Mars Flybys: 7137-701 BCE

Stuart Harris, Eugene Oregon, January 2017

In memory of Donald Patten (1929-2014)

Summary

Donald W. Patten modeled flybys of Mars as a fixed sequence that alternated spring and fall, spaced 108 years apart. He sequenced flybys from 701 to 1404 BCE using historical records. Flybys alternated between the night of March 20-21 on odd years, and during the day of October 24 on even years. Associated with most flybys was a catastrophic impact with a satellite of Mars. An impact would incinerate the land beneath or generate a tidal wave if it hit the sea. Volcanoes would often erupt from the shock and cause a severe drop in global temperature. Impacts might also trigger a pole shift, usually a few degrees, but sometimes a complete pole reversal.

Mars had a two-year elliptical orbit in 6:1 resonance with Jupiter. At its greatest extent, it passed through the asteroid belt and acquired more satellites. The plane of Mars' orbit was not stationary but oscillated with a period of 108 years, pulled by Jupiter. When the planes of Mars and Earth were roughly congruent, a flyby occurred. The data suggests the plane was somewhat tilted, so the time between spring and fall flybys was not equal.

This paper extends Patten's methodology to March 7137 BC by recognizing that the 108-year interval was not constant but occasionally increased in increments of four years. Two important milestones are March 3161 BC, the Biblical Flood, and March 3761 BC, the start of the Hebrew calendar. Dates were obtained by correlating spikes of ammonium ions (NH_4^+) from Greenland's GISP2 ice core; a spike of ammonium occurs within a couple of months of an impacting object in the northern hemisphere. On average, strikes occurred just as frequently four years before or after the closest flyby as Mars reloaded its family of satellites from the Asteroid Belt. Mars remained lethal at least ten years from the nearest flyby.

Greenland does not particularly record strikes in the southern hemisphere, so some fraction of strikes does not appear. In addition, something about the ice frequently disrupted the measurement process whenever there was a strike.

Background

Patten researched dates of Mars flybys from 701 to 1404 BC (Table 1) (Patten 1990, 1996, 1999). To this list add 2300 BC, end of the Bronze Age; 3761 BC, start of the Hebrew calendar; and 3161 BC, the Noachian Flood 600 years later.

Table 1: Mars flybys from historical records (Patten)

Spring Flyby, at night, March 20-21			Fall Flyby, at daytime, October 24		
BCE	Int.	Catastrophe	BCE	Int.	Catastrophe
701	---	Isaiah, Hesiod, Kings	756	----	Jonah, Amos, Joel
809	108		864	108	Elijah
917	108		972	108	Davidic, Gad
1025	108		1080	108	Samuel 1.6
1133	108		1188	108	
1241	108		1296	108	Deborah-Barak
1359	108		1404	108	Long day of Joshua
1447	98	Exodus, does not fit			

How pole shifts offer a way to date Mars flyby

An important contribution by Patten was the discovery that a pole shift usually accompanied a flyby, anywhere from a few degrees to a complete reversal. The mechanism of a pole shift was solved by Flavio Barbiero by modeling the gyroscopic properties of seas separately from the land mass (Barbiero 1999). When considering Earth as a gyroscope, the only mass that matters is the slight differential bulge of the Earth at the equator due to centrifugal force. If an object 3 km in diameter or more hits the periphery of Earth at a tangent, it will create a momentary angular impulse on this sliver, which will confuse the seas into thinking the axis of Earth has changed. The seas slowly move off to a new location, while Earth rotates in the opposite direction to conserve momentum. At the end of the day, the axis of Earth still points to the North Star and Earth still rotates in 24 hours, but from the perspective of someone on the ground, the pole star has moved.

Emilio Spedicato (2004) discovered that a secondary effect lengthens the year slightly, somewhat proportional to the amount of the pole shift.

These impacts stir up so much trouble that their effect can be measured as spikes of ammonium ions (NH_4^+) in Greenland ice cores, first recognized by Mike Baillie (2008).

