | -7.81 | 3.92 | -18.35 | .0 | 16.9 | 19.7 | 5.0 | 19 |
| 1985 | 5 | 21 | .0 | 2446206.5 | 5 7.453 | +16 56.05 | 5 9.462 | +16 58.72 | 4.85 | -8.27 | 3.91 | -18.37 | .0 | 16.8 | 18.9 | 4.8 | 10 |
| 1985 | 5 | 22 | .0 | 2446207.5 | 5 7.975 | +16 58.28 | 5 9.984 | +17 .93 | 4.85 | -8.74 | 3.90 | -18.39 | .0 | 16.8 | 18.1 | 4.6 | 10 |
| 1985 | 5 | 23 | .0 | 2446208.5 | 5 8.502 | +17 .49 | 5 10.512 | +17 3.11 | 4.84 | -9.21 | 3.89 | -18.42 | .0 | 16.8 | 17.3 | 4.4 | 20 |
| 1985 | 5 | 24 | .0 | 2446209.5 | 5 9.034 | +17 2.69 | 5 11.045 | +17 5.29 | 4.84 | -9.68 | 3.88 | -18.44 | .0 | 16.8 | 16.5 | 4.3 | 32 |
| 1985 | 5 | 25 | .0 | 2446210.5 | 5 9.572 | +17 4.88 | 5 11.584 | +17 7.45 | 4.83 | -10.15 | 3.87 | -18.47 | .0 | 16.8 | 15.7 | 4.1 | 44 |
| 1985 | 5 | 26 | .0 | 2446211.5 | 5 10.115 | +17 7.05 | 5 12.127 | +17 9.59 | 4.82 | -10.62 | 3.85 | -18.49 | .0 | 16.8 | 15.0 | 3.9 | 57 |
| 1985 | 5 | 27 | .0 | 2446212.5 | 5 10.663 | +17 9.20 | 5 12.676 | +17 11.72 | 4.82 | -11.09 | 3.84 | -18.51 | .0 | 16.8 | 14.2 | 3.7 | 70 |
| 1985 | 5 | 28 | .0 | 2446213.5 | 5 11.215 | +17 11.33 | 5 13.229 | +17 13.83 | 4.81 | -11.56 | 3.83 | -18.54 | .0 | 16.7 | 13.4 | 3.5 | 83 |
| 1985 | 5 | 29 | .0 | 2446214.5 | 5 11.773 | +17 13.45 | 5 13.787 | +17 15.92 | 4.81 | -12.04 | 3.82 | -18.56 | .0 | 16.7 | 12.7 | 3.3 | 97 |
| 1985 | 5 | 30 | .0 | 2446215.5 | 5 12.335 | +17 15.56 | 5 14.350 | +17 18.00 | 4.80 | -12.51 | 3.81 | -18.59 | .0 | 16.7 | 12.0 | 3.2 | 111 |
| 1985 | 5 | 31 | .0 | 2446216.5 | 5 12.901 | +17 17.65 | 5 14.917 | +17 20.06 | 4.79 | -12.98 | 3.80 | -18.61 | .0 | 16.7 | 11.2 | 3.0 | 125 |
| 1985 | 6 | 1 | .0 | 2446217.5 | 5 13.472 | +17 19.72 | 5 15.489 | +17 22.10 | 4.78 | -13.45 | 3.79 | -18.64 | .0 | 16.7 | 10.5 | 2.8 | 140 |
| 1985 | 6 | 2 | .0 | 2446218.5 | 5 14.047 | +17 21.77 | 5 16.065 | +17 24.12 | 4.78 | -13.93 | 3.78 | -18.66 | .0 | 16.7 | 9.8 | 2.6 | 154 |
| 1985 | 6 | 3 | .0 | 2446219.5 | 5 14.627 | +17 23.81 | 5 16.645 | +17 26.13 | 4.77 | -14.40 | 3.77 | -18.69 | .0 | 16.7 | 9.2 | 2.5 | 167 |
| 1985 | 6 | 4 | .0 | 2446220.5 | 5 15.211 | +17 25.83 | 5 17.230 | +17 28.12 | 4.76 | -14.87 | 3.76 | -18.71 | .0 | 16.6 | 8.5 | 2.3 | 170 |
| 1985 | 6 | 5 | .0 | 2446221.5 | 5 15.798 | +17 27.83 | 5 17.818 | +17 30.10 | 4.75 | -15.35 | 3.75 | -18.74 | .0 | 16.6 | 7.9 | 2.1 | 158 |
| 1985 | 6 | 6 | .0 | 2446222.5 | 5 16.390 | +17 29.82 | 5 18.411 | +17 32.06 | 4.74 | -15.82 | 3.74 | -18.76 | .0 | 16.6 | 7.3 | 2.0 | 145 |
| 1985 | 6 | 7 | .0 | 2446223.5 | 5 16.985 | +17 31.79 | 5 19.007 | +17 34.00 | 4.73 | -16.30 | 3.73 | -18.79 | .0 | 16.6 | 6.8 | 1.9 | 132 |
| 1985 | 6 | 8 | .0 | 2446224.5 | 5 17.584 | +17 33.74 | 5 19.607 | +17 35.93 | 4.72 | -16.77 | 3.71 | -18.81 | .0 | 16.6 | 6.4 | 1.7 | 119 |
| 1985 | 6 | 9 | .0 | 2446225.5 | 5 18.187 | +17 35.68 | 5 20.211 | +17 37.83 | 4.71 | -17.25 | 3.70 | -18.84 | .0 | 16.6 | 6.0 | 1.6 | 107 |
| 1985 | 6 | 10 | .0 | 2446226.5 | 5 18.793 | +17 37.60 | 5 20.818 | +17 39.72 | 4.70 | -17.73 | 3.69 | -18.86 | .0 | 16.5 | 5.7 | 1.6 | 95 |
| 1985 | 6 | 11 | .0 | 2446227.5 | 5 19.403 | +17 39.50 | 5 21.428 | +17 41.59 | 4.69 | -18.20 | 3.68 | -18.89 | .0 | 16.5 | 5.5 | 1.5 | 83 |
| 1985 | 6 | 12 | .0 | 2446228.5 | 5 20.016 | +17 41.38 | 5 22.042 | +17 43.45 | 4.68 | -18.68 | 3.67 | -18.92 | .0 | 16.5 | 5.4 | 1.5 | 71 |
| 1985 | 6 | 13 | .0 | 2446229.5 | 5 20.633 | +17 43.25 | 5 22.659 | +17 45.28 | 4.67 | -19.16 | 3.66 | -18.94 | .0 | 16.5 | 5.5 | 1.5 | 60 |
| 1985 | 6 | 14 | .0 | 2446230.5 | 5 21.252 | +17 45.09 | 5 23.279 | +17 47.10 | 4.66 | -19.64 | 3.65 | -18.97 | .0 | 16.5 | 5.6 | 1.6 | 48 |
| 1985 | 6 | 15 | .0 | 2446231.5 | 5 21.874 | +17 46.92 | 5 23.902 | +17 48.89 | 4.65 | -20.12 | 3.64 | -18.99 | .0 | 16.4 | 5.9 | 1.6 | 37 |
| 1985 | 6 | 16 | .0 | 2446232.5 | 5 22.500 | +17 48.73 | 5 24.528 | +17 50.67 | 4.64 | -20.59 | 3.63 | -19.02 | .0 | 16.4 | 6.3 | 1.7 | 26 |
| 1985 | 6 | 17 | .0 | 2446233.5 | 5 23.127 | +17 50.53 | 5 25.157 | +17 52.43 | 4.62 | -21.07 | 3.62 | -19.05 | .0 | 16.4 | 6.7 | 1.9 | 15 |
| 1985 | 6 | 18 | .0 | 2446234.5 | 5 23.758 | +17 52.30 | 5 25.788 | +17 54.18 | 4.61 | -21.55 | 3.61 | -19.07 | .0 | 16.4 | 7.2 | 2.0 | 8 |
| 1985 | 6 | 19 | .0 | 2446235.5 | 5 24.391 | +17 54.06 | 5 26.422 | +17 55.90 | 4.60 | -22.03 | 3.59 | -19.10 | .0 | 16.4 | 7.7 | 2.2 | 14 |
| 1985 | 6 | 20 | .0 | 2446236.5 | 5 25.026 | +17 55.79 | 5 27.058 | +17 57.61 | 4.59 | -22.50 | 3.58 | -19.13 | .0 | 16.3 | 8.3 | 2.4 | 25 |
| 1985 | 6 | 21 | .0 | 2446237.5 | 5 25.664 | +17 57.51 | 5 27.697 | +17 59.29 | 4.57 | -22.98 | 3.57 | -19.16 | .0 | 16.3 | 9.0 | 2.5 | 37 |
| 1985 | 6 | 22 | .0 | 2446238.5 | 5 26.303 | +17 59.21 | 5 28.337 | +18 .96 | 4.56 | -23.45 | 3.56 | -19.18 | .0 | 16.3 | 9.6 | 2.7 | 50 |
| 1985 | 6 | 23 | .0 | 2446239.5 | 5 26.945 | +18 .89 | 5 28.979 | +18 2.61 | 4.55 | -23.93 | 3.55 | -19.21 | .0 | 16.3 | 10.3 | 2.9 | 63 |
| 1985 | 6 | 24 | .0 | 2446240.5 | 5 27.588 | +18 2.55 | 5 29.623 | +18 4.24 | 4.53 | -24.40 | 3.54 | -19.24 | .0 | 16.3 | 11.0 | 3.1 | 76 |
| 1985 | 6 | 25 | .0 | 2446241.5 | 5 28.233 | +18 4.19 | 5 30.269 | +18 5.86 | 4.52 | -24.87 | 3.53 | -19.26 | .0 | 16.2 | 11.7 | 3.3 | 90 |
| 1985 | 6 | 26 | .0 | 2446242.5 | 5 28.880 | +18 5.82 | 5 30.916 | +18 7.45 | 4.50 | -25.33 | 3.52 | -19.29 | .0 | 16.2 | 12.4 | 3.6 | 103 |
| 1985 | 6 | 27 | .0 | 2446243.5 | 5 29.528 | +18 7.42 | 5 31.565 | +18 9.02 | 4.49 | -25.80 | 3.51 | -19.32 | .0 | 16.2 | 13.1 | 3.8 | 117 |
| 1985 | 6 | 28 | .0 | 2446244.5 | 5 30.177 | +18 9.01 | 5 32.215 | +18 10.57 | 4.47 | -26.26 | 3.49 | -19.35 | .0 | 16.2 | 13.8 | 4.0 | 131 |
| 1985 | 6 | 29 | .0 | 2446245.5 | 5 30.828 | +18 10.58 | 5 32.867 | +18 12.11 | 4.46 | -26.73 | 3.48 | -19.38 | .0 | 16.2 | 14.6 | 4.2 | 145 |
| 1985 | 6 | 30 | .0 | 2446246.5 | 5 31.480 | +18 12.13 | 5 33.519 | +18 13.63 | 4.44 | -27.19 | 3.47 | -19.41 | .0 | 16.1 | 15.3 | 4.4 | 159 |
| 1985 | 7 | 1 | .0 | 2446247.5 | 5 32.133 | +18 13.66 | 5 34.173 | +18 15.13 | 4.43 | -27.65 | 3.46 | -19.43 | .0 | 16.1 | 16.1 | 4.7 | 170 |
| 1985 | 7 | 2 | .0 | 2446248.5 | 5 32.787 | +18 15.17 | 5 34.828 | +18 16.61 | 4.41 | -28.10 | 3.45 | -19.46 | .0 | 16.1 | 16.8 | 4.9 | 167 |
| 1985 | 7 | 3 | .0 | 2446249.5 | 5 33.441 | +18 16.67 | 5 35.484 | +18 18.07 | 4.39 | -28.56 | 3.44 | -19.49 | .0 | 16.1 | 17.6 | 5.1 | 155 |
| 1985 | 7 | 4 | .0 | 2446250.5 | 5 34.097 | +18 18.14 | 5 36.140 | +18 19.51 | 4.38 | -29.02 | 3.43 | -19.52 | .0 | 16.1 | 18.3 | 5.4 | 142 |
| 1985 | 7 | 5 | .0 | 2446251.5 | 5 34.753 | +18 19.60 | 5 36.797 | +18 20.94 | 4.36 | -29.47 | 3.42 | -19.55 | .0 | 16.0 | 19.1 | 5.6 | 129 |
| 1985 | 7 | 6 | .0 | 2446252.5 | 5 35.410 | +18 21.04 | 5 37.454 | +18 22.35 | 4.34 | -29.92 | 3.40 | -19.58 | .0 | 16.0 | 19.9 | 5.8 | 116 |
| 1985 | 7 | 7 | .0 | 2446253.5 | 5 36.067 | +18 22.47 | 5 38.112 | +18 23.74 | 4.33 | -30.37 | 3.39 | -19.61 | .0 | 16.0 | 20.6 | 6.1 | 103 |
| 1985 | 7 | 8 | .0 | 2446254.5 | 5 36.724 | +18 23.87 | 5 38.770 | +18 25.11 | 4.31 | -30.82 | 3.38 | -19.64 | .0 | 16.0 | 21.4 | 6.3 | 91 |
| 1985 | 7 | 9 | .0 | 2446255.5 | 5 37.382 | +18 25.26 | 5 39.428 | +18 26.47 | 4.29 | -31.27 | 3.37 | -19.67 | .0 | 15.9 | 22.2 | 6.5 | 80 |
| 1985 | 7 | 10 | .0 | 2446256.5 | 5 38.040 | +18 26.63 | 5 40.087 | +18 27.80 | 4.27 | -31.72 | 3.36 | -19.70 | .0 | 15.9 | 22.9 | 6.8 | 68 |
| 1985 | 7 | 11 | .0 | 2446257.5 | 5 38.697 | +18 27.98 | 5 40.745 | +18 29.12 | 4.25 | -32.17 | 3.35 | -19.73 | .0 | 15.9 | 23.7 | 7.0 | 56 |
| 1985 | 7 | 12 | .0 | 2446258.5 | 5 39.355 | +18 29.31 | 5 41.403 | +18 30.42 | 4.23 | -32.61 | 3.34 | -19.76 | 15.0 | 15.9 | 24.5 | 7.3 | 45 |
| 1985 | 7 | 13 | .0 | 2446259.5 | 5 40.012 | +18 30.63 | 5 42.061 | +18 31.71 | 4.22 | -33.05 | 3.32 | -19.79 | 15.0 | 15.8 | 25.3 | 7.5 | 33 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D$_t$ | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 7 | 14 | .0 | 2446260.5 | 5 40.669 | +18 31.93 | 5 42.719 | +18 32.97 | 4.20 | -33.49 | 3.31 | -19.82 | 14.9 | 15.8 | 26.0 | 7.7 | 22 |
| 1985 | 7 | 15 | .0 | 2446261.5 | 5 41.325 | +18 33.21 | 5 43.375 | +18 34.22 | 4.18 | -33.93 | 3.30 | -19.85 | 14.9 | 15.8 | 26.8 | 8.0 | 12 |
| 1985 | 7 | 16 | .0 | 2446262.5 | 5 41.980 | +18 34.47 | 5 44.031 | +18 35.45 | 4.16 | -34.37 | 3.29 | -19.88 | 14.9 | 15.8 | 27.6 | 8.2 | 8 |
| 1985 | 7 | 17 | .0 | 2446263.5 | 5 42.634 | +18 35.72 | 5 44.687 | +18 36.67 | 4.14 | -34.80 | 3.28 | -19.91 | 14.8 | 15.7 | 28.4 | 8.5 | 17 |
| 1985 | 7 | 18 | .0 | 2446264.5 | 5 43.287 | +18 36.95 | 5 45.341 | +18 37.87 | 4.12 | -35.23 | 3.27 | -19.94 | 14.8 | 15.7 | 29.2 | 8.7 | 29 |
| 1985 | 7 | 19 | .0 | 2446265.5 | 5 43.939 | +18 38.16 | 5 45.993 | +18 39.05 | 4.10 | -35.66 | 3.26 | -19.97 | 14.8 | 15.7 | 30.0 | 9.0 | 42 |
| 1985 | 7 | 20 | .0 | 2446266.5 | 5 44.590 | +18 39.36 | 5 46.645 | +18 40.21 | 4.08 | -36.09 | 3.24 | -20.00 | 14.7 | 15.7 | 30.7 | 9.2 | 55 |
| 1985 | 7 | 21 | .0 | 2446267.5 | 5 45.239 | +18 40.54 | 5 47.294 | +18 41.36 | 4.06 | -36.51 | 3.23 | -20.03 | 14.7 | 15.6 | 31.5 | 9.5 | 69 |
| 1985 | 7 | 22 | .0 | 2446268.5 | 5 45.886 | +18 41.71 | 5 47.942 | +18 42.50 | 4.03 | -36.93 | 3.22 | -20.06 | 14.7 | 15.6 | 32.3 | 9.7 | 82 |
| 1985 | 7 | 23 | .0 | 2446269.5 | 5 46.531 | +18 42.86 | 5 48.588 | +18 43.61 | 4.01 | -37.35 | 3.21 | -20.10 | 14.7 | 15.6 | 33.1 | 10.0 | 96 |
| 1985 | 7 | 24 | .0 | 2446270.5 | 5 47.174 | +18 43.99 | 5 49.231 | +18 44.71 | 3.99 | -37.76 | 3.20 | -20.13 | 14.6 | 15.6 | 33.9 | 10.2 | 110 |
| 1985 | 7 | 25 | .0 | 2446271.5 | 5 47.815 | +18 45.11 | 5 49.873 | +18 45.80 | 3.97 | -38.17 | 3.19 | -20.16 | 14.6 | 15.5 | 34.7 | 10.5 | 124 |
| 1985 | 7 | 26 | .0 | 2446272.5 | 5 48.454 | +18 46.21 | 5 50.512 | +18 46.87 | 3.95 | -38.57 | 3.17 | -20.19 | 14.6 | 15.5 | 35.5 | 10.7 | 137 |
| 1985 | 7 | 27 | .0 | 2446273.5 | 5 49.090 | +18 47.30 | 5 51.149 | +18 47.93 | 3.92 | -38.98 | 3.16 | -20.22 | 14.5 | 15.5 | 36.3 | 10.9 | 151 |
| 1985 | 7 | 28 | .0 | 2446274.5 | 5 49.723 | +18 48.38 | 5 51.783 | +18 48.97 | 3.90 | -39.38 | 3.15 | -20.26 | 14.5 | 15.4 | 37.1 | 11.2 | 164 |
| 1985 | 7 | 29 | .0 | 2446275.5 | 5 50.353 | +18 49.44 | 5 52.414 | +18 50.00 | 3.88 | -39.77 | 3.14 | -20.29 | 14.5 | 15.4 | 37.9 | 11.4 | 171 |
| 1985 | 7 | 30 | .0 | 2446276.5 | 5 50.981 | +18 50.49 | 5 53.043 | +18 51.02 | 3.86 | -40.16 | 3.13 | -20.32 | 14.4 | 15.4 | 38.7 | 11.7 | 163 |
| 1985 | 7 | 31 | .0 | 2446277.5 | 5 51.605 | +18 51.52 | 5 53.668 | +18 52.02 | 3.83 | -40.55 | 3.12 | -20.36 | 14.4 | 15.4 | 39.5 | 11.9 | 151 |
| 1985 | 8 | 1 | .0 | 2446278.5 | 5 52.227 | +18 52.54 | 5 54.290 | +18 53.01 | 3.81 | -40.94 | 3.10 | -20.39 | 14.3 | 15.3 | 40.3 | 12.2 | 138 |
| 1985 | 8 | 2 | .0 | 2446279.5 | 5 52.844 | +18 53.56 | 5 54.908 | +18 54.00 | 3.79 | -41.32 | 3.09 | -20.42 | 14.3 | 15.3 | 41.1 | 12.4 | 125 |
| 1985 | 8 | 3 | .0 | 2446280.5 | 5 53.458 | +18 54.55 | 5 55.523 | +18 54.96 | 3.76 | -41.71 | 3.08 | -20.46 | 14.3 | 15.3 | 41.9 | 12.7 | 112 |
| 1985 | 8 | 4 | .0 | 2446281.5 | 5 54.069 | +18 55.54 | 5 56.134 | +18 55.92 | 3.74 | -42.08 | 3.07 | -20.49 | 14.2 | 15.2 | 42.7 | 12.9 | 100 |
| 1985 | 8 | 5 | .0 | 2446282.5 | 5 54.675 | +18 56.52 | 5 56.741 | +18 56.87 | 3.71 | -42.46 | 3.06 | -20.52 | 14.2 | 15.2 | 43.5 | 13.2 | 88 |
| 1985 | 8 | 6 | .0 | 2446283.5 | 5 55.277 | +18 57.48 | 5 57.344 | +18 57.80 | 3.69 | -42.83 | 3.05 | -20.56 | 14.2 | 15.2 | 44.3 | 13.4 | 76 |
| 1985 | 8 | 7 | .0 | 2446284.5 | 5 55.875 | +18 58.44 | 5 57.942 | +18 58.73 | 3.66 | -43.20 | 3.03 | -20.59 | 14.1 | 15.1 | 45.1 | 13.7 | 64 |
| 1985 | 8 | 8 | .0 | 2446285.5 | 5 56.468 | +18 59.38 | 5 58.536 | +18 59.64 | 3.64 | -43.57 | 3.02 | -20.63 | 14.1 | 15.1 | 45.9 | 13.9 | 53 |
| 1985 | 8 | 9 | .0 | 2446286.5 | 5 57.056 | +19 .32 | 5 59.124 | +19 .55 | 3.61 | -43.93 | 3.01 | -20.66 | 14.1 | 15.1 | 46.7 | 14.2 | 41 |
| 1985 | 8 | 10 | .0 | 2446287.5 | 5 57.639 | +19 1.25 | 5 59.708 | +19 1.44 | 3.59 | -44.29 | 3.00 | -20.70 | 14.0 | 15.0 | 47.5 | 14.4 | 30 |
| 1985 | 8 | 11 | .0 | 2446288.5 | 5 58.217 | +19 2.17 | 6 .287 | +19 2.33 | 3.56 | -44.65 | 2.99 | -20.73 | 14.0 | 15.0 | 48.4 | 14.7 | 19 |
| 1985 | 8 | 12 | .0 | 2446289.5 | 5 58.790 | +19 3.08 | 6 .860 | +19 3.22 | 3.54 | -45.00 | 2.97 | -20.77 | 13.9 | 15.0 | 49.2 | 14.9 | 9 |
| 1985 | 8 | 13 | .0 | 2446290.5 | 5 59.356 | +19 3.98 | 6 1.427 | +19 4.09 | 3.51 | -45.35 | 2.96 | -20.80 | 13.9 | 14.9 | 50.0 | 15.2 | 10 |
