POLESHIFTS

Theosophy and Science Contrasted

David Pratt

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CONTENTS

Abbreviations

BCW	*H.P. Blavatsky Collected Writings*, Theos. Publ. House, 1950-91.
Dia	*Dialogues of G. de Purucker*, Theos. Univ. Press, 1948.
Echoes	*Echoes of the Orient*, W.Q. Judge, Point Loma Publ., 1975-87.
ET	*The Esoteric Tradition*, G. de Purucker, Theos. Univ. Press, 2nd ed., 1940.
FEP	*Fundamentals of the Esoteric Philosophy*, G. de Purucker, Theos. Univ. Press, 2nd ed., 1979.
FSO	*Fountain-Source of Occultism*, G. de Purucker, Theos. Univ. Press, 1974.
IGT	*The Inner Group Teachings of H.P. Blavatsky*, H.J. Spierenburg (comp.), Point Loma Publ., 2nd ed., 1995.
Isis	*Isis Unveiled*, H.P. Blavatsky, Theos. Univ. Press, 1972 (1877).
ML	*The Mahatma Letters to A.P. Sinnett*, Theos. Univ. Press, 2nd ed., 1926.
Ocean	*The Ocean of Theosophy*, W.Q. Judge, Theos. Univ. Press, 1973 (1893).
SD	*The Secret Doctrine*, H.P. Blavatsky, Theos. Univ. Press, 1977 (1888).
SOP	*Studies in Occult Philosophy*, G. de Purucker, Theos. Univ. Press, 1945.
TG	*Theosophical Glossary*, H.P. Blavatsky, Theos. Co., 1973 (1892).
WoS	*Wind of the Spirit*, G. de Purucker, Theos. Univ. Press, 2nd ed., 1984.

PART 1: ASTRONOMICAL CYCLES

1. The tilt of the axis

The rhythms of life on earth are largely regulated by the two fundamental motions of our planet: its daily rotation on its axis and its annual revolution around the sun. The earth rotates once every 23 hours 56 minutes and 4 seconds – the earth-day. Since the earth rotates on its axis from west to east, or anticlockwise as viewed from above the north pole, the sun appears to rise in the east and set in the west. The earth revolves around the sun from west to east (anticlockwise) about once every 365.25 days – the earth-year.

As a spinning sphere (or rather oblate spheroid), the earth possesses a rotation axis, whose two ends mark the north and south geographic poles, with the equator being situated midway between them. If the earth stood perfectly upright on its axis – i.e. if its axis formed an angle of 90° with the plane of its orbit around the sun (the ecliptic) – the equator would lie in the same plane as the ecliptic. The sun would then always shine above the equator, and all regions of the earth between the two poles would enjoy a constant alternation of 12 hours' daylight and 12 hours' darkness.

The earth's axis, however, is not perpendicular to the ecliptic. At present the equator is tilted at an angle of about 23.4° in relation to the ecliptic, and the earth's axis makes an angle of 23.4° with a line drawn perpendicular to the ecliptic; in other words, the obliquity of the ecliptic is 23.4°. The tilt of the earth's axis gives rise to two important parallels of latitude in each hemisphere: the tropics and the polar circles: the tropics of Cancer and Capricorn currently lie 23.4° north and south of the equator respectively, and the arctic and antarctic circles lie at 66.6° north and south latitude respectively (i.e. 23.4° from the north and south poles). These boundaries divide the earth's surface into three distinct zones: the tropical or torrid zone (the region between the two tropics); the temperate zones (the region in each hemisphere between the tropics and the polar circles); and the frigid or polar zones (the region in each hemisphere inside the polar circles). The polar zones do not enjoy a regular alternation of day and night throughout the year; the sun is below the horizon for between one day (at the polar circles) and six months (at the poles) each year. In the tropical zone the sun is vertically overhead sometime each year, whereas in the temperate and polar zones, the sun is always at some angle less than 90°.

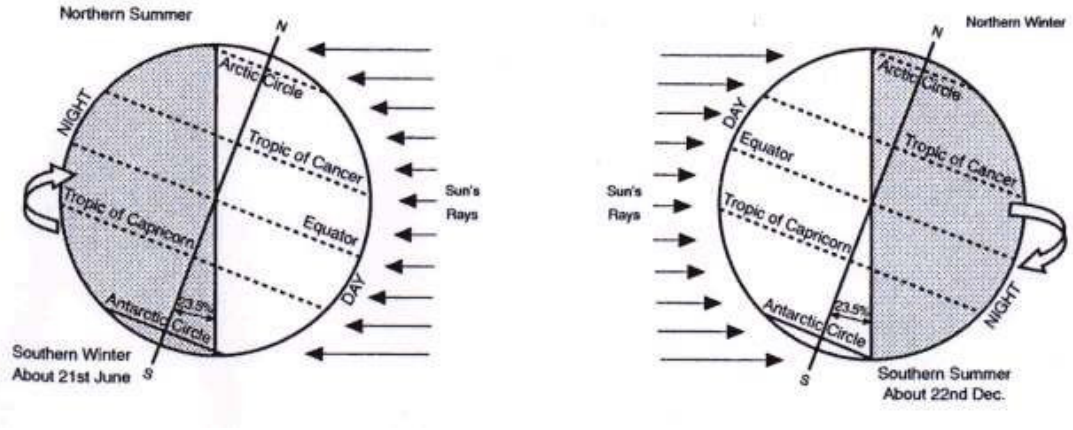

Figure 1. The tilt of the earth's axis.

The existence of the four seasons is due mainly to the earth's tilt and, to a lesser extent, to the ellipticity of the earth's orbit. If the earth's axis stood upright, there would therefore be no distinct seasons.

To describe the positions and motions of astronomical objects, they are considered to lie on an imaginary sphere surrounding the earth, known as the celestial sphere. The north and south celestial poles are the projection onto the celestial sphere of the earth's north and south geographic poles, and the celestial equator is the projection of the earth's equator. The north and south poles of the ecliptic are the projection of a line perpendicular to the ecliptic. It does not matter whether this line is projected into space from the earth or from the sun, since the celestial sphere is conceived as being so far away that the ecliptic pole will fall on a unique point. The north and south celestial poles are 23.4° from the north and south ecliptic poles respectively. If the earth's axis was upright instead of tilted, the celestial poles would coincide with the ecliptic poles. The north ecliptic pole lies in the constellation Draco, while the north celestial pole lies very close to Alpha Ursae Minoris, the current polestar.

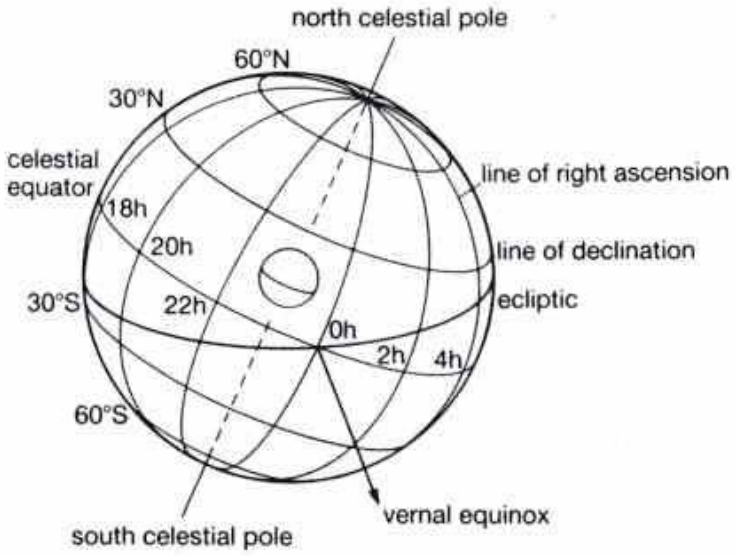

Figure 2. The celestial sphere.

2. The four seasons

The inclination of the earth's axis gives rise to four important points in the earth's orbit, which mark the beginning and end of the four seasons: at the vernal (or spring) equinox, the sun is above the equator; it then appears to move northwards and rises higher and higher in the sky (in the northern hemisphere) until the summer solstice, when it is above the tropic of Cancer; it then appears to move back towards the equator until the autumnal equinox, when it is

again above the equator; finally it proceeds southwards until the winter solstice, when it is above the tropic of Capricorn. In reality, of course, it is the earth that revolves around the sun, not the sun around the earth. In the northern hemisphere, the vernal equinox falls on 20/21 March, the summer solstice on 21 June, the autumn equinox on 22/23 September, and the winter solstice on 21/22 December. In the southern hemisphere spring and autumn, and summer and winter are reversed.

Although, astronomically, each season lasts three months, for non-astronomers it is more sensible over most of the northern hemisphere to think in terms of a four-month winter (December to March), a two-month spring (April/May), a fourth-month summer (June to September), and a two-month autumn (October/November). A lag of a month or more occurs between the time of maximum and minimum solar radiation and the warmest and coldest months, because the earth takes time to respond to changes in the amount of incoming solar energy.

The two equinoctial points are the points (or nodes) where the ecliptic intersects the celestial equator. The equinoxes are therefore the two days of the year when the sun is directly above the earth's equator. Equinox means 'equal night', and at the equinoxes day and night everywhere are about 12 hours long.

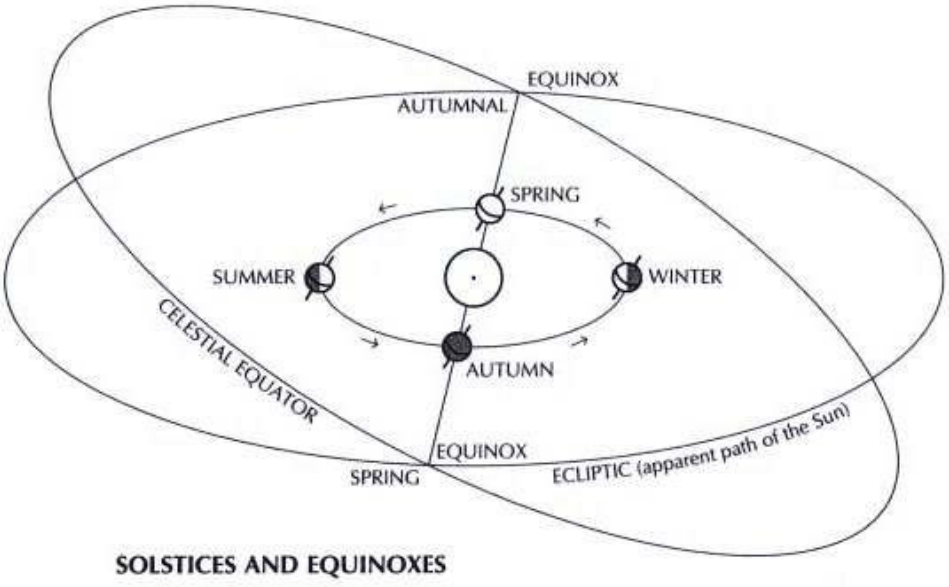

Figure 3. The four seasons.

At the summer solstice (in the northern hemisphere) the sun reaches its northernmost point and rises to its highest point in the sky, and therefore the day reaches its maximum length, while at the winter solstice, the sun reaches its southernmost point, appears at its lowest point in the sky, and therefore the night reaches its maximum length. The sun's rays fall vertically on the equator at the equinoxes, and vertically on the tropic of Cancer and the tropic of Capricorn at the summer and winter solstices respectively. The tropics are therefore that region of the earth on which the sun's rays fall vertically at some point of the year, while at all other places on the earth the sun's rays arrive at an angle, so that they receive less heat.

At the equinoxes the sun's declination is 0° as it is then traversing the celestial equator (declination is the number of degrees north or south of the celestial equator). It therefore rises and sets due east and due west all over the globe. In the northern hemisphere, the sun rises to the north of east in the summer and to the south of east in winter, reaching its northernmost and southernmost positions at the summer and winter solstices respectively, when it has its greatest declination of 23.4° north or south. The distance from due east and west of the point on the horizon where the sun rises and sets depends not only on the time of year but also on the latitude in question – the higher the latitude the greater the distance.[1]

The inclination of the earth's axis means that different parts of the earth receive different amounts of solar radiation, and it is the main cause of the seasonal rhythms. A secondary factor is that the earth follows an elliptical orbit around the sun, so that its distance from the sun varies. At present the earth reaches perihelion – the point in its orbit closest to the sun (146 million km) – on 2-4 January, i.e. during winter in the northern hemisphere, and it reaches aphelion – the point in its orbit furthest from the sun (151 million km) – on 4-6 July, i.e. during summer in the northern hemisphere. This means that the northern hemisphere has milder winters but cooler summers than the southern hemisphere, thought the effect is moderated by the heat stored in the greater expanse of oceans in the southern hemisphere. The amount of solar radiation intercepted by the earth at perihelion is about 7% higher than at aphelion.

3. Precession of the equinoxes

The vernal and autumnal equinoxes occur at the two points in the earth's orbit where the earth's axis forms an exact right angle with a line joining the centre of the earth and sun, as viewed from directly above or below the earth. The summer solstice occurs at the point in the earth's orbit where its north pole is tilted directly towards the sun, and the winter solstice occurs at that point where it is tilted directly away from the sun.

If the earth's axis always pointed to exactly the same point in space, the vernal equinox would occur at the same point in the earth's orbit every year, and the earth would move through a full circle of 360° between successive equinoxes. However the earth's axis gyrates very slowly clockwise (viewed from above the north pole), describing a conical movement round the vertical, rather like the axis of a spinning top, and traces a complete circle among the stars about once every 26,000 years. According to modern science, this is caused by the gravitational pull of the moon and sun and, to a lesser extent, the planets on the earth's slight equatorial bulge. The result is that the vernal equinox occurs a fraction of a degree *before* the earth reaches the point in its orbit where the equinox occurred the year before. This phenomenon is known as the precession of the equinoxes (though it might just as well be called the precession of the solstices). The vernal equinox precesses at an average rate of about 50 arc-seconds (1/72°) per year, and it therefore occurs about twenty minutes earlier every year. This means that the earth does not revolve through 360° between two successive vernal equinoxes but only 359 71/72 degrees (or 359 degrees, 59 minutes and 10 seconds). The actual rate of precession fluctuates around the average figure of 50". The annual rate of precession for the year 2000 (epoch J2000.0) is 50.288".

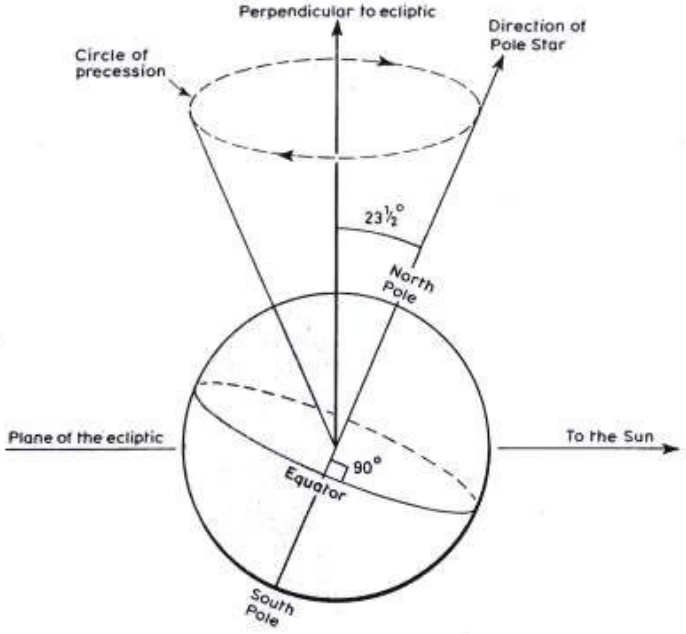

Figure 4. The long-term wobble, or precession, of the earth's axis.

The sidereal year is the time the earth takes to make one 360° revolution around the sun, measured between two successive conjunctions of a particular star, and is currently equal to 365.25636 days. The tropical year (also called the solar or equinoctial year) is the time the earth takes to make one revolution around the sun, measured between two successive vernal equinoxes, and is currently equal to 365.24219 days. In other words, at present the tropical year is about 20.3 minutes shorter than the sidereal year.

The zodiac is a zone or belt of the celestial sphere, extending about 8 degrees on either side of the ecliptic, and divided into twelve portions or constellations. During each annual revolution around the sun, the earth passes through each constellation of the zodiac from west to east, at the rate of approximately one degree per day. At the moment of the vernal equinox, a line from the centre of the earth through the sun and extended outwards will cross the circle of the zodiac at the equinoctial point – one of the two points where the celestial equator intersects the ecliptic. Since each successive vernal equinox occurs when the earth is slightly to the west of its orbital position at the last vernal equinox, the vernal equinoctial point advances slowly westward, so that from equinox to equinox the earth moves 'backwards' through the constellations of the zodiac (i.e. in the opposite direction to that in which it orbits the sun). At an average rate of precession of 50 arc-seconds a year, the sun enters a new constellation (covering an average of 30 degrees of arc) every 2160 years (a period known in theosophy as the messianic cycle), and takes 25,920 years to complete a full circuit of the zodiac.[2] A precessional cycle is also known as the

Great Year or Platonic Year.

There is an important distinction between the *constellations* (or houses) of the zodiac and the *signs* of the zodiac.[3] The constellations are groups of stars encircling the earth at a distance of many light-years. They are sometimes said to be 'fixed', though every star actually has its own proper motion, so that over long periods of time the stars of a constellation alter their position in relation to one another. The signs of the zodiac, on the other hand, are regions of space permeating and surrounding the earth. The vernal equinoctial point is the point on the celestial equator which the sun crosses at the vernal equinox, and the corresponding point on the earth's equator is defined as the beginning of the sign Aries – whatever the constellation in which this occurs. As the vernal equinoctial point gradually shifts around the celestial equator during a precessional cycle, the signs shift around the earth's equator accordingly. The signs are therefore not fixed, while the constellations (relatively speaking) are.

Since Aries is traditionally regarded as the first sign and constellation of the zodiac, a precessional cycle could be said to begin when the first point of the sign of Aries coincides with the first point of the constellation Aries (i.e. when the earth, the sun, and the first point of the constellation Aries are in a straight line at the moment of the vernal equinox). This does not occur at the beginning of the Age of Aries, but at the end, for the following reason. Since the earth revolves around the sun from west to east, the westernmost point of each constellation (each assumed to cover 30° of arc) is counted as 0° of that constellation (and 30° of the preceding constellation); the first point of Aries (0° Aries) is therefore also 30° Pisces. However, the equinoctial point precesses in the opposite direction – from east to west. Thus when, in the course of precession, the sun leaves the constellation Taurus and enters Aries, it enters the 30th degree of Aries, and does not coincide with the first point of the constellation Aries until the end of the Age of Aries. According to H.P. Blavatsky, the Age of Taurus ended and the Age of Aries began in 2410 BC, the Piscean Age began in 255 BC, and the Aquarian Age began at the end of the last century.[4]

Figure 5. The precession of the equinoxes. Position A shows the first point of the sign Aries coinciding with the first point of the constellation Aries. A quarter of a precessional cycle later (6480 years), it coincides with the first point of Capricorn (position B), then Libra (position C), and Cancer (position D). After a total of 25,920 years, the earth returns to position A. (FSO 672)

4. The changing polestar

The north and south celestial poles are the points on the celestial sphere directly above and below the earth's north and south geographic poles respectively. The north and south ecliptic poles are the points directly above and below

a line drawn perpendicular to the ecliptic. The celestial poles are often situated in wide open space, but at other times they come close to, and occasionally coincide with, a star, which is then called the polestar. In the northern hemisphere, the present polestar (Polaris) is the star at the end of Ursa Minor's tail. In the southern hemisphere, there is currently no bright star near the celestial pole; the southern polestar, Sigma Octantis, is only of the 5th magnitude, whereas Polaris is of the 2nd magnitude.

An observer on the earth's surface sees only half the celestial sphere at any one time. The visible half is bounded by the observer's horizon, a plane that cuts the celestial sphere 90° from the observer's zenith (the point on the celestial sphere directly above him or her). As seen from the equator, true polestars lie on the horizon while all other stars rise at right angles to the horizon, remaining above it for 12 hours. As viewed from either of the poles, a polestar remains stationary overhead while all other stars move in circles parallel to the horizon, remaining permanently above it. At intermediate latitudes, the apparent motion of the stars lies between these two extremes: some stars rise and set, but others circle around the poles without setting and are known as circumpolar stars. At a latitude of 25°N, for example, the north celestial pole lies 25° above the north horizon and therefore all stars within 25° of the celestial pole are circumpolar, while all other stars visible from that latitude rise and set. Since the earth rotates in an anticlockwise direction, the stars appear to revolve around the celestial poles in a clockwise direction, completing one revolution every day.

The gyration of the earth's axis that produces the precession of the equinoxes involves a slow change in the direction in which the axis points in space (the tilt, according to modern astronomy, remaining more or less the same). The axis slowly sweeps an approximate circle, with a radius of about 23.5° around the poles of the ecliptic in the course of a precessional cycle. Since the polestar is simply the star closest to the celestial poles at any given time, a series of different stars take on the role of polestar during a precessional cycle. Alpha Draconis (Thuban) was closest to the north celestial pole around 2700 BC. The north celestial pole currently points to within 1° of Polaris, and will point closest to it in AD 2017. In 12,000 years the star closest to the north celestial pole will be Vega, the brightest star in the Lyre.

According to modern science, the tilt of the earth's axis does not remain exactly the same but gradually varies within very narrow limits owing to gravitational perturbations caused by the moon and planets (especially Jupiter, Mars, and Venus). It has been established by observation that the tilt is steadily decreasing by around 0.47 arc-seconds a year (about a hundredth of a degree per century). On 1 January 1950 the obliquity was 23°26'45", and on 1 January 2000 it was 23°26'21". On the basis of calculations of gravitational perturbations, scientists *theorize* that the tilt oscillates between about 21.6° and 24.6° over a period of about 41,000 years. The slight variation in the tilt of the earth's axis means that the curve described by the earth's north pole around the north ecliptic pole is not a perfect circle.[5]

According to theosophy,[6] on the other hand, the axis *gradually inverts through a full 360 degrees*, at an average rate of *4 degrees per precessional cycle* (0.56 arc-seconds per year), and therefore traces not a circle but a *spiral* around the poles of the ecliptic. In addition, sudden axial disturbances occur from time to time, resulting in major cataclysms.[7] Scientists would dismiss the idea of a gradual inversion of the poles as impossible because they do not know of any force that could produce such an effect. Then again, they cannot explain what causes the earth to rotate on its axis – but it keeps on turning just the same!

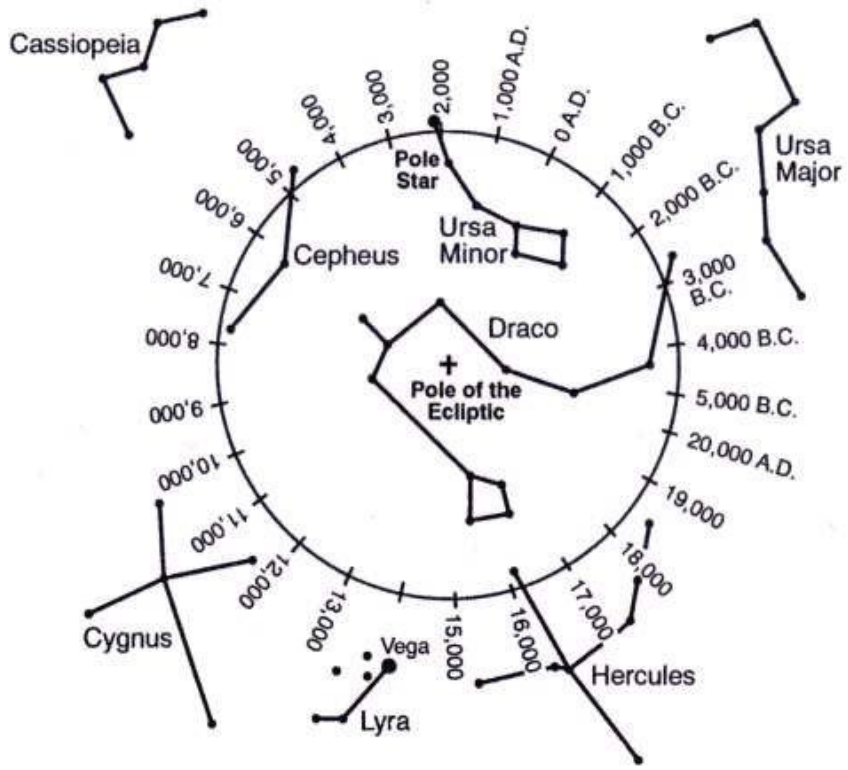

Figure 6. The changing polestar. Theosophy postulates that the earth's axis does not trace a circle around the ecliptic pole but a spiral.

5. Apsidal motion

The sun occupies one of the two foci of the ellipse of the earth's orbit. A line drawn through the point of the earth's closest approach to the sun (perihelion) and farthest retreat (aphelion) – the two apsides – passes through the sun and is called the line of apsides or major axis of the orbit. Perihelion currently occurs when the earth is in Sagittarius and aphelion when it is in Gemini. The line of apsides precesses slowly westward (anticlockwise) due, it is said, to the gravitational attraction of the other planets. The average rate of apsidal (or perihelion) precession is 12 arc-seconds (1/300°) per year, or 108,000 years for a complete rotation,[8] the present rate being 11.65 arc-seconds per year.

In addition to the sidereal and tropical years already mentioned, the rotation of the line of apsides gives rise to a third type of year – the anomalistic or orbital year, which is measured between two successive passages of the earth through perihelion. It is currently 365.25964 mean solar days long, or about 4.7 minutes longer than the sidereal year.

Taking 50 arc-seconds per year as the average rate of the precession of the equinoxes, and 12 arc-seconds per year as the average rate of apsidal precession, the earth revolves around the sun:

- 360° - 50" in one tropical year;
- 360° in one sidereal year;
- 360° + 12" in one anomalistic year.

Since the vernal equinox advances westward, while perihelion advances slowly eastward, the combination of these two movements – the precession of the equinoxes and the rotation of the line of apsides – gives rise to a third cycle lasting about 21,000 years.[9] This cycle is called *climatic precession*, to distinguish it from the astronomical precession of the equinoxes. Whatever the earth's position in relation to the apsides at the time, say, of the vernal equinox in a particular year, it will return to the same relative position at the equinox not in 25,920 years but in only about 21,000 years, due to the movement of the apsides themselves. During this period the earth precesses westward about 290°, while the line of apsides advances eastward about 70°: 290° + 70° = 360°.[10]

According to astronomical calculations, climatic precession has an average period of 21,700 years, but allegedly comprises two main periods of about 23,000 and 19,000 years.[11]

Notes

1. The sun's maximum annual deviation (D) north or south of the E-W line is given by the equation:
sin D = sin e / cos l
where e = obliquity of ecliptic, and l = latitude of observer. On the equator (lat. 0°) the total swing along the eastern horizon is therefore equal to twice the tilt of the earth's axis. For any other latitude, it is greater.

2. H.P. Blavatsky gives the length of the precessional cycle as 25,868 years, equivalent to 50.10 arc-seconds per year (SD 2:330fn). However, she also says that 25,920 years is the 'exact period of revolution of the heavens' (BCW 14:360). In 945 BC the Hindus calculated the rate of precession to be 48.57 arc-seconds per year (see *The Theosophist*, Sept. 1881, p. 263). On the basis of the current rate of increase in precession (0.0002 arc-seconds a year), the annual rate of precession would have been 50.10" around 1060 AD, and 49.699" in 945 BC.
Blavatsky sometimes refers to the precessional cycle as the 'sidereal year' or 'tropical year'. Nowadays these terms have different meanings, as noted above in the text.

3. FSO 125, 139-42.

4. BCW 8:174. See Appendix 1: The zodiac and precession.

5. Furthermore, the 'circle' is not smooth but wavy owing to the phenomenon of nutation, a 'nodding' movement of the earth's axis with a period of 18.6 years and an amplitude of 9.2 arc-seconds. Its chief cause lies in the fact that the moon's orbital plane is inclined at about 5° to the earth's orbital plane and precesses around it in 18.6 years ('ideal' figure: 18 years). The 'circle' described in a complete precessional cycle therefore has about 1440 waves (= 25,920/18). (It is interesting to note that there are 1440 minutes in a day, and a human being breathes an average of 18 times a minute: 18 x 1440 = 25,920.) The approximate circle (with superimposed nutation) is traced in an anticlockwise direction as viewed from the earth, or in a clockwise direction as viewed from the north ecliptic pole.

6. SD 2:331, 357, 407-8, 768; FSO 346-7; Samson Arnold Mackey, *'Mythological' Astronomy of the Ancients Demonstrated* (1822/23), Wizards Bookshelf, 1973.

7. SD 1:369, 2:144-5, 274, 314, 330, 350; Ocean 135-6, 140.

8. FSO 140fn. 108,000 years is equal to a quarter of the period of the kali-yuga (432,000 years). 108 is roughly the average distance between the sun and earth in terms of solar diameters, the average distance between the surfaces of the moon and earth in terms of lunar diameters, and the diameter of the sun in terms of earth diameters (actual figures: 107.5, 108.1, and 109.1 respectively).

9. Using the figure of 50" for the precession of the equinoxes and 12" for apsidal motion, the combined movement is equal to 62" (62/3600°) a year, or 20,903.226 years for a complete cycle. Blavatsky gives a figure of 50.10" for the precession of the equinoxes and 11.24" for the rotation of the line of apsides (equivalent to 115,302 years for a complete circuit), these figures being taken from the *Encyclopaedia Britannica* (SD 2:330fn; note the [deliberate?] mistake involving minutes and seconds).

10. Suppose that, in a particular year, the vernal equinoctial point enters the constellation Aries at the same time as the earth is at perihelion. Using the 'ideal' figures, it would take 6 complete apsidal rotations or 25 precessional cycles – a period of 648,000 years – before such an event occurred again, 648,000 being the lowest common multiple of 108,000 and 25,920.

11. A. Berger et al. (eds.), *Milankovitch and Climate*, Reidel, 1984, p. 35. These two periodicities, along with the 41,000-year obliquity cycle and the 100,000-year eccentricity cycle, are said to have been confirmed by the discovery of similar periodicities in studies of the Pleistocene climate record. This claim is considered in part 4, section 1.

