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Recovering the Lost World, A Saturnian Cosmology -- Jno Cook Appendix E: Polar Relocations.



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The Source of the Problem

It is ubiquitous for the oldest legends to state that the Earth at one time flipped over, although this is also stated as the interchange of north and south compass directions, or east and west. Velikovsky's *Worlds in Collision* includes many examples (I'll list some below), but ultimately they are confusing, for no particular time period is pointed to. Most are generic statements, often introduced with "at one time."

Velikovsky attempted to use this information to suggest that the Earth indeed did turn over, and placed it in the era of 1500 BC, during the Exodus of Moses. There are only a few references which might point to 1500 BC, and even if coupled to the devastation and orbital changes of 1492 BC, they do not add up.

The Earth never turned over, although it likely did so partially. But it sure looked like the Earth flipped over: the compass directions were interchanged, and the Sun now rose where it had set the previous day. I'll suggest that nearly all the references to a change in compass directions, or the Earth turning over, refer to the events of 3147 BC. Other changes refer to 2349 BC, to 747 BC, and to 686 BC. The details of the narratives almost always point to actual events, even if dates are never given.

For people throughout the world, who understood the large globe above the north horizon as the land of the Gods which was attacked by another God in 3147 BC and subsequently removed to the night skies of the south. This scenario was entirely different from our concepts. What was seen was the sudden relocation of the land ("earth") in the north to a location in the south. Saturn had been seen from below, surrounded by its rings. When Saturn was moved to the south (being flung away from its close orbit around the Sun), it took on a completely different look.

The Earth, released from the grip of Saturn, immediately started to move up toward the Sun. Within weeks Saturn was seen from a completely different perspective. For the first time Saturn was seen with its rings edge-on or nearly so. The change over a period of weeks or months was noted: Saturn had teetered, and fell over. Saturn -- "the land" -- had fallen, had flipped over.

The fifth-dynasty Egyptian tomb texts of Unas (2345 BC) relate that his majesty, Osiris, died when he fell on his side at the riverbank. The river is the ecliptic, not the Nile.

The Maya *Chilam Balam* books read,

"Then Oxlahun-ti-ku [Saturn] was seized, ... and he was (thrown) on his back as well."

The removal of Saturn to the south skies was also seen as a reversal of north and south, or east and west. But there was no "east" and "west." That is a modern concept. There was only the main direction where the Gods resided and the land, and the left and right.

All the legendary snippets which have come to us have been translated to our conceptual base, or already recast in terms of east and west. In Mesoamerica, at a much later time, the main cardinal direction was the east where all the planets and stars could be seen to rise throughout the year. At 20 degrees latitude the Sun and planets do not swing as wildly between southeast and northeast in rising as they do at northern latitudes. The north and south in Mesoamerica were known as "the left" and "the right" (east was the forward direction). One can easily translate such directional concepts to the period shortly after 3147 BC, when the left and the right direction had interchanged.

There are similar concepts of "rising" and "setting" which have been altered to what we consider the correct order of nature. But, as Talbott and Cardona have pointed out, we use "rising" (and even "east") and "setting" for words that originally meant "brightening" and "dimming," as Saturn was experienced first during the night and then during the daytime.

Lastly, once we arrive in the period after 1500 BC, we have to allow for metaphorical use of "the Earth turning over" as a substitute for "calamity." The simile is a giveaway. The Egyptian scribe Ipuwer [page 120 of *Worlds in Collision*, Pocket Books edition] wrote after 1500 BC, "the land turned round like a potter's wheel." But Velikovsky inserts the word "over" in brackets after the first quoted use of Ipuwer's "turned round." A potter's wheel does not "turn over," it rotates. Subsequently Velikovsky simply quotes "turned over," rather than "turned round."

[page 88] *"According to the Lapland cosmogonic story ... the angry God spoke, 'I shall reverse the world, I shall bid the rivers flow upward; I shall cause the sea to gather itself up into a towering wall which I shall hurl upon your wicked earth-children, and thus destroy them and all life. ... (Jubmel) with one strong upheaval, made the earth-lands all turn over.'"*

[page 104] *"The tradition of the Cashina, the aborigines of Western Brazil, is narrated as follows; 'the lightnings flashed and the thunders roared terribly and all were afraid. Then the heaven burst and the fragments fell down and killed everything and everybody. Heaven and earth changed places. Nothing that had life was left upon the earth.'"*

The references are both to the events of 3147 B and 2349 BC. The "towering wall" is the fall of the Absu in 2349 BC. Similarly "bursting of heaven" details 2349 BC.

[page 119] *"Pomponius Mela, a Latin author of the first century, wrote: 'The Egyptians pride themselves on being the most ancient people in the world. In their authentic annals ... one may read that since they have been in existence, the course of the stars has changed direction four times, and the sun has set twice in the part of the sky where it rises today.'"*

The reference is to the brief reversals of the travels of the Sun, twice in the 7th and 8th centuries BC, well within memory. Others had been forgotten. Herodotus presented the same information as Pomponius Mela in the book *Histories*. The change in the direction of the Sun's travel accounts also for the four changes in the dome of the stars. There is nothing in this statement that the reversals were permanent. The movement of the stars was very real, however.

[page 120] *"The Magical Papyrus Harris speaks of a cosmic upheaval of fire and water when 'the south becomes north, and the earth turns over.'"*

The reference is to events of 3147 BC.

[page 120] *"The texts found in the pyramids say that the luminary 'ceased to live in the occident, and shines, a new one, in the orient.' [Velikovskiy adds:] After the reversal of direction, whenever it may have occurred, the words 'west' and 'east' were no longer synonyms, and it is necessary to clarify references by adding: 'the west which is at the sun-setting.' It was not mere tautology, as the translator of this text thought."*

The reference is to events of 3147 BC, especially if "a new one" is correctly translated. The "new one" is Jupiter.

[page 121] *"In the Ermitage Papyrus [Leningrad, 1116b recto] also, reference is made to a catastrophe that turned the 'land upside down; happens that which never (yet) had happened.'"*

Velikovskiy added:

"It is assumed at that time -- in the second millennium -- people were not aware of the daily rotation of the earth, and believed that the firmament with its luminaries turned around earth; therefore the expression, 'the earth turned over,' does not refer to the daily rotation of the globe. Nor do these descriptions in the papyri of Leiden and Leningrad leave room for figurative explanation of the sentence, especially if we consider the text of the Papyrus Harris -- the turning over of earth is accompanied by the interchange of the South and North Poles."

