



Coming Full Circle: The June 8, 2004 Transit of Venus

In our very first issue of *AUGuries*, we wrote about the October 10, 2002 retrograde station of Venus, and the Sun-Venus inferior conjunction that was to follow on October 31, 2002. In that issue we mentioned 584-day cycle from one inferior conjunction of Venus to the next. We also noted Venus's traditional association with the Arabs and Islam.

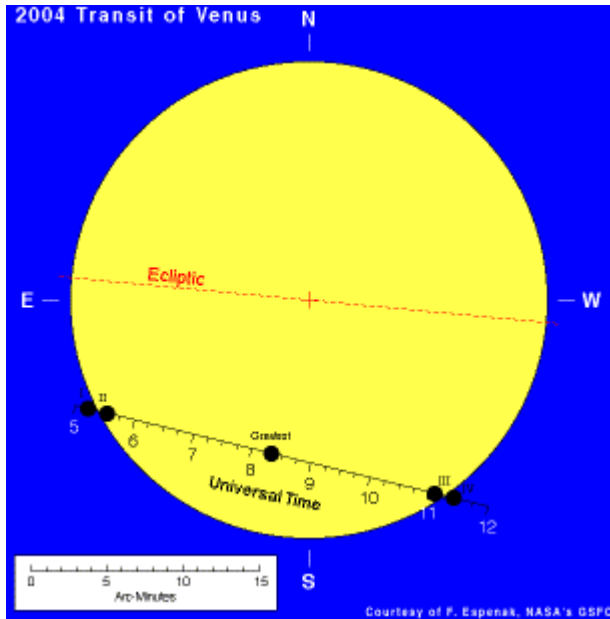
Now, almost exactly 19 months have passed -- the length of another complete Venus cycle. On May 17, 2004, Venus again made a retrograde station, this time at 26 Gemini 08 (on the day that Neptune also went retrograde, the New York Stock Exchange had its 202nd anniversary, the Indian stock exchange experienced its greatest ever one-day drop, and same-sex marriages began in Massachusetts). Following this, on June 8, Venus makes her next inferior conjunction with the Sun, at 17 Gemini 53.

And what a conjunction this is! Not only will Venus conjoin the Sun in longitude, she will also conjoin in latitude. The result is that over three-quarters of the Earth's surface, Venus will be visible as a small black dot passing in front of the blazing disc of the Sun.

To a viewer on Earth, only the Moon, Venus and Mercury are capable of passing in front of the Sun. When the Moon does this, it is a solar eclipse. When Mercury and Venus do this, astronomers call it a "Transit," which means passing across, but not occulting (hiding) or eclipsing the Sun. While solar eclipses happen on average twice a year, and Mercury Transits across the Sun happen about 13 times per century, Venus Transits of the Sun are exceedingly rare. Prior to 2004, only five have been observed, with the last one seen in 1882. With the upcoming June 8 Transit of Venus, we come full circle in a much longer Venus cycle, one that lasts for 243 years.

Because Transits of Venus happen so seldom and were not even known in the West until the 17th century, there is little astrological lore about them. Here are some essential facts about these rare occurrences, and some thoughts about assigning a meaning to them.

