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Recovering the Lost World,
A Saturnian Cosmology -- Jno Cook
Appendix B: Celestial Mechanics.

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"The main theories of astronomy are as
remote from experience as to be spooky."
-- Alfred de Grazia *The Divine Succession* (1983)

Celestial Mechanics

This appendix presents the celestial mechanics I have used as background to the narrative of this text for the event of 3147 BC and the era after 3147 BC. Note that I will use the year 3147 BC for the end of the "Era of the Gods" throughout this appendix. After a look at initial conditions, the remainder of this appendix presents likely later orbits of the inner planets, which do not deviate from what would be expected under the influences of gravitational and occasional electric forces.

One reason for this discussion is to counter interpretations like, "Mars then left its regular position and almost collided with the earth in about 700 BC," as Stephen Jay Gould wrote in *Ever since Darwin* (1977). Planets do not leave their orbits.

But orbits change over time in relation to each other, enough to have caused interference in the remote past. It is unfortunate that Velikovsky titled his 1950 book *Worlds in Collision,* when there were no collisions, and could not be. Planets are not billiard balls. The electric interaction between "colliding" planets happened at distances of tens of millions of miles, except in 800 to 650 BC, when Mars indeed came very "close."

Scavenging Planets

I have in previous text maintained that Saturn would have come in from the far reaches of space with a large positive charge, larger than any of the planets of the Solar System. The Solar System planets would thus be at a negative potential with respect to Saturn.

First, this explains how in meeting up with Jupiter in 3147 BC, both the Saturnian planets and Jupiter were cast into orbits far removed from the Sun. I'll detail the likely geometry of this further below.

Second, it explains how Saturn could have reduced its orbital period from 27,000,000 years to what I estimate to be something on the order of 4000 years, and subsequently reduced it to a value close to a year. In both of these cases Saturn would have been pulled into the Solar System on meeting up with Jupiter on one of its excursions into the inner region of the Solar System. Saturn became a Solar System planet because of the attractive electric field forces between Jupiter and Saturn.

At an orbital period of 4000 years (just as an example) the radius of the orbit would still be an astounding 252 AU. This means Saturn would exit the Solar System on its orbit. A measure of 4000 years for the return of Saturn can be deduced from Book 11 of the *Chilam Balam* -- exceedingly long periods of no sightings of Saturn between appearances, "when there was infinite night." When Saturn made an appearance, it would have been seen for perhaps a decade before disappearing again, because within the Solar System Saturn would travel at the expected speed of a comet or any other celestial body.

It would normally be expected that Saturn and its companion planets would show in the sky as a giant meteor. But there is no recognition of a plasmasphere tail among any of the millions of Venus Figurines. Comets at times do not show a tail, and only infrequently show a bow shock. Comet Holmes in 2007 had only a slight, hazy, and short tail. Comet Holmes was also described as looking like a "bright yellow star." The reader might recollect a description of figurines from the Gravettian period of the Upper Paleolithic as being carved in buff or amber colored limestone (reflecting the buff color of the Absu).

That means that during the Upper Paleolithic, during the time of Cro-Magnon, Saturn was only seen periodically. The long periods between appearances accounts for the fact that the Venus Figurines apparently disappear from the archaeological record for periods of up to 10,000 years (4000 years on average). Only after about 10,900 BC are we certain that the period of Saturn had been reduced to something on the order of a year. This marks the start of the Younger Dryas, and marks the time when Earth was scavenged also. The change in the orbital period of Saturn may have happened earlier, at the beginning of the Neolithic, although nothing of the Venus Figurines show up before the middle of the Neolithic, circa 6000 BC.

Third, it is the greater positive charge on Saturn which accounts for how other Solar System planets could have been scavenged over a period of the last ten million years. Each of the smaller Solar System planets was drawn closer to Saturn, and each found a subpolar or suprapolar location.

At first sight, it would appear that a magnetic connection sustained the grouping of the five-planet stack, except that Mars has no magnetic field. This is also not a case for suggesting that, with the lack of a magnetic field, Mars might have wandered from its position directly below Mercury. But, except for the periodic lowering of Mars, we have no real record of wandering (However, Talbott does, in the imagery presented in *The Saturn Myth*). What is much more certain is that Mercury wandered left and right, which shows up in the fan- or shell-shapes of the plasma streams impinging on Mercury (as detailed by

Talbott).

It is not the magnetic field that aligned the planets. They are aligned because that is how they are normally oriented in the space of the Solar System -- with north as up and south as down, and with a north-south magnetic dipole presented the same way. Jupiter, however, is the exception; its magnetic north pole is at its geographic south pole. Magnetic forces are not powerful enough to move planets around.

It thus might be a coincidence that we find the planets in the stack "as if" they are held together by magnetic forces. With all the south and north poles aligned -- even with Uranus on its side so that its south magnetic pole is above the north magnetic pole of Neptune.

They also violate the concept of magnetic attraction in that they remain separated from each other. We have to suggest that most likely the planets stayed separated because of their electric fields, but this also is negated. The obvious passage of plasma from Saturn to the other planets reveals that Saturn and its solar planets were not at the same charge level.

So what kept the planets apart? Van Flandern would say that the captured planets were just satellites traveling with Saturn. They would remain on an orbit around the Sun parallel to their primary. Apparently what might happen at close range is entirely different from what we would expect planets to experience at large separation distances. We can find other excuses: the magnetospheres of planets are very complex, with space charge sheaths and currents crossing at different locations. And the flow of plasma, in that it is an electric current, created additional local magnetic fields.

The Asteroid Belt

The asteroid belt of the Solar System is strewn end to end with rocks and grains of silicate dust. In the 1970's it was estimated that there might be 100,000 asteroids. Today 300,000 have been detected and plotted, and the estimate for additional smaller asteroids ranges into the millions.

A plot of locations and plots of orbital inclinations and orbital eccentricities of the asteroids reveals that the these objects are on wildly chaotic orbits, and have been subjected repeatedly to unpredictable gravitational and electric forces as Saturn passed through the belt (and much later followed by the Titans and Jupiter after 3147 BC). The dispersion of the asteroids is probably mainly due to gravitational disturbances and electric repulsion. The ubiquitous cratering, however, is due to electric arcing.

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The distribution of asteroids is mainly in the region from 2 to 3.5 AU, between the planets Mars at 1.5 AU and Jupiter at 5.2 AU (with more among the inner planets and at 40 to 50 AU). The eccentricity of the orbits and the great variety of orbital inclinations suggest additionally that the asteroids represent a very old history of cataclysmic interactions. The distinct groups of iron meteorites and 3 groups of distinct stony meteorites (distinct by chemical and crystalline makeup) would seem to constitute four separate rocky or dead planets which could have inhabited the space between 2 and 3 AU, but which were blown apart by Saturn entering the Solar System in the remote past, after a long absence, and more frequently in

the last ten million years.

These outer planets would have been the first objects encountered by Saturn on entering the Solar System and the prime target for interplanetary thunderbolts of huge proportions. Jupiter, Neptune, and Uranus could absorb such lightning strokes, for they have gas and liquid envelops. A rocky planet would not withstand a bolt -- the rush of electron to the surface would break the bonds of the silicates and blow the planet to smithereens, especially if it was similar in size to Mars or the Moon.

... source of the Asteroid Belt

In the 1960s and 1970s, on the basis that the asteroid belt represents the remnants of the dust which "coagulated" to form the Sun and planets, it was assumed that some objects (asteroids or comets) would be traveling on hyperbolic trajectories, representing objects which either had recently been subjected to "collisions" with other objects, or were entering the Solar System from outside of the region beyond any of the planets. On an "open hyperbolic trajectory" such objects would never return after once entering the inner reaches of the Solar System. If this was how stars and planets were created, then this should still be happening.

But no hyperbolic orbits have ever been found. All trajectories are closed elliptical orbits -- paths which bring the meteor or asteroid back. This suggests that the asteroids are not remnants of "planet formation dust," and that the asteroids are local residents (they did not enter from interstellar space). Additionally it indicates that the interactions which led to their wildly elliptical and greatly inclined orbits were local and had culminated a long time ago, rather than continuing to today.

I would suggest an alternate theory of planetary breakup and dispersal of the material over time. An estimate of the depletion of the asteroid belt could be made on the basis of the repeated passages of Saturn through the belt. If on a first breakup of a planet only 15 percent remained on closed orbits, and then, with each of 40 passages of Saturn (20 in each direction) through the broken rocks perhaps another 10 percent was lost each time -- in effect ejected from the Solar System -- then what would remain would be only 0.2 percent of the original mass (0.002).

0.15*0.9^40 = .002

Today it is estimated that all the asteroids together make up a mass of a sphere less than half the diameter of the Moon, and thus 1/8th its mass. The mass of the moon is:

7.35 x 10 exp 22 kg.

One eighth of this is about:

1 x 10 exp 22 kg.

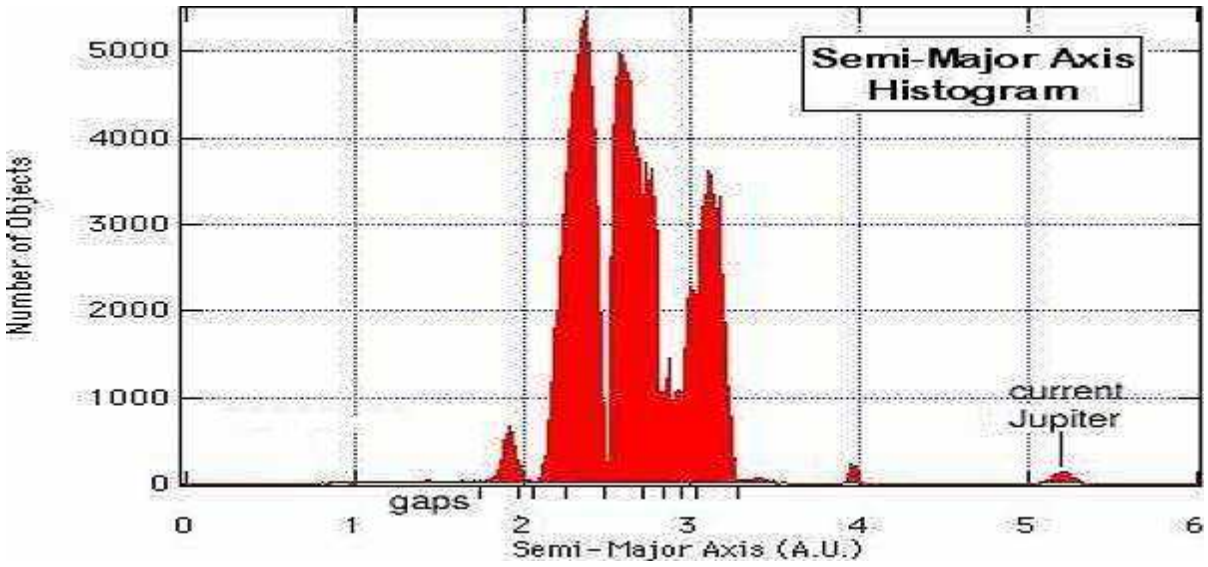
If today the remnants add up to only **1 x 10 exp 22 kg,** then the original planets could have amounted to a half dozen moon-sized to mars-sized bodies -- totaling **500 x 10 exp 22 kg.** [note 1]

- The Earth has a mass of **600 x 10 exp 22 kg.**
- Mars has a mass of **64.1 x 10 exp 22 kg.**
- The Moon is **7.3 x 10 exp 22 kg.**

... gaps in the Asteroid Belt

What is left today is an array of objects widely dispersed, mostly located in a region spanning some 200 million to 350 million miles (320 million to 565 million km) from the Sun, but all on stable orbits. One element of this stability is the existence of some ten distinct gaps where no asteroids (or few) are found. All these gaps are at locations where the orbital period is a fraction of Jupiter's period today, 2:1, 3:1, etc., up to 5:1 (and a few odd ones).

It is assumed that the gaps were created as asteroids at the gap locations passed the radial location of Jupiter (objects closer to the Sun travel faster than objects further away) and were thus subjected repeatedly by the gravitational tug of Jupiter with each passage past the location of Jupiter, even though this amounts to only a fraction of a percent of the gravitational effect of the Sun.

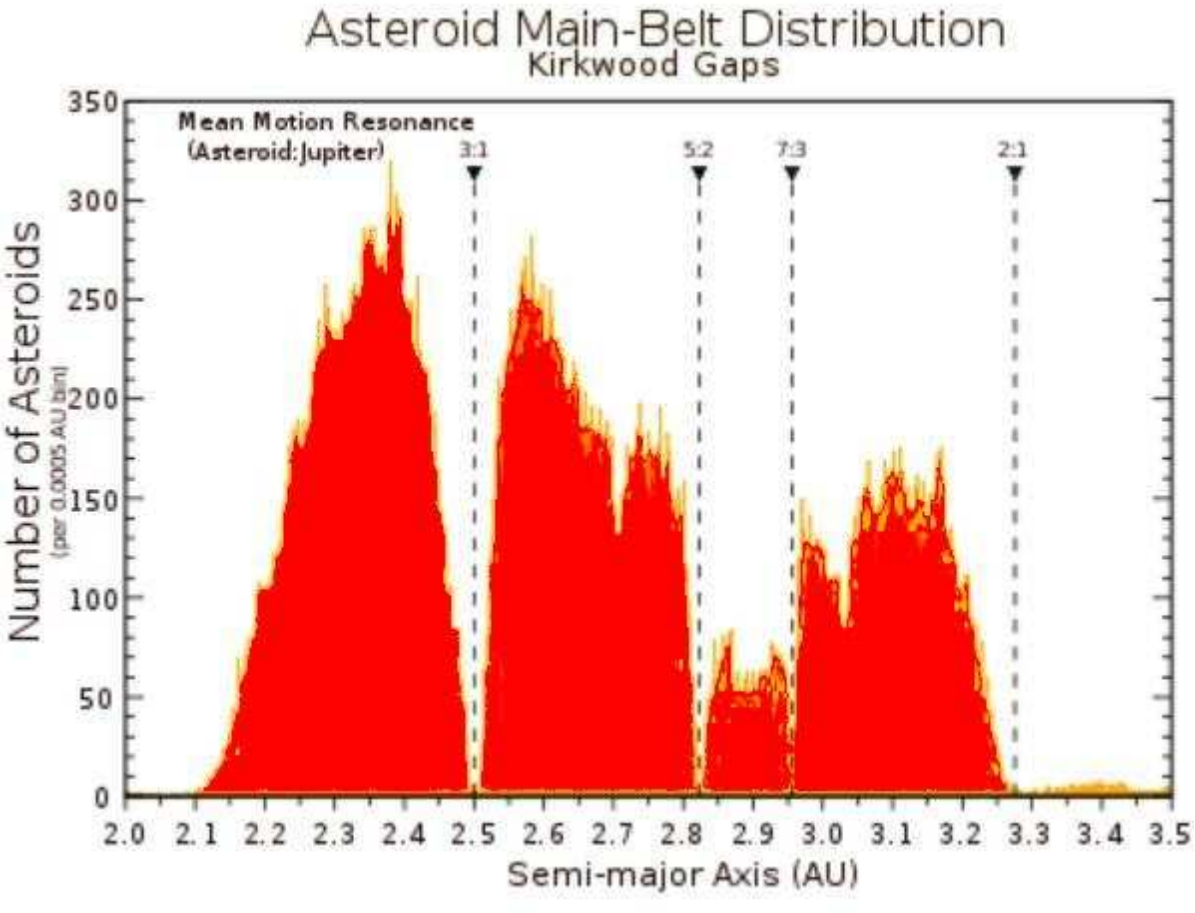


[*Image: "Histogram of the semi-major axis of asteroid objects; gaps in the belt are marked on the abscisa." (Data: ftp.lowell.edu/pub/elgb/astorb.html. Plotted at case.edu/sjr16/; additional graphics added.)*]

This would certainly be true if Jupiter had been at its present location for billions of years. But this would not be true, or would represent only an incomplete process, if, as I have maintained, Jupiter had only arrived at its present location since about 2200 BC. Yet many of the gaps, especially those far from Jupiter's current location are well established, although admittedly many gaps represent only approximations to the current orbital period of Jupiter (some of which is due to the difficulty in making observations). [note 2]

If Jupiter had been at its present location for over 4 billion years, then the gaps in the asteroid belt, even though resulting from gravitational tugging amounting to a fraction of a percent of what an asteroid experiences from the Sun, would have to be more clearly defined than they are now, especially closer to the current location of Jupiter. Over the course of 4 billion years the belt would have segregated into very clearly defined rings and the gaps closest to Jupiter would have been the most clearly defined. Astronomers have wondered why the asteroid belts are not uniformly

segregated into rings. And there have been questions on why inward gaps (nearer to the Sun) are better defined.



[*Image: Kirkwood gaps in the asteroid belt; detail.*]

In fact, we might expect that all of the material would have dispersed by now. Four billion years is a very long time. Asteroids at the 2:1 resonance location would have passed Jupiter 8 billion times; asteroids at the 5:1 resonance location would have passed Jupiter 20 billion times.

If Jupiter actually had spent all of its time, since the earliest creation of the asteroids, at a much closer distance to the Sun, rather than 5.2 AU, could the same gaps be accounted for? In fact, if Jupiter were located at 0.7 AU the same gaps would result from resonance with the period of an inner location, 1:4, 1:5, etc., up to 1:10 (and a few odd ones).

This is not entirely a coincidence, since any inner location of an orbit of Jupiter would also establish resonances throughout the asteroid belt. I checked for resonances at other distances, but 0.7 AU looks most likely. [note 3]

From my perspective, this answers the question of how close Jupiter was to the Sun before 3147 BC. I had earlier suggested, "at one or two AU." Now Jupiter can be placed at 0.7 AU with fair certainty and probably on a fairly circular orbit. (0.9 AU is another good possibility.) Saturn and its planets would have to be on an elliptical orbit which came closer to the Sun at perihelion and extended past 0.7 AU in its aphelion. That is also the only way Jupiter and Saturn could have "collided" in 3147 BC.

Resonance of Asteroid belt gaps
for current and previous location of Jupiter

approximate asteroid gap [AU]	Jupiter at 5.19 AU		Jupiter at 0.7 AU	
	value	resonance	value	resonance
1.78	1:0.201	5:1	1:4.05	1:4
1.91	1:0.223	9:2	1:4.51	2:9
2.06	1:0.250	4:1	1:5.05	1:5
2.26	1:0.287	7:2	1:5.80	1:6
2.50	1:0.334	3:1	1:6.75	1:7
2.70	1:0.375	8:3	1:7.56	3:4
2.82	1:0.401	5:2	1:8.09	1:8
2.96	1:0.431	7:3	1:8.70	?
3.03	1:0.446	9:4	1:9.01	1:9
3.28	1:0.502	2:1	1:10.14	1:10

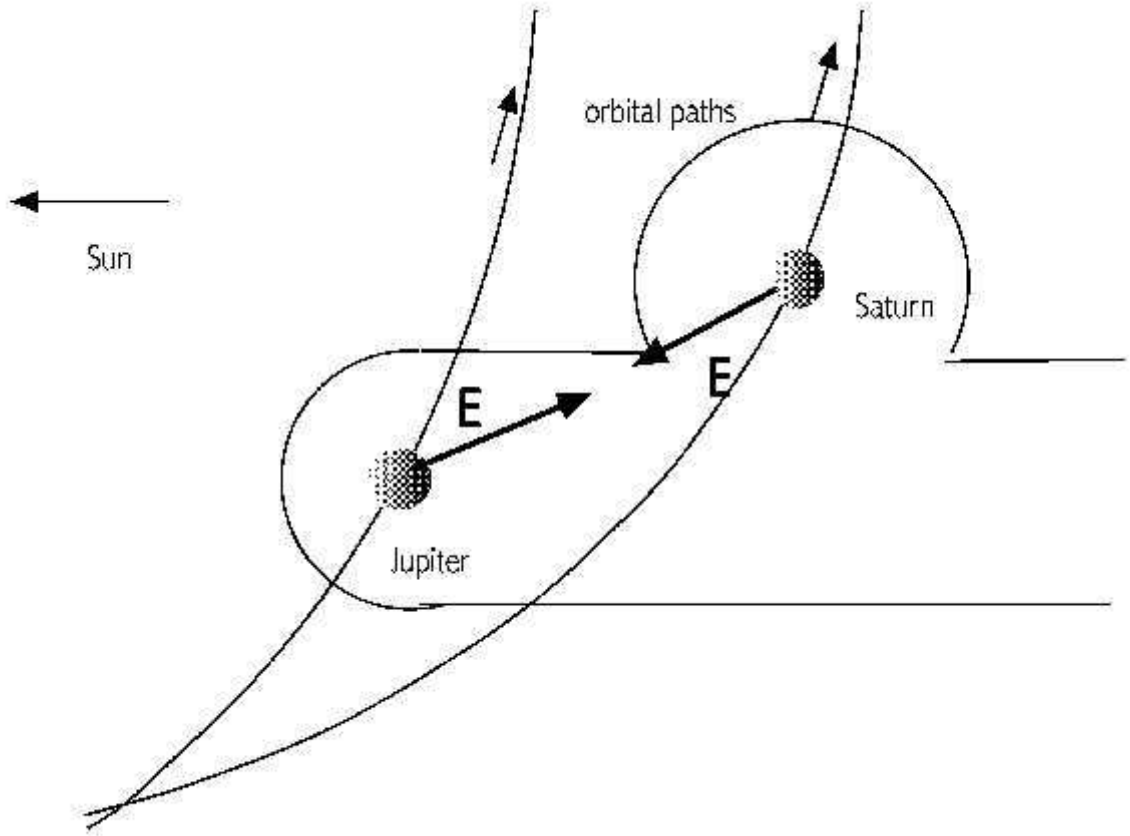
If Saturn were on an eccentric orbit with a period of 225 days as experienced by its companion Earth (as suggested in Appendix A, "Chronology") then the average orbit of Saturn would have to be 0.72 AU. Assuming an eccentricity of 0.25, perihelion would have been at 0.54 AU and aphelion at 0.9 AU. This would certainly not fry the Earth to a crisp. It would keep the northern hemisphere at a reasonable climate (although warm).

An eccentricity of 0.25 is large compared to that of the planets today, but not unrealistic. Mercury today has an eccentricity of 0.20, and Mars still has an eccentricity of nearly 0.10. In 670 BC Venus had an eccentricity of 0.15. One reason for selecting an eccentricity of 0.25, is to keep the Earth at least a reasonable distance from the Sun. A perihelion of 0.54 AU is halfway between the current orbits of Venus and Mercury.

3147 BC, the End of Paradise

In 3147 BC everything came apart. I imagine a scenario like the following, although other arrangements could as well have been the cause.

We begin with Saturn and the planets traveling with Saturn, while on their elliptical orbit. Jupiter caught up, traveling faster on an inner orbit. This corresponds also with the imagery from antiquity: that the city of the Gods -- Saturn and its satellites standing above Earth -- was destroyed by the bull of heaven. Back lighted by the Sun, and traveling on an orbit inclined above Earth, the bull’s Aurochs-like horns were seen.



[*Image: 3147 BC, an electric field interaction between Jupiter and the Saturnian planets. Illustration by J. Cook.*]

I would presume that the interaction of 3147 BC was based on something of this sort, or a close parallel. When the plasmaspheres of Jupiter and the Saturnian planets made contact they were subjected to electric forces of unbelievable magnitude, for the distances separating them was relatively small -- my estimate is 6 to 14 million miles (10 to 23 million km).

Although it is possible that the plasmaspheres of the two planets made contact at a maximum separation (17 million miles, 27 million km), from what scant information we have of the results, it seems much more likely that the contact was made at relatively close quarters.

I was not happy with my earlier attempts at moving the four large planets out to huge distances with repulsive forces, as would normally have happened between electrically negative planets. Then I realized that an interaction with Saturn would have had to involve an attractive force. This is accounted for by realizing that Saturn came from outside the Solar System, and would have had a very considerable positive charge, larger than that any of the Solar System planets.

Having Saturn much more positive than any of the other planets makes Jupiter negative with respect to Saturn. This defines an attractive force between the two. This would result in a serious impulse at an angle to the orbital direction. The result would be to place the planets on elliptical orbits which, at the extreme, would have cast them out of the Solar System.

This is how Earth's artificial satellites change from one orbit to another, except that the Earth-satellites receive a second impulse to inject them into a destination orbit. One cannot have a satellite travel endlessly on a spiral away from the Sun. At some point the further advance has to be curbed.

If then Saturn were to meet Jupiter while outside of Jupiter's orbit, Jupiter would have been yanked away from the Sun, assigning it to a far distant location from the Sun. The Saturnian planets would similarly have been yanked backward, onto trajectories at an angle to their original orbits.

The forward speed is determined by the orbit. Slow speed, far out; high speed, close in. From Kepler's "third law" you can find the speed, or at least the period:

(orbital period)^2 = (orbital radius)^3

How then, did Jupiter, Saturn, Uranus, and Neptune all stay within the Solar System, although at very distant orbits, and even circularized? It just does not make any sense if we only think in terms of elliptical orbits. The only solution is to suggest a spiral path. This is not discussed in orbital dynamics, since it leads nowhere useful in terms of altering Earth-satellite orbits.

But each of these planets had to pass through the asteroid belt. A suggestion that I can therefore offer is that each of these planets was retarded in passing through the mass of the asteroid belt. Could this be? The mass of the asteroid belt does not amount to much, although each of the outer planets would have been in intimate contact with a considerable portion of the asteroids. It might be that there were many more asteroids at one time. This is not unreasonable, since when the asteroid belt was last disturbed it was at a time when four giant planets made their way through, 5000 years ago. The only other alternative would be to suggest some force which is not in the purview of accepted physics. I'm not about to do that.

Venus and Earth were excluded from the electric forces which moved Jupiter, Saturn, and the Titans. Both Venus and Earth were some considerable distance away from (below) Saturn. A reformed plasmasphere of Saturn most likely resulted in their exclusion.