True, these are not 'figurative' descriptions. They were actual, but the references are to events of 3147 BC. Poles were not known to the ancients. Directions were.

[page 121] *"Harakhte is the Egyptian name for the western sun. As there is but one sun in the sky, it is supposed that Harakhte means the sun at its setting. But why should the sun at its setting be regarded as a deity different from the morning sun? The identity of the rising and the setting sun is seen by everyone. The inscriptions do not leave any room for misunderstanding: 'Harakhte, he riseth in the west.'"*

"The Sun" is generally misinterpreted as our current Sun. In most societies "the Sun" was Jupiter during hundreds of years after 3147 BC. But the sun which rises in the northwest is Saturn. Saturn rotated counterclockwise in a circle around the North Pole. During the day it would show up faintly in the northeast, like the new moon against the blue sky, and then travel counterclockwise above the pole star.

At nightfall Saturn would be in the northwest, and would brighten, because it was now illuminated by the (normal) Sun. This is the location, of course, of the setting of the normal Sun, at least in summer at northern latitudes. Saturn would then proceed to rotate toward the east, below the pole star. This is also why many nations of the eastern Mediterranean started their day at nightfall.

This is the confusion we see about the later (regular) Sun rising where previously it had set. It might also apply to Jupiter which traveled on the ecliptic, and thus would be seen to rise in the east or northeast -- not in the northwest where Saturn had first brightened -- in effect rising.

[page 122] *"Plato wrote in his dialogue, The Statesman: 'I mean the change in the rising and the setting of the sun and the other heavenly bodies, how in those times they used to set in the quarter where they now rise, and they used to rise where they now set. ...'"*

This is a very general statement, which could be in reference to a number of eras in the past. The "heavenly bodies" is our terminology. What Plato meant is unsure. Probably he meant that Saturn used to "rise" -- that is, brighten -- while in the northwest at the start of nightfall.

[page 122] *"According to a short fragment of a historical drama ("Atreus") by Sophocles, the sun rises in the east only since its course was reversed. 'Zeus ... changed the course of the sun, causing it to rise in the east and not in the west.'"*

"Not in the west," is added to the concept of the change in the Sun. Zeus here is Jupiter, who removed Saturn (the "Sun") from the northwest in 3147 BC and substituted himself (as the "Sun") during the following 500 years, but now appearing (as "rising") in the east skies as the Earth overtook Jupiter on its travels on the ecliptic. Every night, for months, Jupiter would thus also travel from east to west across the night sky.

There is a similar problem with the Greek name for the lands northwest of the eastern Mediterranean, "Europa" which means "land of the sunrise." This has nothing to do with the "Sun" rising in the west. It is the brightening of Saturn (the "Sun") before 3147 BC seen in the northwest from Greece. It is amazing that these concepts were extant nearly 3000 years later (and the name is still in use 5000 years later).

[page 124] *"Caius Julius Solinus, a Latin author of the third century of the present era, wrote of the people living on the southern borders of Egypt: 'The inhabitants of this country say that they have it from their ancestors that the sun now sets where it formerly rose.'"*

[page 125] *"In the Syrian city Ugarit (Ras Shamra) was found a poem dedicated to the planet-goddess Anat, who 'massacred the population of the Levant,' and who 'exchanged the two dawns and the positions of the stars.'"*

I would guess this is Venus and the "massacre" refers to the blood in the sky (the "Day of the Dead") in 2349 BC. The "two dawns" is then likely a reference to the destruction by Venus in 1492 BC, although I have no idea what that is about, except, as I have earlier suggested, the fact that the Earth perhaps seemed to have partially inverted at the time of the Exodus. The apparent near inversion was due to the lack of sunlight, and the change in climate, which lasted some 40 years as the Bible and Mesoamerica tell.

[page 120] *"The reversal of east and west, if combined with the reversal of north and south, would turn the constellations of the north into constellations of the south, and show them in reversed order, as in the chart of the southern sky on the ceiling of Senmut's tomb. The stars of the north would become the stars of the south; this is what seems to be described by the Mexicans as the 'driving away of the four hundred southern stars.'"*

The "four hundred stars" ("400 lost boys") are recognized from Mesoamerican (Maya) sources as the Pleiades as well as all of the southern stars which showed up at the same time in 2349 BC. But "400" generally meant "lots of" in Mayan; it is often translated as "millions." But this probably deals with the change in the look of the sky in 685 BC, which I have detailed in the chapter "The Sibylline Star Wars."

The graphic depictions of stars by the Egyptians have a long tradition of utter disinterest in the heavens. Starting from the sixth dynasty most often stars are depicted as so much wallpaper in tombs. Consider also the inaccuracies of the Egyptians in depicting the circumpolar constellations in circa 1500 BC, and the use of 24-day months (shown in Senmut's tomb, circa 940 BC). The reversal of the southern constellations cannot be taken seriously. It could only be accomplished by stopping and reversing the Earth's spin. Let me point out that if the Earth turns over, the Sun and the stars would still rise in the east, and in the same order.

On the other hand, a reversed chart does not surprise me at all. I should point out that star charts manufactured today often reverse directions also, and have done so consistently since late antiquity.

[page 126] *"The Eskimos of Greenland told missionaries that in an ancient time the earth turned over and the people who lived then became antipodes."*

[page 126] *"In the Tractate Sanhedrin of the Talmud it is said: 'Seven days before the deluge, the Holy One changed the primeval order and the sun rose in the west and set in the east.'"*

This is the condition directly before and after 3147 BC, when Jupiter yanked Saturn from its orbit, while the Earth, released from below Saturn, continued on a path around the Sun. Saturn, held to be the Sun ("Ra") was seen in the northwest before relocating to the south skies and diminishing in brightness. Jupiter (the "Bull of heaven"), outside the orbit of Earth, had already blazed up, and subsequently was recognized as Ra, the Sun.

I have earlier taken note of the fact that Jupiter apparently blazed up seven days before the flood of 3147 BC. The directions, east and west, are likely to be correct as the initial stage of the seven days of blinding light. I have used this relationship of Saturn and Jupiter to plot the changes in 3147 BC.