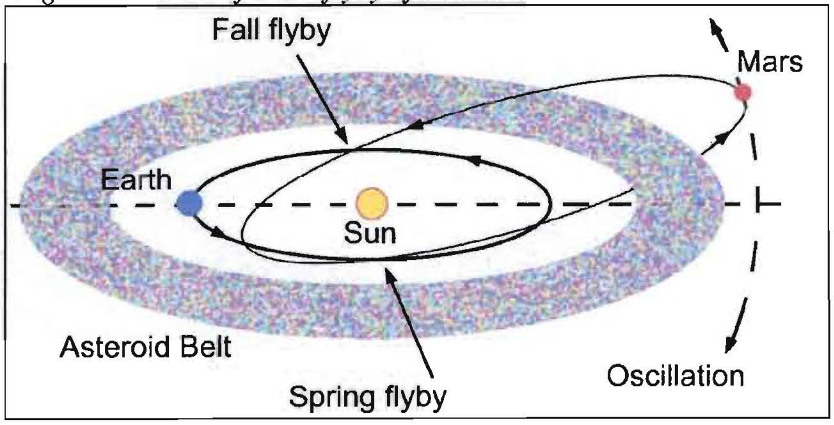
Frequently, the northern hemisphere would cool substantially from volcanic eruptions, which caused minimum tree ring growth that summer if a spring strike, or next summer if a fall strike.

Model of Mars flyby

Patten modeled Mars' trajectory as a two-year elliptical orbit in lockstep with Earth, whose plane oscillated up and down under the gravitational influence of Jupiter. Twice during a full oscillation, the planes of Mars and Earth would be nearly congruent and Mars would pass close to Earth on the sun side, alternating between spring (odd years) and fall (even years). At the extreme outer limit of its travels, Mars passed through the asteroid belt several times during a full cycle, each time acquiring satellites. At the inner limit, it passed by Venus. A close encounter with Venus in January 701 BC set the stage for Mars passing between Earth and Moon for the first and only time (Figure 1).

Whenever Mars passed by, Earth might intercept one or more of these orbiting satellites which could cause an astounding amount of damage, often with a pole shift. If a satellite circled far from Mars, then Earth might intercept it up to five passes before or after the closest flyby. Earth was not the only planet to intercept satellites – Venus and Moon did also.

Figure 1: Model of Mars flyby of both Earth and the asteroid belt.



Impact record in ice cores and tree rings

The consequences of these impacts left a record in the Greenland ice sheet.

Mike Baillie (2008) discovered a correlation between a massive spike of ammonium ion NH4+ and a comet strike. It is not the comet per se that creates the ions, but rather the consequence of an extraterrestrial object of any kind striking Earth. This is fortuitous, because Mars and its satellites are not comets.

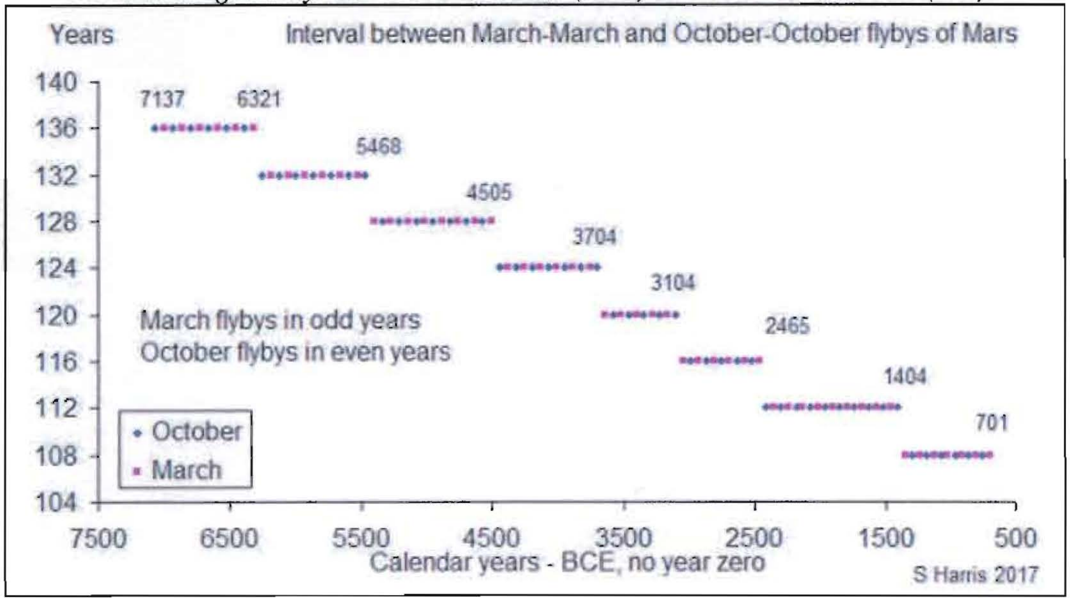
Paul A. Mayewski and Gregory A. Zielinski carefully measured a suite of ions in Greenland's GISP2 ice core, while others correlated snow depth with age by counting snow layers between volcanic explosions. They measured the concentration of ions of ammonium, chlorine, sodium and nitrous oxide taken from a melted section of the ice core that typically spanned two or three years. By assuming the ammonium is not spread evenly but concentrated in a single year, an individual measurement can often double or triple in magnitude. Of these four, ammonium is the most sensitive indicator with a high peak above ambient background. Two ions, sodium and chlorine, peak 60% of the time, perhaps indicating an ocean strike.