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POLESHIFTS

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PART 2: SCIENCE, PSYCHICS, AND MYTHS

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1. Axial shift

There are two basic types of poleshifts:
• *axial shift*: a change in the inclination of the earth's axis caused by the entire planet altering its axial orientation in space (the position of the geographic poles and equator is unaffected);
• *polar wander*: a change in the location of the geographic poles and equator caused by the entire earth, or its outer shell, moving relative to the spin axis, whose inclination remains unchanged.
This section looks at the phenomenon of axial shift.

Scientists disagree on the changes that the inclination of the axis has undergone during the course of the earth's history. Whatever the long-term changes, however, the idea that the axial tilt undergoes a slow oscillation has long been accepted. The earth's obliquity, which is currently 23.44°, is believed to vary between about 21.6° and 24.6° over a period of 41,000 years.[1] These values are based on calculations of the gravitational interaction between the planets.[2] The earth's tilt is currently decreasing and it is believed to have been doing so for the past 10,000 years. Since it is the tilt of the axis that produces the cycle of the seasons, this means that the differences between the seasons are less extreme now than they were 10,000 years ago – other things being equal, summers are a little cooler and winters are a little warmer.

The axis of each planet in our solar system has a different angle of inclination: Mercury 0°, Venus 177°21', Earth 23°26', Mars 25°12', Jupiter 3°07', Saturn 26°44', Uranus 97°46', Neptune 27°52', and Pluto 119°37'.[3] Venus, Uranus, and Pluto are therefore 'upside down' to some extent, and have a retrograde rotation about their axis, i.e. they rotate clockwise as viewed from 'above' the solar system. The sun's axis is tilted at an angle of 7°15' to the ecliptic. The moon's axis is tilted at an angle of 1.5°.

Modern astronomy claims that all the planets we now see in the solar system formed around 4.6 billion years ago following the collapse of the primordial solar nebula.[4] The contracting cloud of gas and dust developed a dense, slowly rotating core, which was destined to become the sun. It was surrounded by a rotating disk of dust grains, which, as a result of tiny density fluctuations, formed into small clumps or planetesimals (about the size of asteroids), the largest of which accreted matter and eventually grew to the size of planets.[5] The four inner planets (Mercury, Venus, Earth, Mars) formed predominantly from dense, rocky materials as heat from the sun caused the volatile ices to evaporate. In the outer regions of the solar system, the four gas giants (Jupiter, Saturn, Uranus, Neptune) formed, which were sufficiently massive to retain large amounts of hydrogen and helium.

Joseph Silk believes that the modern accumulation theory outlined above provides a natural explanation of the

direction of revolution and rotation of the planets.[6] He says that although most planets formed from the accretion of many small bodies, Uranus is an exception.

> It apparently formed from the coalescence of a few – perhaps only two – large bodies. This would result in a random orientation of the axis of rotation, and could account for its tilt of about 90 degrees to the ecliptic. Only planets that formed from many smaller bodies whose individual directions of spin and motion average out, would result in a planet whose spin axis was parallel to that of the sun.[7]

Luke Dones & Scott Tremaine[8] argue that the spins of the four inner planets were probably determined by impacts with a few large bodies while the planets were being formed by the accretion of planetesimals. Gerrit Verschuur[9] speculates that during the earth's formation, a large neighbour, about the size of Mars, slammed headlong into the proto-earth, shaking it from pole to pole, and smashing it sideways so that after the chaos had subsided its axis was tilted. 'Some of the debris from that awesome planet-shaking impact blew outward and was slowed by the planet's gravitational pull to be trapped in orbit to gather into what would someday be called the moon.'[10] Around the same time, similar impacts between protoplanets and objects in nearby orbits allegedly occurred throughout the solar system.

> Uranus was impacted so violently that it ended up tilted sideways. Venus was struck so hard that it began to spin in the opposite direction. Something smashed into Mercury with such violence that its outer layers were torn away and, lost to space, fell into the sun. And Mars? An impact tilted its axis but in the aftermath no moon was formed.

Verschuur says that if today the earth were struck by a large asteroid a few hundred kilometres across, it would trigger global earthquakes but would not alter the tilt of the axis. It would take the impact of a Mars-sized object to have a noticeable effect.

In addition to the theory that Venus' retrograde rotation is due to a collision or near-collision with a large asteroid or planetesimal that reversed the direction in which it rotates, other astronomers argue that a close encounter with another celestial body tilted its axis almost upside down.[11]

George Williams[12] challenges the widely held view that the obliquity of the primordial earth was less than 10-15° and has slowly increased during earth history under the sole influence of tidal friction. He says that this view does not consider possible geophysical mechanisms within the earth, such as 'dissipative core-mantle coupling', which would tend to move the axis towards an upright position. He postulates that the primordial earth acquired an obliquity of about 70° from the alleged giant impact that produced the moon, and that the obliquity remained above 54° for most of the Precambrian. This means that the polar regions would have received more solar energy than the equator and glaciers would have grown in low latitudes while the poles stayed ice-free; during the late Proterozoic glaciation (800-600 million years ago), continents at low palaeolatitudes[13] were apparently glaciated.[14] He holds that the obliquity decreased relatively rapidly from about 60° to about 26° between 650 and 430 million years ago, but has not changed much since then. He claims that this scenario is supported by the climate record.

Although the general view is that during the Phanerozoic (the last 540 million years according to science, or the last 250 million years according to theosophy[15]), normal climatic zonation has prevailed on earth, and there is no evidence for significant departures of the obliquity beyond the supposed current limits of about 21.5-24.5°, this is not universally accepted. According to some scientists, palaeoclimatic and palaeontological data suggest that in the Mesozoic and early Cenozoic the earth's tilt was only 5 to 15°.[16]

Like several other scientists, Williams maintains that many of the other planets are subject to significant changes in obliquity, and he rejects the view that plausible *physical* mechanisms for substantial changes of obliquity are unknown. Such mechanisms are said to include tidal torques, dissipative core-mantle coupling, planetary impact, resonant axial-orbital precession, and a twist of the orbital angular momentum vector. Some scientists hold that the inclinations of planetary spins axes have undergone large random, or chaotic, variations, due to the gravitational pulls of the other planets. On the basis of detailed orbital calculations, J. Laskar, F. Joutel, & P. Robutel[17] reached the following conclusion:

> None of the inner planets (Mercury, Venus, the Earth and Mars) can be considered as to have primordial obliquities, and all these planets could have been formed with a near-zero obliquity. The obliquities of these planets could have undergone large-scale chaotic behaviour during their history. Mercury and Venus have been stabilized by dissipative effects, the Earth may have been stabilized by the capture of the Moon, and Mars is still in a large chaotic zone, ranging from 0° to 60°.

Other estimates of the variation in Mars' tilt are 15-35°[18] and 11-49°.[19] Regarding the outer planets (Jupiter, Saturn, Uranus, and Neptune), Laskar et al. argue that their obliquities

> are essentially stable, and can thus be considered as primordial, that is, with about the same value they had at the end of the formation of the Solar System. Nevertheless, chaotic behaviour of the obliquities under planetary perturbations could have occurred in an earlier stage of the formation of the Solar System . . .

They believe that in the absence of the moon and the torque it exerts on the earth, the chaotic zone for the earth's axis would extend from 0° to 85°.

The views of a few catastrophist writers who oppose the scientific consensus and have argued that the earth has undergone sudden, large axial shifts in the recent past will be considered in section 3.

2. Polar wander

There are two types of polar wander:
• geographical (or true) polar wander: a shift of the entire earth or some part of it (lithosphere, lithosphere + mantle, or the mantle alone) relative to the spin axis, resulting in a change in the position of the geographic poles on the earth's surface;
• magnetic polar wander: the movement of the magnetic poles with respect to the geographic poles.

The north and south magnetic poles are believed to drift slowly westward around the geographic poles, returning to their original position after a period of a few thousand years.[1] But how far from the geographic poles do the magnetic poles move over geologic time? Palaeomagnetism involves the study of the direction and inclination of the magnetic field of rocks of different ages; this information is then used to ascertain the location of a virtual magnetic pole at the time the rocks were formed. Pole locations calculated from measurements on rocks younger than about 20 million years do not depart significantly from the present locations. Going back more than 30 million years, however, successively greater virtual pole distances are revealed. Joining the former, averaged pole positions generates an apparent polar wander path. Different continents yield different polar wander paths, and from this it has been concluded that it is primarily the continents that have wandered rather than the magnetic poles; the apparent wandering of the magnetic poles is allegedly caused by the actual wandering of the continents over the earth's surface, though some degree of true polar wander has not been ruled out.

Palaeomagnetism has many pitfalls, and it is well known that it often yields unreliable results. For instance, palaeomagnetic data imply that during the mid-Cretaceous Azerbaijan and Japan were in the same place! Palaeomagnetic studies of rocks of different ages suggest a different polar wander path not only for each continent, but also for different parts of each continent. When individual palaeomagnetic pole positions, rather than averaged curves, are plotted on world maps, the scatter is huge, often wider than the Atlantic. The further back in time we go, the greater the scatter, suggesting that fossil magnetism becomes less stable with time. Rock magnetism is subject to modification by later magnetism, weathering, metamorphism, tectonic deformation, and chemical changes. This undermines the assumption that the fossil magnetism found in ancient rocks provides an accurate record of the earth's magnetic field at the time the rocks were formed.

Palaeomagnetic data provide an indication of a location's latitude with respect to the former *magnetic* pole, and it is simply assumed that over long periods of time the magnetic poles will tend to coincide with the geographic poles. However, the geomagnetic field at the present time deviates substantially from that of a geocentric axial dipole. The magnetic axis is tilted by about 11° to the rotation axis, and on some planets much greater offsets are found: 46.8° in the case of Neptune, and 58.6° in the case of Uranus. In the earth's present magnetic field, the magnetic latitude may therefore deviate from the geographic latitude by as much as 2000 km. There is also strong evidence that the geomagnetic field had long-term nondipole components in the past, though they have largely been neglected. If there were stable magnetic anomalies of the same intensity as the present-day East Asian anomaly (or slightly more intensive), this would render the geocentric axial dipole hypothesis invalid. It is also possible that the magnetic poles have wandered considerably with respect to the geographic poles in former times. Geological, palaeoclimatic, and palaeontological data provide powerful evidence *against* continental-drift models, and therefore *against* the current interpretation of palaeomagnetic data.[2]

Palaeomagnetic studies show that some rocks have been magnetized in a direction opposite to that of the present magnetic field. The scientific consensus today is that this means that the global geomagnetic field at the time the rocks formed had a reversed polarity. In at least some cases, however, other explanations are conceivable, such as self-reversal and the existence of regional magnetic anomalies. For instance, a set of palaeomagnetic anomalies from northern and central Europe, eastern Canada, the Gulf of Mexico, and New Zealand, with dates clustering around 12,500 BP, has been interpreted as a global geomagnetic fluctuation (the Gothenburg flip), but the event is apparently not recorded in sedimentary sequences of the same age in southern Europe, the Mediterranean Sea, and western North America.[3] Even today there are isolated spots of opposite magnetic polarity in both the northern and southern hemispheres.[4] Whether they occur or not, magnetic reversals should clearly not be confused with inversions of the axis.

In addition to the magnetic axis, three other earth axes can be distinguished: 1. the geographic axis: the line joining the north and south poles, the points of origin for the lines of latitude and longitude; 2. the rotation axis or axis of instantaneous rotation: the line drawn through the earth about which it is actually rotating at any instant; the points where it cuts the earth's surface are called the rotation poles; 3. the axis of figure or axis of maximum moment of inertia: the axis of symmetry of the earth's spheroid, determined by the distribution of mass within the planet.[5]

For everyday purposes, these three axes are so close together that they can be thought of as coinciding. In

reality, however, the axis of figure is not exactly coincident with the axis of rotation, and this gives rise to tiny polar motions. These motions produce slight latitude variations, which can be measured as the difference between the geographical latitude and the true astronomical latitude, as measured from the rotation axis. Two discrete periodic oscillations can be distinguished:

> one, called the Chandler Wobble, has about a 14-month period [428 days], and the other has a 12-month period. The combination of these two wobbles causes the poles to trace spiral paths out of, around, and eventually back into their mean positions over a period of about 6.5 years. The separation between the actual and mean poles was exceptionally large in about 1952, when they were separated by 12 m (37 feet), or 0.37 arc second (0.37"). Their maximum separation during the 6.5-year period averages about 0.25".[6]

The Chandler wobble is thought to be related to earthquakes, surface wind loads, solar activity, and geomagnetism. However, there is disagreement on whether the wobble excites earthquakes, is partly caused by them, or whether they both have a common cause.[7]

The only perfectly stable state of rotation for a planet occurs when it rotates about its axis of figure. An internal redistribution of mass, or a comet or asteroid impact, drags the axis of figure away from the rotation axis, creating an unstable condition. The rotation axis then tries to realign itself with the figure axis; the figure axis precesses about the rotation axis in an ever-decreasing spiral until the two axes again coincide. Strictly speaking, the position of the figure axis is never exactly constant: the weather systems, ocean tides, and even the movement of animals and humans all alter the earth's mass distribution and therefore the position of the figure axis.

This slight axial wobble is not in dispute. However, the occurrence of systematic, large-scale migration of the geographic poles or 'true polar wander' is highly controversial. Throughout the 19th and early 20th centuries, polar wandering was frequently invoked to explain the evidence for former higher temperatures in the polar regions and former ice sheets at low latitudes. Although nowadays such phenomena tend to be explained primarily in terms of continental drift, some scientists believe that polar wandering has also taken place. Opinions differ on the extent to which changes of mass distribution in or on the earth can alter the position of the spin axis and at what rate, depending mainly on the assumptions made about the inner structure of the earth.

In the 19th century a number of prominent scientists, including Sir George Airy, Sir William Thomson (Lord Kelvin), Sir George Darwin (son of Charles Darwin), and James Clerk Maxwell argued that polar wandering of more than a degree or two was impossible owing to the assumed rigidity of the earth and the stabilizing effect of the equatorial bulge.[8] Evidence that the earth is not perfectly rigid was provided by minor tides in the earth's crust caused by the influence of the moon and sun, and by the discovery of the Chandler wobble in 1884-85.

In 1955 Thomas Gold[9] postulated that large-scale polar wandering could be expected to occur over geological periods of time in a plastically deformable earth: the rotation axis could migrate 90° over a period of about a million years. He stated that if the earth were a perfect sphere instead of a flattened spheroid, 'the smallest beetle walking over it would be able to change the axis of rotation relative to markings on the sphere by an arbitrarily large angle; the axis of rotation in space would change by a small angle only'.

If the material forming the earth yields by flow under stress differences of arbitrarily small magnitude, then polar wandering will occur in response to any exciting force, however small (including that caused by Gold's beetle). However, if the material has a non-zero yield stress, polar wandering will take place only when the excitation stress is sufficient to exceed the threshold. W.H. Munk & G.J.F. MacDonald[10] pointed out that if significant polar wandering were possible, the poles should move so as to place the continents as well as possible on top of the equatorial bulge. The present distribution of the continents ought to place the pole in the vicinity of Hawaii in the equatorial Pacific – about as far from the present pole as it can get. The fact that the pole is not in the Pacific nor travelling towards it at the expected rate suggests the earth (or at least its outer shell) has sufficient finite strength to withstand the stresses imposed by the continent-ocean system. However, this conclusion can be avoided by assuming that the stresses in question are balanced by just the right distribution of mantle inhomogeneities. If so, changes in the distribution of mass on or in the earth could conceivably trigger polar wandering, though it is also possible that the earth has enough strength to prevent this. The fact that major gravity anomalies are associated with Palaeozoic mountain chains indicates that major stress differences can persist for very long periods.

The debate on the extent of polar wander over the course of geologic history, and on just what moves if true polar wander does occur, is still in progress. The general consensus, based on palaeomagnetism, is that polar wandering has been small – probably less (perhaps much less) than about 20° over the past 200 million years, and less than about 10° over the past 80 million years.[11] In this view, most of the wandering of the (magnetic) poles implied by palaeomagnetism is explained in terms of continental drift/plate tectonics. An alternative model (wrench tectonics) has been developed by Karsten Storetvedt, who accepts the validity of palaeomagnetism (while admitting it faces many problems) but rejects continental drift. He explains the palaeomagnetic data in terms of in-situ rotations of continental blocks and true polar wander; he argues that the poles have wandered 70° since the mid-Paleozoic, including a 30-35° latitudinal shift around the Eocene-Oligocene boundary.[12]

As already noted, palaeomagnetic data are not reliable enough to support theories of large-scale continental drift or polar wander. Moreover, the evidence that the earth possesses sufficient strength to make significant polar wandering impossible is largely ignored. It is true that the polar motion record collected by the International Latitude Service (ILS) since 1900 indicates that in addition to the 14-month Chandler wobble and the 12-month annual

wobble, the rotation pole has a secular drift of about 0.95° per million years towards eastern Canada. But there is no certainty that such motion will continue in the same direction for many millions or tens of millions of years.

J.L. Kirschvink et al.[13] have argued that true polar wander occurred from 535 to 520 million years ago, during the early Cambrian, as a result of a major reorganization of tectonic plates that changed the balance of mass within the earth. The entire lithosphere and mantle rotated about 90°, so that the regions what were previously at the north and south poles were relocated to the equator, and two antipodal points near the equator became the poles. This hypothesis is based mainly on palaeomagnetic data and is therefore highly dubious.

The views of two unorthodox researchers deserve a brief mention. Hugh Auchincloss Brown[14], who died in 1975, believed that the eccentric force of rotation of the growing south-pole ice cap would eventually become so strong that it would cause the earth to tip over 'like an overloaded canoe'. As it did so, the spin axis and equatorial bulge would rapidly migrate through the earth in the opposite direction, so that the inclination of the axis would remain the same. The cataclysm would take place in a single day, in which time the present poles would travel about 80° of latitude, or some 8800 km, so that the ice caps would end up near the equator. The result would be tremendous deluges and seismic activity and the destruction of civilization. Brown believed that similar cataclysms – caused by gravitational and centrifugal forces – recurred about every 7000 years. There is no serious evidence to support this theory, which will not work anyway because the Antarctic ice cap could not develop sufficient momentum to capsize the earth.

Peter Warlow[15] argued that a near-collision with large cosmic bodies (comets, asteroids, or stray planets), 1000 km or more in diameter, could cause the geographic north and south poles to exchange places on the spin axis, in as little as one day. He held that if the earth turned upside down within the magnetic field, this would explain apparent magnetic reversals. However, Victor Slabinski calculated that a 180° inversion of this type would require a close encounter with a celestial body 31% more massive than Jupiter.[16]

Several scientists see evidence of polar wandering on the moon and Mars. For instance, Kirschvink et al. state: 'The Tharsis volcanic province on Mars, with the largest positive gravity anomaly known from any planet, appears to have reoriented the martian lithosphere to place Tharsis on the equator; similarly, the lunar mascons all lie facing Earth symmetrically about its equator.'

Peter Schultz[17] points out that several large regions of layered and stripped terrain near the present martian equator, roughly 180° apart, bear many similarities to the present polar deposits, and proposes that they represent locations of ancient martian poles. He favours the polar-wander interpretation over the alternative explanations that they are either pyroclastic deposits, or aeolian deposits accumulated during periods when Mars had a very high obliquity. He argues that polar wandering occurred in starts and stops, and that the last major shifts of the poles are related to the formation of the large volcanic shields of Tharsis and Olympus Mons. His scenario depicts a cumulative polar migration of well over 90° over about 4 billion years, each change in pole position involving a shift of less than about 30° over about 100 to 1000 million years. His views have not been universally accepted, and scientists hold differing opinions on the degree of rigidity of Mars and the amount of polar wandering this would permit.[18] The global fractures or lineaments on the surface of Mars, as on earth, consist of four main systems oriented approximately E-W, N-S, NE, and NW in relation to the *present* rotation poles.[19] This casts doubt on theories of large-scale polar wander.

In conclusion, polar wander remains today what it has always been: a speculative and unproven hypothesis.

3. Crustal slippage

A catastrophic form of polar wandering is rapid crustal slippage or lithosphere displacement. This hypothetical phenomenon amounts to an accelerated, global-scale version of the official plate-tectonic scenario, in which individual lithospheric 'plates' (rather than the entire lithosphere) move at a rate of a few centimetres per year in relation to one another and to the earth's poles.

One of the main proponents of crustal slippage was Charles Hapgood,[1] who died in 1982. He argued that there had been three lithosphere displacements during the past 100,000 years. The north pole was allegedly in Hudson Bay during the last ice age, and moved the 30° (3200 km) to its present location between 17,000 and 12,000 years ago. The pole supposedly shifted to Hudson Bay from the Greenland Sea between 55,000 and 50,000 years ago, and to the Greenland Sea from the Yukon district of Canada between 80,000 and 75,000 years ago.

More recently, the idea of crust displacement has been put forward by populist writers Rand and Rose Flem-Ath,[2] and the idea has been picked up by Graham Hancock[3] and Colin Wilson.[4] The Flem-Aths assert that before the last supposed crust displacement some 11,500 years ago, Lesser Antarctica (the part pointing to South America) lay further north; it was partly ice-free, had a temperate climate, and was the home of an advanced civilization – Atlantis! The earth's lithosphere then supposedly underwent a sudden displacement of some 30°, moving the whole of Antarctica into the southern polar circle, resulting in the destruction of Atlantis, whose remains are now buried beneath several miles of ice. While Hancock claims that the cataclysm took place between 14,500 and 12,500 BC with massive aftershocks continuing until 9500 BC, the Flem-Aths believe it took place extremely rapidly around 9600 BC.

The theory of lithosphere displacement ignores masses of contrary evidence about the history of the Pleistocene ice age. There is no evidence of any lithosphere displacements in deep-sea cores, the palaeomagnetic record, glacial chronologies, pollen records, and a wide range of other geological, palaeoclimatic, and palaeontologic data.[5] The claim that a large part of Antarctica was deglaciated prior to 12,000 years ago is unfounded. Paul LaViolette writes:

> data from ice cores penetrated through various parts of the antarctic ice cap show that all parts of this continent have been continually glaciated back through the last ice age and that Antarctica's temperature was as much as 9° Centrigrade *colder* during the last ice age. This invalidates crustal shift theories which instead claim it was warmer.[6]

The crust-shifters also maintain that the north pole was situated in the Hudson Bay area before the last displacement, which caused North America to become deglaciated while Siberia and Alaska became colder. This is contradicted by the fact that during the last ice age the major glacial and interglacial periods in North America, Alaska, Siberia, and Antarctica were more or less synchronous. The final, very cold stage, the Younger Dryas, began around 12,700 BP, and ended around 11,550 BP, with the onset of the Preboreal period of global warming and meltwater flooding.[7] Crust-shifters associate the last supposed crust displacement with the extinction of mammoths and other mammals in Siberia and Alaska, and subscribe to the popular myth that these creatures were instantly frozen in a sudden cataclysm of immense proportions. However, the majority of the frozen remains of mammoths, horses, bison, etc. predate 12,000 BP by up to tens of thousands of years, and the claim that large numbers were flash-frozen and perfectly preserved is false.[8]

Hancock and the Flem-Aths tend to confuse the earth's crust with the lithosphere (in contrast to Charles Hapgood, who was far more precise in his use of terms). In modern geological theory, the crust comprises only the upper part of the rigid lithosphere, down to the Moho discontinuity, at an average depth of about 7 km under oceans and 40 km under continents, but it is firmly welded to the underlying mantle. The lithosphere, on the other hand, comprises the crust and the upper layer of the mantle. In plate tectonics, the lithosphere is said to be fractured into separate plates that move with respect to one another on an underlying plastic layer known as the asthenosphere. There is powerful evidence however that this model is untenable.[9] The lithosphere is said to average 70 km in thickness beneath oceans, and to be 100 to 250 km thick under continents. However, seismic tomography (which produces 3D images of the earth's interior) has shown that the oldest parts of the continents have very deep roots extending to depths of 400 km or more, and that the asthenosphere is absent or very thin beneath them. Even under the oceans there is no continuous asthenosphere, only disconnected asthenospheric lenses. These facts render the large-scale movement of individual 'plates' impossible – to say nothing of the rapid movement of the entire lithosphere!

Modern crust-shifters claim that lithosphere displacement is caused primarily by an imbalance of ice at the polar caps, whereas Hapgood, their mentor, came to reject this mechanism as inadequate. Instead he hypothesized that they might be caused by gravitational imbalances (uncompensated masses) within the lithosphere or immediately below it, but was unable to provide any concrete evidence for this. The Flem-Aths have suggested that the entire mantle and crust might move rapidly and as a unit over the earth's core, but they are merely clutching at straws, and have no idea how the physics of such an unlikely event might work.

Finally, mention should be made of a few catastrophist writers who postulate a combination of axial shift and 'crust' displacement. Immanuel Velikovsky[10] (1895-1979), for example, argued that about 4000 years ago Venus was born as a 'comet' ejected from Jupiter and proceeded to wander the solar system. The earth was supposedly involved in near collisions with Venus and Mars around 3500 and 2700 BC, resulting in devastating catastrophes, including poleshifts and crustal slippage. To support this wild tale, Velikovsky offered evidence from ancient literature, traditions, and folklore, and some geologic evidence of past cataclysms.[11] However, there is no evidence of global catastrophes at the times he claimed. For instance, the debris allegedly deposited in earth's atmosphere by Venus 3500 years ago, which supposedly caused 40 years of darkness, left no trace in the world's ice caps or ocean sediments.[12]

Paul Dunbavin[13] has argued that around 3100 BC the earth suffered a comet impact in the oceans which caused the rotation poles to wander by up to 1° and the axial tilt to oscillate between about 20° and 26° until settling down to its modern value around 800 BC. Over the same period, the number of days in a year supposedly increased from 360 to 365.25. Dunbavin sees evidence for this scenario in the pattern of sea-level variations, climatic and geological changes, and ancient myths and legends. He even claims that Plato's Atlantis was really the British Isles, including the surrounding shelf areas and a former small island in the Irish Sea, which were submerged as the sea level rose some 5000 years ago.

D.S. Allan and J.B. Delair[14] have argued that around 9500 BC an astronomical body ('Phaeton'), projected by a supernova explosion, passed through the solar system causing untold havoc. It resulted in a displacement of the earth's crust, a shift of its axis, the sinking of large landmasses in the Pacific and Atlantic oceans, and widespread extinctions and climatic change. They believe that the axis was virtually upright before this cataclysm. They abolish the whole of the Pleistocene period, claiming that the succession of glacial and interglacial periods is an illusion; the fairly mild climate of the Pliocene was supposedly brought to a close by the Phaeton catastrophe, which issued in a very brief ice age of a few hundred years at the start of the Holocene or Recent period. The evidence they cite, however, is not sufficient to support this extreme catastrophist scenario.

4. Psychic predictions

A number of psychics, with the help of their 'spirit guides', have offered dramatic and generally conflicting accounts of past and future poleshifts. All their 'prophecies' have so far failed to come true.

According to one interpretation of his obscure writings, Nostradamus[1] prophesied that a poleshift would occur in 1999 or 2000. At the end of the century the world was also supposed to be in the throes of a terrible war, Armageddon.

Edgar Cayce[2] (1877-1945) was highly successful at giving medical diagnoses while in a trance state. He also provided information – mostly unverifiable – on the past lives of his subjects and made prophecies for the future. He asserted that the earth had undergone many cataclysmic shiftings of its poles – by which he appears to have meant some form of crust displacement rather than a change in the inclination of the axis. He suggested that another poleshift would occur at the end of the 20th century. It would be preceded by several decades of increasingly severe seismic disturbances, including the submergence of most of Japan, much of Northern Europe, and many parts of the Atlantic and western coasts of the US, and the emergence of new land in the Atlantic and Pacific oceans. And it would be followed by the reappearance of Christ! Cayce stated that 10.5 million years ago the present polar regions 'turned to where they occupied more of the tropical and semi-tropical regions'. Many earth changes, extending over a period of 200,000 years, are said to have occurred during the Atlantean culture, including a displacement of the spin axis. A 'changing of the poles' around 50,772 BC is said to have led to the destruction of the giant animals that had allegedly overrun the earth.

Aron Abrahamsen[3] maintained that a major poleshift would occur in 1999 or 2000 within the space of a few days, resulting in the displacement of the present polar regions by about 90°. It would be followed by the return of Christ. He stated that poleshifts are caused by interplanetary forces (especially electromagnetism) and human thought forms; if enough people improved the quality of their thoughts and deeds, such disasters could therefore be averted. The most recent major poleshift allegedly occurred in 70,000 BC, and another took place about 147,000 years ago.

Paul Solomon[4] predicted that there would be a poleshift on 5 May 2000, involving a crustal displacement of about 40°, in which the close passage of Mars would play a key role. It would be followed by the Second Coming of Christ. Ruth Montgomery[5] asserted that the last shift of the axis occurred around 48,000 BC, when Lemuria was submerged. Atlantis was relatively unaffected and continued as the world's foremost civilization for another 20,000 years, before being destroyed by a technological disaster. She forecast another poleshift for the late 1990s, followed (of course) by the return of Christ.

Michio Kushi,[6] founder of the East-West Foundation in Massachusetts, claimed that there had been thousands of poleshifts (crustal displacements), including shifts of a full 90°. Several had occurred in the last quarter of a million years, most recently 12,000 years ago, prior to which the north pole was in the north Atlantic, slightly southwest of the British Isles. Another poleshift is predicted in the near future.

The Stelle Group[7] claims to be descended from Lemuria (or Mu), where civilization supposedly began 78,000 years ago and which was submerged 26,000 years ago as a result of a poleshift. There were also poleshifts in 8500 BC and 5000 BC, involving a 'minor' crustal slippage of 30°. The Group say they are following the instructions of higher intelligences (Masters) under the direction of archangel Melchizedek. After the battle of Armageddon (which was supposed to begin in 1998, but has apparently been postponed!) there will be a poleshift (crustal slippage) of 90° in the year 2000, caused mainly by a rare planetary alignment. After this wholesale destruction, Melchizedek will establish the Nation of God on Lemuria, which will reappear above the waters of the Pacific.

The ideas of submerged continents and lost civilizations, and of global cataclysms (including poleshifts) ushering in a new golden age of spiritual regeneration, are clearly 'in the air'. However, as the above selections show, the accuracy of the visions and predictions of ordinary (untrained) psychics leaves much to be desired. In general, the more remote the issues being considered are from individual people's lives, the more the information provided by such psychics tends to degenerate into psycho-babble!