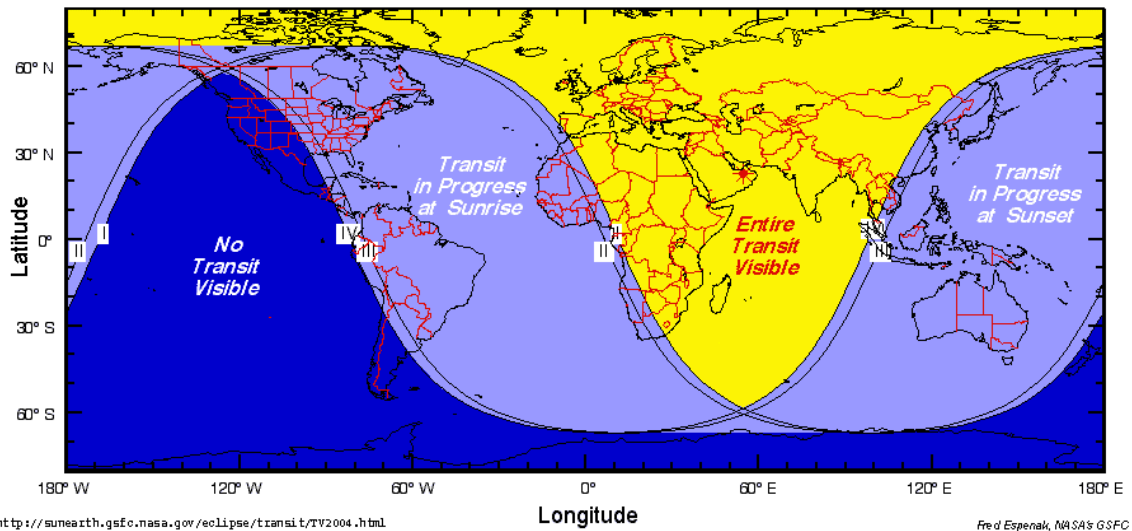
June 8, 2004



The June 8, 2004 Transit of Venus. Venus, traveling retrograde (and therefore from left to right when seen from the Earth's Northern Hemisphere), crosses the ecliptic (conjoins her own heliocentric south node) on June 7 at 14:51 UT. As she conjoins the Sun in longitude on June 8, she is still close enough to the ecliptic to appear to pass over the southern portion of the Sun.

The dot at the far left of Venus's path is Contact I, when Venus, still outside the solar disk, appears to first touch its edge. At the center of the path line is the dot showing the Greatest Transit, when Venus comes closest to the center of the Sun. This occurs at 8:20, slightly before Venus's conjoins in longitude (reaches a point perpendicular to the center of the Sun on the ecliptic) at 8:43 UT. (These times are as seen from the center of the Earth. They can vary by up to 7 minutes depending on the observer's position on the Earth's surface.)

The next Transit, on June 6, 2112, will occur just *before* Venus crosses the ecliptic. Its path will then be tilted downward over the northern portion of the Sun as Venus heads for her helio south node. (1)



Visibility of the 2004 Transit. Weather conditions permitting, this Venus Transit will be visible from start to finish over about a quarter of the Earth's surface. Another quarter will be able to see part of the Transit near sunrise, and another quarter will be able to see part of it at sunset. For a table showing exactly when to look for the 2004 Venus Transit in various locations in the U.S. cities, see the NASA/Goddard Space Flight Center website. (2)

Locality astrologers take note: At her Greatest Transit, the moment when she gets closest to the center of the Sun, Venus will be on the zenith (here shown by a red star) close to the Saudi-Omani border at the mouth of the Persian Gulf. Interestingly, the May 7, 2003 Transit of Mercury (Greatest at 07:52 UT) was on the zenith very close by, in the Arabian Sea at about 60 East.

The longitude of the 2004 Venus Transits is unique in modern times, but the latitude is not. In our era, all Transits of Venus occur in late Gemini/Sag when the Sun has almost reached the solstices. This means that they currently occur at about 23 North and South latitude, just inside the lines marking the Tropics. (When the heliocentric nodes of Venus work their way around to the equinoxes about 20,000 years from now, all Transits of Venus will be at the zenith near the Earth's equator.)

Doing astro-mapping for June 8, 2004 at 8:20 UT (the moment of Greatest transit) shows the conjoined Sun and Venus to be visible on the upper meridian near longitude 54 East, running north through Réunion and the Seychelles islands off the east coast of Africa, through the zenith point near the Strait of Hormuz, through Iran east of Teheran, along the eastern border of the Caspian Sea, up through the former USSR to Novaya Zemlya. The conjunction is on the lower meridian near 126 West, running through western Canada and down the U.S. Pacific coast from Seattle to San Francisco. This whole meridian runs close to Pluto's IC and MC lines. (You might also want to try astro-mapping using the time for Contact I, the Transit's inception rather than its Greatest passage. This is at 05:13 UT.)