[page 132] *"On the Andaman Islands the natives are afraid that a natural catastrophe will cause the world to turn over."*

[page 132] *"In Greenland also the Eskimos fear that the earth will turn over."*

The references are, again, to the event of 3147 BC.

[page 132] *"The Egyptian papyrus known as Papyrus Anastasi IV contains a complaint about gloom and the absence of solar light; it also says: 'The winter is come as (instead of) summer, the months are reversed and the hours disordered."*

This refers to a period of heavy clouds (or a shadow), lasting for years, which appeared after an interplanetary lightning strike traveled through an ocean to cause vast clouds in the atmosphere, or across forests to cause carbon dust to be lifted into the stratosphere. This would also happen when the Earth's polar axis took a long time to swing through a loop, which in effect would pass Earth through all the seasons in short order.

Gloom, of course, would make even a summer feel like winter. But the complaint is likely about the large climatic change after 1492 BC, and possibly a longer than usual gyroscopic reaction since Earth was impacted with a repulsive electric shock just below the equator in the eastern Pacific. The lever arm of the electric force was short, but it also hit closer to the Earth's center, causing a 30 percent increase in the orbit. This in itself changed climatic conditions worldwide. Grapes no longer grew in Scandinavia.

[page 132] *"'The breath of heaven is out of harmony. ... The four seasons do not observe their proper times,' we read in the Texts of Taoism."*

The reference is to events of 685 BC. The Taoist doctrine is specifically a reaction to the changes of that year, and a suggested cause.

[page 315] *"In the tale of the southern Ute Indians, the cottontail is the animal that is connected with the disruption of the movement of the sun." ... "There is one instance more in the Indian story of the sun being impeded on its path and the ensuing world conflagration. Before the catastrophe, 'the sun used to go round close to the ground.' the purpose of the attack on the sun was to make 'the sun shine a little longer: the days were too short.' After the catastrophe 'the days became longer.'"*

This beautifully conflates two events close together in time, the Earth shock of 686 BC (involving Mercury), and the change in the axis in 685 BC. The longer days are in reference to the year after 685 BC, when the days would be longer, and the Sun would ride higher in the sky. Check this with the program [sun.html] for the latitude involved (about 30 degrees) and an axial inclination of 30 degrees. The Utes at that time lived much further north, where the difference between the travel of the Sun in summer would have been even more striking.

[page 317] *"Hindu astronomical tablets composed by the Brahmans in the first half of the millennium before the present era shows a uniform deviation from the expected position of the stars at the time the observations were made (the precession of the equinoxes being taken into consideration). Modern scholars wondered at this, in their opinion, inexplicable error. In view*

of the geometrical methods employed by Hindu astronomy and its detailed method of calculation, a mistake in observation equal to even a fraction of a degree would be difficult to account for. In Jaiminiya-Upanisad-Brahmana it is written that the center of the sky, or the point around which the firmament revolves, is the Great Bear."

There are two ideas expressed here. That the axis of rotation of Earth was in the Great Bear before 685 BC, is entirely correct. The second piece of information, about tablet which "shows a uniform deviation from the expected position of the stars," is also correct. These are known as the *Panchasiddhantika* tables recorded before 685 BC but not published until AD 600. They were saved for us despite the vagaries of time, when all its companion observations were probably discarded a 1000 years earlier.

[page 318] *"We possess the Chinese records of the longest and shortest shadows at noontime. These records are attributed to -1100. 'But the shortest and longest shadows recorded do not really represent the true lengths at present.' The old Chinese charts record the longest day with a duration which does not represent the various geographical latitudes of their observatories,' and therefore the figures are supposed to have been those of Babylonia [at 32.55 degrees latitude], borrowed by ancient Chinese, a rather unusual conjecture."*

Again, probably entirely correct for the era before 685 BC. (But these certainly were not "borrowed" records from Babylonia.)

Considering that throughout most of antiquity the Earth was held to be shaped like a pancake, it is inconceivable how statements about this pancake get transformed into a sphere by modern translators. I would suggest a wide range of misreadings, based on our preconceptions of the Earth as a globe.

Some of the above material does not deal with the Earth turning over, but has reference to the change in the inclination of the Earth's axis in 685 BC, something Velikovsky and most other investigators were not at all aware of.

Velikovsky's Moving Pole

Because the recent glaciations have been centered at odd locations away from the North Pole, a number of people have concluded that the North Pole shifted and the crust of the Earth followed -- sliding over the core to new locations. Velikovsky first invoked this idea in *Worlds in Collision*, and a number of writers of alternative cosmology tracts have followed suit. I have shown that glaciation had nothing to do with the North Pole. However, let me discuss these notions anyway. The following dismisses the concept of any permanent relocation of the Earth's spin axis with respect to the landmasses.

Two episodes of "pole shifting" were suggested by Immanuel Velikovsky. One instance, which concerns suspected events of circa 1500 BC, I disagree with and will discuss directly below. A second instance centers on the 8th century BC, which I will also expand on further below.

Velikovsky's suggestion in *Worlds in Collision* is that the Earth may have flipped over in 1500 BC, in addition to having the pole relocated by some 20 degrees. In support of this, Velikovsky supplies data for two changes of latitude for locations in the Middle East. The data, however, are from after 747 BC. I will address the changes in latitude first.

Data from 747 BC

Velikovsky's attempts to suggest that the Earth might have turned over are first of all based on Herodotus's information from the priests of Egypt, "Four times the Sun has set where it now rises." -- in effect that the path of the Sun had changed. The ancients could probably figure out that these represented two short-term changes in the path of the Sun, not a permanent condition. This happened in 747 BC and in 686 BC, accompanied by an Earth shock. Even so, if the Earth turned upside down, the Sun would still rise in the east, and would not "rise where it now sets." Spin does not stop. Perhaps one of these references is to the 40 days in 685 BC. [note 1]

The recollection of the priests was likely from a few hundred years earlier, not from three thousand years earlier. The more likely explanation, then, for this statement by the priests of Sais is that it reflects how the Sun, after rising, reversed direction and set where it had risen, to rise again from the same compass point shortly afterwards. That happened twice during the 8th and 7th centuries BC, and something similar may have also been recalled from 1492 and 1440 BC, although doubtful. In that it might have taken a day or even a few days, it would have been frightening. Herodotus writes this paragraph directly after a discussion of the demise of Sennacherib's army in 686 BC -- the year of the second Earth shock in the 8th and 7th centuries BC.