5. Ancient traditions

References to many different types of cataclysms, including poleshifts, can be found in the literature and mythology of numerous nations and peoples, as the following examples show. This does not of course mean that the descriptions are intended as literal descriptions of historical events; mythology is a complex mixture of fact, allegory, and symbolism, often woven into a dramatic narrative.

In the *Book of Enoch* (64:1, 3),[1] we read: 'In those days Noah saw that the earth became inclined, and that destruction approached. . . . And he said, Tell me what is transacting upon earth; for the earth labours, and is violently shaken.'

In the Bible (King James Version), we find the following:

> Behold, the Lord maketh the earth empty, and maketh it waste, and turneth it upside down, and scattereth abroad the inhabitants thereof. . . . The earth shall reel to and fro like a drunkard . . . (Isaiah 24:1, 20)[2]
>
> Immediately after the tribulation of those days [prior to the Second Coming] shall the sun be darkened, and the moon shall not give her light, and the stars shall fall from heaven, and the powers of the heavens shall be shaken . . . (Matthew 24:29)
>
> The earth shook, the heavens also dropped at the presence of God: even Sinai itself was moved at the presence of God . . . (Psalms, 68:8)[3]

The last two quotations could refer to a change in the declination of the stars, as would result from a poleshift.[4]

According to Ovid's account of the deluge catastrophe, the chariot of the sun, driven by Phaeton, changed direction, the horses pulling it broke loose from their course and rushed aimlessly, knocking against the stars, and the constellations of the Cold Bears tried to plunge into the ocean.[5] In the *Timaeus* Plato says that this 'signifies a declination of the bodies moving around the earth and the heavens'. In the same work he describes a cataclysm in which the earth moves 'forwards and backwards, and again to right and left, and upwards and downwards, wandering every way in all six directions'.[6]

The paradisical Eden, Asgard, Meru, or Airyana Vaejo are said to have enjoyed a perennial spring-like climate, despite their traditional northern or polar location – indicating that the axis must have been more or less upright. The Greek astronomer Anaxagoras taught that during the Golden Age the stars revolved in a tholiform manner (i.e. in a horizontal plane), a belief shared by another Greek astronomer, Anaximenes. Diogenes Laertius added that at first the polestar always appeared in the zenith, but afterwards acquired a certain declination. Similar references can also be found in ancient Japanese cosmogony and Chinese traditions.[7]

For the Egyptians, a large fiery circle symbolized the cosmos, and a serpent with a hawk's head represented the pole. When the latter was placed across the diameter of the circle, it symbolized the pole of the earth lying in the plane of the ecliptic.[8] The Harris Magical Papyrus speaks of a cosmic upheaval of fire and water when 'the south becomes north, and the earth turns over'.[9]

Hopi mythology speaks of the creation of four worlds, three of which were destroyed in succession. The first world was destroyed by fire and volcanoes. In the creation of the second world, land was put where water was, and water where the land was. When the time came for its destruction, the 'pole twins' left their posts at the north and south ends of the world's axis, where they were stationed to keep the earth properly rotating. The world teetered off balance, spun around crazily, then rolled over twice. Mountains plunged into seas, the land was inundated, and the earth froze into solid ice. Eventually the pole twins were ordered back to their stations at the poles. With a great shudder and a splintering of ice the planet began rotating again. As the ice melted, the world began to warm to life, and the third world was created. It was destroyed by waves higher than mountains which rolled in upon the land. Continents broke asunder and sank beneath the seas. The present (fourth) world will be destroyed by a poleshift and flooding, unless we change our nature sufficiently to prevent it.[10]

The Pawnee Indians of North America preserved memories of a remote time when the north and south polar stars 'changed places' or 'went to visit each other'.[11] They believed that a similar cataclysm would happen at the end of the world, when there would be a great flood, the skies would move, and the stars would come to earth.[12] The Eskimos of Greenland recalled a time when the earth tilted over and all people were drowned in the sea.[13] The Andaman Islanders fear a repetition of a great natural disaster that occurred in the days of their remote ancestors when the world capsized.[14]

The Norse Edda refers to shifts in the position of the Midgard serpent, Midgard being our planet, and the serpent denoting the equator, ecliptic, or Milky Way.[15] According to a Norse legend, the wolf Fenrir, who had been chained up by the gods, managed to break his bonds and escape. He shook himself and the world trembled. The ash tree Yggdrasil (the earth's axis) was shaken from its roots to its topmost branches. Mountains crumbled or split from top to bottom, and the stars came adrift in the sky.[16]

One ancient Chinese work, consisting of 4320 volumes, tells of the consequences that followed when mankind rebelled against the gods and the universe fell into disorder: 'The planets altered their courses. The sky sank lower towards the north. The sun, moon, and stars changed their motions. The earth fell to pieces and the waters in its bosom rushed upwards with violence and overflowed the earth.'[17]

Many legends refer to long periods of darkness when the light of the sun vanished from the sky,[18] while others speak of the sun not setting for long periods of time. One possible interpretation is that such stories refer to the 'age of horror', when the earth's axis is tilted at 90°, and there would be continuous darkness during the winter months and continuous daylight during the summer months. Norse mythology teaches that before the present order of things, the sun rose in the south, and it places the frigid zone in the east, whereas now it is in the north.[19] This, too, could be a graphic way of referring to a time when the earth was inclined at 90°.

Notes

1. Axial shift

1. J.J. Hidore & J.E. Oliver, *Climatology: an atmospheric science*, Macmillan, 1993, p. 369. A. Berger calculated that the earth's obliquity varies between 22° and 24.5° with a very prominent and stable quasi-period of 41,000 years, and additional significant periods of 54,000 and 29,000 years (A. Berger et al. (eds.), *Milankovitch and Climate*, Reidel, 1984, p. 35). Occasionally, a larger variation of between 21.8° and 28.3° is mentioned (e.g. Patrick Moore, *Encyclopaedia of Astronomy*, 1986; *Brockhaus Enzyklopädie*, 1968, 5:382-3).

2. Gravity is the least understood of the four recognized forces of nature. Blavatsky: '[T]here is no *gravitation* in the Newtonian sense, but only magnetic attraction and repulsion; . . . it is by their magnetism that the planets of the solar system have their motions regulated in their respective orbits by the still more powerful magnetism of the sun, not by their weight or gravitation' (Isis 1:271). 'The earth is a magnetic body . . . charged with one form of electricity – let us call it positive – which it evolves continuously by spontaneous action, in its interior or centre of motion. Human bodies, in common with all other forms of matter, are charged with the opposite form of electricity – negative. That is to say, organic or inorganic bodies, if left to themselves will constantly and involuntarily charge themselves with, and evolve the form of electricity opposed to that of the earth itself' (Isis 1:xxiii). W.Q. Judge: 'Gravitation . . . depends entirely on electrical law, and not on weight or density' (Echoes 1:336). G. de Purucker: '[G]ravitation [is] the same fundamentally as cosmic electro-magnetism' (ET 441).

3. *Sterrengids 2000*, Nederlandse Vereniging voor Weer- en Sterrenkunde, p. 170.

4. Theosophy, on the other hand, asserts that after the initial birth of the sun and its family of planets, the physical globes of the individual planets (and subsequently their corresponding astral globes), die and disintegrate when they reach the end of their respective lifetimes and, after a certain interval, reembody on a higher or lower subplane; they reappear in the solar system as comets, before settling down into stable orbits, and condensing and growing into planets. Planets reembody several times before their parent sun reaches the end of its own lifetime. The earth in its current embodiment is about 2 billion years old (see '**The age of earth**', http://www.ourworld.compuserve.com /homepages/age.htm).

5. Astronomer Tom Van Flandern points out several problems with the planetesimal hypothesis (*Dark Matter, Missing Planets & New Comets*, North Atlantic Books, 1993, pp. 329-31). It is also criticized from a theosophical standpoint by G. de Purucker (FEP 79-80).

6. This is not true. If the density of matter is distributed in a spherically symmetric manner inside the celestial bodies, then the orbital planes of the planets around the sun should be randomly oriented in three-dimensional space, and the direction of motion of the planets in their orbits should be random. Yet all the planets orbit the sun in planes which form only small angles to the sun's equatorial plane, and in the same direction as the sun's sense of rotation. The probability of this spatial arrangement occurring by chance is extremely small.

7. J. Silk, *The Big Bang*, W.H. Freeman & Company, 1989, pp. 357-8.

8. L. Dones & S. Tremaine, 'Why does the earth spin forward?', *Science*, vol. 259, 1993, pp. 350-4.

9. G.L. Verschuur, *Impact: the threat of comets and asteroids*, Oxford University Press, 1996, pp. 69, 89.

10. This 'big splash' theory of the moon's origin has been in and out of scientific fashion for over a century. Theosophy rejects the theory and says that the moon is the remnant of the former embodiment of the earth (SD 1:154-6, 2:64; FEP 527, 548-50; FSO 341-5).

11. See D.A. Pearlman (ed.), *Stephen J. Gould and Immanuel Velikovsky*, Ivy Press Books, 1996, pp. 211-3.

12. G.E. Williams, 'History of the earth's obliquity', *Earth-Science Reviews*, vol. 34, 1993, pp. 1-45.

13. Palaeolatitudes are past latitudes determined on the basis of the dubious 'science' of palaeomagnetism; see next section.

14. See also Darren M. Williams, James F. Kasting & Lawrence A. Frakes, 'Low-latitude glaciation and rapid changes in the Earth's obliquity explained by obliquity-oblateness feedback', *Nature*, vol. 396, 1998, pp. 453-5.

15. See part 4, section 3, figure 2.

16. See part 4, section 3, The climate record.

17. J. Laskar, F. Joutel & P. Robutel, 'Stabilization of the Earth's obliquity by the Moon', *Nature*, vol. 361, 1993, pp. 615-17; J. Laskar & P. Robutel, 'The chaotic obliquity of the planets', ibid., pp. 608-12.

18. *Nature*, 18 February 1993, p. 610.

19. J. Touma & J. Wisdom, 'The chaotic obliquity of Mars', *Science*, vol. 259, 1993, pp. 1294-7.

2. Polar wander

1. The dipole field drifts westward at a rate of about 0.08° per year (equivalent to 4500 years for a complete circuit of the earth), while the nondipole field, which makes up between 5% and 20% of the total field but is believed to be chiefly responsible for secular variations, drifts westward at a rate of about 0.18° per year (2000 years for a complete circuit). At the north magnetic pole, the north pole of the compass points downwards, which is usually interpreted to mean that this location is actually the *south* magnetic pole. (A. McLeish, *Geological Science*, Thomas Nelson and Sons Ltd., 1992, pp. 131-3; 'Earth', Encyclopaedia Britannica CD98. See '**Theosophy and magnetism**', http://ourworld.compuserve.com/homepages/dp5/magnet.htm)

2. See '**Sunken continents versus continental drift**, http://ourworld.compuserve.com/homepages /dp5/sunken.htm.

3. William R. Corliss (comp.), *Unknown Earth*, Sourcebook Project, 1980, p. 752.

4. 'Journey to the centre of the earth', Inside Science no. 134, *New Scientist*, 14 October 2000, figure 2.

5. See Paul Dunbavin, *The Atlantis Researches: the earth's rotation in mythology and prehistory*, Third Millennium, 1995, pp. 51-64.

6. 'Polar motion', Encyclopaedia Britannica CD98.

7. William R. Corliss (comp.), *Earthquakes, Tides, Unidentified Sounds*, Sourcebook Project, 1983, pp. 120-3.

8. John White, *Pole Shift: predictions and prophecies of the ultimate disaster*, A.R.E. Press, 1991, pp. 54-7; Immanuel Velikovsky, *Earth in Upheaval*, Delta, 1955, pp. 111-4.

9. T. Gold, 'Instability of the earth's axis of rotation', *Nature*, vol. 175, 1955, pp. 526-9; *Pole Shift*, p. 60.

10. W.H. Munk & G.J.F. MacDonald, *The Rotation of the Earth*, Cambridge University Press, 1975, pp. 275-85. See also Harold Jeffreys, *The Earth: its origin, history and physical constitution*, Cambridge University Press, 6th ed., 1976, pp. 478-81.

11. R.G. Gordon, 'Polar wandering and paleomagnetism', *Annu. Rev. Earth Planet. Sci.*, vol. 15, 1987, pp. 567-93.

12. K.M. Storetvedt, *Our Evolving Planet: earth history in new perspective*, Alma Mater, 1997.

13. Joseph L. Kirschvink, Robert L. Ripperdan & David A. Evans, 'Evidence for a large-scale reorganization of early Cambrian continental masses by inertial interchange true polar wander', *Science*, vol. 277, 1997, pp. 541-5.

14. *Pole Shift*, pp. 65-86.

15. Ibid., pp. 133-42, 417-8.

16. V.J. Slabinski, 'A dynamical objection to the inversion of the earth on its spin axis', *Journal of Physics A*, vol. 14, 1981, pp. 2503-7.

17. Peter H. Schultz & Anne B. Lutz, 'Polar wandering of Mars', *Icarus*, vol. 73, 1988, pp. 91-141.

18. See Bruce C. Murray & Michael C. Malin, 'Polar wandering on Mars?', *Science*, vol. 179, 1973, pp. 997-1000.

19. G.H. Katterfeld & G.V. Charushin, 'General grid systems of planets', *Modern Geology*, vol. 4, 1973, pp. 243-87.

3. Crustal slippage

1. Charles H. Hapgood, *The Path of the Pole*, Chilton Book Company, 1970; White, *Pole Shift*, pp. 87-107.

2. Rand & Rose Flem-Ath, *When the Sky Fell*, Stoddart, 1995.

3. Graham Hancock, *Fingerprints of the Gods*, Heinemann, 1995.

4. Colin Wilson, *From Atlantis to the Sphinx*, Virgin, 1996.

5. See Paul Heinrich, 'The Mysterious Origins of Man: Atlantis, mammoths, and crustal shift' and 'Fingerprints of the Gods', http://www.intersurf.com/~chalcedony/wildside.shtml.

6. Paul LaViolette, *Earth Under Fire*, Starlane Publications, 1997, p. 316.

7. Ibid., pp. 142, 180.

8. Sue Bishop & Philip Burns, 'Woolly Mammoths: Evidence of Catastrophe?', http://earth.ics.uci.edu /faqs/mammoths.html; *Earth Under Fire*, pp. 189-218; R. Dale Guthrie, *Frozen Fauna of the Mammoth Steppe: the story of blue babe*, University of Chicago Press, 1990.

9. See '**Sunken continents versus continental drift**', http://ourworld.compuserve.com/homepages /dp5/sunken.htm.

10. I. Velikovsky, *Worlds in Collision* (1950), Pocket Books, 1977; Velikovsky, *Earth in Upheaval*; *Pole Shift*, pp. 109-32.

11. For a critique of Velikovsky's (mis)use of myths and legends, see Bob Forrest, *Guide to Velikovsky's Sources*, Stonehenge Viewpoint, 1987.

12. Leroy Ellenberger: 'Top ten reasons why Velikovsky is wrong about Worlds in Collision', http://abob.libs.uga.edu /bobk/vdtopten.html; 'An antidote to Velikovskian delusions', http://abob.libs.uga.edu/bobk/velidelu.html. Sean Mewhinney: 'Tree rings', http://www.pibburns.com/smtrerng.htm, 1996; 'Minds in ablation', part 1, http://www.pibburns.com/smmia.htm, 1998.

13. Dunbavin, *The Atlantis Researches*.

14. D.S. Allan & J.B. Delair, *When the Earth Nearly Died: compelling evidence of a world cataclysm 11,500 years ago*, Gateway Books, 1995.

4. Psychic predictions

1. White, *Pole Shift*, pp. 307-11.

2. Hugh Lynn Cayce, *Earth Changes Update*, A.R.E. Press, 1980, pp. 59-60, 69, 71, 84, 87, 98; *Pole Shift*, pp. 193-207.

3. *Pole Shift*, pp. 209-25. Abrahamsen was more successful in giving clairvoyant advice on places in Arizona where archaeological evidence of ancient civilization would be found; he achieved a 78% success rate (David Hatcher Childress, *Lost Cities of North & Central America*, Adventures Unlimited, 1992, p. 325).

4. Ibid., pp. 227-41.

5. Ibid., pp. 245-7.

6. Ibid., pp. 252-4.

7. Ibid., pp. 313-23.

5. Ancient traditions

1. *The Book of Enoch* (1883), Wizards Bookshelf, 1983, p. 78; see SD 2:145, 314, 533-4, 726.

2. Revised Standard Version: 'Behold, the Lord will lay waste the earth and make it desolate, and he will twist its surface and scatter its inhabitants. . . . The earth staggers like a drunken man . . .' Holman Bible: 'Behold, the Lord shall destroy the earth and lay it waste, and turn it upside down and scatter its inhabitants. . . . The earth shall reel to and fro like a drunkard . . .' (White, *Pole Shift*, p. 288)

3. Revised Standard Version: 'the earth quaked, the heavens poured down rain, at the presence of God; yon Sinai quaked at the presence of God . . .'

4. Stars falling to earth can also symbolize the descent of spirit into matter.

5. Allan & Delair, *When the Earth Nearly Died*, p. 153.

6. Ibid., p. 191. In the *Timaeus*, the earth is said to 'wind about the axis of the universe' (Dunbavin, *The Atlantis Researches*, p. 158).

7. *When the Earth Nearly Died*, pp. 14-15; William F. Warren, *Paradise Found: the cradle of the human race at the north pole* (1885), Health Research reprint, 1964, pp. 191-2.

8. SD 2:356-7; Samson Arnold Mackey, *'Mythological' Astronomy of the Ancients Demonstrated* (1822/23), Wizards Bookshelf, 1973, pp. 41-2.

9. Velikovsky, *Worlds in Collision*, p. 120. According to Velikovsky, the Ipuwer papyrus refers to a time when 'the land turns round [over] as does a potter's wheel', and the Ermitage papyrus speaks of a catastrophe that turned the land 'upside down'. However, in Faulkner's translation of the Ipuwer papyrus we read: 'the land turns round as does a potter's wheel; the robber is a possessor of riches, and the rich man is become a plunderer.' According to Bob Forrest, this is simply a metaphorical description of the upheaved social order, and the expression 'upside down' as used in the Ermitage papyrus simply means 'topsy turvy' (*Guide to Velikovsky's Sources*, p. 11).

10. Frank Waters, *Book of the Hopi*, Penguin, 1977, pp. 14, 16, 18; *Pole Shift*, pp. 284-5.

11. *When the Earth Nearly Died*, pp. 153-4.

12. *The Atlantis Researches*, p. 105.

13. Ibid.

14. *When the Earth Nearly Died*, p. 191.

15. Elsa-Brita Titchenell, *The Masks of Odin: wisdom of the Ancient Norse*, Theos. Univ. Press, 1985, pp. 143, 149-50.

16. Hancock, *Fingerprints of the Gods*, pp. 204-5, 247.

17. Ibid., pp. 193-4.

18. E.g. ibid., pp. 164, 202-4; Fred J. Dick, *The Theosophical Path*, Dec. 1915, pp. 447-8, Aug. 1925, pp. 120-3.

19. SD 2:535. There is one place on earth where the sun rises in the south even today: namely, at the north pole.

Poleshifts: Part 3

Poleshifts: Contents

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POLESHIFTS

Theosophy and Science Contrasted

David Pratt

January 2000

PART 3: POLESHIFTS AND THEOSOPHY

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1. The gradual inversion of the poles

> That worlds (also Races) are periodically destroyed by fire (volcanoes and earthquakes) and water, in turn, and renewed, is a doctrine as old as man. Manu, Hermes, the Chaldeans, all antiquity believed in this.[1] Twice already has the face of the globe been changed by fire, and twice by water, since man appeared on it. As land needs rest and renovation, new forces, and a change for its soil, so does water. Thence arises a periodical redistribution of land and water, change of climates, etc., all brought on by geological revolution, and ending in a final change in the axis. . . . [T]here is a secular change in the inclination of the earth's axis, and its appointed time is recorded in one of the great Secret Cycles.[2]

According to theosophy, the inclination of the earth's axis slowly changes by 4° every precessional cycle.[3] At present the angle of inclination is decreasing, which means that the earth's axis, which is currently inclined at 23.44° (23°26'), is steadily moving towards an upright position at the average rate of 56 arc-seconds (1/648°) per century, the current rate being 47 arc-seconds per century. Consequently, the tropics of Cancer and Capricorn[4] are receding from the poles and approaching the equator, while the arctic and antarctic circles are receding from the equator and approaching the poles.

The following table compares the obliquity of the ecliptic measured by the Chinese in 160 BC and 1100 BC[5] with the corresponding values calculated using the modern scientific formula[6] and the theosophical rule of a 4° shift every 25,920 years.

	Chinese	Science	Theosophy
160 BC	23°45'52"	23°42'55"	23°46'21"
1100 BC	23°54'03"	23°49'40"	23°55'03"

Perhaps the 4° rule has more going for it than just being easier to apply than the scientific formula!

The 4° rule implies that just over 430,000 years ago the tilt was 90° and the earth was lying on its side with its axis in the plane of the ecliptic; at this time the tropics were at the poles and the 'polar' circles were at the equator. In just over 150,000 years, the tilt will reach 0°, and the earth's axis will be perpendicular to the ecliptic; the tropics will then coincide with the equator and the polar circles will be at the poles.

H.P. Blavatsky states in the quotation at the head of this section that the earth's axis undergoes a secular – i.e. gradual and progressive – change. This implies that when the poles become perpendicular to the ecliptic the change in the inclination of the axis continues in the same direction, and that the earth's axis inverts a full 360° in a period of about 2,340,000 years.

G. de Purucker, too, states that there is a secular change in the inclination of a globe's axis, and implies that it slowly shifts through a full 360° in a period of several million years:

> every planet or globe in the solar system, visible or invisible, at different times in its planetary manvantara, slowly changes the position of its axis of rotation, so that the axis has a secular movement of inclination, slowly increasing (or decreasing) through the ages. Thus it is that at one time the axis of our earth is upright – the plane of its equator coinciding with the plane of the ecliptic – and then there is springtime over all the globe throughout the year. At other times the poles of the earth, i.e. of the axis of the earth, are parallel with the plane of the ecliptic, or with the earth's own orbit. This secular movement of inclination continues until what is the north pole points, so to speak, downwards, and the south pole upwards. The poles then have become inverted; and the movement of inclination continues until finally the north pole resumes its former upright position in space when considered in relation to the plane of the ecliptic.
>
> An inversion of the poles usually brings about great continental readjustments, with consequent karmic changes in the destiny of human races, such as those which took place in the long career of the fourth root-race, the Atlantean. It should be obvious that a slow secular movement of change in the earth's axis takes millions of years; and an inversion of the poles brings about a retrograde rotation of the thus inverted globe.[7]

Of the nine planets known to science, Venus, Uranus, and Pluto have a retrograde motion (i.e. rotate clockwise about their axis), which means that they are inverted to some extent (Uranus 97°46', Venus 177°21', Pluto 119°37'). According to Purucker this is also true of Lilith, or the 'Planet of Death', a planet too dense to be visible to us, which is situated 'near' or 'behind' the moon.[8] As far as the other planets are concerned, Mars is inclined at 25°12', Jupiter at 3°07', Saturn at 26°44', and Neptune at 27°52'.

Elsewhere Purucker states that the earth's north and south poles have not been inverted during this manvantara.[9] The meaning of this statement is made clear in the following passage:

> . . . sudden shiftings of the poles do indeed take place; and by 'shifting of the poles' I mean a change in the direction in which the present poles of the earth point in space as against the stars or towards the stars, not that these poles shift within the earth from place to place. In other words, the present North Pole of the earth remains its North Pole during all this present Manvantara; it does not shift geologically or geographically; but its direction in space, its pointing towards the stars, shifts secularly or constantly in space, undergoing at certain karmic periods sudden movements which are governed by the Karman of the earth and the times of which are written, so to say, on the face of the clock of the Universe.

He adds that when these sudden movements of the poles of the earth take place, the waters of the ocean rush northwards and southwards, dry land appears near the equator, and northern and southern lands are submerged. This sudden shifting of the poles in space also means that the angle of incidence of the sun's rays likewise changes, so that lands which a short time previously – even a few hours – had a mild and subtropical climate are gripped in icy cold, and vice versa.[10]

In *The Secret Doctrine* Blavatsky refers on several occasions to *Mythological Astronomy of the Ancients Demonstrated* (1822/23), by Sampson Arnold Mackey, a shoemaker and amateur astronomer, whom she calls the 'self-made adept of Norwich'.[11] Mackey asserts that the tilt of the earth's axis slowly inverts through a full 360° at the rate of 4° per precessional cycle. He says that according to the ancient Hindus, who generally reckoned a precessional cycle as approximately 24,000 years in length,[12] the earth took 1,080,000 years (a 'mahâ-yuga') to invert 180°, 2,160,000 years (a 'prajanatha-yuga') to invert 360°, and 4,320,000 years (a 'deva-yuga') for two complete inversions.[13] In theosophy, the period of 4,320,000 years is called a mahâ-yuga and is approximately equal to half the life-period of a root-race.[14]

In an article entitled 'Secret Cycles', which was not published in her lifetime, Blavatsky quotes a very long passage from Mackey, in which he refers to the yugas and their connection with the gradual change in the inclination of the earth's axis. She prefaces the quotation by saying that Mackey's theory about the Hindu yugas and their length is 'very near the correct doctrine'.[15]

The theosophical teaching of the gradual inversion of the poles means that in the course of each precessional cycle the earth's axis does not trace out an approximate circle around the poles of the ecliptic with a radius of about 23.5°, but rather a *spiral*. Since the inclination of the axis is at present diminishing, each whorl of the spiral finishes 4° closer to the ecliptic pole. In about 150,000 years the axis will be upright and the earth's north pole will point directly to the north pole of the ecliptic – the centre of the spiral will have been reached. But the tilt of the earth's axis will continue to move past the vertical and the earth's north pole will begin to trace out a new spiral, each whorl finishing 4° further from the centre. About half a million years later, the north pole will be in the plane of the ecliptic, and thereafter the spiral will continue towards the south ecliptic pole until the earth is completely upside down. But

again, the inclination of the axis will continue to change and a new spiral will begin, moving from the south pole of the ecliptic round and round the celestial sphere back to the north pole.[16] This process may be repeated again and again, each complete spiral circuit of the heavens, from the north pole to the south pole of the ecliptic and back, being composed of 90 whorls, and taking about two and a third million years to complete. However, no indication is given in theosophical writings as to how long the secular change in the inclination of the earth's axis has been taking place, or how long it has averaged 4 degrees per precessional cycle.

It is worth noting that Blavatsky implies that at one time the earth made certain movements it no longer makes today. One of the stanzas of Dzyan states: '*At the expiration of every forty (annual) Suns, at the end of every fortieth Day, the double one becomes four; male and female in one, in the first and second and the third*. . . . . .' Blavatsky comments:

> Which is clear, since 'every sun' meant a whole year, the latter being composed of one day then, as in the arctic circle it is now composed of six months. According to the old teaching, the axis of the earth gradually changes its inclination to the ecliptic, and at the period referred to, this inclination was such that a polar day lasted during the whole period of the earth's revolution about the sun, when a kind of twilight of very short duration intervened; after which the polar land resumed its position directly under the solar rays. This may be contrary to astronomy as now taught and understood: but who can say that changes in the motion of the earth, which do not take place now, did not occur millions of years back?[17]

The effect described could be produced by *annual* changes in the earth's tilt.[18]

Blavatsky does not follow the modern scientific fashion of ascribing axial shifts and other catastrophes to collisions with asteroids, comets, or other astronomical bodies. Indeed, she writes:

> Science confesses its ignorance of the cause producing climatic vicissitudes and . . . changes in the axial direction, which are always followed by these vicissitudes; nor does it seem so sure of the axial changes. And being unable to account for them, it is prepared rather to deny the axial phenomena altogether, than admit the intelligent Karmic hand and law which alone could reasonably explain such sudden changes and their results. It has tried to account for them by various more or less fantastic speculations; one of which would be the sudden, and as imaginary, collision of our earth with a comet . . . , as the cause of all the geological revolutions. But we prefer holding to our esoteric explanation, since FOHAT is as good as any comet, having, in addition, universal intelligence to guide him.[19]

She does, however, refer to the 'pregenetic battles fought by the growing planets before the final formation of Kosmos', and says that this accounts for 'the seemingly disturbed position of the systems of several planets, the plane of the satellites of some (of Neptune and Uranus, for instance . . .) being tilted over, thus giving them an appearance of retrograde motion'.[20] The latter remark refers not to *axial* tilt but to *orbital* tilt: a few of the satellites of the outer planets (Jupiter, Saturn, Uranus, and Neptune) revolve around their primaries in a clockwise (retrograde) rather than anticlockwise direction.[21]

As far as large-scale polar wandering and lithosphere displacement are concerned, theosophical writings do not appear to give any support to such ideas. This is seen in Purucker's remark, quoted above, that the poles do not shift geologically or geographically within the earth. Blavatsky says that since the appearance of the first root-race (in the mid-Palaeozoic) the earth has been convulsed four times, and

> though the whole face of the earth was transformed thereby each time, the conformation of the arctic and antarctic poles has but little altered. The polar lands unite and break off from each other into islands and peninsulas, yet remain ever the same.[22]

If the earth's outer shell were to shift over the interior, latitudes and longitudes and the direction of the cardinal points would change. Archaeocryptographer Carl Munck has shown that ancient mounds, pyramids, temples, and other megalithic monuments the world over were designed and positioned according to a universal code, whereby their design features often encode their exact present-day latitude and longitude.[23] This rules out any major lithosphere displacements or continental movements since these monuments were built. Officially they are all believed to have been built well within the last 10,000 years, but according to theosophy, some of them, or at least their original structures, date back several hundred thousand years. The Great Pyramid of Giza is said to have been built about three precessional cycles (78,000 years) ago.[24] Since it is aligned with the present cardinal points with unprecedented accuracy, this would rule out any major lithosphere displacements since that time. Moreover, as shown in part 2, 'poleshifts' of this type are highly improbable.