California bristlecone pines and Irish bog oaks often exhibit a narrow growth ring after a strike, caused by a summer of severe cold as volcanoes triggered by the impact block the heat of the sun with their emissions. Trees add summer growth rings only after their roots thaw. Mike Baillie and David Brown kindly supplied a 7000-year record of Irish bog oak tree rings (Baillie 1988). Donald Graybill began the process of assembling an 8000-year record of Bristlecone pines from separate locations. However, I had to not use their data because there were other ways for volcanoes to erupt without being triggered by a strike.

Variable interval between flybys

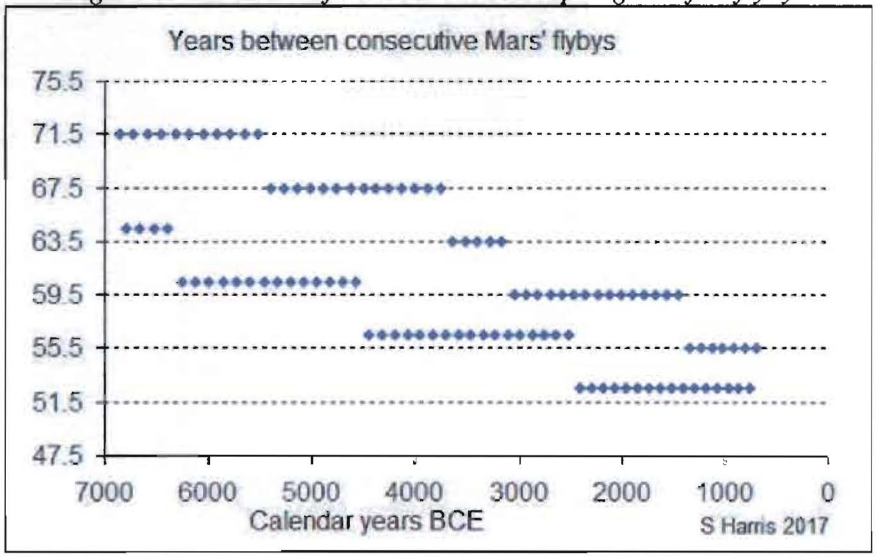
An examination of ammonium spikes shows that the 108-year cycle ended in October 1404 BC, the day the sun stood still. However, it continued back in time on a 112-year cycle. This in turn ended in 2465 BC, but continued back on a 116-year cycle. This step-pattern continues until the strikes end in 7137 BC (Figure 2).

Figure 2: Plot of years between flybys of Mars.
Plotted congruently are March intervals (blue) and October intervals (red).



A consequence of this step pattern is that the interval between spring and fall flybys varies considerably (Figure 3).

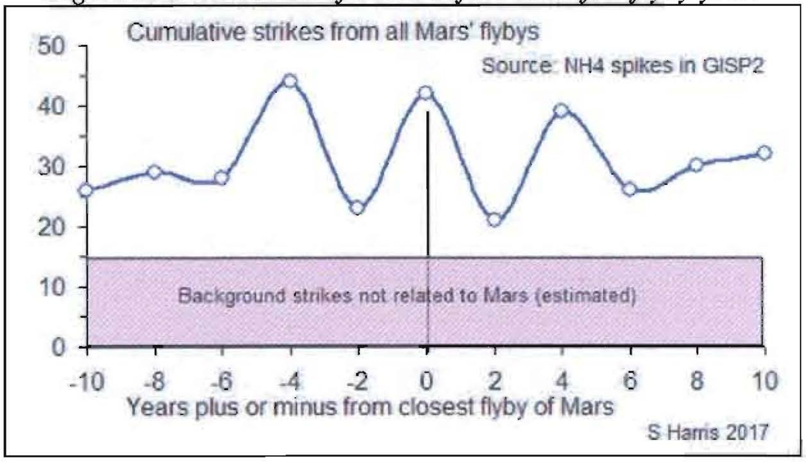
Figure 1: Variation of interval between spring and fall flybys.