| 1985 | 8 | 14 | .0 | 2446291.5 | 5 59.916 | +19 4.88 | 6 1.988 | +19 4.96 | 3.48 | -45.69 | 2.95 | -20.84 | 13.9 | 14.9 | 50.8 | 15.4 | 21 |
| 1985 | 8 | 15 | .0 | 2446292.5 | 6 .470 | +19 5.77 | 6 2.543 | +19 5.82 | 3.46 | -46.03 | 2.94 | -20.87 | 13.8 | 14.9 | 51.6 | 15.7 | 34 |
| 1985 | 8 | 16 | .0 | 2446293.5 | 6 1.017 | +19 6.65 | 6 3.091 | +19 6.68 | 3.43 | -46.37 | 2.93 | -20.91 | 13.8 | 14.8 | 52.5 | 15.9 | 47 |
| 1985 | 8 | 17 | .0 | 2446294.5 | 6 1.558 | +19 7.53 | 6 3.632 | +19 7.53 | 3.40 | -46.70 | 2.91 | -20.95 | 13.7 | 14.8 | 53.3 | 16.2 | 60 |
| 1985 | 8 | 18 | .0 | 2446295.5 | 6 2.091 | +19 8.41 | 6 4.165 | +19 8.38 | 3.38 | -47.03 | 2.90 | -20.98 | 13.7 | 14.8 | 54.1 | 16.4 | 74 |
| 1985 | 8 | 19 | .0 | 2446296.5 | 6 2.616 | +19 9.28 | 6 4.691 | +19 9.23 | 3.35 | -47.35 | 2.89 | -21.02 | 13.7 | 14.7 | 55.0 | 16.7 | 88 |
| 1985 | 8 | 20 | .0 | 2446297.5 | 6 3.133 | +19 10.15 | 6 5.209 | +19 10.08 | 3.32 | -47.67 | 2.88 | -21.06 | 13.6 | 14.7 | 55.8 | 16.9 | 102 |
| 1985 | 8 | 21 | .0 | 2446298.5 | 6 3.643 | +19 11.02 | 6 5.719 | +19 10.92 | 3.29 | -47.98 | 2.87 | -21.09 | 13.6 | 14.7 | 56.6 | 17.2 | 117 |
| 1985 | 8 | 22 | .0 | 2446299.5 | 6 4.143 | +19 11.89 | 6 6.220 | +19 11.76 | 3.27 | -48.28 | 2.85 | -21.13 | 13.5 | 14.6 | 57.5 | 17.4 | 131 |
| 1985 | 8 | 23 | .0 | 2446300.5 | 6 4.635 | +19 12.75 | 6 6.713 | +19 12.60 | 3.24 | -48.58 | 2.84 | -21.17 | 13.5 | 14.6 | 58.3 | 17.6 | 144 |
| 1985 | 8 | 24 | .0 | 2446301.5 | 6 5.118 | +19 13.62 | 6 7.196 | +19 13.44 | 3.21 | -48.88 | 2.83 | -21.21 | 13.4 | 14.5 | 59.2 | 17.9 | 158 |
| 1985 | 8 | 25 | .0 | 2446302.5 | 6 5.591 | +19 14.49 | 6 7.670 | +19 14.29 | 3.18 | -49.17 | 2.82 | -21.25 | 13.4 | 14.5 | 60.0 | 18.1 | 169 |
| 1985 | 8 | 26 | .0 | 2446303.5 | 6 6.054 | +19 15.37 | 6 8.134 | +19 15.14 | 3.15 | -49.46 | 2.80 | -21.28 | 13.4 | 14.5 | 60.9 | 18.4 | 169 |
| 1985 | 8 | 27 | .0 | 2446304.5 | 6 6.508 | +19 16.25 | 6 8.588 | +19 16.00 | 3.12 | -49.74 | 2.79 | -21.32 | 13.3 | 14.4 | 61.7 | 18.6 | 158 |
| 1985 | 8 | 28 | .0 | 2446305.5 | 6 6.950 | +19 17.13 | 6 9.032 | +19 16.86 | 3.10 | -50.01 | 2.78 | -21.36 | 13.3 | 14.4 | 62.6 | 18.8 | 145 |
| 1985 | 8 | 29 | .0 | 2446306.5 | 6 7.382 | +19 18.02 | 6 9.464 | +19 17.72 | 3.07 | -50.28 | 2.77 | -21.40 | 13.2 | 14.4 | 63.4 | 19.1 | 132 |
| 1985 | 8 | 30 | .0 | 2446307.5 | 6 7.803 | +19 18.91 | 6 9.886 | +19 18.60 | 3.04 | -50.55 | 2.75 | -21.44 | 13.2 | 14.3 | 64.3 | 19.3 | 120 |
| 1985 | 8 | 31 | .0 | 2446308.5 | 6 8.212 | +19 19.82 | 6 10.295 | +19 19.48 | 3.01 | -50.81 | 2.74 | -21.48 | 13.1 | 14.3 | 65.2 | 19.5 | 107 |
| 1985 | 9 | 1 | .0 | 2446309.5 | 6 8.608 | +19 20.73 | 6 10.692 | +19 20.38 | 2.98 | -51.07 | 2.73 | -21.52 | 13.1 | 14.2 | 66.0 | 19.7 | 95 |
| 1985 | 9 | 2 | .0 | 2446310.5 | 6 8.992 | +19 21.65 | 6 11.077 | +19 21.28 | 2.95 | -51.32 | 2.72 | -21.56 | 13.0 | 14.2 | 66.9 | 20.0 | 83 |
| 1985 | 9 | 3 | .0 | 2446311.5 | 6 9.363 | +19 22.58 | 6 11.448 | +19 22.19 | 2.92 | -51.57 | 2.70 | -21.60 | 13.0 | 14.1 | 67.8 | 20.2 | 71 |
| 1985 | 9 | 4 | .0 | 2446312.5 | 6 9.720 | +19 23.53 | 6 11.806 | +19 23.12 | 2.89 | -51.81 | 2.69 | -21.64 | 12.9 | 14.1 | 68.7 | 20.4 | 60 |
| 1985 | 9 | 5 | .0 | 2446313.5 | 6 10.064 | +19 24.49 | 6 12.150 | +19 24.06 | 2.86 | -52.05 | 2.68 | -21.68 | 12.9 | 14.1 | 69.6 | 20.6 | 48 |
| 1985 | 9 | 6 | .0 | 2446314.5 | 6 10.392 | +19 25.47 | 6 12.479 | +19 25.02 | 2.83 | -52.28 | 2.67 | -21.72 | 12.8 | 14.0 | 70.5 | 20.9 | 37 |
| 1985 | 9 | 7 | .0 | 2446315.5 | 6 10.705 | +19 26.46 | 6 12.793 | +19 26.00 | 2.80 | -52.51 | 2.65 | -21.76 | 12.8 | 14.0 | 71.3 | 21.1 | 25 |
| 1985 | 9 | 8 | .0 | 2446316.5 | 6 11.002 | +19 27.47 | 6 13.091 | +19 27.00 | 2.77 | -52.73 | 2.64 | -21.80 | 12.7 | 13.9 | 72.2 | 21.3 | 14 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 9 | 9 | .0 | 2446317.5 | 6 11.283 | +19 28.50 | 6 13.372 | +19 28.01 | 2.74 | -52.94 | 2.63 | -21.84 | 12.7 | 13.9 | 73.1 | 21.5 | 8 |
| 1985 | 9 | 10 | .0 | 2446318.5 | 6 11.546 | +19 29.55 | 6 13.636 | +19 29.05 | 2.71 | -53.15 | 2.62 | -21.88 | 12.6 | 13.8 | 74.1 | 21.7 | 14 |
| 1985 | 9 | 11 | .0 | 2446319.5 | 6 11.791 | +19 30.63 | 6 13.882 | +19 30.11 | 2.68 | -53.36 | 2.60 | -21.93 | 12.6 | 13.8 | 75.0 | 21.9 | 26 |
| 1985 | 9 | 12 | .0 | 2446320.5 | 6 12.018 | +19 31.73 | 6 14.110 | +19 31.20 | 2.65 | -53.55 | 2.59 | -21.97 | 12.5 | 13.7 | 75.9 | 22.1 | 39 |
| 1985 | 9 | 13 | .0 | 2446321.5 | 6 12.225 | +19 32.85 | 6 14.318 | +19 32.31 | 2.62 | -53.74 | 2.58 | -22.01 | 12.5 | 13.7 | 76.8 | 22.3 | 52 |
| 1985 | 9 | 14 | .0 | 2446322.5 | 6 12.412 | +19 34.00 | 6 14.506 | +19 33.46 | 2.58 | -53.92 | 2.57 | -22.05 | 12.4 | 13.7 | 77.7 | 22.5 | 66 |
| 1985 | 9 | 15 | .0 | 2446323.5 | 6 12.578 | +19 35.19 | 6 14.672 | +19 34.63 | 2.55 | -54.09 | 2.55 | -22.10 | 12.4 | 13.6 | 78.7 | 22.7 | 81 |
| 1985 | 9 | 16 | .0 | 2446324.5 | 6 12.722 | +19 36.40 | 6 14.817 | +19 35.84 | 2.52 | -54.26 | 2.54 | -22.14 | 12.3 | 13.6 | 79.6 | 22.9 | 95 |
| 1985 | 9 | 17 | .0 | 2446325.5 | 6 12.842 | +19 37.65 | 6 14.938 | +19 37.08 | 2.49 | -54.42 | 2.53 | -22.18 | 12.3 | 13.5 | 80.5 | 23.1 | 110 |
| 1985 | 9 | 18 | .0 | 2446326.5 | 6 12.939 | +19 38.93 | 6 15.036 | +19 38.36 | 2.46 | -54.57 | 2.52 | -22.23 | 12.2 | 13.5 | 81.5 | 23.3 | 124 |
| 1985 | 9 | 19 | .0 | 2446327.5 | 6 13.012 | +19 40.25 | 6 15.109 | +19 39.67 | 2.43 | -54.71 | 2.50 | -22.27 | 12.1 | 13.4 | 82.5 | 23.5 | 139 |
| 1985 | 9 | 20 | .0 | 2446328.5 | 6 13.058 | +19 41.61 | 6 15.156 | +19 41.03 | 2.40 | -54.85 | 2.49 | -22.31 | 12.1 | 13.4 | 83.4 | 23.6 | 153 |
| 1985 | 9 | 21 | .0 | 2446329.5 | 6 13.078 | +19 43.02 | 6 15.177 | +19 42.43 | 2.36 | -54.97 | 2.48 | -22.36 | 12.0 | 13.3 | 84.4 | 23.8 | 165 |
| 1985 | 9 | 22 | .0 | 2446330.5 | 6 13.069 | +19 44.47 | 6 15.169 | +19 43.88 | 2.33 | -55.09 | 2.46 | -22.40 | 12.0 | 13.3 | 85.4 | 24.0 | 171 |
| 1985 | 9 | 23 | .0 | 2446331.5 | 6 13.031 | +19 45.97 | 6 15.133 | +19 45.38 | 2.30 | -55.20 | 2.45 | -22.45 | 11.9 | 13.2 | 86.4 | 24.1 | 162 |
| 1985 | 9 | 24 | .0 | 2446332.5 | 6 12.964 | +19 47.52 | 6 15.066 | +19 46.94 | 2.27 | -55.30 | 2.44 | -22.49 | 11.8 | 13.1 | 87.4 | 24.3 | 150 |
| 1985 | 9 | 25 | .0 | 2446333.5 | 6 12.864 | +19 49.12 | 6 14.968 | +19 48.54 | 2.24 | -55.40 | 2.42 | -22.54 | 11.8 | 13.1 | 88.4 | 24.4 | 137 |
| 1985 | 9 | 26 | .0 | 2446334.5 | 6 12.731 | +19 50.77 | 6 14.836 | +19 50.21 | 2.20 | -55.48 | 2.41 | -22.58 | 11.7 | 13.0 | 89.4 | 24.6 | 124 |
| 1985 | 9 | 27 | .0 | 2446335.5 | 6 12.564 | +19 52.49 | 6 14.670 | +19 51.93 | 2.17 | -55.56 | 2.40 | -22.63 | 11.7 | 13.0 | 90.4 | 24.7 | 112 |
| 1985 | 9 | 28 | .0 | 2446336.5 | 6 12.361 | +19 54.26 | 6 14.468 | +19 53.71 | 2.14 | -55.63 | 2.39 | -22.68 | 11.6 | 12.9 | 91.4 | 24.8 | 100 |
| 1985 | 9 | 29 | .0 | 2446337.5 | 6 12.121 | +19 56.10 | 6 14.228 | +19 55.56 | 2.11 | -55.69 | 2.37 | -22.72 | 11.5 | 12.9 | 92.4 | 25.0 | 87 |
| 1985 | 9 | 30 | .0 | 2446338.5 | 6 11.841 | +19 58.00 | 6 13.949 | +19 57.48 | 2.08 | -55.74 | 2.36 | -22.77 | 11.5 | 12.8 | 93.5 | 25.1 | 75 |
| 1985 | 10 | 1 | .0 | 2446339.5 | 6 11.520 | +19 59.98 | 6 13.629 | +19 59.47 | 2.04 | -55.78 | 2.35 | -22.82 | 11.4 | 12.8 | 94.5 | 25.2 | 63 |
| 1985 | 10 | 2 | .0 | 2446340.5 | 6 11.155 | +20 2.02 | 6 13.266 | +20 1.53 | 2.01 | -55.82 | 2.33 | -22.87 | 11.3 | 12.7 | 95.6 | 25.3 | 52 |
| 1985 | 10 | 3 | .0 | 2446341.5 | 6 10.746 | +20 4.14 | 6 12.857 | +20 3.67 | 1.98 | -55.84 | 2.32 | -22.91 | 11.3 | 12.6 | 96.7 | 25.4 | 40 |
| 1985 | 10 | 4 | .0 | 2446342.5 | 6 10.288 | +20 6.34 | 6 12.401 | +20 5.89 | 1.95 | -55.85 | 2.31 | -22.96 | 11.2 | 12.6 | 97.8 | 25.4 | 28 |
| 1985 | 10 | 5 | .0 | 2446343.5 | 6 9.782 | +20 8.62 | 6 11.895 | +20 8.20 | 1.91 | -55.85 | 2.29 | -23.01 | 11.1 | 12.5 | 98.9 | 25.5 | 17 |
| 1985 | 10 | 6 | .0 | 2446344.5 | 6 9.222 | +20 10.98 | 6 11.337 | +20 10.59 | 1.88 | -55.84 | 2.28 | -23.06 | 11.1 | 12.5 | 100.0 | 25.6 | 8 |
| 1985 | 10 | 7 | .0 | 2446345.5 | 6 8.608 | +20 13.43 | 6 10.725 | +20 13.07 | 1.85 | -55.81 | 2.27 | -23.11 | 11.0 | 12.4 | 101.1 | 25.6 | 11 |
| 1985 | 10 | 8 | .0 | 2446346.5 | 6 7.936 | +20 15.98 | 6 10.054 | +20 15.65 | 1.82 | -55.77 | 2.25 | -23.16 | 10.9 | 12.3 | 102.3 | 25.7 | 22 |
| 1985 | 10 | 9 | .0 | 2446347.5 | 6 7.203 | +20 18.61 | 6 9.322 | +20 18.33 | 1.79 | -55.72 | 2.24 | -23.20 | 10.8 | 12.3 | 103.4 | 25.7 | 35 |
| 1985 | 10 | 10 | .0 | 2446348.5 | 6 6.406 | +20 21.35 | 6 8.526 | +20 21.10 | 1.75 | -55.66 | 2.23 | -23.25 | 10.8 | 12.2 | 104.6 | 25.7 | 48 |
| 1985 | 10 | 11 | .0 | 2446349.5 | 6 5.541 | +20 24.18 | 6 7.663 | +20 23.98 | 1.72 | -55.58 | 2.21 | -23.30 | 10.7 | 12.1 | 105.8 | 25.7 | 62 |
| 1985 | 10 | 12 | .0 | 2446350.5 | 6 4.605 | +20 27.11 | 6 6.725 | +20 26.96 | 1.69 | -55.49 | 2.20 | -23.35 | 10.6 | 12.1 | 107.0 | 25.7 | 76 |
| 1985 | 10 | 13 | .0 | 2446351.5 | 6 3.594 | +20 30.15 | 6 5.715 | +20 30.05 | 1.66 | -55.38 | 2.19 | -23.40 | 10.5 | 12.0 | 108.2 | 25.7 | 91 |
| 1985 | 10 | 14 | .0 | 2446352.5 | 6 2.504 | +20 33.30 | 6 4.630 | +20 33.26 | 1.63 | -55.25 | 2.17 | -23.46 | 10.5 | 11.9 | 109.5 | 25.7 | 106 |
| 1985 | 10 | 15 | .0 | 2446353.5 | 6 1.330 | +20 36.56 | 6 3.458 | +20 36.58 | 1.59 | -55.10 | 2.16 | -23.51 | 10.4 | 11.9 | 110.8 | 25.6 | 121 |
| 1985 | 10 | 16 | .0 | 2446354.5 | 6 .068 | +20 39.93 | 6 2.198 | +20 40.01 | 1.56 | -54.93 | 2.15 | -23.56 | 10.3 | 11.8 | 112.0 | 25.5 | 136 |
| 1985 | 10 | 17 | .0 | 2446355.5 | 5 58.713 | +20 43.41 | 6 .844 | +20 43.56 | 1.53 | -54.75 | 2.13 | -23.61 | 10.2 | 11.7 | 113.3 | 25.4 | 151 |
| 1985 | 10 | 18 | .0 | 2446356.5 | 5 57.259 | +20 47.01 | 5 59.392 | +20 47.23 | 1.50 | -54.54 | 2.12 | -23.66 | 10.1 | 11.6 | 114.7 | 25.3 | 166 |
| 1985 | 10 | 19 | .0 | 2446357.5 | 5 55.701 | +20 50.72 | 5 57.835 | +20 51.03 | 1.47 | -54.32 | 2.10 | -23.71 | 10.1 | 11.6 | 116.0 | 25.2 | 172 |
| 1985 | 10 | 20 | .0 | 2446358.5 | 5 54.032 | +20 54.55 | 5 56.169 | +20 54.94 | 1.44 | -54.07 | 2.09 | -23.77 | 10.0 | 11.5 | 117.4 | 25.0 | 162 |
| 1985 | 10 | 21 | .0 | 2446359.5 | 5 52.247 | +20 58.48 | 5 54.385 | +20 58.97 | 1.40 | -53.80 | 2.08 | -23.82 | 9.9 | 11.4 | 118.8 | 24.8 | 148 |
| 1985 | 10 | 22 | .0 | 2446360.5 | 5 50.338 | +21 2.53 | 5 52.477 | +21 3.11 | 1.37 | -53.50 | 2.06 | -23.87 | 9.8 | 11.3 | 120.3 | 24.6 | 135 |
| 1985 | 10 | 23 | .0 | 2446361.5 | 5 48.297 | +21 6.67 | 5 50.438 | +21 7.36 | 1.34 | -53.17 | 2.05 | -23.92 | 9.7 | 11.3 | 121.7 | 24.4 | 122 |
| 1985 | 10 | 24 | .0 | 2446362.5 | 5 46.117 | +21 10.92 | 5 48.260 | +21 11.72 | 1.31 | -52.82 | 2.04 | -23.98 | 9.6 | 11.2 | 123.2 | 24.1 | 109 |
| 1985 | 10 | 25 | .0 | 2446363.5 | 5 43.789 | +21 15.25 | 5 45.933 | +21 16.11 | 1.28 | -52.44 | 2.02 | -24.03 | 9.5 | 11.1 | 124.8 | 23.8 | 96 |
| 1985 | 10 | 26 | .0 | 2446364.5 | 5 41.304 | +21 19.66 | 5 43.449 | +21 20.71 | 1.25 | -52.03 | 2.01 | -24.09 | 9.5 | 11.0 | 126.4 | 23.5 | 83 |
| 1985 | 10 | 27 | .0 | 2446365.5 | 5 38.651 | +21 24.14 | 5 40.798 | +21 25.33 | 1.22 | -51.58 | 1.99 | -24.14 | 9.4 | 10.9 | 128.0 | 23.1 | 71 |
| 1985 | 10 | 28 | .0 | 2446366.5 | 5 35.820 | +21 28.66 | 5 37.969 | +21 29.99 | 1.19 | -51.09 | 1.98 | -24.19 | 9.3 | 10.8 | 129.6 | 22.7 | 58 |
| 1985 | 10 | 29 | .0 | 2446367.5 | 5 32.800 | +21 33.20 | 5 34.951 | +21 34.69 | 1.16 | -50.57 | 1.97 | -24.25 | 9.2 | 10.8 | 131.3 | 22.3 | 46 |
| 1985 | 10 | 30 | .0 | 2446368.5 | 5 29.579 | +21 37.75 | 5 31.731 | +21 39.40 | 1.13 | -50.00 | 1.95 | -24.30 | 9.1 | 10.7 | 133.1 | 21.8 | 33 |
| 1985 | 10 | 31 | .0 | 2446369.5 | 5 26.144 | +21 42.26 | 5 28.297 | +21 44.09 | 1.11 | -49.39 | 1.94 | -24.36 | 9.0 | 10.6 | 134.9 | 21.3 | 21 |
| 1985 | 11 | 1 | .0 | 2446370.5 | 5 22.481 | +21 46.70 | 5 24.635 | +21 48.72 | 1.08 | -48.73 | 1.92 | -24.41 | 8.9 | 10.5 | 136.7 | 20.7 | 9 |
| 1985 | 11 | 2 | .0 | 2446371.5 | 5 18.576 | +21 51.02 | 5 20.730 | +21 53.25 | 1.05 | -48.02 | 1.91 | -24.47 | 8.8 | 10.4 | 138.6 | 20.1 | 6 |
| 1985 | 11 | 3 | .0 | 2446372.5 | 5 14.413 | +21 55.18 | 5 16.568 | +21 57.61 | 1.02 | -47.24 | 1.90 | -24.52 | 8.7 | 10.3 | 140.6 | 19.4 | 18 |
| 1985 | 11 | 4 | .0 | 2446373.5 | 5 9.976 | +21 59.10 | 5 12.133 | +22 1.76 | .99 | -46.41 | 1.88 | -24.58 | 8.6 | 10.2 | 142.6 | 18.7 | 31 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 11 | 5 | .0 | 2446374.5 | 5 5.250 | +22 2.71 | 5 7.407 | +22 5.61 | .97 | -45.51 | 1.87 | -24.64 | 8.5 | 10.1 | 144.7 | 17.9 | 44 |