The *Iliad* and the *Odyssey* both record a Goddess holding back the sun at dawn or sunset for some hours only. Two Chinese records for the events of 686 BC state, "at night the stars fell like rain," which can be understood as an axial correction of short duration induced by a gyroscopic reaction.

Velikovsky also suggested that after the events of the 8th and 7th centuries BC the axis of the Earth no longer pointed in the same direction in space. That is correct, but was not the result of a close call by a planet. He cites the number of Greek and Roman writers who maintain that the center of the sky was previously located in "the wain" -- the constellation Ursa Major. Along with other sources, these all point to a change in the era of the 7th century BC. This specific change (in 685 BC) is dealt with in the chapter "The Tablets of Ammizaduga."

Other specific evidence offered by Velikovsky reduces the possible changes of the location of the geographical North Pole quite a bit. He cites evidence that Babylon moved 2.5 degrees south. Earlier records, before the 7th century BC, show Babylon located at 34.95 degrees. Today, and since most of the seventh century BC, it is located at 32.55 degrees latitude. I have discussed this in the chapter "Hezekiah and Babylon." It resulted from the change in the inclination of the Earth's axis in 685 BC. The invalid latitude was based on erroneous data for the length of the day -- in fact, the only error that could have been made. Babylon never moved. [note 2]

The second suggestion for a geographical relocation of the North Pole is from the curious prediction by Isaiah that some 10 measures of a shadow gnomon would be returned as a sign from God that king Hezekiah would live another 15 years. Because the gnomon had been built under a previous king, the Bible reads, "*I will bring again the shadow of the degrees, which is gone down in the sun-dial of*

Ahaz, ten degrees backward," it has been assumed that the "degrees" which disappeared, did so at an earlier time, under the former king, Ahaz. This is an unwarranted addition to the facts as presented in the Bible passage.

The meaning of the passage changes if it is understood that the "lost degrees" were returned in the very same year that they were lost. Again we are dealing, in simple terms, with the change in the inclination of the Earth's axis in 685 BC, which moved the equinoxes forward by 15 days. Isaiah recognized this in the fall of 685 BC, when the Sun stood lower in the sky on the expected day of the equinox, but assumed the correct angle 15 days later. God's promise to return the "shadow of the degrees" was accomplished on March 21, 15 days after the expected spring equinox March 6. I have detailed this also in the chapter "Hezekiah and Babylon."

Lastly, Velikovsky mentions Ptolemy's star chart of the second century AD, which leaves off a number of stars seen at the north horizon, and adds other stars in the south, different from what stars are visible from Alexandria today. This suggests that Alexandria changed location with respect to the North Pole, perhaps after the time of Ptolemy -- the second century AD. We do not have a single record of this. The "additional stars" of the south skies include only a few well-known stars. If used for navigation, additional southern stars would have been mostly useless to Mediterranean navigators. The Southern Cross could be seen at the latitude of Baghdad until circa AD 700, however, after which it started to slip below the southern horizon. Far northern stars would not be needed. I have detailed the use of stars in navigation in "Olmec Alignments."

The implications we are asked to reach by Velikovsky do not hold up against the known fact that the star chart of Ptolemy -- which remained in use in Europe for over a thousand years -- was based on older sources, most likely Chaldean (Babylonian) records which were turned over to Alexander in 331 BC in Babylon. (These records supposedly dated to 2349 BC.) Ptolemy himself attributes Hipparchus (146 to 127 BC) as his source. Hipparchus made his observations in Asia Minor, north of Alexandria, and also would have constructed the chart for navigation. Star charts were certainly needed after 685 BC, when Sirius no longer traveled just below the equatorial.

These data points are either disproven or completely inconclusive. I do not think the Earth turned over in the 8th century BC as either claimed or insinuated by Velikovsky, although certainly the axis of rotation shifted permanently to point to a different location in space, but not until after 685 BC, and for completely different reasons. This did not relocate the Earth's North Pole geographically.

Earth as a Gyroscope

The Earth is a gyroscope, and reacts to outside forces as a gyroscope. If an external torque is momentarily applied to the Earth as a force offset from the center, in effect tipping the rotational axis, the Earth will produce a reaction torque which will sweep the pole through a circle to correct the imbalance and bring the pole back to its previous location. Such a reaction does not disrupt the normal rotation (spin). To stop the Earth's spin would take an absolutely enormous amount of energy. Spin simply does not stop.

Let me point out also that the Earth is not a toy top or gyroscope set on a table, and does not react the same way to an impulse. There is absolutely no comparison between a toy gyroscope and a sphere spinning unsupported in space.

A top is subject to a normal force directed up from the bottom, and the force of gravity along the same axis. As you nudge the top, 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. Nudge it more and it falls over, but since it is spinning, it will turn upside down instead. The top will do this when the force of sliding friction at the point of contact has been overcome. Sliding friction is only ten percent or so of the weight of the top.

You can play all you want, but until you remove the top away from gravity, and off the table, it will not act like Earth under the influence of an external impulse. It would be better to make a comparison to a gyrocompass, which is a gyroscope gimbaled on three axes. It will remain unperturbed when any of the axes are moved.

Data from 1500 BC

Thus the reaction to an external force, as from the sudden repulsive electrical field of another planet, at a distance of maybe millions of miles (see Appendix B, "The Celestial Mechanics"), would be a sweep of the pole through the sky which will make it look as if the Sun is traveling in unexpected ways. The disturbed path of the Sun in 1492 BC was noted in statements from the Mediterranean region that darkness extended over three days, from China that the Sun did not set for three days, and from Mesoamerica that the Sun just showed above the horizon for days on end. Velikovsky suggests that these recollections apply to 1500 BC, and I might agree, for certainly the Earth's orbit increased dramatically at that time.

The Midrashim commentary on Exodus suggests that in 1492 BC the sweep of the pole, "when the stars stopped moving," took a little over a year rather than three days. But it is not certain if the stars were seen at all, and certainly the stars would not relocate, even with an increase in the Earth's orbit. The Egyptian *Ipuwer Papyrus*, apparently written a few months after the initial disruption of 1492 BC, makes no claims for how long a sweep of the pole might have taken, but notes that the seasons were out of order -- which means that the change was noticed within 3 to 6 months. It is also likely that the "change in the seasons" in 1492 was entirely due to the sudden cloud cover which lasted 20 years, plus the removal of the Earth to a much larger orbit.