Distribution of impacts around flyby year

To my surprise, the impacts from Mars' flybys do not have a normal distribution around the year of closest approach. Instead they exhibit three lobes spaced four years apart, each with a normal distribution, plus a hint of another peak eight years out (Figure 3). Upon reflection, these are caused by Mars reloading its family of satellites whenever it passed through the Asteroid Belt. Because the plane of Mars was tilted in relation to that of the Asteroid Belt as well as that of Earth, it apparently passed through twice while going in one direction, spaced four years apart.

Figure 3: Distribution of strike before and after flyby year.

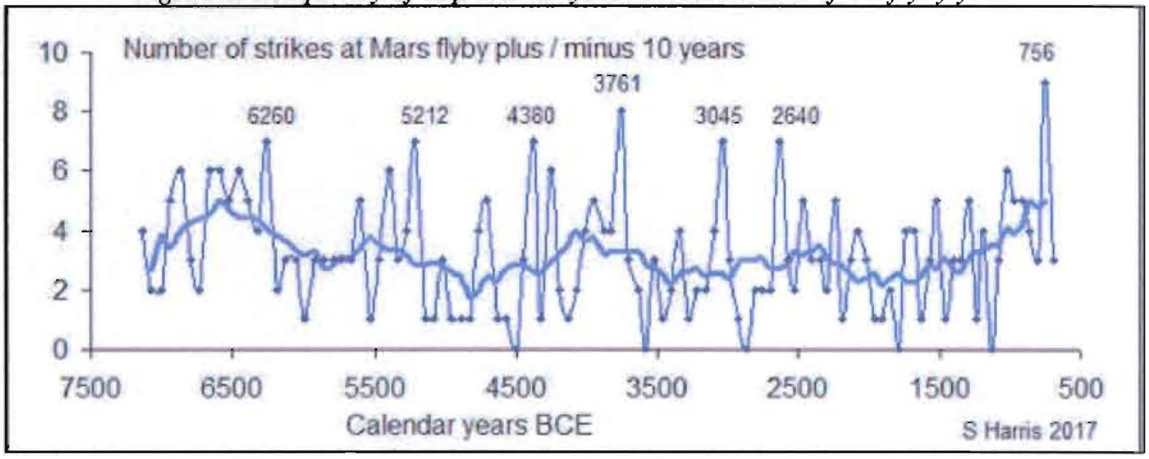


The total number of impacts is perhaps twice as large for two reasons: multiple impacts during a flyby are recorded only once in the ice core, and impacts in the southern hemisphere do not seem to appear at all.

Frequency of impacts

A plot of frequency of impacts over the life of Mars shows a few episodes of above average number of impacts. Two of these dates are significant: 3761 BC, the start of the Hebrew calendar, and 756 BC, just prior to the unique flyby of 701 BC. Because Mars kept replenishing satellites every time it went through the Asteroid Belt, there is no drop-off in number of strikes with time.

Figure 4: Frequency of impacts ten years on either side of the flyby year.



Origin of Mars

The birth of Mars as a planet occurred somewhat earlier than 6900 BC (Spedicato 2012). Mars had been a satellite of Earth that orbited three times a year, which accounts for early calendars having only three months. It was much farther away than Moon, so that reflected light from the Sun was much dimmer than Moonlight. The new Moon was so bright that it allowed activities to be held at night. Spedicato modeled the capture of Moon from a large passing planet Nibiru and the simultaneous release of Mars as a four-body problem. Nibiru eventually crashed into Jupiter around 6900 BC, when it formed the red spot and possibly ejected its core as Venus on the opposite side. Mars was thrown into a wild orbit around the Sun, which soon settled down to 6:1 resonance with Jupiter.

Observations of the sequence

The last year of each sequence was often especially catastrophic. Well known dates include:

Mar 3761 BC, the start of the Jewish calendar, considered the day of creation.
Mar 3161 BC, the global flood
Oct 1404 BC, the long day of Joshua
Mar 701 BC, the night Sennacherib lost most of his army at Jerusalem

The catastrophe of Exodus in March 1447 BC is within the ten-year window of strikes from a Mars' flyby in 1457 BC. Mars likely contributed the colliding satellites, but a different comet-like body with a glowing tail circled Earth in a stationary orbit (Velikovsky 1950).

The mechanism to decrease the interval between flybys by increments of four years is unknown. For the period of the oscillating orbital plane of Mars to decrease, the long axis of the orbit must decrease. At the same time, the day of the month would change.