2. From eternal spring to age of horror

Blavatsky makes several references to times when the earth's axis was more or less upright, and, like Mackey,

says that the earth then enjoyed an 'eternal spring'.[1] The vernal equinoctial point is the point on the celestial equator which the sun crosses at the vernal equinox. When the earth's poles are upright, the celestial equator coincides with the ecliptic, and therefore every point on the equator is the vernal equinoctial point. In this sense, the earth does indeed enjoy an 'eternal spring'. This does not mean that every part of the earth enjoys spring-like weather all year round, but day and night would always be of approximately equal length and there would be no major seasonal changes such as result from the inclination of the axis, though there would still be minor seasonal changes resulting from the earth's elliptical orbit. Blavatsky says that Jupiter enjoys an eternal spring at present (its axis being inclined at only 3.1°).[2]

Blavatsky also refers to times when the earth's axis was tilted by 90° and therefore lay in the plane of the ecliptic.[3] Mackey refers to such periods as the 'age of horror'. At such times the contrast of the seasons would be at its maximum. There would be a period of continuous daylight in summer and a period of continuous darkness in winter, and most of the globe would suffer extreme annual variations in climate, from tropical heat to frigid cold.

At present the angle of inclination of the earth's axis is about 23.4° (or rather 336.6°); the tropics lie 23.4° north and south of the equator, and the polar circles lie at 66.6° north and south latitude (or 23.4° from the north and south poles). All regions north of the arctic circle and south of the antarctic circle are still in their 'age of horror'; they do not experience a normal succession of day and night throughout the year, but have a period of continuous daylight and a period of continuous darkness of between one day (at the polar circles) and six months (at the poles) every year.

The angle of inclination of the earth's axis at which the 'age of horror' begins and ends depends on latitude. The further north or south of the equator a particular location lies, the longer its age of horror will last. The age of horror in any particular latitude begins when the 'arctic' or 'antarctic' circle coincides with that latitude as it recedes from the pole to the equator (i.e. as the tilt of the axis shifts from 0° to 90°, or from 180° to 270°), and ends when the polar circle again coincides with that latitude as it returns from the equator to the pole (i.e. as the tilt of the axis shifts from 90° to 180°, or from 270° to 360° [or 0°]). At 25° north or south latitude, for instance, the age of horror would last while the north pole was between 25° above the ecliptic and 25° below it, equivalent to about 324,000 years. At 45° north or south latitude, it would last about 583,000 years. Every latitude would experience two ages of horror during each 360° inversion of the axis.[4]

During the age of horror, the annual period of complete darkness would be shorter than the period of constant daylight, due to atmospheric refraction. Twilight is generally reckoned to begin when the centre of the rising sun is 18° below the horizon, and when the setting sun is about 2° below the horizon. At the poles, for example, darkness does not really continue for six months but for less than half this period. When the sun sets at the north pole, about 22 September, there is perpetual twilight for about two months until the sun has descended 18° below the horizon. Likewise, a new twilight commences about two months before the winter solstice, when the sun is again 18° below the horizon.[5] The stars, moon, and auroras provide additional light for the polar regions. When the axis is perpendicular to the ecliptic, the north pole will therefore not enjoy perpetual twilight but perpetual sunlight due to the refraction of the sun's rays by the atmosphere. The axis would have to be tilted by more than 2° before the sun will rise and set, and sunlight gives way to twilight for part of the year. When the axis is inclined at 90°, there will be a band of permanent sunlight extending two degrees on either side of the equator, and beyond it bands of permanent twilight extending to 18° N and S.

3. Axial disturbances and geological cataclysms

In addition to the gradual inversion of the axis, amounting to about 4° per 25,920 years, 'sudden' poleshifts or axial disturbances occur, resulting in major geological upheavals. No information is given in theosophical literature on the magnitude of such shifts or the rate at which they take place.

Blavatsky says that since the appearance of the first root-race in the present, fourth round of the earth's evolution,

> there have already been four such axial disturbances; when the old continents – save the first one – were sucked in by the oceans, other lands appeared, and huge mountain chains arose where there had been none before. The face of the Globe was completely changed each time . . .[1]

Poleshifts have therefore played a role in the geological cataclysms that affected all four preceding root-races and continental systems referred to in theosophy.

Blavatsky writes:

> after the first geological disturbance in the Earth's axis which ended in the sweeping down to the bottom of the Seas of the whole second Continent [which included northern Asia, Scandinavia, and Greenland], with its primeval races . . . there came another disturbance by the axis resuming just as rapidly its previous degree of inclination; when the Earth was indeed *raised once more* out of the Waters . . .[2]

The destruction of Lemuria is said to have been caused by submarine volcanoes and earthquakes, and by a decrease in the earth's velocity of rotation.[3] A poleshift took place in the middle of the third race: '*The axle of the Wheel tilted. The Sun and Moon shone no longer over the heads of that portion of the* SWEAT BORN; *people knew snow, ice, and frost, and men, plants, and animals were dwarfed in their growth*.'[4]

In the case of Atlantis, destruction 'was brought on by successive disturbances in the axial rotation', beginning in the earliest Tertiary times and continuing for long ages.[5] The submergence of Atlantis began in the Eocene, and much of it sank in the Miocene,[6] but the largest remaining island, Ruta, situated in the Pacific Ocean, was destroyed about 850,000 years ago, at a time of the shifting of the earth's axis.[7]

Although Blavatsky sometimes states that there have been four axial disturbances to date, she also says on one occasion that *three* of the seven great cataclysms during the present round will be caused by changes in the inclination of the earth's axis.[8] This may mean that poleshifts only play a central role in three of the cataclysms (perhaps those connected mainly with flooding, involving the second, fourth, and sixth continents, since the sinking of the second continent is said to have been the result of 'the first geological disturbance of the earth's axis').[9]

The cataclysms concerned may well have involved a series of axial disturbances, spread over extremely long periods. As Blavatsky says, 'The racial cataclysms are not a Noah's deluge of forty days – a kind of Bombay monsoon.'[10] Purucker states that it took hundreds of thousands of years for the main portions of Atlantis to be submerged and for new lands to rise to take their place.[11] The sinking of the island of Ruta is said to have taken 150,000 years.[12]

4. Cataclysms and the precessional cycle

Cataclysms are said to occur at every renewal of the precessional cycle.[1] This suggests that earthshaking events will also occur at the end of the present precessional cycle (in which axial disturbances may or may not play a role). When will this be? Blavatsky states that since the present angle of inclination is just under 23.5°, there are still another two and a half degrees to go before the end of the precessional cycle, which gives humanity in general, and our civilized races in particular, a reprieve of about 16,000 years.[2]

But the question arises: how does Blavatsky arrive at the figure of two and a half degrees? This figure would imply that the current precessional cycle began when the angle of inclination was 25° (i.e. one and a half degrees ago) and will end when it reaches 21°. At the rate of 4° every 25,920 years, one and a half degrees is equal to about 9740 years, which would mean that the present precessional cycle began around 7740 BC, when the equinoctial point was in the middle of Cancer – whereas it might be expected that the precessional cycle would have begun when the equinox entered Aries (in 2410 BC) or when it coincided with the first point of the constellation Aries, some 2160 years later.

One of the sources of the figure of 16,000 years (or two and a half degrees) which Blavatsky gives for the end of the present precessional cycle was apparently S.A. Mackey, as a comparison of quotations will show.

Before quoting the relevant passage from Mackey, it is necessary to outline the context. Mackey interprets each of the ten avatâras of Vishnu as signifying one precessional cycle. Varanasi (Benares), the chief seat of celestial science in India, lies at about 25° north latitude. At the end of the 'age of horror' in the latitude of Varanasi, the earth's axis would have been inclined at 65°. Ten 'avatâras' or precessional cycles later, the angle of inclination would have been 25°, and the tropic of Cancer would therefore have passed through Varanasi. This was 9000 years ago. Mackey writes:

> Now, we have seen, that the tropics would recede from the pole four degrees in each revolution from the equinoctial points . . . And as we know in our time, that the tropic is but twenty-three degrees and something less than half a degree from the equator; it has still to move two degrees and nearly half before the formation of another round or Avatar, or age; which take about 16,000 years to perform. And as we know that about 9,000 years have elapsed since the tropic was vertical at Benares, so we know that the TEN AVATARS bring down the knowledge of Astronomy to that period.[3]

In other words, Mackey is saying that, reckoning from the time, 9000 years ago, when the tropic passed through Varanasi, 16,000 years will bring us to the end of a precessional cycle of about 25,000 years, and this is equivalent to 2.5 degrees.

Compare the above quotation with what Blavatsky writes in *The Secret Doctrine*:

> Every sidereal year the tropics recede from the pole *four degrees* in each revolution from the equinoctial points, as the equator rounds through the Zodiacal constellations. Now, as every astronomer knows, at present the tropic is only twenty-three degrees and a fraction less than half a degree from the equator. Hence it has still 2.5 degrees to run before the end of the Sidereal year; which gives humanity in general, and our civilized races in *particular*, a reprieve of about 16,000 years.[4]

Blavatsky therefore gives the same figures as Mackey, but drops all reference to Benares and avatâras. At first glance, it seems as though the figure of 16,000 years (or 2.5 degrees) has been taken out of context.

In 16,000 years, as 9000 years ago, the sun will be in Cancer, and Blavatsky therefore appears to be measuring a precessional cycle from this point. Purucker says that the European national race has completed about 9000 years of its 25,920-year cycle and still has another 16,000 years to go,[5] when it will be overtaken by a cataclysm. Since the length of a national race is the same as that of a precessional cycle, Purucker, too, seems to be saying that the present precessional cycle associated with the national-race cycle began about 9000 years ago.[6]

Further corroboration that an important cycle began about 9000 years ago is provided by Fred J. Dick. Quoting from an ancient Commentary, Blavatsky says that the great pyramids of Egypt were built at the beginning of a precessional cycle 'when *Dhruva* (the then Pole-star) was at his lowest culmination, and the Krittika (Pleiades) looked over his head (were on the same meridian but above) to watch the work of the giants', and she identifies the polestar in question as Polaris.[7] Dick interpreted this obscure statement to mean that the first pyramids were built when Polaris, the polestar at the time the Commentary was written, was furthest from the actual pole at the time the Pyramid was built, and was on the same meridian both with the latter and Alcyone (the chief star of the Pleiades), the latter being higher than the pole. He calculated that the last time such an event occurred was 86,960 years ago.[8] This would mean that subsequent precessional cycles began at intervals of 25,920 years thereafter, or 61,040, 35,120, and *9200* years ago.

5. Earth in motion

Besides its annual revolution around the sun, the earth has three distinct movements: rotation, precession, and inversion.

The slow gyratory motion that gives rise to the precession of the equinoxes is said by science to be caused mainly by the moon's gravitational pull on the earth's equatorial bulge. Since the moon does not revolve around the earth in the plane of the earth's orbit but in an orbit which sometimes gives it a north declination and sometimes a south declination, it pulls alternately downwards and upwards. The resulting force tries to make the earth's axis become upright, but the momentum of the earth's rotation prevents this. Instead, the solar and lunar forces slightly twist the earth's axis around in a new direction, causing it to gyrate. Thus, precession is said to be due to the motion of the spinning earth under the action of the gravitational torque or couple exerted by the sun and moon on the non-spherical earth. From a theosophical viewpoint, however, the moon may merely help to regulate the process.

G. de Purucker says that the two main causes of solar and planetary movements are the twelve 'fohatic magnetisms' of the zodiac together with forces in the inner constitution of celestial bodies. They account for the precession of the equinoxes, apsidal motion, and the inversion of the earth's axis.[1] The latter brings about the extraordinary cataclysms marking the endings and beginnings of root-races and their main subraces; two complete inversions (through 360°) are approximately equal to half the lifetime of a root-race. Blavatsky states that changes in the earth's axis, deluges, and other cosmic cataclysms are brought about by the influence of the sun and moon.[2]

Purucker emphasizes that psycho-spiritual forces as well as physical forces are involved. In a similar vein, Blavatsky writes:

> it is absolutely *false*, and but an additional demonstration of the great conceit of our age, to assert (as men of science do) that all the great geological changes and terrible convulsions have been produced *by ordinary and known physical forces*. For these forces were but the tools and final means for the accomplishment of certain purposes, acting periodically, and apparently mechanically, through an inward impulse mixed up with, but beyond their material nature. There is a purpose in every important act of Nature, whose acts are all cyclic and periodical. But spiritual Forces having been usually confused with the purely physical, the former are denied by, and therefore, have to remain unknown to Science, because left unexamined. . . . There *is* a predestination in the geological life of our globe, as in the history, past and future, of races and nations. This is closely connected with what we call *Karma* . . .[3]

The important impact of human thought and behaviour on our globe is highlighted by W.Q. Judge:

> Karma operates to produce cataclysms of nature by concatenation through the mental and astral planes of being. A cataclysm may be traced to an immediate physical cause such as internal fire and atmospheric disturbance, but these have been brought on by the disturbance created through the dynamic power of human thought.[4]

In other words, however fortuitous and indiscriminate natural disasters may appear, their root causes may be traced back to the individual and collective thoughts and deeds of human beings.

In theosophy, it is said that the earth's poles are the storehouses and liberators of cosmic and terrestrial vitality (electricity), and that without these two safety valves the earth would have been destroyed long ago by surplus

forces. The agitation of the fohatic electric and magnetic forces at the poles is said to produce the auroras.[5] Blavatsky quotes the following from a Commentary:

> 'The abodes of Fohat are many,' it is said. 'He places his four fiery (electro-positive) sons in the 'four circles'; these circles are the equator, the ecliptic, and the two parallels of declination, or the tropics . . . 'Other seven (sons) are commissioned to preside over the . . . *lokas* at the two ends of the Egg of Matter (our Earth and its poles). . . .'[6]

Fred Dick disagreed with the scientific theory that the present diminution in the obliquity of the earth's axis is due to gravitational planetary influences or to tidal friction, and ascribed it instead to an electromagnetic torque or couple produced by one magnetic end of the earth being repelled and the other attracted by impinging solar electric forces, combined with the effects of gyroscopic action. He argued that the subtle electromagnetic forces emanating from the sun, interacting with the earth's own magnetic emanations, especially at the poles, could set up a dynamic torque sufficient to bring about both the precession of the equinoxes and the gradual inclination of the axis.[7]

> A thermo-electric torque with a resolved axial component in the plane of the ecliptic would account for the phenomenon of precessional movement. . . . An electromagnetic torque . . . only one-ninetieth of that causing precession, with a resolved axial component perpendicular to the plane of the ecliptic, would account for [the] slow phenomenon of inversion.[8]

He adds that inversion (which may also be called vertical or inversional precession) may take place rapidly at certain cyclic periods in response to forces generated by the karma of the earth and its inhabitants, producing major cataclysms.

As far as the earth's rotation is concerned, Purucker states:

> rotation is caused by the entry into it at its north pole of spiritual and psychomagnetic energies; for electricity, and magnetism perhaps especially, pursue a circuitous or serpentine path, somewhat like that of a spiral, and the entity through which it flows follows the circular impulse given to it and therefore whirls or rotates.[9]

Fred Dick called attention to a 'beautiful and suggestive' experiment performed by Ampère:

> A magnet, loaded with platinum at the lower end, floats upright in mercury contained in a circular glass vessel, at some distance from its center. On dipping a point, connected with one of the terminals of a battery, in the center of the mercurial surface, the other terminal being connected with the outer edge of the mercury, the magnet is seen to rotate on its axis. Here is a perfect analogy to the sun, considered as a radiator of electric forces.[10]

In *The Secret Doctrine*, changes in the earth's spin velocity are identified as a major cause of geological upheavals. If the spin velocity increases, the greater centrifugal force will lead to an increase in the flattening of the poles and in the equatorial bulge. The oceans would immediately adjust to the new ellipsoid, causing increases in sea level at latitudes below 45°, with decreasing sea level at latitudes above 45°. If the spin velocity slows down, the effect will be reversed.

A Commentary describes the effects of a decrease in the earth's speed of rotation as follows:

> '*When the Wheel runs at the usual rate, its extremities* (the poles) *agree with its middle circle* (equator), *when it runs slower and tilts in every direction, there is a great disturbance on the face of the Earth. The waters flow toward the two ends, and new lands arise in the middle belt* (equatorial lands), *while those at the ends are subject to pralayas by submersion*. . . .'
>
> '*Thus the wheel* (the Earth) *is subject to, and regulated by, the Spirit of the Moon, for the breath of its waters* (tides). *Toward the close of the age* (Kalpa) *of a great* (root) *race*, *the regents of the moon* (the Pitar fathers, or Pitris) *begin drawing harder, and thus flatten the wheel about its belt, when it goes down in some places and swells in others, and the swelling running toward the extremities* (poles) *new lands will arise and old ones be sucked in*.'[11]

Blavatsky says that it was a decrease in the earth's speed of rotation that caused the gigantic continent of Lemuria to begin separating into smaller continents.[12] She also says that the cataclysm which destroyed Lemuria was due to 'a series of subterranean convulsions and the breaking asunder of the ocean floors'[13] – triggered or accelerated perhaps by the decrease in the spin velocity.

According to modern science, the earth and moon raise tides in the bodies of one another, resulting in the dissipation of energy into heat, which in turn leads to the slowing of the earth's spin velocity and the recession of the moon. At present, the earth's spin velocity is declining by about two milliseconds per century, and the length of the earth's day is increasing at the same rate. By extrapolating this trend backwards in time, scientists have concluded that the year must have been far longer in the distant past. For instance, there were supposedly about 425 days in a year in the early Palaeozoic. It is also said that the moon was only 346,000 km from the earth in

Precambrian times and has receded since then at a rate of just over 2 cm per year to its present distance of 384,000 km, and that as a result there were 13.1 lunar months in a year 650 million years ago compared to 12.4 at present.[14]

The prediction that there were far more days in a year in the distant past has supposedly been confirmed by counting growth rings in fossil shells.[15] However, this 'evidence' has been challenged. For instance, Stephen J. Gould says that we cannot be sure what periodicity the lines reflect. Instead of recording solar days, they might be a response to tidal cycles, or even to internal metabolic rhythms with no apparent relationship to days, tides, and seasons. He concludes: 'The result of these unsolved problems is a body of poorly synchronized data. Uncomfortably large differences exist in the literature.'[16]

Purucker says that the earth's spin velocity periodically increases and decreases, so that the number of days in a year also increases and decreases, perhaps between limits of about 366 and 354 days. However, during the planet's lifetime the number of days in a year averages 360.[17] A periodic increase and decrease in the speed of rotation is also implied by the above passage from an ancient Commentary. Purucker says that these changes are due to a number of cosmic interacting causes, under the governance of the fohatic magnetisms of the zodiacal constellations.

A decline in the earth's spin velocity would lead to an increase in the polar diameter and a decrease in the equatorial diameter. Confirmation that this has occurred can be found in the measurements of the Great Pyramid, which represents the earth's northern hemisphere on a scale of 1:43,200: its perimeter equals a half minute of latitude at the equator; the perimeter of the corner sockets equals a half minute of equatorial longitude, or 1/43,200 of the earth's circumference; and its height, including the platform on which it stands, is 1/43,200 of the earth's polar radius.[18] The pyramid value for 1/43,200 of the earth's equatorial circumference is 927.72161 m, which is 0.0559 m *longer* than the current value; the pyramid value for 1/43,200 of the earth's polar radius is 147.14479 m, which is 0.741 m *shorter* than current figure. In other words, the polar radius has lengthened and the equatorial radius has shortened since the Pyramid was built – about three precessional cycles ago, according to theosophy.[19]

The slowing down of the earth's rotation probably explains why sea level appears to have risen in the Arctic and fallen in the equatorial regions in recent times.[20] Fracturing caused by variations in the rotation speed may help to account for the global network of linear crustal features or lineaments, such as rifts and ridges, often parallel and persisting for hundreds and thousands of kilometres. Lineament systems are also found on the moon, Mars, and Mercury.[21]

Notes

1. The gradual inversion of the poles

1. 'The Mexicans had, and still have, the tradition of the four-fold destruction of the world by fire and water, just as the Egyptians had, and the Hindus have, to this day' (SD 2:311). 'Christians ought not to object to this doctrine of the periodical destruction of continents by fire and water: for *2 Peter* speaks of the earth "standing *out of the water*, and *in the water*, which earth, being *overflowed*, perished, but *is now reserved unto fire*" ' (SD 2:762). The Buddhists believe that the universe is periodically called forth from an invisible state into a visible state. 'They reckon twenty-two such visible appearances of the universe governed by Buddhas, and as many destructions of it, by fire and water in regular successions' (Isis 2:156fn). Plato quotes an Egyptian priest as saying that there have been and will be many destructions of mankind, the greatest of which are by fire and water (*Timaeus* 22 C-D). Berossus asserted that the earth was to be submerged when all the planets met in Cancer, and consumed by fire when they met in Capricorn (R.H. Allen, *Star Names: their lore and meaning* (1899), Dover, 1963, pp.107-8).

2. SD 2:725-6.

3. 'Every sidereal year the tropics recede from the pole *four degrees* in each revolution from the equinoctial points, as the equator rounds through the zodiacal constellations' (SD 2:331). There is 'a secular change in the inclination of the earth's axis' (SD 2:726). 'According to the old teaching, the axis of the earth gradually changes its inclination to the ecliptic . . .' (SD 2:292). For examples of the application of the 4° rule (all taken from S.A. Mackey), see: SD 2:357, 407-8, 768.

In his book *Pole Shift* (A.R.E. Press, 1991), John White devotes a whole chapter to the views of H.P. Blavatsky and theosophy, but apparently fails to realize that she speaks of a secular axial shift of 4° per precessional cycle, even though he quotes the relevant passage from *The Secret Doctrine* (2:331).

4. When Hipparchus (re)discovered and publicized the precession of the equinoxes around 130 BC, the vernal equinox occurred in the constellation Aries, the summer solstice in Cancer, the autumnal equinox in Sagittarius, and

the winter solstice in Capricorn. (According to Blavatsky, the vernal equinox was already in Pisces in 130 BC, at least as far as the artificial zodiac of 12 equal constellations is concerned.) Since the time of Hipparchus, the earth has precessed about 28°, and, astronomically, the vernal equinox now lies in Pisces (approaching Aquarius), the summer solstice in Gemini, the autumnal equinox in Virgo, and the winter solstice in Sagittarius. As far as the *constellations* of the zodiac are concerned, the tropics should really be called the tropics of Gemini and Sagittarius at present (or the tropics of Taurus and Scorpio, if we divide the zodiac into 12 equal arcs of 30° each and the earth is considered to have already entered Aquarius). However, as far as the *signs* of the zodiac are concerned, since the equinoctial point is by definition the first point of the sign Aries, the summer and winter solstices still occur at 0° Cancer and 0° Capricorn respectively.

5. *Encyclopaedia Britannica*, 1898, 2:794.

6. The scientific formula for calculating the obliquity of the ecliptic (e) for different epochs is:
$e = 23°26'21.448" - 46.8150"T - 0.00059"T^2 + 0.001813"T^3$
where T = time from epoch J2000.0 in Julian centuries (1 Julian century = 36525 days); T is negative for dates before AD 2000. This formula is considered to be accurate only for a period of a few thousand years.

7. FSO 346-7.

8. FEP 324, 349-50; FSO 346-9.

9. SOP 445-7.

10. *ES Instructions*, pp. 112-3.

11. See Appendix 6, Sampson Arnold Mackey.

12. A precessional cycle of 24,000 years corresponds to an annual rate of precession of 54". This figure can be found in the *Sûrya-Siddhânta* (1860) (Wizards Bookshelf, n.d., pp. 243-4). It results from the fact that the ancient Hindus measured the precessional cycle not from a fixed point but from the star Revatî, which has a direct proper motion of 4" per year: 50" + 4" = 54". See Fred J. Dick, 'Ancient Astronomy', *The Theosophical Path*, July 1911, pp. 64-8.

13. Samson Arnold Mackey, *'Mythological' Astronomy of the Ancients Demonstrated* (1822/23), Wizards Bookshelf, 1973, Pt. 2, pp. 28-9, 142.

14. Blavatsky says that the occult sciences show that the founders of the root-races have all been connected with the polestar. She then quotes the following from a Commentary: '*He who understands the age of Dhruva who measures 9090 mortal years, will understand the times of the pralayas, the final destiny of nations, O Lanoo*.' The '9090 mortal years' could be a veiled reference to inversions of the axis (90+90 = 180°). The paragraph that follows this quotation does at any rate refer to the secular change in axial inclination: 'Moreover there must have been a good reason why an Asiatic nation should locate its great progenitors and saints in the *Ursa Major*, a *northern constellation*. It is 70,000 YEARS, HOWEVER, SINCE THE POLE OF THE EARTH POINTED TO THE FURTHER END OF URSA MINOR'S TAIL; and many more thousand years since the seven Rishis could have been identified with the constellation of Ursa Major.' (SD 2:768; see also SD 2:307fn)

In *Mythological Astronomy* (Pt. 2, p. 74), S.A. Mackey wrote: 'It is 70,000 years since the pole of the earth pointed to the *tip of Ursa-major's tail*!' Fred J. Dick points out that in writing 'tip', Mackey had made an error of 180° – which Blavatsky corrects (*The Theosophical Path*, March 1916, p. 299fn). Dick also says that Blavatsky's reference to 'Ursa Minor's tail' is apparently a misprint for 'Ursa *Major's* tail' (the constellation mentioned by Mackey). Thus, Blavatsky (who may have been writing at a master's dictation) corrected 'tip' to read 'further end', but then wrote 'Ursa Minor' instead of 'Ursa Major'. The sentence in question means that 70,000 years ago the celestial pole and the tip of Ursa Major's tail (Alkaid) were both located about the same number of degrees from the ecliptic pole, and were approximately 180 degrees of longitude apart. The celestial pole was situated in Ursa Major between about 81,500 and 85,000 years ago.

15. BCW 14:365-8; see Appendix 6.

16. G. de Purucker says that the pole of the ecliptic can be considered as remaining virtually stationary for immense periods of time, though it actually undergoes minute but cumulative movements of which modern astronomy knows almost nothing (FSO 671).

17. SD 2:292. The 'period referred to' was probably the early third race of the fourth round (early Mesozoic), in view of the preceding reference to hermaphrodites (SD 2:291).

18. Two possible scenarios are given below. It should be noted that due to atmospheric refraction the sun will not set at the poles unless the inclination is greater than 2°, while for inclinations greater than 18° there would be complete darkness (rather than twilight) at the poles for part of the year.

a. If the axis were inclined at 0° to 2°, the poles would enjoy continuous sunlight throughout the year. To produce a brief annual twilight at the north pole, at the end of each orbit around the sun the inclination of the earth's axis would have to increase to no more than 18° (the north pole being tilted away from the sun) and then decrease again to below 2°, in the space of, say, a few days or weeks.

b. For inclinations greater than 2° (and a very high obliquity is implied by the statement that the 'polar land' was 'directly under the solar rays'), the axis would have to precess around the ecliptic pole in the space of a year (i.e. the precessional cycle would have to coincide with the annual revolution), so that the north pole permanently points towards the sun. To produce the brief annual twilight at the north pole, the axis would have to shift so that the north pole is tilted away from the sun (by between 2° and 18°), and then return to its previous position.

As Joscelyn Godwin says, 'the whole situation is most puzzling' and 'presumes conditions and motions which astronomy would be very hard put to imagine' (*Arktos: the polar myth in science, symbolism, and Nazi survival*, Phanes Press, 1993, p. 210).

19. SD 2:329-30. In its broadest sense, fohat is a collective name for the myriad forces of nature, which work from the inner planes outwards into the physical world – not randomly but in conformity with the 'laws', or rather karmic habits, of nature.

20. SD 1:101, 593.

21. Pari Spolter points out that it is only satellites that are at very great distances from their primaries that have retrograde orbits, and suggests that this forms an integral part of gravitation (*Gravitational Force of the Sun*, Orb, 1993, pp. 199-201).

22. SD 2:776. Blavatsky states that modern science 'denies any violent shiftings of the Earth's axis, and would attribute the reason for the change of climates to other causes. But this question is still an open one. If Dr. Croll will have it that all such alterations can be accounted for by the effects of nutation and the precession of the equinoxes, there are other men of Science, such as Sir H. James (*Athenaeum*, Aug. 25, 1860), and Sir John Lubbock (*ibid*), who feel more inclined to accept the idea that they are due to a change in the position of the axis of rotation. Against this the majority of the astronomers are again arrayed' (SD 2:314). The expression 'a change in the position of the axis of rotation' refers here to polar wander rather than a change in the inclination of the axis (see Charles Gould, *Mythical Monsters* (1886), Wizards Bookshelf, 1981, pp. 92-3).

23. Carl P. Munck, *Whispers from Time*, 1997, L L Productions, 700-112 Ave., N.E., Suite G-1, Bellevue WASH 98004; http://www.pyramidmatrix.com.

24. SD 2:432; see '**The Great Pyramid**', http://ourworld.compuserve.com/homepages/dp5/pyramid.htm.

2. From eternal spring to age of horror

1. SD 2:138, 332, 356, 368, 400.

2. SD 2:135.

3. SD 2:52, 356-7, 368, 534.

4. Mackey points out that in the latitude of the ancient Hindus (36°N), the age of horror would last 432,000 years (assuming a precessional cycle to last 24,000 years), and this explains why the kali-yuga (the dark age) is of this length (*Mythological Astronomy*, Pt. 2, pp. 95, 98).

5. William F. Warren, *Paradise Found* (1898), Health Research reprint, 1964, pp. 61-2.

3. Axial disturbances and geological cataclysms

1. SD 2:330. Each inversion of the poles causes 'the displacement of the Oceans, the submersion of the polar lands, and the consequent *upheaval* of new continents in the equatorial regions, and *vice versâ*' (SD 2:360).

2. SD 1:369.

3. SD 2:141fn, 266, 324-5.

4. SD 2:329.

5. SD 2:314. The Tertiary began less than 8 million years ago according to theosophy, and 66.4 million years ago according to science. See part 4, section 3, figure 2.

6. SD 1:439fn, 2:8fn, 314, 395, 433fn, 693, 710, 740.

7. SD 2:144-5. Daitya, a fairly large island in the Indian Ocean, though smaller than Ruta, sank about 270,000 years ago, while the last remaining island, Poseidonis, about the size of Ireland, and situated in the Atlantic Ocean, sank in a great cataclysm in 9565 BC (SOP 19, 24; SD 1:650-1; ML 151/155). Sometimes both Daitya and Ruta are said to have sunk 850,000 years ago (SD 2:314, 433); this may mean that *parts* of Daitya sank at the same time as (most of) Ruta.