| 1985 | 11 | 6 | .0 | 2446375.5 | 5 .218 | +22 5.92 | 5 2.374 | +22 9.08 | .94 | -44.53 | 1.85 | -24.69 | 8.4 | 10.0 | 146.8 | 17.0 | 58 |
| 1985 | 11 | 7 | .0 | 2446376.5 | 4 54.860 | +22 8.64 | 4 57.016 | +22 12.07 | .92 | -43.48 | 1.84 | -24.75 | 8.3 | 10.0 | 149.1 | 16.1 | 72 |
| 1985 | 11 | 8 | .0 | 2446377.5 | 4 49.162 | +22 10.74 | 4 51.336 | +22 14.46 | .89 | -42.35 | 1.82 | -24.80 | 8.2 | 9.9 | 151.4 | 15.1 | 87 |
| 1985 | 11 | 9 | .0 | 2446378.5 | 4 43.105 | +22 12.09 | 4 45.257 | +22 16.11 | .87 | -41.12 | 1.81 | -24.86 | 8.1 | 9.8 | 153.8 | 14.0 | 103 |
| 1985 | 11 | 10 | .0 | 2446379.5 | 4 36.672 | +22 12.54 | 4 38.852 | +22 16.88 | .84 | -39.80 | 1.80 | -24.92 | 8.0 | 9.7 | 156.3 | 12.8 | 119 |
| 1985 | 11 | 11 | .0 | 2446380.5 | 4 29.849 | +22 11.92 | 4 31.996 | +22 16.59 | .82 | -38.37 | 1.78 | -24.97 | 7.9 | 9.6 | 158.8 | 11.6 | 135 |
| 1985 | 11 | 12 | .0 | 2446381.5 | 4 22.623 | +22 10.04 | 4 24.765 | +22 15.05 | .80 | -36.84 | 1.77 | -25.03 | 7.8 | 9.5 | 161.5 | 10.2 | 152 |
| 1985 | 11 | 13 | .0 | 2446382.5 | 4 14.981 | +22 6.69 | 4 17.115 | +22 12.06 | .78 | -35.20 | 1.75 | -25.09 | 7.6 | 9.4 | 164.2 | 8.8 | 169 |
| 1985 | 11 | 14 | .0 | 2446383.5 | 4 6.917 | +22 1.64 | 4 9.048 | +22 7.39 | .76 | -33.44 | 1.74 | -25.15 | 7.5 | 9.3 | 167.1 | 7.3 | 173 |
| 1985 | 11 | 15 | .0 | 2446384.5 | 3 58.426 | +21 54.67 | 4 .551 | +22 .81 | .74 | -31.55 | 1.72 | -25.20 | 7.4 | 9.2 | 170.0 | 5.7 | 156 |
| 1985 | 11 | 16 | .0 | 2446385.5 | 3 49.510 | +21 45.51 | 3 51.627 | +21 52.05 | .72 | -29.54 | 1.71 | -25.26 | 7.3 | 9.1 | 172.9 | 4.1 | 139 |
| 1985 | 11 | 17 | .0 | 2446386.5 | 3 40.177 | +21 33.94 | 3 42.284 | +21 40.89 | .71 | -27.41 | 1.69 | -25.32 | 7.2 | 9.0 | 175.8 | 2.4 | 123 |
| 1985 | 11 | 18 | .0 | 2446387.5 | 3 30.441 | +21 19.69 | 3 32.537 | +21 27.06 | .69 | -25.16 | 1.68 | -25.37 | 7.1 | 8.9 | 177.7 | 1.3 | 107 |
| 1985 | 11 | 19 | .0 | 2446388.5 | 3 20.324 | +21 2.56 | 3 22.408 | +21 10.34 | .68 | -22.78 | 1.66 | -25.43 | 7.1 | 8.9 | 176.1 | 2.3 | 92 |
| 1985 | 11 | 20 | .0 | 2446389.5 | 3 9.856 | +20 42.35 | 3 11.927 | +20 50.55 | .66 | -20.29 | 1.65 | -25.49 | 7.0 | 8.8 | 173.0 | 4.2 | 77 |
| 1985 | 11 | 21 | .0 | 2446390.5 | 2 59.077 | +20 18.91 | 3 1.133 | +20 27.51 | .65 | -17.69 | 1.64 | -25.54 | 6.9 | 8.7 | 169.6 | 6.3 | 62 |
| 1985 | 11 | 22 | .0 | 2446391.5 | 2 48.232 | +19 52.15 | 2 50.073 | +20 1.15 | .64 | -15.00 | 1.62 | -25.60 | 6.8 | 8.6 | 166.0 | 8.5 | 47 |
| 1985 | 11 | 23 | .0 | 2446392.5 | 2 36.776 | +19 22.04 | 2 38.801 | +19 31.42 | .64 | -12.23 | 1.61 | -25.65 | 6.7 | 8.6 | 162.3 | 10.8 | 32 |
| 1985 | 11 | 24 | .0 | 2446393.5 | 2 25.369 | +18 48.64 | 2 27.377 | +18 58.39 | .63 | -9.41 | 1.59 | -25.71 | 6.6 | 8.5 | 158.6 | 13.1 | 18 |
| 1985 | 11 | 25 | .0 | 2446394.5 | 2 13.877 | +18 12.08 | 2 15.868 | +18 22.17 | .63 | -6.55 | 1.58 | -25.77 | 6.6 | 8.5 | 154.8 | 15.5 | 5 |
| 1985 | 11 | 26 | .0 | 2446395.5 | 2 2.366 | +17 32.59 | 2 4.340 | +17 43.00 | .62 | -3.67 | 1.56 | -25.82 | 6.5 | 8.4 | 151.0 | 17.9 | 12 |
| 1985 | 11 | 27 | .0 | 2446396.5 | 1 50.905 | +16 50.46 | 1 52.862 | +17 1.16 | .62 | -.80 | 1.55 | -25.87 | 6.4 | 8.4 | 147.2 | 20.2 | 26 |
| 1985 | 11 | 28 | .0 | 2446397.5 | 1 39.559 | +16 6.05 | 1 41.500 | +16 17.01 | .62 | 2.03 | 1.53 | -25.93 | 6.4 | 8.3 | 143.4 | 22.6 | 40 |
| 1985 | 11 | 29 | .0 | 2446398.5 | 1 28.390 | +15 19.78 | 1 30.315 | +15 30.97 | .62 | 4.81 | 1.52 | -25.98 | 6.3 | 8.3 | 139.6 | 25.0 | 55 |
| 1985 | 11 | 30 | .0 | 2446399.5 | 1 17.454 | +14 32.09 | 1 19.369 | +14 43.47 | .63 | 7.50 | 1.50 | -26.03 | 6.3 | 8.3 | 135.8 | 27.3 | 70 |
| 1985 | 12 | 1 | .0 | 2446400.5 | 1 6.800 | +13 43.44 | 1 8.697 | +13 54.99 | .63 | 10.10 | 1.49 | -26.09 | 6.3 | 8.2 | 132.1 | 29.5 | 84 |
| 1985 | 12 | 2 | .0 | 2446401.5 | 0 56.468 | +12 54.27 | 0 58.354 | +13 5.96 | .64 | 12.58 | 1.47 | -26.14 | 6.2 | 8.2 | 128.5 | 31.7 | 99 |
| 1985 | 12 | 3 | .0 | 2446402.5 | 0 46.492 | +12 5.02 | 0 48.366 | +12 16.83 | .65 | 14.93 | 1.46 | -26.19 | 6.2 | 8.2 | 124.9 | 33.7 | 114 |
| 1985 | 12 | 4 | .0 | 2446403.5 | 0 36.894 | +11 16.09 | 0 38.759 | +11 27.97 | .66 | 17.15 | 1.44 | -26.24 | 6.2 | 8.2 | 121.4 | 35.7 | 129 |
| 1985 | 12 | 5 | .0 | 2446404.5 | 0 27.692 | +10 27.80 | 0 29.548 | +10 39.75 | .67 | 19.22 | 1.43 | -26.29 | 6.1 | 8.2 | 118.0 | 37.6 | 144 |
| 1985 | 12 | 6 | .0 | 2446405.5 | 0 18.895 | + 9 40.47 | 0 20.743 | + 9 52.46 | .68 | 21.14 | 1.41 | -26.33 | 6.1 | 8.1 | 114.7 | 39.4 | 159 |
| 1985 | 12 | 7 | .0 | 2446406.5 | 0 10.505 | + 8 54.34 | 0 12.346 | + 9 6.35 | .69 | 22.91 | 1.40 | -26.38 | 6.1 | 8.1 | 111.5 | 41.1 | 169 |
| 1985 | 12 | 8 | .0 | 2446407.5 | 0 2.519 | + 8 9.60 | 0 4.355 | + 8 21.61 | .70 | 24.53 | 1.38 | -26.42 | 6.1 | 8.1 | 108.3 | 42.7 | 162 |
| 1985 | 12 | 9 | .0 | 2446408.5 | 23 54.932 | + 7 26.39 | 23 56.763 | + 7 38.39 | .72 | 26.01 | 1.36 | -26.47 | 6.1 | 8.1 | 105.3 | 44.1 | 147 |
| 1985 | 12 | 10 | .0 | 2446409.5 | 23 47.732 | + 6 44.82 | 23 49.560 | + 6 56.80 | .73 | 27.35 | 1.35 | -26.51 | 6.0 | 8.1 | 102.4 | 45.5 | 131 |
| 1985 | 12 | 11 | .0 | 2446410.5 | 23 40.907 | + 6 4.93 | 23 42.731 | + 6 16.88 | .75 | 28.56 | 1.33 | -26.55 | 6.0 | 8.1 | 99.6 | 46.7 | 114 |
| 1985 | 12 | 12 | .0 | 2446411.5 | 23 34.441 | + 5 26.78 | 23 36.263 | + 5 38.69 | .77 | 29.63 | 1.32 | -26.59 | 6.0 | 8.1 | 96.8 | 47.9 | 98 |
| 1985 | 12 | 13 | .0 | 2446412.5 | 23 28.318 | + 4 50.34 | 23 30.139 | + 5 2.21 | .79 | 30.59 | 1.30 | -26.62 | 6.0 | 8.1 | 94.2 | 48.9 | 81 |
| 1985 | 12 | 14 | .0 | 2446413.5 | 23 22.520 | + 4 15.61 | 23 24.340 | + 4 27.43 | .80 | 31.43 | 1.29 | -26.65 | 6.0 | 8.1 | 91.6 | 49.8 | 66 |
| 1985 | 12 | 15 | .0 | 2446414.5 | 23 17.031 | + 3 42.54 | 23 18.851 | + 3 54.30 | .82 | 32.16 | 1.27 | -26.69 | 5.9 | 8.1 | 89.1 | 50.7 | 50 |
| 1985 | 12 | 16 | .0 | 2446415.5 | 23 11.832 | + 3 11.09 | 23 13.652 | + 3 22.79 | .84 | 32.80 | 1.26 | -26.71 | 5.9 | 8.1 | 86.7 | 51.4 | 36 |
| 1985 | 12 | 17 | .0 | 2446416.5 | 23 6.907 | + 2 41.19 | 23 8.726 | + 2 52.83 | .86 | 33.34 | 1.24 | -26.74 | 5.9 | 8.1 | 84.4 | 52.1 | 22 |
| 1985 | 12 | 18 | .0 | 2446417.5 | 23 2.238 | + 2 12.77 | 23 4.057 | + 2 24.35 | .88 | 33.80 | 1.23 | -26.76 | 5.9 | 8.1 | 82.1 | 52.7 | 12 |
| 1985 | 12 | 19 | .0 | 2446418.5 | 22 57.808 | + 1 45.77 | 22 59.628 | + 1 57.28 | .90 | 34.17 | 1.21 | -26.78 | 5.9 | 8.1 | 79.9 | 53.1 | 14 |
| 1985 | 12 | 20 | .0 | 2446419.5 | 22 53.603 | + 1 20.10 | 22 55.423 | + 1 31.54 | .92 | 34.47 | 1.20 | -26.79 | 5.8 | 8.1 | 77.8 | 53.6 | 24 |
| 1985 | 12 | 21 | .0 | 2446420.5 | 22 49.606 | + 0 55.69 | 22 51.428 | + 1 7.07 | .94 | 34.70 | 1.18 | -26.80 | 5.8 | 8.1 | 75.7 | 53.9 | 36 |
| 1985 | 12 | 22 | .0 | 2446421.5 | 22 45.805 | + 0 32.48 | 22 47.627 | + 0 43.79 | .96 | 34.87 | 1.16 | -26.81 | 5.8 | 8.1 | 73.7 | 54.2 | 48 |
| 1985 | 12 | 23 | .0 | 2446422.5 | 22 42.185 | + 0 10.38 | 22 44.009 | + 0 21.63 | .98 | 34.97 | 1.15 | -26.81 | 5.7 | 8.1 | 71.7 | 54.4 | 60 |
| 1985 | 12 | 24 | .0 | 2446423.5 | 22 38.734 | - 0 10.67 | 22 40.559 | + 0 .51 | 1.00 | 35.02 | 1.13 | -26.80 | 5.7 | 8.0 | 69.7 | 54.5 | 73 |
| 1985 | 12 | 25 | .0 | 2446424.5 | 22 35.440 | - 0 30.74 | 22 37.266 | - 0 19.63 | 1.02 | 35.02 | 1.12 | -26.79 | 5.7 | 8.0 | 67.8 | 54.6 | 85 |
| 1985 | 12 | 26 | .0 | 2446425.5 | 22 32.291 | - 0 49.90 | 22 34.119 | - 0 38.85 | 1.04 | 34.96 | 1.10 | -26.77 | 5.6 | 8.0 | 66.0 | 54.6 | 98 |
| 1985 | 12 | 27 | .0 | 2446426.5 | 22 29.278 | - 1 8.21 | 22 31.107 | - 0 57.22 | 1.06 | 34.85 | 1.09 | -26.75 | 5.6 | 8.0 | 64.2 | 54.5 | 111 |
| 1985 | 12 | 28 | .0 | 2446427.5 | 22 26.390 | - 1 25.73 | 22 28.220 | - 1 14.81 | 1.08 | 34.70 | 1.07 | -26.72 | 5.6 | 8.0 | 62.4 | 54.4 | 123 |
| 1985 | 12 | 29 | .0 | 2446428.5 | 22 23.618 | - 1 42.52 | 22 25.449 | - 1 31.65 | 1.10 | 34.51 | 1.06 | -26.68 | 5.5 | 7.9 | 60.6 | 54.2 | 136 |
| 1985 | 12 | 30 | .0 | 2446429.5 | 22 20.953 | - 1 58.63 | 22 22.786 | - 1 47.82 | 1.12 | 34.27 | 1.04 | -26.63 | 5.5 | 7.9 | 58.9 | 54.0 | 149 |
| 1985 | 12 | 31 | .0 | 2446430.5 | 22 18.387 | - 2 14.11 | 22 20.222 | - 2 3.37 | 1.14 | 34.00 | 1.03 | -26.58 | 5.4 | 7.9 | 57.2 | 53.7 | 160 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 1 | 1 | .0 | 2446431.5 | 22 15.913 | - 2 29.01 | 22 17.749 | - 2 18.33 | 1.16 | 33.68 | 1.01 | -26.51 | 5.4 | 7.9 | 55.5 | 53.4 | 167 |
| 1986 | 1 | 2 | .0 | 2446432.5 | 22 13.532 | - 2 43.38 | 22 15.360 | - 2 32.75 | 1.18 | 33.33 | .99 | -26.43 | 5.3 | 7.8 | 53.9 | 53.0 | 162 |
| 1986 | 1 | 3 | .0 | 2446433.5 | 22 11.210 | - 2 57.26 | 22 13.049 | - 2 46.69 | 1.20 | 32.93 | .98 | -26.34 | 5.3 | 7.8 | 52.3 | 52.6 | 150 |
| 1986 | 1 | 4 | .0 | 2446434.5 | 22 8.968 | - 3 10.69 | 22 10.805 | - 3 .18 | 1.22 | 32.51 | .96 | -26.24 | 5.2 | 7.8 | 50.7 | 52.1 | 137 |
| 1986 | 1 | 5 | .0 | 2446435.5 | 22 6.792 | - 3 23.72 | 22 8.634 | - 3 13.26 | 1.23 | 32.04 | .95 | -26.12 | 5.2 | 7.7 | 49.1 | 51.5 | 123 |
| 1986 | 1 | 6 | .0 | 2446436.5 | 22 4.675 | - 3 36.37 | 22 6.515 | - 3 25.97 | 1.25 | 31.54 | .93 | -25.99 | 5.1 | 7.7 | 47.5 | 50.9 | 109 |
| 1986 | 1 | 7 | .0 | 2446437.5 | 22 2.612 | - 3 48.69 | 22 4.457 | - 3 38.34 | 1.27 | 31.00 | .92 | -25.85 | 5.0 | 7.7 | 46.0 | 50.3 | 94 |
| 1986 | 1 | 8 | .0 | 2446438.5 | 22 .598 | - 4 .70 | 22 2.445 | - 3 50.41 | 1.29 | 30.43 | .90 | -25.68 | 5.0 | 7.6 | 44.4 | 49.6 | 79 |
| 1986 | 1 | 9 | .0 | 2446439.5 | 21 58.628 | - 4 12.46 | 22 .477 | - 4 2.22 | 1.31 | 29.82 | .89 | -25.50 | 4.9 | 7.6 | 42.9 | 48.8 | 64 |
| 1986 | 1 | 10 | .0 | 2446440.5 | 21 56.697 | - 4 23.97 | 21 58.548 | - 4 13.79 | 1.32 | 29.18 | .87 | -25.29 | 4.8 | 7.5 | 41.4 | 48.0 | 49 |
| 1986 | 1 | 11 | .0 | 2446441.5 | 21 54.802 | - 4 35.28 | 21 56.654 | - 4 25.15 | 1.34 | 28.49 | .86 | -25.07 | 4.8 | 7.5 | 39.9 | 47.2 | 35 |
| 1986 | 1 | 12 | .0 | 2446442.5 | 21 52.937 | - 4 46.42 | 21 54.791 | - 4 36.34 | 1.36 | 27.78 | .85 | -24.82 | 4.7 | 7.4 | 38.4 | 46.2 | 22 |
| 1986 | 1 | 13 | .0 | 2446443.5 | 21 51.099 | - 4 57.41 | 21 52.955 | - 4 47.39 | 1.37 | 27.02 | .83 | -24.54 | 4.6 | 7.4 | 36.9 | 45.3 | 13 |
| 1986 | 1 | 14 | .0 | 2446444.5 | 21 49.284 | - 5 8.29 | 21 51.142 | - 4 58.32 | 1.39 | 26.23 | .82 | -24.24 | 4.6 | 7.3 | 35.4 | 44.2 | 15 |
| 1986 | 1 | 15 | .0 | 2446445.5 | 21 47.489 | - 5 19.07 | 21 49.348 | - 5 9.15 | 1.40 | 25.40 | .80 | -23.91 | 4.5 | 7.3 | 34.0 | 43.2 | 25 |
| 1986 | 1 | 16 | .0 | 2446446.5 | 21 45.710 | - 5 29.79 | 21 47.571 | - 5 19.93 | 1.42 | 24.53 | .79 | -23.55 | 4.4 | 7.2 | 32.5 | 42.0 | 37 |
| 1986 | 1 | 17 | .0 | 2446447.5 | 21 43.944 | - 5 40.47 | 21 45.806 | - 5 30.66 | 1.43 | 23.62 | .78 | -23.15 | 4.3 | 7.2 | 31.0 | 40.8 | 49 |
| 1986 | 1 | 18 | .0 | 2446448.5 | 21 42.188 | - 5 51.14 | 21 44.052 | - 5 41.38 | 1.44 | 22.66 | .76 | -22.71 | 4.3 | 7.1 | 29.6 | 39.6 | 61 |
| 1986 | 1 | 19 | .0 | 2446449.5 | 21 40.439 | - 6 1.82 | 21 42.305 | - 5 52.11 | 1.46 | 21.67 | .75 | -22.24 | 4.2 | 7.1 | 28.2 | 38.2 | 73 |
| 1986 | 1 | 20 | .0 | 2446450.5 | 21 38.695 | - 6 12.52 | 21 40.563 | - 6 2.87 | 1.47 | 20.64 | .74 | -21.73 | 4.1 | 7.0 | 26.7 | 36.9 | 85 |
| 1986 | 1 | 21 | .0 | 2446451.5 | 21 36.954 | - 6 23.28 | 21 38.823 | - 6 13.68 | 1.48 | 19.56 | .72 | -21.17 | 4.0 | 7.0 | 25.3 | 35.4 | 98 |
| 1986 | 1 | 22 | .0 | 2446452.5 | 21 35.212 | - 6 34.12 | 21 37.084 | - 6 24.57 | 1.49 | 18.44 | .71 | -20.57 | 3.9 | 6.9 | 23.9 | 34.0 | 110 |
| 1986 | 1 | 23 | .0 | 2446453.5 | 21 33.469 | - 6 45.05 | 21 35.343 | - 6 35.56 | 1.50 | 17.27 | .70 | -19.92 | 3.9 | 6.8 | 22.5 | 32.4 | 122 |
| 1986 | 1 | 24 | .0 | 2446454.5 | 21 31.722 | - 6 56.10 | 21 33.598 | - 6 46.66 | 1.51 | 16.05 | .69 | -19.22 | 3.8 | 6.8 | 21.0 | 30.8 | 134 |
| 1986 | 1 | 25 | .0 | 2446455.5 | 21 29.970 | - 7 7.28 | 21 31.848 | - 6 57.90 | 1.52 | 14.79 | .68 | -18.47 | 3.7 | 6.7 | 19.6 | 29.2 | 146 |
| 1986 | 1 | 26 | .0 | 2446456.5 | 21 28.211 | - 7 18.61 | 21 30.092 | - 7 9.29 | 1.53 | 13.48 | .67 | -17.66 | 3.6 | 6.7 | 18.2 | 27.5 | 158 |
| 1986 | 1 | 27 | .0 | 2446457.5 | 21 26.445 | - 7 30.12 | 21 28.328 | - 7 20.85 | 1.54 | 12.12 | .66 | -16.80 | 3.6 | 6.6 | 16.9 | 25.7 | 167 |
| 1986 | 1 | 28 | .0 | 2446458.5 | 21 24.671 | - 7 41.80 | 21 26.556 | - 7 32.60 | 1.54 | 10.72 | .65 | -15.88 | 3.5 | 6.6 | 15.5 | 23.9 | 164 |
| 1986 | 1 | 29 | .0 | 2446459.5 | 21 22.888 | - 7 53.69 | 21 24.776 | - 7 44.54 | 1.55 | 9.27 | .64 | -14.91 | 3.4 | 6.5 | 14.2 | 22.1 | 154 |