The Earliest Known Transits of Venus

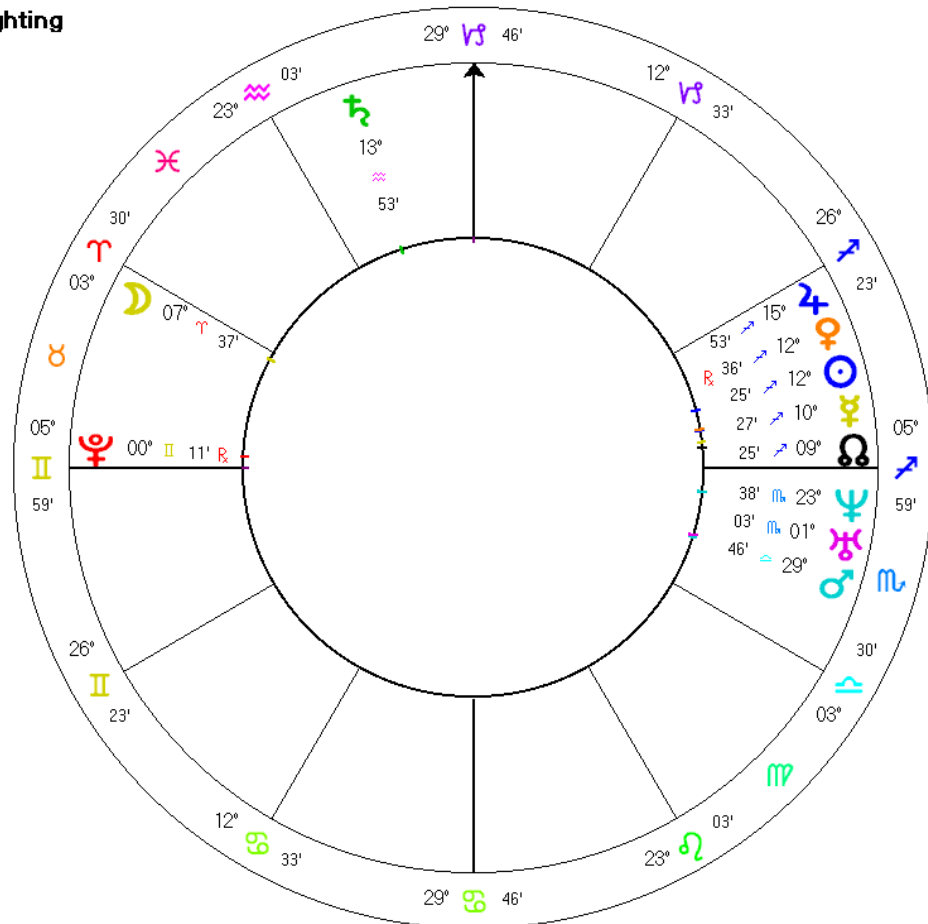
Using current planetary equations, astronomers are now able to calculate occurrences of Venus and Mercury Transits over a period of at least six thousand years. However, not until the 1600s are there indisputable records of humans being aware of these interesting celestial events. Like eclipses, they can be seen under the proper conditions, but because the Sun remains so bright when they occur, they aren't likely to be noticed unless people are alerted to look for them.

There seems to have been no awareness of the possibility of Venus and Mercury Transits until Johannes Kepler was able to predict them. By his death in 1630, Kepler had worked out planetary orbits accurately enough to predict that both Mercury and Venus were due to pass across the face of the Sun in 1631. Following Kepler's predictions, Pierre Gassendi was able to observe the Transit of Mercury, but viewing conditions did not permit the 1631 Transit of Venus to be seen in Europe.