Tom Van Flandern would suggest, instead of reformed plasmaspheres, that the gravitational sphere of influence decreased with the addition of the nearby mass of Jupiter. Under this concept, too, the Earth and Venus would have been released from their duties as satellites.

Having Jupiter approach Saturn because of an attractive electric field force also clearly delineates the blame. The Palette of Narmer shows the "Bull of Heaven" wrecking the city of the Gods. The *Chilam Balam* is also clear about an immediate contact:

"Then Oxlahun-ti-ku [Saturn] was seized by Bolon-ti-ku [Jupiter]."

"Then [when] Oxlahun-ti-ku [Saturn] was seized, his head was wounded, his face was buffeted, he was spit upon, and he was (thrown) on his back as well."

Obviously, starting with attractive forces, there would have been an immediate charge imbalance, not induced as in all the other situations, and as a result the immediate start of a continuous lightning bolt. That too is what the *Chilam Balam* says.

There was no intermediate agent, as in the plasmoid of Venus in 2349 BC, which was variously presented as a dragon or an angry goddess. In this case it was Jupiter who was the agent, and clearly identified in Egypt, Mesopotamia, and Mesoamerica. The graphic and verbal descriptions suggest considerable violence. Jupiter was understood as a celestial bull not simply from its looks, but from the apparent impact it had in wrecking the city of the Gods. Jupiter would have looked like an approaching bull with its huge broad-shouldered shape of its lower coma and with a coma as the head (complete with eyes) with horns on top, formed of the chalice-like plumes above the upper magnetic pole.

An estimate of the size of the plasmaspheres of Jupiter and Saturn, of about 40 planet diameters for each, will suggest how close the two planets came to each other. (Jupiter's plasmasphere today extends some 40 to 100 planet radiuses from the planet's center -- 2.5 to 4.5 million miles, 4 to 7 million km.) This amounts to about 3 million miles for each on average, and thus a total horizontal separation of about 6 million miles (10 million km) minimum.

The other estimate of a separation distance can be had from the Bible and Vedic references to a bright light flooding Earth day and night for seven days -- which Velikovsky thinks preceded the flood, correctly so, but it was the flood of 3147 BC, not Noah's flood. Isaiah, in a prophetic mood, describes a cataclysm to come as:

> *"the light of the moon shall be as the light of the sun, and the light of the sun shall be sevenfold, as the light of the seven days...."*
>
> -- Isaiah, 30:26

Ronald Knox, however, translates the last line as, "as if the light of seven days were joined in one." Jan Sammer and Velikovsky point to Vedic sources, possibly more accurate Talmudic sources, and the Sumerian *Epic of Gilgamesh.* (http://www.varchive.org/eclight.htm). Genesis 7:4 also makes reference to a seven-day delay before the flood.

Notwithstanding the particular translation by Knox and the illusive quality of some of the other sources, the concept of seven days of a very brilliant light before the flood (the flood of 3147 BC), makes sense.

A model immediately comes to mind: on sensing Saturn and the other two large planets electrically, Jupiter would have started to relocate away from the Sun, mostly in the forward direction of its travels. The very act of relocating would cause it to start shedding charge to match the changed electric condition of being at a different distance from the Sun. Jupiter would have lit up in glow mode. The coma that developed was three times the diameter of the Sun (it still is today, but in dark mode). As we know from comets, a glow mode coma, even for a very small object, can light up the night skies as brightly as the Sun.

Jupiter would have relocated and would have remained brilliant far past the original location of Saturn (as we know). But for humans it was over as soon as Earth was released from below Saturn. That brought the flood. So to this point in time we can count seven days of travel for Jupiter. Or perhaps less, since the flood might have taken a few days to arrive from the south.

If, as I suggested earlier, Jupiter were located at 0.7 AU, then its orbit would be **pi * 2 * 0.7 * AU = 409,000,000 miles (659,000,000 km)**, and its year would be 214 days (from **365.24 * sqrt(.7^3) = 213.9**). The orbital speed would thus be 1,920,187 miles per day (3,090,000 km per day). Assuming a travel velocity no greater than Jupiter's forward orbital speed, in seven days it could have traveled about 14,000,000 miles. The initial attractive force, which changed the direction of travel to some value above a tangent to the original orbit, would have to overcome Jupiter's forward momentum, and would not likely last all that long, and certainly not seven days. As the plasmaspheres reformed, the electric fields of the planets would again isolate them from each other.

Is the interaction distance reasonable? We can't argue with the time it took to yank Saturn away from Earth. First, 14,000,000 miles (22,500,000 km) is twice what I had suggested earlier in the text above as the separation based only on estimates of the sizes of the plasmaspheres of the two planets.

Second, I will assume that both Jupiter and the Saturnian planets would have been subjected to an initial impulse force which probably lasted no longer than minutes.

Third, what we have here is markedly different from the descriptions of other electric field interactions, in that there was no restraining force -- something that in all other cases kept planets from continuing onward after the initial repulsive shock. The restraining effect for a repulsive electric force was always provided by the induced charge, which would provide an attractive force to counter the initial repulsion.

So, in this case, Jupiter, Saturn, Neptune, and Uranus were destined to travel forever outward from the Solar System. I would suggest that the eventual restraining effect was provided by the material of the asteroid belt.

Earth stayed behind when Saturn started to move away. At the end of the flood Jupiter was seen with a crescent of sunlight on the planet, seen through its coma, and placed as Noah's ship on top of a green mountain. It was thus located outside of the orbit of Earth. There is more than one image of Jupiter like this as seen by humans and reported on.

Earth was loosened from the grip of Saturn, for the presence of a planet with more than three times the mass of Saturn would have reduced the gravitational sphere of influence of Saturn (as defined by Van Flandern). Not only was Earth outside of Saturn's new sphere of influence, but with Saturn moving away, the Earth's orbital speed no longer matched. Mercury and Mars remained with Saturn.

The Earth at this time was already on a new path about the Sun, and was experiencing the worldwide flood. Jupiter might have been seen in the daytime, but certainly not for long. As the flood came to an end, in a week or two, Jupiter had already relocated to the south skies, and was receding from Earth and from the Sun. The light of seven days came to an end as Earth moved past Jupiter's lower plasma plume -- its mountain.

This type of "collision" would have had a very low probability of ever happening, for although Jupiter and Saturn were on nearly the same average orbit, they had likely fallen into a synchronous relationship which would vary only slowly. The variation in the relationship of the orbits of Jupiter and Saturn would probably be on cycles spanning tens of thousands of years. But at some point in time there was going to be a close call, where the distance between Jupiter and Saturn would become critical. That happened in 3147 BC.

All four of the large planets relocated to a distance from the Sun approximately inversely proportional to their mass, with the exception of Uranus. Nearly the same electric field force was experienced by all the planets (as a diagram of relative positions will indicate), and thus the increase of the orbital distance from the Sun would have been proportional to the inverse of their mass. The exception is Uranus, which should have been relocated to an orbit beyond Neptune, but was not. Uranus's orbit was relocated to an orbit nearer to the Sun than the orbit of Neptune. I'm not sure what might explain that, except perhaps the direction in which the stack of the Saturnian planets was leaning.

If the stack leaned away from the approaching direction of Jupiter, then Uranus would be the most distant from Jupiter when all three planets received their initial attractive shocks, and Uranus would have received a lesser shock (which falls off with the distance). I am assuming here that the force of the electric impulse would have been proportional to the coulomb charge of the planets, and that these in turn would have been a function of their mass, or at least their surface area. This is not quite sufficient to explain the much larger orbit of Neptune -- an additional 1000 million miles beyond Uranus at 1,700 million miles (2,700 million km).

Considering the enormous charge carried by the giant planets, it will become obvious that reforming of the enclosing plasmasphere for the large planets would lock out the smaller planets, so that the smaller planets, enclosed in their own newly configured plasmaspheres, never experienced the electric field force of Jupiter or Saturn and the Titans. Otherwise Earth would have been tossed out of the Solar System.

The tiny planet Earth, the furthest from the Saturnian group, remained on an inner orbit. Venus was torn away (escaped) somehow from Saturn and Neptune. Venus may have been excluded simply because Venus was on an orbit far above and outside of the rings of Saturn, and possibly not located between Jupiter and Neptune at the moment the plasmaspheres touched. From "reports" from Greece, Venus seems to have rounded the globe of Jupiter ("his skull"), still located on the night side of Earth, before heading into an orbit around the Sun with a period nearly identical to the orbit of Earth (as would be expected).

Mercury and Mars were carried along by Saturn as if they were satellites, which in effect they were. Mars and Mercury remained with Saturn and were not released until some 80 years later, when Saturn entered the asteroid belt and reconfigured its plasmasphere, making it much smaller. [note 4]

Axial Inclination of Earth

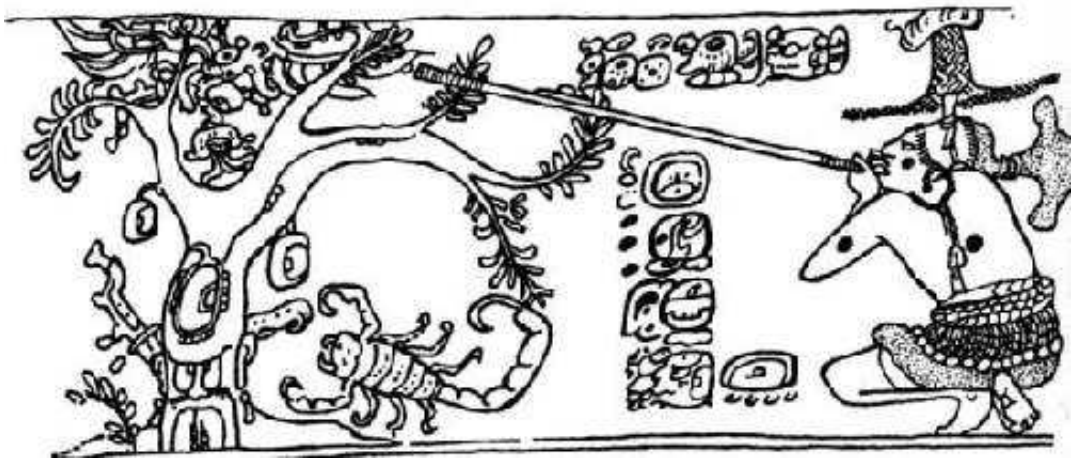
Earth would relocate immediately to a new elliptical orbit which would have the Sun as one of its centers (nodal points). The start of this orbit -- the location of the release -- would constituted the aphelion of the orbit (on the seasonal equivalent day of May 28th, according to the Maya "blowgunner" pot) and is the location Earth would return to during its circuit around the Sun until the orbit changed again in 2349 BC.

Today the aphelion falls in early July, somewhere around July 4th to July 6th (the dates vary on our calendar). A change of 10 or 15 degrees in the location of the aphelion (as happened in 685 BC) was suggested by Rose and Vaughan in 1994. That is the 15 day advance in the equinox, as I have determined also, counting a degree as very close to a day.

In terms of today's calendar, the aphelion moved a total of 36 days: 3 in May, 30 in June, and 5 in July. On the basis of the changes in 685 BC, the original aphelion in 686 BC can be placed at June 20th, on today's calendar (15 days earlier). This is the solstice, to within a day (it varies with leap year adjustments). The remaining difference of 23 days (May 28th to June 20th, inclusive) represents changes in the number of days in the year. Changes in the days of the year, using 225/365 as a factor, would account for 14.8 days. That still leaves 8 days unaccounted for.

This is likely accounted for from a change in the axial inclination -- this would account for a sudden advancing or retarding of the calendar. Thus in 685 BC, when the inclination went from 30 degrees to 23.5 degrees, the solstice advanced 15 days in the calendar. This event is previously established, and already taken into account (above).

On the other hand, the eight days might represent the completion of the removal of Saturn, but cast in terms of the last of the World Flood. The 2000 to 3000 foot deep deposits of fossils at the Siwalik hills (the foothills to the Himalayas), interleafed with layers of mud, looks like the work of repeated tsunamis of astounding magnitude.



[*Image: "Done by Hun-Ahau; on 1-Ahau 3-Kankin he entered the sky, Itzam-Yeh." After David Freidel and Linda Schele "Maya Cosmos" (1993).*]

The seasonal date of May 28th is how both the classical era Maya as well as archaeologists calculated from an unadjusted Long Count. The year of 3148 BC might be a coincidence (although I doubt that). What is important is that 1-Ahau 3-Kankin can be translated to a sunset location of 23 degrees above west if we assume this was determined for a latitude of 19 degrees north which is sort of the midpoint of Maya occupation.

The question then becomes, what would be the latitude for a solstice sunset location of 23 degrees north of west? Today's solstice of June 21 can safely be used to calculate this, but it would have to be set for a different axial inclination of the Earth. Elsewhere I have determined that a value of 25.2 degrees for an earlier axial inclination would be reasonable, after the Australian astronomer G.F. Dodwell.

The axial inclination of 25.2, however, is Dodwell's weakest data point, and it would be acceptable to modify this somewhat. Dodwell assumes that the Earth was jolted in 2550 BC or so, and corrected itself over time. His measure was taken from a pylon at Karnac, built after 2549 BC. My take is that until 1492 BC the initial inclination of the Earth's axis remained the same.

I am suggesting 25.0 degrees rather than 25.2 degrees. At 25.0 degrees, the solstitual sunset would be 23 degrees north of west for a latitude of 1 degree north. It could be south also; but at any rate it is a location near the equator. This could be inland Venezuela as the earlier location for the Olmecs (as I have suggested), or Columbia or Ecuador. [note 5]

Outer Planet Orbits

The current inclinations of the orbits of Jupiter and the other outer planets, in degrees above or below the equator of the Sun, should reflect their interaction in 3147 BC. The current inclinations are the retained history of the starting point of the "collision" of 3147 BC at 0.70 AU from the Sun. This is a very simple and obvious consideration which has not been broached by any researcher in 60 years.

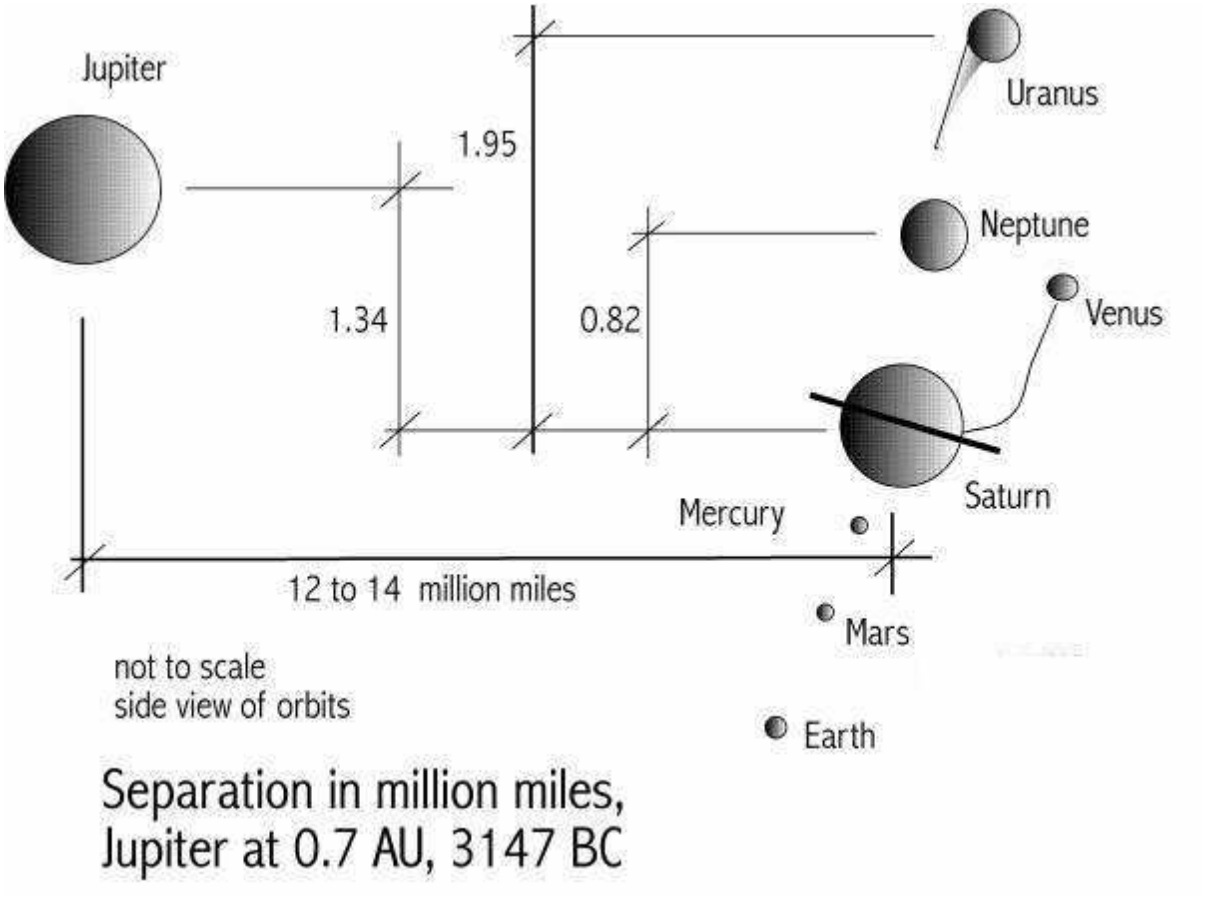
There would be no reason for the inclination of the orbits to change, although it remains to be suggested that the orbits might "flatten" over a long period of time under the gravitational influence of the other planets. But the angle of the eventual orbit would mainly have been determined by the angle each of the larger planets made with the equatorial of the Sun at the location where they were all coincident in 3147 BC. We should thus be able to get a glimpse of the vertical separation distances between the larger (outer) planets in 3147 BC.

Although I have confidence in determining the vertical separation of the outer planets, I have somewhat less confidence that we could extract relevant information about the inner planets, for they have been released from the grip of Saturn at different times and would thus have established their new orbits (with the Sun at one of the centers of the ellipses of the new orbits) at an unknown location other than 0.70 AU.

object	inclination of orbit to ecliptic [degrees]	inclination of orbit to Sun's equator [degrees]	vertical separation of adjacent planets [million miles] as shown
Uranus	0.77	6.23	1.95 (above Saturn)
Jupiter	1.31	5.67	1.34 (above Saturn)
Neptune	1.77	5.23	0.82 (above Saturn)
Saturn	2.49	4.51	-1.34 (below Jupiter)

The chart above shows the vertical distances between the four large planets in 3147 BC. The vertical separation between planets assumes all were located at 0.7 AU from the Sun. The inner planets will be considered separately, below. [note 6]

Predictably, Uranus is at a considerable distance above Saturn, nearly two million miles. Saturn in turn is below the "level" of Jupiter, by over a million miles. Thus Earth would have been even lower and Jupiter would initially have been seen from Earth from a low angle. As described in the various flood legends, the crescent of the Sun's light would have been seen on the lower portion of Jupiter, understood as a "ship" moored to a "mountain" of plasma discharging from the south pole of Jupiter and green.



Neptune, which definitely is a Saturnian planet, can be fit into this configuration. We do not know anything of this planet from mythology (except for references in the Quiche *Popol Vuh*). The name for the planet was selected in AD 1846 to match classical mythology as being one of the Titans banished by Zeus (Jupiter), as related by Hesiod. (Uranus was similarly named, but the planet certainly is not the Uranus "Father Sky" who was the father of Kronos, Saturn.)

Although it might turn out that Neptune could be associated with one of the Gods or Goddesses of antiquity, it is unlikely that Neptune was ever seen (although recounted by the *Popol Vuh*), since it would have been directly above Saturn and certainly was close enough, 0.8 million miles (1.3 million km). Saturn is twice the diameter of Neptune. Saturn and its rings would have easily obscured Neptune.

The reason for considering the possibility that Neptune had hovered above Saturn before 3147 BC is that Neptune is today found in the extreme reaches of space, in fact, at 32 AU. Additionally, both in the earlier Gravettian period of the Upper Paleolithic (28,000 to 24,000 ya) and again after about 5600 BC, the figurines display distinct breasts above the large belly and rump. With Uranus forming the head, and

Saturn the belly or body, the location of an additional planet directly above Saturn would be required to form the breasts, probably as an outline of its equatorial toroidal plasma belt. Neptune is larger than Uranus.

The most convincing evidence comes from the Magdalenian period of the Upper Paleolithic, 17,000 to 14,000 years ago, when the Venus Figurines, from a period 10,000 years earlier, become strangely elongated and hardly realistic looking. Elsewhere I have postulated that at about this time Earth had visually risen in its orbital latitude (or Saturn was on a part of its orbit more inclined to the Sun), so that the figure of the Saturnian planets was no longer foreshortened into the typically squat Venus Figurines of the Aurignacian and Gravettian periods of 30,000 to 24,000 year ago. Rather than dismiss the sculptors of this era as incompetent, as many archaeologists do, I suggest that we are being presented with a realistic depiction from a point of view where the orbit of Earth is at nearly the same level as the Saturnian planets. Without too much effort the sculptures reveal four or five separate globes connected with an enclosing plasma. The sculptures are being forced to appear as an image of a woman, because that had been the long-standing tradition.

... outer planet spin rates

I have assumed (earlier) that the electric and gravitational interaction in 3147 BC slowed the travel of each of the large planets to a value which would correspond to the new (slower) orbital speed of each of these planets at their eventual location far from the Sun.

Of course we have to ask, if both Jupiter and Saturn slowed to a orbital speed which they would have at their remote locations, what happened to the kinetic energy and rotational momentum?

The repulsive electric interaction, which altered the forward speed of the planets, was short lived. Likewise the electric arcing which was involved in the near collision must have been enormous, but these simply cannot account for the energy exchanges which were involved. Plasma exchanges, even in arc mode, are always constrained by time and are self-limiting.

What then happened to the kinetic energy and the potential energy in the collision of 3147 BC? The simplest answer might be to suggest that the orbital rotational momentum which was lost by each of the planets was translated to spin rotational momentum. In fact, both Jupiter and Saturn spin at inordinately high rates for their size (9 and 10 hours).

What I have suggested earlier is that Saturn revolved at about 24 hours before 3147 BC, so that from Earth, below its south pole, Saturn would have stood still. This suggestion could be extended to the other outer planets also, that is, that each of them in relocating to a larger orbit (which reduced orbital rotational momentum) increased their spin rate (which increased the rotational momentum of spin).

On strictly mechanical terms, the conservation of rotational momentum will not allow this unless the planet somehow gained mass, increased in size, or a force was applied. That force was due to an electric field. I suspect, therefore, that, before the collision, Jupiter, Saturn, Neptune, and Uranus, rotated about their individual axes at a lower rate than they do today. [note 7]

New Inner Planet Orbits

The inner planets Venus and Earth released from the gravitational grip of Saturn, immediately started on new orbits with the Sun as one of the centers. The orbital inclinations shown in the chart below are calculated as before. From this it appears that Mercury and Venus started from a location above Saturn. Mars and Earth, however, start from below Saturn, as per my original assumptions. Earth started from a location furthest below at 2.8 million miles (4.5 million km) distance from Saturn, also as expected. Mars started from a location 730 thousand miles (1,175 thousand km) below Saturn. However, see the caveat, below.

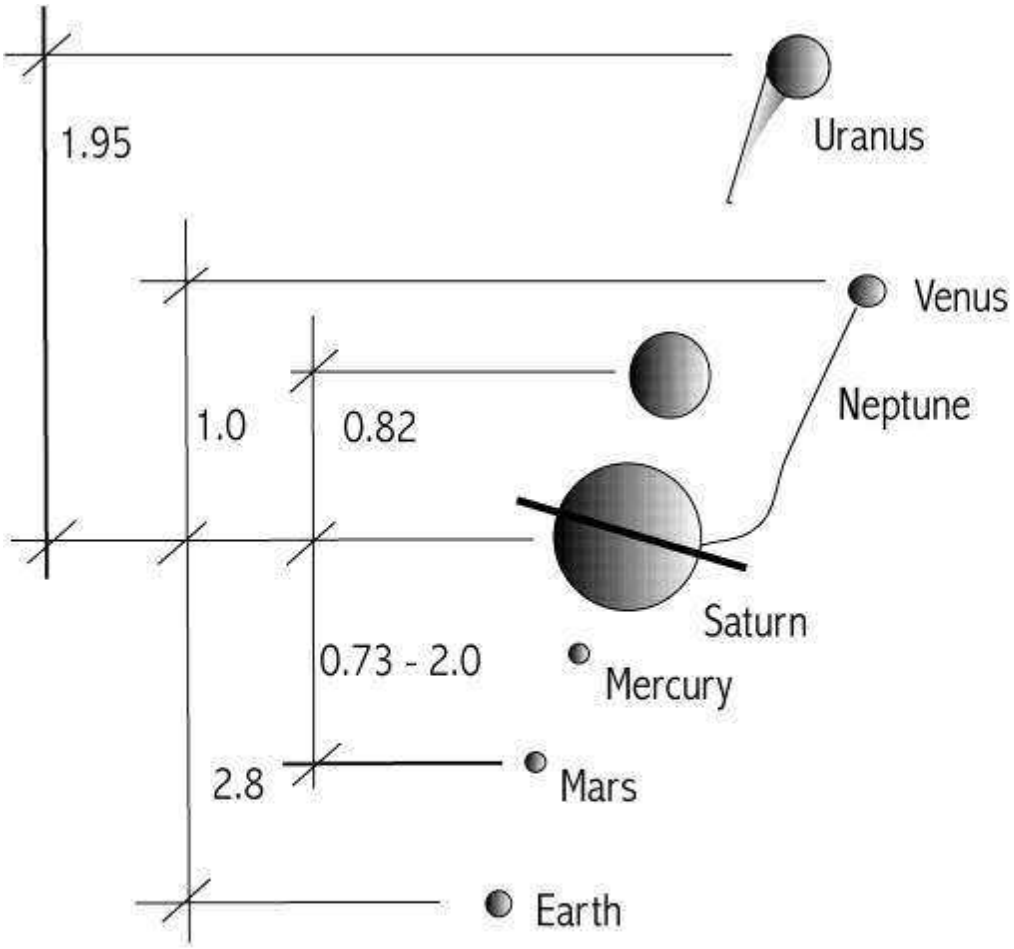
object	inclination of orbit to the ecliptic [degrees]	inclination of orbit to Sun's equator [degrees]	vertical separation from Saturn [million miles]
Mercury	7.0	0.00	-5.13 (sb below)
Venus	3.4	3.60	-1.03 (above)
Saturn	2.49	4.51	---
Mars	1.85	5.15	0.73 (below) **
Earth	0.0	7.00	2.83 (below)

What the chart shows is that Venus would have had a location well above Saturn, and in fact close to the inclination of Jupiter (as also confirmed by "mythology"). The data for Mercury is suspect. It looks to be very far above Saturn, although I have suggested that Mercury was located directly below Saturn. That means the compressive shock between Earth and Mercury in 686 BC not only radically changed the orbit of Mercury, but must have changed the orbital inclination to the equator of the Sun as well. [note 8]

The terms "above" and "below," in the chart above, were selected on the basis of today's angular separation. The location of Mercury is incorrect; it should have been below Saturn. Details for the Earth's contact with Mercury are shown further below.