| 1986 | 1 | 30 | .0 | 2446460.5 | 21 21.095 | - 8 5.78 | 21 22.986 | - 7 56.70 | 1.55 | 7.77 | .63 | -13.87 | 3.3 | 6.5 | 12.9 | 20.3 | 141 |
| 1986 | 1 | 31 | .0 | 2446461.5 | 21 19.294 | - 8 18.11 | 21 21.187 | - 8 9.09 | 1.56 | 6.23 | .62 | -12.78 | 3.3 | 6.4 | 11.6 | 18.5 | 127 |
| 1986 | 2 | 1 | .0 | 2446462.5 | 21 17.484 | - 8 30.66 | 21 19.379 | - 8 21.70 | 1.56 | 4.65 | .62 | -11.64 | 3.2 | 6.4 | 10.4 | 16.7 | 113 |
| 1986 | 2 | 2 | .0 | 2446463.5 | 21 15.665 | - 8 43.46 | 21 17.562 | - 8 34.56 | 1.56 | 3.02 | .61 | -10.44 | 3.2 | 6.3 | 9.3 | 15.1 | 99 |
| 1986 | 2 | 3 | .0 | 2446464.5 | 21 13.838 | - 8 56.51 | 21 15.740 | - 8 47.68 | 1.56 | 1.36 | .61 | -9.19 | 3.1 | 6.3 | 8.3 | 13.6 | 85 |
| 1986 | 2 | 4 | .0 | 2446465.5 | 21 12.005 | - 9 9.81 | 21 13.910 | - 9 1.04 | 1.56 | -.32 | .60 | -7.90 | 3.1 | 6.3 | 7.4 | 12.3 | 70 |
| 1986 | 2 | 5 | .0 | 2446466.5 | 21 10.166 | - 9 23.38 | 21 12.074 | - 9 14.67 | 1.56 | -2.04 | .60 | -6.57 | 3.0 | 6.2 | 6.8 | 11.4 | 56 |
| 1986 | 2 | 6 | .0 | 2446467.5 | 21 8.324 | - 9 37.21 | 21 10.235 | - 9 28.57 | 1.56 | -3.77 | .59 | -5.20 | 3.0 | 6.2 | 6.5 | 10.9 | 41 |
| 1986 | 2 | 7 | .0 | 2446468.5 | 21 6.478 | - 9 51.31 | 21 8.392 | - 9 42.73 | 1.56 | -5.52 | .59 | -3.80 | 3.0 | 6.2 | 6.6 | 11.0 | 28 |
| 1986 | 2 | 8 | .0 | 2446469.5 | 21 4.631 | -10 5.67 | 21 6.549 | - 9 57.16 | 1.56 | -7.28 | .59 | -2.38 | 2.9 | 6.2 | 6.9 | 11.7 | 15 |
| 1986 | 2 | 9 | .0 | 2446470.5 | 21 2.785 | -10 20.30 | 21 4.707 | -10 11.86 | 1.55 | -9.04 | .59 | -.95 | 2.9 | 6.1 | 7.6 | 12.8 | 11 |
| 1986 | 2 | 10 | .0 | 2446471.5 | 21 .942 | -10 35.20 | 21 2.867 | -10 26.83 | 1.54 | -10.79 | .59 | .49 | 2.9 | 6.1 | 8.5 | 14.4 | 20 |
| 1986 | 2 | 11 | .0 | 2446472.5 | 20 59.102 | -10 50.36 | 21 1.031 | -10 42.06 | 1.54 | -12.52 | .59 | 1.92 | 3.0 | 6.1 | 9.5 | 16.1 | 32 |
| 1986 | 2 | 12 | .0 | 2446473.5 | 20 57.268 | -11 5.79 | 20 59.201 | -10 57.56 | 1.53 | -14.24 | .59 | 3.34 | 3.0 | 6.1 | 10.7 | 18.1 | 45 |
| 1986 | 2 | 13 | .0 | 2446474.5 | 20 55.442 | -11 21.48 | 20 57.378 | -11 13.32 | 1.52 | -15.93 | .59 | 4.75 | 3.0 | 6.1 | 11.9 | 20.1 | 58 |
| 1986 | 2 | 14 | .0 | 2446475.5 | 20 53.624 | -11 37.43 | 20 55.564 | -11 29.34 | 1.51 | -17.59 | .59 | 6.13 | 3.0 | 6.1 | 13.2 | 22.3 | 70 |
| 1986 | 2 | 15 | .0 | 2446476.5 | 20 51.816 | -11 53.65 | 20 53.755 | -11 45.62 | 1.50 | -19.20 | .60 | 7.47 | 3.1 | 6.2 | 14.5 | 24.4 | 83 |
| 1986 | 2 | 16 | .0 | 2446477.5 | 20 50.018 | -12 10.13 | 20 51.966 | -12 2.17 | 1.49 | -20.78 | .60 | 8.78 | 3.2 | 6.2 | 15.9 | 26.6 | 95 |
| 1986 | 2 | 17 | .0 | 2446478.5 | 20 48.232 | -12 26.87 | 20 50.184 | -12 18.98 | 1.48 | -22.31 | .61 | 10.04 | 3.2 | 6.2 | 17.3 | 28.8 | 107 |
| 1986 | 2 | 18 | .0 | 2446479.5 | 20 46.457 | -12 43.88 | 20 48.413 | -12 36.06 | 1.46 | -23.78 | .62 | 11.26 | 3.3 | 6.2 | 18.7 | 30.9 | 119 |
| 1986 | 2 | 19 | .0 | 2446480.5 | 20 44.693 | -13 1.18 | 20 46.654 | -12 53.42 | 1.45 | -25.21 | .62 | 12.42 | 3.5 | 6.2 | 20.1 | 33.0 | 131 |
| 1986 | 2 | 20 | .0 | 2446481.5 | 20 42.941 | -13 18.75 | 20 44.907 | -13 11.06 | 1.43 | -26.58 | .63 | 13.53 | 3.6 | 6.3 | 21.5 | 35.1 | 144 |
| 1986 | 2 | 21 | .0 | 2446482.5 | 20 41.200 | -13 36.62 | 20 43.170 | -13 29.00 | 1.42 | -27.89 | .64 | 14.58 | 3.7 | 6.3 | 22.9 | 37.1 | 156 |
| 1986 | 2 | 22 | .0 | 2446483.5 | 20 39.468 | -13 54.80 | 20 41.443 | -13 47.25 | 1.40 | -29.14 | .65 | 15.58 | 3.9 | 6.3 | 24.3 | 39.1 | 167 |
| 1986 | 2 | 23 | .0 | 2446484.5 | 20 37.743 | -14 13.31 | 20 39.723 | -14 5.83 | 1.39 | -30.34 | .66 | 16.51 | 4.0 | 6.4 | 25.8 | 41.0 | 159 |
| 1986 | 2 | 24 | .0 | 2446485.5 | 20 36.025 | -14 32.16 | 20 38.010 | -14 24.74 | 1.37 | -31.48 | .67 | 17.39 | 4.1 | 6.4 | 27.2 | 42.9 | 159 |
| 1986 | 2 | 25 | .0 | 2446486.5 | 20 34.311 | -14 51.37 | 20 36.301 | -14 44.03 | 1.35 | -32.57 | .68 | 18.22 | 4.3 | 6.4 | 28.7 | 44.6 | 146 |
| 1986 | 2 | 26 | .0 | 2446487.5 | 20 32.598 | -15 10.98 | 20 34.593 | -15 3.70 | 1.33 | -33.60 | .69 | 18.99 | 4.4 | 6.5 | 30.1 | 46.4 | 132 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 2 | 27 | .0 | 2446488.5 | 20 30.884 | -15 31.00 | 20 32.884 | -15 23.79 | 1.31 | -34.58 | .70 | 19.70 | 4.5 | 6.5 | 31.6 | 48.0 | 118 |
| 1986 | 2 | 28 | .0 | 2446489.5 | 20 29.165 | -15 51.47 | 20 31.170 | -15 44.34 | 1.29 | -35.51 | .71 | 20.37 | 4.6 | 6.6 | 33.0 | 49.6 | 103 |
| 1986 | 3 | 1 | .0 | 2446490.5 | 20 27.437 | -16 12.43 | 20 29.448 | -16 5.37 | 1.27 | -36.38 | .72 | 20.99 | 4.7 | 6.6 | 34.5 | 51.1 | 89 |
| 1986 | 3 | 2 | .0 | 2446491.5 | 20 25.696 | -16 33.92 | 20 27.713 | -16 26.92 | 1.25 | -37.21 | .73 | 21.56 | 4.8 | 6.6 | 36.0 | 52.5 | 74 |
| 1986 | 3 | 3 | .0 | 2446492.5 | 20 23.938 | -16 55.97 | 20 25.961 | -16 49.04 | 1.23 | -37.98 | .75 | 22.08 | 4.9 | 6.7 | 37.4 | 53.9 | 60 |
| 1986 | 3 | 4 | .0 | 2446493.5 | 20 22.157 | -17 18.64 | 20 24.187 | -17 11.78 | 1.20 | -38.71 | .76 | 22.57 | 5.0 | 6.7 | 38.9 | 55.2 | 45 |
| 1986 | 3 | 5 | .0 | 2446494.5 | 20 20.348 | -17 41.97 | 20 22.385 | -17 35.19 | 1.18 | -39.39 | .77 | 23.01 | 5.0 | 6.7 | 40.4 | 56.4 | 31 |
| 1986 | 3 | 6 | .0 | 2446495.5 | 20 18.505 | -18 6.03 | 20 20.548 | -17 59.33 | 1.16 | -40.03 | .79 | 23.42 | 5.0 | 6.8 | 41.9 | 57.6 | 17 |
| 1986 | 3 | 7 | .0 | 2446496.5 | 20 16.620 | -18 30.88 | 20 18.670 | -18 24.26 | 1.14 | -40.62 | .80 | 23.79 | 5.0 | 6.8 | 43.5 | 58.7 | 6 |
| 1986 | 3 | 8 | .0 | 2446497.5 | 20 14.686 | -18 56.59 | 20 16.744 | -18 50.04 | 1.11 | -41.17 | .81 | 24.14 | 5.0 | 6.8 | 45.0 | 59.7 | 13 |
| 1986 | 3 | 9 | .0 | 2446498.5 | 20 12.695 | -19 23.23 | 20 14.761 | -19 16.77 | 1.09 | -41.67 | .83 | 24.45 | 5.0 | 6.9 | 46.6 | 60.7 | 26 |
| 1986 | 3 | 10 | .0 | 2446499.5 | 20 10.638 | -19 50.87 | 20 12.712 | -19 44.50 | 1.06 | -42.13 | .84 | 24.73 | 5.0 | 6.9 | 48.1 | 61.5 | 40 |
| 1986 | 3 | 11 | .0 | 2446500.5 | 20 8.505 | -20 19.62 | 20 10.587 | -20 13.34 | 1.04 | -42.54 | .86 | 24.99 | 5.0 | 6.9 | 49.7 | 62.4 | 53 |
| 1986 | 3 | 12 | .0 | 2446501.5 | 20 6.285 | -20 49.57 | 20 8.376 | -20 43.38 | 1.01 | -42.90 | .87 | 25.22 | 5.0 | 6.9 | 51.3 | 63.1 | 67 |
| 1986 | 3 | 13 | .0 | 2446502.5 | 20 3.966 | -21 20.81 | 20 6.065 | -21 14.73 | .99 | -43.22 | .88 | 25.43 | 4.9 | 6.9 | 53.0 | 63.8 | 80 |
| 1986 | 3 | 14 | .0 | 2446503.5 | 20 1.533 | -21 53.47 | 20 3.642 | -21 47.49 | .96 | -43.49 | .90 | 25.62 | 4.9 | 7.0 | 54.6 | 64.4 | 92 |
| 1986 | 3 | 15 | .0 | 2446504.5 | 19 58.971 | -22 27.66 | 20 1.091 | -22 21.79 | .94 | -43.71 | .91 | 25.79 | 4.9 | 7.0 | 56.3 | 64.9 | 105 |
| 1986 | 3 | 16 | .0 | 2446505.5 | 19 56.264 | -23 3.52 | 19 58.395 | -22 57.87 | .91 | -43.88 | .93 | 25.95 | 4.8 | 7.0 | 58.1 | 65.3 | 118 |
| 1986 | 3 | 17 | .0 | 2446506.5 | 19 53.392 | -23 41.18 | 19 55.535 | -23 35.56 | .89 | -44.00 | .94 | 26.08 | 4.8 | 7.0 | 59.8 | 65.7 | 130 |
| 1986 | 3 | 18 | .0 | 2446507.5 | 19 50.333 | -24 20.81 | 19 52.489 | -24 15.32 | .86 | -44.05 | .96 | 26.20 | 4.7 | 7.0 | 61.7 | 65.9 | 143 |
| 1986 | 3 | 19 | .0 | 2446508.5 | 19 47.062 | -25 2.56 | 19 49.232 | -24 57.22 | .84 | -44.05 | .97 | 26.31 | 4.7 | 7.0 | 63.5 | 66.1 | 156 |
| 1986 | 3 | 20 | .0 | 2446509.5 | 19 43.551 | -25 46.62 | 19 45.735 | -25 41.44 | .81 | -43.97 | .99 | 26.40 | 4.6 | 7.0 | 65.4 | 66.2 | 169 |
| 1986 | 3 | 21 | .0 | 2446510.5 | 19 39.767 | -26 33.16 | 19 41.967 | -26 28.15 | .79 | -43.83 | 1.00 | 26.49 | 4.6 | 7.0 | 67.4 | 66.2 | 177 |
| 1986 | 3 | 22 | .0 | 2446511.5 | 19 35.672 | -27 22.39 | 19 37.890 | -27 17.57 | .76 | -43.60 | 1.02 | 26.56 | 4.5 | 7.0 | 69.5 | 66.1 | 163 |
| 1986 | 3 | 23 | .0 | 2446512.5 | 19 31.224 | -28 14.49 | 19 33.460 | -28 9.87 | .74 | -43.28 | 1.04 | 26.62 | 4.5 | 7.0 | 71.6 | 65.9 | 149 |
| 1986 | 3 | 24 | .0 | 2446513.5 | 19 26.373 | -29 9.66 | 19 28.628 | -29 5.28 | .71 | -42.87 | 1.05 | 26.67 | 4.5 | 7.0 | 73.8 | 65.6 | 134 |
| 1986 | 3 | 25 | .0 | 2446514.5 | 19 21.059 | -30 8.11 | 19 23.336 | -30 3.98 | .69 | -42.35 | 1.07 | 26.71 | 4.4 | 7.0 | 76.1 | 65.2 | 119 |
| 1986 | 3 | 26 | .0 | 2446515.5 | 19 15.216 | -31 9.99 | 19 17.516 | -31 6.15 | .66 | -41.71 | 1.08 | 26.74 | 4.4 | 6.9 | 78.5 | 64.6 | 104 |
| 1986 | 3 | 27 | .0 | 2446516.5 | 19 8.764 | -32 15.46 | 19 11.090 | -32 11.93 | .64 | -40.94 | 1.10 | 26.77 | 4.3 | 6.9 | 81.0 | 63.9 | 88 |
| 1986 | 3 | 28 | .0 | 2446517.5 | 19 1.611 | -33 24.60 | 19 3.965 | -33 21.42 | .62 | -40.01 | 1.11 | 26.79 | 4.3 | 6.9 | 83.6 | 63.0 | 71 |
| 1986 | 3 | 29 | .0 | 2446518.5 | 18 53.650 | -34 37.41 | 18 56.034 | -34 34.62 | .59 | -38.91 | 1.13 | 26.80 | 4.2 | 6.9 | 86.4 | 62.0 | 55 |
| 1986 | 3 | 30 | .0 | 2446519.5 | 18 44.758 | -35 53.75 | 18 47.174 | -35 51.41 | .57 | -37.61 | 1.14 | 26.81 | 4.2 | 6.9 | 89.2 | 60.8 | 39 |
| 1986 | 3 | 31 | .0 | 2446520.5 | 18 34.790 | -37 13.31 | 18 37.241 | -37 11.47 | .55 | -36.09 | 1.16 | 26.81 | 4.1 | 6.8 | 92.3 | 59.4 | 24 |
| 1986 | 4 | 1 | .0 | 2446521.5 | 18 23.586 | -38 35.50 | 18 26.074 | -38 34.25 | .53 | -34.33 | 1.17 | 26.80 | 4.1 | 6.8 | 95.5 | 57.9 | 11 |
| 1986 | 4 | 2 | .0 | 2446522.5 | 18 10.970 | -39 59.41 | 18 13.495 | -39 58.81 | .51 | -32.30 | 1.19 | 26.79 | 4.1 | 6.8 | 98.9 | 56.1 | 15 |
| 1986 | 4 | 3 | .0 | 2446523.5 | 17 56.752 | -41 23.66 | 17 59.315 | -41 23.80 | .49 | -29.98 | 1.21 | 26.78 | 4.0 | 6.8 | 102.4 | 54.1 | 29 |
| 1986 | 4 | 4 | .0 | 2446524.5 | 17 40.750 | -42 46.30 | 17 43.347 | -42 47.28 | .48 | -27.33 | 1.22 | 26.77 | 4.0 | 6.8 | 106.2 | 51.9 | 45 |
| 1986 | 4 | 5 | .0 | 2446525.5 | 17 22.802 | -44 4.77 | 17 25.430 | -44 6.69 | .46 | -24.35 | 1.24 | 26.75 | 4.0 | 6.7 | 110.1 | 49.5 | 61 |
| 1986 | 4 | 6 | .0 | 2446526.5 | 17 2.810 | -45 15.84 | 17 5.455 | -45 18.79 | .45 | -21.02 | 1.25 | 26.72 | 4.0 | 6.7 | 114.1 | 46.8 | 77 |
| 1986 | 4 | 7 | .0 | 2446527.5 | 16 40.781 | -46 15.72 | 16 43.436 | -46 19.78 | .44 | -17.35 | 1.27 | 26.69 | 4.0 | 6.7 | 118.3 | 44.1 | 92 |
| 1986 | 4 | 8 | .0 | 2446528.5 | 16 16.875 | -47 .34 | 16 19.520 | -47 5.57 | .43 | -13.37 | 1.28 | 26.66 | 4.0 | 6.7 | 122.6 | 41.1 | 108 |
| 1986 | 4 | 9 | .0 | 2446529.5 | 15 51.450 | -47 25.83 | 15 54.062 | -47 32.24 | .42 | -9.11 | 1.30 | 26.63 | 4.0 | 6.8 | 126.8 | 38.1 | 123 |
| 1986 | 4 | 10 | .0 | 2446530.5 | 15 25.059 | -47 29.12 | 15 27.616 | -47 36.69 | .42 | -4.64 | 1.31 | 26.60 | 4.0 | 6.8 | 131.0 | 35.1 | 136 |
| 1986 | 4 | 11 | .0 | 2446531.5 | 14 58.399 | -47 8.60 | 15 .882 | -47 17.23 | .42 | -.03 | 1.33 | 26.56 | 4.0 | 6.8 | 135.0 | 32.2 | 147 |
| 1986 | 4 | 12 | .0 | 2446532.5 | 14 32.212 | -46 24.45 | 14 34.607 | -46 34.01 | .42 | 4.62 | 1.34 | 26.52 | 4.1 | 6.9 | 138.8 | 29.4 | 152 |
| 1986 | 4 | 13 | .0 | 2446533.5 | 14 7.168 | -45 18.69 | 14 9.471 | -45 29.03 | .42 | 9.23 | 1.36 | 26.48 | 4.1 | 7.0 | 142.1 | 26.9 | 142 |
| 1986 | 4 | 14 | .0 | 2446534.5 | 13 43.775 | -43 54.76 | 13 45.988 | -44 5.72 | .43 | 13.70 | 1.37 | 26.44 | 4.2 | 7.0 | 144.9 | 24.8 | 138 |
| 1986 | 4 | 15 | .0 | 2446535.5 | 13 22.340 | -42 16.93 | 13 24.471 | -42 28.36 | .44 | 17.97 | 1.39 | 26.39 | 4.3 | 7.1 | 147.1 | 23.1 | 125 |
| 1986 | 4 | 16 | .0 | 2446536.5 | 13 2.982 | -40 29.64 | 13 5.041 | -40 41.40 | .45 | 21.98 | 1.41 | 26.35 | 4.4 | 7.2 | 148.5 | 21.9 | 112 |
| 1986 | 4 | 17 | .0 | 2446537.5 | 12 45.678 | -38 37.00 | 12 47.677 | -38 48.99 | .46 | 25.69 | 1.42 | 26.30 | 4.5 | 7.3 | 149.3 | 21.2 | 98 |
| 1986 | 4 | 18 | .0 | 2446538.5 | 12 30.311 | -36 42.48 | 12 32.260 | -36 54.61 | .48 | 29.08 | 1.44 | 26.25 | 4.6 | 7.5 | 149.3 | 20.9 | 83 |
| 1986 | 4 | 19 | .0 | 2446539.5 | 12 16.711 | -34 48.83 | 12 18.621 | -35 1.04 | .50 | 32.16 | 1.45 | 26.20 | 4.7 | 7.6 | 148.8 | 21.0 | 69 |
| 1986 | 4 | 20 | .0 | 2446540.5 | 12 4.691 | -32 58.06 | 12 6.570 | -33 10.31 | .51 | 34.93 | 1.47 | 26.15 | 4.8 | 7.7 | 147.8 | 21.4 | 56 |
| 1986 | 4 | 21 | .0 | 2446541.5 | 11 54.068 | -31 11.56 | 11 55.923 | -31 23.80 | .54 | 37.41 | 1.48 | 26.10 | 4.9 | 7.9 | 146.4 | 22.1 | 43 |
| 1986 | 4 | 22 | .0 | 2446542.5 | 11 44.665 | -29 30.18 | 11 46.501 | -29 42.40 | .56 | 39.62 | 1.50 | 26.05 | 5.1 | 8.0 | 144.8 | 22.8 | 33 |
| 1986 | 4 | 23 | .0 | 2446543.5 | 11 36.329 | -27 54.39 | 11 38.150 | -28 6.58 | .58 | 41.59 | 1.51 | 26.00 | 5.2 | 8.1 | 143.1 | 23.6 | 29 |
| 1986 | 4 | 24 | .0 | 2446544.5 | 11 28.919 | -26 24.37 | 11 30.730 | -26 36.51 | .61 | 43.34 | 1.53 | 25.95 | 5.3 | 8.2 | 141.3 | 24.4 | 34 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 4 | 25 | .0 | 2446545.5 | 11 22.318 | -25 .10 | 11 24.120 | -25 12.18 | .63 | 44.89 | 1.54 | 25.89 | 5.4 | 8.4 | 139.4 | 25.1 | 44 |