Another Transit of Venus was due in late 1639, but Kepler's equations were not precise enough to predict it. Less than a month before the event, Jeremiah Horrocks, a 20-year-old English curate, reworked the figures and realized that a Transit of Venus would be visible from his parish just north of Liverpool. His theory was confirmed when, a half hour before sunset, the clouds parted to reveal a striking conjunction of Jupiter, Venus, the Sun and Mercury, with Venus visible as "a spot of unusual magnitude . . . already fully entered upon the Sun's disk on the left." The chart for this first sighting -- one of the great moments in astronomy -- is reproduced below. (3)

Horrocks' First Sighting

Event Chart (18)
 Dec 4 1639 NS
 3:15 pm LMT +0:11:12
 Much Hoole, UK
 53°N42' 00"W48'
Geocentric
Topical
Ptolemaic
True Node



After Horrocks, scientists were better prepared to observe the next four Transits of Venus. Following a return from the South Atlantic to observe the 1677 Transit of Mercury, astronomer Edmond Halley realized that it would be possible to determine the Earth's distance from the Sun by observing Transits of Venus from widely dispersed points on the globe. Because Venus is near enough to the Earth to show a parallax effect, the timing of its ingress into and egress from the solar disc can differ by up to 7 minutes in various parts of the world. Using triangulation, the differences in observation times at various longitudes and latitudes can be used to find an approximate value for the Earth-Sun distance. Halley realized that this would enable more accurate eclipse predictions and planetary calculations. Measuring the Transits of Venus would also aid in improving longitude measurements and hence the accuracy of navigation.

Consequently, many expeditions were launched to view the 18th- and 19th-century Transits of Venus from far-flung points on earth. Notable among these were the expedition of Charles Mason and Jeremiah Dixon (of Mason-Dixon Line fame) to South Africa for the 1761 Transit; and the expedition of Captain James Cook to Tahiti for the 1769 Transit. Besides adding to scientific knowledge, this opened the the Pacific to more intense exploration and colonization. Some eighty expeditions were sent out to view the 1874 Transit, and still other expeditions were sent for the 1882 Transit, including one to South Africa by the noted Canadian-American astronomer Simon Newcomb.

These expeditions resulted in many tales of adventure, hardship, triumph and discovery that captured the public imagination. They produced a spate of "Transit of Venus" magazine covers and postcards, a *Transit of Venus* novel and march by John Philip Sousa, and other literary and artistic works of the same name. (4)

The Pattern of Venus Transits

At the end of this article you will find Table 1, "Transits of Venus in Modern Times." Looking at the dates when Transits of Venus occur, you will notice an intricate, syncopated beat. Usually in November/December there are two north node Transits spaced 8 years apart, then an interval of 121.5 years, then in May/June two south node Transits 8 years apart, and then an interval of 105.5 years. And then the whole 243-year cycle begins again. Occasionally, as in the years 910, 1153 and 1396, there is a single Transit instead of a pair.

To understand this strange periodicity of Transits of Venus, we need to recall the 584-day Venus-Sun conjunction cycle that we described in AUGuries Vol. 1. A Transit of Venus always occurs at an inferior conjunction, when Venus is traveling retrograde on the near side of the Sun. After her inferior conjunction with the Sun, Venus emerges as a morning star, turns direct, reaches maximum western elongation, travels around to the far side of the Sun, makes her superior conjunction, emerges as an evening star, reaches maximum eastern elongation, turns retrograde, and makes her next inferior conjunction 584 days later. There are almost exactly 5 of these Venus-Sun conjunction cycles in 8 Earth years, with the result that 5 successive inferior conjunctions of Venus form an almost perfect pentagonal pattern in the zodiac.

Almost perfect -- but not quite! In each 8-year cycle, the whole pentagon moves backwards in the zodiac about two degrees. Over the centuries, the inferior conjunctions of Venus slowly march around until one of them occurs near the north or south heliocentric node of Venus (where Venus's slightly tilted orbit intersects the ecliptic, the apparent path of the Sun). At these times, when Venus is conjunct the Sun in longitude, she is also conjunct in latitude, and a Transit of Venus occurs.

The reason that Transits of Venus generally occur in pairs is that they don't usually hit right on the node. In modern times, the first Transit in a pair has been occurring about a day after Venus makes her nodal transit, and then the second Transit in the pair has been occurring almost exactly 8 years later, just *before* Venus makes her nodal transit.

