Ancient Astronomy, Assignment 10 for Monday, Nov. 13

Evans Ex. 7.8, p. 316

Part 1. Using the 12-year cycle

The idea is to use the 1971 positions of Jupiter to predict the 1983 positions.

In 1971, retrograde began at 247° on March 29. In 1983, retrograde began at 251° on April 15. So, is everything shifted by 4° and 17 days?

In 1971 retrograde ended with Jupiter at 236° on July 27. Adding 4° and 17 days, we predict 240° and Aug. 13 as the end of retrograde in 1983.

Actually it ended July 24 at 241°. We were just 1° off on the longitude, but frankly, we did pretty badly on the date.

It is common to predict the conjunction with Regulus or Spica. However, Jupiter did not have conjunctions with Regulus or Spica in 1971 or 1983.

So how about we just do some arbitrary ecliptic longitude, like 250°? In 1971 that was Nov. 9. So we predict 254° on Nov. 26 in 1983. 254° actually occurred on Nov. 11.

Part 2. A shorter cycle for Mercury

The “first stations” of Mercury (meaning the beginning of the first retrograde of the year) are:

1971 Apr 8, 34°
1972 Mar 23, 16°
1973 Mar 8, 356°
1974 Feb 11, 341°
1975 Jan 27, 325°
1976 Jan 12, 310°
1977 Apr 16, 45°

Comparing 1971 and 1977, we have a 6-year cycle that puts Mercury 8 days and 11° later in 1977 than 1971.

Part 3. A goal-year text for 2023

The idea would be to subtract multiples of 12 for Jupiter until you are in the range of the tables at the beginning of Chapter 7. Subtracting 4x12 gets us 1975. Evans suggests the 15-year cycle for Mars (if the dates work out). Subtracting 3x15 gives 1978. Evans suggests the 8-year cycle for Venus, and subtracting 6x8 gives us 1975. Finally, Evans suggests the 6-year cycle for Mercury, and subtracting 8x6 again gives us 1975.

Jupiter First Station (start of first retrograde) 1975 = Aug 25
Jupiter Second Station (end of first retrograde) 1975 = Nov 23
Jupiter Conjunction with Regulus (ecliptic longitude 150°) 1975 = N/A
Jupiter Conjunction with Spica (ecliptic longitude 203°) 1975 = N/A

Mars First Station (start of first retrograde) 1978 = Dec 12 (1977)
Mars Second Station (end of first retrograde) 1978 = Mar 22
Mars Conjunction with Regulus (ecliptic longitude 150°) 1978 = Jun 14
Mars Conjunction with Spica (ecliptic longitude 203°) 1978 = Sep 9

Venus First Station (start of first retrograde) 1975 = Aug 5
Venus Second Station (end of first retrograde) 1975 = Sep 14
Venus Conjunction with Regulus (ecliptic longitude 150°) 1975 = Jul 9
Venus Conjunction with Spica (ecliptic longitude 203°) 1975 = Nov 30

Mercury First Station (start of first retrograde) 1975 = Jan 27
Mercury Second Station (end of first retrograde) 1975 = Feb 16
Mercury Conjunction with Regulus (ecliptic longitude 150°) 1975 = Aug 3
Mercury Conjunction with Spica (ecliptic longitude 203°) 1975 = Nov 1