The seven-degree angle which the Earth's orbit has (today) to the Sun's equator, the largest of any planet, speaks to the fact that Earth was furthest removed from the vertical location of the other planets. Were we lucky?

The distance of 2,830,000 miles (4,557,000 km), shown in the chart above, between Earth and Saturn differs significantly from my first estimate (not shown in these texts) which placed Earth a half million miles below Saturn, so that the disk of Saturn would subtend ten degrees, although with a coma the "disk" might have been larger. The earlier estimate was based on the slimmest of data. It should be expected, however, as I have also mentioned earlier, that Earth should have slowly distanced itself from Saturn as the coulomb charge of Earth increased.



Separation in million miles,3147 BC

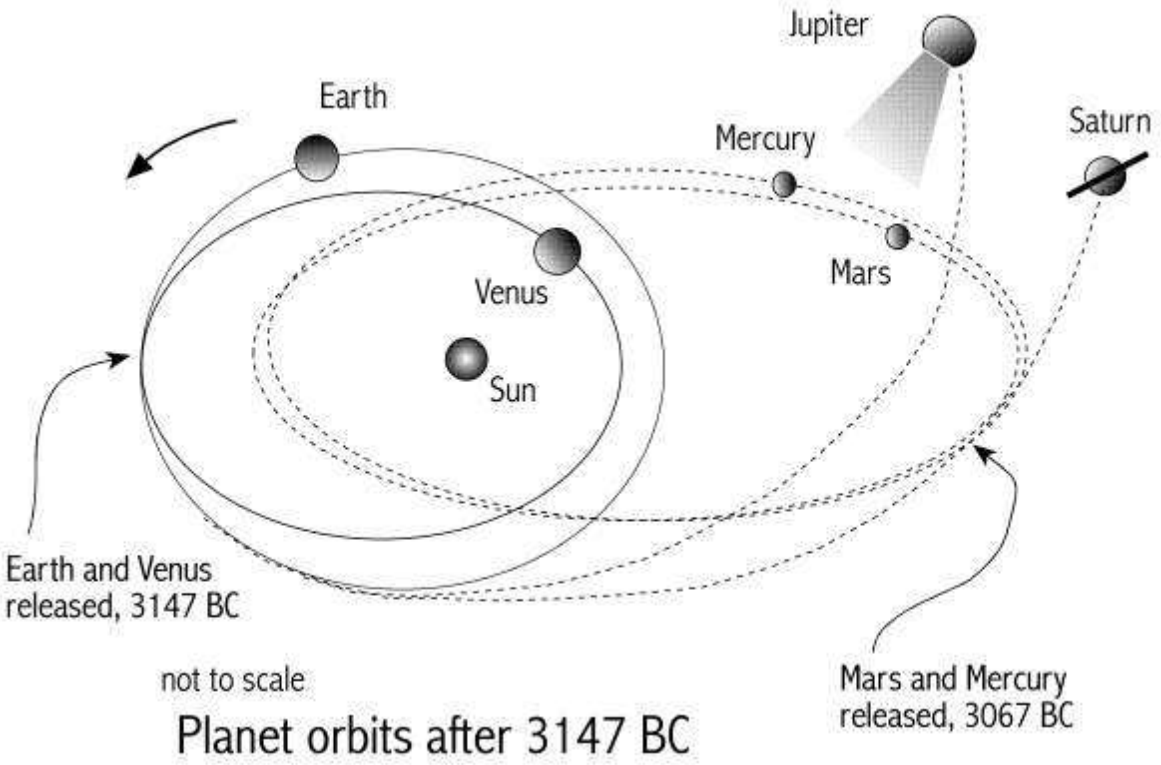
not to scale

For Earth, perhaps a distance of 2.8 million miles below Saturn is not unexpected. The White Crown of Upper Egypt seems to depict this situation. The bulb at the top of the bowling-pin shape, which would be Saturn (but could also be Mercury), has been reduced to a size smaller than Mars (where I suspect Mars is depicted as the pharaoh's head.

At a distance of 2.8 million miles, Saturn would look three times as large as the Moon does today. Mercury, located one quarter to a half million miles (400 thousand to 800 thousand km) below Saturn, would have looked considerably larger with its atmosphere and coma. Mars was much further from Saturn and would have remained a speck except when it lowered to earth. We cannot tell too much from the depiction of the Red and White Crowns, however, because these images probably depict Mars at its closest approach to Earth in the period well before 3147 BC. [note 9]

The location of Earth with respect to Jupiter can also be verified from the description of Noah's Ark. The crescent seen on the bottom of Jupiter looked like a boat or ship, probably equal to the first quarter of the Moon (but at the bottom of the sphere). For this the Earth would have to be a considerable distance vertically below and at an inclination of perhaps 45 degrees. Thus Earth might have very well have been located some 3 million miles (5 million km) below Jupiter and 3 million miles away horizontally.

The distance between Saturn and Mars, listed in the chart above, also is not correct. If Mars and Mercury were carried off by Saturn from the "collision" location of 3147 BC, then the vertical separation should be calculated for a distance from the Sun greater than 0.7 AU. If we assume that these two planets were not released until the edge of the Asteroid Belt was reached, then a distance to the Sun of maybe 2.0 AU would be more appropriate. That would place Mars about 2 million miles (3.25 million km) below Saturn at the time of the delayed release. The same calculation for Mercury does not result in a sensible figure. [note 10]



Planet orbits after 3147 BC

... coincident orbits

As Saturn approached Jupiter, with Venus in orbit above Saturn, and with Mercury, Mars, and Earth some distance below, the small planets might have experienced an electric repulsion or attraction from Jupiter (when the plasmaspheres touched). The resulting interactions would have been somewhat unpredictable, and any number of things might have happened. But in fact it seems that the electric field of Jupiter was never experienced by the four small planets. It would, at any rate, have completely destroyed the Earth. The gravitational attraction of the Sun prevailed for both Earth and Venus; both at once assumed new orbits around the Sun; Mars and Mercury followed 80 years later.

This suggests that Saturn's plasmasphere almost instantaneously reshaped to account for the contact with Jupiter's plasmasphere, leaving the distant planets Venus and Earth free from the electric fields and the electric interactions, and thus subject only to the gravitational force of the Sun.

Mars and Mercury, closer to Saturn, seem to have remained within Saturn's plasmasphere, to be released at a later date, probably when Saturn entered the asteroid belt some 80 years later. At which time its plasmasphere would have contracted, or, if you like, the "gravitational sphere of influence" reduced in size. Isis hides the newborn Horus among the bulrushes of the swamp. The swamp is the Absu. [note 11]

Uranus moved to a larger orbit immediately, initially moving to behind Jupiter. On the second orbit of Earth around the Sun after the flood, the raven is seen behind Jupiter, seeming to move closer to Jupiter's "mountain" as the Earth approached the location of the planet (in the night sky), and then seen moving away again as Earth passed Jupiter. *"And he* [Noah] *sent forth a raven, which went to and fro, until the waters were dried up from off the earth."* The raven is also mentioned in the Sumerian flood story. [note 12]

Having shot past the point of the collision, the Earth (and Venus) moved up from its previous orbit below the Sun's equator, making the Sun again one of the focal points of its elliptical orbit, in effect changing the inclination of its orbit with the Sun's equatorial. Venus would settle on an orbit nearly duplicating the prior orbit of Saturn, and thus end up with a perihelion close to the Sun, probably as close as Saturn had come in the previous era.

Earth and Venus both would have had their aphelion at the location of the "collision" between Saturn and Jupiter -- 0.72 AU or 0.79 AU -- with Venus, because it started above and away from Saturn, having its furthest location from the Sun at a somewhat greater distance than Earth. This would result in having the orbit of Venus extend beyond the orbit of Earth in the future.

Mars and Mercury ended up with orbits of the greatest aphelion, perhaps two AU or more, since apparently they were released later, when Saturn had moved into the asteroid belt, and probably within a short time of each other. I suspect, however, that the planets were released simultaneously. Thus Mars assumed the largest orbit, and, apparently overran the orbit of Earth, periodically coming very close to Earth, likely at 30 or 40 degrees north. Mercury also crossed over Earth's orbit, but I suspect it never got close to the Earth's surface.

Mercury, originally some million miles or more above Mars, would progressively shorten the separation between Mars and Mercury as it neared the Sun. At the location of Earth, Mercury intersected the Earth's orbit perhaps at a location only a few ten-thousand miles further north along Earth's surface.

We have what seems like records of the sightings of these two planets near Earth in the Palermo Stone, and in the lists of the names of the pharaohs of two dynasties in Egypt, and the list of Kings at Kish in Mesopotamia, but nothing much of a record of destructive interactions by Mars, except for some casual mention by Manetho. This is certainly also true for the periods of 1100 years into the future, at the time of the destruction of Sodom and Gomorrah, and 2200 years in the future, the destructions of the 8th and 7th century BC. Even for the destructions of the 8th century BC we know more from archaeology than from any contemporaneous records. There were few people left alive to record the destructions.

It seems likely that Mercury showed up repeatedly near Earth, as the precession of the orbits of these two planets completed an 1100-year turn around the Sun. Nabu (Mercury) became a very popular name in about 2000 BC.

What is being described here is based on later interactions of the inner planets, observations which have come down to us from remote antiquity, plus the facts we currently have at hand, which include the present conditions of the Solar System.

"He also sent forth a dove from him, to see if the waters were abated from the face of the ground." Venus nearly followed the old orbit of Saturn around the Sun, but from a location somewhat above Saturn in 3147 BC. The orbit of Venus is today inclined about 3.61 degrees to the equatorial of the Sun, the second least inclination (after Mercury at zero degrees). Saturn's orbit is inclined at 4.51 degrees to the Sun's equator, the third least in orbital inclination.

The mythology of Greece holds that Venus was "born" from the "skull" of Zeus (Jupiter). This was seen on the first circuit of the Earth on its new orbit around the Sun. To the Greeks the first sight of Venus was as it first appeared from behind the globe (the skull) of Jupiter -- rather than from behind the mountainous outpouring of plasma at its south pole which was understood as his body or garment. [note 13]

The dove returned to the ark on the mountain, as seen from Earth. After the second circuit around the Sun the dove returned with a green branch -- Venus had developed a green cometary tail of ionized Hydrogen gas. On the third orbit the dove flew out again but did not return. Earth and Venus had relocated on their orbits so that Venus could no longer be seen as an outer planet. At least, that is my opinion as to what happened.

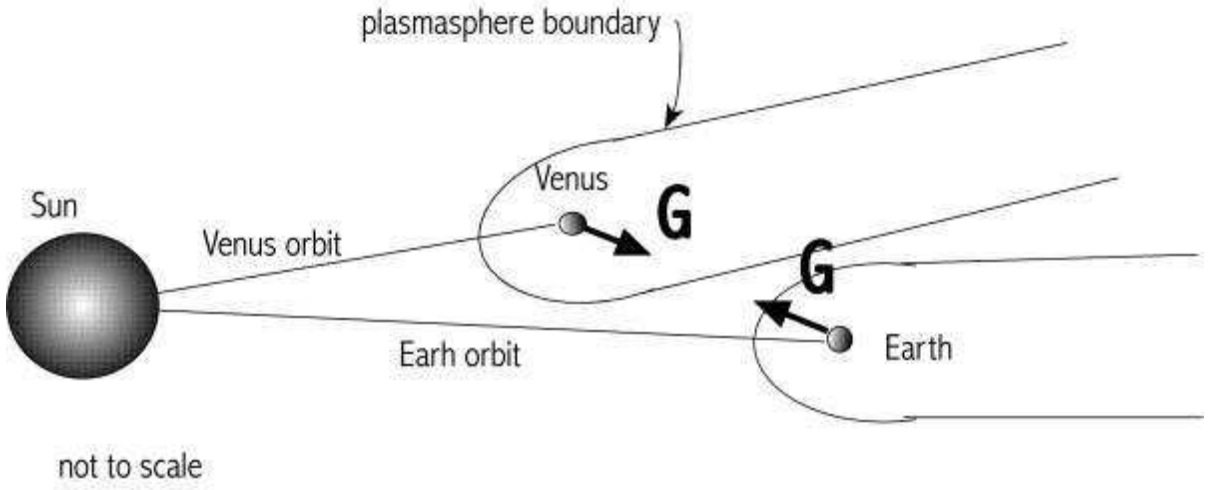
Mesopotamian "flood mythology" mentions that a swallow was also released to test the waters. My first thought was that this might have been Mercury, but Mercury was not available directly after the flood of 3147 BC. Mercury was traveling with Saturn, and only appeared 80 years later. Mercury was available from 80 years after the flood, and also again after 1100 years later, that is, at the time of the fall of the Absu and the blood seen in the sky. It would have just started to approach a periodic intersection with Earth's orbit a few hundred years before 1936 BC -- the destruction of Sodom and Gomorrah.

Earth would start to orbit the Sun with an inclination of seven degrees to the equator of the Sun. This was determined by how far below the other planets Earth was located in 3147 BC. As I have demonstrated, the separation between Earth and the other planets can be determined from the current orbital inclination to the equator of the Sun. Once a planet starts to circle the Sun there is no urgency to change its inclination, except through the minute periodic gravitational attraction of other planets.

Plasmasphere Interactions

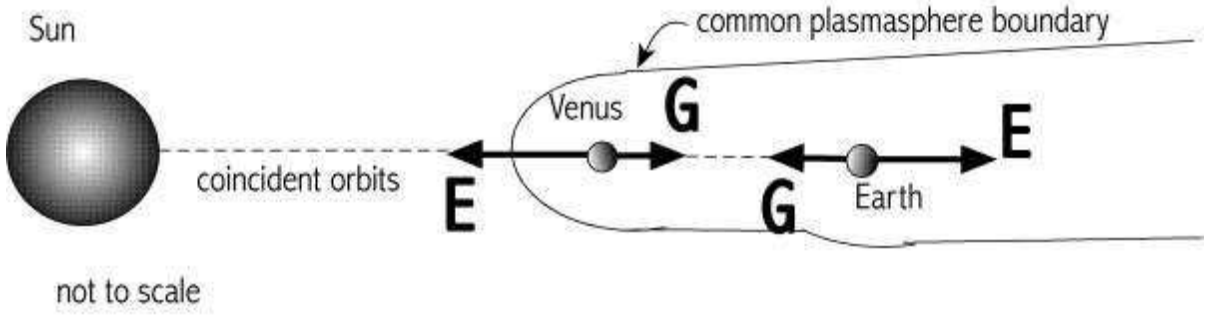
A plasmasphere tail has to "strike" the plasmasphere of another planet to make electric field contact. With the planets all orbiting at different periods and at different inclinations to the ecliptic, this would be a very infrequent event, and would only happen when two planets were both in line with the Sun -- thus at the equinox location of both planets.

The interior of the plasmasphere tail is the medium for electric forces, but the edges (the double layer) of the tubular tail are more likely to be the conduit in a contact involving an arc.



Planet Plasmaspheres

Gravitational effects increase and decrease with the distance between planets, and are sensed past plasmasphere boundaries. Electric forces are experienced only within two plasmaspheres after they touch and merge, and there is a line of sight between the two planets. It is these sudden forces which were recorded as planet shocks of antiquity. Examples of shock damage below.



Planet Plasmaspheres

Since all Solar System planets present themselves as electrically negative, the force would be repulsive. The start of the interaction would be followed by a rapid decline -- as one of the planets induced an opposite charge in the facing surface of the other. With the added induced charge the voltage difference between the two planets would increase rapidly, and it is this which will cause electric arcs to travel from one to the other.

The difference in the electric potential between the planets would cause attempts at charge equalization -- an electric arc (lightning) would strike from one planet to the other. The lightning strikes, however, would be a secondary action compared to the initial repulsive forces. Also, the lightning would take time to travel, for it is a physical transfer of charged particles. When traveling millions of miles it might be seen approaching Earth.

All interaction would eventually stop because both planets continue in their travel around the Sun and would pass each other -- the inner planet traveling faster. The electric field interactions would end as the individual plasmaspheres of the two planets would separate and reform.

Gyroscopic Reaction

The Earth's axis would twist if the initial jolt were delivered off-center to the center of the Earth (above or below the equator). The wrenching of a planetary axis would exhibit a sudden onset in response to the shock, and then start to swing in a circle as the torque of a gyroscopic reaction sets in as a response. (This is explained further below.) The twisting motion of the reaction torque would decline as the applied force decreased and then would slow but would continue to twist the polar axis in the direction of a correction.

The axis would be twisted, but the inclination of the axis would return to where it started from, for the reaction torque would decrease and cease as the axis again approached its initial location (where it initially pointed to in the dome of the stars). The order of the seasons might change, but only temporarily. The energy of the impact would be dissipated in heat, in the relocation of the planet to a new orbit, and in a change in rotational speed.

One would wonder why electric field interactions between the inner planets were not more frequent. It depends on a number of factors which are listed below. I'll use this listing also to suggest the mechanics of the interactions, and explain the reaction torques.

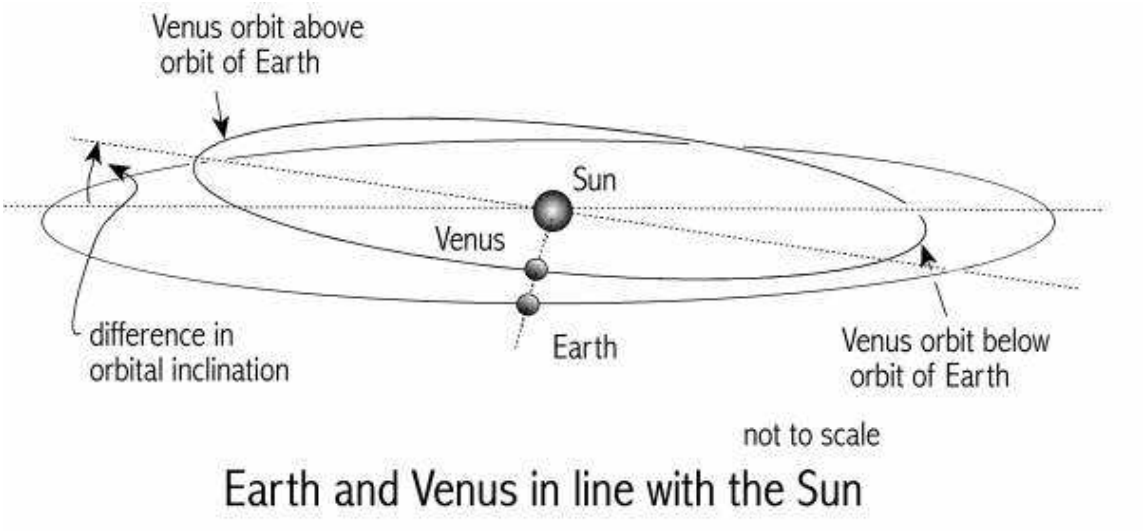
1. Although the tails of the plasmaspheres of planets extend millions of miles away from the Sun (30,000,000 miles for Venus today, 40,000,000 miles for Earth), they are in effect blind. They remain blind to the electric charge of any other planets, and do not even "see" the plasmaspheres of other planets they may be nearing.
2. Plasmasphere tails extend away from the Sun, in the direction of the decreasing electric field, and in the past were seen in glow mode (as most comet tails are still seen so). Today the plasmaspheres of all the planets are in dark mode. Only if two planets are directly in line with the Sun could the plasmasphere of an inner planet reach the plasmasphere of an outer planet.

    - Venus, because it has an atmosphere, would have had a large and bright coma, and two distinct tails. One consisting of ejected (repelled) particulate matter, the other composed only of ions in glow mode at the edge of a plasmasphere tube. The first tail (of ejected material) might curve because the material is left behind after being repelled from Venus. It would also likely split as the charged particles are repelled from each other.

        The other tail is defined by the electric field of Venus and the Sun, and is straight, like a shadow. The ion plasma tail can redefine itself in seconds, even as Venus curves away on its orbital travels around the Sun.

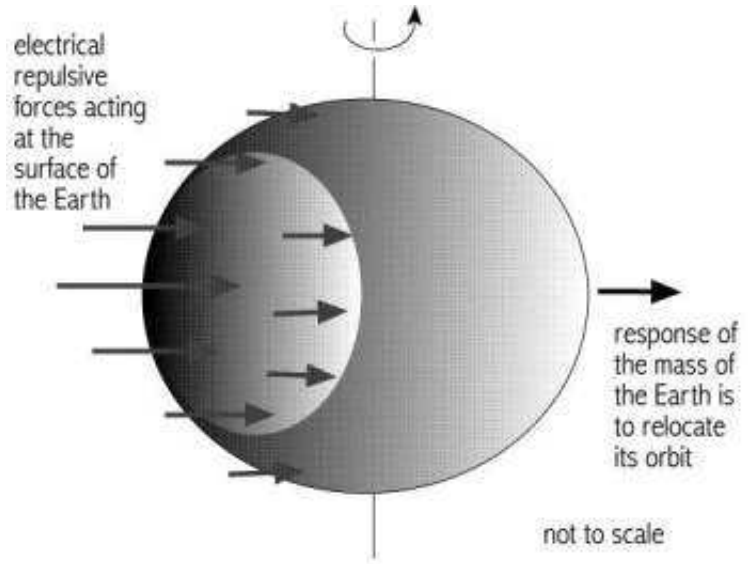
- Mars, without an atmosphere, had a very closely held coma, perhaps composed only of dust, with a tail composed of ions and electrons borrowed from the Solar Wind. The records of Mesoamerica, that twice (out of four close approaches) Mars was seen approaching Earth as a "mighty demon bat" (after 747 BC), suggests that perhaps the dust-envelope extended into space away from the planet and was warped by the Earth's magnetic field as Mars entered the Earth's plasmasphere.
- Velikovsky, in *Worlds in Collision,* has collected similar images from many sources, depicting Mars as a sword, a wolf, and other shapes, also for the 8th and 7th centuries BC.
- The plasmaspheres of planets on adjacent orbits will not make contact very frequently. Today the Earth and Venus line up exactly with the disk of the Sun only four times every 243 years (technically known as a "transit event"). These four transits are grouped in two pairs (with each pair separated by 8 years), at 129.5- and 113.5-year intervals.
- The reason for this should be obvious: since all the planetary orbits are tilted at diverse angles to the equatorial of the Sun (the orbital inclination), and planets travel at different speeds, the likelihood of an alignment of two planets and the Sun is low.
- In antiquity, the period at which Earth and Venus lined up with the Sun seems to have been 52 solar years from 2349 BC through 2193 BC, and near 48 or 50 years at other times. The so-called "52-year period" is discussed separately below.
- This suggests that the orbit of Venus changed very little over the complete span of all the interactions -- during the course of some 3000 solar years. In fact, from various estimates of the orbital period of Venus derived from Mesoamerican calendrical sources, it seems the period of the orbit of Venus changed by only two days. I'll address this peculiarity below.

3. The plasmasphere tail of a planet would completely bypass another planet if the line of sight from the Sun passed above or below the other planet, even though the plasmaspheres of the two planets come relatively close to each other. For Earth the "closeness" would be measured at about 30 planet diameters, 240,000 miles (386,000 km).
4. If the edge of the plasmasphere tail brushed the plasmasphere of another planet it would probably have little effect, although there might be an exchange of the ions constituting the double layer, which might be detected by either planet. A direct hit of repulsive electric field force might be avoided, but lightning strikes could still happen via the double layer of the plasmaspheres. [note 14]
5. If the portion of the main body of the plasmasphere tail runs into the plasmasphere of another planet there will be a sudden realignment of the two plasmasphere surfaces so that the two planets become enclosed within a single plasmasphere. Of course "sudden" is relative, for it involves the selective separation of ionized particles. It may take a minute.