Table 1 shows that there were unpaired Transits of Venus in 910, 1153 and 1396 CE. These happened when Venus made the inferior conjunction almost exactly on the node. There can be several unpaired Transits near the middle of one of Venus's Saros-like Transit series. This doesn't alter the 243-year periodicity of the whole Venus Transit cycle. It just means that one of the Transits in the cycle is a near-miss. In the "missing Transits" of 902, 1145 and 1388, Venus conjoined her node close to the time of the inferior conjunction, but just beyond the approximate 25-hour limit required for a Transit.

Like eclipses of the Sun and Moon, Venus and Mercury Transits are classified into recurrence series. Venus Transits in a given series occur at 243-year intervals, with each succeeding Transit happening about two degrees further on in the zodiac. The first occurrence in a Transit series begins at the top or bottom of the Sun's disc, barely grazing it, and is very short in duration. At each successive Transit in the series, the path of the planet across the Sun runs parallel to previous paths, but comes closer and closer to the Sun's center. During the Transits near the center, Venus is very close to her node and there is only one transit instead of a pair. These central Transits last the longest, over 8 hours in the case of Venus. Having passed the center, the paths of successive Transits get further and further out again, until many centuries later there is a very brief grazing or near-grazing Transit on the opposite edge of the Sun, and the series ends.

To get at the character of a given Venus Transit, you might think of erecting a chart for the beginning of the Transit series as you would do for the initial eclipse in a Saros series. However, Venus Transit series are much longer. The 2004 Transit of Venus is in series 3, which appears to have begun before the start of Fred Espenak's Six Millennium Venus Transit catalog at the year 1999 BCE (-1998). You'll have more luck with the 2012 Transit of Venus. This is in series 5, which began with the Transit of May 22 (New Style), 554 CE, Greatest at 4:51 UT. In Table 1 at the end of this article you can see the beginning of series 6 with the Transit of 1631. This Transit lasted less than 4 hours and never got closer to the Sun's center than 939 arc seconds. (5)

Historical Trends

Dr. Carl Johan Calleman, a scientist and long-time student of Mayan calendrics, correlates previous Venus Transits with the gradual development of a Global Brain. He points out that:

- The 1518 Transit was followed by Magellan's setting sail in 1519 to circumnavigate the globe. This historic "first" demonstrated in practice that the Earth is spherical, and it resulted in a dramatic change in world-view that Dr. Calleman sees as the first step in the development of a Global Brain.
- The 1631 and 1639 Transits coincided roughly with the emergence of the first national mail services -- in Denmark in 1624, and in Sweden in 1636.
- The 1761 Transit marked the first international scientific collaboration, as people from many nations voyaged to remote parts of the Earth in order to view the Transit of that year. Their aim was to help ascertain the Earth's distance from the Sun and to improve navigation through a more accurate calculation of longitudes. As Calleman says, "Never before had

scientists belonging to different national academies collaborated and it was the Venus transit that compelled them to do so.” According to him, this was “a crucial step in connecting the different peoples of the world.” There were further international expeditions to observe the Venus Transits of 1769, 1874 and 1882.

- The 1874 Transit coincided with the founding of the World Post Union, the completion of the Atlantic telegraph cable, and Bell’s first idea of a telephone, which he patented 2 years later. Calleman points out that the telephone was a necessary first step in the development of the World Wide Web, which many have likened to a Global Brain. Also, the “photographic revolver” machine that French astronomer Pierre Jules Janssen invented to deliver multiple images of the 1874 Transit gave Edison the idea for motion pictures.

Calleman sees the 2004 Venus Transit as heralding a further development in this trend of human communication, but he feels that this time it will not be based on technology. Through his studies of eras in the Mayan calendar, he sees us entering a new period of right-brain consciousness where communication uses mental rather than electromagnetic fields, and where a high development of human intuitive faculties attunes people to one another at a new level and makes lying and concealment very difficult. (6)

Preparing for the Next Venus Transit in 2012

Some see the 2004 and 2012 Transits of Venus as further stages in a process that included the Harmonic Convergence of August 16, 1987 and the Harmonic Concordance of November 8/9, 2003. A constructive way to think of the 2004 Venus Transit is as the start of a critical run-up period that will end with the next Transit in 2012 -- the year that many have said is at, or right after, the end-date of the Mayan Calendar. Some believe that this could be the portal into a golden age, “the ending of Time as we know it” when something old will die and something new will be born.