Two of the most significant catastrophic dates, 2300 BC (end of the Bronze Age) and 3161 BC (Noachian Flood), lack an entry in the ice core database; their measurements are entirely missing. This is not a case of a missing spike of ammonium, but of missing data entirely. Something about the data made the scientists uneasy, an error in the equipment, bad ice, so rather than report an anomaly, they deleted it. Perhaps an ice-core specialist can hazard a guess as to why.

Methodology

I began with two known flyby dates, March 3761 BC and March 3161 BC, exactly 600 years apart. An interval of 120 years gives five evenly-spaced periods. For the analysis, I converted these dates to an astronomical calendar by subtracting a year, -3760.3 and -3160.3, the scheme used by scientific reports.

-3760.3 strike
-3640.3 strike
-3520.3 strike
-3400.3 nothing
-3280.3 nothing, deep freeze the next year
-3160.3 missing data from ice core, deep freeze the next year

Surrounding these dates are other strikes within ten years.

Additional March flybys with a 120-year period don't make sense when considering the probability of strikes before and after, so I changed the period to 116 years. There were not many strikes at the closest approach, but there was a nice balance of strikes before and after. Continuing on this way, trying to achieve a balanced portfolio of strikes, I ended up at -700.3, much to my surprise. The last increment was 108 years, as predicted by Patten.

Then I returned to -3760.3 and went backward using the same methodology, starting this time with an interval of 124 years, gradually increasing the interval in steps of 4 years, until the strikes ended at -7136.3. When finished, the distribution of strikes had three peaks, not one.

Why four year increments? When I first compared Patten's data years ago with the Bristlecone-pine tree-ring database, I noticed that if I lengthened the period by four years I landed in a cluster of very cold summers.

Using the three peaks model as a guide, I then constructed the October flybys the same way, using the same set of intervals. It took a couple of days to get a balanced distribution of October strikes, and they too exhibited a triple set of peaks.

Bibliography

Baillie, Mike G.L. and M.A.R. Munro; 1988; Irish tree rings, Santorini and volcanic dust veils; Nature 332, pp 344-346, summarizes a 7000-year continuous sequence. Actual average tree-ring data sampled from many Irish bog oaks for each year is called the Belfast Long Chronology, held by the School of Geography, Archaeology and Paleoecology, Queen's University Belfast.

Baillie, Mike; 2008, Chemical signature of the Tunguska Event in Greenland Ice; Greenland International conference: 100 years since Tunguska Phenomenon: past, present and future; Moscow, p. 80. Baillie correlated a peak of ammonium ions (NH4+) with several comet strikes, including the 1918 Tunguska impact in Russia. The peak occurred within a month of the strike.

Barbiero, Flavio; 1999; On the possibility of instantaneous shifts of the poles; New scenarios on the evolution of the solar system and consequences on history of Earth and man; Milano and Bergamo, June 7-9, Spedicato and Notarpietro, eds., pp 55-72. He presents the physics that allows an impact from an object only 3 km wide to cause a pole shift by briefly confusing the seas, which take off in the direction of a new pole, while Earth revolves in the opposite direction to conserve momentum.

Graybill, Donald A.; Methuselah Walk; NOAA dataset PILO, ITRDB CA535. Great Basin Bristlecone Pine tree rings from -6000 to 1979 AD, the gold standard in tree ring research because it has such great sensitivity to climate change. Graybill organized and published the collaborative efforts of three tree-ring collectors, Thomas P. Harlan, Valmore C. LaMarche Jr., and Marvin A. Stokes at the Southern Arizona Research Association.

Hapgood, Charles,1970, The Path of the Pole, Chilton Books. Hapgood argued that the poles changed position three times in the recent past, but could not arrive at a mechanism. Ice caps are highly eccentric, Siberia had no ice cap, humans lived in the New Siberia Islands, Antarctica was partially free of ice. Although widely criticized, if anything he was too conservative as there have been many more pole shifts from impacts, some of which wiped out the large animals.

Mandelkehr, Maurice M.; 2006; The 2300 BC Event, in three volumes: Archaeology and Geophysics, the meteoroid stream, Vol. I; Mythology, the eyewitness accounts, Vol II and III; Outskirts Press, Inc., Denver. It's a wonder anyone survived. He found corroboration in the most unlikely places, like an abrupt change in the wandering path of the magnetic pole.