| 1986 | 4 | 26 | .0 | 2446546.5 | 11 16.420 | -23 41.41 | 11 18.217 | -23 53.44 | .66 | 46.28 | 1.56 | 25.84 | 5.5 | 8.5 | 137.5 | 25.9 | 57 |
| 1986 | 4 | 27 | .0 | 2446547.5 | 11 11.140 | -22 28.05 | 11 12.932 | -22 40.03 | .68 | 47.50 | 1.57 | 25.78 | 5.6 | 8.6 | 135.7 | 26.6 | 72 |
| 1986 | 4 | 28 | .0 | 2446548.5 | 11 6.399 | -21 19.74 | 11 8.189 | -21 31.66 | .71 | 48.60 | 1.59 | 25.73 | 5.8 | 8.8 | 133.8 | 27.3 | 86 |
| 1986 | 4 | 29 | .0 | 2446549.5 | 11 2.134 | -20 16.15 | 11 3.922 | -20 28.01 | .74 | 49.58 | 1.60 | 25.67 | 5.9 | 8.9 | 132.0 | 27.9 | 100 |
| 1986 | 4 | 30 | .0 | 2446550.5 | 10 58.289 | -19 16.97 | 11 -.076 | -19 28.77 | .77 | 50.45 | 1.62 | 25.62 | 6.0 | 9.0 | 130.3 | 28.4 | 114 |
| 1986 | 5 | 1 | .0 | 2446551.5 | 10 54.816 | -18 21.86 | 10 56.602 | -18 33.61 | .80 | 51.23 | 1.63 | 25.56 | 6.1 | 9.1 | 128.6 | 28.9 | 127 |
| 1986 | 5 | 2 | .0 | 2446552.5 | 10 51.674 | -17 30.54 | 10 53.460 | -17 42.24 | .83 | 51.93 | 1.65 | 25.50 | 6.2 | 9.3 | 126.9 | 29.3 | 139 |
| 1986 | 5 | 3 | .0 | 2446553.5 | 10 48.827 | -16 42.70 | 10 50.614 | -16 54.36 | .86 | 52.55 | 1.66 | 25.45 | 6.3 | 9.4 | 125.3 | 29.7 | 148 |
| 1986 | 5 | 4 | .0 | 2446554.5 | 10 46.245 | -15 58.09 | 10 48.032 | -16 9.70 | .89 | 53.11 | 1.67 | 25.39 | 6.3 | 9.5 | 123.7 | 30.1 | 156 |
| 1986 | 5 | 5 | .0 | 2446555.5 | 10 43.901 | -15 16.45 | 10 45.689 | -15 28.01 | .92 | 53.61 | 1.69 | 25.33 | 6.4 | 9.6 | 122.2 | 30.4 | 153 |
| 1986 | 5 | 6 | .0 | 2446556.5 | 10 41.771 | -14 37.56 | 10 43.560 | -14 49.08 | .95 | 54.06 | 1.70 | 25.28 | 6.5 | 9.7 | 120.7 | 30.6 | 147 |
| 1986 | 5 | 7 | .0 | 2446557.5 | 10 39.834 | -14 1.19 | 10 41.624 | -14 12.67 | .98 | 54.47 | 1.72 | 25.22 | 6.6 | 9.8 | 119.2 | 30.8 | 138 |
| 1986 | 5 | 8 | .0 | 2446558.5 | 10 38.073 | -13 27.17 | 10 39.865 | -13 38.61 | 1.01 | 54.83 | 1.73 | 25.16 | 6.7 | 9.9 | 117.8 | 31.0 | 127 |
| 1986 | 5 | 9 | .0 | 2446559.5 | 10 36.472 | -12 55.30 | 10 38.265 | -13 6.71 | 1.05 | 55.15 | 1.75 | 25.11 | 6.8 | 10.0 | 116.4 | 31.2 | 116 |
| 1986 | 5 | 10 | .0 | 2446560.5 | 10 35.017 | -12 25.44 | 10 36.811 | -12 36.82 | 1.08 | 55.43 | 1.76 | 25.05 | 6.8 | 10.1 | 115.0 | 31.3 | 105 |
| 1986 | 5 | 11 | .0 | 2446561.5 | 10 33.695 | -11 57.42 | 10 35.490 | -12 8.78 | 1.11 | 55.69 | 1.78 | 24.99 | 6.9 | 10.2 | 113.7 | 31.4 | 94 |
| 1986 | 5 | 12 | .0 | 2446562.5 | 10 32.494 | -11 31.13 | 10 34.291 | -11 42.46 | 1.14 | 55.91 | 1.79 | 24.94 | 7.0 | 10.3 | 112.4 | 31.4 | 82 |
| 1986 | 5 | 13 | .0 | 2446563.5 | 10 31.406 | -11 6.43 | 10 33.204 | -11 17.76 | 1.17 | 56.11 | 1.81 | 24.88 | 7.1 | 10.4 | 111.2 | 31.5 | 71 |
| 1986 | 5 | 14 | .0 | 2446564.5 | 10 30.420 | -10 43.21 | 10 32.219 | -10 54.50 | 1.21 | 56.28 | 1.82 | 24.82 | 7.1 | 10.5 | 109.9 | 31.5 | 60 |
| 1986 | 5 | 15 | .0 | 2446565.5 | 10 29.530 | -10 21.38 | 10 31.330 | -10 32.64 | 1.24 | 56.43 | 1.83 | 24.77 | 7.2 | 10.6 | 108.7 | 31.5 | 49 |
| 1986 | 5 | 16 | .0 | 2446566.5 | 10 28.727 | -10 .83 | 10 30.525 | -10 12.07 | 1.27 | 56.56 | 1.85 | 24.71 | 7.3 | 10.7 | 107.5 | 31.5 | 38 |
| 1986 | 5 | 17 | .0 | 2446567.5 | 10 28.006 | - 9 41.48 | 10 29.808 | - 9 52.70 | 1.31 | 56.67 | 1.86 | 24.65 | 7.3 | 10.8 | 106.3 | 31.4 | 28 |
| 1986 | 5 | 18 | .0 | 2446568.5 | 10 27.359 | - 9 23.25 | 10 29.162 | - 9 34.46 | 1.34 | 56.76 | 1.88 | 24.60 | 7.4 | 10.9 | 105.2 | 31.3 | 22 |
| 1986 | 5 | 19 | .0 | 2446569.5 | 10 26.783 | - 9 6.06 | 10 28.588 | - 9 17.26 | 1.37 | 56.83 | 1.89 | 24.54 | 7.4 | 11.0 | 104.0 | 31.3 | 22 |
| 1986 | 5 | 20 | .0 | 2446570.5 | 10 26.272 | - 8 49.86 | 10 28.078 | - 9 1.05 | 1.40 | 56.89 | 1.90 | 24.49 | 7.5 | 11.0 | 102.9 | 31.2 | 29 |
| 1986 | 5 | 21 | .0 | 2446571.5 | 10 25.821 | - 8 34.58 | 10 27.628 | - 8 45.75 | 1.44 | 56.93 | 1.92 | 24.43 | 7.6 | 11.1 | 101.8 | 31.1 | 40 |
| 1986 | 5 | 22 | .0 | 2446572.5 | 10 25.427 | - 8 20.17 | 10 27.235 | - 8 31.33 | 1.47 | 56.96 | 1.93 | 24.38 | 7.6 | 11.2 | 100.7 | 30.8 | 53 |
| 1986 | 5 | 23 | .0 | 2446573.5 | 10 25.086 | - 8 6.56 | 10 26.895 | - 8 17.71 | 1.50 | 56.98 | 1.95 | 24.32 | 7.7 | 11.3 | 99.6 | 30.8 | 67 |
| 1986 | 5 | 24 | .0 | 2446574.5 | 10 24.794 | - 7 53.72 | 10 26.604 | - 8 4.86 | 1.54 | 56.98 | 1.96 | 24.27 | 7.7 | 11.4 | 98.6 | 30.7 | 81 |
| 1986 | 5 | 25 | .0 | 2446575.5 | 10 24.549 | - 7 41.60 | 10 26.360 | - 7 52.73 | 1.57 | 56.97 | 1.98 | 24.21 | 7.8 | 11.4 | 97.5 | 30.6 | 96 |
| 1986 | 5 | 26 | .0 | 2446576.5 | 10 24.347 | - 7 30.15 | 10 26.159 | - 7 41.28 | 1.60 | 56.95 | 1.99 | 24.16 | 7.8 | 11.5 | 96.5 | 30.4 | 110 |
| 1986 | 5 | 27 | .0 | 2446577.5 | 10 24.187 | - 7 19.35 | 10 25.999 | - 7 30.48 | 1.63 | 56.93 | 2.00 | 24.10 | 7.9 | 11.6 | 95.5 | 30.2 | 124 |
| 1986 | 5 | 28 | .0 | 2446578.5 | 10 24.065 | - 7 9.15 | 10 25.878 | - 7 20.27 | 1.67 | 56.89 | 2.02 | 24.05 | 7.9 | 11.7 | 94.5 | 30.1 | 137 |
| 1986 | 5 | 29 | .0 | 2446579.5 | 10 23.979 | - 6 59.52 | 10 25.794 | - 7 10.64 | 1.70 | 56.84 | 2.03 | 24.00 | 8.0 | 11.7 | 93.5 | 29.9 | 149 |
| 1986 | 5 | 30 | .0 | 2446580.5 | 10 23.929 | - 6 50.44 | 10 25.743 | - 7 1.56 | 1.73 | 56.78 | 2.04 | 23.94 | 8.0 | 11.8 | 92.5 | 29.7 | 157 |
| 1986 | 5 | 31 | .0 | 2446581.5 | 10 23.910 | - 6 41.88 | 10 25.724 | - 6 52.99 | 1.77 | 56.71 | 2.06 | 23.89 | 8.1 | 11.9 | 91.5 | 29.5 | 160 |
| 1986 | 6 | 1 | .0 | 2446582.5 | 10 23.923 | - 6 33.81 | 10 25.739 | - 6 44.92 | 1.80 | 56.64 | 2.07 | 23.84 | 8.1 | 11.9 | 90.5 | 29.3 | 155 |
| 1986 | 6 | 2 | .0 | 2446583.5 | 10 23.965 | - 6 26.20 | 10 25.781 | - 6 37.31 | 1.83 | 56.55 | 2.09 | 23.78 | 8.2 | 12.0 | 89.6 | 29.1 | 146 |
| 1986 | 6 | 3 | .0 | 2446584.5 | 10 24.035 | - 6 19.04 | 10 25.852 | - 6 30.14 | 1.86 | 56.46 | 2.10 | 23.73 | 8.2 | 12.1 | 88.6 | 28.9 | 136 |
| 1986 | 6 | 4 | .0 | 2446585.5 | 10 24.131 | - 6 12.30 | 10 25.948 | - 6 23.41 | 1.90 | 56.36 | 2.11 | 23.68 | 8.3 | 12.1 | 87.7 | 28.7 | 125 |
| 1986 | 6 | 5 | .0 | 2446586.5 | 10 24.252 | - 6 5.96 | 10 26.070 | - 6 17.07 | 1.93 | 56.25 | 2.13 | 23.63 | 8.3 | 12.2 | 86.7 | 28.4 | 114 |
| 1986 | 6 | 6 | .0 | 2446587.5 | 10 24.397 | - 6 .01 | 10 26.215 | - 6 11.12 | 1.96 | 56.13 | 2.14 | 23.58 | 8.4 | 12.3 | 85.8 | 28.2 | 103 |
| 1986 | 6 | 7 | .0 | 2446588.5 | 10 24.565 | - 5 54.43 | 10 26.383 | - 6 5.54 | 1.99 | 56.00 | 2.15 | 23.52 | 8.4 | 12.3 | 84.9 | 28.0 | 92 |
| 1986 | 6 | 8 | .0 | 2446589.5 | 10 24.754 | - 5 49.20 | 10 26.573 | - 6 .32 | 2.03 | 55.86 | 2.17 | 23.47 | 8.5 | 12.4 | 84.0 | 27.7 | 81 |
| 1986 | 6 | 9 | .0 | 2446590.5 | 10 24.963 | - 5 44.31 | 10 26.783 | - 5 55.43 | 2.06 | 55.72 | 2.18 | 23.42 | 8.5 | 12.5 | 83.0 | 27.5 | 69 |
| 1986 | 6 | 10 | .0 | 2446591.5 | 10 25.192 | - 5 39.74 | 10 27.012 | - 5 50.86 | 2.09 | 55.57 | 2.19 | 23.37 | 8.6 | 12.5 | 82.1 | 27.3 | 58 |
| 1986 | 6 | 11 | .0 | 2446592.5 | 10 25.439 | - 5 35.48 | 10 27.260 | - 5 46.61 | 2.12 | 55.41 | 2.21 | 23.32 | 8.6 | 12.6 | 81.2 | 27.0 | 47 |
| 1986 | 6 | 12 | .0 | 2446593.5 | 10 25.704 | - 5 31.51 | 10 27.525 | - 5 42.64 | 2.15 | 55.25 | 2.22 | 23.27 | 8.7 | 12.6 | 80.3 | 26.8 | 36 |
| 1986 | 6 | 13 | .0 | 2446594.5 | 10 25.986 | - 5 27.83 | 10 27.808 | - 5 38.97 | 2.19 | 55.08 | 2.24 | 23.22 | 8.7 | 12.7 | 79.5 | 26.5 | 26 |
| 1986 | 6 | 14 | .0 | 2446595.5 | 10 26.284 | - 5 24.42 | 10 28.106 | - 5 35.56 | 2.22 | 54.90 | 2.25 | 23.17 | 8.8 | 12.7 | 78.6 | 26.3 | 19 |
| 1986 | 6 | 15 | .0 | 2446596.5 | 10 26.597 | - 5 21.27 | 10 28.419 | - 5 32.42 | 2.25 | 54.71 | 2.26 | 23.12 | 8.8 | 12.8 | 77.7 | 26.0 | 18 |
| 1986 | 6 | 16 | .0 | 2446597.5 | 10 26.925 | - 5 18.38 | 10 28.746 | - 5 29.53 | 2.28 | 54.52 | 2.28 | 23.07 | 8.9 | 12.9 | 76.8 | 25.8 | 25 |
| 1986 | 6 | 17 | .0 | 2446598.5 | 10 27.266 | - 5 15.72 | 10 29.088 | - 5 26.88 | 2.31 | 54.33 | 2.29 | 23.03 | 8.9 | 12.9 | 76.0 | 25.5 | 35 |
| 1986 | 6 | 18 | .0 | 2446599.5 | 10 27.620 | - 5 13.30 | 10 29.443 | - 5 24.46 | 2.34 | 54.12 | 2.30 | 22.98 | 9.0 | 13.0 | 75.1 | 25.2 | 48 |
| 1986 | 6 | 19 | .0 | 2446600.5 | 10 27.988 | - 5 11.10 | 10 29.810 | - 5 22.27 | 2.37 | 53.91 | 2.32 | 22.93 | 9.0 | 13.0 | 74.2 | 25.0 | 61 |
| 1986 | 6 | 20 | .0 | 2446601.5 | 10 28.367 | - 5 9.11 | 10 30.189 | - 5 20.29 | 2.41 | 53.70 | 2.33 | 22.88 | 9.1 | 13.1 | 73.4 | 24.7 | 75 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 6 | 21 | .0 | 2446602.5 | 10 28.757 | - 5 7.33 | 10 30.58[illegible] | - 5 18.52 | 2.44 | 53.48 | 2.34 | 22.83 | 9.1 | 13.1 | 72.5 | 24.5 | 90 |
| 1986 | 6 | 22 | .0 | 2446603.5 | 10 29.159 | - 5 5.75 | 10 30.982 | - 5 16.94 | 2.47 | 53.26 | 2.35 | 22.79 | 9.2 | 13.2 | 71.7 | 24.2 | 104 |
| 1986 | 6 | 23 | .0 | 2446604.5 | 10 29.571 | - 5 4.36 | 10 31.394 | - 5 15.56 | 2.50 | 53.03 | 2.37 | 22.74 | 9.2 | 13.2 | 70.8 | 23.9 | 118 |
| 1986 | 6 | 24 | .0 | 2446605.5 | 10 29.993 | - 5 3.16 | 10 31.817 | - 5 14.36 | 2.53 | 52.80 | 2.38 | 22.69 | 9.3 | 13.3 | 70.0 | 23.6 | 132 |
| 1986 | 6 | 25 | .0 | 2446606.5 | 10 30.425 | - 5 2.13 | 10 32.245 | - 5 13.35 | 2.56 | 52.56 | 2.39 | 22.65 | 9.3 | 13.3 | 69.2 | 23.4 | 145 |
| 1986 | 6 | 26 | .0 | 2446607.5 | 10 30.866 | - 5 1.28 | 10 32.69[illegible] | - 5 12.50 | 2.59 | 52.32 | 2.41 | 22.60 | 9.4 | 13.4 | 68.3 | 23.1 | 156 |
| 1986 | 6 | 27 | .0 | 2446608.5 | 10 31.316 | - 5 .59 | 10 33.14[illegible] | - 5 11.82 | 2.62 | 52.08 | 2.42 | 22.55 | 9.4 | 13.4 | 67.5 | 22.8 | 162 |
| 1986 | 6 | 28 | .0 | 2446609.5 | 10 31.774 | - 5 .07 | 10 33.595 | - 5 11.31 | 2.65 | 51.82 | 2.43 | 22.51 | 9.5 | 13.5 | 66.7 | 22.6 | 160 |
| 1986 | 6 | 29 | .0 | 2446610.5 | 10 32.241 | - 4 59.70 | 10 34.065 | - 5 10.95 | 2.68 | 51.57 | 2.45 | 22.46 | 9.5 | 13.5 | 65.9 | 22.3 | 151 |
| 1986 | 6 | 30 | .0 | 2446611.5 | 10 32.716 | - 4 59.49 | 10 34.54[illegible] | - 5 10.74 | 2.71 | 51.30 | 2.46 | 22.42 | 9.6 | 13.6 | 65.0 | 22.0 | 141 |
| 1986 | 7 | 1 | .0 | 2446612.5 | 10 33.198 | - 4 59.43 | 10 35.023 | - 5 10.68 | 2.74 | 51.03 | 2.47 | 22.37 | 9.6 | 13.6 | 64.2 | 21.7 | 130 |
| 1986 | 7 | 2 | .0 | 2446613.5 | 10 33.688 | - 4 59.50 | 10 35.512 | - 5 10.77 | 2.77 | 50.76 | 2.49 | 22.33 | 9.7 | 13.7 | 63.4 | 21.5 | 119 |
| 1986 | 7 | 3 | .0 | 2446614.5 | 10 34.185 | - 4 59.72 | 10 36.005 | - 5 11.00 | 2.80 | 50.48 | 2.50 | 22.29 | 9.7 | 13.7 | 62.6 | 21.2 | 108 |
| 1986 | 7 | 4 | .0 | 2446615.5 | 10 34.688 | - 5 .07 | 10 36.513 | - 5 11.36 | 2.83 | 50.20 | 2.51 | 22.24 | 9.8 | 13.8 | 61.8 | 20.9 | 97 |
| 1986 | 7 | 5 | .0 | 2446616.5 | 10 35.198 | - 5 .56 | 10 37.023 | - 5 11.85 | 2.86 | 49.91 | 2.52 | 22.20 | 9.8 | 13.8 | 61.0 | 20.6 | 85 |
| 1986 | 7 | 6 | .0 | 2446617.5 | 10 35.714 | - 5 1.17 | 10 37.535 | - 5 12.48 | 2.88 | 49.62 | 2.54 | 22.15 | 9.9 | 13.8 | 60.2 | 20.3 | 74 |
| 1986 | 7 | 7 | .0 | 2446618.5 | 10 36.236 | - 5 1.91 | 10 38.061 | - 5 13.22 | 2.91 | 49.32 | 2.55 | 22.11 | 9.9 | 13.9 | 59.4 | 20.1 | 63 |
| 1986 | 7 | 8 | .0 | 2446619.5 | 10 36.763 | - 5 2.76 | 10 38.588 | - 5 [illegible]4.09 | 2.94 | 49.01 | 2.56 | 22.07 | 10.0 | 13.9 | 58.6 | 19.8 | 52 |
| 1986 | 7 | 9 | .0 | 2446620.5 | 10 37.296 | - 5 3.74 | 10 39.121 | - [illegible]5.07 | 2.97 | 48.71 | 2.57 | 22.02 | 10.0 | 14.0 | 57.8 | 19.5 | 40 |
| 1986 | 7 | 10 | .0 | 2446621.5 | 10 37.834 | - 5 4.83 | 10 39.655 | - [illegible]6.17 | 3.00 | 48.39 | 2.59 | 21.98 | 10.1 | 14.0 | 57.0 | 19.2 | 30 |
| 1986 | 7 | 11 | .0 | 2446622.5 | 10 38.377 | - 5 6.02 | 10 40.202 | - 5 17.37 | 3.03 | 48.07 | 2.60 | 21.94 | 10.1 | 14.1 | 56.2 | 19.0 | 20 |
| 1986 | 7 | 12 | .0 | 2446623.5 | 10 38.924 | - 5 7.33 | 10 40.749 | - 5 18.69 | 3.05 | 47.75 | 2.61 | 21.90 | 10.2 | 14.1 | 55.4 | 18.7 | 15 |
| 1986 | 7 | 13 | .0 | 2446624.5 | 10 39.476 | - 5 8.74 | 10 41.300 | - 5 20.10 | 3.08 | 47.43 | 2.63 | 21.86 | 10.2 | 14.1 | 54.6 | 18.4 | 19 |
| 1986 | 7 | 14 | .0 | 2446625.5 | 10 40.032 | - 5 10.25 | 10 41.856 | - 5 21.62 | 3.11 | 47.10 | 2.64 | 21.82 | 10.3 | 14.2 | 53.8 | 18.1 | 29 |
| 1986 | 7 | 15 | .0 | 2446626.5 | 10 40.591 | - 5 11.86 | 10 42.416 | - 5 23.24 | 3.13 | 46.76 | 2.65 | 21.77 | 10.3 | 14.2 | 53.0 | 17.8 | 41 |
| 1986 | 7 | 16 | .0 | 2446627.5 | 10 41.155 | - 5 13.57 | 10 42.979 | - 5 24.96 | 3.16 | 46.42 | 2.66 | 21.73 | 10.4 | 14.3 | 52.2 | 17.6 | 54 |
| 1986 | 7 | 17 | .0 | 2446628.5 | 10 41.722 | - 5 15.36 | 10 43.546 | - 5 26.76 | 3.19 | 46.08 | 2.68 | 21.69 | 10.4 | 14.3 | 51.5 | 17.3 | 67 |
| 1986 | 7 | 18 | .0 | 2446629.5 | 10 42.292 | - 5 17.25 | 10 44.116 | - 5 28.66 | 3.21 | 45.74 | 2.69 | 21.65 | 10.5 | 14.3 | 50.7 | 17.0 | 81 |