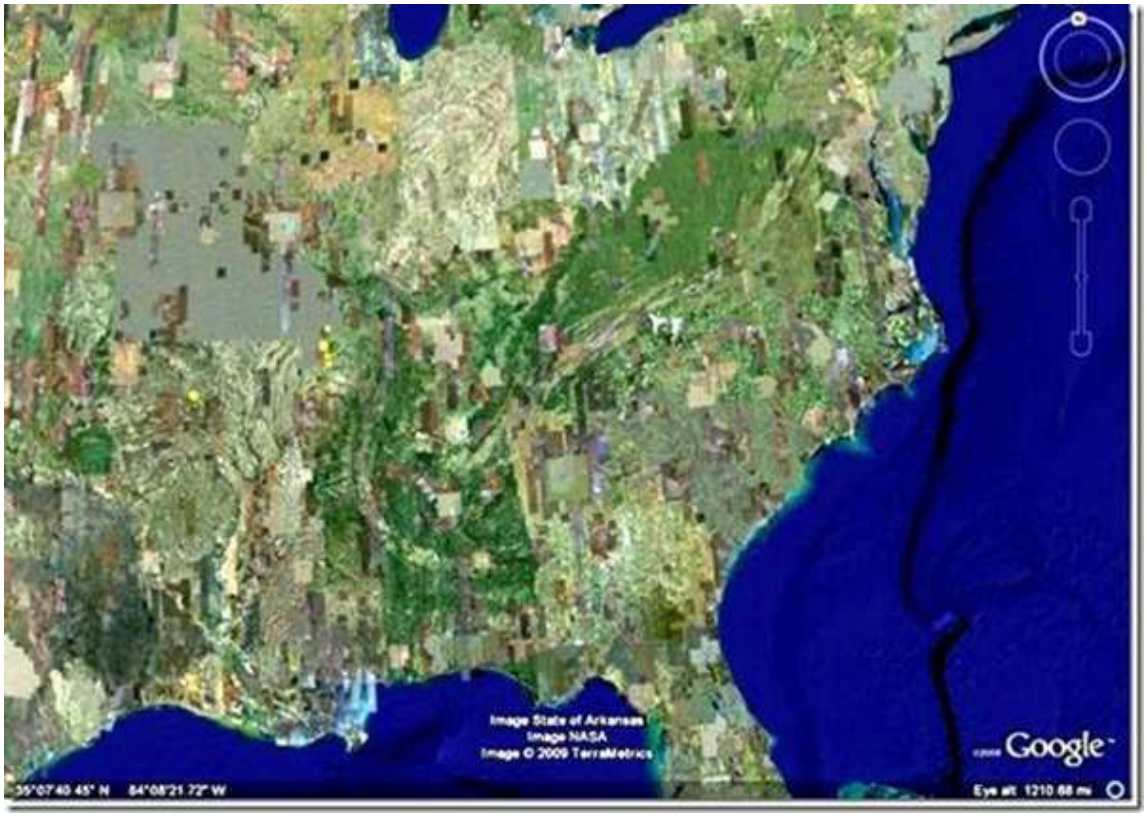
Earth and Venus in line with the Sun

- After two plasmaspheres have merged, and there is a line of sight between the surfaces of the two planets, each planet becomes aware of the electric field of the other planet and both will experience the physical shock of a sudden repulsive electric force. (All planets experience each other as negatively charged, except Saturn.)
- This electric force is not to be neglected, especially since it will be experienced suddenly and at full force. The two shocks experienced by Earth in 747 BC and 686 BC were of this nature. It could jog a planet to a new orbit (as in 747 BC), for it would always be experienced at a right angle to the orbital path. The two planets would be physically propelled away from each other. (But this is not always the case; see "686 BC" below.)
- A stupendous seismic shock would be experienced which would travel around the Earth. At the location facing the other planet, the crust would be depressed, uplifting adjacent surrounding areas. This can be seen at the Caloris basin of Mercury, which extends over about one third of a hemisphere (see image, further below). As the Earth continued to rotate, the depression would move toward the southwest as the Earth tilted away from the impact (for the northern hemisphere) and continued to rotate to the east. The force of the impact would cease as a change in the charge was accomplished through induction. The force on the crust (on one hemisphere) would transmit to the mass of the Earth, moving it to a different orbit away from the Sun.



Hemispherical Electrical Repulsive Forces Experienced by Earth

- Gravity acts throughout the whole of a mass. The effects can be modeled as if the force of gravity acts through a single point at the center of the Earth. An external force can similarly be modeled as if it acts through the center of the earth, but located along the central spin axis away from the center. This force, even if it moves a planet, will have no effect on the Earth's spin.
- The actual electric field force is applied to the crust of the Earth (not to the interior), and on the portion facing the other planet. The other hemisphere of the Earth would be in the shadow of the electric field of the Earth and would not experience an electric field force from an exterior object. The impacting surface force would, of course, be transmitted physically to the whole Earth.
- The Caloris basin of Mercury and the Orientale basin of the Moon are both circular because Mercury and the Moon did not rotate very fast when they were hit, although another likely cause for the circularity of the impact basins is that the duration of the forces was very brief.
- The depressions on Earth, if they are found, would exhibit a semicircle of raised mountains on the western or southwestern side and flat region on the other side. The flat region would indicate the direction of travel of the Earth's surface at the moment the repulsive force was applied or directly after. The application of the exterior force would have traveled in the opposite direction -- in the direction of the semicircle of shoved-over mountains. The lack of mountains at the eastern edge is the result of the Earth's surface moving away from the location of the impact, due to the rotation of the Earth and the tilting of the Earth's spin axis away from the point of impact -- a combination of the external force, the gyroscopic reaction, and the rotation of the Earth. I'll detail the reaction torque below.
- There should be four of these semi-circular areas dating from the last 4000 years. These should be recognized as being recent, that is, represent surface scarring which shows none of the marks of millions of years of weathering. There should be two very large impact basins from the passage of Venus in 2349 and 2193 BC. The contact of 1492 BC was made in the Pacific and left no mark on the land. [note 15]



[*Image: View over Alabama. Courtesy of Dennis Cox, http://sites.google.com/site/dragonstormproject/*]

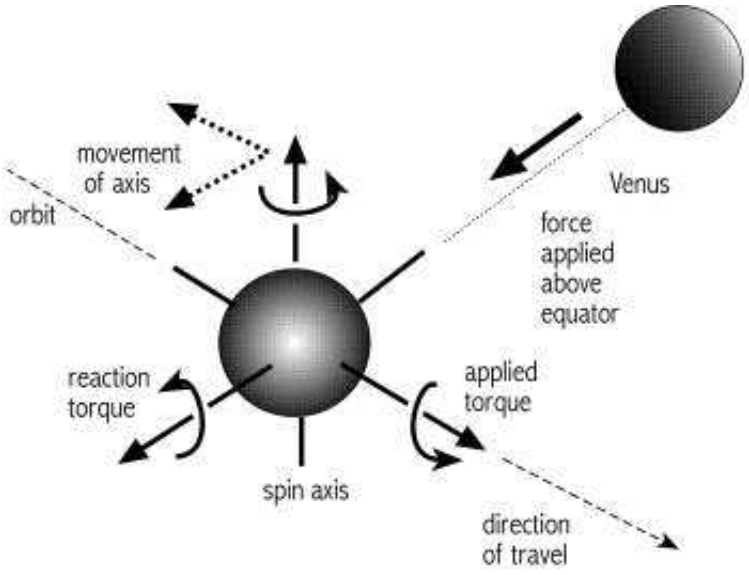
- A second set of marks would represent the contact with Mars in 747 BC and with Mercury in 686 BC. The events by Mars and Mercury would cause much smaller impressions. The impact of 686 BC by Mercury can be generally located from "legendary" observations of North American Indians, and placed with considerable certainty in Northern Alabama. There will be no tribes indigenous to this area which would be able to tell tales of such events. There will be much later earthquakes just west of this area.
- At first I suspected the mark of the 747 BC event to be located in Northern Mexico, just south of the Mexico-US border, south of Manuel Benavides, as suggested by Dennis Cox. The location of the semi-circle of raised mountains in this case points away in the "wrong" direction from the center of the impact basin -- in an arc from north to east. The "wrong location" of the crushed and shoved-over mountains is difficult to justify as an impact location. Additionally, the size of the basin seems far too small (the circle in this image is only 17 miles, 27 km, in diameter).
- Cox attributes the burn damage to a "comet" exploding above the surface, as is proper to do among mainstream academics, and a lead followed by Cox. I would suggest arcing from Mars during the 8th and 7th century BC. The burn damage looks to be a cathode burn mark from a massive electric arc. The mountain ridges which show up at the northeast edge of the 17-mile-diameter circular mark are more or less coincidental. They are not shoved-over, but only molten.

- There is additional similar large scale burn damage further north of this location, pointed up by Michael Steinbacher in a paper "A new Approach to Mountain Formation" (in *Proceedings of the Natural Philosophy Alliance* Volume 8, 2011), which is not about mountain building as much as it is about the melting and burn damage of canyon edges in the southwest of the USA. The latitude is the same as that of the passages of Mars over the Middle East. This does not, however, constitute an impact area like what we are looking for.
- At this point I do not know where the impact of 747 BC ought to be placed.

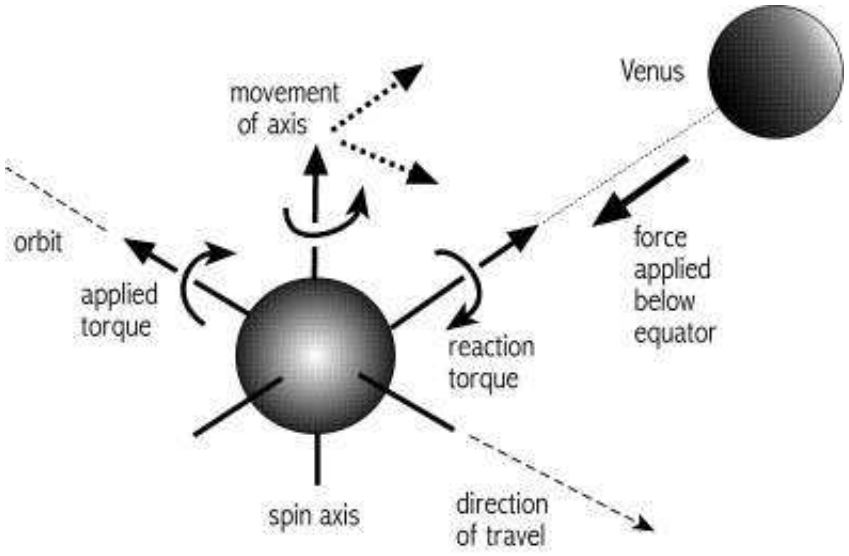
6. The force acting on one hemisphere would represent an unbalanced force if there was any misalignment with the other planet, and the force was experienced above or below the equator, that is, either in the northern or in the southern hemisphere.

    - This will be recognized as an externally applied torque to the spinning Earth. The reaction to an external torque is a twist (a reaction torque) with an axis at a right angles to both the spin axis and axis of the applied external torque. This is thus an interaction between **three** vectors.

        - **First:** The spin axis of the Earth may be considered the first of the three rotational vectors. It points in the "up" direction, and the spin is counterclockwise around this axis.
        - **Second:** An off-center force (shown as applied above the equator in the sketch) applied from the direction of the Sun (the direction of an inner planet) would present a rotation about an axis defining the forward motion of Earth on its orbit. This is the second vector. In this example, it would attempt to rotate the top of the spin axis away from the direction of the Sun.



A -- Torque Applied Above Equator



B -- Torque Applied Below Equator

- **Third:** The third vector is the resultant gyroscopic reaction, and is defined as a rotational axis at a right angle to the other two vectors, and thus (in this example) pointing away from the Sun. The rotation about this axis is also in the counterclockwise direction so that it will initially attempt to move the Earth's spin axis away from the forward direction of orbital travel.

7. Seen from above the Earth, the axis will thus dip (tilt) away from the Sun and away from the forward travel of the Earth (in the first example). Seen from above, the tip of the axis will seem to be rotating in a counterclockwise direction. Seen from Earth (looking up toward the north) the rotational axis will seem to describe a clockwise path through the dome of the stars (facing north). The stars at the pole will rotate through the sky in the opposite direction from normal.

- An unbalanced force applied to the southern hemisphere would result in a tilt of the spin axis of the Earth in the direction of the Sun. The reaction torque is the opposite -- it will attempt to tilt the axis in the direction toward the travel path along the orbit.

  Note that in the diagrams above, the Earth's spin axis is shown perpendicular to the plane of the orbit. This is never the case. It is shown in this manner here for the sake of graphic simplicity.

  Note also that I have neglected any possible longitudinal misalignment. If the compressive force first appears in the northeast, for example, there will be the additional twist of the Earth's axis away from the southwest. This would also likely pile up shoved-over mountains on the southwest side of the circular compression mark.

- The spin axis of the Earth, and the Earth with it, would swing its axis through a loop -- at least as long as the spin axis remained in motion. In the case of a force applied above the equator, the axis will swing through a loop because it is being forced simultaneously to tilt

away from the Sun and at a right angle away from the forward direction of the planet's travel -- "backward," if you like. (The strange result of this is to have the region in the northern hemisphere and below the axis turn faster toward the east.)

- The reaction torque will start up instantaneously and will continue to exert its force to counter the motion bending the spin axis away from its initial direction in space. The result is a precession of the axis -- a wobble, like a spinning top which is slowing down in rotation, except that the wobble will not continue, for the Earth, after all, is not a top placed on a table. [note 16]
- The start of movement of the spin axis after a shock starts quickly but smoothly, for inertia has to be overcome. Inertia is the resistance of objects to a change in movement. Anything loose from the Earth, like the oceans and the atmosphere, might resist the start of the changed motion of the crust, and move in the opposite geographic direction, although mostly the motion will be limited to a reaction to the initial shock. The start and progress of the reaction torque will consist of a smooth transition.
- Once the motion is started, the same resistance to a change would guarantee that Earth's axis would continue its circular wobble, but the rate of movement would drop rapidly as the external torque is removed. The reaction torque would shift value continuously to bring the Earth's spin axis back to the location it started from.

> *This, by the way, is how a gimballed navigational gyrocompass works. It is a device which can be twisted, turned, flipped, and the axis of the spinning gyroscope will continue to point to the same location in space, because it is free to move on all three axes. The fact that the spin axes of all the planets still align either within a few degrees with the Sun's spin axis or are inclined 31 to 32 degrees away from the Sun's axis, confirms the fact that the gyroscopic reaction -- the wobble -- will return the axis to the location it started from.*

8. When the plasmaspheres merge, the planets will also recognize the charge difference between them and will attempt to equalize charge, first by inducing a change in the charge of the facing hemispheres. This changes the repulsive electric field force to an attractive force, mostly felt by the crust. The oppositely induced charge increases the voltage difference between the planets and an electric arc might strike between the planets to equalize charge -- a lightning strike which could travel millions of miles within the highly conductive interior of the plasmasphere (or, as likely, along the double layer of the outer edges). Once struck, an arc will continue even as distance increases. The bolt could sweep around the planet if it struck laterally, for Earth would continue to rotate.

The 8 items considered above explain why "collisions" were so infrequent. But also point up that the actual interaction could be absolutely devastating. Between 3147 BC and 685 BC Venus passed the location of Earth some 3500 times, yet in only a few instances was there any recorded interaction with Earth, even though Venus may have "come close" many times. Seven instances are noted (for Venus) in Mesoamerican sources (four of which probably in the period of 2349 BC through 2193 BC). Egyptian sources (as the cow of Hathor) also suggest seven events. Overall, in only three instances was the orbit of the Earth changed significantly enough to have been recorded as calendar changes.

As presented above, the method whereby Earth changed its orbit always involved a displacement radially away from the Sun. Earth apparently never moved toward the Sun. The inclination of the planet's orbit would remain the same. From this follows what I proposed earlier, that the inclination

of the orbits of the planets has not changed significantly in 5000 years since 3147 BC. There was a change in the axial inclination of the Earth in 685 BC, but this was likely due to a giant 40-day coronal mass ejection.

It could be suggested that two planets might be off from being exactly in line with the Sun by the diameters of their plasmaspheres. Then the thrust to a new orbit would be at a slight angle to the original orbital inclination. But for the combination of Earth and Venus this difference in alignment would not be much more than about 30 planet diameters, thus about 240,000 miles (386,000 km). This displacement is totally insignificant compared to the radius of Earth's orbit -- 93,000,000 miles. I do not think, therefore, that even under these possible unusual conditions the inclination of the orbit would change by even a fraction of a degree.

Lastly, it should be noted that Venus would react quite differently to a plasmasphere contact. Venus has an extremely heavy atmosphere, nearly 100 times the density of the Earth's atmosphere. It is like an ocean. Because of its density and the 700 degree Fahrenheit surface temperature, the atmosphere is the location of Venus's exterior electric charge.

The dense atmosphere would therefore be the location of the electric forces impinging on Venus in meeting another planet. But rather than being transmitted to the surface of one hemisphere, the forces would be absorbed by the atmosphere and distributed around the planet, buffeting the crust with a compression wave from all directions. The planet would not likely relocate to a new orbit, and in fact it looks like the orbital period of Venus has not changed significantly since 3147 BC, except for becoming circular at some point after 685 BC.

Lightning Strikes

About the absolute devastation of extraterrestrial lightning strikes, Dennis Cox, who has investigated altered landforms, has pointed out that the results of the initial lightning strike would have been absolutely stupendous. I have quoted from his website in Chapter 23 ("Destruction by Mars").

Cox writes from the experience of having seen the landscape. He is a welder and welding inspector, and can recognize the molten forms, even though they are rock instead of steel. But his causes are constructs from the limited imagination of the scientific community -- a dreamland of comets and meteors which doesn't exist.

We have, additionally the data from the Chicago Fire of AD 1871. This was not an electric arc from a planet, but a very similar blast from the heavens, not unlike the secondary effects of a planetary arc. Quoting from contemporary sources of the 19th century, the link to the Chicago Fire at [thunderbolts.info/tpod/2006/arch06/060206chicagofire.htm], reads:

> "[the flames] *absolutely melted the hardest building-stone, which had previously been considered fire-proof. Iron, glass, granite, were fused and run together into grotesque conglomerates, as if they had been put through a blast-furnace."*
>
> *"The huge stone and brick structures melted before the fierceness of the flames as a snow-flake melts and disappears in water, and almost as quickly. Six-story buildings would take fire and disappear forever from sight in five minutes by the watch."*

These are reports from Chicago. Conditions in the rural town (and region) of Peshtigo, Wisconsin, in the same year (AD 1871) and at the same time on the same date, describe giant balloons of fire dropping from the sky. Balloons in the 19th century were not the foot-diameter toys of today, but gigantic spheres the size of houses. A second entry at thunderbolts.info continues with:

> *"Most, if not all* [of comets]*, are as rocky as asteroids. The result of their fragmentation will be a meteoric shower of granulated silicates, or sand, mixed with flammable gases and electric discharge phenomena - a 'biblical' rain of fire and sand."*

If I recall correctly, there is some reference in Isaiah or Jeremiah about hot sand blowing in the windows of houses, or under the doors. But this sand is not due to fragmentation, but is the result of the complete disintegration of the silicates. It is a fine powder, with the particle sizes of clays. It is the result of cathodic lightning bolts playing on the rocky comet. Thus "flammable gases" or atmospheric Oxygen are not needed. The silicates will be incandescent from their electrification: electrons in glow mode will envelop the grains as a "space charge."

A continuation of this partially quoted essay by Cox likewise suggests that: "Comets discharge carbon compounds that would be flammable in the Earth's oxygen atmosphere." Again, none of this is needed. The fire will be there -- as burning incandescent dust.

I would object also to the "detonation shock." Cox here assumes a replay of the 1908 Tunguska detonation in Siberia. But, except for the wind, the events would have been nearly silent. The eyewitness reports from the Chicago Fire and the Peshtigo Fire report that the fire was silent except for a roar of a tornado-like wind.

The charge equalization might have involved repeated single lightning strokes, or involved a lightning strike which did not let up, but continued to blast and travel mile after mile. For Mars between 806 BC and 687 BC, we should expect the arc to be tens of miles wide and fall like a sheet of fire. But this is at the eye of the hurricane. The effects at the edges would have extended maybe hundreds of miles. This would be a rotating whirlpool of soil, dust, molten rock, and flaming incinerated forests.

As the planets start to distance from each other the plasma would turn to glow mode and dissipate at the atmosphere. Even a number of full days of arcing will not equalize the charge between planets, as Juergens has pointed out. A lightning strike which would carve the Grand Canyon (a bolt which is suspected to have arrived from Saturn) would only reduce the charge of the striking planet by a fraction of a percent.

Compression Marks

If, as I have suggested, the Earth has experienced massive compressive forces a number of times due to the line-up with another planet, we should be able to search the Earth's surface for compression marks. Two stand out clearly, a crescent of mountains in the Himalayas, and a smaller similar semi-circle in Northern Alabama (US).

"Documented," as used here, means that we can follow a trail of what was seen and was recorded in legends and myths worldwide. "Suspected" means that there is a trail of destruction which points to an inception somewhere east of the string of destruction sites.

Before setting out some details, let me list what little we know of the impacts. The following lists the compression marks since 3147 BC:

There are other suspect locations, marked by crescents of mountains -- Northern Mongolia south of Lake Baikal, and the Elburz mountains south of the Caspian (edging on Northern Iran). In all cases (including the land contacts in the list above) the crescent is in the south or southwest of what would be the contact area for the northern hemisphere. This shows that the Earth immediately tilted away at a rate much greater than the normal displacement of the Earth's surface due to rotation. This is to be expected, for if the shock moved mountains, it must have been stupendous.

year of impact	agent	suspected location	comments
10,900 BC	Saturn	Hudson Bay	obvious
2349 BC	Venus	Tibet	obvious
2193 BC	Venus	Central Asia ?	only suspected
1492 BC	Venus	Central Pacific	good evidence
1440 BC	Venus	unknown land ?	undocumented
747 BC	Mars	Central Asia ?	suspected
686 BC	Mercury	North Alabama	documented

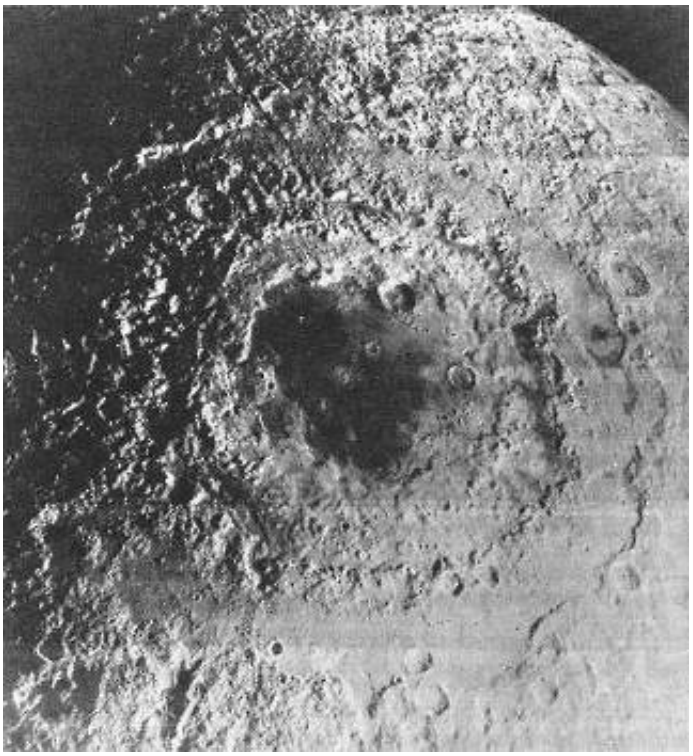
What I will do in the following is to describe the likely sequence of an impact. The reader should realize that although the "impacts" were local, these were induced from afar -- for Venus at distances of 20 million and 10 million miles (32 million and 16 million km). In three diagrams below I'll relate what seemed to have happened at the locations where we have some evidence. But first there is a need to look at two other "impact craters," the Moon's Mare Orientale basin and Mercury's Caloris Basin.

First of all, we could expect these two impact marks to be circular. If a planet remained standing still, that is, not rotating (or nearly so), the reaction torque would not send the planet into a spin which changed the location of the impact. This seems to be the case for the two very large circular marks on the Moon and Mercury.

Additionally, if the compressive force was applied at the equator of a planet, there would be no applied torque, and thus no gyroscopic reaction torque. A circular mark would be made. This might be suggested for the Caloris Basin of Mercury.

Going by the record of Mesoamerica, the Moon's Mare Orientale was likely formed shortly after 2349 BC. Mercury's Caloris Basin was probably created in 686 BC. (Mercury's Caloris basin will be described further below.) Both consist of rings of mountains and circular flat planes, surrounding a flat central depression.

The ring of mountains of Mercury's Caloris Basin is 963 miles (1,550 km) in diameter. The Moon's Orientale Basin is 578 miles (930 km) in diameter.



[*Image: Mare Orientale basin of the Moon. After NASA.*]

Orientale Basin is located at the extreme lower left edge of the Moon, as seen from Earth. The Orientale Basin is overlaid with younger craters, although it is thought to be one of the "youngest" craters or basins. Although lacking any evidence, it is held to be 3.9 billion years old by Establishment Astronomers.

The Mare Orientale, unlike the other circular depressions on the Moon (the Mare basins), is not a flat field of flood basalts, that is, melted rock resulting from an extended electric arc. The Orientale ejecta extends beyond the 600-mile (966-km) diameter of the rings for another 300 miles (483 km), and "contains linear patterns that point back to the center of Orientale" (Wikipedia).

The peculiar overall shape of both the basin and its ringed structure was likely created with an initial repulsive impulse which depressed the central area, causing the outer edges to lift in response. The outer ring of mountains was caused by fracturing of the crust which was pushed away from the center (overthrust). Stone and rock will fracture at a 60-degree angle from the point of impact of a blow. With both the surface of the small planet and the applied force angling away from the center of the impact area, the breaking of surface rock would happen at a low angle to the surface. Together with forces directed away from the center, this would shove a ring of crust onto the adjacent exterior surface. The drag encountered by the moving material would crumple the displaced crust into mountains.

The interior basin, on the other hand, stretched in subsiding from compression and fractured in shear (faulting, a process whereby a section of land drops down). The Caloris Basin of Mercury is noted for "lava plains," and "radial troughs." "The exact cause of this pattern of troughs is not currently known"

(Wikipedia).

Within seconds of the onset of "seeing" the exterior negative voltage, electrons of the planet with a lesser charge would be chased away from the region, and the crust of the planet facing the other would assume a positive charge. That would rapidly dissipate the repulsive electric field force, and change it to an attractive force instead. The sudden withdrawal of the repulsive force would allow the depressed center to relax and raise itself again, with the result that the raised outer rings would then start to subside. The following lifting force will have the same effect.