Mayewski, Paul Andrew, et. al; 1990; An ice core record of atmospheric response to anthropogenic sulphate and nitrate; Nature 346: 554-556. Data published on line by NOAA as GISP2 Ions, Deep Core. Glacier Research Group sampled the core over a depth from 2 to 3040 meters, with meters 2 to 96 having B core data, the remainder being D core. Each sample melted the center portion from a 3.5 x 3.5 cm section of ice. Each sample lists the top and bottom depth, from which a separate file calculates the age for each depth in ice-age years that begin and end in the summer when no snow falls. Normally this is of no consequence, but for this particular project, I converted ice age years to calendar years so that I could determine if NH_4 spikes occurred in spring or fall. Volcanic emissions captured in ice layers has been cross-calibrated with tree rings to give an accurate chronology for the period under consideration.

Patten, Donald W.; 1990; The 108-year cyclicism of ancient catastrophes, Pacific Meridian Publishing Co., Seattle, republished 1994. Patten proposes a 108-year cycle of near collisions between Earth and Mars with many corroborating details that explain much of Velikovsky's 'Worlds in Collision'.

Patten, Donald W. and Samuel R. Windsor; 1996; The Mars-Earth Wars (Ending in 701 B.C.E); Pacific Meridian Publishing Co., Seattle. Online at www.creationism.org. An extensive elaboration of the original paper.

Patten, Donald; 1999; The periodic cyclicism of ancient catastrophes; Proceedings of the conference New Scenarios on the Evolution of the Solar System and Consequences on History of Earth and Man; Milano and Bergamo, June 7-9, Spedicato and Notarpietro, eds., pp 110-127. This long paper summarizes his book with extended descriptions of 14 catastrophes, and drops his proposed mechanism for pole shifts.

Spedicato, Emilio; 2004; On the reversal of the rotation axis of Earth, a first order model; Report DMSIA 06/04 University of Bergamo. Calculates the effect of an axis reversal on length of year, length of day, radius of Earth from Sun.

Spedicato, Emilio: 2012; From Nibiru to Tiamat, an astronomic scenario for earliest Sumerian cosmology; Nov 2012, Univ. of Bergamo. Presents historical evidence that Mars was once a moon of Earth, how Moon was captured, how Mars was lost when a defunct planet Nibiru flew past, with dates.

Velikovsky, Emmanuel; 1950; Worlds in Collison; Macmillan Publishers. It topped the NY Times best seller list for eleven weeks, but generated such antipathy in the scientific community that Macmillan transferred the book to Doubleday within two months. Sixty years later it remains the most comprehensive collection of observations of celestial catastrophes from around the globe, lacking only a time frame for each event and an explanation of what actually occurred. Forty-six years passed before Donald Patten cracked the enigma by counting the craters of Mars and modelling an elliptical orbit of Mars that lasted 720 days, twice the period of Earth. But this was only part of the problem, as Mars did not closely approach Earth the year of Exodus. Venus was also involved, and a missing planet that exploded leaving the asteroid belt.

Appendix 1: Known Catastrophe Dates

701 BC, March

The flyover occurred on the night of the Passover, Mar 20-21, during the 14th year of the reign of King Hezekiah, in 701 BC (Edwin Thiele)

864 BC, October

The Elijah Catastrophe was in the middle of King Ahab's 21-year reign (874/873-853), thus 863 BC (Patten).

972 BC, October, 2 years early

King David preceded King Solomon (971-931). The catastrophe occurred in the next to last year of King David's reign, thus 972 BC. (Edwin Thiele) Descriptions in II Samuel 22 and 24, I Chronicles 21, Psalm 18.

1404 BC, October

The day the sun stood still (Joshua) occurred in 1403 BC. Start with Exodus in 1447 BC. They were 40 years in the wilderness (1407), 1 year in conquest of Gilead (1406), 1 year for conquest of Jericho (1405), fought several armies then next year at a propitious time (1404). (Patten)

1447 BC, March

This was not a close encounter with Mars, whose flyby was in 1457 BC, but lurks on the edge of the ten-year window of Mars-related strikes.

Exodus occurred 480 years before the laying of the foundation of the First Temple of Solomon (I Kings 6:1). The foundation was laid in 967 BC, the fourth year of Solomon's reign (971 to 931). Adding 480 to 967 gives 1447 BC for Exodus. (Edwin Thiele)

2300 BC, October

In *The 2300 BC Event*, Maurice M. Mandelkehr documented the global destruction that ended the Bronze Age, including numerous references to around 2300 BC and exactly 2300 BC. For a time, Earth wore a reflective icy ring like a mirror that lit up the night sky.