The repulsive forces which hit the Earth in 1492 BC were experienced in the eastern Pacific, and were followed almost at once by an attractive force which lifted the ocean into the skies. There are no islands left in the eastern Pacific below the equator and west of South America. The population of other islands, as far as Asia were entirely wiped out, leaving only their petroglyphs carved between 10,900 BC and 8347 BC.

I have localized the Earth shock of 1492 BC in the chapter "Moses," and explain the planetary reaction to an external torque in Appendix B, "The Celestial Mechanics." Going by information which can be gleaned from Velikovsky's *Worlds in Collision*, in 1492 BC, before making contact with Venus, it was spring. This is important to know, since it bears on the frozen mammoths, discussed below. Velikovsky claims the 14th of Aviv (equivalent to Nisan, that is, March/ April) as the day of the Earth shock. (Olmec site alignments point to a Gregorian equivalent day of April 19th.)

The sweep of the Earth's axis in 1492 BC followed on a massive earth-shock -- experienced worldwide. This devastating shock was the "event of Exodus," not the parting of the Red Sea waters. The movement of the Earth due to a gyroscopic reaction is not violent. Tsunamis and hurricanes would be due only to the initial reaction to the electrical repulsive force. Earthquakes would be experienced of course, but no landmasses would be subjected to earthquakes or even tremors except in relation to the initial external impulse force, the Earth shock. [note 3]

It is possible that the seasons being out of order might have been due to an actual inversion of the Earth. But the continued gyroscopic reaction would tend to bring the Earth back to its original (upright) position, and rather quicker than the Midrashim commentary that "the stars only stopped moving after a year." It is very conceivable that it would take a long time to move the earth upright again. And there is perhaps no guarantee that the Earth returned to its original inclination. The change to a 30 degree inclination of the rotational axis of the Earth dates from this event, and possibly much of the commentary from antiquity is based on this.

The repulsive electrical shock struck in the west Central Pacific south of the equator. The external torque thus tilted the Earth's northern hemisphere toward the Sun, in effect moving the northern hemisphere into a summer season. Thus summer, not winter, followed spring, but it only lasted some hours or days.

Over the next few hours or days the gyroscopic reaction of the Earth would have caused the spin axis to swing through a loop (in a clockwise direction as seen from above Earth). This would have initially tilted the northern hemisphere away from the Sun, a winter condition, and moved the west faster to the east (at mid-latitudes).

The gyroscopic reaction might have taken a very long time. Or, more likely, the perceived winter weather might have followed from the water vapor put into the atmosphere as the initial slam, and followed by a lightning strike from Venus which traveled through the Pacific, the Indian Ocean, and into the Mediterranean. The tilt of the Earth was minor, but the impact force was considerable. This was the largest displacement encountered by Earth since 3147 BC.

The change in the radius of the orbit was from 74.1 million miles to 92.1 million miles (119 million to 148 million km). With that change in the orbit the seasons would seem to have changed, for Earth was now 25 percent further from the Sun. Hot summers never returned.

Flipping the Pole in 1500 BC

The following are the suppositions of others. It is thought that if the Earth's spin axis swings through an arc, the crust is just along for the ride, but is impeded by its momentum from rapidly changing direction. The lithosphere would continuously attempt to change direction, following the changing direction of the axis, perhaps sliding over the substrate of magma. The crust, it is further supposed, might not come to rest in the same place relative to the Earth's axis from which it started. This would result in shifts in the geographic location of the North Pole.

Or so it is assumed. The actual movement of the crust might be very little, but even small displacements could cause devastating earthquakes. The gyroscopic reaction torque is exactly what is often placed as the blame: the conversion of momentum from one form to another. But as C. S. Sherrerd,

in "Gyroscopic Precession and Celestial Axis Displacement," in *Pensee Journal* (1973), wrote:

"These could occur without large angular decelerating and accelerating forces and without major tectonic disruptions, by the phenomenon of gyroscopic precession. Since gyroscopic precession involves a temporary transfer of angular momentum from spin to precession, when beginning and terminating it moderately affects the rate of rotation of a spinning object and introduces small horizontal forces on points on its surface; but it significantly shifts the absolute orientation of the spin axis in space as long as the precession continues in effect."

The precession, the circular swing of the axis of rotation, will continue until the axis again points to where among the stars it originally pointed, or somewhere near. A large permanent deflection of the pole -- such as turning the world upside down -- is extremely unlikely, for the amount of energy required to do so is enormous. The reaction torque could move the rotational axis of the earth in a circle at or below an equatorial level. But still the Earth would upright itself.

The Earth did not flip over in 1492 but the axis certainly moved through a loop. How long this took we do not know. The data is very sparse. We have only some descriptions which could be interpreted in differing ways, and one mention in commentaries on Genesis, which could, at any rate, be applied to other repulsive electrical field impulses which Earth has experienced.

Velikovsky attempts to build on the contradictory evidence of the 7th and 8th centuries BC to suggest a 20-degree shift of the North Pole in 1500 BC. Much of his argument is by innuendo, letting the data from the 8th century BC set a tone for an argument about the 16th century BC, augmented by the lack of specifics for 1492 BC. Let me proceed to explore his argument.

He bases the argument for a large shift in the location of the Earth's North Pole in 1500 BC on three items. (1) The fact that northern Siberia has never been glaciated, yet today the region is located within the Arctic Circle and is very cold. (2) The fact that the center of glaciation (actually one of the more recent centers) was located approximately 20 degrees south of the North Pole in an area west of Greenland, which (coincidentally) is almost the current location of the magnetic pole. (3) The fact that large herds of mammoths apparently died very suddenly in Siberia around 1500 BC. I have already addressed two of these issues, but will explore them again briefly. The third will become obvious.

Lack of Glaciation in Siberia

I have suggested that the glaciation had nothing to do with Polar snowfall "extended over millions of years," but was the result of the sudden snowfalls surrounding the strike point of the plasma arc connecting Earth and Saturn. Have any catastrophists ever recognized the obvious?