Because the lifting force (or the negation of compressive force) builds in magnitude over a period of time (although this could be short), it will not cause the shock-induced damage of the initial compressive force. The initial shock is not to be neglected, however. It is this which probably makes the central depression look like a relatively smooth lava field, as it may also have done to the smooth outer ring. Rock melted and flowed like wet clay from the heat generated by compression.

As the subsequent force provided a lift, it would have seriously aided the recovery, making the two regions of the Moon and Mercury look more like car dents which have been hammered out.

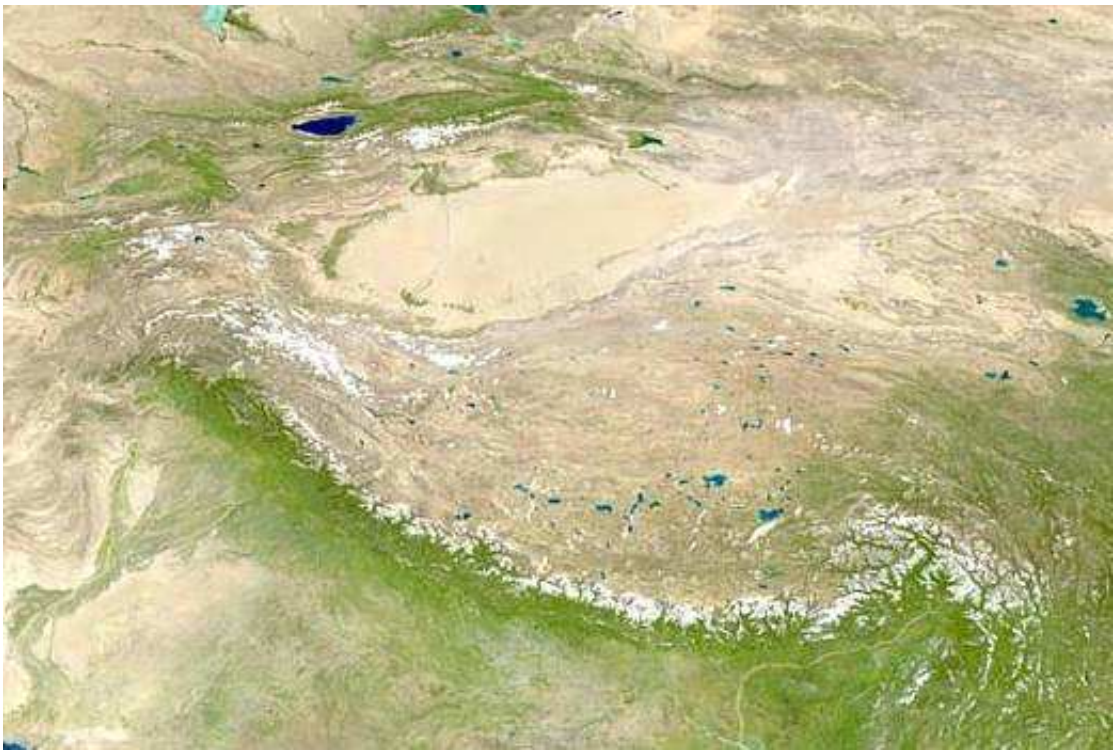
Both Mercury and the Moon show crustal damage at the antipodal locations from the impact marks. Astronomers have identified these as being the result of shock waves traveling from the Orientale Basin of the Moon and the Caloris Basin of Mercury to meet at the location directly opposite -- all the way around the Moon and Mercury.

... Hudson Bay impact

The Hudson Bay impact has been described in an earlier chapter.

... Himalayan crescent

The crescent of mountains representing the Himalayas is a prime representation of a massive compression contact. The Himalayas were shoved from the north and northeast onto older mountains. I have not made much of this in the analysis presented in the text earlier, but it becomes obvious in looking at the Himalayas.

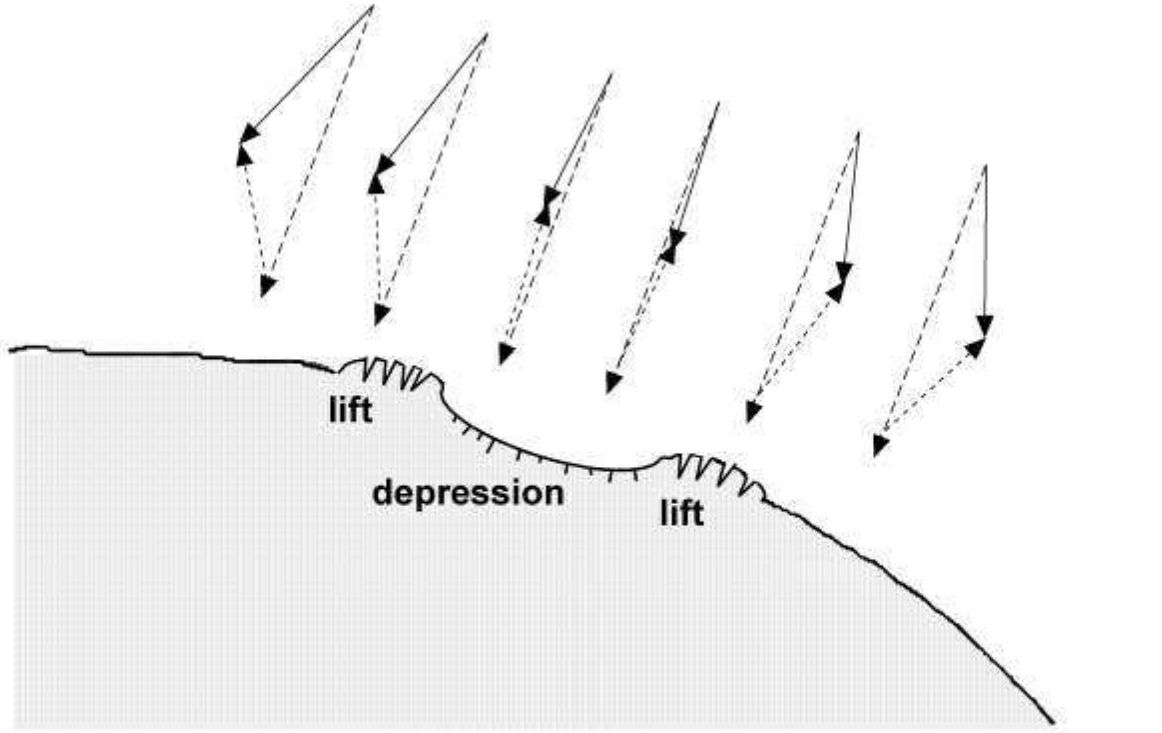


[*Image: Himalayan crescent and Tibetan plateau.*
From NASA satellite image.]

The Tibetan Plateau is nearly flat compared to the Himalayas. A satellite image is shown above. Actually, the Tibetan Plateau is a rugged elevated terrain consisting of what looks like buried mountaintops peering through. In the upper left is the Tarim Basin. In this image, India's lowlands appear below the Himalayas.

[*Image: Himalayan mountains. Source public domain.*]

If a compressive impact leaves a circular mark on a planet which does not significantly rotate, like Mercury and the Moon, the result is entirely different for Earth, which rotates through 360 degrees in 24 hours. The surface at mid-latitudes moves at 500 miles per hour.

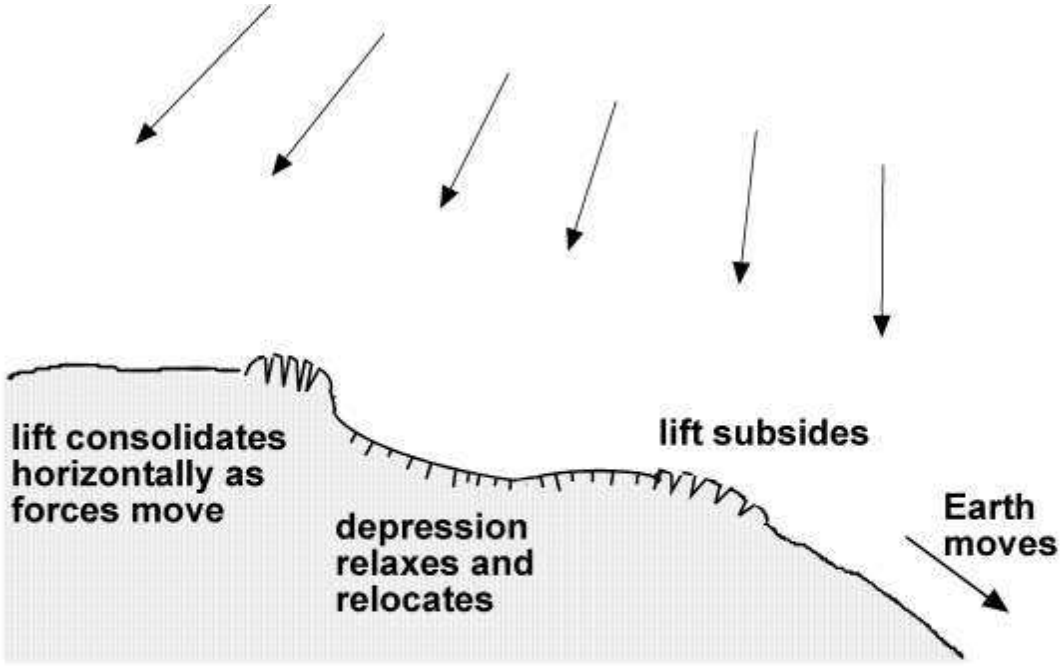


Initial response of the crust to a compressive force

section through Earth

spherical field of Earth parallel field of Venus resultant forces

A planet standing still will not respond with a gyroscopic reaction, for no other rotation is affected. The fast rotation of Earth, however, would cause an immediate gyroscopic reaction, a movement at right angles both to the torques of the applied repulsive electric field force and to the spin.



Response of the crust as the Earth continues to turn

section through Earth

The initial reaction of the crust would be the same as for a planet which was not rotating. The center would be compressed and would subside. The edges would rise in response, but also be subjected to compressive forces. Because these impinge at an angle, the shear, which normally breaks rock (the crust) at a 60-degree angle from the direction of impact (as any bricklayer knows), would break the crust at an angle greater than 60 degrees to the normal of the surface, in effect "shoving" the crust ahead of the compressive forces.

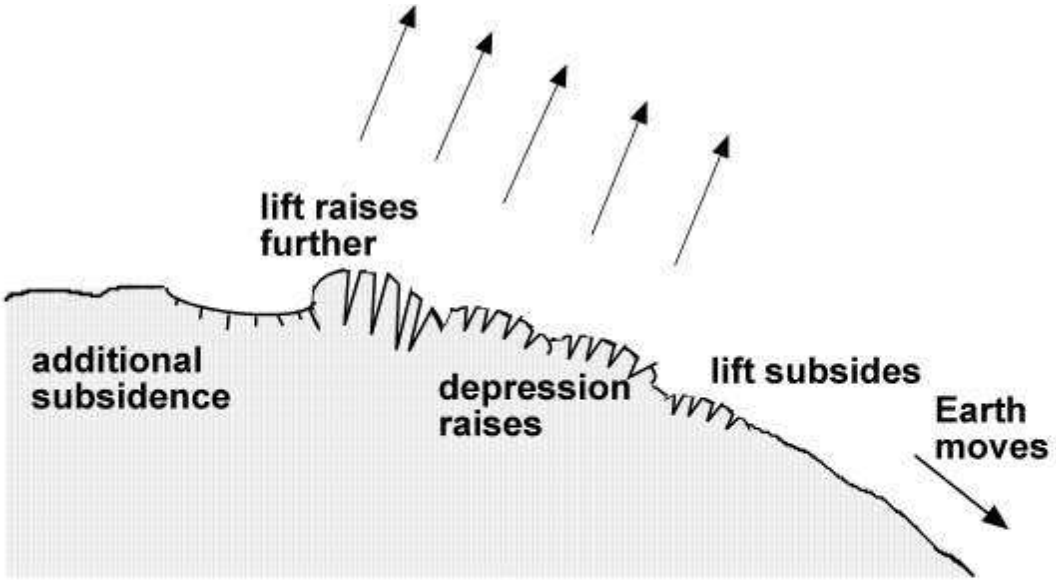
The forces drop off unexpectedly rapidly from the center of the contact area. This is the result of combining the nearly parallel electric field due to the foreign planet and the spherical orientation of the electric field due to the Earth. In addition, the curvature of the Earth (or the Moon, or Mercury) is such that the effect of an exterior force lessens rapidly away from the center. The shock becomes directed to a nearly horizontal angle with distance from the center of the impact location.

planet	compression area	area Diameter	planet Diameter	planet Circumf	degrees subtended
Moon	Orientale Basin	578 mi	2159 mi	6783 mi	31 deg
Mercury	Caloris Basin	963	3030	9518	36
Earth	Himalayas	1700	7923	24891	24

What happens subsequently is that the Earth continues to rotate, thus the external force is applied to a region away from the initial contact. The direction the Earth moves, however, does not follow its normal rotation (to the east), but a direction determined by the impact forces and the gyroscopic reaction, which starts up immediately. For an impact to the northern hemisphere, the new direction to which the Earth's surface would move (with respect to an exterior reference) is toward the northeast, thus bringing the southwest under the external impinging forces. [note 17]

Thus we can define a lagging edge of the circle of impact (northeast) and a leading edge (southwest). The lagging edge now experiences reduced forces. The relaxation of the originally uplifted crust will be aided by this. Although I have shown the leading edge as uplifting or consolidating in the diagram above, this is not certain. What has happened at this juncture is that the compressive force has diminished as the external electric field induces a change of charge in this section of the crust. Electrons are chased away, and the surface becomes more positively charged.

At this point in time (and this could take only minutes), the compressive (repulsive) forces are failing and perhaps have become attractive, that is, the exterior planet now will attempt to lift the crust. This will aid the region of the initial depression, helping it back up, and causing the lift at the lagging edge to subside. But at the leading edge of the contact region the portion of the crust, which initially rose in response to the central depression, will rise even further (and cause an additional subsidence beyond the leading edge). The results of this are shown in the following diagram.



Response of the crust to later lifting force

section through Earth

With the reversal of the value of the electric field between Earth and the exterior planet, an attempt would be made at charge equalization -- an electric arc would pass between the planets. In fact, the equalization arc might start up from the planet with the greater charge at the moment a voltage difference between the two is sensed (even with both planets at a negative charge).

Now we reach a problem. The compressive scar shows a sudden letup, but the cause for this is not at all obvious. The sudden cessation of the compressive forces cannot be due to an arc between the planets, for this would take much more time to be felt by Earth, in that the arc would have to travel from some remote distance.

For example, in 2349 BC, it looks like the arc from Venus traveled for approximately 6 hours, and was, in fact, a disconnected plasmoid bolt. From "mythological" sources, the bolt would have been enormous, and could have fried the Earth (at least, the Eastern Mediterranean region) if the initial shock had not tilted the Absu up to face the approaching plasmoid bolt. The initial release of the plasmoid from Venus would also have suddenly dropped the electric field of Venus, and it is this which suggests another cause for the sudden cessation of the compressive forces (long before the plasmoid arrived).

I am not entirely comfortable with this electrostatic simplification, especially the change of a portion of the Earth's surface to a positive value. We are here not considering a local thunderstorm, which will chase away surface electrons, but something immensely larger and of a potential measured in billions of volts.

Obviously the initial repulsive shock was limited, and in fact, it fell off as suddenly as it had first started (or we wouldn't be here at all). It is the crescent of shoved-over mountains which shows that the repulsive forces stopped rather suddenly. Otherwise we would see the Himalayas spread across India and Pakistan like frosting on a cake. The same goes for the mountain ring surrounding Huntsville, Alabama, or the US Rocky Mountains.

I have covered the look of a "shoved over" mountain range, the Rocky Mountains, in the analysis of the "impact" of 10,900 BC in an earlier chapter. I realize that it seems almost inconceivable that an exterior repulsive electric field force would have been so stupendous that it would shear mountains off at their base and shove them over hundreds of miles, to be piled up in a crescent surrounding the center of impact. Yet this is what is indicated by the geological evidence. For the North American impact all plant and animal life was incinerated by that impact force.

The 52-Year Cycle of Venus

The interval between approaches of Venus was known by the people of Mesoamerica to be 52 years. This would initially have been derived from observation in the era of 2349 BC to 2193 BC. The 52-year period can be verified, or strongly suggested, if it is found that the synodic period for Venus is a near integral division of 52 Earth years. Assuming, initially, that the period for Venus was 225 days, as it is today, and the Earth's year was 260 days, the synodic period is:

260 * 225 / (260 - 225) = 1671.43 days

This period divides into 52 Earth years as a near even integer value, or reasonable fraction, as follows:

52 * 260 / 1671.428 = 8.088

If it could be assumed that the period of repetition of approaches of Venus was an even 8 years, then the synodic period of Venus could be calculated as:

8 * 260 = 2080 days

From this a more reasonable (believable) orbital period of Venus could be found to be 231.1 days.

260 * 231.1 / (260 - 231.1) = 2079.10 days

I realize that this sort of math give some people cold shivers and may induce convulsions, yet is is perfectly reasonable, and the results from this reasoning fall into place with unprecedented ease.

Period of 2193 BC to 1492 BC

For the period between 2193 BC and 1492 BC I have assumed an orbital period of 273 days for Earth, but the period of Venus has to be estimated. This is so because there is no data available, except what might be guessed after from calendar implementations. Since the Mesoamerican Haab calendar was not instituted until after 1492 BC, the 52-year coincidence of the Haab and Tzolkin calendars does not apply to this era. The Haab was meant to account for the longer 360-day year after 1492 BC.

If I was to estimate a time period when the 52-year coincidence might have been initiated from observation, I would suggest the period of 2349 BC to 2193 BC. Certainly after 1492 BC this was no longer true, both because of the very large increase in the Earth's orbit (at that time) and because the incident of the Sun standing still in the sky at the time of Joshua cannot be dated to 52 years after 1492 BC (as Velikovsky has pointed out).

The following table calculates the synodic period of Venus for values of orbital periods from 231 days to 225 days. The first value of the table (231) is the likely orbital period before 2193 BC; the last value of the table (225) is the most likely orbital period after 1492 BC. Thus synodic periods at either of these extremes are not legitimate values for this time period, but will be the limits in any calculations (as shown below).

------ Venus interval for the period of 2193 BC – 1492 BC ----------								
Venus period	Synodic period	---------- interval * 273 / synod ---------- 52 yr	51 yr	50 yr	49 yr	48 yr	47 yr	46 yr	45 yr
231	1501.50	9.45	9.27	9.09*	8.91	8.27	8.54	8.36	8.18
230	1460.23	9.72	9.53	9.34	9.16	8.97*	8.78	8.60	8.41
229	1420.84	9.99*	9.80	9.60	9.41	9.22	9.03*	8.83	8.64
228	1383.20	10.26	10.06	9.86	9.67	9.47	9.27	9.07*	8.88
227	1347.19	10.53	10.33	10.13	9.93*	9.76	9.52	9.32	9.11
226	1312.72	10.81	10.60	10.39	10.19	9.98*	9.77	9.56	9.35
225	1279.68	11.09*	10.88	10.66	10.45	10.24	10.02*	9.81	9.60
* – near whole values									

There is no continuity of dates at regular 52-year intervals between the four contacts by Venus after 2193 BC, and the first contact in 1492 BC. I suspect that in this intervening period (2193 BC to 1492 BC) the Venus cycle might have been something other than 52 solar years. The coincidence of the 52-year period between the Mesoamerican Tzolkin and Haab calendar is a mathematical construct which is independent of the actual seasonal calendar. We have no guarantee of what the "Venus cycle" was in actuality, but the synodic period for Venus can be tested against various values of the Venus cycle, using 52 years through 45 years.

I would reject orbital values nearer 225 days (today's value), since the catastrophe of 1492 BC caused a very large change in the Earth's orbit, and would have caused a proportional change in the orbit of Venus. It is thus more likely that a value closer to an orbital value of 231 days is a likely candidate. That suggests an orbital period for Venus of either 229 days or 230 days. I am selecting 229 days.

From information detailed in the chapter "The Day of Kan," it looks like there were 11 "sightings" of Venus in the 520-year period (called a "may") ending shortly after 1440 BC. From the above table, for an orbital period of 229 days, a reduction to 48 or 47 years would be suggested. Of these two, a 47-year cycle comes closest to filling the time interval from 2193 BC to 1492 BC with a nearly even number of intervals -- it comes to within 4 years of 2193 BC.

520 / 11 = 47.2
2193 - 1492 = 701 years
701 / 47 = 14.91
47 * 15 - (2193 - 1492) = 4

Period of 1492 BC to 747 BC

It would seem that the Venus period would be firmly established, even though based on slim data, for the period of 1492 BC to 747 BC. The catastrophe of 1492 BC was followed by another contact in 1440 BC, "52 years later" -- suggested Velikovsky. However, the date of 1440 BC is very uncertain. Velikovsky settled on 1440 BC by applying the well-known Mesoamerican interval of 52 years. This was certainly the interval when Mesoamerica expected the end of the world, but it was based on the fact that the Haab and the Tzolkin calendar come again to the same day-name and day-number combination after an interval of "about 52 years." In actuality these were Tun years of 360 days, and fell 273 days short. In Mesoamerica it was thought that the Tzolkin calendar regulated the

movements of the planets.

The Venus period therefore ought to be investigated in a manner similar to the chart above. The Earth's period was 360 days; the period of Venus should be less than 229 days and more that 225 days. There were no further contacts between Earth and Venus after 1492 BC (or 1440 BC). The possible contact of Venus with Mars in 776 BC is not likely to have changed the orbit of Venus significantly, since Mars is only 1/8th of the mass of Venus. Again, in the table below, we are looking for whole numbers or reasonable fractions.

------ Venus interval for the period of 1492 BC – 747 BC ----------

Venus	Synodic	interval * 360 / synod							
period	period	52 yr	51 yr	50 yr	49 yr	48 yr	47 yr	46 yr	45 yr
229	629.31	29.7	29.1	28.6	28.0	27.4	26.9*	26.3	25.7
228	621.81	30.1*	29.5	28.9*	28.3	27.8	27.2	26.6	26.0*
227	614.44	30.4	29.9*	29.3	28.7	28.1*	27.5	26.9*	26.3
226	607.16	30.8	30.2	29.6	29.0*	28.4	27.8	27.2	26.7
225	600.00	31.2	30.6	30.0*	29.4	28.8	28.2	27.6	27.0*

*** – near whole values**

For two reasons I would select a period of 225 days for Venus (which is nearly today's value). First, because the synodical period of 600 days shows up in calendars dating from this period as a whole number product of the period of the Moon (**20*30 = 600**) and the period of the Earth (**5*360 - 3*600 = 0**.) Second, because it is most likely that the contact with Venus in 1492 BC reduced its orbit in proportion to the 100-day increase in the Earth's orbit. (The later change of the Earth's orbit in 747 BC was due to Mars, not due to Venus.)

Selecting a Venus cycle of 50 years moves the event of the Sun standing still for Joshua from 1440 BC to 1442 BC. This resolves the difficulty Velikovsky had in justifying a date of 1440 BC. I have not corrected this elsewhere in this text. A 50-year Jubilee of the Jews was instituted after 1492 BC. I do not know if this was the actual interval, or how it was counted, but it is suggestive.

Period of 747 BC to today

After 1440 BC there were no further "close calls" by Venus. The orbit of the Earth rounded later in 670 BC, which may have completely voided the condition. Mesoamerica, however, continued to celebrate "world endings," based entirely on the Haab and Tzolkin calendars, as it had always been. The period for this is 52 years of 365 days (18,980 days), which is somewhat shy of 52 Gregorian years, but not enough to make much of a difference during this time.

Venus Crosses Earth's Orbit

From the above we have the following estimates of the orbital period of Venus for various eras. From this it can be found if Venus crossed Easrth's orbit at any time.

---------- Venus interval for the various periods ----------

time period	Earth period	Venus period	Venus synodical	Maya cycle
3147 BC – 2349 BC	240 days	up to 240	unknown	unknown
2349 BC – 2193 BC	260	231.1 days	2080 days	52 years
2193 BC – 1492 BC	273	229	1420.8	47
1492 BC – 747 BC	360	225	600	50
747 BC – today	365.24	224.7	583.9	52

Following below are some estimates of the orbit of Venus and Earth in terms of their perihelion and aphelion. This is of interest if it is held that planets "collide" when their orbits cross. The orbits of Earth and Venus were probably nearly the same at first (but not in the same plane), as would be expected, and likely crossed, but none of all the possible orbital crossings ever resulted in physical interference with each other. We certainly know that for certain; we are here to testify to this.

It should be realized that electric contacts would only happen when both planets crossed the equator of the Sun. The two planets have to be in a direct line with the Sun for the plasmasphere tail of an inner planet to be sensed by the outer of the two planets. The geometry of that condition defines an equinox for both orbits. A look at past electric contacts between Earth and other planets places each of them at or very near an equinox.

Using Kepler's Third Law, the average orbits can be found from **(T{Venus} / T{Earth})^2 = (r{Venus} / r{Earth})^3**, which is most easiest accomplished by setting the radius of Earth's orbit to 1, that is, 1 AU.

---------- Venus interval for the various periods ----------

time period	Venus period	Venus orbit	Earth period	Earth orbit
after 3147 BC	unknown	unknown	240 days	0.75 AU *
after 2349 BC	231.1 days	0.737 AU	260	0.79 *
after 2193 BC	229	0.733	273	0.83
after 1492 BC	225	0.724	360	0.99
after 747 BC	224.7	0.723	365.24	1.00

*** data from calendar analysis, Appendix A, "Chronology"**

In 2349 BC Venus and Earth might have approached no closer than 12 million miles, and more likely at a distance on the order of 17.5 million miles (28 million km). This was the estimate derived earlier based on the time of travel of a plasmoid from Venus to Earth and the timing of eyewitness accounts around the world.