3161 BC, March

Flood occurred 600 years after the start of the Jewish calendar in 3761 BC. (Torah) Confirmed by an offset from a known date by an Aztec historian (Spedicato).

3761 BC, March

Start of Jewish calendar. 25th of Elul, 3761 BC, considered first day of creation. 1st of Tishrei, 3761 BC, considered the sixth day of creation (Rosh Hashanah Day 1), on which God created Adam and Eve. (Torah)

Appendix 2: List of each flyby of Mars

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Northern hemisphere strikes from flybys of Mars

Julian calendar, years BCE with year 0. Outlined cells lack GISP2 data. Known dates in sepia. Strikes in **bold**.

Flyby Year	Mo	Interval Yr	-10	-8	-6	-4	-2	0	2	4	6	8	10	Notes
7207.8	Oct													
7136.3	Mar		7126.3	7128.3	7130.3			7136.3						
7071.8	Oct	136	7061.8					7071.8						
7000.3	Mar	136				6996.3				7004.3				
6935.8	Oct	136	6925.8		6929.8		6933.8		6937.8				6945.8	
6864.3	Mar	136	6854.3		6858.3		6862.3	6864.3		6868.3		6872.3		
6799.8	Oct	136						6799.8	6801.8	6803.8				
6728.3	Mar	136						6728.3		6732.3				
6663.8	Oct	136	6653.8			6659.8	6661.8	6663.8		6667.8		6671.8		
6592.3	Mar	136		6584.3	6586.2	6588.3	6590.3			6596.3			6602.3	
6527.8	Oct	136		6519.8			6525.8	6227.8		6531.8			6237.8	
6456.3	Mar	136		6448.3			6454.3	6456.3	6458.3		6462.3		6466.3	
6391.8	Oct	136		6381.8			6389.8	6391.8	6393.8	6395.8				
6320.3	Mar	136			6314.3	6316.3			6322.3		6326.3			
6259.8	Oct	132	6249.8			6255.8	6257.8	6259.8		6263.8		6267.8	6269.8	
6188.3	Mar	132						6188.3					6198.3	
6127.8	Oct	132				6123.8			6129.8			6135.8		
6056.3	Mar	132				6052.3			6058.3	6060.2				
5995.8	Oct	132							5997.8					
5924.3	Mar	132		5916.3		5920.3				5928.3				
5863.8	Oct	132				5859.8	5861.8						5873.8	
5792.3	Mar	132			5786.3		5790.2	5792						
5731.8	Oct	132						5729.8		5735.8		5739.8		
5660.3	Mar	132		5652.3		5656.3		5660.3						
5599.8	Oct	132	5589.8	5591.8		5595.8						5607.8	5609.8	
5528.3	Mar	132								5532.3				
5467.8	Oct	132	5457.8			5463.8		5467.8						
5400.3	Mar	128				5396.3	5398.3			5404.3	5406.3	5408.3	5410.3	
5339.8	Oct	128		5331.8							5345.8		5349.8	
5272.3	Mar	128				5268.3	5270.3				5278.3	5280.3		
5211.8	Oct	128	5201.8	5203.8	5205.8		5209.8	5211.8		5215.8	5217.8			
5144.3	Mar	128	5134.6											
5083.8	Oct	128						5083.8						
5016.3	Mar	128				5012.3					5022.3	5024.3		
4955.8	Oct	128							4957.8					
4888.3	Mar	128			4882.3									
4827.8	Oct	128				4823.8								
4760.3	Mar	128			4754.3	4756.3		4760.3			4766.3			
4699.8	Oct	128				4695.8		4699.8		4703.8	4705.8		4709.8	
4632.3	Mar	128											4642.3	
4571.8	Oct	128	4561.8											
4504.3	Mar	128												
4447.8	Oct	124						4447.8		4451.8	4453.8			
4380.3	Mar	124	4370.3	4372.3	4374.3	4376.3				4384.3		4388.3	4390.3	
4323.8	Oct	124		4315.8										
4256.3	Mar	124		4248.3				4256.3		4260.3	4262.3	4264.3	4266.3	
4199.8	Oct	124								4203.8	4205.8			
4132.3	Mar	124									4138.3			
4075.8	Oct	124		4067.8		4071.8								
4008.3	Mar	124	3998.3			4004.3		4008.3		4012.3				
3951.8	Oct	124	3941.8		3945.8	3947.8		3951.8				3959.8		3952 Bede's cal
3884.3	Mar	124	3874.3		3878.3							3892.3	3894.3	
3827.8	Oct	124		3821.8	3823.8	3825.8	3825.8							
3760.3	Mar	124		3752.3	3754.3	3756.3		3760.3	3762.3	3764.3		3768.3	3770.3	3761 Hebrew cal
3703.8	Oct	124		3695.8		3699.8		3703.8						

Northern hemisphere strikes from flybys of Mars

Julian calendar, years BCE with year 0. Outlined cells lack GISP2 data. Known dates in sepia. Strikes in **bold**.