8. SD 2:329.

9. SD 1:369. The fourth race is said to have been affected by the 'Second Flood' (SD 2:146), but also by the 'the fourth deluge on our globe in this Round' (SD 2:350).

10. SD 2:325.

11. WoS 297.

12. SD 2:395, 751fn.

4. Cataclysms and the precessional cycle

1. SD 1:649. '. . . the weal and woe of nations is intimately connected with the beginning and close of [the precessional] cycle' (SD 2:330).

2. SD 2:331. At the rate of 4° per 25,920 years, it would take 16,234 years for the axis to move two and a half degrees.

3. *Mythological Astronomy*, Appendix, pp. 25-6.

4. SD 2:331.

5. SOP 35-9. Elsewhere Purucker states that the geological racial cataclysm will take place in 16 thousand or more years (SOP 485-6); in 15 or 16 to 18 thousand years (SOP 702-3; FSO 163-4); or in 16 to 20 thousand years in the latter part of a precessional cycle (FEP 280/282; OG 143).

6. FSO 164.

7. SD 1:435.

8. *The Theosophical Path*, March 1916, p. 299. 86,960 years ago, the equinox was at 6.4° Cancer (the Crab) – a constellation that features prominently in the two Dendera zodiacs, in which it appears a total of three times. This figure is in agreement with Blavatsky's statement that 'the Egyptians have on their Zodiacs irrefutable proofs of records having embraced more than three-and-a-half *sidereal years* [precessional cycles] – or about 87,000 years' (SD 2:332). 87,000 = 3.356 x 25,920, or 3.48 x 25,000, or 3.625 x 24,000.

5. Earth in motion

1. FSO 140-2, 307.

2. SD 2:771.

3. SD 1:640-1.

4. Echoes 1:315-6, see also 1:528.

5. SD 1:204-5. Purucker states that the auroras are manifestations of the psychomagnetic vitality of the earth, and are intimately linked with the sun, especially the sunspots. They usually occur during the periods of inrush and outrush of the numberless hosts of monads (or consciousness-centres) constantly entering and leaving our globe (FSO 306-7).

6. SD 1:204.

7. F.J. Dick, 'Climatic and axial changes', *The Theosophical Path*, February 1912, pp. 83-7; 'The Spinning Earth', *The Theosophical Path*, September 1920, pp. 227-31.

8. 'Thoughts about the Earth's Rotation etc.', *The Century Path*, 31 October 1909, pp.11-12. The rate of precession is 90 times faster than the rate of axial inversion.

9. FSO 307.

10. *The Century Path*, 31 October 1909, pp.11-12.

11. SD 2:324-5.

12. SD 2:324.

13. SD 2:314.

14. *Whitaker's Almanac* 1990, p. 1152. In theosophical literature it is stated that the moon used to be much closer to the earth and much larger (IGT 14; ET 858fn; Dia 2:170).

15. William R. Corliss (comp.), *Anomalies in Geology: physical, chemical, biological*, Sourcebook Project, 1989, pp. 55-60. Some of the data suggest that although there has been an overall deceleration of the rotation rate, at certain times it has accelerated (Karsten M. Storetvedt, *Our Evolving Planet: earth history in new perspective*, Alma Mater, 1997, pp. 228-30).

16. S.J. Gould, *The Panda's Thumb*, Penguin, 1990, pp. 262-8.

17. FSO 161-2. The absolute length of the year is likewise said to both lengthen and decrease (Dia 1:368-70).

18. Wm.R. Fix, *Pyramid Odyssey*, Jonathan-James Books, 1978, pp. 22-33, 236-45; L.C. Stecchini, 'Notes on the Relation of Ancient Measures to the Great Pyramid', appendix to Peter Tompkins, *Secrets of the Great Pyramid*, Harper & Row, 1978.

19. SD 2:432. The slow change in the dimensions of the earth resulting from variations in the rate of rotation *could* bring about a change in latitudes and longitudes. The present latitude of the Great Pyramid is 29°58'51". Fred J. Dick suggests that when the pyramid was built, some 67,700 years ago, the latitude was exactly 30° ('Geophysics', *The Theosophical Path*, July 1922, pp. 69-70). However, this view is based on the assumption that the volume of the earth remains constant. If the earth undergoes a periodic inbreathing and outbreathing, its volume might change, and its surface may lengthen and compress in such a way that most latitudes and longitudes remain essentially the same. Carl Munck has shown that the Pyramid's present latitude is its design latitude.

20. William R. Corliss (comp.), *Carolina Bays, Mima Mounds, Submarine Canyons*, Sourcebook Project, 1988, p. 67.

21. Ibid., pp. 102-5; G.H. Katterfeld & G.V. Charushin, 'General grid systems of planets', *Modern Geology*, vol. 4, 1973, pp. 243-87.

Poleshifts: Part 4

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POLESHIFTS

Theosophy and Science Contrasted

David Pratt

January 2000

PART 4: CLIMATE CHANGE

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1. The climate system

A continuous change in the axial inclination of 4° per precessional cycle would alter the amount of radiation reaching the earth's surface in a regular way and the earth would be expected to undergo the same climatic changes during each 360° inversion of the poles, if no other factors were involved. In reality, however, the earth's weather system is an immensely complicated system, involving many interacting variables. Moreover, it is not stated in theosophical literature how long this steady shift in the earth's tilt has been in operation, or how the rate of inversion may have varied in the past; there may have been times when the axial inclination remained virtually constant, including long periods of 'eternal spring'.

Paul Davies underlines our limited understanding of the global climate as follows:

> Most computer simulations of the Earth's atmosphere predict some sort of runaway disaster, such as global glaciation, the boiling of the oceans, or wholesale incineration due to an overabundance of oxygen setting the world on fire. . . . Yet somehow the integrative effect of many interlocking complex processes has maintained atmospheric stability in the face of large-scale changes and even during periods of cataclysmic disruption.[1]

Some of the chief factors influencing the climate are mentioned below:

1. The energy output of the sun. Solar flares and sunspots come and go over a cycle of about 11 years (the polarity of the leading spots in each hemisphere reverses at the beginning of each cycle, so that the magnetic period of the sun is considered to be 22 years). There are also thought to be longer variations of 200 or 400 years. Although the sun's overall brightness varies by no more than a fraction of a percentage point over its more or less regular cycle of activity, both individual flare bursts and the average level of flaring activity over a whole solar cycle are known to affect the weather on earth; one possible mechanism may be changes in the intensity of cosmic rays penetrating the atmosphere. During the most intense phase of the Little Ice Age in Europe, from 1645 to 1715, there were very few sunspots. In contrast, sunspot activity peaked between 1100 and 1250, a distinctly warm time in the northern hemisphere.[2]

2. The geometry of the earth's orbit, which determines the amount of solar radiation reaching the earth's outer atmosphere. The three main variables are:

a. The tilt of the earth's axis, which determines how much solar radiation is received at different latitudes.

b. Climatic precession (the 21,000-year cycle resulting from astronomical precession combined with apsidal motion), which determines at what time of the year the earth is closest to and furthest from the sun. At present the earth is closest to the sun in midwinter, which means that winters in the northern hemisphere are less severe than they

might otherwise be. The most pronounced difference between winter and summer seasons occurs with a large obliquity and a large eccentricity such that winter occurs when the earth is farthest from the sun.
c. The ellipticity of the orbit (the degree of deviation from a circle, involving variations in the earth's distance from the sun). The ellipticity is currently 0.017, and is thought to range between 0.001 (almost circular) and 0.054 over a period of about 100,000 years.

3. The transparency of the atmosphere to either incoming solar radiation or outgoing heat. An important factor is the concentration of greenhouse gases in the atmosphere, such as carbon dioxide, methane, water vapour, nitrous oxide, and ozone. Clouds are the most important element in reflecting solar radiation back into space. Another important variable is the amount of aerosols (small particles) in the atmosphere, including dust thrown up by volcanic eruptions, and meteoric dust from space (resulting from passing through the tail of a comet, a meteorite stream, interstellar dust clouds, etc.). Sulphur dioxide from volcanic eruptions combines with water vapour to form tiny droplets of sulphuric acid, which reflect sunlight and lead to cooler temperatures in the lower atmosphere. Worldwide temperature dropped by about 2°C following the major volcanic eruption of Krakatoa in Indonesia in 1883. After the Tambora eruption in 1815, the extensive volcanic haze caused the following year to be called the 'year without a summer'.

Theosophical literature speaks of a veil of meteoric dust surrounding the earth. That the entire atmosphere is permeated with meteoric dust is well established, and an estimated 20,000 to 40,000 tons of cosmic dust fall on the earth every year. It is known that if there were no dust in the atmosphere, there would be little or no precipitation. But the meteoric veil apparently plays a more important role than scientists have yet realized. It is said to be many scores of miles thick, and to consist mostly of very fine cosmic dust but partly of larger bodies. Solar forces reaching the earth arouse electromagnetic currents in this thick shell of meteoric dust; the electromagnetic interchanges between the earth and its meteoric veil produce various meteorological phenomena, such as storms, lightning, winds, droughts, and the auroras, and are also responsible for some 70% of the earth's heat. The associated expansions and contractions of the atmosphere are said to be linked to the succession of glacial and warm periods.[3]

Paul LaViolette has proposed that a cosmic ray volley or galactic superwave, caused by explosions in the centre of our galaxy, can push large amounts of cosmic dust into the solar system. These dust incursions substantially alter the earth's climate through their effect on the sun (perhaps triggering nova-like eruptions) and sunlight transmission through space. He argues that galactic superwaves pass us about once every 26,000 +/- 3000 years (approximating a polar precessional cycle), with the possibility of a 13,000 year recurrence interval.[4] Another important factor is that as the earth revolves around the centre of the galaxy, it oscillates up and down through the galactic plane in a cycle of some 30 million years. When it crosses the plane, as it has been doing for the past 3 million years, it encounters higher concentrations of cosmic debris. The moon is believed to play a role in modulating the influx of meteoric dust.[5]

4. Atmospheric and oceanic circulation patterns, which are set in motion by the different amounts of energy received from the sun at different latitudes and by the rotation of the earth. The circulation of atmosphere and oceans reduces temperature imbalances on a regional scale as well as between high and low latitudes.

5. The albedo (reflectivity) of the surface (due to soil types, presence of ice, snow, and vegetation, etc.), which affects the earth's absorption or radiation of energy.

6. The distribution of land and sea, and the topography of the continents and seafloor (land elevation, sill depth, channel width, etc.), which affect atmospheric and oceanic circulation patterns. Land temperatures reflect both elevation and proximity to the sea (which has a higher heat-storage capacity than land). The average annual temperature decreases by about 4°C for each 550-metre rise in altitude. Hence there is permanent snow on Mt. Kilimanjaro, despite the fact that it is located astride the equator. In the Atlantic, the Gulf Stream carries warm surface water northwards, and keeps northern Europe much warmer than Canada at the same latitude. Conversely, the cool Peruvian coastal current ameliorates the tropical climate of Chile and Peru. The Gulf Stream is thought to have been some 35% weaker during the last glacial maximum, some 21,000 years ago.[6]

The popular dogmas of plate tectonics and continental drift are frequently invoked to explain past climates, but detailed studies show that shifting the continents succeeds at best in explaining *local* or *regional* palaeoclimatic features for a particular period, and invariably fails to explain the *global* climate for the same period. Moreover, drifters say that the continents have shifted little since the start of the Tertiary, yet this period has seen significant alterations in climatic conditions. The geographic distribution of palaeoclimatic indicators such as evaporites, carbonate rocks, coals, and tillites is best explained by stable continents and by periodic changes in climate, from globally warm or hot to globally cool. For instance, 95% of all evaporites (a dry-climate indicator) from the Proterozoic to the present lie in regions that now receive less than 100 cm of rainfall per year, i.e. in today's dry-wind belts. The evaporite and coal zones show a pronounced northward offset similar to today's northward offset of the thermal equator.[7] Horizontal crustal movements are relatively unimportant compared with vertical crustal movements and the associated emergence and submergence of continents.[8]

7. Currents of electricity within the earth (telluric currents) and in the atmosphere, and variations in the geomagnetic field. Geomagnetic field patterns closely match the circulation patterns of the atmosphere and also affect ocean currents.[9] It may be significant that during the last ice age, the ice cap was not centred on the geographic north pole but about 15° southward, at a point below Thule, Greenland, at about the same latitude as the present north magnetic pole. A sudden collapse of the magnetic field could cause the air to be chilled into a liquid

rain or frozen into snowflakes, followed by super-hurricane winds rushing in to fill the atmospheric vacuum.[10]

8. The impact of asteroids, meteoroids, or comets of varying sizes. It is fashionable at present to assign impacts a major role in triggering climate change and global catastrophes. However, polar ice core studies show no evidence that the climatic transitions of the last ice age were precipitated by comet impacts, though cosmic bodies certainly hit the earth from time to time.[11]

9. Interactions between life and its environment. According to the Gaia hypothesis, the earth's biota does not simply respond passively to climate but helps to modulate and even control it, by regulating the concentration of atmospheric carbon dioxide and other organically derived substances so as to keep temperature and precipitation at advantageous levels. James Lovelock describes the earth as a self-regulating organism, capable of ensuring the survival of a life-sustaining global climate. Humans, however, are also known to exercise an adverse influence, through desertification, deforestation, emissions of greenhouse gases, etc., though their impact is probably of little significance compared to what nature itself is capable of.

According to the widely accepted Milankovitch model of the ice ages, the history of glaciation and deglaciation is primarily determined by the insolation changes resulting from the three orbital cycles – the obliquity cycle (i.e. the postulated axial oscillation between 21.6° and 24.6°) with a period of 41,000 years; climatic precession with periods of 23,000 and 19,000 years; and the eccentricity cycle with a period of 100,000 years. It is commonly asserted that studies of the climate record have found evidence of climatic variations with essentially the same frequencies. However, the picture is rather more complicated than is often implied. The periodicities found in the Pleistocene climate record include: 140,000, 104,000, 100,000, 44,000, 43,000, 41,000, 40,000, 25,000 24,000, 23,400, 23,000, 20,000, 19,000, 18,600, 15,700, 9300, 9200, 6400, and 5700 years.[12] It seems at times that scientists are more interested in fitting data into the Milankovitch theory than in objectively testing it or looking for alternative explanations.

Even if the approximately 41,000-year periodicity found in the climate record is genuine – and age determinations become increasingly uncertain the further back we go in time – it would be premature to conclude that this proves the existence of the obliquity cycle postulated by science, since other factors may be responsible. The general belief that the 100,000-year periodicity is related to the eccentricity cycle has also occasionally been challenged.[13] LaViolette says that galactic superwaves may be related to the 23,000-year climatic cycle, and could also account for the 100,000-year cycle, which approximates four superwave periods.[14]

Alistair Dawson has concluded that some of the Late Quaternary palaeoclimatic data can certainly not be explained in terms of the Milankovitch cycles. He also warned that any correlations should be tempered with caution since the calibration between Milankovitch astronomical chronology and radiometric ages is not know with certainty, and it is not at all clear how Milankovitch effects are translated into changes in global climate.[15]

The main problems facing the Milankovitch model are as follows.[16] First, it fails to explain the vast epochs in which the earth was free of polar ice sheets. Second, the relatively small seasonal and latitudinal radiation variations resulting from the orbital parameters are insufficient to account for the magnitude of climatic changes. Third, the 100,000-year cycle appears to dominate in the Pleistocene climatic record, whereas scientists calculate that the 100,000-year eccentricity cycle is the weakest of the orbital parameters. Fourth, the pattern of the climatic record is asymmetrical: ice ages appear to start slowly and take a long time to build up to maximum glaciation, only to terminate abruptly and go from maximum glacial to full interglacial conditions in less than 7000 years. In fact, major temperature changes of up to 10°C can even occur in a matter of decades.[17] Fifth, climatic changes in the northern and southern hemispheres appear to be synchronous, whereas the precession cycle operates in different directions in the two hemispheres. Finally, solar flares have probably altered the amount of solar radiation received at the outer atmosphere, whereas the Milankovitch theory assumes that it has remained constant.

In theosophical literature poleshifts are mentioned as one of the causes of sudden climatic changes and ice ages. Blavatsky says that the 'karmic disturbance of the axis' has produced periodical deluges and glacial periods.[18] W.Q. Judge writes:

> Ice cataclysms come on not only from the sudden alteration of the poles but also from lowered temperature due to the alteration of the warm fluid currents in the sea and the hot magnetic currents in the earth, the first being known to science, the latter not. The lower stratum of moisture is suddenly frozen, and vast tracts of land covered in a night with many feet of ice. This can easily happen to the British Isles if the warm currents of the ocean are diverted from its shores.[19]

2. Climate and axial tilt

The most important single variable in the climate is the temperature, which is determined by two main factors: the angle of incidence at which the sun's rays strike the earth's surface, and the length of time the sun remains above the horizon each day.[1] The amount of solar radiation reaching the earth's surface is reduced by the thickness of the atmosphere through which it must pass. The heating effect per unit area (insolation) is at its maximum when the sun

is vertically overhead and at its minimum when it is on the horizon.

The earth's axial tilt divides it into three main climatic zones: the tropical or torrid zone, the temperate zones, and the polar or frigid zones. The tropical zone lies between the tropic of Cancer and the tropic of Capricorn, where the midday sun is vertically overhead at the summer and winter solstices respectively. The temperate zones lie between the tropics and the polar circles (23.4° and 66.6° N and S). Within these regions, the sun is never vertically overhead, and the intensity of insolation becomes increasingly seasonal with distance from the equator. At 50° latitude, there are just over 16 hours of daylight at the summer solstice, but only about 8 hours at the winter solstice. At 60° latitude, the figures are 19 hours and 6 hours respectively. In the polar zones, seasonality is taken to extremes. At the arctic and antarctic circles, there is a day of 24 hours daylight at the summer solstice and 24 hours darkness at the winter solstice. At 79° there are two months of permanent daylight during summer and two months of winter darkness. At the poles, there would be six months of daylight during the summer and six months of winter darkness, were it not for the fact that atmospheric refraction reduces the period of darkness by about half.

Although the earth's tilt defines the *theoretical* boundaries of the tropical, temperate, and polar zones, actual climate conditions can differ significantly from this simple picture due to the influence of all the many other climatic factors. Thus, although, theoretically, the temperate zones are the regions of the earth between the tropics and the polar circles, in terms of actual climatic conditions the temperate zone currently lies between about 40° and 50° in the northern hemisphere and 35° and 55° in the southern hemisphere. Moreover, not even these more restricted zones can be described as temperate in their entirety, since although the northern zone includes western Europe and similar regions such as New Zealand, it also includes the heartlands of continents, such as Siberia and the central-northern US and Canada, where conditions are much more extreme. These far from temperate regions are generally described as having continental climates, while the only true temperate regions are those on the western sides of continents, dominated by the arrival of successive weather systems sweeping in from the oceans further to the west. The prevailing winds off the ocean keep the temperate regions cool in summer and warmer than they would otherwise be in winter.[2]

An increase in the inclination of the axis to, say, 26° would enlarge the (theoretical) tropical and polar zones, and compress the temperate zones. Only at the midlatitudes of 45° N and S would there be little noticeable change. The temperature range in continental interiors would probably change for the worse. Increased extremes of temperature in summer and winter would require a more vigorous atmospheric and oceanic circulation to transport the heat from the tropics to the poles, resulting in increased storminess, fierce winds, and general unpredictability of the weather. If the obliquity were to decrease to about 20°, the temperate zones would expand at the expense of the tropical and polar zones. Temperate flora and fauna would be able to extend their ranges north and south of the present limits. The variations between summer and winter insolation would be reduced, and the range of temperature in continental regions would be much more equable. The temperature gradient between the tropical and polar regions would be greatly reduced and less heat would need to be transferred across the temperate zone. Weather patterns would become more stable and predictable.

With an axial tilt of 30°, the tropics are at 30° latitude and polar circles at 60° latitude, so that the tropics, temperate zone, and polar zone each cover 30° of latitude in each hemisphere. With a tilt of 45°, the tropics and polar circles are at 45° latitude, and the temperate zone disappears (though temperate conditions may still exist in certain regions). With a tilt of 60°, the tropics are at 60° latitude and the polar circles at 30° latitude, which means that latitudes between 30° and 60° are within both the tropics and the 'polar' zone! At higher tilts, the overlap between the two zones increases, until at 90° (and 270°) it reaches 90°, so that the whole earth lies in both the tropics and the 'polar' zones, resulting in seasonal variations of extreme intensity even at midlatitudes. With a tilt of 0°, on the other hand, the temperate zone would cover the entire earth, and day and night would everywhere be 12 hours long. This would be the ideal world for human habitation, as there would be no pronounced seasons, little heat flow, and the weather system would be reduced to only the gentler circulations of atmosphere and oceans resulting from the earth's rotation.

An article in *Astronomy* magazine in 1992 attempted to describe the conditions that would prevail if the earth's axis was tilted at 90°.[3] In spring and autumn all parts of the earth would still have daily cycles of daylight and darkness, but there would be extended periods of constant daylight in summer and constant darkness in winter. Twice a year every latitude would experience tropical heating as the sun passed directly overhead. At a latitude of about 34° N or S, the day-night cycle would last for a total of 7.5 months of the year, while for the other 4.5 months there would be constant day or constant night, coupled with harsh summers and winters. The lengths of these periods would vary at different latitudes.

> The seasonal heating cycle prevents the formation of permanent polar ice caps. The polar regions would experience the same tropical heating and high temperatures as the equatorial regions of old Earth. However, the polar regions in winter are exceptionally cold, so seasonal polar ice caps may form. Because the polar caps aren't permanent, the oceans – and the shorelines on the continents – are higher than those on old Earth.
>
> If seasonal polar ice caps form, the dominant force controlling weather may shift from jet streams which circle the Earth along lines of latitude to a pole-to-pole flow. This mimics the condensation flows seen on Mars, caused by the freezing and thawing of the Red Planet's polar caps. Thermal flows created by intense heating at one location and cooling at others may replace old Earth's trade winds and other east-west winds.

New Earth residents probably also experience significant seasonal variations in the shoreline, depending on whether the thawing of one polar ice cap occurred at the same rate as freezing at the other pole. This change in sea level would occur on top of a change in the range of tides due to gravitational effects from the Moon and Sun. . . .

Biological clocks, also called circadian rhythms, help animals and plants make the best use of their waking hours, driving urges to eat, sleep, seek shelter, or store food for the winter. . . . Most living things have biological clocks that run with cycles of between 23 and 25 hours. Earth's cycle of day and night constantly realigns these cycles to keep them in sync with the changing seasons. In contrast, during experiments in which no day-night change occurs in lighting, people resort to their natural biological clock of around 25 hours to regulate their actions, such as sleep cycles.

But life on new Earth, where protracted periods of daylight and darkness exist, would have to adapt differently. Life-forms may depend exclusively upon their biological clocks to avoid the problem of the changing day-night cycle and the periods of prolonged daylight and darkness. Or perhaps the biological clocks would take over only during the periods of continuous daylight and darkness. When day and night cycles finally returned, the day-night cycle would control activities. (Would life-forms suffer from a massive dose of jet lag during the period when the day-night cycle takes over from the internal biological clock?) Perhaps life wouldn't have biological clocks at all. Or perhaps life-forms would have a complex set of rhythms that control activities during the periods of prolonged darkness and prolonged light and that adjust to changes in the day-night cycle. Clearly, whatever dominates the biological rhythms, social and emotional aspects of humans would evolve differently on new Earth.

3. The climate record

The global climate has undergone major changes over the course of geologic history. Figure 1 shows how the earth's climate has fluctuated episodically between periods of worldwide warming and worldwide cooling. Right-hand deflections of the curve represent periods when the earth was uniformly warm with no frigid zone, and left-hand deflections of the curve represent periods when the earth was cool.[1]

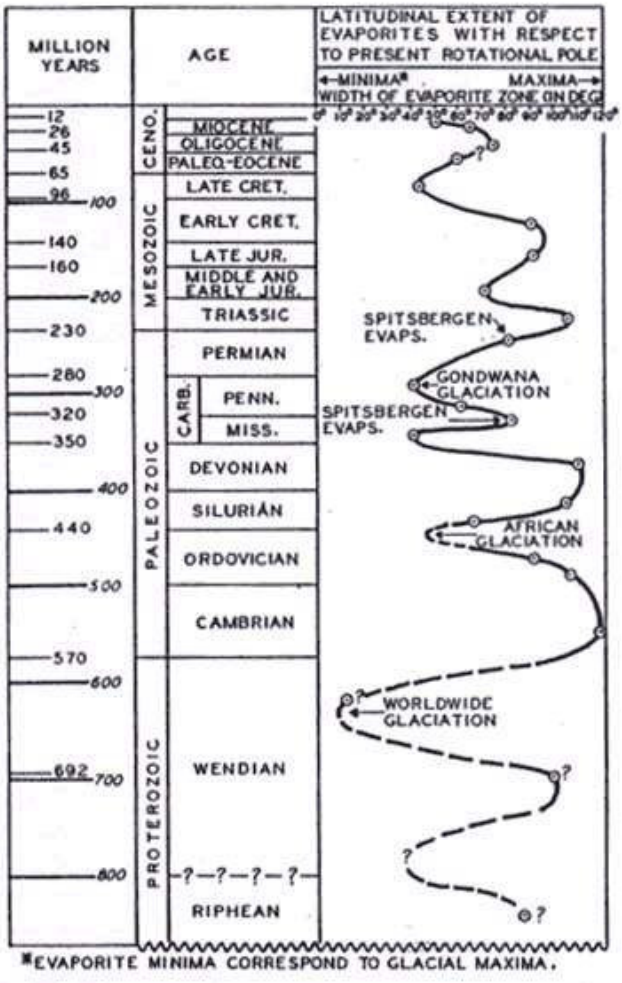

Figure 1. Evaporite-maximum and evaporite-minimum (glacial-maximum) periods.

	Science Began (years BP)	Theosophy Began (years BP)
Phanerozoic eon		
Cenozoic era		
Quaternary period:		
Holocene epoch	10,000	
Pleistocene	1,600,000	870,000
Tertiary period:		
Pliocene epoch	5,300,000	1,870,000
Miocene	23,700,000	3,670,000
Oligocene	36,600,000	5,280,000
Eocene	57,800,000	7,140,000
Palaeocene	66,400,000	7,870,000
Mesozoic era		
Cretaceous	144,000,000	16,000,000
Jurassic	208,000,000	28,000,000
Triassic	245,000,000	44,000,000
Palaeozoic era		
Permian	286,000,000	74,000,000
Carboniferous	360,000,000	110,000,000
Devonian	408,000,000	148,000,000
Silurian	438,000,000	179,000,000
Ordovician	505,000,000	214,000,000
Cambrian	540,000,000	250,000,000
Proterozoic eon		
(Laurentian)	(640,000,000)	320,000,000 (start of 4th round)
Late	900,000,000	
Middle	1,600,000,000	(720,000,000; start of 3rd round?)
Early	2,500,000,000	
Archean eon		
Late	3,000,000,000	(1,300,000,000; start of 2nd round?)
Middle	3,400,000,000	
Early	3,960,000,000	
Formation of earth	4,600,000,000	1,973,000,000 (start of 1st round)

Figure 2. The geological timescale: theosophy vs. science.[2]

The evidence for very warm temperatures at high latitudes and glaciation at low latitudes clearly shows that the width of climatic zones has changed radically since the mid-Proterozoic. Since the width of climatic zones and the range of seasonal change are largely determined by the degree of axial tilt, this would suggest significant changes in obliquity. Nevertheless, the reigning scientific belief is that since the climatic record shows that in the past, as today, the earth was generally divided into three primary zones – a mainly warm climate at low latitudes, with cooler climates at high latitudes – there is no need to invoke major changes in obliquity. However, a number of scientists disagree with this.

Since the warming and cooling trends shown in figure 1 generally lasted many millions or tens of millions of years, they can certainly not be explained simply in terms of a steady shift of the axis – even allowing for the fact that according to theosophy the geological periods are much shorter than the exaggerated periods postulated by science on the basis of radiometric dating (see figure 2). It should be borne in mind, however, that our planet's history is reconstructed by studying the properties of the various strata of the earth and the fossils found in them, and that the record of the rocks is very incomplete: more than 95% of all the sedimentary rocks formed since the origin of the planet have been eroded and recycled. In addition, many former land areas are now submerged beneath the oceans. Nevertheless, there is mounting evidence that superimposed on the long-term warming and cooling trends there have been significant oscillations in climate. For instance, the Pleistocene ice age consisted of a succession of glacial and interglacial periods, whose number was initially put at 4, whereas nowadays it is put at 17.[3]

The prevailing view today is that Antarctica has been subject to continuous polar climates for the last 15 million years (since the mid-Miocene), though some scientists believe that East Antarctica may have been relatively deglaciated 3 to 5 million years ago (in the early Pliocene). The Arctic is thought to have been a warm ocean until approximately 2 million years ago, followed by a permanent ice pack about 850,000 years ago. There have been

many times during the history of the globe when the polar regions had a warm climate.[4] For example, fossil plants and animals (including the first-known amphibians) indicate that warm conditions existed in the arctic regions in the Devonian. Large Permian reptiles, which must have required a warm climate, are found along the Dvina River of Russia, just below the arctic circle. A forest of Late Permian age, interpreted to have lived between 80 and 85°S, has been discovered on Mt. Achernar in the Transantarctic Mountains.

The overall climate of the Mesozoic, and more specifically of the Cretaceous, was warmer than that prevailing over the globe today. Modern tropical to subtropical conditions extended to at least 45°N and possibly to 70°S, with warm- to cool-temperate climates beyond this zone. This warm global climate was also notably equable. In the Triassic some amphibians ranged all the way from 40°S to 80°N. In the Cretaceous large dinosaurs and trees existed in such high-latitude localities as Svalbard and the present North Slope of Alaska. In the late Palaeocene-mid-Eocene, there were forests on Ellesmere Island (80°N) with crocodilian bones, palm trees in west-central Greenland and southern Alaska, and mangrove swamps in the London-Paris basin. During the late middle Eocene, tropical rain forest occurred at least 20° and possibly 30° poleward of the present northern limit. The Miocene floras of Grinnell Land, Greenland, and Spitzbergen all required temperate climatic conditions with plentiful moisture.[5] Large Pliocene trees in fossil forests have been discovered at 82.5°N in northern Greenland and 83.5°S in the Beardmore Glacier area of Antarctica.