| 1986 | 7 | 19 | .0 | 2446630.5 | 10 42.865 | - 5 19.23 | 10 44.69[illegible] | - 5 30.65 | 3.24 | 45.39 | 2.70 | 21.61 | 10.5 | 14.4 | 49.9 | 16.7 | 95 |
| 1986 | 7 | 20 | .0 | 2446631.5 | 10 43.442 | - 5 21.29 | 10 45.266 | - 5 32.72 | 3.27 | 45.04 | 2.71 | 21.57 | 10.6 | 14.4 | 49.1 | 16.4 | 109 |
| 1986 | 7 | 21 | .0 | 2446632.5 | 10 44.021 | - 5 23.43 | 10 45.846 | - 5 34.87 | 3.29 | 44.68 | 2.73 | 21.53 | 10.6 | 14.4 | 48.3 | 16.2 | 123 |
| 1986 | 7 | 22 | .0 | 2446633.5 | 10 44.602 | - 5 25.66 | 10 46.427 | - 5 37.11 | 3.32 | 44.33 | 2.74 | 21.49 | 10.7 | 14.5 | 47.6 | 15.9 | 137 |
| 1986 | 7 | 23 | .0 | 2446634.5 | 10 45.187 | - 5 27.97 | 10 47.012 | - 5 39.42 | 3.34 | 43.96 | 2.75 | 21.45 | 10.7 | 14.5 | 46.8 | 15.6 | 150 |
| 1986 | 7 | 24 | .0 | 2446635.5 | 10 45.773 | - 5 30.35 | 10 47.598 | - 5 41.81 | 3.37 | 43.60 | 2.76 | 21.41 | 10.8 | 14.6 | 46.0 | 15.3 | 160 |
| 1986 | 7 | 25 | .0 | 2446636.5 | 10 46.362 | - 5 32.81 | 10 48.187 | - 5 44.28 | 3.39 | 43.23 | 2.78 | 21.37 | 10.8 | 14.6 | 45.3 | 15.1 | 164 |
| 1986 | 7 | 26 | .0 | 2446637.5 | 10 46.954 | - 5 35.34 | 10 48.778 | - 5 46.82 | 3.42 | 42.86 | 2.79 | 21.34 | 10.9 | 14.6 | 44.5 | 14.8 | 158 |
| 1986 | 7 | 27 | .0 | 2446638.5 | 10 47.547 | - 5 37.94 | 10 49.371 | - 5 49.43 | 3.44 | 42.49 | 2.80 | 21.30 | 10.9 | 14.7 | 43.7 | 14.5 | 148 |
| 1986 | 7 | 28 | .0 | 2446639.5 | 10 48.142 | - 5 40.62 | 10 49.966 | - 5 52.12 | 3.47 | 42.11 | 2.81 | 21.26 | 11.0 | 14.7 | 43.0 | 14.2 | 137 |
| 1986 | 7 | 29 | .0 | 2446640.5 | 10 48.739 | - 5 43.36 | 10 50.563 | - 5 54.87 | 3.49 | 41.73 | 2.82 | 21.22 | 11.0 | 14.7 | 42.2 | 14.0 | 126 |
| 1986 | 7 | 30 | .0 | 2446641.5 | 10 49.337 | - 5 46.17 | 10 51.162 | - 5 57.69 | 3.52 | 41.34 | 2.84 | 21.18 | 11.1 | 14.8 | 41.5 | 13.7 | 115 |
| 1986 | 7 | 31 | .0 | 2446642.5 | 10 49.937 | - 5 49.05 | 10 51.762 | - 6 .58 | 3.54 | 40.95 | 2.85 | 21.15 | 11.1 | 14.8 | 40.7 | 13.4 | 104 |
| 1986 | 8 | 1 | .0 | 2446643.5 | 10 50.539 | - 5 51.99 | 10 52.363 | - 6 3.53 | 3.56 | 40.56 | 2.86 | 21.11 | 11.2 | 14.8 | 39.9 | 13.2 | 92 |
| 1986 | 8 | 2 | .0 | 2446644.5 | 10 51.141 | - 5 55.00 | 10 52.966 | - 6 6.55 | 3.59 | 40.16 | 2.87 | 21.07 | 11.2 | 14.9 | 39.2 | 12.9 | 81 |
| 1986 | 8 | 3 | .0 | 2446645.5 | 10 51.745 | - 5 58.07 | 10 53.57[illegible] | - 6 9.62 | 3.61 | 39.76 | 2.89 | 21.03 | 11.3 | 14.9 | 38.4 | 12.6 | 70 |
| 1986 | 8 | 4 | .0 | 2446646.5 | 10 52.350 | - 6 1.20 | 10 54.175 | - 6 12.76 | 3.63 | 39.35 | 2.90 | 21.00 | 11.3 | 14.9 | 37.7 | 12.4 | 58 |
| 1986 | 8 | 5 | .0 | 2446647.5 | 10 52.956 | - 6 4.39 | 10 54.78[illegible] | - 6 15.96 | 3.66 | 38.95 | 2.91 | 20.96 | 11.4 | 15.0 | 36.9 | 12.1 | 47 |
| 1986 | 8 | 6 | .0 | 2446648.5 | 10 53.562 | - 6 7.63 | 10 55.387 | - 6 19.21 | 3.68 | 38.54 | 2.92 | 20.92 | 11.4 | 15.0 | 36.2 | 11.8 | 36 |
| 1986 | 8 | 7 | .0 | 2446649.5 | 10 54.169 | - 6 10.94 | 10 55.994 | - 6 22.53 | 3.70 | 38.12 | 2.93 | 20.89 | 11.5 | 15.0 | 35.4 | 11.6 | 25 |
| 1986 | 8 | 8 | .0 | 2446650.5 | 10 54.777 | - 6 14.30 | 10 56.601 | - 6 25.89 | 3.72 | 37.70 | 2.95 | 20.85 | 11.5 | 15.0 | 34.7 | 11.3 | 1[illegible] |
| 1986 | 8 | 9 | .0 | 2446651.5 | 10 55.385 | - 6 17.71 | 10 57.209 | - 6 29.31 | 3.74 | 37.28 | 2.96 | 20.82 | 11.6 | 15.1 | 34.0 | 11.0 | 15 |
| 1986 | 8 | 10 | .0 | 2446652.5 | 10 55.993 | - 6 21.17 | 10 57.817 | - 6 32.78 | 3.77 | 36.86 | 2.97 | 20.78 | 11.6 | 15.1 | 33.2 | 10.8 | 23 |
| 1986 | 8 | 11 | .0 | 2446653.5 | 10 56.601 | - 6 24.69 | 10 58.426 | - 6 36.30 | 3.79 | 36.43 | 2.98 | 20.74 | 11.7 | 15.1 | 32.5 | 10.5 | 34 |
| 1986 | 8 | 12 | .0 | 2446654.5 | 10 57.209 | - 6 28.25 | 10 59.034 | - 6 39.88 | 3.81 | 36.01 | 2.99 | 20.71 | 11.7 | 15.2 | 31.8 | 10.3 | 46 |
| 1986 | 8 | 13 | .0 | 2446655.5 | 10 57.817 | - 6 31.86 | 10 59.642 | - 6 43.50 | 3.83 | 35.58 | 3.01 | 20.67 | 11.8 | 15.2 | 31.0 | 10.0 | 59 |
| 1986 | 8 | 14 | .0 | 2446656.5 | 10 58.425 | - 6 35.52 | 11 .25[illegible] | - 6 47.17 | 3.85 | 35.14 | 3.02 | 20.64 | 11.8 | 15.2 | 30.3 | 9.8 | 73 |
| 1986 | 8 | 15 | .0 | 2446657.5 | 10 59.033 | - 6 39.23 | 11 .85[illegible] | - 6 50.88 | 3.87 | 34.71 | 3.03 | 20.61 | 11.9 | 15.3 | 29.6 | 9.5 | 86 |
| 1986 | 8 | 16 | .0 | 2446658.5 | 10 59.640 | - 6 42.98 | 11 1.464 | - 6 54.64 | 3.89 | 34.27 | 3.04 | 20.57 | 11.9 | 15.3 | 28.9 | 9.3 | 100 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 8 | 17 | .0 | 2446659.5 | 11 .246 | - 6 46.77 | 11 2.071 | - 6 58.44 | 3.91 | 33.83 | 3.05 | 20.54 | 12.0 | 15.3 | 28.2 | 9.0 | 114 |
| 1986 | 8 | 18 | .0 | 2446660.5 | 11 .852 | - 6 50.61 | 11 2.677 | - 7 2.28 | 3.93 | 33.39 | 3.07 | 20.50 | 12.0 | 15.3 | 27.5 | 8.8 | 128 |
| 1986 | 8 | 19 | .0 | 2446661.5 | 11 1.456 | - 6 54.48 | 11 3.282 | - 7 6.17 | 3.95 | 32.95 | 3.08 | 20.47 | 12.1 | 15.4 | 26.8 | 8.5 | 141 |
| 1986 | 8 | 20 | .0 | 2446662.5 | 11 2.061 | - 6 58.40 | 11 3.886 | - 7 10.09 | 3.97 | 32.51 | 3.09 | 20.43 | 12.1 | 15.4 | 26.1 | 8.3 | 153 |
| 1986 | 8 | 21 | .0 | 2446663.5 | 11 2.664 | - 7 2.36 | 11 4.489 | - 7 14.06 | 3.98 | 32.07 | 3.10 | 20.40 | 12.2 | 15.4 | 25.4 | 8.0 | 163 |
| 1986 | 8 | 22 | .0 | 2446664.5 | 11 3.266 | - 7 6.36 | 11 5.091 | - 7 18.06 | 4.00 | 31.62 | 3.11 | 20.37 | 12.2 | 15.4 | 24.7 | 7.8 | 164 |
| 1986 | 8 | 23 | .0 | 2446665.5 | 11 3.867 | - 7 10.39 | 11 5.692 | - 7 22.10 | 4.02 | 31.17 | 3.12 | 20.33 | 12.2 | 15.5 | 24.0 | 7.6 | 156 |
| 1986 | 8 | 24 | .0 | 2446666.5 | 11 4.467 | - 7 14.46 | 11 6.292 | - 7 26.18 | 4.04 | 30.72 | 3.14 | 20.30 | 12.3 | 15.5 | 23.3 | 7.3 | 146 |
| 1986 | 8 | 25 | .0 | 2446667.5 | 11 5.065 | - 7 18.57 | 11 6.890 | - 7 30.30 | 4.06 | 30.26 | 3.15 | 20.27 | 12.3 | 15.5 | 22.6 | 7.1 | 134 |
| 1986 | 8 | 26 | .0 | 2446668.5 | 11 5.663 | - 7 22.72 | 11 7.488 | - 7 34.45 | 4.07 | 29.81 | 3.16 | 20.24 | 12.4 | 15.5 | 22.0 | 6.9 | 123 |
| 1986 | 8 | 27 | .0 | 2446669.5 | 11 6.259 | - 7 26.90 | 11 8.084 | - 7 38.64 | 4.09 | 29.35 | 3.17 | 20.20 | 12.4 | 15.6 | 21.3 | 6.7 | 112 |
| 1986 | 8 | 28 | .0 | 2446670.5 | 11 6.853 | - 7 31.11 | 11 8.678 | - 7 42.86 | 4.11 | 28.89 | 3.18 | 20.17 | 12.5 | 15.6 | 20.7 | 6.4 | 100 |
| 1986 | 8 | 29 | .0 | 2446671.5 | 11 7.446 | - 7 35.36 | 11 9.271 | - 7 47.11 | 4.13 | 28.43 | 3.19 | 20.14 | 12.5 | 15.6 | 20.1 | 6.2 | 89 |
| 1986 | 8 | 30 | .0 | 2446672.5 | 11 8.037 | - 7 39.64 | 11 9.863 | - 7 51.40 | 4.14 | 27.96 | 3.21 | 20.11 | 12.5 | 15.6 | 19.4 | 6.0 | 78 |
| 1986 | 8 | 31 | .0 | 2446673.5 | 11 8.626 | - 7 43.95 | 11 10.452 | - 7 55.72 | 4.16 | 27.49 | 3.22 | 20.08 | 12.6 | 15.7 | 18.8 | 5.8 | 66 |
| 1986 | 9 | 1 | .0 | 2446674.5 | 11 9.214 | - 7 48.30 | 11 11.040 | - 8 .07 | 4.17 | 27.02 | 3.23 | 20.04 | 12.6 | 15.7 | 18.2 | 5.6 | 55 |
| 1986 | 9 | 2 | .0 | 2446675.5 | 11 9.799 | - 7 52.67 | 11 11.625 | - 8 4.45 | 4.19 | 26.55 | 3.24 | 20.01 | 12.7 | 15.7 | 17.7 | 5.4 | 43 |
| 1986 | 9 | 3 | .0 | 2446676.5 | 11 10.382 | - 7 57.08 | 11 12.209 | - 8 8.86 | 4.20 | 26.08 | 3.25 | 19.98 | 12.7 | 15.7 | 17.1 | 5.2 | 32 |
| 1986 | 9 | 4 | .0 | 2446677.5 | 11 10.963 | - 8 1.51 | 11 12.790 | - 8 13.30 | 4.22 | 25.61 | 3.26 | 19.95 | 12.7 | 15.8 | 16.6 | 5.1 | 22 |
| 1986 | 9 | 5 | .0 | 2446678.5 | 11 11.542 | - 8 5.97 | 11 13.368 | - 8 17.77 | 4.23 | 25.13 | 3.28 | 19.92 | 12.8 | 15.8 | 16.0 | 4.9 | 15 |
| 1986 | 9 | 6 | .0 | 2446679.5 | 11 12.118 | - 8 10.46 | 11 13.944 | - 8 22.26 | 4.25 | 24.65 | 3.29 | 19.89 | 12.8 | 15.8 | 15.5 | 4.7 | 17 |
| 1986 | 9 | 7 | .0 | 2446680.5 | 11 12.692 | - 8 14.97 | 11 14.518 | - 8 26.78 | 4.26 | 24.17 | 3.30 | 19.86 | 12.9 | 15.8 | 15.1 | 4.6 | 27 |
| 1986 | 9 | 8 | .0 | 2446681.5 | 11 13.263 | - 8 19.51 | 11 15.089 | - 8 31.33 | 4.27 | 23.69 | 3.31 | 19.83 | 12.9 | 15.9 | 14.6 | 4.4 | 39 |
| 1986 | 9 | 9 | .0 | 2446682.5 | 11 13.831 | - 8 24.08 | 11 15.657 | - 8 35.90 | 4.29 | 23.22 | 3.32 | 19.80 | 12.9 | 15.9 | 14.2 | 4.3 | 52 |
| 1986 | 9 | 10 | .0 | 2446683.5 | 11 14.396 | - 8 28.66 | 11 16.223 | - 8 40.49 | 4.30 | 22.74 | 3.33 | 19.77 | 13.0 | 15.9 | 13.8 | 4.1 | 65 |
| 1986 | 9 | 11 | .0 | 2446684.5 | 11 14.958 | - 8 33.27 | 11 16.785 | - 8 45.11 | 4.31 | 22.25 | 3.34 | 19.74 | 13.0 | 15.9 | 13.5 | 4.0 | 79 |
| 1986 | 9 | 12 | .0 | 2446685.5 | 11 15.517 | - 8 37.91 | 11 17.344 | - 8 49.74 | 4.33 | 21.77 | 3.36 | 19.71 | 13.0 | 15.9 | 13.2 | 3.9 | 92 |
| 1986 | 9 | 13 | .0 | 2446686.5 | 11 16.073 | - 8 42.56 | 11 17.901 | - 8 54.40 | 4.34 | 21.29 | 3.37 | 19.68 | 13.1 | 16.0 | 13.0 | 3.8 | 106 |
| 1986 | 9 | 14 | .0 | 2446687.5 | 11 16.625 | - 8 47.23 | 11 18.453 | - 8 59.08 | 4.35 | 20.81 | 3.38 | 19.65 | 13.1 | 16.0 | 12.8 | 3.8 | 119 |
| 1986 | 9 | 15 | .0 | 2446688.5 | 11 17.174 | - 8 51.92 | 11 19.003 | - 9 3.78 | 4.36 | 20.33 | 3.39 | 19.62 | 13.1 | 16.0 | 12.6 | 3.7 | 132 |
| 1986 | 9 | 16 | .0 | 2446689.5 | 11 17.720 | - 8 56.63 | 11 19.548 | - 9 8.49 | 4.38 | 19.85 | 3.40 | 19.59 | 13.2 | 16.0 | 12.5 | 3.7 | 145 |
| 1986 | 9 | 17 | .0 | 2446690.5 | 11 18.262 | - 9 1.36 | 11 20.091 | - 9 13.23 | 4.39 | 19.37 | 3.41 | 19.56 | 13.2 | 16.0 | 12.4 | 3.6 | 156 |
| 1986 | 9 | 18 | .0 | 2446691.5 | 11 18.800 | - 9 6.11 | 11 20.629 | - 9 17.98 | 4.40 | 18.89 | 3.42 | 19.53 | 13.2 | 16.1 | 12.4 | 3.6 | 164 |
| 1986 | 9 | 19 | .0 | 2446692.5 | 11 19.335 | - 9 10.87 | 11 21.164 | - 9 22.75 | 4.41 | 18.41 | 3.43 | 19.50 | 13.3 | 16.1 | 12.5 | 3.6 | 163 |
| 1986 | 9 | 20 | .0 | 2446693.5 | 11 19.866 | - 9 15.65 | 11 21.695 | - 9 27.53 | 4.42 | 17.93 | 3.45 | 19.47 | 13.3 | 16.1 | 12.6 | 3.6 | 154 |
| 1986 | 9 | 21 | .0 | 2446694.5 | 11 20.392 | - 9 20.45 | 11 22.222 | - 9 32.33 | 4.43 | 17.45 | 3.46 | 19.44 | 13.3 | 16.1 | 12.8 | 3.7 | 143 |
| 1986 | 9 | 22 | .0 | 2446695.5 | 11 20.915 | - 9 25.26 | 11 22.745 | - 9 37.15 | 4.44 | 16.96 | 3.47 | 19.42 | 13.3 | 16.1 | 13.0 | 3.7 | 131 |
| 1986 | 9 | 23 | .0 | 2446696.5 | 11 21.434 | - 9 30.08 | 11 23.264 | - 9 41.98 | 4.45 | 16.48 | 3.48 | 19.39 | 13.4 | 16.2 | 13.2 | 3.8 | 120 |
| 1986 | 9 | 24 | .0 | 2446697.5 | 11 21.948 | - 9 34.92 | 11 23.778 | - 9 46.82 | 4.46 | 16.00 | 3.49 | 19.36 | 13.4 | 16.2 | 13.5 | 3.9 | 109 |
| 1986 | 9 | 25 | .0 | 2446698.5 | 11 22.459 | - 9 39.78 | 11 24.289 | - 9 51.68 | 4.47 | 15.51 | 3.50 | 19.33 | 13.4 | 16.2 | 13.9 | 3.9 | 97 |
| 1986 | 9 | 26 | .0 | 2446699.5 | 11 22.964 | - 9 44.64 | 11 24.795 | - 9 56.55 | 4.48 | 15.03 | 3.51 | 19.30 | 13.5 | 16.2 | 14.3 | 4.0 | 86 |
| 1986 | 9 | 27 | .0 | 2446700.5 | 11 23.466 | - 9 49.52 | 11 25.296 | -10 1.44 | 4.48 | 14.55 | 3.52 | 19.28 | 13.5 | 16.2 | 14.7 | 4.1 | 75 |
| 1986 | 9 | 28 | .0 | 2446701.5 | 11 23.962 | - 9 54.41 | 11 25.793 | -10 6.33 | 4.49 | 14.06 | 3.54 | 19.25 | 13.5 | 16.2 | 15.1 | 4.2 | 63 |
| 1986 | 9 | 29 | .0 | 2446702.5 | 11 24.454 | - 9 59.32 | 11 26.285 | -10 11.24 | 4.50 | 13.58 | 3.55 | 19.22 | 13.5 | 16.3 | 15.6 | 4.4 | 52 |
| 1986 | 9 | 30 | .0 | 2446703.5 | 11 24.941 | -10 4.23 | 11 26.773 | -10 16.15 | 4.51 | 13.10 | 3.56 | 19.19 | 13.6 | 16.3 | 16.1 | 4.5 | 40 |
| 1986 | 10 | 1 | .0 | 2446704.5 | 11 25.423 | -10 9.15 | 11 27.255 | -10 21.08 | 4.52 | 12.61 | 3.57 | 19.17 | 13.6 | 16.3 | 16.7 | 4.6 | 29 |
| 1986 | 10 | 2 | .0 | 2446705.5 | 11 25.899 | -10 14.08 | 11 27.732 | -10 26.01 | 4.52 | 12.13 | 3.58 | 19.14 | 13.6 | 16.3 | 17.3 | 4.8 | 19 |
| 1986 | 10 | 3 | .0 | 2446706.5 | 11 26.371 | -10 19.02 | 11 28.203 | -10 30.96 | 4.53 | 11.65 | 3.59 | 19.11 | 13.6 | 16.3 | 17.9 | 4.9 | 14 |
| 1986 | 10 | 4 | .0 | 2446707.5 | 11 26.837 | -10 23.96 | 11 28.670 | -10 35.90 | 4.54 | 11.17 | 3.60 | 19.08 | 13.6 | 16.3 | 18.5 | 5.0 | 20 |
| 1986 | 10 | 5 | .0 | 2446708.5 | 11 27.297 | -10 28.91 | 11 29.130 | -10 40.86 | 4.54 | 10.69 | 3.61 | 19.06 | 13.7 | 16.4 | 19.1 | 5.2 | 31 |
| 1986 | 10 | 6 | .0 | 2446709.5 | 11 27.752 | -10 33.88 | 11 29.585 | -10 45.82 | 4.55 | 10.21 | 3.62 | 19.03 | 13.7 | 16.4 | 19.7 | 5.3 | 44 |
| 1986 | 10 | 7 | .0 | 2446710.5 | 11 28.201 | -10 38.84 | 11 30.035 | -10 50.79 | 4.55 | 9.73 | 3.63 | 19.00 | 13.7 | 16.4 | 20.4 | 5.5 | 58 |
| 1986 | 10 | 8 | .0 | 2446711.5 | 11 28.644 | -10 43.80 | 11 30.478 | -10 55.76 | 4.56 | 9.26 | 3.65 | 18.98 | 13.7 | 16.4 | 21.1 | 5.7 | 71 |
| 1986 | 10 | 9 | .0 | 2446712.5 | 11 29.087 | -10 48.77 | 11 30.916 | -11 .73 | 4.57 | 8.79 | 3.66 | 18.95 | 13.7 | 16.4 | 21.8 | 5.8 | 85 |
| 1986 | 10 | 10 | .0 | 2446713.5 | 11 29.511 | -10 53.74 | 11 31.347 | -11 5.71 | 4.57 | 8.32 | 3.67 | 18.93 | 13.8 | 16.4 | 22.5 | 6.0 | 99 |