Between 8347 BC and 3147 BC the arc struck repeatedly in regions well away from the North Pole -- off the coast of Norway, east of Greenland, and in Hudson Bay. [note 4]

The surrounding ring of falling snow had nothing to do with the North Pole. It had to do with the north magnetic pole -- which does not coincide with the geographical North Pole. A compass needle will point to the "magnetic pole." This is located today at 80 degrees north (10 degrees south of the North Pole) and 110 degrees west, a location off the west coast of Greenland. The magnetic pole is a

location influenced by magnetic anomalies within the Earth. In 1850 it was located at 70 degrees north (20 degrees south of the North Pole), 100 degrees west. In the Middle Ages of Europe it was located much further north and east, and had been moving south for centuries.

The actual location where compass needles would point straight down is at 85 degrees north and 133 degrees west in AD 2010. This would be the location of a plasma contact, if we were to have a plasma stream contact today.

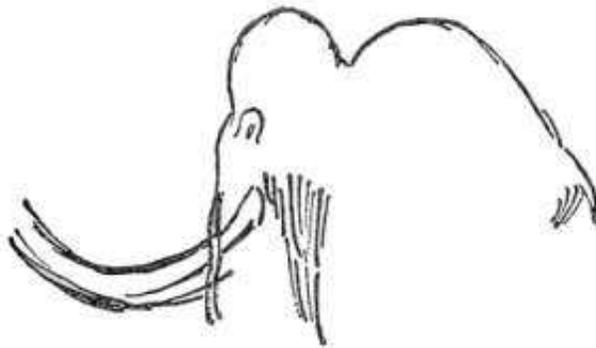
The north magnetic pole moves in spirals on a daily basis, moves in larger circles over longer time periods, and since the 16th century has moved southwest, from a location near Spitsbergen east of Greenland (in AD 1590), through the Atlantic, and across Greenland. It is currently moving rapidly north toward the geographic North Pole.

We can draw a 30-degree circle around these points. It will include Greenland, except for the extreme northern part, and at various times also include Northwestern Europe, Canada, and parts of the USA (but not northern Alaska), but Siberia will never fall within the 30-degree radius circle of glaciation.

Frozen Mammoths in 1500 BC

I have also suggested that the Earth changed orbits a number of times since 3147 BC, moving from an orbit much closer to the Sun to our present location thirty percent further away. And I have noted that the largest change in the series of four orbital relocations occurred in 1492 BC.

So here is the "*Tale of the Frozen Mammoths*". It was Spring of 1492 BC (as I mentioned earlier), and the mammoth herds, having overwintered further south in Central Asia, were happily grazing above the arctic circle in Siberia, just as humans had camped and hunted in the upper regions of Siberia since 30,000 BC, when suddenly the weather changed. The Earth's axis swung in a loop and Earth started to move further away from the Sun. The first manifestation moved spring to summer directly, followed at once by winter. It was an arctic winter which suddenly descended on mammoths who normally migrated south in the fall. Although the light returned soon, with this came worldwide hurricanes, followed by an Arctic Ocean tsunami. The mammoths were swept away by winds and flood waters -- or so it is imagined. [note 5]



[Image: A mammoth carving from the wall of the Cave of Font de Gaume, Périgord region, France.]

When the Earth completed its gyroscopic reaction, and summer of the following year came, it never got as warm again as it had in the past, for the Earth had moved much further away from the Sun. The Arctic ground turned to permafrost, a condition which prevails to today. The mammoths lost.

Velikovsky would suggest that the mammoths died because Siberia suddenly moved north into the Arctic region in 1500 BC -- rather than that the climate changed radically. He holds that some location west of Greenland was the *geographic* North Pole, and as the pole moved from Hudson Bay to its present location in 1500 BC, Siberia would have moved north into the Arctic region, just like Hudson Bay would have moved south.

By that scenario the temples and monuments in Egypt and Mesopotamia which were built before 1500 BC (and after 2600 BC) would face northwest, for that would have been the direction of "north." They do not. Only the Western European megalithic constructions before and shortly after 3100 BC, and Egyptian mastabas and the pyramids until the Meidum pyramid (2600 BC), face northwest -- towards Greenland. In Egypt the change in the orientation of buildings happens after 2600 BC, not after 1500 BC. Since 2600 BC most temples and public buildings are consistently oriented with an axis pointing north or near-north -- the same "north" we experience today. I would thus reject the suggestion that the Earth's axis shifted 20 degrees in 1500 BC.

Other Polar Relocations

The writers Charles Hapgood, C. Rand, Rose Flem-Ath, and Colin Wilson have made much of Antarctica and relocating poles -- with books which are at times listed as "pseudoscientific" in reviews. Hapgood writes of the Earth turning over and ancient maps identifying Antarctica, while Rand and Flem-Ath populate Antarctica with sailors who bring the knowledge of geography to the peoples of the world. [note 6]

I don't take much stock in these theories, although I have fewer problems with Hapgood's map book, especially since his maps show coastal features, without mapping the interior of Antarctica. Rather than being very ancient maps, these coastlines were probably charted by the Chinese naval expeditions of the 15th century, during a period of warm climate everywhere, from AD 800 to AD 1400. [note 7]

I don't buy any of the information in the Rand and Flem-Ath books. The authors hold to the postulate of the catastrophic sinking of Atlantis in 9600 BC, as told by Plato (but not by a single other source in antiquity), and they identify Antarctica as Atlantis (which has not dipped below the waters of an ocean). But of some interest are the identifications of three locations of the "North Pole" based on estimating the center of various previous glaciations. These are placed in the Atlantic off the coast of northern Norway, at the southern tip of Greenland, and at the western edge Hudson Bay. They also hold that the northern glaciations each form a circle of some 24 degrees surrounding these three locations. [note 8]

At this point, let me summarize the above information: I do not believe that the Earth ever turned over and remained in that position, or that the North Pole relocated by any appreciable amount. Other researchers have proposed, not only that the Earth turned over, but that it remained in that position, until a later gravitational "external torque" of a Mars fly-by, as Martin Sieff notes in "Assyria and the End of the Late Bronze Age" (*SIS Workshop* 1981), in discussing M. G. Reade, "The Ramesside Star Tables" (*SIS Review* 1979).