Large trees live in parts of the Arctic today in a much colder climate than usually prevailed in the past, and some sizable trees in Siberia live as far north as 73°N. However, controversy surrounds the question of whether the big trees, widespread vegetation, and abundant, large animals that occupied these regions in the past could have survived under polar-light conditions such as those that exist with an axial tilt similar to the present one. Some scientists argue that the earth's obliquity must have been as low as 5-15° to explain the occurrence of subtropical floras in high latitudes during the Cretaceous and Palaeogene (early Cenozoic).[6] H.A. Allard argued that the weak zonations of climate that have characterized certain geological eras are difficult to harmonize with a strongly tilted axis such as now prevails; he believed that in the Cretaceous, when there was little seasonal change, the obliquity was around 0°.[7]

Opponents of this view argue that although a smaller obliquity would increase the winter solar insolation at high latitudes, the mean annual insolation would *decrease*, leading to cooler polar temperatures, whereas the evidence points to warmer polar temperatures in Mesozoic and early Cenozoic time; an alternative explanation is that life may have adapted to a polar-light regime.[8] However, the climatic models on which such views are based have been challenged. Jack Wolfe suggested that at some critical value of axial inclination, the atmospheric circulation changes from one that is predominantly cellular (as it is today) to one that is predominantly meridional, which would have more than compensated for decreased annual insolation values at high latitudes.

It is also conceivable that trees could have grown in polar regions if the earth had a *much higher* obliquity than at present. Fred Dick suggested that with an inclination of say 45°, an orbit of considerable eccentricity, and midwinter at perihelion, the Greenland summers would have been long and warm enough for the trees that used to grow there.[9] This possibility illustrates how difficult it is to draw firm conclusions about the inclination of the axis on the basis of palaeoclimatic and palaeontological data.

It is stated in theosophical literature that the poles have been cold and warm in turn,[10] and this is supported by the climatic record. According to an ancient Commentary, the third (Lemurian) root-race was at about the midpoint of its development when: '*The axle of the Wheel tilted. The Sun and Moon shone no longer over the heads of that portion of the Sweat Born; people knew snow, ice, and frost, and men, plants, and animals were dwarfed in their growth*.'[11] This may refer to the cooling period that began in the early Cretaceous (see figure 1).

An overall gradual warming took place from the Palaeocene to the mid-Eocene, followed by gradual cooling until the major climatic deterioration at the end of the Eocene, though there were several fluctuations during this period.[12] Since then, one major trend of northern hemisphere climates has been a decrease in the mean annual range of temperature and thus increased equability, though again there have been several fluctuations. Jack Wolfe postulates that if the major climatic trends during the Tertiary were largely the result of changes in the inclination of the axis, then from the Palaeocene to the mid-Eocene, the inclination gradually decreased from around 10 to 5°. It then began to increase slightly until the end of the Eocene, when the inclination increased rapidly to 25-30°. Since then, he believes that the inclination has gradually decreased to the present average value of 23.5°. He admits that this model does not explain several fluctuations in mean annual temperature, which might result from fluctuations in the amount of solar radiation reaching the earth. Xu Qinqi has argued that the main cause of the alternation of glacial and nonglacial periods is the variation of the obliquity between about 10 and 25°.[13] Clearly such scenarios are still very conservative by comparison with the changes in axial inclination implied in theosophical writings.

Since early Pliocene time the width of the temperate zone is said to have changed by more than 15° (1650 km) in both the northern and southern hemispheres. If we apply the rule of a 4° axial shift per precessional cycle, the theoretical temperate zone (as defined solely by the axial tilt) should have changed by 90° in each hemisphere since the beginning of the Pliocene (about 1.87 million years ago on the theosophical timescale), though this could be obscured by the complexity of the climate system. At the start of this period, the inclination of the axis would have been about 48°, and it proceeded to pass through 90°, 180°, and 270°, before reaching its current value of about 336.6° (23.4°). At the beginning of the Pleistocene (about 870,000 years ago on the theosophical timescale), the tilt would have been about 200°, and the earth's north pole would have made an angle of 20° with the south ecliptic pole. A series of glacial and interglacials ensued, and the last ice age ended about 11,000 years ago, when the

earth's tilt would have been about 25°. We do not know for certain whether this is the theosophical scenario, since we have not been given any details of exactly how the axial tilt has evolved during this period.

The end of the last ice age between 13,000 and 8000 years ago was accompanied by a 120-metre rise in sea level and widespread flooding. The Late Pleistocene also saw large-scale volcanic activity, and the extinction of large animal species in many parts of the world. Blavatsky says that the last major cataclysm occurred about 12,000 years ago,[14] but she does not explicitly link this with a poleshift. This cataclysm was followed by the submergence of Poseidonis, the last remaining Atlantean island in the Atlantic, in 9565 BC.[15]

Notes

1. The climate system

1. Paul Davies, *The Cosmic Blueprint*, Unwin, 1989, p. 132.

2. J.J. Hidore & J.E. Oliver, *Climatology: an atmospheric science*, Macmillan, 1993, p. 371.

3. ML 160-2; FEP 327-8, 371-2; SOP 295, 320; FSO 336; Dia 1:35-6. See '**Earth's meteoric veil**', http://ourworld.compuserve.com/homepages/dp5/dust1.htm.

KH says that the heat the earth receives by radiation from the sun is at most one third of the amount it receives directly from the mass of meteoric dust above its surface (ML 162). He also states: 'The absorption of Solar Forces by the earth is tremendous; yet it is, or may be demonstrated that the latter receives hardly 25 per cent. of the chemical power of its rays, for these are despoiled of 75 per cent. during their vertical passage through the atmosphere at the moment they reach the outer boundary of "the aerial ocean." And even those rays lose about 20 per cent. in illuminating and caloric power – we are told [by science]' (ML 168). According to modern science, 50% of the solar radiation reaching earth passes through the atmosphere to the surface. However, this accounts for only one third of the energy reaching the surface; sky radiation accounts for two thirds. Of the energy received by the atmosphere, 77% comes from earth, and only 13% from direct absorption of solar radiation (Hidore & Oliver, *Climatology*, pp. 37-8).

4. Paul LaViolette, *Earth Under Fire*, Starlane Publications, 1997.

5. William R. Corliss (ed.), *Science Frontiers*, no. 100, Jul.-Aug. 1995, p. 3.

6. Jean-Claude Duplessy, 'Climate and the Gulf Stream', *Nature*, vol. 402, 1999, pp. 593-4.

7. A.A. Meyerhoff & H.A. Meyerhoff, 'Tests of plate tectonics', American Association of Petroleum Geologists, Memoir 23, 1974, pp. 43-145; A.A. Meyerhoff, A.J., Boucot, D. Meyerhoff Hull & J.M. Dickins, *Phanerozoic Faunal & Floral Realms of the Earth*, Geological Society of America, Memoir 189, 1996; C.J. Smiley, 'Paleofloras, faunas, and continental drift: some problem areas', in: S. Chatterjee & N. Horton III (eds.), *New Concepts in Global Tectonics*, Texas Tech University Press, 1992, pp. 241-57.

8. See '**Sunken continents versus continental drift**', http://ourworld.compuserve.com/homepages/dp5/sunken.htm.

9. John Gribbin, *Future Weather*, Penguin, 1982, pp. 154-68.

10. Frederic Jueneman, *Raptures of the Deep*, published by *Research & Development Magazine*, 1994/95, pp. 122, 127.

11. *Earth Under Fire*, p. 321. See also '**The great dinosaur extinction controversy**', http://ourworld.compuserve.com/homepages/dp5/dino.htm.

12. 'Geochronology', Encyclopaedia Britannica CD98; A. Berger et al. (eds.), *Milankovitch and Climate*, Reidel, 1984.

13. W.S. Broecker, in ibid., pp. 687-98.

14. *Earth Under Fire*, pp. 301-2.

15. A.G. Dawson, *Ice Age Earth*, Routledge, 1992, pp. 247, 255.

16. W.S. Broecker, op cit.; 'Geochronology', Encylopaedia Britannica CD98.

17. Robert M. Schoch, *Voices of the Rocks*, Harmony Books, 1999, pp. 147-8.

18. SD 2:274, 144-5. Blavatsky quotes the following from an article by Dr Henry Woodward in the *Popular Science Review*: 'If it be necessary to call in extramundane causes to explain the great increase of ice at this glacial period, I would prefer the theory propounded by Dr. Robert Hooke in 1688; since, by Sir Richard Phillips and others; and lastly by Mr. Thomas Belt, C.E., F.G.S.; namely, a slight increase in the present obliquity of the ecliptic . . .' (SD 2:726).

19. Ocean 140.

2. Climate and axial tilt

1. See Paul Dunbavin, *The Atlantis Researches: the earth's rotation in mythology and prehistory*, Third Millennium, 1995, pp. 82-6.

2. Gribbin, *Future Weather*, p. 69.

3. Neil F. Comins, 'A new slant on Earth', *Astronomy*, July 1992, pp. 45-9.

3. The climate record

1. Meyerhoff & Meyerhoff, 'Tests of plate tectonics', p. 48.

2. See '**Geochronology: theosophy vs. science**', http://ourworld.compuserve.com/homepages/dp5/geochron.htm.

3. 'Geochronology', Encyclopaedia Britannica CD98.

4. Meyerhoff et al., 'Phanerozoic Faunal & Floral Realms of the Earth', pp. 46-9; Charles H. Hapgood, *The Path of the Pole*, Chilton Book Company, 1970, pp. 61-7; Jack A. Wolfe, 'A palaeobotanical interpretation of Tertiary climates in the northern hemisphere', *American Scientist*, vol. 66, 1978, pp. 694-703; Jack A. Wolfe, 'Tertiary climates and floristic relationships at high latitudes in the northern hemisphere', *Palaeogeography, Palaeoclimatology, Palaeoecology*, vol. 30, 1980, pp. 313-23; J.G. Douglas & G.E. Williams, 'Southern polar forests: the early Cretaceous floras of Victoria and their palaeoclimatic significance', *Palaeogeography, Palaeoclimatology, Palaeoecology*, vol. 39, 1982, pp. 171-85.

5. Blavatsky cites evidence that Greenland was a subtropical land in the Miocene (SD 2:12, 726).

6. Wolfe, 'A palaeobotanical interpretation of Tertiary climates in the northern hemisphere'; 'Tertiary climates and floristic relationships at high latitudes in the northern hemisphere'; Douglas & Williams, 'Southern polar forests: the early Cretaceous floras of Victoria and their palaeoclimatic significance'; Xu Qinqi, 'Climatic variation and the obliquity', *Vertebrata PalAsiatica*, vol. 18, 1980, pp. 334-43.

7. H.A. Allard, 'Length of day in the climates of past geological eras and its possible effects upon changes in plant life', in: A.E. Murneek & R.O. Whyte (eds.), *Vernalization and photoperiodism: a symposium*, Chronica Botanica, 1948, pp. 101-19.

8. E.J. Barron, 'Climatic implications of the variable obliquity explanation of Cretaceous-Paleogene high-latitude floras', *Geology*, vol. 12, 1984, pp. 595-8.

9. F.J. Dick, *The Theosophical Path*, February 1912, p. 86.

10. SD 2:770fn, 771fn, 777.

11. SD 2:329.

12. Wolfe, 'A palaeobotanical interpretation of Tertiary climates in the northern hemisphere'; 'Tertiary climates and floristic relationships at high latitudes in the northern hemisphere'.

13. Xu Qinqi, 'On the causes of ice ages', *Scientia Geologica Sinica*, vol. 7, 1979, pp. 252-63; 'Climatic variation and the obliquity'.

14. SD 2:8-9.

15. ML 151/155.

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POLESHIFTS

Theosophy and Science Contrasted

David Pratt

January 2000

PART 5: APPENDICES

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1. The zodiac and precession

In a footnote to the first part of her article 'The Esoteric Character of the Gospels', published in November 1887, H.P. Blavatsky wrote:

> There are several remarkable cycles that come to a close at the end of this century. First, the 5,000 years of the Kaliyuga cycle; again the Messianic cycle of the Samaritan (also Kabalistic) Jews of the man connected with *Pisces* (Ichthys or 'Fish-man' *Dag*). It is a cycle, historic and not very long, but very occult, lasting about 2,155 solar years, but having a true significance only when computed by lunar months. It occurred 2410 and 255 BC, or when the equinox entered into the sign of the *Ram*, and again into that of *Pisces*. When it enters, in a few years, the sign of *Aquarius*, psychologists will have some extra work to do, and the psychic idiosyncrasies of humanity will enter on a great change.[1]

According to the average, occult figures for the precession of the equinoxes, the vernal equinox falls back 50 seconds of arc a year, and therefore takes 2160 years to move through one constellation of the zodiac (30°), and 25,920 years for a complete circuit of the zodiac. In reality, the rate of precession varies. Blavatsky used the figure of 50.10 seconds of arc per year, equivalent to 25,868 years for a complete precessional cycle.[2] Dividing the latter figure by 12, gives (in round figures) 2155 years as the length of a messianic cycle. The rate of precession for the epoch J2000.0 is 50.288 arc-seconds per year, and the rate is said to be increasing by 0.0002 arc-seconds per year. It should be noted that the constellations of the zodiac do not really extend over exactly 30° of the ecliptic; they are of varying sizes, and some of them overlap in the sense that some lines of ecliptic longitude pass through two constellations. In addition, there is a gap between Scorpio and Sagittarius, where the ecliptic passes through the southern part of a thirteenth constellation, Ophiucus, the Serpent Bearer.

The kali-yuga began in February 3102 BC, and the first 5000 years therefore came to an end in February 1899 (= 5000 - 3102 + 1).[3] Blavatsky suggests that the Piscean Age also came to a close at the end of the 19th century. She indicates that 2155 years elapsed between the start of the Age of Aries in 2410 BC and the start of the Piscean Age in 255 BC. If the Piscean Age also lasted 2155 years, the Aquarian Age would have begun in 1901 (= 2155 - 255 + 1) if 255 BC is a chronological date, or 1900 if it is an astronomical date. On the basis of the current rate of increase in precession, the Piscean Age would have lasted 2157 years (assuming that Pisces covers 30° of arc).

The dates of 2410 BC and 255 BC are also given by Gerald Massey and quoted by Blavatsky in her article

'Esotericism of Christian Dogma', published in December 1887.[4] Elsewhere Blavatsky quotes slightly different figures. In *The Secret Doctrine* she makes two references to C.F. de Volney's remark that Aries was in its 15th degree in 1447 BC.[5] This is just over 100 years earlier than the date of 1333 BC that we would expect on the basis of her own/Massey's figures. She also quotes on several occasions from A.H. Sayce, who says that the Age of Taurus began around 4700 BC and the Age of Aries in 2540 BC.[6] These dates are about 130 years earlier than those given by Blavatsky.

According to one modern book on astronomy, the Age of Aries began around 2100 BC, the Age of Pisces around the start of the Christian era, and the Age of Aquarius will begin around the year 2200.[7] These dates are about 300 years later than those given by Blavatsky. The astronomical date given for the beginning of the Age of Aquarius by the French Institut Géographique National is AD 2010. Schwaller de Lubicz gives a date of AD 2100. Clearly there is no consensus on where to place the boundary between Pisces and Aquarius and thus on how best to divide the zodiac into 12 equal segments of 30°. Taking the position of the equinox in 2410 BC as the boundary between Taurus and Aries (as Blavatsky does) may well be one of the best ways of fitting an artificial zodiac of 12 equal constellations to the actual zodiac.[8]

Blavatsky says that at the beginning of the kali-yuga, in 3102 BC, the vernal equinox fell within the constellation Taurus.[9] A more precise reference is provided in *The Secret Doctrine*, where J.S. Bailly is quoted as saying that at the beginning of the kali-yuga the vernal equinox approximately coincided with the Eye of the Bull (Aldebaran).[10] Blavatsky supports this view when she says that Aldebaran was also in conjunction with the vernal equinoctial point about 31,000 years ago, and she adds: 'It is from this point of the ecliptic that the calculations of the new cycle were commenced.'[11] The figure of 31,000 years is approximately equivalent to 3102 BC plus a complete precessional cycle (3102 + 1888 + 25,920 - 1 = 30,910). Calculations based on a rate of precession of 50" per year and a shift in the axis of 4° every 25,920 years indicate that Aldebaran was about 1° from the equinox in 3102 BC, and would have coincided with the equinox around 3025 BC and 30,920 BP (counting from J.2000.0).

In 255 BC, the date given by Blavatsky for the start of the Piscean Age, the vernal equinoctial point lay 2.5° west of Beta Arietis. Pisces extends over a total of about 40°, and only if we regard it as covering 30° would the Aquarian Age have begun around 1900. Geoffrey Cornelius and Paul Devereux write:

> In recent decades precession has taken root in the popular imagination of the 'New Age'. However, the assumption that we are at the dawning of this Great Age owes very little to observation of the sky. Since around 100 BC the equinox point has been slowly making its way through the constellation Pisces and is only now beginning its progress through the second fish of the Pisces pair: it will not reach the same degree of longitude as the star Beta Piscium at the head of this fish until AD 2813; even stretching the case we barely brush the edge of Aquarius much before AD 2300.[12]

We do, however, appear to be entering an age of transition, and the influence of Aquarius is likely to become progressively stronger with each passing year.

2. The zodiac and cataclysms

Cataclysms are said to occur at every renewal of the precessional cycle.[1] The point in the zodiac from which a precessional cycle is measured can apparently vary; at present it appears to be measured from 6.4° Cancer (see part 3, section 4). Some of the catastrophes on which data are available are mentioned below. It appears that earth changes can take place at any point in the precessional cycle, and the data are not sufficient to identify any overall patterns. For instance, different constellations may favour different types of catastrophe. Also, the circle of the zodiac could be divided into four quarters (corresponding to the four seasons), with the boundaries being marked by Aries (vernal equinox), Capricorn (summer solstice), Libra (autumnal equinox) and Cancer (winter solstice), and it is possible that cataclysms accompanying the equinox's entry into each quarter are severer than normal.

A large island, Ruta, in the Pacific Ocean is said to have sunk 859,000 years ago.[2] At that time the vernal equinoctial point would have been at 19° Aries. The smaller island of Daitya in the Indian Ocean is said to have sunk 270,000 years ago,[3] when the equinox would have been at 28.5° Cancer.

The approximate dates on which the last nine zodiacal ages began are as follows: Libra 17,380 BP (before present, i.e. 2000), Virgo 15,220 BP, Leo 13,060 BP, Cancer 10,900 BP, Gemini 8740 BP, Taurus 6580 BP, Aries 4420 BP (2420 BC), Pisces 255 BC, Aquarius 1900.

The melting of the ice sheets at the end of the last ice age led to a significant rise in world sea levels. This was not a gradual process; three sudden ice-melts and the collapse of glacial lakes resulted in three episodes of rapid flooding, as tens of cubic kilometres of water rushed off the polar ice caps generating earthquakes and superwaves. The three floods began about 14,000, 11,500 and 8000 years ago, and the resulting 120-metre rise in sea level destroyed many coastal settlements.[4]

Blavatsky refers to a deluge in Central Asia 10-12,000 BP, which changed the whole face of Central Asia, and transformed the present Gobi Desert into a sea for the last time.[5] Poseidonis, an island about the size of Ireland

situated in the mid-Atlantic (one of the last major remnants of Atlantis), sank 'in a single day and night' in 9565 BC,[6] when the equinox was at about 9° Leo. Cro-Magnon man started to appear on the western coasts of Europe and around the shores of the Mediterranean about 40,000 years ago, and arrived in large numbers between 15,000 and 10,000 BP. One theory is that they were migrants from Poseidonis and other islands in the Atlantic, who emigrated in several waves as their homelands showed increasing signs of sinking.[7]

One Sumerian text seems to say that the Deluge occurred in the Age of Leo.[8] The Egyptian Pyramid Texts, too, associated a period of terrible destruction, including a flood, with the Age of Leo.[9] Immense floods swept repeatedly down the Nile valley between 15,000 and 11,500 BP, reaching a climax around 12,500 BP.[10]

Turning to more recent times, there was a major flood in Sumer around 5000-4800 BP, probably resulting from the Tigris and Euphrates rivers drastically changing their courses and overflowing their banks.[11] This was towards the end of the Age of Taurus. However, according to another interpretation, the very thick silt deposit at Ur may have been laid down during a marine incursion 7500-5500 BP due to the rising sea level.[12]

Noah's Flood is dated by Ussher's biblical chronology at 2349 BC, but there was certainly no worldwide flood at that time. Blavatsky says that Noah's flood is 'a purely mythical rendering of old traditions', and that 'as described in its dead letter and within the period of Biblical chronology', it 'never existed' but is 'a fiction based upon geological and geographical ignorance'.[13] She says that the Biblical deluge relates to the partial flood which changed the whole face of Central Asia about 10,000 BC.[14] The Age of Aries did, however, witness numerous natural disasters.

According to Chinese chronology, disastrous floods occurred in China in 2953 BC, 2357-2205 BC, and 1766 BC.[15] There was a great inundation in China in 2297 BC, in the 61st year of the reign of Yao.[16] There were major floods in Babylon in 2379 BC and Palestine in 2355 BC.[17] Volcanic eruptions followed by radical climatic changes are thought to have precipitated the collapse of the Mesopotamian empire of Akkad, sometime after 2290 BC.[18]

The vast Thar or Great Indian Desert to the east of the Indus river was once traversed by a great river, known in Vedic writings as the Sarasvati (an extension of the present-day Ghaggar or Hakra river). This once fertile region was a key centre of early Indic civilization. Around 1900 BC, in the Age of Aries, a series of tectonic upheavals caused several rivers to change their courses, leading to devastating floods and the drying up of the Sarasvati and other rivers. As a result, Indic civilization was temporarily eclipsed, and its centre shifted eastward to the Ganges and Yamuna valleys.[19]

The Minoan civilization in the Aegean was devastated by fire, flooding, and ash, following a series of volcanic eruptions on the island of Thera (Santorini), 125 km to the north of Crete, the final explosion being dated at 1628 BC.[20] Manetho's king list dates the flood of Deucalion to the reign of the sixth king of the 18th dynasty, or about 1500 BC.[21] (Plato, however, says that it followed the sinking of Poseidonis.) Around 1250 BC, extensive flooding seems to have occurred in Anatolia (modern Turkey), burying the Bronze Age city of Tiryns, and at about the same time the rich merchant city of Troy (archaeological level VI) was destroyed by an earthquake.[22]

The tree-ring record for the past 5000 years points to global environmental traumas between 2354 and 2345 BC, 1628 and 1623 BC, 1159 and 1141 BC, 208 and 204 BC, and AD 536 and 545. The first three fall within Blavatsky's dates for the Age of Aries. These five episodes coincide with the onset of 'dark ages' for society. They involved earthquakes, tidal waves, volcanic eruptions, and ocean floor outgassing. According to one school of thought, they may have been triggered by a series of cometary impacts about the size of the 20-megaton explosion at Tunguska in Siberia in 1908.[23]

Natural disasters have of course continued into more recent times. The most devastating earthquakes in terms of human fatalities were: 526 AD, Antioch, Syria, 250,000 deaths; 1201, Upper Egypt or Syria, 1,100,000 deaths; 1556, Shensi province, China, 830,000 deaths; 1737, Calcutta, India, 300,000 deaths; 1976, T'ang-shan, China, 240,000 deaths. The eruption of Vesuvius, Italy, in AD 79 buried the cities of Pompeii and Stabiae under ashes and lapilli and Herculaneum under a mudflow. An eruption of Kelud, Java, Indonesia, in 1586 killed 10,000 people. The eruption of Etna, Italy, in 1669 left 20,000 people dead. An eruption of Unzen, Kyushu, Japan, in 1792 killed more than 10,000 people. A tidal wave (tsunami) following an eruption of Tambora, Sumbawa, Indonesia, in 1815 killed 56,000 people. The most destructive known tsunami occurred in 1703 at Awa, Japan, killing more than 100,000 people. The 1883 eruption of Krakatoa, Krakatau, Indonesia, was one of the most catastrophic in history. A series of tremendous explosions occurred, the largest being heard at a distance of 4670 km. Most of the 36,000 people killed on Java and Sumatra were drowned by tidal waves as high as 35 metres. An eruption of Pelée, Martinique, in 1902 killed 26,000 people. In 1985 mudflows triggered by explosions of Ruiz, Colombia, killed more than 22,000 people.[24]

G. de Purucker says that the great tidal waves and earthquakes occurring in the last few thousand years are premonitions of what in a few more thousand years will occur with augmented force.[25] Major cataclysms are forecast in about 16,000 years,[26] when the equinox will lie in the middle of Cancer.[27] The European cataclysm will see the submersion of the British Isles, most of France, Holland, some of Spain, and a good deal of Italy. It will not take place in a night, but will be preceded by slow sinkings of the coast and major earthquakes.

3. Herodotus and the Egyptians

In *The Secret Doctrine* we find four different versions of certain remarks – possibly relating to poleshifts – that the Egyptian priests made to Herodotus in the 5th century BC. Only one of these versions is strictly accurate.

On one occasion Blavatsky states that the Egyptian priests told Herodotus that the sun had not always risen where it now rises and that in former times the ecliptic had cut the equator at right angles.[1] At that time the earth would have been lying on its side with its poles in the plane of the ecliptic. She refers in a footnote to Bailly's *Histoire de l'astronomie ancienne*, where the statement is attributed to Herodotus' *History*, Book II (Euterpe), 142. But if we look up this reference, we find that what Herodotus actually said was the following: 'The sun, however, had within this period of time [341 generations], on four several occasions, moved from his wonted course, twice rising where he now sets, and twice setting where now he rises.'[2] There is no reference here to either the equator or the ecliptic, though obviously to become inverted the poles would have to pass through the plane of the ecliptic, at which time the ecliptic would cut the equator at right angles. Herodotus converts the figure of 341 generations into a period of 11,340 years.

On another occasion Blavatsky says that the Egyptian priests told Herodotus that the pole of the earth and the pole of the ecliptic had formerly coincided,[3] i.e. that the poles had been perpendicular to the ecliptic. She does not give a source for this remark, but it is probably S.A. Mackey.[4]

Elsewhere Blavatsky states that the Egyptian priests told Herodotus that 'even since their first Zodiacal records were commenced, the Poles have been three times within the plane of the Ecliptic, as the Initiates taught.'[5] She also says that 'even since the time of the regular establishment of the Zodiacal calculations in Egypt, *the poles have been thrice inverted*.'[6] If three 360° inversions of the axis are being referred to, 'within the plane of the ecliptic' would have to mean 'below the plane of the ecliptic' (i.e. a tilt of between 90° and 270°) for the two statements to be consistent; if it means that the poles lay in the plane of the ecliptic (i.e. that the tilt was either 90° or 270°), they would not be consistent as the north pole would pass twice through the ecliptic in each 360° inversion of the axis. If three 180° inversions are being referred to, 'three times within the plane of the ecliptic' can be interpreted quite literally to mean that the poles have passed through the ecliptic three times.

Another (accurate!) reference to Herodotus is quoted by Blavatsky from Gerald Massey, who wrote: 'The priests informed the Greek inquirer that time had been reckoned by them for so long that the sun had twice risen where it then set, and twice set where it then arose.' According to Massey, 'This . . . can only be realized as a fact in nature by means of two cycles of Precession, or a period of 51,736 years [= 2 x 25,868].'[7] For Massey, then, this change is not the result of an inversion of the poles, but is purely an effect of the precession of the equinoxes.

R.A. Schwaller de Lubicz gives a similar interpretation to Massey, but says that only one and a half precessional cycles would be required to produce the effect referred to: Herodotus's remarks mean that 'the vernal point had twice been located in the same constellation of Aries, and that it also passed twice in the opposing constellation of Libra. This would grant the duration of one and a half precessional cycles to the entire historic and prehistoric periods, or approximately *39,000 years*.'[8]

In Herodotus's time the vernal sunrise occurred in Aries, with Libra in opposition (due west). 13,000 years before that (half a precessional cycle), the vernal sunrise occurred in Libra, with Aries in opposition. Counting back another 13,000 years, the vernal sunrise would have occurred in Aries, and 13,000 years before that in Libra. Thus, in the preceding 39,000 years the vernal sunrise has occurred twice in Libra and twice in Aries. The figure of 39,000 years accords closely with the testimony of the Turin Papyrus, which shows that the ancient Egyptians considered their prehistory to go back 36,620 years before Menes (c. 4240 BC), or about 40,000 years before our era. Diodorus of Sicily reports that according to several chroniclers, gods and heroes ruled Egypt for 18,000 years, following which the land was governed by mortal kings for 15,000 years, bringing the time span of history and prehistory to a total of 33,000 years. Manetho grants 15,150 years to the divine dynasties and 9777 years to all kings who had reigned before Menes, giving a total of 24,927 years to prehistory. George the Syncellus states that the Egyptians had an ancient chronicle that mentioned 30 royal dynasties preceded by the reign of the gods, comprising a period of 36,525 years (25 sothic cycles of 1461 years).[9]

W. Marsham Adams, following Rawlinson, gives yet another interpretation of the remarks reported by Herodotus. In his view, they refer to the sothic cycle and the heliacal risings and settings of the star Sirius (Greek: Sothis; Egyptian: Sopdit). (The heliacal rising of a star means that it rises just before the dawn, so that it is visible very briefly before being lost in the solar rays.) The Egyptians had a civil or vague year of 365 days, and a fixed or sothic year of 365.25 days based on the heliacal rising of Sirius, which approximately coincided with the summer solstice and the rise of the Nile. A sothic cycle commences when the civil and sothic years begin on the same day. The first day of the civil year then falls back in relation to the sothic year by a quarter of a day each year, or one day every four years. The first day of the civil and sothic years will therefore again coincide after 365 x 4 = 1460 sothic years (or 365.25 x 4 = 1461 civil years) – this being the length of the sothic cycle. Adams writes:

> Since in the course of the cycle, the heliacal risings take place on each day of the entire year, they will run during the first half of the cycle in one direction (relatively to the earth's orbit) and in the latter half in the opposite. And since there is also a corresponding series of settings, subject to a similar change of direction, the two series would in each cycle make up a double reversal, interchanging positions not once but twice. . . . We learn [from Herodotus], therefore, that two Sothiac cycles (four reversals) had been completed since the institution of the scientific Kalendar; so that the cycle then current in the time

> of Herodotus would be the third. And as there is evidence that that cycle was completed in A.D. 139, and therefore commenced in 1322 B.C.; at which epoch Sothis rose heliacally at Memphis about a week before the solstice, and the Rising of the river was heralded by the Orient of the star. Hence, therefore, we conclude that the commencement of the first Sothiac cycle and the institution of the scientific Kalendar took place (2 x 1,461 years previously, i.e.) at the summer solstice of 4244 B.C. . . .[10]

All these interpretations are plausible but ignore the figure of 341 generations/11,340 years given by Herodotus. The possibility that three genuine inversions of the axis are being referred to is considered in Appendix 4.