| 1986 | 10 | 11 | .0 | 2446714.5 | 11 29.936 | -10 58.72 | 11 31.772 | -11 10.68 | 4.58 | 7.85 | 3.68 | 18.90 | 13.8 | 16.5 | 23.2 | 6.1 | 112 |
| 1986 | 10 | 12 | .0 | 2446715.5 | 11 30.354 | -11 3.69 | 11 32.190 | -11 15.66 | 4.58 | 7.38 | 3.69 | 18.87 | 13.8 | 16.5 | 23.9 | 6.3 | 125 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 10 | 13 | .0 | 2446716.5 | 11 30.765 | -11 8.66 | 11 32.802 | -11 20.64 | 4.58 | 6.92 | 3.70 | 18.85 | 13.8 | 16.5 | 24.7 | 6.5 | 138 |
| 1986 | 10 | 14 | .0 | 2446717.5 | 11 31.170 | -11 13.63 | 11 33.007 | -11 25.61 | 4.59 | 6.46 | 3.71 | 18.82 | 13.8 | 16.5 | 25.4 | 6.6 | 150 |
| 1986 | 10 | 15 | .0 | 2446718.5 | 11 31.568 | -11 18.60 | 11 33.405 | -11 30.59 | 4.59 | 6.00 | 3.72 | 18.80 | 13.8 | 16.5 | 26.2 | 6.8 | 160 |
| 1986 | 10 | 16 | .0 | 2446719.5 | 11 31.959 | -11 23.57 | 11 33.796 | -11 35.56 | 4.59 | 5.54 | 3.73 | 18.77 | 13.9 | 16.5 | 26.9 | 6.9 | 164 |
| 1986 | 10 | 17 | .0 | 2446720.5 | 11 32.343 | -11 28.54 | 11 34.181 | -11 40.52 | 4.60 | 5.09 | 3.74 | 18.75 | 13.9 | 16.5 | 27.7 | 7.1 | 159 |
| 1986 | 10 | 18 | .0 | 2446721.5 | 11 32.720 | -11 33.50 | 11 34.558 | -11 45.49 | 4.60 | 4.64 | 3.75 | 18.72 | 13.9 | 16.6 | 28.5 | 7.3 | 150 |
| 1986 | 10 | 19 | .0 | 2446722.5 | 11 33.089 | -11 38.46 | 11 34.928 | -11 50.45 | 4.60 | 4.19 | 3.77 | 18.70 | 13.9 | 16.6 | 29.3 | 7.4 | 139 |
| 1986 | 10 | 20 | .0 | 2446723.5 | 11 33.451 | -11 43.41 | 11 35.290 | -11 55.41 | 4.61 | 3.74 | 3.78 | 18.67 | 13.9 | 16.6 | 30.0 | 7.6 | 127 |
| 1986 | 10 | 21 | .0 | 2446724.5 | 11 33.806 | -11 48.36 | 11 35.645 | -12 .36 | 4.61 | 3.30 | 3.79 | 18.65 | 13.9 | 16.6 | 30.8 | 7.7 | 116 |
| 1986 | 10 | 22 | .0 | 2446725.5 | 11 34.153 | -11 53.30 | 11 35.993 | -12 5.30 | 4.61 | 2.86 | 3.80 | 18.62 | 13.9 | 16.6 | 31.6 | 7.9 | 105 |
| 1986 | 10 | 23 | .0 | 2446726.5 | 11 34.492 | -11 58.23 | 11 36.333 | -12 10.24 | 4.61 | 2.42 | 3.81 | 18.60 | 13.9 | 16.6 | 32.5 | 8.1 | 93 |
| 1986 | 10 | 24 | .0 | 2446727.5 | 11 34.824 | -12 3.16 | 11 36.665 | -12 15.17 | 4.61 | 1.98 | 3.82 | 18.57 | 14.0 | 16.6 | 33.3 | 8.2 | 82 |
| 1986 | 10 | 25 | .0 | 2446728.5 | 11 35.147 | -12 8.08 | 11 36.988 | -12 20.09 | 4.61 | 1.54 | 3.83 | 18.55 | 14.0 | 16.7 | 34.1 | 8.4 | 71 |
| 1986 | 10 | 26 | .0 | 2446729.5 | 11 35.462 | -12 12.99 | 11 37.304 | -12 25.00 | 4.61 | 1.11 | 3.84 | 18.52 | 14.0 | 16.7 | 34.9 | 8.5 | 59 |
| 1986 | 10 | 27 | .0 | 2446730.5 | 11 35.769 | -12 17.89 | 11 37.611 | -12 29.91 | 4.61 | .68 | 3.85 | 18.50 | 14.0 | 16.7 | 35.7 | 8.7 | 48 |
| 1986 | 10 | 28 | .0 | 2446731.5 | 11 36.067 | -12 22.78 | 11 37.909 | -12 34.80 | 4.61 | .26 | 3.86 | 18.48 | 14.0 | 16.7 | 36.6 | 8.8 | 37 |
| 1986 | 10 | 29 | .0 | 2446732.5 | 11 36.356 | -12 27.65 | 11 38.199 | -12 39.67 | 4.61 | -.17 | 3.87 | 18.45 | 14.0 | 16.7 | 37.4 | 9.0 | 26 |
| 1986 | 10 | 30 | .0 | 2446733.5 | 11 36.636 | -12 32.52 | 11 38.480 | -12 44.54 | 4.61 | -.59 | 3.88 | 18.43 | 14.0 | 16.7 | 38.3 | 9.1 | 17 |
| 1986 | 10 | 31 | .0 | 2446734.5 | 11 36.908 | -12 37.36 | 11 38.752 | -12 49.39 | 4.61 | -1.00 | 3.89 | 18.40 | 14.0 | 16.7 | 39.1 | 9.3 | 16 |
| 1986 | 11 | 1 | .0 | 2446735.5 | 11 37.170 | -12 42.20 | 11 39.014 | -12 54.23 | 4.61 | -1.41 | 3.90 | 18.38 | 14.0 | 16.7 | 40.0 | 9.4 | 24 |
| 1986 | 11 | 2 | .0 | 2446736.5 | 11 37.423 | -12 47.02 | 11 39.268 | -12 59.05 | 4.61 | -1.82 | 3.92 | 18.36 | 14.0 | 16.7 | 40.8 | 9.5 | 36 |
| 1986 | 11 | 3 | .0 | 2446737.5 | 11 37.666 | -12 51.82 | 11 39.511 | -13 3.85 | 4.61 | -2.22 | 3.93 | 18.33 | 14.0 | 16.8 | 41.7 | 9.7 | 50 |
| 1986 | 11 | 4 | .0 | 2446738.5 | 11 37.900 | -12 56.60 | 11 39.746 | -13 8.64 | 4.61 | -2.62 | 3.94 | 18.31 | 14.0 | 16.8 | 42.6 | 9.8 | 64 |
| 1986 | 11 | 5 | .0 | 2446739.5 | 11 38.124 | -13 1.36 | 11 39.970 | -13 13.40 | 4.61 | -3.01 | 3.95 | 18.29 | 14.1 | 16.8 | 43.4 | 9.9 | 78 |
| 1986 | 11 | 6 | .0 | 2446740.5 | 11 38.337 | -13 6.11 | 11 40.184 | -13 18.15 | 4.61 | -3.40 | 3.96 | 18.26 | 14.1 | 16.8 | 44.3 | 10.1 | 92 |
| 1986 | 11 | 7 | .0 | 2446741.5 | 11 38.541 | -13 10.83 | 11 40.388 | -13 22.87 | 4.60 | -3.78 | 3.97 | 18.24 | 14.1 | 16.8 | 45.2 | 10.2 | 106 |
| 1986 | 11 | 8 | .0 | 2446742.5 | 11 38.734 | -13 15.52 | 11 40.582 | -13 27.57 | 4.60 | -4.15 | 3.98 | 18.22 | 14.1 | 16.8 | 46.1 | 10.3 | 119 |
| 1986 | 11 | 9 | .0 | 2446743.5 | 11 38.917 | -13 20.20 | 11 40.765 | -13 32.25 | 4.60 | -4.52 | 3.99 | 18.19 | 14.1 | 16.8 | 46.9 | 10.5 | 132 |
| 1986 | 11 | 10 | .0 | 2446744.5 | 11 39.088 | -13 24.85 | 11 40.937 | -13 36.90 | 4.60 | -4.89 | 4.00 | 18.17 | 14.1 | 16.8 | 47.8 | 10.6 | 144 |
| 1986 | 11 | 11 | .0 | 2446745.5 | 11 39.250 | -13 29.47 | 11 41.099 | -13 41.53 | 4.59 | -5.25 | 4.01 | 18.15 | 14.1 | 16.8 | 48.7 | 10.7 | 155 |
| 1986 | 11 | 12 | .0 | 2446746.5 | 11 39.400 | -13 34.07 | 11 41.249 | -13 46.12 | 4.59 | -5.60 | 4.02 | 18.13 | 14.1 | 16.9 | 49.6 | 10.8 | 162 |
| 1986 | 11 | 13 | .0 | 2446747.5 | 11 39.539 | -13 38.63 | 11 41.389 | -13 50.69 | 4.59 | -5.95 | 4.03 | 18.10 | 14.1 | 16.9 | 50.5 | 10.9 | 162 |
| 1986 | 11 | 14 | .0 | 2446748.5 | 11 39.667 | -13 43.17 | 11 41.517 | -13 55.23 | 4.58 | -6.29 | 4.04 | 18.08 | 14.1 | 16.9 | 51.4 | 11.0 | 154 |
| 1986 | 11 | 15 | .0 | 2446749.5 | 11 39.783 | -13 47.68 | 11 41.634 | -13 59.75 | 4.58 | -6.62 | 4.05 | 18.06 | 14.1 | 16.9 | 52.3 | 11.1 | 144 |
| 1986 | 11 | 16 | .0 | 2446750.5 | 11 39.888 | -13 52.16 | 11 41.739 | -14 4.23 | 4.58 | -6.95 | 4.06 | 18.04 | 14.1 | 16.9 | 53.3 | 11.2 | 133 |
| 1986 | 11 | 17 | .0 | 2446751.5 | 11 39.981 | -13 56.60 | 11 41.833 | -14 8.67 | 4.57 | -7.28 | 4.07 | 18.01 | 14.1 | 16.9 | 54.2 | 11.4 | 122 |
| 1986 | 11 | 18 | .0 | 2446752.5 | 11 40.062 | -14 1.02 | 11 41.914 | -14 13.09 | 4.57 | -7.60 | 4.08 | 17.99 | 14.1 | 16.9 | 55.1 | 11.5 | 110 |
| 1986 | 11 | 19 | .0 | 2446753.5 | 11 40.131 | -14 5.39 | 11 41.984 | -14 17.47 | 4.56 | -7.91 | 4.09 | 17.97 | 14.1 | 16.9 | 56.0 | 11.5 | 99 |
| 1986 | 11 | 20 | .0 | 2446754.5 | 11 40.188 | -14 9.74 | 11 42.041 | -14 21.81 | 4.56 | -8.22 | 4.10 | 17.95 | 14.1 | 16.9 | 57.0 | 11.6 | 88 |
| 1986 | 11 | 21 | .0 | 2446755.5 | 11 40.233 | -14 14.04 | 11 42.086 | -14 26.12 | 4.55 | -8.52 | 4.11 | 17.93 | 14.1 | 16.9 | 57.9 | 11.7 | 76 |
| 1986 | 11 | 22 | .0 | 2446756.5 | 11 40.265 | -14 18.31 | 11 42.119 | -14 30.39 | 4.55 | -8.81 | 4.12 | 17.90 | 14.1 | 16.9 | 58.8 | 11.8 | 65 |
| 1986 | 11 | 23 | .0 | 2446757.5 | 11 40.284 | -14 22.54 | 11 42.139 | -14 34.62 | 4.54 | -9.10 | 4.14 | 17.88 | 14.1 | 17.0 | 59.8 | 11.9 | 54 |
| 1986 | 11 | 24 | .0 | 2446758.5 | 11 40.290 | -14 26.72 | 11 42.145 | -14 38.81 | 4.54 | -9.38 | 4.15 | 17.86 | 14.1 | 17.0 | 60.7 | 12.0 | 43 |
| 1986 | 11 | 25 | .0 | 2446759.5 | 11 40.283 | -14 30.87 | 11 42.139 | -14 42.96 | 4.53 | -9.65 | 4.16 | 17.84 | 14.1 | 17.0 | 61.7 | 12.1 | 32 |
| 1986 | 11 | 26 | .0 | 2446760.5 | 11 40.263 | -14 34.97 | 11 42.119 | -14 47.06 | 4.53 | -9.92 | 4.17 | 17.82 | 14.1 | 17.0 | 62.6 | 12.1 | 22 |
| 1986 | 11 | 27 | .0 | 2446761.5 | 11 40.230 | -14 39.02 | 11 42.086 | -14 51.12 | 4.52 | -10.17 | 4.18 | 17.80 | 14.1 | 17.0 | 63.6 | 12.2 | 17 |
| 1986 | 11 | 28 | .0 | 2446762.5 | 11 40.183 | -14 43.03 | 11 42.039 | -14 55.13 | 4.52 | -10.42 | 4.19 | 17.78 | 14.1 | 17.0 | 64.5 | 12.3 | 20 |
| 1986 | 11 | 29 | .0 | 2446763.5 | 11 40.122 | -14 46.99 | 11 41.979 | -14 59.09 | 4.51 | -10.67 | 4.20 | 17.76 | 14.1 | 17.0 | 65.5 | 12.3 | 30 |
| 1986 | 11 | 30 | .0 | 2446764.5 | 11 40.047 | -14 50.90 | 11 41.904 | -15 3.00 | 4.50 | -10.90 | 4.21 | 17.73 | 14.1 | 17.0 | 66.4 | 12.4 | 42 |
| 1986 | 12 | 1 | .0 | 2446765.5 | 11 39.958 | -14 54.76 | 11 41.815 | -15 6.86 | 4.50 | -11.13 | 4.22 | 17.71 | 14.1 | 17.0 | 67.4 | 12.5 | 56 |
| 1986 | 12 | 2 | .0 | 2446766.5 | 11 39.854 | -14 58.56 | 11 41.712 | -15 10.67 | 4.49 | -11.34 | 4.23 | 17.69 | 14.1 | 17.0 | 68.4 | 12.5 | 70 |
| 1986 | 12 | 3 | .0 | 2446767.5 | 11 39.736 | -15 2.31 | 11 41.595 | -15 14.42 | 4.48 | -11.55 | 4.24 | 17.67 | 14.1 | 17.0 | 69.4 | 12.6 | 85 |
| 1986 | 12 | 4 | .0 | 2446768.5 | 11 39.604 | -15 6.00 | 11 41.463 | -15 18.11 | 4.48 | -11.75 | 4.25 | 17.65 | 14.1 | 17.0 | 70.4 | 12.6 | 99 |
| 1986 | 12 | 5 | .0 | 2446769.5 | 11 39.456 | -15 9.64 | 11 41.316 | -15 21.75 | 4.47 | -11.94 | 4.26 | 17.63 | 14.1 | 17.0 | 71.3 | 12.7 | 113 |
| 1986 | 12 | 6 | .0 | 2446770.5 | 11 39.294 | -15 13.21 | 11 41.154 | -15 25.32 | 4.46 | -12.12 | 4.27 | 17.61 | 14.1 | 17.1 | 72.3 | 12.7 | 127 |
| 1986 | 12 | 7 | .0 | 2446771.5 | 11 39.116 | -15 16.72 | 11 40.976 | -15 28.83 | 4.46 | -12.28 | 4.28 | 17.59 | 14.1 | 17.1 | 73.3 | 12.7 | 140 |
| 1986 | 12 | 8 | .0 | 2446772.5 | 11 38.923 | -15 20.16 | 11 40.784 | -15 32.28 | 4.45 | -12.44 | 4.29 | 17.57 | 14.1 | 17.1 | 74.3 | 12.8 | 151 |

Table B-3 (contd)

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | ETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1986 | 12 | 9 | .0 | 2446773.5 | 11 38.715 | -15 23.54 | 11 40.57[illegible] | -15 35.66 | 4.44 | -12.59 | 4.30 | 17.55 | 14.1 | 17.1 | 75.3 | 12.8 | 160 |
| 1986 | 12 | 10 | .0 | 2446774.5 | 11 38.491 | -15 26.85 | 11 40.35[illegible] | -15 38.97 | 4.43 | -12.73 | 4.31 | 17.53 | 14.1 | 17.1 | 76.3 | 12.8 | 161 |
| 1986 | 12 | 11 | .0 | 2446775.5 | 11 38.252 | -15 30.10 | 11 40.11[illegible] | -15 42.22 | 4.43 | -12.86 | 4.32 | 17.51 | 14.1 | 17.1 | 77.3 | 12.9 | 156 |
| 1986 | 12 | 12 | .0 | 2446776.5 | 11 37.997 | -15 33.27 | 11 39.85[illegible] | -15 45.39 | 4.42 | -12.98 | 4.33 | 17.49 | 14.1 | 17.1 | 78.3 | 12.9 | 146 |
| 1986 | 12 | 13 | .0 | 2446777.5 | 11 37.726 | -15 36.37 | 11 39.58[illegible] | -15 48.49 | 4.41 | -13.09 | 4.34 | 17.47 | 14.1 | 17.1 | 79.4 | 12.9 | 135 |
| 1986 | 12 | 14 | .0 | 2446778.5 | 11 37.439 | -15 39.39 | 11 39.301 | -15 51.52 | 4.40 | -13.19 | 4.35 | 17.45 | 14.1 | 17.1 | 80.4 | 12.9 | 124 |
| 1986 | 12 | 15 | .0 | 2446779.5 | 11 37.137 | -15 42.34 | 11 38.99[illegible] | -15 54.47 | 4.40 | -13.29 | 4.36 | 17.43 | 14.1 | 17.1 | 81.4 | 12.9 | 113 |
| 1986 | 12 | 16 | .0 | 2446780.5 | 11 36.818 | -15 45.21 | 11 38.68[illegible] | -15 57.34 | 4.39 | -13.37 | 4.37 | 17.41 | 14.1 | 17.1 | 82.4 | 12.9 | 102 |
| 1986 | 12 | 17 | .0 | 2446781.5 | 11 36.482 | -15 48.01 | 11 38.345 | -16 .14 | 4.38 | -13.44 | 4.38 | 17.39 | 14.1 | 17.1 | 83.5 | 12.9 | 91 |
| 1986 | 12 | 18 | .0 | 2446782.5 | 11 36.131 | -15 50.72 | 11 37.99[illegible] | -16 2.85 | 4.37 | -13.50 | 4.39 | 17.37 | 14.1 | 17.1 | 84.5 | 12.9 | 79 |
| 1986 | 12 | 19 | .0 | 2446783.5 | 11 35.762 | -15 53.34 | 11 37.62[illegible] | -16 5.48 | 4.37 | -13.55 | 4.40 | 17.35 | 14.1 | 17.1 | 85.5 | 12.9 | 68 |
| 1986 | 12 | 20 | .0 | 2446784.5 | 11 35.378 | -15 55.88 | 11 37.241 | -16 8.02 | 4.36 | -13.59 | 4.41 | 17.33 | 14.1 | 17.1 | 86.6 | 12.9 | 57 |
| 1986 | 12 | 21 | .0 | 2446785.5 | 11 34.976 | -15 58.34 | 11 36.84[illegible] | -16 10.47 | 4.35 | -13.62 | 4.42 | 17.31 | 14.1 | 17.1 | 87.6 | 12.8 | 46 |
| 1986 | 12 | 22 | .0 | 2446786.5 | 11 34.558 | -16 .70 | 11 36.421 | -16 12.84 | 4.34 | -13.63 | 4.43 | 17.29 | 14.1 | 17.2 | 88.7 | 12.8 | 35 |
| 1986 | 12 | 23 | .0 | 2446787.5 | 11 34.123 | -16 2.97 | 11 35.98[illegible] | -16 15.11 | 4.33 | -13.64 | 4.44 | 17.27 | 14.1 | 17.2 | 89.7 | 12.8 | 26 |
| 1986 | 12 | 24 | .0 | 2446788.5 | 11 33.671 | -16 5.15 | 11 35.53[illegible] | -16 17.29 | 4.33 | -13.64 | 4.45 | 17.25 | 14.1 | 17.2 | 90.8 | 12.8 | 19 |
| 1986 | 12 | 25 | .0 | 2446789.5 | 11 33.202 | -16 7.24 | 11 35.06[illegible] | -16 19.37 | 4.32 | -13.62 | 4.46 | 17.23 | 14.1 | 17.2 | 91.8 | 12.7 | 20 |
| 1986 | 12 | 26 | .0 | 2446790.5 | 11 32.716 | -16 9.22 | 11 34.57[illegible] | -16 21.36 | 4.31 | -13.59 | 4.47 | 17.21 | 14.1 | 17.2 | 92.9 | 12.7 | 27 |
| 1986 | 12 | 27 | .0 | 2446791.5 | 11 32.213 | -16 11.10 | 11 34.07[illegible] | -16 23.24 | 4.30 | -13.55 | 4.48 | 17.20 | 14.1 | 17.2 | 94.0 | 12.7 | 38 |
| 1986 | 12 | 28 | .0 | 2446792.5 | 11 31.692 | -16 12.89 | 11 33.55[illegible] | -16 25.02 | 4.29 | -13.50 | 4.49 | 17.18 | 14.1 | 17.2 | 95.0 | 12.6 | 51 |
| 1986 | 12 | 29 | .0 | 2446793.5 | 11 31.155 | -16 14.56 | 11 33.01[illegible] | -16 26.70 | 4.29 | -13.44 | 4.50 | 17.16 | 14.1 | 17.2 | 96.1 | 12.6 | 65 |
| 1986 | 12 | 30 | .0 | 2446794.5 | 11 30.600 | -16 16.13 | 11 32.464 | -16 28.27 | 4.28 | -13.36 | 4.51 | 17.14 | 14.1 | 17.2 | 97.2 | 12.5 | 79 |
| 1986 | 12 | 31 | .0 | 2446795.5 | 11 30.028 | -16 17.59 | 11 31.89[illegible] | -16 29.73 | 4.27 | -13.27 | 4.52 | 17.12 | 14.1 | 17.2 | 98.3 | 12.4 | 94 |