Flyby Year	Mo	Interval Yr	-10	-8	-6	-4	-2	0	2	4	6	8	10	Notes
3640.3	Mar	120						3640.3			3646.3			
3583.8	Oct	120												
3520.3	Mar	120		3512.3				3520.3				3528.3		
3463.8	Oct	120		3459.8										
3400.3	Mar	120		3392.3		3396.3								
3343.8	Oct	120			3337.8			3343.8				3351.8	3353.8	
3280.3	Mar	120	3270.3											
3223.8	Oct	120	3213.8							3227.8				
3160.3	Mar	120						3160.3	3162.3					3161 world flood
3103.8	Oct	120	3093.8	3095.8						3107.8	3109.8			
3044.3	Mar	116			3038.3		3042.3	3044.2	3046.3		3050.3	3052.3	3054.3	
2987.8	Oct	116							2989.8			2995.8	2997.8	
2928.3	Mar	116					2926.3							
2871.8	Oct	116												
2812.3	Mar	116								2816.3		2820.3		2817 end Akkad.
2755.8	Oct	116			2749.8	2751.8								2760 end Old King
2696.3	Mar	116				2692.3						2704.3		
2639.8	Oct	116		2631.8	2633.8	2635.8		2639.8		2643.8	2645.8	2647.8		
2580.3	Mar	116	2570.3				2578.3			2584.3				2585 end Kish
2523.8	Oct	116	2513.8	2315.8										
2464.3	Mar	116				2460.3			2466.3	2468.3	2470.3		2474.3	
2411.8	Oct	112			2405.8	2407.8						2419.8		
2352.3	Mar	112			2346.3					2356.3	2358.3			2357 China beg
2299.8	Oct	112			2293.8		2297.8	2299.8						2300 end Bronze Age
2240.3	Mar	112				2236.3		2240.3	2242.3			2248.3	2250.3	
2187.8	Oct	112										2195.7		
2128.3	Mar	112	2118.3			2124.3	2126.3							
2075.8	Oct	112	2065.8			2071.8		2075.8					2085.8	
2016.3	Mar	112			2010.3						2022.3		2026.3	
1963.8	Oct	112				1959.8								
1904.3	Mar	112								1908.3				
1851.8	Oct	112							1853.8				1861.8	
1792.3	Mar	112												
1739.8	Oct	112				1735.8				1743.8	1745.8		1749.8	
1680.3	Mar	112			1674.3			1680.3		1684.3	1686.3			
1627.8	Oct	112						1627.8						1628 Santorini
1568.3	Mar	112	1558.3				1566.3	1568.3						1567 end 13th dynt
1515.8	Oct	112			1509.8	1511.8	1513.8		1517.8	1519.8				
1456.3	Mar	112	1446.3										1466.3	1447 Exodus
1403.8	Oct	112	1393.8			1399.8		1403.8						1404 Joshua long day
1348.3	Mar	108		1340.3		1344.3				1352.3				
1295.8	Oct	108		1287.8		1291.8		1295.8		1299.8			1305.8	1296 end 18th dyn
1240.3	Mar	108						1240.3						Gideon
1187.8	Oct	108			1181.8	1183.8					1193.8		1197.8	
1132.3	Mar	108												
1079.8	Oct	108		1071.8				1079.8		1083.8			1089.8	1080 Samuel
1024.3	Mar	108	1014.3			1020.3		1024.3	1026.3	1028.3	1030.3			
971.8	Oct	108			966.5			971.8		975.8		979.8	981.8	972 David-Gad
916.3	Mar	108		908.3	910.3		914.3		918.3			924.3		
863.8	Oct	108		855.8		859.8	861.8	863.8				871.8		864 Elijah-Homer
808.3	Mar	108							810.3			816.3	818.3	
755.8	Oct	108	745.8	747.8	749.8	751.8		755.8	757.8	759.8	761.8	763.8	765.8	756 Jonah-Amos
700.3	Mar	108						700.3			706.3	708.3		701 Isaiah-Hesoid