We can be fairly certain of the separation distance of about 12 or 17.5 million miles, for if Venus had approached Earth as close as (perhaps) a million miles, then, as many others have suggested, Earth would have been devastated by repulsive electric forces.

If in 2349 BC, Venus struck from a distance of 12 million miles, then we would expect the "contact" of 1492 BC to mostly repeat at the same separation distance. The orbits of Venus and Earth changed, but not all that much, and it would be reasonable to suggest that the planets would again meet under nearly the same conditions. In 1492 BC, if Earth and Venus were on circular orbits (which they were not), then they would have approached no closer than 9 million miles (14 million km).

(0.83 - 0.733) * AU = 9,021,000 miles.

Yet, as we know, catastrophic interactions took place in 2349 BC and 1492 BC despite these immense distances. It would have to be suggested that the initial orbits of all the inner planets were eccentric, moving on part of their orbit much further from the Sun than estimates of the average radius of the orbits would suggest (the orbital period remains the same for eccentric orbits). We know virtually nothing about the eccentricity of the orbits of Mars and Mercury, except the suggestion that their orbits remained the same into the 7th century BC. We do know some things about the orbits of Venus and Earth, although the information is late -- also dating from the 7th century BC.

An investigation by Lynn Rose and Raymond Vaughan in 1974, of the 7th century BC *Venus Tablets of Ammizaduga,* found in the library of Assurbanipal, determined that the eccentricity of the orbits of Venus and Earth were still at 0.15 and 0.10 respectively before 670 BC, but Earth's orbit became nearly circular (0.01) in 670 BC. The eccentricity of Venus changed to today's value of 0.006 at an unknown later date.

I have suggested above that the period of Venus probably did not change significantly in remote antiquity. Using the eccentricity of 0.15 found by Rose and Vaughan, the perihelion and aphelion of Venus can be determined from the average orbital radius, the semimajor axis.

The eccentricity multiplied by the semimajor axis (the average radius of an orbit) will yield the amount by which the perihelion or the aphelion of the orbit (the closest and furthest distance from the Sun) differs from the "average radius" of the orbit. The perihelion of Venus, for example, in 685 BC, will be found to be:

(1 - 0.15) * 0.723 AU = 0.614 AU

The aphelion would be:

(1 + 0.15) * 0.723 AU = 0.831 AU

Assuming that the eccentricities found by Rose and Vaughan are indicative of earlier conditions, we could calculate the perihelion and aphelion of both Venus and Earth for various time periods and compare these to see if the orbits potentially crossed. First, for Venus:

Perihelion and Aphelion of Venus before 685 BC, 0.15 eccentricity

time period	semimajor axis	perihelion	aphelion
after 2349 BC	0.737 AU	0.626 AU	0.847 AU
after 2193 BC	0.733	0.623	0.843
after 1492 BC	0.724	0.615	0.832
after 747 BC	0.723	0.614	0.831

Similarly the perihelion and aphelion of Earth can be found for various estimated orbits in antiquity as follows.

Perihelion and Aphelion of Earth in antiquity, 0.10 eccentricity

time period	semimajor axis	perihelion	aphelion
after 3147 BC	0.75 AU	0.675 AU *	0.825 AU
after 2349 BC	0.79	0.711 *	0.869
after 2193 BC	0.83	0.747 *	0.913
after 1492 BC	0.99	0.891	1.089
after 747 BC	1.00	0.990	1.010

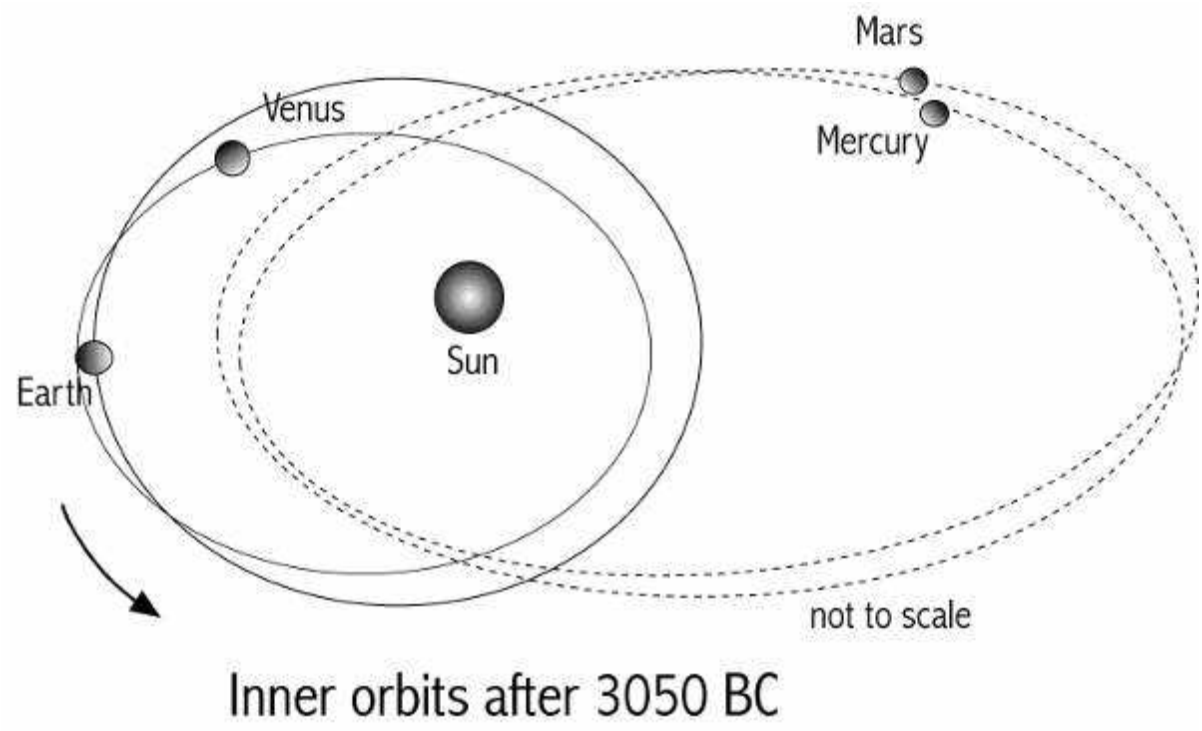
* -- Earth perihelion falls within Venus aphelion

These numbers define orbits which potentially cross, since until 1492 BC the perihelion for Earth was less than the aphelion for Venus. (That they actually crossed would depend on the relationship of the two orbits.) What is certainly shown from the above table, is the possibility that the two planets were on genuine "collision paths" until 1492 BC. Since Earth was three times displaced to a larger orbit by Venus, then Venus would have to be inside the orbit of Earth at the moment an electric contact was made. Coming close to each other would be insufficient reason for interaction. To interact electrically the plasmaspheres of the planets have to touch. This only happens if two planets are in line with the Sun while "passing" each other, because the tails of the plasmaspheres of planets all point away from the Sun. [note 18]

What I have shown above is the possibility of "collision" courses for Venus and Earth. This is a favored proposition of catastrophic analysis, despite the fact that crossing orbits will not likely do anything bad. But these crossings certainly bear on the Mesoamerican concept of the possibility of disaster based on 52-Tun year intervals, which was the condition between 2349 BC and 2193 BC. During this 150-year period Venus was seen to cross Earth’s orbit, with disasters in 2349 BC and 2193 BC, and perhaps (likely) at other 52 year intervals.

But these events probably had nothing to do with Venus crossing Earth’s orbital path. It was just that the crossing of orbits remained visible until 1492 BC. The Olmecs were right in instituting whatever ceremonies were required to prevent any further catastrophes. It worked, too.

The Orbit of Venus



Shown in the diagram above, Venus's elliptical orbit falls partially outside the Earth's orbit. The planet Venus would be seen between the Sun and Earth every two years or so, and would line up directly between Earth and the Sun at intervals of 700 or 800 years. These "meetings" would depend, among other things, on the slow rotation of the second nodal points of the orbits of Earth and Venus.

The orbit of any planet is an ellipse, with one "focus" (nodal point) at the Sun, and the other some distance away from the Sun. The second focus of an elliptical orbit slowly rotates (precesses) around the Sun. There will therefore be periods of hundreds or thousands of years where two planets would never line up. Precession of orbits is gravitationally induced and thus depends on how close the orbits of various other planets are, and the sizes of the planets.

Precession of orbits should not be confused with precession of the equinox (the intersection of the equatorial of the sky and the ecliptic). The equinox currently moves 50 seconds of a degree west per year. This is determined by the precession of the rotational (polar) axis. The complete precession of the rotational axis takes 27,000 years currently.

The second nodal point of Earth's orbit currently moves 10 seconds of a degree east per year in a counterclockwise direction as seen from above. Today the Earth's orbital precession takes 112,000 year to complete a full swing around the Sun. The location of the aphelion of the Earth's orbit (the part of the orbit where Earth is furthest away from the Sun, which corresponds to the location of the second nodal point) slowly moves in a circle around the Sun. Aphelion of Earth's orbit is today reached at about July 4th. The orbital precession of Mars is 43,000 years today. [note 19]

In the case of Earth and Venus, there would be a series of "close calls" when the precession of the orbits caused the two planets to reach the same radial location around the Sun at the same time. The close calls would be spaced widely apart in time, for it would depend on the ratio of the lengths of the orbits of the two planets, and additionally would only occur when both planets crossed the equatorial of the Sun at the same time and at the same radial location (angle) with respect to the Sun. Four approaches (or what, to humans, looked like approaches), happened between 2349 BC to 2193 BC and twice between 1492 BC and 1440 BC, at intervals of 52 and 50 years, three (or four) of which resulted in plasma contacts between Venus and Earth. [note 20]

Venus in 2349 and 2193 BC

An approach of Venus with Earth happened in 2349 BC. It had been waiting to happen for 700 years. As Venus passed between Earth and the Sun, the plasmaspheres of the two planets touched and merged, a sudden electric repulsive impulse from a distance of about 20,000,000 miles shoved Earth away from the Sun and a giant plasmoid electric arc traveled from Venus to Earth, followed by lesser plasmoids. The orbit of Earth enlarged by 5 percent. The Absu was severely disturbed and disappeared. The orbital period of Venus seemed to have remained almost the same.

Because of the spectacular nature of the event, we know a considerable amount about this. It includes the "flood of Noah," the flood of Yao in China, the fall of the Absu, the return of Jupiter from death, the appearance of the Pleiades, the placement of the southern stars, and the appearance of the Moon. There are retellings from Babylonian, Bible, Canaan, Chinese, Egyptian, Vedic, and Maya sources. The Gregorian equivalent calendar day for the event is noted in chapter 21, and can be verified from Olmec site alignments, discussed in the chapter "Olmec Alignments." The orbit of the Earth enlarged to 260 days (from 240 days). The Moon appeared as the Earth moved to a larger orbit. It is uncertain how long it took the Moon to regularize.

The electric contact with Venus in 2349 BC was the first of four such events during this era (I suspect). All can be dated (or at least, estimated) from the records of the first histories. The details are reported in chapter 20. For the last event (of 2193 BC) we have considerable climatic and historical evidence, but no spectacular tales. Akkad collapsed and the Old Kingdom of Egypt came to a sudden end. The Earth's orbit enlarged to 273 days. This last contact happened 156 years after 2349 BC, in 2193 BC -- three times 52 solar years. The 52-year interval, I should note, was only in effect during this period. At later times it was 47 and 50 years.

Venus in 1492 and 1440 BC

A second series of approaches between Venus and Earth started in the year 1492 BC, with the second some 50 years later in 1442 BC (originally thought to be 52 years, and 1440 BC). Venus, on an inner orbital path, aligned with the Earth and Sun. This approach was apparently much closer (about 10 million miles, 16 million km) than the previous contact of 800 years earlier (about 20 million miles, 32 million km). Following a massive compressive impact in the Pacific Ocean below the equator by a few degrees at most, an arc from Venus to Earth was delivered laterally, traveling (perhaps) a number of times around the globe. [note 21]

Genesis details two more contacts, one 6 days later, and one 6 weeks later. Even if these intervals were written to conform to a required completion before the Sabbatical seventh day or seventh week of the new era, it does not matter. It would, as I have pointed out, take about 6 days for the plasmasphere tail of Venus to pass by the plasmasphere of Earth.

The climatic and historical record of the events stands out clearly. The immediate effect of the circumferential arc was a cloud cover lasting decades, resulting from the arc traveling through the Pacific, Indian, Mediterranean, and Atlantic oceans. But more likely the cloud cover was due to the compressive force which landed in the Pacific Ocean, which was followed directly by a lifting force. And then an arc. The cloud cover is described in Genesis and in Mesoamerican records. The Israelites "walked in darkness" for 40 years; in Mexico "the people grew up in darkness."

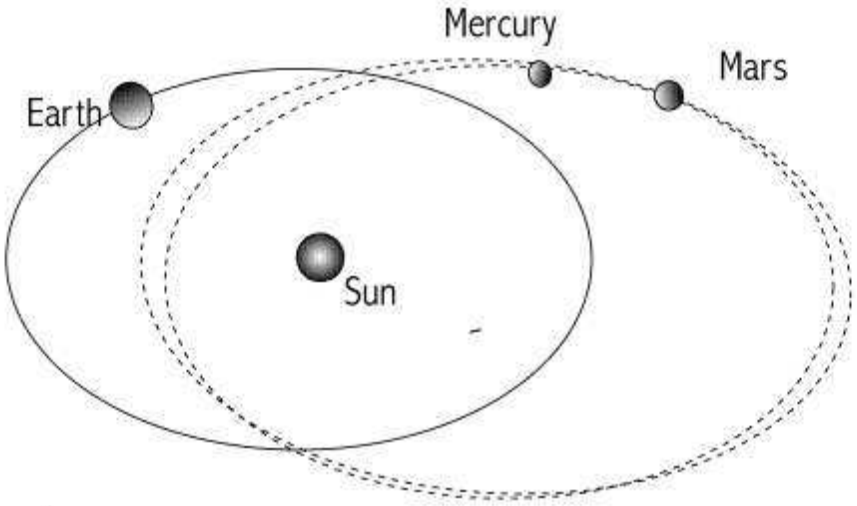
I would blame this "darkness" on water vapor clouds, since the downturn was fairly short. This was unlike the longer climatic downturn of 2193 BC, which was due to nanometer-sized dust particles. Yet, the most drastic and permanent change was a severe decline in temperature. Much of this can be attributed to a radical change in the orbit of the Earth, a sudden jump from 273 days per year to 360 days, which moved Earth 30 percent further from the Sun.

Afterwards, Venus would frequently have been seen in the daytime skies, and perhaps periodically at close range ("close" being defined as 10,000,000 miles or so, 16,000,000 km). This is the image of the Goddess Isis or Inanna, generally benevolent but with a mean streak recalled from earlier encounters.

The Orbit of Mars

Mars did not escape from Saturn until after Saturn had receded some distance from the Sun. As established in Appendix A, "Chronology," Mars probably was released 80 years after 3147 BC, and thus was first seen in 3067 BC.

By that time the planets Jupiter and Saturn would already have relocated 50 or 100 million miles further away from the Sun. By the time Mars was released it would have started with an aphelion much further away from the Sun than Earth or Venus, probably at two AU, the edge of the asteroid belt.



not to scale

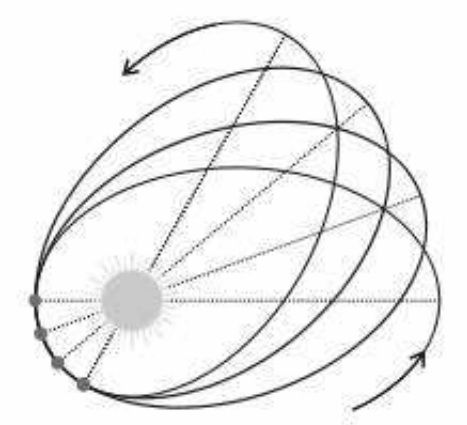
Elliptical Orbits of Inner Planets,
Showing Near Approaches of Mars and Earth

The orbit of Mars overrode the orbit of Earth during the first 300 years after 3067 BC, and repeatedly crossed Earth's orbit close to Earth. Mars came close enough (with Mars beyond or above Earth), for Mars to make electric contact (via a plasma stream) to Earth -- recalled from the text of spells on coffins and pyramids, and eventually recorded in the Egyptian *Book of the Dead.* The Egyptians understood this as Horus taking on the leadership of Egypt (similar interpretations obtain in Sumer).

Any dates at all would qualify for a contact between Earth and Mars, because Earth and Mars would not need to be in line with the Sun, unlike the condition of an electric field force between Earth and Venus.

But Earth and Mars would near each other only on rare occasions. In the 300-year period after 3067 BC this apparently happened at 30-year intervals -- the sequence of kings at Kish, pharaohs in Egypt, and the birth of first sons in the Bible all happen at various intervals of 25 to 35 years. Mars would appear close to Earth, possibly above the northern hemisphere, seen at first on the night side, then seen rotating around the sky, and finally entering the day skies (or the reverse of this). The movement and rotation of Mars is, of course, caused by the rotation of Earth. When close to Earth, a conical plasma connection was established between Earth and Mars -- from the Earth's ionosphere to the lower hemisphere of Mars. Because the edges of this cone were the most dense, it looked as if the "mountain" had distinct edges and flat sides, like a pyramid. Mars would lose its plasma connection with Earth as soon as some distance was achieved. Strange as the suggestion for this condition seems, it is the only explanation of the sudden start of building pyramids worldwide when Mars no longer appeared after about 2750 or 2700 BC.

This sequence of events probably lasted only a few days at the most. Then Mars was off again into deep space (or toward the Sun), repeating this performance approximately 30 years later. The event of sitting on a throne, with what looked like a race around the skies of Earth possibly established some elements of the "Sed festival" of the Egyptians, celebrated at 30-year intervals.



[*Image: Rotation of second nodal point of an orbit (apsidal precession). Illustration after Wikipedia, public domain.*]

We don't know when it stopped, but after about 300 years the Earth and Mars did not close in on each other again, at least, not until 1000 years later in 1900 BC, or 2000 years later in the 8th century BC.

It is likely that the elliptical orbits of Mars and Mercury rotated away from the orbit of Earth -- precessed away. It would take very little precession of the orbits to entirely remove any "close calls" and it would take a full rotation of the elliptical orbits to bring back the condition where Earth and Mars would again come close to each other.

If we go by Horus names taken by pharaohs, and the kings of Sumer with God status, it looks like the orbit of Mars fell completely away from the orbit of Earth after 2700 BC, for the references to God-like kings in the Mesopotamian *King List* cease at that time. By 2600 BC humans started to build mountains of chalk and pyramids of stone to invite a return of the God, something which happened worldwide. The constructions were an indication that the primary image had disappeared, and typically, the humans felt that it was up to them to induce the return of the God.

Using an Ephemeris

Throughout this text I have checked the heavens with an ephemeris program named "SkyGlobe 3.6," written by Mark Haney in the early 1990s and issued by KlassM SoftWare. It shows the Moon and planets, the ecliptic, and the constellations. It can be set for different geographic locations and different dates. As locations I mostly used Cairo, Baghdad (for Babylon), Beijing, and Mexico City. From my perspective, the program will be in error at dates earlier than 685 BC. More on that below.

SkyGlobe makes allowance for the precession of the equinox, skips the year zero, and switches from Gregorian to Julian in October of AD 1582 (based on Julian days). Correction from a Julian calendar to a backward extension of the Gregorian calendar can be (approximately) accomplished by adding 1.5 days for every 400 years before AD 1582, starting with a 10 day difference. [note 22]

Locations on the dome of the stars are identified by elevation and azimuth, and Right Ascension. Right Ascension (in hours) is calculated from the spring equinox for the date being viewed, which is a drawback at times (even though it is the standard today). Because the motions of the planets are based on calculated approximation, there is some slippage in moving far into the remote past.

The program also allows seeing the Solar System in rotation from above. This feature is of great value in checking for locations and conjunctions of the planets as a function of time. Single keys will allow rotating the system in hours, days, months, etc.

As with any ephemeris calculations, some corrections have to be made. All the dates from before the Roman era should be corrected by four years for the error introduced in our reckoning by Dionysius Exiguus in AD 532. Thus for any known date in the Eastern Mediterranean, the ephemeris should be pointed to a date four years earlier -- further back in time (and on occasion, five years). An additional error of one year, for the passage from AD to BC, needs to be kept in mind. The SkyGlobe ephemeris program, however, properly skips the year zero between the eras, although this takes it out of phase with "astronomical" dates by one year.

Patten and Windsor write the following about Exiguus:

> *"Dionysius Exiguus was a medieval monk, who was given the task of resolving a calendar dispute as to the proper date for Easter. Later research revealed Dionysius had missed four years in assessing the year of Christ's birth. Many centuries before this error was identified, his dating system for history had come to be accepted."*
>
> *"His error was not revised, in order to minimize confusion. By the time his error was realized, the sequencing of historical dates for the Roman Empire and for early Christianity had long ago become too widely accepted. So Dionysius's dates were kept, and mankind was left with a quixotic system. The accepted system cites that Christ was born in 4 B.C.E., seemingly an impossibility."*
>
> -- Donald W. Patten and Samuel R. Windsor *The Mars-Earth Wars* (1996).

The correction of 4 years applies to dates for the Eastern Mediterranean region, where all dates are tied to the Babylonian king list developed by Ptolemy, extending from 747 BC until the second century AD. It does not apply to dates from China where Western researchers of the 19th century have correctly converted dates to an absolute Western chronology. All celestial dates from China which I have inspected via an ephemeris were correct for the listed date.

I need to add one more caveat. An ephemeris program based on today's orbits cannot be correct for dates before the 7th century BC, for the orbits of Venus, Earth, Mars, and Mercury all changed in the eight and seventh century. In addition the whole dome of the stars rotated some 15 degrees in 685 BC, in effect shifting the equinox by two weeks.

But it is unlikely that the changes in orbits in the 8th and 7th century BC would make any significant difference when it comes to using an ephemeris for slightly earlier dates. Conjunctions might be off by a few days at most. This is because most of the changes I have proposed involve orbital eccentricity, of which we know, admittedly, almost next to nothing. If a planet's orbit changes shape, the planet will slow down on the portion of the orbit further away from the Sun and speed up on the

portion closer to the Sun. The net effect is that the period does not change.

This is not true for Mercury, which changed its orbit and period radically in 686 BC. Otherwise, the sky before 685 can be simulated by setting the ephemeris to about 2000 or 2300 BC.

For the changes in 685 BC we have little to go on except what we know about Venus from the Mesopotamian Tablets of Ammizaduga and the Maya canonical values of the appearances and disappearances of Venus (from the *Dresden Codex*). The Maya values (last recopied in AD 1200 from earlier sources of about AD 700) total to 584 days, as they do today, even though the appearances of Venus in the skies and its disappearance behind the Sun differ from today's values by as much as 40 days.

This suggests that the orbit of Earth or Venus would make a difference in the synodic period of Venus only if we insist that a change in the shape of the orbit would in effect constitute a new orbit. But the synodic period of 584 days of Venus remained the same before 685 BC as after, even if portions of the time of the appearances and disappearances of Venus in the skies changed considerably. This last relates to the changes in the eccentricity of the orbit of Venus, which has subsequently become nearly circular. The ratio of the synodic period of Venus to Earth in 670 BC is nearly the same as today (1.63, today it is 1.625).

The change in the Earth's orbit, which added 5 1/4 days to the year in 747 BC, is only a 1 1/2 percent change from a 360-day orbital period. Thus the ephemeris would be "off" by only approximately 1.5 degrees before 747 BC. Lastly, the relationship between the Earth and its Moon and the Sun is radial. A change in the shape or size of the orbit does not change eclipses of the Sun or Moon significantly.

What this means is that, first of all, an ephemeris can be used, with some caution (and if obvious adjustments are kept in mind), for the period before 685 BC or even before 747 BC, and it can probably be used back to 1492 BC. And, secondly, this also means that nothing will be proven from an ephemeris about changes in the Earth's orbit, its ellipticity, or the timing of the equinox, or from earlier records of eclipses of the Moon or the Sun.

The Eighth and Seventh Century

The orbits of Mars and Earth crossed, after 1492 BC, but differences in inclination of the orbits and the location of their respective aphelion kept the two planets apart most of the time. If nothing else, these interactions kept alive the images of the Gods and their incomprehensible activities. It would take a long time before the slow alterations in the orbits would bring Mars close enough to Earth to cause any damage.