Endnotes

Note 1 --

Peter Warlow "Geomagnetic reversals?" in *J. Physics*, October 1978. The article notes that spin will not likely stop, however the point of the article is to suggest "pole flipping" while also inducing a transfer of east and west. A summary by others:

"Employing a wide span of data from complex top theory to ancient legend, P. Warlow suggests that the earth has undergone many violent catastrophes, some of them within the time of man. Flood legends, geomagnetic reversals, tektites, paleoclimatology, salinity crises, and other familiar standbys of the catastrophists force P. Warlow to examine the stability of the earth in the presence of astronomical collisions and near-collisions."

"He shows that the earth rotates slowly and that, even with the stabilizing equatorial bulge, our planet is rather sensitive to outside forces. It is, he says, like ... an 8,000-mile-diameter top that turns over repeatedly in response to external influences. Did not the ancient Egyptians write that the sun once rose in the west?"

This is followed in 1981 by: "Fatal Flaw in Pole-Flipping Theory," *New Scientist*, 92:433, 1981:

"V. Slabinski of the Communications Satellite Corporation claims that there are three separate errors in P. Warlow's theoretical analysis of terrestrial pole-flipping due to the gravitational torques created by a passing celestial body. With these errors corrected, the earth is 200 times less sensitive to pole-flipping. Slabinski does not believe that any known solar system object could turn the earth end-for-end if it passed by. This item proclaims that the discovery of Warlow's errors is a serious blow to Velikovskian catastrophism."

In 2002 William Corliss (of Science Frontiers, Internet) noted: "Over a decade has passed and no rebuttal by Warlow has been seen. We must, therefore, consider his hypothesis highly questionable." In 1982, however, Warlow had countered with a book *Reversing Earth*, noted as "a major scientific contribution" by one reviewer. Warlow has a PhD in physics.

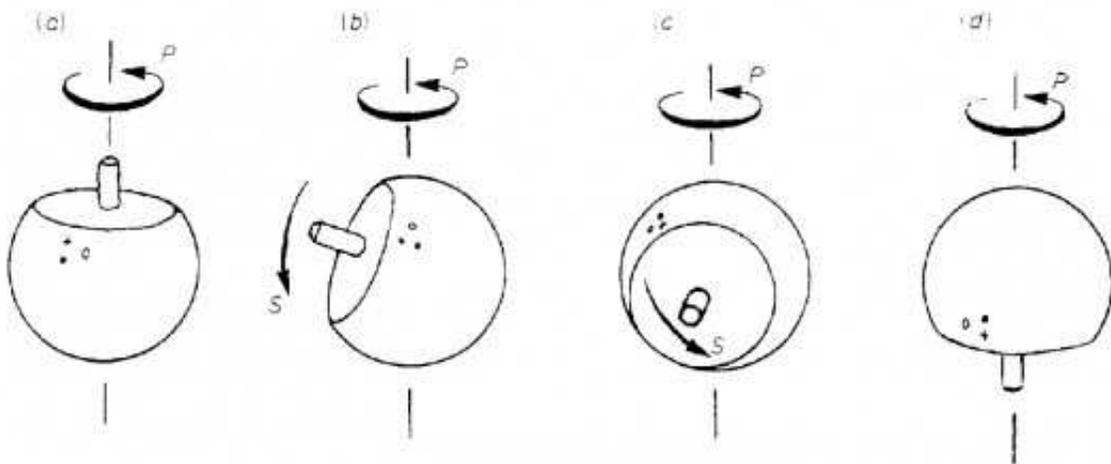
Leroy Ellenberger made the point more clearly when he wrote,

"Warlow's inversion would actually require an intruder 31% more massive than Jupiter, which is patently ludicrous. Adjusting the calculation for a more realistic, and shorter, transit time [Warlow used the application of an exterior torque lasting 24 hours] raises the requirement to a body as massive as 62 Suns!"

-- LE, *Skeptical Inquirer* (1986) with later revisions

Was there anyone who could suggest that the only reason the Tippe-Top (the toy which was used to demonstrate the flipping over of Earth) exhibits its east-west interchange is because the bottom surface would scrape against a flat surface which supported the top while the spin handle (representing the North Pole) dips down to invert the Earth? There would be a spin axis at the top of the wobbling top throughout the inversion, although this is actually the gyroscopic reaction torque.

Warlow's suggestion of a differential torque applied only to the Earth's equatorial bulge is hardly legitimate mechanics, and only worsens the model. The whole of this Tippe-Top notion is a bad analogy buffered with illegitimate math. It is almost beyond comprehension that since 1978 thousands of academics -- economists, classicists, writers, poets -- have accepted the Tippe-Top analogy without as much as a single thought to the mechanics involved. The debunkers have the same nearsightedness, offering solutions that are simply not required.

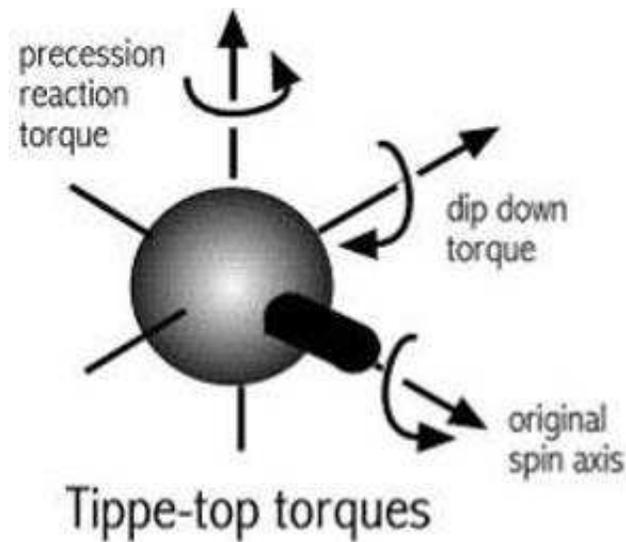


[Image: *The inversion of a Tippe-Top as presented by Peter Warlow.*]

What Warlow understood in looking at the spinning Tippe-Top is that the original vertical spin axis remained in place at the top of the Tippe-Top, even as the original spin handle dipped down and started to precess. But this is not so. It is indeed difficult to tell what is happening with a spinning top.

The original spin remains at the spin handle, even as this dips down and starts to precess. When the spin handle starts to lean over a gyroscopic reaction torque is added, exhibited as a rotation in the same direction as the original spin. The axis of this is located at the top of the Tippe-Top by the time the spin handle is horizontal.