4. Three axial inversions?

H.P. Blavatsky writes:

> The astronomical records of Universal History . . . are said to have had their beginnings with the Third Sub-race of the Fourth Root-race or the Atlanteans. When was it? Occult data show that even since the time of the regular establishment of the zodiacal calculations in Egypt, *the poles have been thrice inverted*.[1]

There are three possible interpretations of this passage (these interpretations are not mutually exclusive).

(1) Simplicius, in the 6th century AD, wrote that he had heard that the Egyptians had kept records of astronomical observations for a period of 630,000 years.[2] However, this only allows enough time for the angle of inclination to change by about 100°. Blavatsky says that the zodiacs in the Egyptian Temple of Dendera show the passage of over three precessional cycles, but during this time the inclination of the axis would have changed by only 12°. Perhaps the word 'invert' is not meant literally, and Blavatsky means that the axis has *shifted* (by four degrees) in each of the last three precessional cycles.

(2) The ancient Egyptians are said to have obtained their zodiac from the Atlanteans of Ruta.[3] As for the Atlanteans, we are told that 'their zodiacal records cannot err, as they were compiled under the guidance of those who first taught astronomy, among other things, to mankind'.[4] Perhaps, then, the reference to Egypt is a blind and the three inversions actually refer to the period that has elapsed since the Atlantean zodiac was established in their third subrace. If our fifth root-race originated at the start of the fifth subrace of the fourth root-race,[5] the period since the beginning of the third subrace of the Atlanteans would have covered nearly 5 1/2 subraces; each subrace lasts 49 precessional cycles,[6] so that the total period would have spanned approximately 260 precessional cycles. Since the earth's axis takes 90 precessional cycles to invert 360°, it would take 270 precessional cycles for it to undergo three complete inversions.

In the Dendera zodiacs, the constellation Virgo is said to appear three times.[7] One interpretation is that this means that the equinox has precessed through these constellations (and in fact all the others too) three times, and that the zodiacs indicate (among other things) the passage of three precessional cycles. This interpretation corresponds to the first interpretation given above. But Blavatsky gives another interpretation:

> the three 'Virgins,' or Virgo in three different positions, meant, with both [the Hindus and the Egyptians] the record of the first three 'divine or astronomical Dynasties,' who taught the Third Root-Race; and after having abandoned the Atlanteans to their doom, returned (or redescended, rather) during the third Sub-Race of the Fifth, in order to reveal to saved humanity the mysteries of their birth-place – the sidereal Heavens.[8]

Did the Atlanteans (and in a sense, therefore, the later Egyptians) obtain their zodiac from divine instructors during their third subrace, just as the fifth race did? In view of the fact that Blavatsky also refers to the third root-race in the above quotation, it should be borne in mind that, since the root-races overlap, with each root-race beginning around the midpoint of its predecessor, the third subrace of the Atlanteans would have coincided with one of the later subraces (perhaps the sixth) of the third, Lemurian root-race.[9] We are told that during their last two subraces, the Lemurians (or Lemuro-Atlanteans) established the first civilizations under the guidance of their divine instructors, who taught them the arts and sciences, *including astronomy*.[10]

(3) The passage may refer to three 180° inversions of the axis rather than three 360° inversions. In the fifth century BC Herodotus was told by the Egyptian priests that during the past 341 generations, the sun had twice risen where it now sets and twice set where it now rises. This does not necessarily mean that the sun used to rise in the west and set in the east, because as long as the earth rotates on its axis from west to east, as it does at present, the sun will *always* rise in the east and set in the west, even when the poles are inverted – unless, of course, what we now call the earth's north pole is renamed the south pole when its inclination exceeds 90°, so that the earth could then be said to rotate from east to west. S.A. Mackey suggests that Herodotus is actually referring to the *constellations* in which the sun rises and sets: at any given time, the constellations in which the sun rises and sets

would be reversed if the earth were to be suddenly inverted.[11]

Herodotus converts the figure of 341 generations into a period of 11,340 years. However, this is only enough time for the tilt of the axis to change by about 1.7°. Herodotus explains that the figure of 11,340 years is based on a conversion factor of 100 years for every three generations. Curiously, this conversion factor would actually give a period of nearer 11,367 years. Perhaps Herodotus knew more than he was prepared to reveal, and by 'generation' he meant a cycle or period with a length of 11,340 years. Multiplying 11,340 by 341 gives a period of 3,866,940 years, during which time the axis would have moved about 597° (3 x 180° = 540°). This period began not long after the start of the satya-yuga, during the first subrace of the nascent Aryan race. At this time, the axis would have been inclined at an angle of about 100°. It would have been in the plane of the ecliptic when it reached an angle of 270°, and, after returning to 0° (360°), again at 90° and 270°, before reaching its present angle of 336.6° (23.4°). This is in agreement with Blavatsky's statement (taken from Mackey[12]) that the Egyptian priests told Herodotus that 'even since their first Zodiacal records were commenced, the Poles have been three times within the plane of the Ecliptic, as the Initiates taught'.[13] This is also sufficient time for the sun to have twice risen where it now sets and twice set where it now rises, in the sense indicated by Mackey.[14] In Mackey's view, the Dendera zodiacs record a period of about 3.5 million years, or three 180° inversions of the poles.

The above speculations are based on the assumption that the inclination of the axis changes at an average rate of 4° every 25,920 years, and no account is taken of the influence of sudden disturbances of the axis, on which no definite information has been given.

5. The Dendera zodiacs

The Egyptian Temple of Dendera, dedicated to the goddess Hathor, is thought to have been constructed by the Ptolemies in the first century BC, but on the site of an earlier temple. It contains two zodiacs: a rectangular zodiac, carved in the ceiling of the hypostyle hall, and a circular zodiac, about 8 feet across, found on the ceiling of a chapel on the temple roof.

The zodiacs have been the subject of great controversy and have been interpreted in many different ways. They were probably intended to record more than one important date.

Some early French writers assigned the zodiacs an age of 15,000 years or more on the grounds that certain of the constellations were repeated at an interval of six signs.[1] This applies, for example, to Aquarius in both the circular zodiac (figure 3, nos. 10 and 50) and the rectangular zodiac (figure 4, nos. 12 and 56). Sampson Arnold Mackey pointed out that the Goat is found at the top of the rectangular zodiac, while the Crab/Scarab is divided into two separate figures at the bottom. He argued that this indicated that the winter solstice then occurred in the 15th degree of Cancer – which it did just over 16,000 years ago. The Ram was then an autumn constellation, while Virgo was a March constellation – this was the Egyptian month of harvest, and Virgo appropriately holds an ear of corn.[2]

On the basis of a detailed analysis, John Bentley rejected such an antiquity for the zodiacs and concluded that they were 'nothing more nor less than the Roman Calendar for the year 708 of Rome, translated into hieroglyphics'.[3] Whether they represent this date or not, some of the features of the zodiacs were not explained by Bentley or were interpreted wrongly.

Figure 1. The circular zodiac of Dendera. (from Schwaller de Lubicz, 1982, p. 178)

R.A. Schwaller de Lubicz argued that the circular zodiac of Dendera marked three important dates, associated with the last three zodiacal ages (see figure 2):[4]

1. A line drawn perpendicular to the temple's axis runs between the end of the Ram and the beginning of Pisces, indicating the position of the equinox around 100 BC, the date of the construction of the temple and the sculpting of the zodiac. The celestial pole for that time is located in one of the paws of the jackal, Anubis (Ursa Minor). The ecliptic pole is located in the breast of the female hippopotamus, Apet (Draco).
2. The true east-west line traverses Aries, indicating the position of the equinox in about 1200 BC, at the height of the cult of Amun the Ram. This equinoctial line passes through the two points where circles (of equal radius) drawn around the celestial and ecliptic poles intersect.[5]
3. A third equinoctial line, indicated by the hieroglyphs of east and west drawn on the exterior of the disk, passes between Gemini and Taurus, indicating the date of the foundation of the empire, the beginning of the cult of the sacred Bull, Apis, and the adoption of the new calendar, in about 4240 BC.

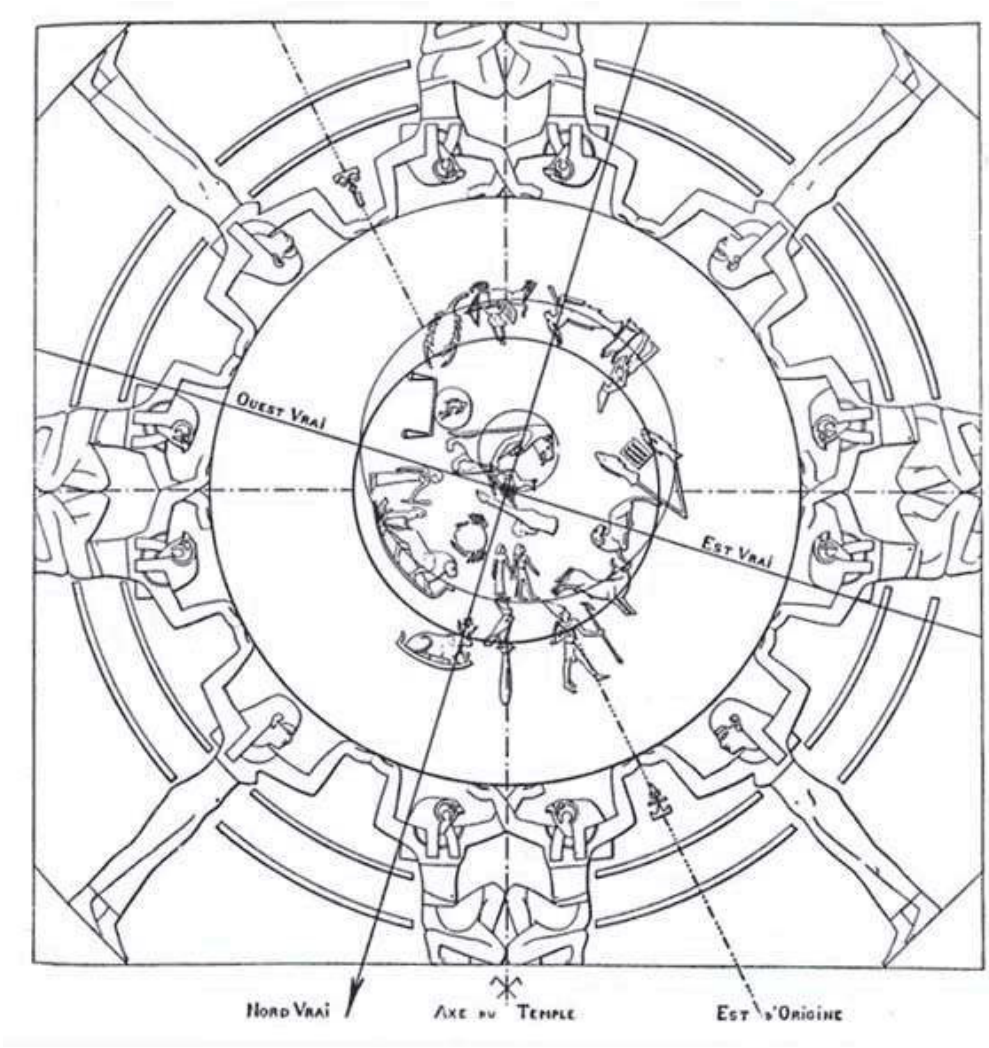

Figure 2. Analysis of the circular zodiac.

S.A. Mackey believed that, as well as representing an antiquity of about 16,000 years, the Dendera zodiacs also represented a far greater antiquity.[6] He argued that the rectangular zodiac represents the earth's poles in the plane of the ecliptic (i.e. a tilt of 90°), which last occurred over 400,000 years ago, and that the circular zodiac represents the earth's poles coinciding with the ecliptic poles (i.e. a tilt of 180° or 0°), which last occurred over 540,000 years earlier, when the earth's axis was inverted. He also says that the zodiacs have features indicating that these positions of the poles had been repeated three times – a reference to the depictions of Leo and Virgo. The zodiacs therefore represented an antiquity of some 3.5 million years, during which time the earth's poles had been 'three times within the plane of the ecliptic'. It is interesting to note that, as well as referring to Mackey as the Oedipus who had understood the riddle of the zodiacs, H.P. Blavatsky also commented: 'On the Dendera Zodiac as preserved by the modern Egyptian Coptic and Greek adepts, and explained a little differently by Mackey . . .'[7]

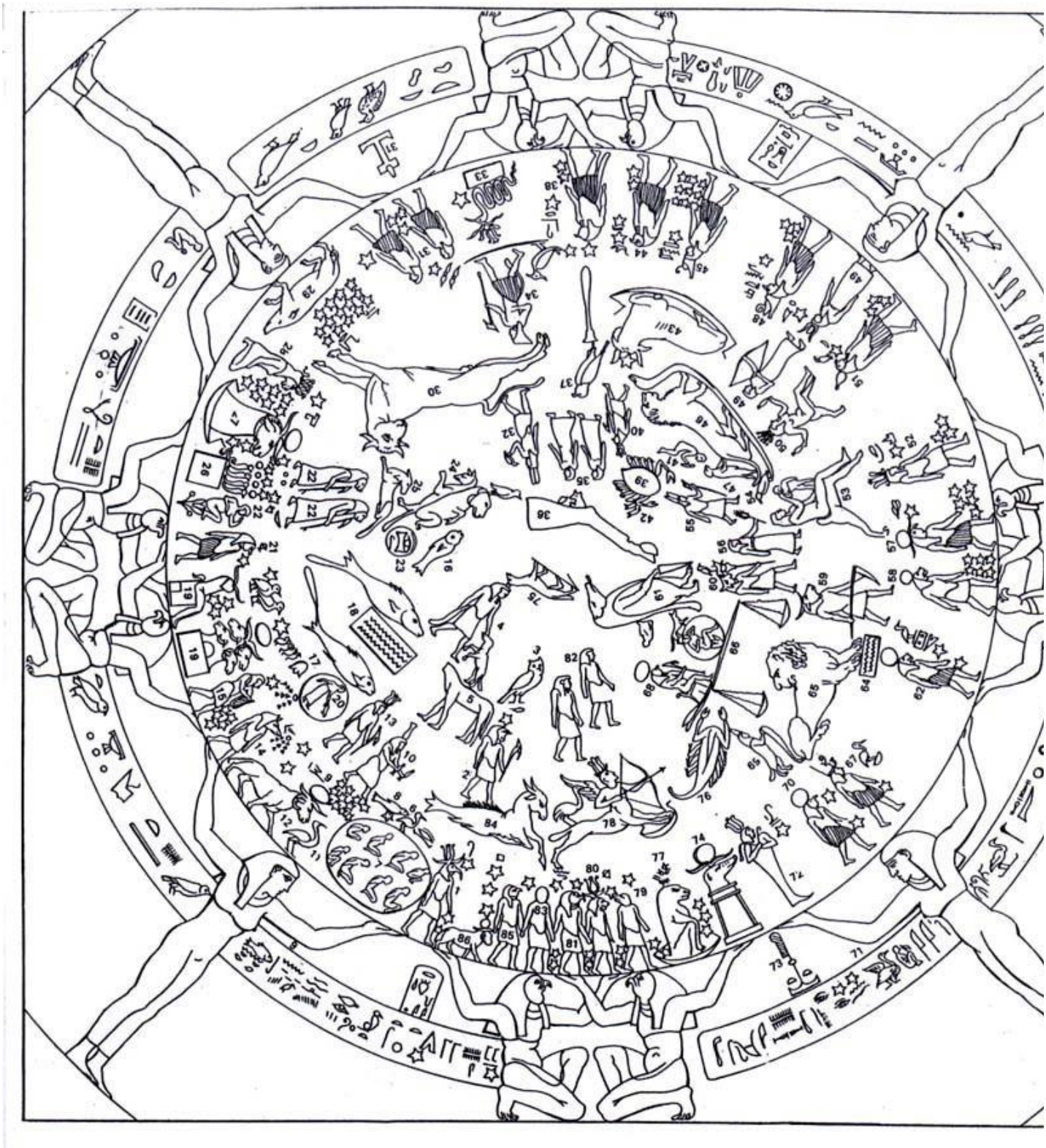

Figure 3. The circular zodiac of Dendera. (from Bentley, 1825, plate VIII)

The circular zodiac contains two Lions. In one of them the Lion's tail is turned up over its back (no. 65, but shown more clearly in figure 1, which is more accurate[8]), indicating according to Mackey that the Lion (and every other constellation) had become inverted. In the other, the Lion's tail curves downward (no. 46). In the rectangular zodiac, the Lion's tail likewise curves downward at an angle of 40 to 50° (figure 4, no. 61).

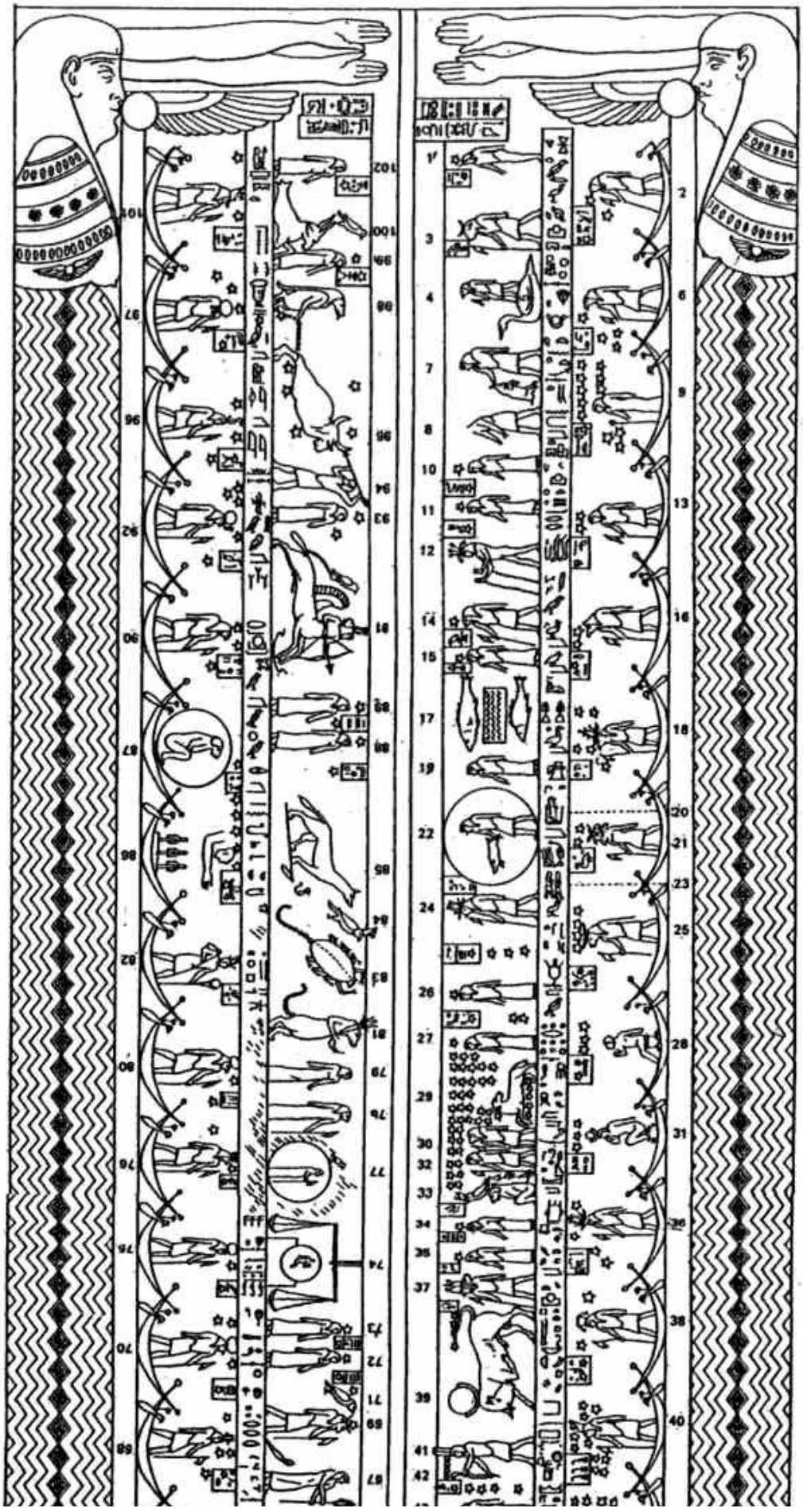

Figure 4. The rectangular zodiac of Dendera. (from Bentley, 1825, plate VII)

Mackey writes that in the rectangular zodiac 'we see three Virgins between the Lion and the Scales; the last of which holds, in her hand, an ear of wheat'.[9] The figure of Virgo holding an ear of wheat is clearly recognizable. But where are the other two Virgos that Mackey refers to? Figure 5, part of Mackey's own drawing of the rectangular zodiac,[10] clearly shows what he had in mind.

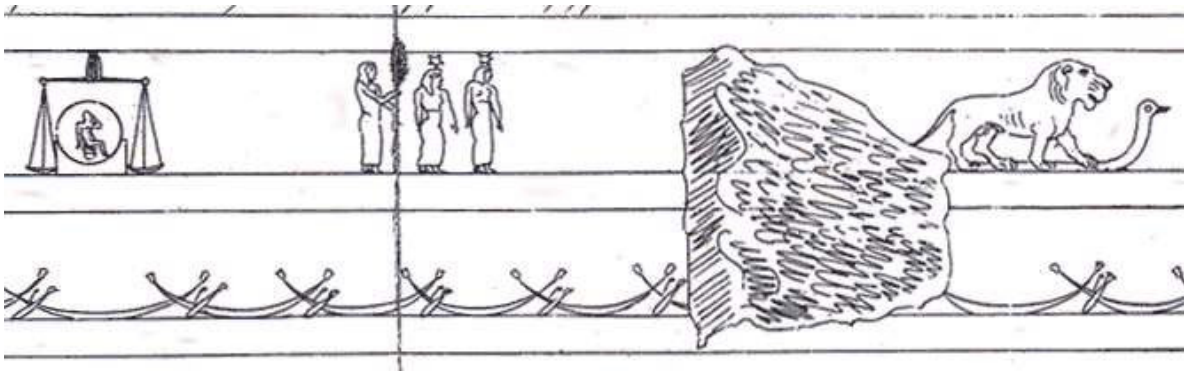

Figure 5. Mackey's three Virgins.

Mackey's belief that the two female figures (nos. 65 and 66 in figure 4) standing directly to the right of the Virgo holding a wheat ear (no. 67) are also Virgos is almost certainly wrong; such figures can be seen standing before many of the constellations in the rectangular zodiac, usually beside a tablet. There are actually a total of 19 such figures: nos. 10, 11, 15, 26, 27, 34, 35, 43, 45, 59, 65, 66, 72, 73, 79, 88, 89, 93, 99 – and it's rather unlikely that they are all Virgos, or that just two of them are Virgos!

According to Mackey, in the circular zodiac, too, 'there are three virgins, which represent the three Decans, into which each sign of the Zodiac was divided. But, here, the first virgin is represented with a *Child* on her knee . . .'[11] The Virgo holding a child[12] and the Virgo holding a wheat stalk are clearly recognizable (nos. 53 and 56 in figure 3). But where is the third Virgo? Figure 6 is Mackey's own drawing of the circular zodiac.[13] The figure holding a scythe (figure 3, no. 59), standing between the Virgo with a child and the Lion is said by Mackey to represent Bootes, so the only remaining candidate for the third Virgin appears to be the figure to the left of the Virgin holding a wheat ear (figure 3, no. 60). But it is an odd-looking and rather unconvincing Virgin![14]

Figure 6. Three more Virgins?

Returning to the rectangular zodiac, there are two figures standing just to the left of Leo, in the damaged part of the zodiac. These are barely shown in figure 4,[15] but are more clearly visible in figure 7, which is more accurate.[16] However, it is difficult to make out exactly what they represent. If the figure (holding a whip) standing immediately behind the Lion represents Virgo, then the same would presumably apply to the female figure standing behind one of the Lion's in the circular zodiac (see figure 1).[17] If this is the case, then the circular zodiac would indeed contain *three* Virgos, just as the rectangular zodiac may conceivably do. Taking the two Dendera zodiacs together, even if we ignore the more doubtful Virgos, there are still a total of three.

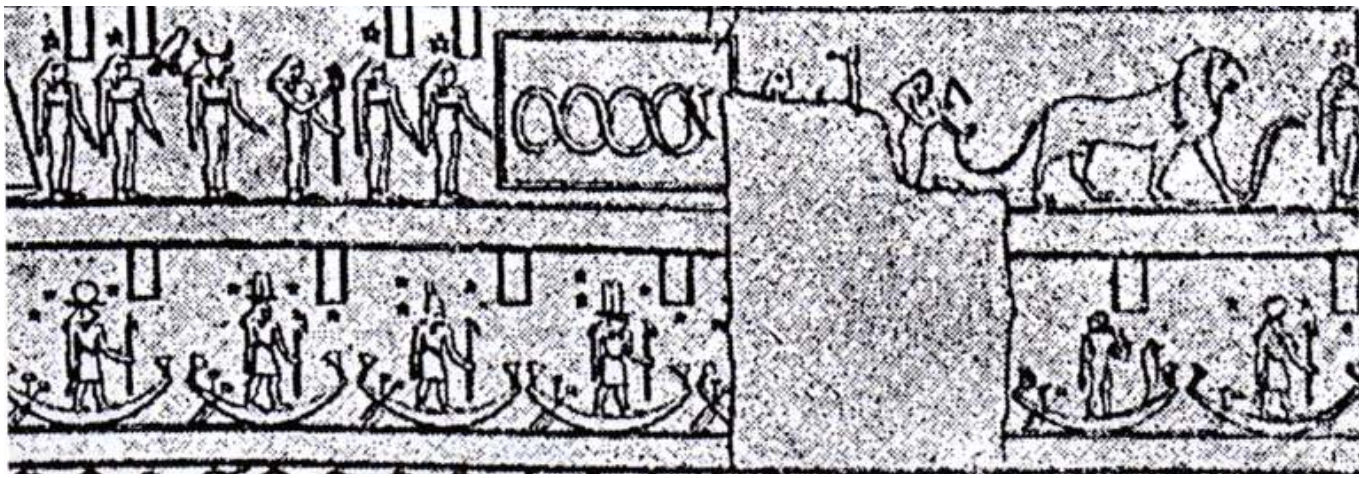

Figure 7. Part of the rectangular zodiac. (from Lockyer[18])

Virgo and Leo are not the only constellations that appear more than once in either of the Dendera zodiacs, as the following table (which is far from definitive) shows:

	Circular Zodiac (figure 3)	*Rectangular Zodiac* (figure 4)
Virgo	2? (nos. 56, 53)	1? (no. 67)
Leo	2 (nos. 46, 65)	1 (no. 61)
Cancer	1 (no. 39)	2 (near the feet of Nut)
Gemini	2 (nos. 35, 82)	1 (no. 48)
Aries	2 (nos. 25, 36, seated on Thigh/Ursa Major[19])	1 (no. 29)
Pisces	2? (nos. 18, 64[20])	1 (no. 17)
Aquarius	2 or 3? (nos. 10, 50, 64[20])	2 (nos. 12, 56)

The Secret Doctrine contains three references to the 'three Virgos'. One of these is the quotation of Mackey's remark that in the rectangular zodiac 'we see *three Virgins* between the Lion and the Scales'.[21] In the SD, the three Virgos appear to be linked to three different dates:
(a) They represent three precessional cycles:

> 'Isis-Osiris' reigned in Egypt before the Dendera Zodiac was painted on the ceiling of that temple, and that is over 75,000 years ago![22]
>
> since the Dendera Zodiac shows the passage of three sidereal years, the great Pyramid must have been built 78,000 years ago . . .[23]
>
> the Egyptians have on their Zodiacs irrefutable proofs of records having embraced more than three-and-a-half *sidereal years* – or about 87,000 years . . .[24]

(b) They represent three 180° inversions of the axis:

> the Dendera zodiac . . . , with its mysterious three *Virgos* between the *Lion* and *Libra*, has found its Oedipus [Mackey], who understood the riddle of these signs, and justified the truthfulness of those

> priests who told Herodotus that . . . even since their first Zodiacal records were commenced, the Poles have been three times within the plane of the Ecliptic.[25]

(c) They represent three 360° inversions of the axis:

> The three 'Virgins,' or Virgo in three different positions, meant, with both, the record of the first three 'divine or astronomical Dynasties,' who taught the Third Root-Race; and after having abandoned the Atlanteans to their doom, returned (or redescended, rather) during the third Sub-Race of the Fifth, in order to reveal to saved humanity the mysteries of their birth-place – the sidereal Heavens.[26]

Further details of the last two interpretations can be found in Appendix 4.

In short, the Dendera zodiacs are open to multiple interpretations!

6. Sampson Arnold Mackey

Notes

1. The zodiac and precession

1. BCW 8:174fn.

2. SD 2:330fn.

3. It is necessary to add '1', because in the historical or chronological method of counting, as opposed to the astronomical method of counting, there is no year zero between 1 BC and 1 AD. Some authors say that the kali-yuga began in 3101 BC, this being the equivalent date using the astronomical system. Either way, the year 1 AD was not the 3103rd year of the kali-yuga but the 3102nd (see Subba Row, *Esoteric Writings*, Theos. Publ. House, 1931, p. 55). J.S. Bailly clearly indicates that 3102 BC is a chronological date when he says that 4383 years (and not 4384) elapsed between 3102 BC and 1282 AD (SD 1:666-7).