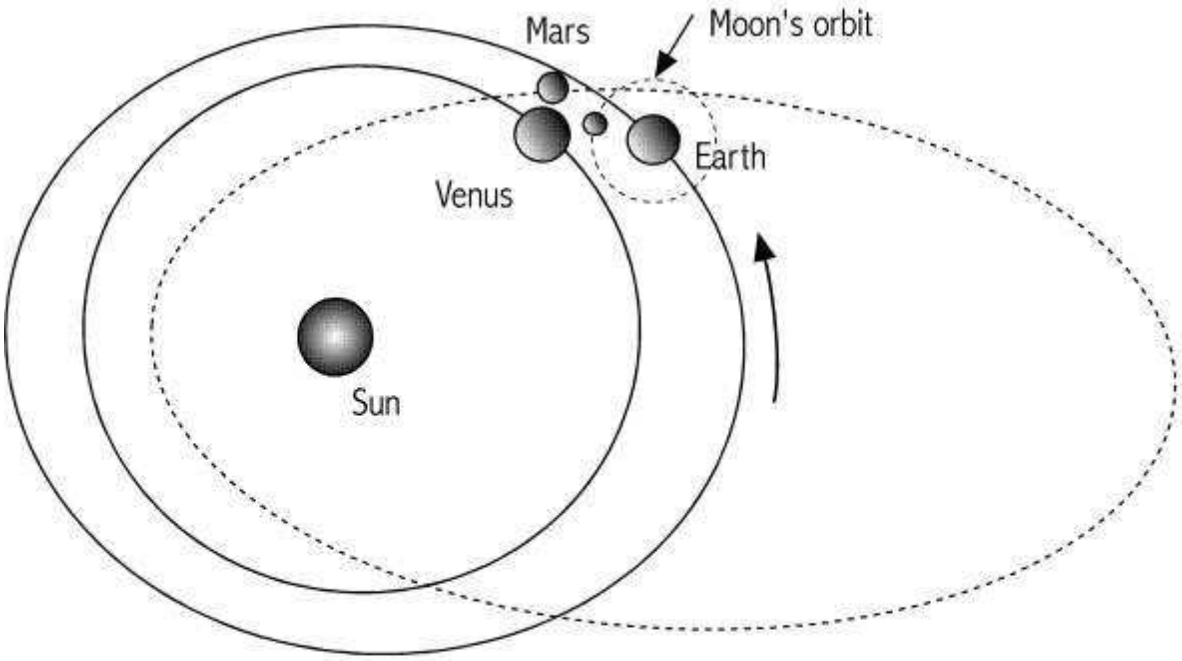
That started to happen in the eight century BC. The details can be gleaned from a number of sources, including Mesoamerican annals, and Chinese records. There are a number of dates marked with celestial events during these two centuries, which are discussed below, including the following:

- -- 776 BC, the suspected date when Mars and Venus both show up on the day side of Earth, and are involved in a "ballgame" with the Moon or Mercury. The eastern Mediterranean understood this to be a race.
- -- 747 BC, the date of an Earth shock, a change in the orbit of Earth, and the start of "the era of Nabonassar."
- -- 686 BC, the date of a second Earth shock, due to Mercury.

- -- 685 BC, the nova event of Venus and Mercury, and a change in the aphelion of Earth, which moves the orbit away from Mars's orbit.

What I will do below is to present mostly ephemeris information for these events. All the other evidence is presented in detail on the narrative pages of the main text. All the dates shown below are on the Julian calendar.

The Ballgame of 776 BC



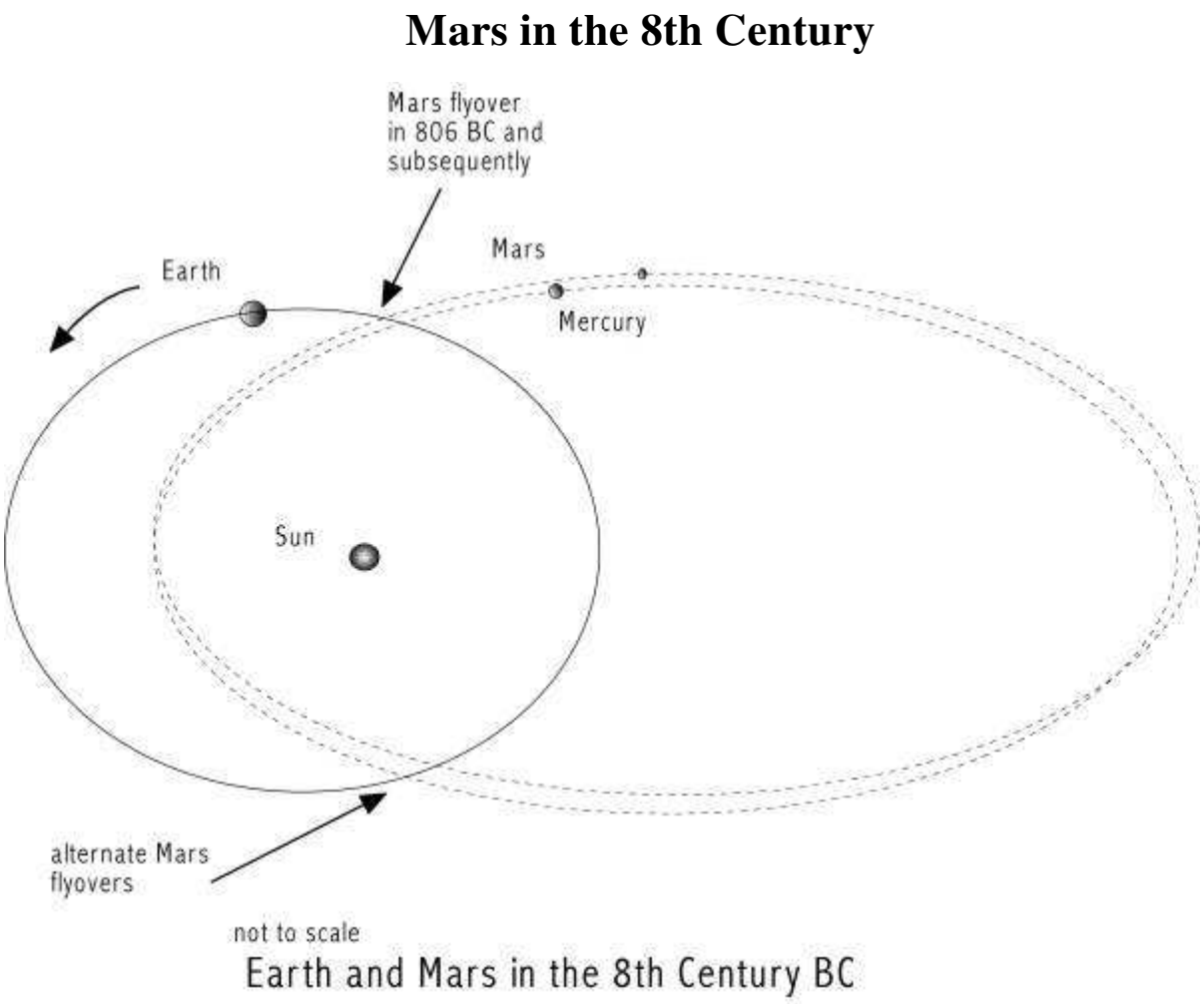
Earth, Mars, Venus conjunction of 776 BC

The date of the ballgame of 776 BC was inferred (by others) from the date of the first Olympic Games (772 BC). The question to be asked of an ephemeris program for the year of 776 BC is if Mars and Venus could simultaneously appear on the day side of Earth in 776 BC. [note 23]

Of course using an ephemeris based on today's orbits will place Mars outside of Earth's orbit. I will have to suggest the existence of eccentricities which no longer show today and assume that in actuality Mars crossed the orbit of Earth at an earlier time. Venus, still on an eccentric orbit, would come near Earth but remain inside the orbit of Earth. The only requirement for an ephemeris program is to show that Venus, Mars, and Earth might have been in (or near) inferior conjunction at some date during that year.

An inspection of the orbits of the planets between the years 800 BC to 700 BC show any number of these near conjunctions of Mars, Earth, and Venus during this period, at six and seven year intervals. The following endnote lists these, along with the angle between the three planets, as measured from the Sun.

Mars is at inferior conjunction in February of 776 BC (thus passing close to Earth), with Venus passing Earth (or certainly seen) at the same time on the day side. Between February 24th and 25th, the Moon passes by Venus in the day sky. [note 24]

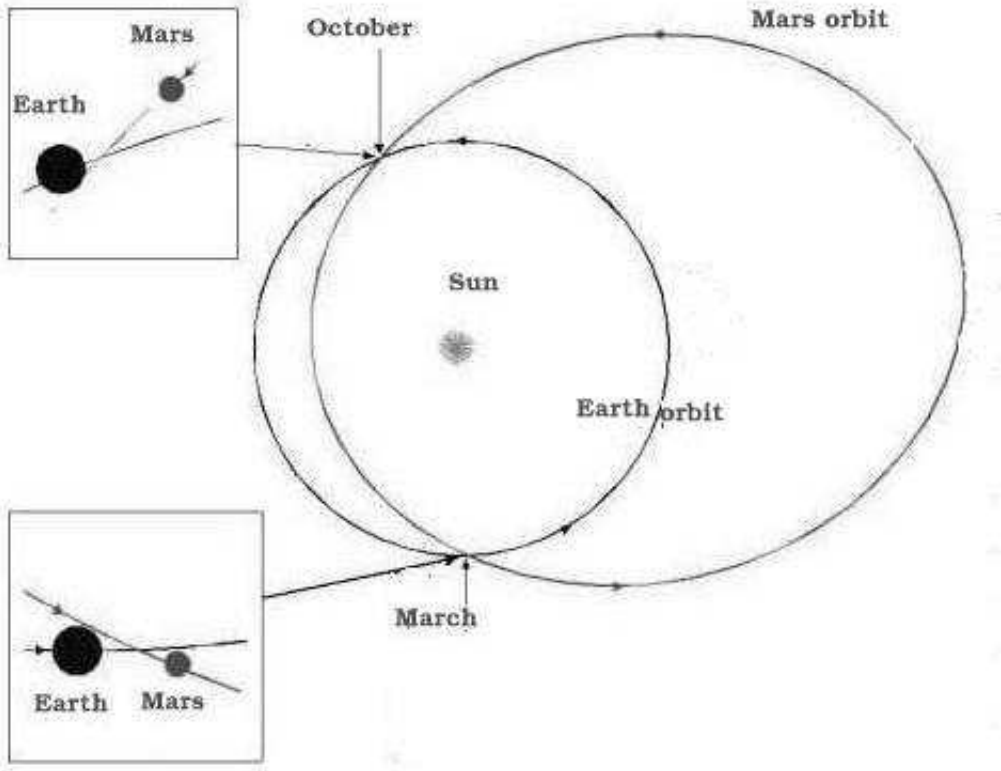


It seems that only after the simultaneous appearance of Venus and Mars inside the orbit of Earth in 776 BC -- which became the starting point for the Olympiads -- did Mars repeatedly start cruising close to Earth. (In the chapter "Destruction by Mars" I propose, however, that the contacts started in 806 BC.)

In the diagram above I have noted two possible locations where Mars might have made a near contact with Earth. This is based on the model developed by Patten and Windsor. It should be expected that these would be separated by years -- that is, after Mars made an approach at the location in the lower left quadrant of the diagram above, the following close approach would happen at the location in the upper left quadrant 15 years later.

747 BC, the First Earth Shock

Patten and Windsor, in *The Mars-Earth Wars* (1996), propose that the length of the year changed in 701 BC. Considering the extensive evidence of calendar changes following on 747 BC, I will hold with the date of 747 BC. The starting year 747 BC (-747) and the date of February 27 is used for the compilation of the "Era of Nabonassar" by Babylonian astronomers. [note 25]



[Image: Mars in the 8th century BC; after Patten and Windsor. Similar to prior image. Mercury not shown.]

Patten and Windsor, for reasons of the celestial mechanics of their model, suggest a close approach of Mars and Earth and a change in the length of the year in 701 BC, and place this at the time of a full Moon. In their model, Mars travels between Earth and the Moon on the night side, and disturbs both orbits. This scenario is demanded if only gravitational interaction is used to change the orbit of the Earth. My suggestion is that Mars traveled past Earth on the day side.

The year 747 BC can be inspected with an ephemeris program. It will be the first year for which an ephemeris program should be nearly correct. Mars is in inferior conjunction (on the assumption that its travel took it inside the Earth's orbit) on about mid-March of the year 748 BC, Julian (-747) (which is 8 days earlier on the Gregorian calendar, but not exactly on February 26th). March 2 or 3 is the day of a new Moon, the second new Moon after the winter solstice. [note 26]

"The present definition of the Chinese New Year, as the second New Moon after the Winter Solstice, dates from the inception of the T'ai-ch'u Era in 103 BC."

-- Kelley L. Ross (2004)

On this day (February 28th) of the Maya Long Count, the count of days since August 11, 3114 BC, reaches a "zero position" at Baktun 6, with all the other cycles at zero (6.0.0.0.0). A change in Baktun happens only at about 400 year intervals. Baktun 6 was reached on February 28, -747, Gregorian.

687 or 686 BC, the Second Earth Shock

The second Earth shock can also be searched for. This event was suspected to have happened in 686 BC (-686), on March 23. There have been suggestions that 701 BC should be used, but we have a parallel record from China, with the suggestion for a date of March 23. Mercury is the agent for the Earth shock of 686 BC.

What is certain about this event is that none of the numerous people, including Immanuel Velikovsky, who have attempted to establish the year and date have come up with anything conclusive. A perusal of *Worlds in Collision* (1950) and the unpublished manuscript "The Assyrian Conquest" (1978), will show that no agreement was ever reached. The only certain date is from two Chinese sources, and both equate to March 23, 686 BC (Julian). The confusion encountered by Velikovsky may simply be due to the mismatch of astronomical chronology for China and the chronology of the Eastern Mediterranean. The Chinese dates were retrocalculated in the 19th century, and are listed as astronomical dates. These dates should be numerically reduced by four years to match dates in the chronology of the Eastern Mediterranean.

The event itself can be established by accessing an ephemeris for the date of March 23, 686 BC. The year of 686 BC is correct. It is specifically noted by Legge in *The Ch'un Ts'ew and The Tso Chuen* (*The Spring and Autumn Annals* translated AD 1872). The other source is from the *Annals of the Bamboo Books,* and was calculated by Jean-Baptiste Biot in the 19th century as 687 BC and is correct if this date was meant to be in astronomical notation, in which case it is equal to 686 BC in Julian notation.

To further confuse the issue, all the researchers were looking for Mars as an agent. It turns out that it clearly is Mercury instead. Mercury was almost directly between the Sun and Earth on March 23, 686 BC (Julian). As expected, this only happens when the Earth's orbit crosses the equatorial plane of the Sun -- thus at or near the equinox, on March 29, Julian. On March 23 the Sun and Mercury are displaced 7 degrees in azimuth, but only 2 degrees in altitude.

Additionally, I should point out that the shock from Mercury happened a year before the dome of the stars shifted in 685 BC, so that at this time the Sun stood directly below the Pleiades (rather than at the beginning of Pisces). Polynesian myths deal with a rat God who chewed through the nets of the Pleiades. In the afternoon, Mars stood in the sky, below the altitude of the Sun and to the east. The Pleiades were high in the south sky, but could not be seen. Mars should be understood as being within the orbit of Earth at this portion of Mars's orbit. This places Mars much closer to the Sun in the sky as seen from Earth than an ephemeris program will show.

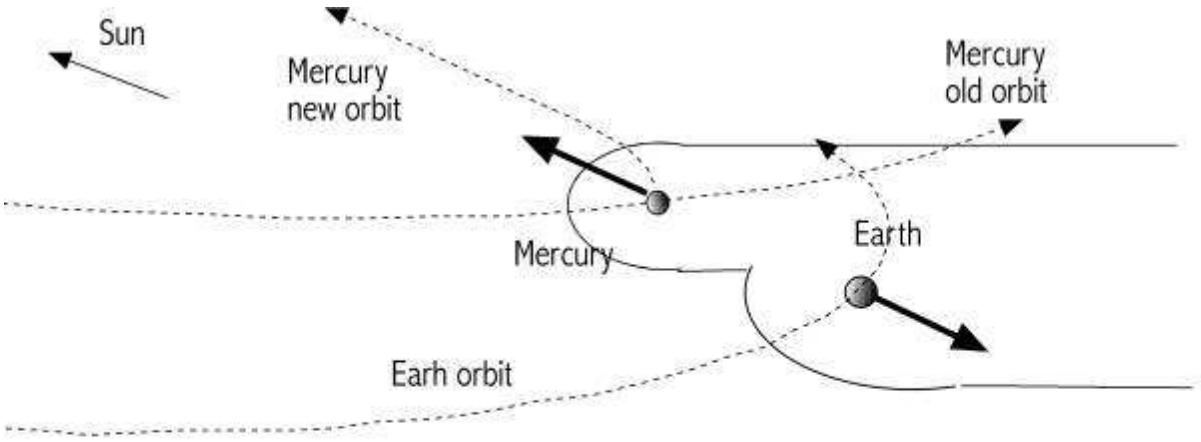
With the placement of these three planets (Venus is the third) all in the same quarter of the sky with the Sun, the American Plains Indian tale of the snaring of the Sun by Coyote, and the rescue by a mouse, starts to make sense.

Certainly it would seem that a plasmasphere tail from Mercury extending 57 million miles (92 million km) to Earth is an uncommon anomaly for a small rocky planet, which, however, it was not: the appearance of Mercury as the Mouse God "Smintheus" in 686 BC suggests that it still had a plasmasphere tail at that time.

But Mercury may have been much closer. If, as North American Indians hold, Mercury blotted out the Sun, it would have been between a half million and one-quarter million miles from Earth to be the right size at the time it eclipsed the Sun. Mercury is about the size of the Moon. However, with an atmosphere and a coma in glow mode, it would have been much larger in diameter, and thus the distance between Earth and Mercury could have been much greater. At any rate, it would mean that Mercury's orbit was radically different at that time from today, as I have maintained in earlier text.

I should also point out that the "look of a mouse" has to be due to a visible tail pointing away from Mercury after it no longer blocked the Sun. This was seen in the sky by North American Indians as the Sun started to rise up in the sky again -- presumably on the same day and the same afternoon. The tail of the mouse would only show up as Mercury moved out of alignment with the Sun.

The shock felt by Earth was also experienced by Mercury. At a mass of only 1/20th that of Earth, the repulsive electric impulse would have bolted Mercury away from Earth, and displaced Mercury to the much smaller orbit. Today the orbit of Mercury falls entirely within the orbit of Venus, and has the greatest orbital eccentricity of any of the planets. The ephemeris program, which can reasonably (and cautiously) be used in era before 685 BC, might produce a considerable error for the orbit of Mercury. In fact, four days in this case.



Oblique view of 686 BC contact

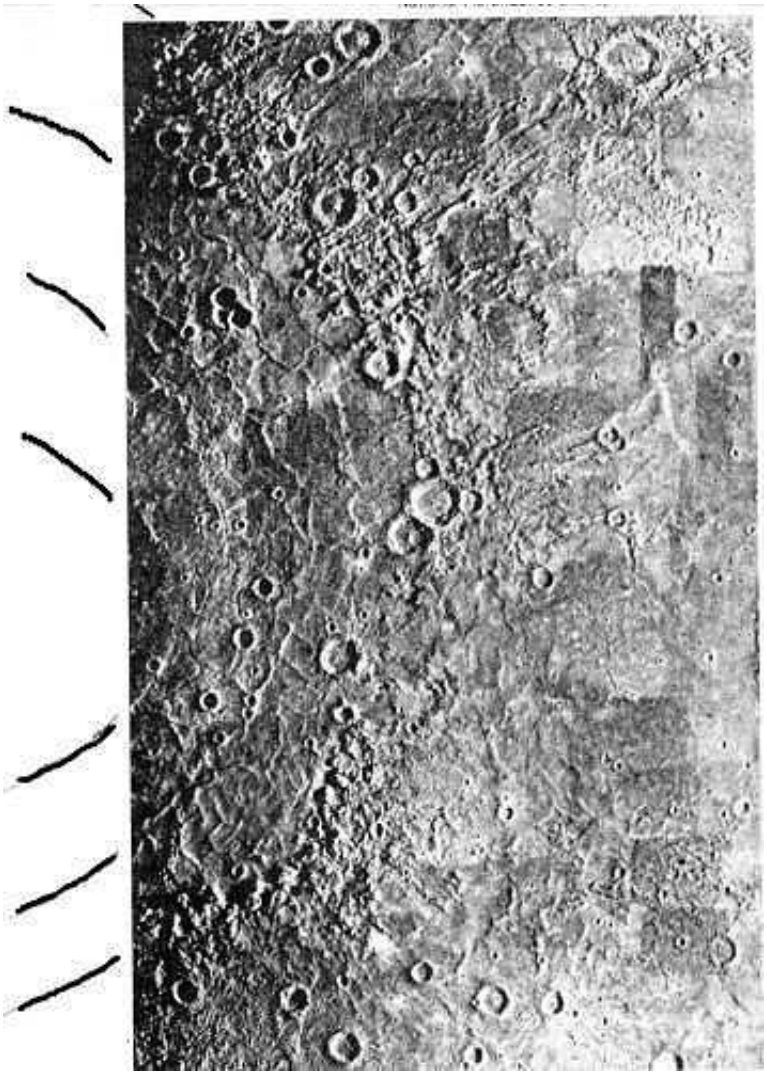
Gravitational forces are not shown not to scale

Let me recap the drama. Mercury was headed, I presume, outward bound from perihelion closer to the Sun, when its plasmasphere intersected Earth's plasmasphere. The Sun, Mercury, and Earth all lined up. This lineup had been avoided for a long time. Although Mars crossed Earth's orbit at the level of Earth, and thus came within Earth's plasmasphere, I suspect Mercury had always passed above Earth, clearing it by perhaps 300,000 miles (483,000 km), the size of Earth's plasmasphere.

Mercury was whacked with a repulsive shock and shoved in the direction of the Sun. Since Mercury crossed Earth's orbit at the level of the Sun's equator, it may have been forced into a completely changed orbit -- with a zero inclination to the Sun's equator, which is its inclination today. Only the forward motion of its original orbit kept it from falling into the Sun. I have in the text detailed that this event probably constituted the burning tower remembered throughout the world. American Indians recall that prairies and plains also burned in the southwest. The Polynesians saw a rat. A few hours later Sennacherib's army met with disaster.

If we go by Mercury's present orbit, which at aphelion is 51,000,000 miles (82,000,000 km) from Earth, then it could be suggested that this was the separation when electric contact was made. Mercury not only shocked Earth, but also may have changed the Earth's orbit some small amount, reducing it to 365.24 days -- the current value. Since this should have shown up in the Mesoamerican Tzolkin calendar, but did not, it would seem that the change made to Earth's orbit was limited to changing the shape (the eccentricity) of the orbit. This would not change the orbital period.

The Caloris Basin of Mercury



[*Image: Caloris Basin, on Mercury. After JPL, 1975.*]

At first, on seeing the Caloris Basin of Mercury, I wondered if in 686 BC Mercury might already have been standing still, that is, rotating the Sun like a moon, always showing the same face to the Sun, or at best rotating very slowly. Like almost all the satellites of the planets, its spin may have already been reduced to synchronous rotation about the parent planet, in this case, the Sun. Today Venus has achieved that status also. The Earth is slowing its spin at a rate of one second per year, and will be the next to come to a standstill.

I then realized that the Caloris Basin is located at the equator of the planet. As I mentioned earlier, a shock to the equator only shoves a planet over in space. This is motion "in translation" and thus there is no gyroscopic reaction torque induced, and no corrective motion is started. So the impact mark would be circular, and not have the typical leading and lagging edge markings that impact marks on Earth have.

The Caloris Basin of Mercury is located at the equator and occupies somewhat over 30 percent of Mercury's diameter. Thought to be 800 miles (1,300 km) in diameter in 1975, it was measured at 963 miles (1,550 km) in January, 2008. Caloris is mostly a flat plain with what looks like circular lava fields. Caloris is additionally ringed with circular sets of mountains, and there is an antipodal location where the shock waves converged to break up the crust.

If this is the mark of a collision with an asteroid, then it is the largest impact crater in the Solar System. If this had been due to an asteroid, the impact should have obliterated Mercury and removed the fragments entirely from the Solar System. If it was caused by electric force between Mercury and Earth in 686 BC, then the marked circles seem almost too small.

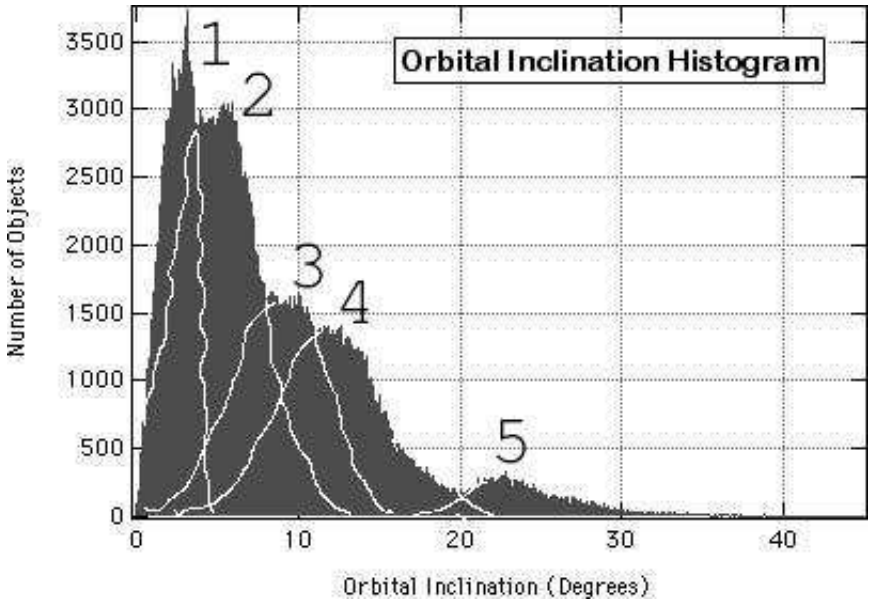
In addition to the fact that the surface of Mercury falls away rapidly from the center of the impact, thus causing only sliding damage at the periphery (mountains), the electric field at Mercury would have been radial, and thus similarly would fall away from the center. At the edges of the basin only a shoving movement of the crust would have been experienced.

A year later, in 685 BC, the Sun went into high activity, and Venus and Mercury blazed like suns. Every surface feature of Mercury was overlaid with cathode burn marks -- or "meteor impacts" as astronomers call them.

Endnotes

Note 1 --

A frequency plot of orbital inclinations (see below), which hides the information of the ten gaps where there are no asteroids, suggests that five planets may have been destroyed. The plot seems to consist of five superimposed Gaussian distributions. A distribution of orbital inclination is the most likely graphical representation which would more or less preserve the original *in-situ* locations of the parent bodies. Considering the sparsity of objects in the asteroid belt, I feel comfortable in plotting these Gaussian distributions on top of each other.