| 1987 | 1 | 1 | .0 | 2446796.5 | 11 29.439 | -16 18.94 | 11 31.30[illegible] | -16 31.08 | 4.26 | -13.17 | 4.53 | 17.10 | 14.1 | 17.2 | 99.3 | 12.4 | 108 |
| 1987 | 1 | 2 | .0 | 2446797.5 | 11 28.832 | -16 20.17 | 11 30.69[illegible] | -16 32.31 | 4.26 | -13.05 | 4.54 | 17.08 | 14.1 | 17.2 | 100.4 | 12.3 | 123 |
| 1987 | 1 | 3 | .0 | 2446798.5 | 11 28.208 | -16 21.29 | 11 30.07[illegible] | -16 33.43 | 4.25 | -12.92 | 4.55 | 17.06 | 14.1 | 17.2 | 101.5 | 12.2 | 136 |
| 1987 | 1 | 4 | .0 | 2446799.5 | 11 27.568 | -16 22.29 | 11 29.43[illegible] | -16 34.43 | 4.24 | -12.78 | 4.56 | 17.05 | 14.1 | 17.2 | 102.6 | 12.2 | 148 |
| 1987 | 1 | 5 | .0 | 2446800.5 | 11 26.910 | -16 23.17 | 11 28.774 | -16 35.30 | 4.23 | -12.62 | 4.57 | 17.03 | 14.1 | 17.2 | 103.7 | 12.1 | 157 |
| 1987 | 1 | 6 | .0 | 2446801.5 | 11 26.236 | -16 23.92 | 11 28.09[illegible] | -16 36.06 | 4.23 | -12.45 | 4.58 | 17.01 | 14.1 | 17.2 | 104.8 | 12.0 | 160 |
| 1987 | 1 | 7 | .0 | 2446802.5 | 11 25.544 | -16 24.56 | 11 27.40[illegible] | -16 36.69 | 4.22 | -12.27 | 4.59 | 16.99 | 14.1 | 17.2 | 105.9 | 11.9 | 155 |
| 1987 | 1 | 8 | .0 | 2446803.5 | 11 24.836 | -16 25.07 | 11 26.69[illegible] | -16 37.20 | 4.21 | -12.08 | 4.60 | 16.97 | 14.1 | 17.2 | 107.0 | 11.8 | 146 |
| 1987 | 1 | 9 | .0 | 2446804.5 | 11 24.112 | -16 25.45 | 11 25.975 | -16 37.57 | 4.21 | -11.88 | 4.61 | 16.96 | 14.1 | 17.3 | 108.1 | 11.7 | 135 |
| 1987 | 1 | 10 | .0 | 2446805.5 | 11 23.371 | -16 25.70 | 11 25.233 | -16 37.82 | 4.20 | -11.66 | 4.62 | 16.94 | 14.1 | 17.3 | 109.2 | 11.6 | 124 |
| 1987 | 1 | 11 | .0 | 2446806.5 | 11 22.614 | -16 25.82 | 11 24.47[illegible] | -16 37.94 | 4.19 | -11.43 | 4.63 | 16.92 | 14.1 | 17.3 | 110.3 | 11.5 | 113 |
| 1987 | 1 | 12 | .0 | 2446807.5 | 11 21.840 | -16 25.81 | 11 23.70[illegible] | -16 37.93 | 4.19 | -11.18 | 4.64 | 16.90 | 14.1 | 17.3 | 111.5 | 11.4 | 102 |
| 1987 | 1 | 13 | .0 | 2446808.5 | 11 21.051 | -16 25.66 | 11 22.91[illegible] | -16 37.78 | 4.18 | -10.93 | 4.65 | 16.88 | 14.1 | 17.3 | 112.6 | 11.3 | 91 |
| 1987 | 1 | 14 | .0 | 2446809.5 | 11 20.246 | -16 25.38 | 11 22.10[illegible] | -16 37.50 | 4.17 | -10.66 | 4.66 | 16.87 | 14.1 | 17.3 | 113.7 | 11.2 | 79 |
| 1987 | 1 | 15 | .0 | 2446810.5 | 11 19.425 | -16 24.97 | 11 21.287 | -16 37.08 | 4.17 | -10.38 | 4.67 | 16.85 | 14.2 | 17.3 | 114.8 | 11.0 | 68 |
| 1987 | 1 | 16 | .0 | 2446811.5 | 11 18.589 | -16 24.41 | 11 20.451 | -16 36.52 | 4.16 | -10.09 | 4.68 | 16.83 | 14.2 | 17.3 | 115.9 | 10.9 | 57 |
| 1987 | 1 | 17 | .0 | 2446812.5 | 11 17.738 | -16 23.71 | 11 19.59[illegible] | -16 35.82 | 4.16 | -9.79 | 4.69 | 16.81 | 14.2 | 17.3 | 117.1 | 10.8 | 46 |
| 1987 | 1 | 18 | .0 | 2446813.5 | 11 16.872 | -16 22.88 | 11 18.733 | -16 34.97 | 4.15 | -9.47 | 4.70 | 16.80 | 14.2 | 17.3 | 118.2 | 10.6 | 36 |
| 1987 | 1 | 19 | .0 | 2446814.5 | 11 15.991 | -16 21.89 | 11 17.851 | -16 33.99 | 4.14 | -9.15 | 4.70 | 16.78 | 14.2 | 17.3 | 119.3 | 10.5 | 27 |
| 1987 | 1 | 20 | .0 | 2446815.5 | 11 15.096 | -16 20.77 | 11 16.95[illegible] | -16 32.86 | 4.14 | -8.81 | 4.71 | 16.76 | 14.2 | 17.3 | 120.4 | 10.4 | 21 |
| 1987 | 1 | 21 | .0 | 2446816.5 | 11 14.186 | -16 19.50 | 11 16.046 | -16 31.58 | 4.13 | -8.45 | 4.72 | 16.74 | 14.2 | 17.3 | 121.6 | 10.2 | 22 |
| 1987 | 1 | 22 | .0 | 2446817.5 | 11 13.263 | -16 18.08 | 11 15.122 | -16 30.16 | 4.13 | -8.09 | 4.73 | 16.73 | 14.2 | 17.3 | 122.7 | 10.1 | 29 |
| 1987 | 1 | 23 | .0 | 2446818.5 | 11 12.326 | -16 16.51 | 11 14.185 | -16 28.58 | 4.13 | -7.71 | 4.74 | 16.71 | 14.3 | 17.3 | 123.8 | 9.9 | 39 |
| 1987 | 1 | 24 | .0 | 2446819.5 | 11 11.376 | -16 14.80 | 11 13.234 | -16 26.86 | 4.12 | -7.32 | 4.75 | 16.69 | 14.3 | 17.3 | 124.9 | 9.8 | 51 |
| 1987 | 1 | 25 | .0 | 2446820.5 | 11 10.413 | -16 12.94 | 11 12.271 | -16 24.99 | 4.12 | -6.92 | 4.76 | 16.67 | 14.3 | 17.4 | 126.1 | 9.6 | 64 |
| 1987 | 1 | 26 | .0 | 2446821.5 | 11 9.437 | -16 10.92 | 11 11.29[illegible] | -16 22.97 | 4.11 | -6.51 | 4.77 | 16.66 | 14.3 | 17.4 | 127.2 | 9.5 | 78 |
| 1987 | 1 | 27 | .0 | 2446822.5 | 11 8.449 | -16 8.75 | 11 10.30[illegible] | -16 20.80 | 4.11 | -6.08 | 4.78 | 16.64 | 14.3 | 17.4 | 128.3 | 9.3 | 92 |
| 1987 | 1 | 28 | .0 | 2446823.5 | 11 7.449 | -16 6.43 | 11 9.30[illegible] | -16 18.47 | 4.11 | -5.65 | 4.79 | 16.62 | 14.4 | 17.4 | 129.4 | 9.1 | 106 |
| 1987 | 1 | 29 | .0 | 2446824.5 | 11 6.438 | -16 3.96 | 11 8.295 | -16 15.99 | 4.10 | -5.20 | 4.80 | 16.61 | 14.4 | 17.4 | 130.5 | 9.0 | 120 |
| 1987 | 1 | 30 | .0 | 2446825.5 | 11 5.416 | -16 1.34 | 11 7.27[illegible] | -16 13.36 | 4.10 | -4.73 | 4.81 | 16.59 | 14.4 | 17.4 | 131.7 | 8.8 | 134 |
| 1987 | 1 | 31 | .0 | 2446826.5 | 11 4.383 | -15 58.56 | 11 6.23[illegible] | -16 10.57 | 4.10 | -4.26 | 4.82 | 16.57 | 14.4 | 17.4 | 132.8 | 8.6 | 146 |
| 1987 | 2 | 1 | .0 | 2446827.5 | 11 3.340 | -15 55.63 | 11 5.19[illegible] | -16 7.63 | 4.09 | -3.78 | 4.83 | 16.56 | 14.4 | 17.4 | 133.9 | 8.5 | 155 |
| 1987 | 2 | 2 | .0 | 2446828.5 | 11 2.288 | -15 52.55 | 11 4.143 | -16 4.54 | 4.09 | -3.28 | 4.84 | 16.54 | 14.5 | 17.4 | 135.0 | 8.3 | 158 |
| 1987 | 2 | 3 | .0 | 2446829.5 | 11 1.227 | -15 49.32 | 11 3.081 | -16 1.30 | 4.09 | -2.78 | 4.85 | 16.52 | 14.5 | 17.4 | 136.1 | 8.1 | 152 |

**Table B-3 (contd)**

| YR | MN | DY | HR | J.D. | R.A. 1950.0 | DEC. | R.A. APPN | DEC. | DELTA | DELDOT | R | RDOT | $M_1$ | $M_2$ | THETA | BETA | MOON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1987 | 2 | 4 | .0 | 2446830.5 | 11 .157 | -15 45.93 | 11 2.011 | -15 57.90 | 4.09 | -2.26 | 4.86 | 16.51 | 14.5 | 17.4 | 137.2 | 7.9 | 143 |
| 1987 | 2 | 5 | .0 | 2446831.5 | 10 59.079 | -15 42.40 | 11 .932 | -15 54.36 | 4.09 | -1.74 | 4.87 | 16.49 | 14.6 | 17.4 | 138.2 | 7.8 | 132 |
| 1987 | 2 | 6 | .0 | 2446832.5 | 10 57.993 | -15 38.72 | 10 59.846 | -15 50.66 | 4.09 | -1.21 | 4.88 | 16.47 | 14.6 | 17.4 | 139.3 | 7.6 | 121 |
| 1987 | 2 | 7 | .0 | 2446833.5 | 10 56.901 | -15 34.89 | 10 58.753 | -15 46.82 | 4.09 | -.67 | 4.89 | 16.46 | 14.6 | 17.4 | 140.4 | 7.4 | 110 |
| 1987 | 2 | 8 | .0 | 2446834.5 | 10 55.802 | -15 30.91 | 10 57.654 | -15 42.83 | 4.09 | -.12 | 4.90 | 16.44 | 14.6 | 17.5 | 141.4 | 7.2 | 99 |
| 1987 | 2 | 9 | .0 | 2446835.5 | 10 54.697 | -15 26.79 | 10 56.549 | -15 38.70 | 4.09 | .44 | 4.91 | 16.42 | 14.7 | 17.5 | 142.5 | 7.0 | 88 |
| 1987 | 2 | 10 | .0 | 2446836.5 | 10 53.586 | -15 22.52 | 10 55.438 | -15 34.42 | 4.09 | 1.00 | 4.92 | 16.41 | 14.7 | 17.5 | 143.5 | 6.9 | 76 |
| 1987 | 2 | 11 | .0 | 2446837.5 | 10 52.471 | -15 18.12 | 10 54.322 | -15 30.00 | 4.09 | 1.57 | 4.93 | 16.39 | 14.7 | 17.5 | 144.5 | 6.7 | 65 |
| 1987 | 2 | 12 | .0 | 2446838.5 | 10 51.352 | -15 13.57 | 10 53.203 | -15 25.44 | 4.09 | 2.15 | 4.93 | 16.38 | 14.8 | 17.5 | 145.6 | 6.5 | 54 |
| 1987 | 2 | 13 | .0 | 2446839.5 | 10 50.228 | -15 8.88 | 10 52.079 | -15 20.74 | 4.09 | 2.74 | 4.94 | 16.36 | 14.8 | 17.5 | 146.5 | 6.3 | 44 |
| 1987 | 2 | 14 | .0 | 2446840.5 | 10 49.102 | -15 4.06 | 10 50.952 | -15 15.90 | 4.09 | 3.33 | 4.95 | 16.34 | 14.9 | 17.5 | 147.5 | 6.1 | 34 |
| 1987 | 2 | 15 | .0 | 2446841.5 | 10 47.973 | -14 59.11 | 10 49.822 | -15 10.93 | 4.09 | 3.93 | 4.96 | 16.33 | 14.9 | 17.5 | 148.5 | 6.0 | 26 |
| 1987 | 2 | 16 | .0 | 2446842.5 | 10 46.841 | -14 54.02 | 10 48.690 | -15 5.83 | 4.10 | 4.53 | 4.97 | 16.31 | 14.9 | 17.5 | 149.4 | 5.8 | 22 |
| 1987 | 2 | 17 | .0 | 2446843.5 | 10 45.708 | -14 48.80 | 10 47.557 | -15 .59 | 4.10 | 5.14 | 4.98 | 16.30 | 15.0 | 17.5 | 150.3 | 5.6 | 25 |
| 1987 | 2 | 18 | .0 | 2446844.5 | 10 44.575 | -14 43.46 | 10 46.423 | -14 55.23 | 4.10 | 5.75 | 4.99 | 16.28 | .0 | 17.5 | 151.2 | 5.5 | 33 |
| 1987 | 2 | 19 | .0 | 2446845.5 | 10 43.440 | -14 37.99 | 10 45.288 | -14 49.75 | 4.11 | 6.37 | 5.00 | 16.26 | .0 | 17.6 | 152.0 | 5.3 | 44 |
| 1987 | 2 | 20 | .0 | 2446846.5 | 10 42.306 | -14 32.40 | 10 44.154 | -14 44.14 | 4.11 | 7.00 | 5.01 | 16.25 | .0 | 17.6 | 152.8 | 5.2 | 55 |
| 1987 | 2 | 21 | .0 | 2446847.5 | 10 41.173 | -14 26.69 | 10 43.020 | -14 38.42 | 4.11 | 7.63 | 5.02 | 16.23 | .0 | 17.6 | 153.6 | 5.0 | 68 |
| 1987 | 2 | 22 | .0 | 2446848.5 | 10 40.041 | -14 20.87 | 10 41.888 | -14 32.58 | 4.12 | 8.26 | 5.03 | 16.22 | .0 | 17.6 | 154.4 | 4.9 | 81 |
| 1987 | 2 | 23 | .0 | 2446849.5 | 10 38.910 | -14 14.93 | 10 40.757 | -14 26.62 | 4.12 | 8.90 | 5.04 | 16.20 | .0 | 17.6 | 155.1 | 4.7 | 94 |
| 1987 | 2 | 24 | .0 | 2446850.5 | 10 37.782 | -14 8.89 | 10 39.629 | -14 20.56 | 4.13 | 9.54 | 5.05 | 16.19 | .0 | 17.6 | 155.7 | 4.6 | 108 |
| 1987 | 2 | 25 | .0 | 2446851.5 | 10 36.657 | -14 2.73 | 10 38.504 | -14 14.39 | 4.13 | 10.18 | 5.06 | 16.17 | .0 | 17.6 | 156.3 | 4.5 | 121 |
| 1987 | 2 | 26 | .0 | 2446852.5 | 10 35.536 | -13 56.48 | 10 37.382 | -14 8.12 | 4.14 | 10.83 | 5.07 | 16.15 | .0 | 17.6 | 156.9 | 4.4 | 134 |
| 1987 | 2 | 27 | .0 | 2446853.5 | 10 34.419 | -13 50.13 | 10 36.265 | -14 1.74 | 4.15 | 11.48 | 5.08 | 16.14 | .0 | 17.6 | 157.3 | 4.3 | 146 |
| 1987 | 2 | 28 | .0 | 2446854.5 | 10 33.306 | -13 43.68 | 10 35.152 | -13 55.28 | 4.15 | 12.13 | 5.08 | 16.12 | .0 | 17.7 | 157.8 | 4.2 | 154 |
| 1987 | 3 | 1 | .0 | 2446855.5 | 10 32.199 | -13 37.14 | 10 34.044 | -13 48.72 | 4.16 | 12.78 | 5.09 | 16.11 | .0 | 17.7 | 158.1 | 4.2 | 136 |
| 1987 | 3 | 2 | .0 | 2446856.5 | 10 31.097 | -13 30.51 | 10 32.943 | -13 42.07 | 4.17 | 13.43 | 5.10 | 16.09 | .0 | 17.7 | 158.4 | 4.1 | 150 |
| 1987 | 3 | 3 | .0 | 2446857.5 | 10 30.002 | -13 23.80 | 10 31.847 | -13 35.34 | 4.18 | 14.09 | 5.11 | 16.08 | .0 | 17.7 | 158.6 | 4.0 | 140 |
| 1987 | 3 | 4 | .0 | 2446858.5 | 10 28.914 | -13 17.02 | 10 30.759 | -13 28.54 | 4.19 | 14.74 | 5.12 | 16.06 | .0 | 17.7 | 158.8 | 4.0 | 129 |
| 1987 | 3 | 5 | .0 | 2446859.5 | 10 27.833 | -13 10.16 | 10 29.678 | -13 21.66 | 4.19 | 15.39 | 5.13 | 16.05 | .0 | 17.7 | 158.9 | 4.0 | 118 |
| 1987 | 3 | 6 | .0 | 2446860.5 | 10 26.760 | -13 3.23 | 10 28.605 | -13 14.71 | 4.20 | 16.03 | 5.14 | 16.03 | .0 | 17.7 | 158.9 | 4.0 | 106 |
| 1987 | 3 | 7 | .0 | 2446861.5 | 10 25.695 | -12 56.23 | 10 27.540 | -13 7.69 | 4.21 | 16.68 | 5.15 | 16.02 | .0 | 17.7 | 158.8 | 4.0 | 95 |
| 1987 | 3 | 8 | .0 | 2446862.5 | 10 24.639 | -12 49.18 | 10 26.484 | -13 .62 | 4.22 | 17.32 | 5.16 | 16.00 | .0 | 17.8 | 158.6 | 4.0 | 84 |
| 1987 | 3 | 9 | .0 | 2446863.5 | 10 23.593 | -12 42.07 | 10 25.438 | -12 53.49 | 4.23 | 17.96 | 5.17 | 15.99 | .0 | 17.8 | 158.4 | 4.1 | 72 |
| 1987 | 3 | 10 | .0 | 2446864.5 | 10 22.556 | -12 34.91 | 10 24.401 | -12 46.30 | 4.24 | 18.60 | 5.18 | 15.97 | .0 | 17.8 | 158.1 | 4.1 | 62 |
| 1987 | 3 | 11 | .0 | 2446865.5 | 10 21.529 | -12 27.69 | 10 23.374 | -12 39.07 | 4.25 | 19.24 | 5.19 | 15.96 | .0 | 17.8 | 157.7 | 4.2 | 51 |
| 1987 | 3 | 12 | .0 | 2446866.5 | 10 20.513 | -12 20.44 | 10 22.358 | -12 31.80 | 4.27 | 19.87 | 5.20 | 15.94 | .0 | 17.8 | 157.3 | 4.2 | 41 |
| 1987 | 3 | 13 | .0 | 2446867.5 | 10 19.508 | -12 13.15 | 10 21.353 | -12 24.48 | 4.28 | 20.49 | 5.21 | 15.93 | .0 | 17.8 | 156.8 | 4.3 | 31 |
| 1987 | 3 | 14 | .0 | 2446868.5 | 10 18.514 | -12 5.82 | 10 20.359 | -12 17.13 | 4.29 | 21.11 | 5.21 | 15.91 | .0 | 17.8 | 156.3 | 4.4 | 25 |
| 1987 | 3 | 15 | .0 | 2446869.5 | 10 17.531 | -11 58.46 | 10 19.376 | -12 9.75 | 4.30 | 21.73 | 5.22 | 15.90 | .0 | 17.8 | 155.7 | 4.5 | 23 |
| 1987 | 3 | 16 | .0 | 2446870.5 | 10 16.561 | -11 51.08 | 10 18.406 | -12 2.35 | 4.31 | 22.34 | 5.23 | 15.89 | .0 | 17.9 | 155.1 | 4.6 | 28 |
| 1987 | 3 | 17 | .0 | 2446871.5 | 10 15.603 | -11 43.67 | 10 17.448 | -11 54.92 | 4.33 | 22.95 | 5.24 | 15.87 | .0 | 17.9 | 154.4 | 4.7 | 37 |
| 1987 | 3 | 18 | .0 | 2446872.5 | 10 14.657 | -11 36.25 | 10 16.502 | -11 47.47 | 4.34 | 23.55 | 5.25 | 15.86 | .0 | 17.9 | 153.7 | 4.8 | 48 |
| 1987 | 3 | 19 | .0 | 2446873.5 | 10 13.725 | -11 28.81 | 10 15.570 | -11 40.01 | 4.35 | 24.15 | 5.26 | 15.84 | .0 | 17.9 | 152.9 | 4.9 | 60 |
| 1987 | 3 | 20 | .0 | 2446874.5 | 10 12.805 | -11 21.36 | 10 14.651 | -11 32.54 | 4.37 | 24.74 | 5.27 | 15.83 | .0 | 17.9 | 152.2 | 5.1 | 73 |
| 1987 | 3 | 21 | .0 | 2446875.5 | 10 11.899 | -11 13.90 | 10 13.745 | -11 25.07 | 4.38 | 25.33 | 5.28 | 15.81 | .0 | 17.9 | 151.4 | 5.2 | 86 |
| 1987 | 3 | 22 | .0 | 2446876.5 | 10 11.007 | -11 6.44 | 10 12.853 | -11 17.59 | 4.40 | 25.91 | 5.29 | 15.80 | .0 | 17.9 | 150.5 | 5.3 | 99 |
| 1987 | 3 | 23 | .0 | 2446877.5 | 10 10.129 | -10 58.99 | 10 11.975 | -11 10.11 | 4.41 | 26.48 | 5.30 | 15.78 | .0 | 18.0 | 149.7 | 5.5 | 112 |