The gyroscopic reaction torque results from the couple which forces the top's spin handle down. This couple (torque) is produced by the down-directed force of gravity and the up-directed normal force at the base of the Tippy-Top where it is in contact with its supporting surface. As the Tippe-Top inverts completely, this couple disappears, and the spin of the gyroscopic reaction torque has substituted for the original spin -- and in the opposite direction.



[Image: Tippe-Top torques on inversion. Graphics by J. Cook.]

The Tippy-Top will indeed reverse direction. The Earth would too, if it could be placed on the surface of a table.

[return to text]

Note 2 --

Velikovsky supplies some additional data on water clocks and shadow clocks in Egypt built before 750 BC which no longer record the correct daylight hours at solstice. Since shadow clocks can easily keep time to within a few seconds, and have done so since antiquity, this is a notable anomaly. The data he presents, however, is entirely inconclusive, or missing.

[return to text]

Note 3 --

"Hurricanes of 250 miles an hour [400 km per hr] strip a land and all man-made works down to bedrock. Great tsunamis, such as are caused by huge earthquakes and meteoritic passthroughs of the atmosphere, do the same." -- de Grazia, *The Burning of Troy* (1984)

De Grazia is addressing the effects of a close passage of Mars.

[return to text]

Note 4 --

As noted in another chapter, the orientation of European megalithic structures, the orientation of the first Egyptian mastabas and pyramids, and the direction of the World Mountain in Chinese mythology all intersect at the Atlantic south of Greenland. This was the location of the last strike point of the Saturnian arc, and the north magnetic pole in the period before 3147 BC. Today it is west of Greenland.

[return to text]

Note 5 --

There are two-hundred-foot-high piles of mammoth bones and tusks (and elephants and other Asiatic grazing animals) on the shores of the New Siberian Islands, swept to land (it is assumed) by Arctic Ocean storms. Most of the ivory of antiquity came from this location.

The whole question of why the mammoth died out in Siberia, Asia, Europe, and the Americas has been in contention for a hundred years. Carbon-14 dates are often brought forward as evidence of an antiquity stretching to 30,000 BC, but the same carcasses will have stomach contents dated to 1500 BC. See Charles Ginenthal *Extinction of the Mammoth* (1997).

What is clear is that the mammoth (and many other diverse species) lived in..

"... a grassland environment with a long growing season, mild winters, very little permafrost, and a wide diversity of plants -- quite different from the climate in the region today."

-- Michael J. Oard, in "The extinction of the woolly mammoth: was it a quick freeze?"
<http://AnswersinGenesis.org> (pdf, 1997)

Mammoths not only ate grasses, but whole bushes and small shrubs. Oard also notes two interesting facts. First, many mammoth carcasses show signs of asphyxiation, and, second, most remains are found in windblown deposits (at times in a standing position). They did not slip into bogs, as some people maintain.

The mass extinction of the mammoth, especially in Siberia, has been taken up by Creationists (including Michael Oard, above) as a *cause célèbre*, and is as a result mired in pseudo-science, with similarly muddled objections from Gradualists.

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Note 6 --

A few reviews posted at Amazon.com:

Charles Hapgood *Maps of the Ancient Sea Kings* (pb 1997):

Eric Vertommen (Brussels, Belgium) *"Charles Hapgood has made an excellent job to point out some strange features on Ancient maps. Comparing a set of maps made from Ptolemaea (166 AD) to the Middle Ages and the first global maps made by Piri Re'is (An Ottoman admiral), Hadji Ahmed, Oronteaues Finaeus, and Mercator, all editing their maps between 1513 and 1560, he (and the reader) notice that Antarctic continent figures almost accurately on all of them."*

C. Rand and Colin Wilson *The Atlantis Blueprint* (2002):

From Publishers Weekly: *"In this pseudoscientific account, Flem-Ath, a Canadian librarian, and Wilson, bestselling author and New Age jack-of-all-trades, propose a single, geo-historical theory that links the Egyptian, Chinese and South American pyramids and other sacred sites. According to this argument, these civilizations received templates from Atlantis that contained crucial geodesic, geological and geometric information. Furthermore, Atlantean mariners, based in Antarctica, sailed the globe over 100,000 years ago and established more than 60*

sacred sites around the world, such as Byblos and Jericho, to preserve the sophisticated wisdom of their culture. (Copyright 2001 Cahners Business Information, Inc.)

C. Rand and Rose Flem-Ath *When the Sky Fell, in Search of Atlantis* (pb 1997):

"The mystery of Atlantis, the legendary advanced civilization described in ancient texts, has been solved at last. Scientific evidence, exciting new research, and the breakthrough discovery of an amazing Egyptian map prove without a doubt that this lost continent did exist ... and reveal where its ruins can be found."

See also Charles Hapgood *The Path of the Pole* (1999). I fail to see what "geodesic information" or "sophisticated wisdom" would have been so crucial. Antarctica has been glaciated for over 30 million years. A number of people have completely dismissed the Piri Re'is map. See, for example, the comments of geologist Steven Dutch, "The Piri Reis Map" at [www.uwgb.edu/DutchS/PSEUDOSC/PiriRies.HTM].
[return to text]

Note 7 --

This is the point of research by Gavin Menzies, in *1421: The Year China Discovered America* (2002). Menzies includes the circumnavigation of Greenland in addition to Antarctic explorations. The ice-free coasts did not last, for by the time the Europeans started worldwide explorations the Atlantic had become very stormy. The last climatic changes are as follows: circa 500 AD: warm; circa 800 AD: cold; circa 1400: warm; circa 1700: cold.

Of course Menzies's maps are disputed, as is his whole thesis. But if we allow that climatic conditions were not always as they are today, then the settlement of South America and South Africa by Cro-Magnon humans via Australia and the very productive fishing grounds of Antarctica becomes a real possibility, even if placed 60,000 years ago in time.
[return to text]

Note 8 --

Rand and Flem-Ath place the center of the European glaciation at 73 degrees north and 170 degrees west, and give no dates; place the Wisconsin glaciation at 63 degrees north and 45 degrees east, starting at 2.5 million years ago and ending about 100,000 BC; and place the Illinoian glaciation at 60 degrees north and 97 degrees east (the east end of Hudson Bay), ending in Plato's date of 9600 BC. This last is far too late. The last ice age came to an end in 12,000 BC. I'm not at all in agreement on the locations either.
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Special thanks to S Borruso for the questions on gyroscopes.



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