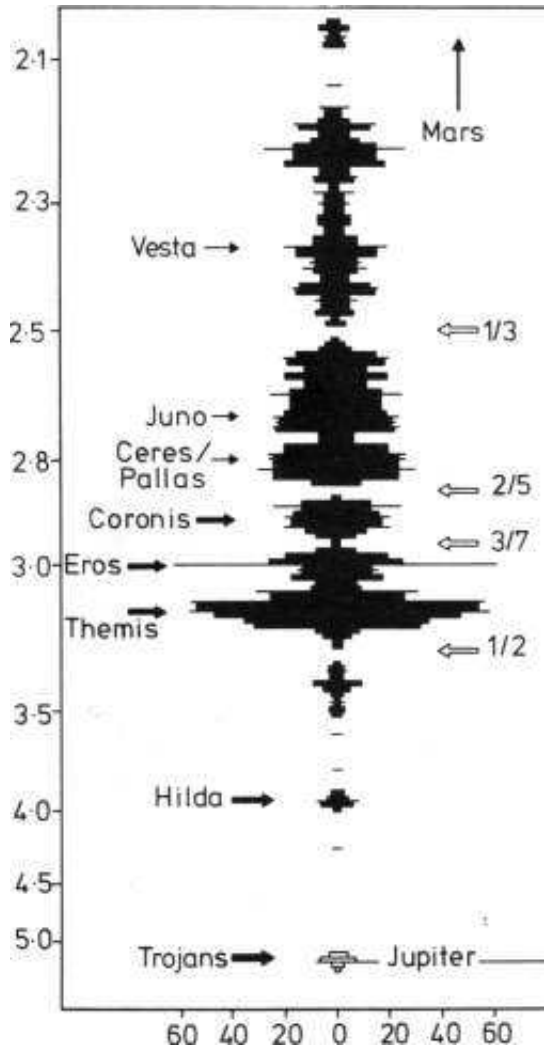
[*Image: "Histogram of the orbital inclination of objects in the asteroid belt." (Data: ftp.lowell.edu/pub/elgb/astorb.html. Plotted at case.edu/sjr16/) Additional graphics added.*]

Tom Van Flandern has suggested that the meteorites fallen to Earth (constituting a sample of the contents of the Asteroid belt) represent at least 3 or 4 planets.

Note also the extent of the orbital inclinations. By comparison, planetary orbits vary only seven degrees from the ecliptic. Although the *mode* of the distribution of the asteroids is at about 4 degrees, the *mean* is located at about 8 degrees. There are secondary peaks at 9, 12, and 23 degrees. It is, at any rate, not a single Gaussian distribution.
[return to text]

Note 2 --

Another graph of the distribution of asteroids, below, based on some 4000 objects known by 1950. Please note that the vertical axis is not linear. This exaggerates the asteroids closer to Mars. The horizontal axis shows the number of known objects at the respective location. The gaps can be clearly seen.



[*Image: Asteroid distribution with distance from the Sun in AUs. After Zdenek Kopal "The Realm of the Terrestrial Planets" (1979).*]

[return to text]

Note 3 --

The resonances may be calculated from Kepler's third law which defines the relationship between the period of an orbit and the radius of an orbit, as follows:

(T{Asteroid} / T{Jupiter})^2=(r{Asteroid} / r{Jupiter})^3

The asteroid belt period, as a fraction of multiples of the period of Jupiter is found by using 1 for the period of Jupiter and unit AUs for the orbital radiuses:

T{Asteroid} = sqrt((r{Asteroid} / r{Jupiter})^3).

orbital resonances for various locations of Jupiter

approx asteroid orbit [AU]	0.50 AU orbit	0.70 AU orbit	0.90 AU orbit	1.10 AU orbit	1.30 AU orbit	1.50 AU orbit	1.70 AU orbit	1.90 AU orbit
1.78	6.72	4.05*	2.78	2.05*	1.60	1.29	1.07*	0.96
1.91	7.46	4.51	3.09*	2.28	1.78	1.44	1.19	1.01*
2.06	8.36	5.05*	3.46	2.56	1.99*	1.61	1.33	1.13
2.26	9.61	5.80	3.98*	2.94*	2.29	1.85	1.53	1.30
2.50	11.18	6.75	4.63	3.43	2.67	2.15	1.78	1.51
2.70	12.55	7.58	5.20	3.85	2.99*	2.41	2.00*	1.69
2.82	13.39	8.09*	5.55	4.10*	3.19	2.58	2.14	1.81
2.96	14.40	8.70	5.96*	4.41	3.44	2.77	2.30	1.94
3.03	14.92*	9.01*	6.18	4.57	3.56	2.87	2.38	2.01*
3.28	16.80	10.14	6.96*	5.15	4.01*	3.23	2.68	2.27

* -- near whole-number values

[return to text]

Note 4 --

That Earth was not kicked out of the domain of Solar System remains somewhat of a mystery. All life on Earth would have come to an end. In addition to suggesting that the Earth was simply locked out of the reformed plasmaspheres when Saturn and Jupiter met, we could also follow Tom Van Flandern, who makes the claim, in *Dark Matter, Missing Planets and New Comets* (1999), for a "sphere of gravitational influence" for planets and objects in space, which under normal circumstances extends to about 100 planet diameters from the primary. Objects which are within this sphere (and which do not exceed escape velocity with respect to their primary) will remain (and travel) with the primary. Garbage jettisoned from space ships reacts this way, it just floats along with the ships. A number of conditions are able to change and negate this; the primary condition being the presence of another nearby large mass.

The point of release of Earth would constitute the aphelion of its (new) orbit around the Sun -- the location furthest away from the Sun.
[return to text]

Note 5 --

See the Appendix "Change in the Axis" for notes on Dodwell's 25.2 degree inclination. See the Chapter "The Popol Vuh" for additional discussion on the Blowgunner Pot.
[return to text]

Note 6 --

The separation distances are from the tangent of the differences in the angles, multiplied by the assumed distance to the Sun, where the tangent is defined as **sin ( ) / cos (**):

vertical distance = 0.7 * AU * sin (angle) / cos (angle),

Here we are using 0.7 AU as the location and 93 million miles for one AU. To obtain the distance, for example, between Uranus and Saturn:

0.7 * AU * sin (2.49-0.77) / cos (2.49-0.77) = 1,954,865 [mi] (3,146,000 km)

Adding 10 million miles to 0.7*AU makes little difference in the vertical separation distances, as I have mentioned earlier. The reader will also note that the calculations include a shortcut in that it is assumed that the repulsive forces are directed on a radius line from the Sun, instead of being directed from Jupiter. This also will make almost no difference.
[return to text]

Note 7 --

I have not done the calculations for an exchange of KE (kinetic energy) involved, or for an exchange of momentum. Electric energy could be at cause also, and there are some hints from recent measurements, as follows: Since 1973 it has been repeatedly noticed that whenever Earth experiences a massive coronal mass ejection from the Sun, the Earth's rotation suddenly decreases, although only by nanoseconds. The speed of rotation increases again over the following few days, at a slower rate than the initial decrease in rotational speed, and returns to normal.

The process of slowing down and regaining speed thus seems to result from a sudden change in the coulomb charge of Earth (intercepting solar protons), followed by a reduction of the surplus charge over the following days through the normal leakage out to space away from the Sun along the Earth's plasmasphere tail.

The spin of the Earth is decreasing currently. The international atomic clock, which determines the length of the day for Earth, has been adjusted by thirty seconds since 1972. The Earth's rate of rotation thus has slowed 30 seconds in 32 years -- about a second per year. This is certainly much more than the nanosecond deviations experienced with the occasional coronal mass ejection. Extrapolating one second per year to the time since 3147 BC, results in a calculated loss of 1.4 hours. Although this represents an extreme and probably illegitimate extension of the data, it confirms my supposition that Earth (and also Mars) today spin at the same rate, or nearly the same rate, as before the breakup of 3147 BC, and also suggests that Earth and Mars both rotated at about 24 hours per day before 3147 BC. The average orbital distance from the Sun for Earth and Mars has not changed all that much.

Tim Thompson contests this as a young-earth-creationist argument (http://www.tim-thompson.com/young-earth.html), although I have no idea what he is talking about.

In the last 25 years, Saturn has changed its rotational period from 10 hours and 39.3 minutes (1982) to 10 hours and 45.5 minutes (2004) -- about six minutes, or an average of 17 seconds per year. This data is based not on the rotation of its cloud cover, but on the rotation of its magnetic field. This is an astoundingly large amount, and difficult to comprehend and explain in astrophysical terms.
[return to text]

Note 8 --

I am at a loss to explain how the inclination of Mercury's orbit could have changed in 686 BC.
[return to text]

Note 9 --

The White (and Red Crown) of Egypt depict Mars in the stream of a plasma connection in glow mode from Saturn, probably at a late date in the "Era of the Gods" -- after Saturn had ceased its initial nova condition in arc mode. The White Crown shows the plasma stream frontally lighted by the Sun and thus hiding Mars. The Red Crown shows the same stream at night, back lighted by the Sun (and casting a partial shadow) with the red surface of Mars showing through the plasma stream.

If we assume that the White or Red Crown of Egypt represents approximately the size of a human head and seen at arm's length (which is, of course, very subjective), then it might have subtended about 2.5 to 3.0 degrees (the angle subtended by a hand at arm's length).

On the basis of the above conjecture, it could be suggested that the upper bulb of the White Crown, representing Saturn, would be about 1.5 degrees wide visually (half the width of the larger Horus bulb). That clearly places Saturn 2.8 million miles (4.5 million km) from Earth.

72000 * (cos (1.5) / sin (1.5)) = 2.75 million miles

The same reasoning, applied to Mars in its lowered position, reveals a distance of about 80,000 miles (129,000 km) between Earth and Mars at the closest approach:

arctangent (4200/80000) = 3.0 degrees.
[return to text]

Note 10 --

At two AU the distance would amount to...

2 * au * sin (2.49-1.85) / cos (2.49-1.85) = 2.1 million miles (3.4 million km).

Mars would have been much closer to Earth. This might, in fact, be suggested from the *King List,* where the last descent to Earth of Mars was only 80 years prior to 3147 BC, half of the average of 141 years of the previous seven "reign lengths."
[return to text]

Note 11 --

Electrons in the Van Allen belts of the Earth, a toroidal ring of plasma a few hundred miles to a thousand miles above the equatorial regions, will move to different locations over distances of a thousand miles in only a few seconds when a lightning strike is experienced far below in the atmosphere of the Earth (the last few miles above the surface). We could expect the same rapid reconfiguration when two planetary plasmaspheres intersect. A thousand miles in two seconds ("a few") represents a speed on the order of 2 million miles per hour. This is actually equal to the speed of the Solar Wind in the region of space near Earth today.

Mars and Mercury may have remained within the plasmasphere of Saturn after 3147 BC because Mars, having been in periodic violent discharge from Saturn at least since the Gravettian, 40,000 years ago, must have been at a potential partially equal to that of Saturn. I can also place Mercury in the polar configuration late in the Gravettian (circa 24,000 ya) or in the Magdalenian (17,000 to 14,000 ya), but certainly long ago.

The plasmasphere which reformed around Saturn would have no cause to exclude Mars from its enclosing bubble. Only on arriving at the asteroid belt, would the plasmasphere of Saturn have radically reconfigured itself to match conditions of the conducting dust and rocks nearby, resulting in the exclusion of Mars and Mercury from Saturn's electric influence.

This scenario seems reasonable in accounting for the release of Mars (and Mercury) 80 years after 3147 BC, as well as accounting for the swarm of dust and asteroids which accompanied Mars for the next 3000 years. It would mean that Mars's initial orbit (as also for Mercury) was very elliptical, with aphelion beyond the initial edge of the asteroid belt. The scenario proposed by Patten and Windsor also suggests aphelion within the asteroid belt.
[return to text]

Note 12 --

The raven might have been Saturn, with its rings as wings. But I doubt it.
[return to text]

Note 13 --

There are other "births" in Greek mythology. One records the birth of a God (planet) from Zeus's thigh -- thus the planet was first noticed as it appeared from behind the lower mountain shaped coma. This likely is the image of the mummy of Osiris with his erect penis. In Greek mythology the erect penis will turn out to be Dionysus. Dionysus belongs to the class of Gods who are "twice born" -- where the second birth for Mercury happens in the seventh century BC. In this case the second birth is the fiery appearance in 685 BC as if Venus gave birth to Mercury.
[return to text]

Note 14 --

The reader should take this statement as an admission that, first, we know only a little of the interactions of plasmaspheres, and second, that the effects are neither as clear-cut nor as discrete as presented here.
[return to text]

Note 15 --

I initially placed the event of 2349 BC in Central Asia. A map inspection reveals two semicircular configurations of mountains, both with the open (flat) side pointing north or northeast. One is identified at the lower edge by the rim of mountains of the Himalayas, with Tibet as the flat area of the basin. The Tibetan plateau is known to be of "recent" origin. In fact, it is held today by geologists that both the "uplift" of the Himalayas and the Tibetan plateau are as recent as "after the end of the last ice age," thus more recent than 14,000 years ago. This largely argues against the plate tectonics

notion of the Indian subcontinent colliding with Asia some sixty million (60,000,000) years ago, although the current Himalayas do constitute the raising of a previous set of more modest mountains.

The other large impact basin is further north, with Lake Baikal included in the curvature. I would suggest that this might be the impact of 2193 BC. Since we are aware of a long period of reduced light (reduced agricultural production) starting in 2193 BC, this seems like a most likely location which would provide a path for a continental lightning strike and extensive forest fires.

Since the lightning strikes in 2349 BC were plasmoids which apparently dissipated at the equatorial rings or the ionosphere, there might have been few forest fires at that time.

I should point to an article by Donald W. Patten and Samuel R. Windsor, "Catastrophic Theory of Mountain Uplifts" in *Catastrophism and Ancient History* (1991), which assigns the uplift of the Himalayas and other mountain ranges to close passes of Mars in the 8th century BC. I'll reluctantly assent to some mountain ranges, but not the Himalayas (nor the Andes), since the overall structure of these mountains and the adjacent areas do not easily conform to the geological mechanics envisioned by Patten and Windsor.

The Indian bar-headed goose (*Anser indicus*) flies over the Himalayas to nest at the Tibetan Plateau and in Mongolia. There are no low passes through the Himalayas. The geese regularly fly at 20,000 feet. [return to text]

Note 16 --

The Earth as a gyroscope is not equivalent to a toy top set on a table, and does not react the same way to an impulse. (An "impulse" is the momentary application of a force.) There is absolutely no comparison between a toy top or toy gyroscope and a sphere spinning in space without any support.

The top set on a table is subject to a "normal force" directed up from the bottom, and the force of gravity directed down along the same axis. As it is nudged, the force acting through its center of gravity is offset from the point of contact at the bottom. This constitutes a "couple" (a torque) acting permanently around the horizontal center of the top. The reaction torque resulting from this will set the top into precession. And it will be permanent, for the leaning of the top is permanent. Nudge it more and it will turn upside down instead. The top will do this when the force of sliding friction (about 20 percent of the normal force) has been overcome.

Until a top is removed away from the effect of gravity, and off the table, it will not act like Earth under the influence of an impulse. The notion of the Earth turning upside down -- expressed repeatedly by Velikovskian researchers and savants who apparently have never taken elementary physics or mechanics in high school -- is based on false analogies. I cannot believe that some of these articles were ever printed in the Velikovskian journals.
[return to text]

Note 17 --

Because the contact in 2349 BC happened at the fall equinox, it is amenable to a simple analysis. At the fall equinox the axis of the Earth was tilted 30 degrees "forward" along the orbit. The center of impact may be estimated to be about 40 degrees north of the equator. The hit occurred when the

impact point faced the Sun. Thus the impact was not directed through the center of Earth, but on a line 30 degrees above the center and through the Earth. Thus the first reaction was a tilt of the Earth to the northeast.

The gyroscopic reaction would immediately change to a movement of the Earth's axis away from the first tilt. The two motions would describe a counterclockwise circle of the Earth's axis as seen from above. This moved the exterior force geographically toward the southwest.
[return to text]

Note 18 --

I suspect that the orbital period of Venus might have been on the order of 240 days initially, when the Earth's period was also 240 days. With the eccentricity of Venus at 0.15 and the eccentricity of the Earth at 0.10, the orbit of Venus would certainly have overrun the orbit of Earth.
[return to text]

Note 19 --

The Moon's orbit, which describes a cycloidal pattern at the same distance from the Sun as the Earth, but at a slightly different orbital inclination, precesses in only 19 years to repeat its positions with respect to Earth and the background stars.
[return to text]

Note 20 --

I should note that only for far distant interactions would two planets have to line up with the Sun, for the Sun's electric shadow of the inner planet determines the location of the planet's plasmasphere tail. But planets could interact electrically at much closer distances if two plasmaspheres brushed against each other in passing. This apparently happened with Mars and Earth for 300 years starting in 3067 BC, again for a period after 1935 BC, and the last time in 806 to 687 BC.

In 776 BC Venus seems to have made electric contact with Mars but not with Earth. Note that the number of closely spaced approaches seems to have decreased over time, as did the severity of the electric contacts.
[return to text]

Note 21 --

I had originally (years ago) only considered gravitational interaction for the displacement of the Earth's orbit in 1492 BC, and thus had Venus pass on the night side of Earth. Velikovsky, however, suggests that Venus passed on the day side of Earth, based on textual evidence. This is an interesting concession, since it would discount gravitational interactions altogether.

Velikovsky hoped that magnetic interactions would do the job. That is doubtful. But it works even better if electric interactions are considered. The interaction would have to be during daylight, at about noon, and near the equinox. If we allow for the repulsive forces of the electric fields, which would become "visible" to the two planets during a plasmasphere contact, then the Earth would be "shoved" to a larger orbit instead of being gravitationally or magnetically "pulled."

[return to text]

Note 22 --

Greater accuracy is achieved with the use of a public domain calendar conversion program written by John Walker, which allows conversion between the Maya Long Count (with the Tzolkin and Haab days) and the Julian calendar and Gregorian calendar. I use a modified version which allows use of either the August 11 or the August 13 correlation.

The advantage of the backward-extended Gregorian calendar is that it represents solar years, although the days of the year will be out of phase with reality. The Julian calendar, based on Julian days, diverges progressively from solar years.
[return to text]

Note 23 --

Additional data brought to bear on this event by Velikovsky was a "reference to some celestial event of 776 BC" from a secondary source referring to the *Shih King* (the Confucian *Book of Odes*). However, the *Book of Odes* lists only an eclipse of the Sun. As a book of collected poetry the *Shih King* is not really concerned with celestial events.

James Legge translates the passage of the *Shih King* as:

> *"At the conjunction (of the Sun and Moon) in the tenth month, on the first day of the Moon, which was Hsin-mâo, the Sun was eclipsed."*

Legge further notes:

> *"This eclipse is verified by calculation as having taken place in B.C. 776, on August 29th, the very day and month assigned to it in the poem."*

It is only curious that this is the only "celestial event" which is listed in a book of poetry, and it may be a coincidence that this is in the same year as the event of the ballgame.

By my retrocalculation the eclipse happens in the late afternoon on September 6th, 776 BC, on the Julian calendar, which is astronomical year -776 for the ephemeris program I am using, and August 29, -775, on the Gregorian calendar, matching Legge's date quoted above as "B.C. 776, on August 29th." Of course both my ephemeris program and the savants of the late 19th century are using the same assumptions about the constancy of the Solar System. But I do not think this was simply a solar eclipse by the Moon, for the date is 30 years before 747 BC, and thirty years before the Moon's orbit reduced enough to actually cause eclipses to be seen on Earth.

The *Encyclopaedia Britannica* reports:

> *"A date of 776 BC was formerly adopted for such an event, but modern computations show that no solar eclipse in that year was visible in China. A revised date of 735 BC has been proposed."*

I disagree. A solar eclipse was certainly visible in Peking on the date above, although perhaps in the late afternoon. The *Encyclopaedia Britannica* may also have reference to a reading of the first stanza stating that the eclipse of the Sun followed an earlier lunar eclipse. An earlier lunar eclipse would have been 14 or 15 days earlier, at night. On August 22 (Julian) at 1:45 AM -- not on September 6th -- the Moon is on the ecliptic (in line with the Earth and the Sun) and 12 hours removed from the location of the Sun. That defines a lunar eclipse. The *Encyclopaedia Britannica* continues with:

> *"Throughout the subsequent thousand years or so, lunar eclipses were hardly ever reported in China -- in marked contrast to solar obscurations, which were systematically observed."*

What Velikovsky failed to note from his secondary source, is that in the third stanza of the ode mention is made of lightning and geological disturbances, including the lifting of streams and valleys.

> *Grandly flashes the lightning of the thunder.*
> *There is a want of rest, a want of good.*
> *The streams all bubble up and overflow.*
> *The crags on the hill-tops fall down.*
> *High banks become valleys; Deep valleys become hills.*
> *Alas for the men of this time!*
> *How does (the king) not stop these things?*

I find it very interesting that the "solar eclipse" is associated with catastrophes. I would assign the movement of hills and river and the lightning strikes to a close passage of Mars, but the year 776 BC in China, based on astronomical data, does not match the year 776 BC in the Eastern Mediterranean, based on chronological data. It is off by four years, which actually may not be a problem, since the first Olympic Games could have started either 4 or 8 years after the event.

It should also be realized that texts in China, dating from the seventh century BC, were often corrected, even as late as AD 900 or AD 1000. Others have suggested this, and I have noted this for the entry concerning the calendar adopted by Yao as described in the *Annals of Shu*. It is possible that the lunar eclipse followed by a solar eclipse were retrocalculated at a late date and inserted to account for the disturbances noted in the poem. Additionally, I believe that no lunar or solar eclipses were experienced anywhere (except perhaps in the tropics) before 747 BC. This was Mars.
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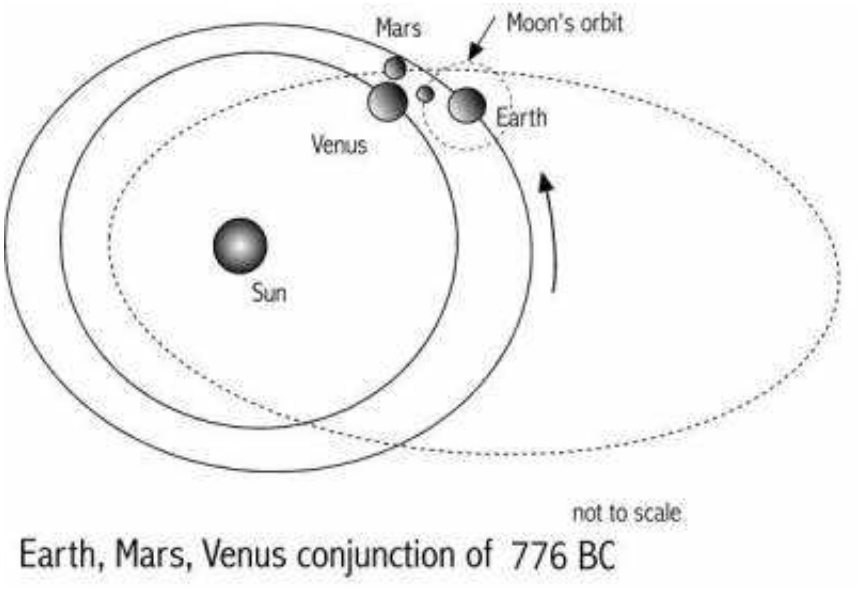
Note 24 --

The following lists the coincidental inferior conjunctions of Mars and Venus with Earth, between 800 BC and 700 BC. The angles listed are measured from the Sun, and are taken from printouts of visual best approximations of "close passes" of Venus and Mars.



[*Image: Mars, Earth, Venus on February 17, 776 BC; Mars shown within Earth's orbit.*]

year*	angle	interval
800	17 deg	6
793	11	7
787	24	6
780	10	7 <-- 776 BC
774	26	6
768	21	6
761	15	7
755	28	6
748	20	7
744	28	4
736	28	8
729	25	7
716	22	13
712	20	4

* corrected by 4 years

The corrected date corresponding to 776 BC is marked. I have excluded conjunctions of 30 degrees or more, some of which happen at odd intervals of two, four, or five years. The date of February 25 -780 Julian is February 17 -779 Gregorian, and equal to the year 776 BC in Eastern Mediterranean chronology.
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Note 25 --

Velikovsky mentions, in the unpublished "The Assyrian Conquest":

"It is often asserted that the Era of Nabonassar was Ptolemy's invention; but it is a fact that one of the most important of the Babylonian historical texts, the so-called 'Babylonian Chronicle' (B.M. 92502), starts with the reign of Nabonassar, or the year -747. See H. Winckler and J. N. Strassmeier, Zeitschrift für Assyriologie, II (1887), pp. 163-168. Cf. D. J. Wiseman, 'Chronicles of Chaldean Kings' (London, 1956), pp. 1-2."

-- Immanuel Velikovsky, from "Haremhab's Contemporaries" at [www.varchive.org]
[return to text]

Note 26 --

Velikovsky quotes from J. de Costa, *The Natural and Moral History of the Indies* (1604), that the new year among the Indians of Mexico started on February 26th (supposedly on the Julian calendar, but this is on the Gregorian calendar).

From another secondary source I have information attributed to Bernadino de Sahaguán, in *Historya General de Nueva España* (circa AD 1530) who identified the start of the Aztec year with February 12 (supposedly) on the Gregorian calendar. However, February 12 falls on the Julian calendar, and is equivalent to February 22 on the Gregorian calendar (of the same year). February 22 is five days before February 26. February 22 is here thus the end of the year, with the five extra days following.
[return to text]

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Special thanks to J Hafner for questions on the mechanics.
Special thanks to D Vander Ploeg for comments on the orbits.

Calculations are in Unix bc notation, where ^ denotes exponentiation; the functions a(rctangent), s(ine), and c(osine) use radians; angle conversions to radians or degrees by the divisors rad=.017+ and deg=57.2+; other functions are shown as f( ); tan( )=s( )/c( )
units: million == 1,000,000; billion == 1,000,000,000;
AU == 93,000,000 miles.

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