Dr. Calleman believes that Venus Transits concentrate higher energies and send an intensifying beam to planet Earth. Any exact celestial alignment suggests focus -- and for modern astrologers, an alignment connecting Earth, the central life energy of the Sun, and the love energy and biological life force of Venus surely seems something worthy to concentrate on during these troubled times.

Accordingly, Dr. Calleman is involved in the Global Oneness Commitment -- an 8-year project that starts with the first Venus Transit on June 8, 2004 and ends with the second Transit on June 6, 2012. Its aim is to “unite people around the globe to mutual action in order to not only save what we have, but to transform the planet through an increase in spiritual awareness.” The project starts with a Oneness Celebration on June 6-8, 2004 involving a Transit of Venus world meditation on June 8 (at 12 AM CET). It continues with meditations on the same date for the coming 8 years. In Dr. Calleman’s words, “To participate, there is nothing to believe in except that you are human and inhabit this Earth. . . . Its purpose is to serve as a bridge between peoples of different nations, religions, philosophies, races, genders or belief systems, a bridge which will be built despite all the mental constructs that may keep us apart.”

Table 1: Transits of Venus in Modern Times (8)

1	2	3	4	5	6	7	8	9	10	11
Date of Greatest Transit	Con-junct in Long. (h:m)	Long. of Conj. (Trop. Geo.)	Greatest Transit (h:m)	Mini-mum Separation. (arc sec.)	Sun's Declin. at Greatest (degrees)	Contact I (h:m)	Contact II (h:m)	Contact III (h:m)	Contact IV (h:m)	Tran-sit Ser-ies
0910 Nov 28	21:22	06Sg33	21:28	207.9	-21.53	17:28	17:44	01:11	01:27	4
1032 May 30	19:19	08Ge42	19:03	373.4	21.87	15:18	15:34	22:32	22:48	3
1040 May 28	11:56	06Ge34	12:23	791.8	21.52	10:02	10:29	14:18	14:45	5
1153 Nov 30	20:28	08Sg33	20:38	307.6	-21.83	16:45	17:01	00:15	00:31	4
1275 Jun 01	22:55	11Ge00	22:37	444.9	22.18	19:00	19:17	01:57	02:14	3
1283 May 30	15:19	08Ge51	15:44	733.6	21.87	13:04	13:27	18:01	18:25	5
1396 Dec 01	19:09	10Sg31	19:25	424.3	-22.10	15:43	16:00	22:49	23:06	4
1518 Jun 05	02:15	13Ge18	01:56	505.3	22.45	22:28	22:45	05:06	05:24	3
1526 Jun 02	18:47	11Ge09	19:11	666.7	22.18	16:13	16:34	21:48	22:08	5
1631 Dec 07	05:55	15Sg00	05:19	939.3	-22.64	03:51	04:59	05:40	06:47	6
1639 Dec 04	18:05	12Sg32	18:25	523.6	-22.34	14:57	15:15	21:36	21:54	4
1761 Jun 06	05:40	15Ge36	05:19	570.4	22.69	02:02	02:20	08:18	08:37	3
1769 Jun 03	22:02	13Ge27	22:25	609.3	22.44	19:15	19:34	01:16	01:35	5
1874 Dec 09	04:39	17Sg00	04:07	829.9	-22.82	01:49	02:19	05:56	06:26	6
1882 Dec 06	16:41	14Sg31	17:06	637.3	-22.56	13:57	14:17	19:55	20:15	4
2004 Jun 08	08:43	17Ge53	08:20	626.9	22.89	05:13	05:33	11:07	11:26	3
2012 Jun 06	01:08	15Ge45	01:29	554.4	22.68	22:09	22:27	04:32	04:49	5
2117 Dec 11	03:16	19Sg00	02:48	723.6	-22.97	23:58	00:21	05:15	05:38	6
2125 Dec 08	15:33	16Sg32	16:01	736.4	-22.74	13:15	13:38	18:24	18:48	4
2247 Jun 11	11:59	20Ge12	11:33	691.3	23.05	08:42	09:03	14:04	14:25	3
2255 Jun 09	04:19	18Ge03	04:38	491.9	22.87	01:08	01:25	07:51	08:08	5
2360 Dec 13	02:08	21Sg01	01:44	625.7	-23.09	22:32	22:52	04:35	04:56	6
2368 Dec 10	14:12	18Sg33	14:45	836.4	-22.90	12:29	13:00	16:31	17:01	4
2490 Jun 12	14:43	22Ge30	14:17	741.1	23.17	11:39	12:02	16:32	16:55	3
2498 Jun 10	07:07	20Ge21	07:25	442.7	23.02	03:48	04:05	10:45	11:02	5

Col. 1: Date of greatest phase of transit. (All dates are New Style.)

Col. 2: Time of the Venus-Sun inferior conjunction in longitude. (UT)

Col. 3: Degree of the inferior conjunction. (Geocentric longitude, tropical zodiac.)

Col. 4: Time of the greatest transit -- i.e., when Venus passes closest to the center of the Sun. (UT)

Col. 5: Distance from the center of Venus to the center of the Sun at the greatest transit. (In arc seconds)

Col. 6: Declination of the Sun at the greatest transit. (In degrees.)

Col. 7: Time of Contact I, when disc of Venus is externally tangent with the Sun (when it first touches Sun's edge). (UT)

Col. 8: Time of Contact II, when disc of Venus is internally tangent with the Sun (wholly inside the Sun's disc). (UT)

Col. 9: Time of Contact III, when Venus is last internally tangent with the Sun (still inside the Sun's disc on the way to egress). (UT)

Col. 10: Time of Contact IV, when disc of Venus is last externally tangent with the Sun. (UT)

Col. 11: Number in Venus Transit series.

Notes

(1) Diagram and contact times courtesy of F. Espenak, NASA/GSFC.

(2) Map courtesy of F. Espenak. For the table of exact Transit times in the U.S., visit <http://sunearth.gsfc.nasa.gov/eclipse/transit/TV2004/city-USA1.html> .

Important note: Directly looking at the Sun to view a Transit of Venus or Mercury would be even more damaging to the eyes than directly viewing a solar eclipse. To view the Transit, you could follow Horrocks' method of using a telescope to focus the image of the Sun onto a piece of paper, or purchase a pair of disposable goggles as explained at <http://www.transitofvenus.org/safety.htm> . A way of rigging up a pair of binoculars for safe Transit viewing is explained in detail at: <http://www.exploratorium.edu/venus/question2.html>. Or you can just watch a live webcast of the Transit at <http://www.exploratorium.com/venus/index.html> .

(3) English translation of Horrocks' account, *Venus in sole visa*, cited in M. Maunder and P. Moore, *When Planets Cross the Sun*. Chart erected by *Solar Fire 5* for 30 minutes before sunset in Horrocks' town, Much Hoole, UK.

(4) For a wide variety of information (including picture archives) on the Transits of Venus, see the Transit of Venus website, <http://www.transitofvenus.org/> and also <http://transits.mhs.ox.ac.uk/> .

(5) The best astronomical information on Transits, including a "Six Millennium Catalog of Venus Transits: 2000 BCE to 4000 CE," begins on the page hosted by Fred Espenak, <http://sunearth.gsfc.nasa.gov/eclipse/transit/transit.html> .

(6) You can read Calleman's articles on the subject at <http://www.experiencefestival.com/index.php/topic/articles/article/2042> .

(7) See the Global Oneness Commitment website, <http://www.globaloneness.com> , and also <http://www.experiencefestival.com/index.php/topic/articles/article/2033> and, for the connection to the Mayan tradition, <http://www.astrology.com.com/quetzalcoat11.html> .

(8) Table data from *Solar Fire 5* and F. Espenak, "Six Millennium Catalog of Venus Transits" cited in (5) above.