4. BCW 8:384. Massey says that the 255 BC date is given by the French astronomer Cassini and by Sir William Drummond (Gerald Massey, 'The prehistorical period of man in Egypt and Africa', in: Brad Steiger and John White, *Other Worlds, Other Universes*, Health Research, 1986, pp. 48-62).

5. SD 1:658, 2:436fn.

6. SD 2:693; A.H. Sayce, *Astronomy & Astrology of the Babylonians* (1874), Wizards Bookshelf, 1981, p. 237.

7. Elisabeth Mulder, *Zon, maan en sterren*, Christofoor, 1991, p. 47.

8. F.J. Dick proposes that Alcyone (in the Pleiades) should be seen as marking the boundary between Taurus and Aries (*The Theosophical Path*, March 1916, p. 299), in which case the Age of Aries would have begun in 2320 BC. Taking Alcyone as 0° Taurus would place Regulus at 0° Leo, Antares at 10° Scorpio, and Formalhaut at 4° Aquarius, these being the four royal stars of the Persians. In this zodiac, the year 2000 would mark the beginning of the Age of Aquarius.

G. de Purucker stated that around 1935 the vernal equinox was in approximately the 11th degree of the constellation Pisces (FSO 673). This can be explained as follows: The vernal equinox is said to have coincided with the initial point of the Hindu zodiac in AD 560 (E. Burgess & W.D. Whitney, *Sûrya-Siddhânta* (1860), Wizards Bookshelf, n.d., pp. 323, 326). If we take this point as the first point of the constellation Aries (though it actually lay in Pisces), the equinox would have been at about 10.8° Pisces in 1935.

9. TG 387.

10. SD 1:663.

11. SD 2:785. A figure of 31,105 years is also given (SD 1:435).

12. G. Cornelius & P. Devereux, *The Secret Language of the Stars and Planets*, Chronicle, 1996, p. 36.

2. The zodiac and cataclyms

1. SD 1:649. '. . . the weal and woe of nations is intimately connected with the beginning and close of [the precessional] cycle' (SD 2:330).

2. Letter from H.P. Blavatsky to J.R. Skinner, 17 February 1887. The figure usually given is 850,000 years, when the equinoctial point would have been in the middle of Sagittarius. However, Ruta's submergence is said to have taken 150,000 years – enough time for nearly 6 complete circuits of the zodiac!

3. SD 1:650-1; SOP 19, 24.

4. Stephen Oppenheimer, *Eden in East*, Weidenfeld & Nicolson, 1998, pp. 18, 29-38.

5. SD 2:5, 141; Isis 2:426.

6. ML 151/155.

7. Blair A. Moffett, 'A World Had Passed', pt. 2, *Sunrise*, May 1980; Peter Lemesurier, *The Great Pyramid Decoded*, Element Books, 1989, pp. 279-80.

8. Zecharia Sitchin, *The 12th Planet*, Avon Books, 1976, p. 409.

9. Graham Hancock, *Fingerprints of the Gods*, Heinemann, 1995, pp. 370-2.

10. Ibid., pp. 411-2, 414.

11. Paul Dunbavin, *The Atlantis Researches*, Third Millennium, 1995, p. 101.

12. *Eden in East*, pp. 49-62.

13. SD 1:370, 2:141, 393; BCW 5:199fn.

14. Isis 2:426.

15. *The Atlantis Researches*, pp. 114-15.

16. Charles Gould, *Mythical Monsters* (1886), Wizards Bookshelf, 1981, pp. 129-30.

17. James DeMeo, *Saharasia*, Orgone Biophysical Lab. Inc., 1998, p. 321.

18. Georg Feuerstein, Subhash Kak & David Frawley, *In Search of the Cradle of Civilization*, Quest, 1995, p. 84.

19. Ibid., pp. 87-99.

20. Ibid., pp. 83-4.

21. *The Atlantis Researches*, p. 102.

22. *In Search of the Cradle of Civilization*, p. 83.

23. *New Scientist*, 9 Jan. 1999, p. 42.

24. Encyclopaedia Britannica, CD98.

25. FEP 316.

26. SD 2:330-1; SOP 35-9, 41, 485-6, 702-3; FSO 163-4; FEP 280/2; OG 143.
Blavatsky refers to the 'great year' of the Chaldeans, lasting about 21,000 years. She says that major cataclysms occur at the end of each cycle, and minor cataclysms at the midpoint. In this connection she mentions Dr R. Falb's theory that there was a 'universal' deluge in 4000 BC, and that the next such disaster will occur in AD 6500. The catastrophe after that would therefore occur in AD 17,000 (BCW 3:149-50; Isis 1:30-1).

27. The symbol for Cancer looks like '69'. In this connection, the following may be significant: Blavatsky says that the figures of a man standing upright and a woman standing on her head before him symbolize the poles inverted. The Persian sovereign, King Cambyses, is said to have gone into an inextinguishable fit of laughter when he entered the Temple of the Kabiri in Egypt and saw the figures of a man and woman (the two Kabiri) represented in this position. The Kabiri are, among other things, the 'Deluge' gods (SD 2:360). Could this mean that when the earth is in Cancer it is more susceptible not to complete axial inversions, but to major disturbances of the axis? It should

be noted, however, that the Kabiri are also associated with the two Dioscuri, Castor and Pollux (SD 2:362), which are situated in the adjacent constellation of Gemini.

3. Herodotus and the Egyptians

1. SD 2:534.

2. Herodotus, *The Histories*, translated by G. Rawlinson, Everyman's Library, 1992, p. 194.

3. SD 2:332, 368, 431.

4. Samson Arnold Mackey, *'Mythological' Astronomy of the Ancients Demonstrated* (1822/23), Wizards Bookshelf, 1973, p. 2.

5. SD 2:353.

6. SD 2:368. See Appendix 4, Three axial inversions?

7. SD 1:435; G. Massey, *The World's Great Year*, Sure Fire Press, 1988, pp. 4-5.

8. R.A. Schwaller de Lubicz, *Sacred Science: the king of pharaonic theocracy* (1961), Inner Traditions, 1982, p. 87.

9. Ibid., pp. 86-7.

10. W. Marsham Adams, *The Book of the Master of the Hidden Places*, edited by E.J. Langford Garstin, Search Publishing Company, 1933, pp. 109-10.

4. Three axial inversions?

1. SD 2:353.

2. SD 1:650.

3. SD 2:436fn.

4. SD 2:49.

5. Dia 1:56, 86.

6. SOP 35-9.

7. SD 2:368, 433, 435; see Appendix 5, The Dendera zodiacs.

8. SD 2:435-6. Blavatsky adds: 'As the three inversions of the Poles of course changed the face of the zodiac, a new one had to be constructed each time.' During a period covering three complete inversions of the axis, the zodiac would obviously have to be altered rather more than three times! In this sentence Blavatsky may be referring to the three 4° *movements* of the poles during the last three precessional cycles.

9. Counting a precessional cycle as 25,920 years, this would mean that the third subrace of the Atlanteans, and the sixth (?) subrace of the Lemurians, lived about 6.5 or 7.5 million years ago. But this is difficult to reconcile with the period of about 18.5 million years that is said to have elapsed since the separation of the sexes in the fifth subrace of the third root-race (SD 1:150fn; 2:69, 197, 715fn). It may be that 18.5 million years is not the true esoteric figure. It is also possible that a precessional cycle lasted longer in the past due to a slower rate of precession. Note that the current rate of precession averages 1/72° per year, or 1° in 72 years, 72 years being the 'ideal' lifetime of a human being in our race and round, and also the average human heart-beat per minute. If humans lived longer in the past (as Blavatsky suggests – BCW 6:117fn), the rate of precession might have been correspondingly slower.

10. SD 2:198, 221-2, 316-8.

11. Samson Arnold Mackey, *'Mythological' Astronomy of the Ancients Demonstrated* (1822/23), Wizards Bookshelf, 1973, Appendix, pp. 11-12.

12. Ibid., pp. 2-6. Blavatsky refers to these passages on several occasions: SD 2:332, 432, 433, 435, 436.

13. SD 2:353.

14. See Appendix 3 for other interpretations of the remarks made by Herodotus.

5. The Dendera zodiacs

1. See J. Bentley, *A Historical View of Hindu Astronomy* (1825), Como Publications, 1981, pp. 251-2.

2. S.A. Mackey, *The Two Zodiacs of Tentyra, and the Zodiac of Thebes*, Norwich, 1832, pp. 15-17.

3. *A Historical View of Hindu Astronomy*, pp. 251-82. Blavatsky writes: 'Europeans are unacquainted with the real Zodiacs of India, nor do they understand those they happen to know (witness Bentley)' (SD 2:431).

4. R.A. Schwaller de Lubicz, *Sacred Science: the king of Pharaonic theocracy* (1961), Inner Traditions, 1982, pp. 283-6; R.A. Schwaller de Lubicz, *The Temple of Man*, Inner Traditions, 1998, pp. 486-90; John Anthony West, *Serpent in the Sky: the high wisdom of ancient Egypt*, Quest, 1993, pp. 100-2; Peter Tompkins, *Secrets of the Great Pyramid*, Harper & Row, 1978, pp. 169-75.

5. As John West notes, Schwaller de Lubicz's contention that the zodiacal constellations in the circular zodiac are arranged around two circles, one centred on the ecliptic pole and one on the celestial pole, is not entirely convincing, as can be seen in the placement of Libra and, above all, of Cancer. The overall impression is of a spiral, though not a regular one.

6. Samson Arnold Mackey, *'Mythological' Astronomy of the Ancients Demonstrated* (1822/23), Wizards Bookshelf, 1973, pp. 2-6; *The Two Zodiacs of Tentyra, and the Zodiac of Thebes*, pp. 15-21; S.A. Mackey, *The Original Design of the Ancient Zodiacal and Extra-Zodiacal Constellations*, Norwich, 1834, pp. 21-2. The relevant quotations can be found in Appendix 6.

7. SD 2:368, 432. Blavatsky makes the following comment on Mackey's view that the myth of the gods ascending and descending referred to the movement of the zodiacal constellations at a time when the earth's poles were in the plane of the ecliptic: 'This is an ingenious explanation, even if it is not altogether free from occult heresy' (SD 2:358).

Mackey's scattered comments on the Dendera zodiacs are somewhat incoherent and confusing, and at times rather dubious. His assertion that in the circular zodiac the zodiacal constellations are in the plane of the equator, and the pole of the earth and the pole of the ecliptic coincide, receives no support from Schwaller de Lubicz's analysis, though de Lubicz does not explain all the features of the zodiac.

8. For photos of the circular zodiac, see *Secrets of the Great Pyramid*, p. 171; Graham Hancock & Santha Faiia, *Heaven's Mirror: quest for the lost civilization*, Michael Joseph, 1998, p. 61.

9. *Mythological Astronomy*, p. 4. In *The Original Design of the Ancient Zodiacal and Extra-Zodiacal Constellations*, Mackey writes: '[The] virgin is thrice repeated in the long Zodiac of Dendera, one of which holds up a wheat-ear between Leo and the Balance or Scales' (p. 21).

10. *The Two Zodiacs of Tentyra, and the Zodiac of Thebes*, plate A.

11. *The Original Design of the Ancient Zodiacal and Extra-Zodiacal Constellations*, pp. 21-2. In *The Two Zodiacs of Tentyra*, he states that in the circular zodiac 'Virgo is intermixed with Leo, and the *first* of the three *virgins has her child on her lap*' (p. 20).

12. Bentley interprets the latter figure as Isis holding Horus, but Schwaller de Lubicz, like Mackey, took it to represent Virgo (*The Temple of Man*, p. 776fn).

13. *The Two Zodiacs of Tentyra, and the Zodiac of Thebes*, plate B.

14. Bentley says that this figure stands for the first quarter of the moon: 'Represented by a figure holding a support in his hands, on which rests an animal like a sheep, and a bird on the top of it, both symbols of the moon, and the commencement of harvest' (*A Historical View of Hindu Astronomy*, p. 277).

The figure holding a scythe, which Mackey regards as Bootes (*The Two Zodiacs of Tentyra*, p. 20; *The Original Design of the Ancient Zodiacal and Extra-Zodiacal Constellations*, p. 21), is considered by Bentley to be Thoth (*A Historical View of Hindu Astronomy*, p. 277). He says that the crescent on Thoth's head implies the commencement of the Egyptian year (and of the month of Thoth). The same feature can be seen in figure no. 3 of the rectangular zodiac (see figure 4).

15. Figure 4 is based on the drawing in volume 2 of D.V. Denon's *Voyage dans la Basse et la Haute Egypte*. Hence the two figures in question are not shown in Mackey's drawing of the rectangular zodiac (figure 5), which is likewise based on Denon's depiction of the zodiac.

16. For a photograph of this part of the rectangular zodiac, see *Heaven's Mirror*, p. 62.

17. In figure 3 (from Bentley/Denon), the Virgo in question is numbered 47, but note how different it looks to the more accurate representation in figure 1. The figure standing behind the other Lion in the circular zodiac (figure 3, no. 69) is said by Bentley to be Anubis, and he makes the same claim regarding the (misdrawn) figure no. 47. A small female figure standing immediately behind Leo also appears (in addition to the usual Virgo) in the zodiac in the Temple of Esna (*The Theosophical Path*, March 1916, p. 300). Schwaller de Lubicz apparently regarded the female figure as an integral part of the symbol for Leo (*Temple of Man*, p. 483). However, not all Egyptian representations of Leo include this figure.

Since Mackey based his interpretation of the circular zodiac on Denon's depiction of it, in which the figure to the left of Leo is misdrawn, this female figure is not included in his own drawing of the circular zodiac (figure 6).

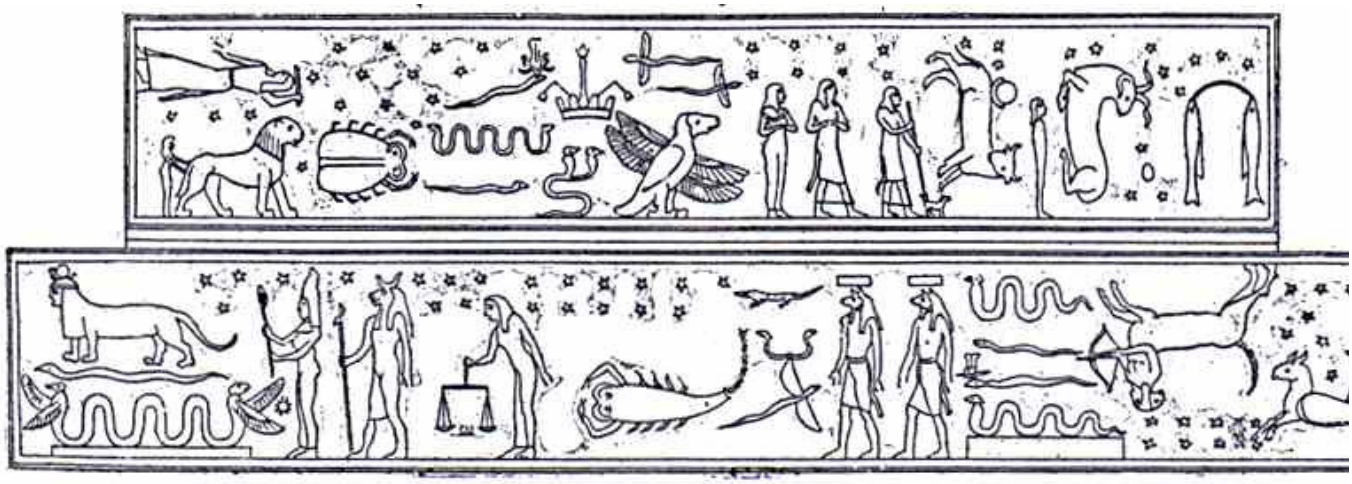

Figure 8. The Esna zodiac.

18. J.N. Lockyer, *The Dawn of Astronomy* (1894), Kessinger, n.d., p. 136.

19. Giorgio de Santillana & Hertha von Dechend, *Hamlet's Mill: an essay investigating the origins of human knowledge and its transmission through myth*, Nonpareil Books, 1969, p. 405.

20. Bentley regards the wavy lines under the Lion's paws as representing Pisces (*A Historical View of Hindu Astronomy*, p. 277), whereas Mackey believes they represent Aquarius (*The Two Zodiacs of Tentyra*, p. 20).

21. SD 2:433; see also SD 2:368, 435. Blavatsky states: 'Having seen [the Dendera zodiacs] personally, the writer has no longer need to trust to what other students – who have examined and studied both very carefully – have to say of them' (SD 2:431).

22. SD 2:374fn.

23. SD 2:432.

24. SD 2:332; see The Great Pyramid, http://ourworld.compuserve.com/homepages/dp5/pyramid.htm.

25. SD 2:368.

26. SD 2:435-6.

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POLESHIFTS

Theosophy and Science Contrasted

David Pratt

January 2000

PART 5: APPENDICES

6. Sampson Arnold Mackey

Sampson Arnold Mackey (1765-1843) lived for most of his adult life in Norwich, where he worked as a shoemaker. He received minimal education, but pursued his own studies of astronomy, geology, and mythology. He gave lectures on his theories, and published several books and pamphlets at his own expense. He was one of the first writers to publicly challenge the biblical dogma that the earth was no more than about 6000 years old, and argued instead that the earth, and humanity too, was *millions* of years old. He was invited to join the Freemasons, but refused to do so as he wanted to preserve his independence. He died in an almshouse.

For further information on Mackey's life and work, see BCW 14:545-9, and two books by Joscelyn Godwin: *Arktos: the polar myth in science, symbolism, and Nazi survival*, Phanes Press, 1993, pp. 196-202, and *The Theosophical Enlightenment*, State University of New York Press, 1994, pp. 67-76.

Godwin makes the following criticism:

> Like many an autodidact, Mackey hurt his case by riding his hobby-horse to the limit. Every myth or legend he came across seemed to illustrate the experiences of mankind under the changing conditions of the shifting axis. All solar myths referred to the apparent behavior of the sun; serpent myths, to the spiral path of the pole. The different volves of the spiral were always mythologized as intelligent beings, which explained away all the stories of the gods and their progeny. All numbers in theogony and myth referred to celestial mathematics, which Mackey believed to have been fully understood by the priest-astronomers of antiquity. (*The Theosophical Enlightenment*, p. 71)

Although Mackey may have overstated his case, H.P. Blavatsky clearly considered some of his views worthy of quotation. All the passages in Blavatsky's works which quote from or draw on Mackey's writings are reproduced below, and the page numbers of the relevant passages in *'Mythological' Astronomy of the Ancients Demonstrated* [MA] are indicated. The relevant passages from MA are then given. Finally a few additional passages referring to the Dendera zodiacs are given from several of Mackey's works. (For more on the Dendera zodiacs, see Appendix 5.)

H.P. Blavatsky

SD 1:654-5

> 'Christian theologians think it their duty to write against the long periods of Hindu chronology,' argues very pertinently S.A. Mackey, the Norwich 'philosopher, astronomer, and shoemaker.' 'But when a man of learning crucifies the names and numbers of the ancients, and wrings and twists them into a form which means something quite foreign to the intention of the ancient authors; but which, so mutilated, fits in with the birth of some maggot pre-existing in his own brain with so much exactness that he pretends *to be amazed* at the discovery, I cannot think him quite so pardonable' (*Key of Urania*). **[MA, Pt. 2, 23-4]**
>
> This is intended to apply to Captain (late Colonel) Wilford, but the words may fit more than one of our modern Orientalists.

SD 2:331

> Every sidereal year the tropics recede from the pole *four degrees* in each revolution from the equinoctial points, as the equator rounds through the Zodiacal constellations. Now, as every astronomer knows, at present the tropic is only twenty-three degrees and a fraction less than half a degree from the equator. Hence it has still 2 1/2 degrees to run before the end of the Sidereal year; which gives humanity in general, and our civilized races in *particular*, a reprieve of about 16,000 years. **[MA, App., 25-6]**

See part 3, section 4.

SD 2:332

> The Egyptian priests assured Herodotus that the Pole of the Earth and the Pole of the Ecliptic had formerly coincided **[MA, 2]**. But, as remarked by the author of the *Sphinxiad* [the Sphinxiad is actually a zodiacal drawing in MA], 'These *poor benighted* Hindoos have registered a knowledge of Astronomy for ten times 25,000 years since the (last local) *Flood* (in Asia), or *Age of Horror*,' in the latitude of India. **[MA, App., 23]** And they possess recorded observations from the date of the first *Great* Flood within the Aryan *historical* memory – that which submerged the last portions of Atlantis, 850,000 years ago.

SD 2:356

> . . . every occultist knows that the Serpent alluded to is the north pole, as also the pole of the heavens.* The latter produces the seasons according to the angle at which it penetrates the centre of the earth. **[MA, 39]**
>
> *Symbolized by the Egyptians under the form of a Serpent with a hawk's head.

SD 2:357-8

> The Egyptians, according to Eusebius, who for once (and for a wonder) wrote the truth, symbolized kosmos by a large fiery circle, representing a serpent with a hawk's head lying across its diameter. 'Here we have the pole of the earth within the plane of the ecliptic, attended with all the fiery consequences that must arise from such a state of the heavens: when the whole Zodiac in 25,000 (odd) years, must have reddened with the solar blaze, and each sign must have been *vertical* to the polar region.' (see Mackey's '*Sphinxiad*'.) **[MA, 42]**
>
> Meru – the abode of the gods – was placed, as before explained, in the North Pole, while *Pâtâla*, the nether region, was supposed to lie in the South. As each symbol in esoteric philosophy has *seven keys*, geographically, *Meru* and *Pâtâla* have one significance and represent localities; while astronomically, they have another, and mean 'the two poles,' which meaning ended by their being often rendered in *exoteric* sectarianism – the 'Mountain' and the 'Pit,' or Heaven and Hell. . . . As the author just quoted half explains, *Helion* and *Acheron* meant nearly the same: '*Heli-on is the Sun in the highest*' (Helios, Heli-on, the 'most high'); 'and *Acheron* is 32 deg. above the pole, and 32 below it, the allegorical river being thus supposed to touch the northern horizon in the latitude of 32 degrees. The vast concave, that is for ever hidden from our sight and which surrounded the southern pole, being therefore called the PIT, while observing, toward the Northern pole that a certain circuit in the heavens always appeared above the horizon – they called it the Mountain. As Meru is the high abode of the Gods, these were said to *ascend* and *descend* periodically; by which (astronomically) the *Zodiacal* gods were meant, the passing of the original North Pole of the Earth to the South Pole of the heaven.' 'In that age,' adds the author of that curious work, the '*Sphinxiad*' and of '*Urania's Key to the Revelations*' – 'at noon, the ecliptic would be parallel with the meridian, and part of the Zodiac would descend from the North Pole to the north horizon; crossing the *eight coils of the serpent* (eight sidereal years, or over 200,000 solar years), which would seem like an imaginary *ladder* with *eight staves* reaching from the earth up to the pole, *i.e.*, the throne of Jove. Up this ladder, then, the Gods, *i.e.*, the signs of the Zodiac, ascended and descended. (Jacob's ladder and the angels) . . . . It is more than 400,000 years since the Zodiac formed the sides of this ladder.' **[MA, 41, 44, 46-7]** . . . .
>
> This is an ingenious explanation, even if it is not altogether free from occult heresy. Yet it is nearer the truth than many of a more scientific and especially theological character.

SD 2:360

> [T]he two figures in white and black stone have existed in the temples of Egypt from time immemorial – agreeably to tradition; and historically – ever since the day of King Cambyses, who personally saw them. . . . These figures were the two *Kabiri personifying the opposite poles*. Herodotus (*Thalia*, No. 77) tells posterity that when Cambyses entered the temple of the Kabirim, he went into an inextinguishable fit of laughter, on perceiving what he thought a man erect and a woman standing on the top of her head before him. These were the poles, however, whose symbol was intended to

commemorate 'the passing of the original North Pole of the Earth to the South Pole of the Heaven,' as perceived by Mackey.* **[MA, 40-1]** But they represented also the poles *inverted*, in consequence of the great inclination of the axis, bringing each time as a result of the displacement of the Oceans, the submersion of the polar lands, and the consequent *upheaval* of new continents in the equatorial regions, and *vice versâ*. These Kabirim were the 'Deluge' gods.

*Who adds that the Egyptians had various ways of representing the angles of the Poles. Also in Perry's *View of the Levant* there is 'a figure representing the South Pole of the Earth in the constellation of the Harp,' in which the poles appear like two *straight rods*, surmounted with hawks' wings, but they were also often represented as serpents with heads of hawks, one at each end. **[MA, 41]**

SD 2:362fn

It is a curious idea – yet one not very far from the truth, perhaps – that speculation of Mackey, the self-made Adept of Norwich, found in his 'Mythological Astronomy.' He says that the Kabiri named Axieros and Axiokersa derived their names (*a*) from *Kab* or *Cab*, a measure, and from *Urim*, the heavens: the Kabirim being thus 'a measure of the heavens;' and (*b*) that their distinctive names, implying the *principle of generation*, referred to the sexes. For, 'the word *sex* was formerly understood by *aix*; which has now settled . . . . into sex.' And he refers to 'Encyclopaedia Londinus' at the word '*aspiration*.' Now if we give the aspirated sound to Axieros, it would be *Saxieros*; and the other pole would be *Saxiokersa*. The two poles would thus become the generators of the other powers of nature – they would be the *parents*: therefore the most powerful gods. **[MA, 38-9]**

SD 2:368

Africa, as a continent, it is said, appeared before Europe did; nevertheless it appeared later than Lemuria and even the earliest Atlantis. That the whole region of what is now Egypt and the deserts was once upon a time covered with the sea, was known firstly through Herodotus, Strabo, Pliny, and all the Greeks; and, secondly, through geology. Abyssinia was once upon a time an island; and the Delta was the first country occupied by the pioneer emigrants who came with their gods from the North-east.

When was it? History is silent upon the subject. Fortunately we have the Dendera Zodiac, the planisphere on the ceiling of one of the oldest Egyptian temples, which records the fact. This Zodiac, with its mysterious three *Virgos* between the *Lion* and *Libra*, has found its Oedipus, who understood the riddle of these signs, and justified the truthfulness of those priests who told Herodotus that:– (*a*) The poles of the Earth and the Ecliptic had formerly coincided; and (*b*) That even since their first Zodiacal records were commenced, the Poles have been three times within the plane of the Ecliptic, as the Initiates taught. **[MA, 2, 4]**

SD 2:406-8

Surely, if the Hindu Purânas give a description of wars on continents and islands situated beyond Western Africa in the Atlantic Ocean; if their writers speak of *Barbaras* and other people such as Arabs – they who were never known to navigate, or cross the *Kala pani* (the black waters of the Ocean) in the days of Phoenician navigation – then their Purânas must be older than those Phoenicians (placed at from 2,000 to 3,000 years B.C.). At any rate those traditions must have been older; as –

'In the above accounts,' writes an adept, 'the Hindus speak of this island as *existing* and in great power; it must, therefore, have been more than *eleven thousand years ago*.' **[MA, Pt. 2, 70]**

But another calculation and proof may be adduced of the great antiquity of these Hindu Aryans who knew of (because they had once dwelt in it) and described the last surviving island of Atlantis – or rather of that remnant of the Eastern portion of that continent which had perished soon after the upheaval of the two Americas – the two Varshas of Pushkara. This may be demonstrated, moreover, on an astronomical calculation by an adept who criticises Wilford. For re-calling what the Orientalist had brought forward concerning the Mount Ashburj 'at the foot of which the sun sets,' where was the war between the Devatas and the Daityas, he says:–

'We will consider, then, the latitude and longitude of the lost island, and of the remaining Mount Ashburj. It was on the seventh stage of the world, *i.e.*, in the seventh climate (which is between the latitude of 24 degrees and latitude 28 degrees north). . . This island, the daughter of the Ocean, is frequently described as lying in the West; and the sun is represented as setting at the foot of its mountain (Ashburj, Atlas, Teneriffe or Nila, no matter the name), and fighting the white Devil of the "White Island." ' **[MA, Pt. 2, 69]** . . .

It was just remarked that since, in the Purânic accounts, the island is *still existing*, then those accounts must be older than the 11,000 years elapsed since Sancha dwipa, or the Poseidonis of Atlantis, disappeared. Is it not barely possible that Hindus should have known the island still earlier? Let us turn again to astronomical demonstrations, which make this quite plain if one assumes, according to the said adept, that 'at the time when the summer tropical "colure" passed through the *Pleiades*, when

cor-Leonis [Regulus] would be upon the equator; and when Leo *was vertical* to Ceylon at sunset, then would *Taurus* be vertical to the island of *Atlantis at noon*.' **[MA, Pt. 2, 70]**

This explains, perhaps, why the Singhalese, the heirs of the Râkshasas and Giants of Lanka, and the direct descendants of *Singh*, or *Leo*, became connected with Sancha dwipa or Poseidonis (Plato's Atlantis). Only, as shown by Mackey's '*Sphinxiad*,' this must have occurred about 23,000 years ago, *astronomically*; at which time the obliquity of the ecliptic must have been rather more than 27 degrees, and consequently Taurus must have passed over 'Atlantis' or 'Sancha dwipa.' And that it was so is clearly demonstrated. **[MA, Pt. 2, 70]**

SD 2:431-6

Among other arts and sciences, the ancients – ay, as a heirloom from the Atlanteans – had those of astronomy and symbolism, which included the knowledge of the Zodiac.

As already explained, the whole of antiquity believed, with good reason, that humanity and its races are all intimately connected with the planets, and these with Zodiacal signs. The whole world's History is recorded in the latter. In the ancient temples of Egypt this was proved by the Dendera Zodiac; but except in an Arabic work, the property of a *Sufi*, the writer has never met with a correct copy of these marvellous records of the past, as also of the *future*, history of our globe. Yet the original records exist, most undeniably.

As Europeans are unacquainted with the real Zodiacs of India, nor do they understand those they happen to know (witness Bentley), the reader is advised, in order to verify the statement, to turn to the work of Denon (*Travels in Egypt, Vol. II.*) in which, *if understood*, the two famous Egyptian Zodiacs, can be found and examined. Having seen them personally, the writer has no longer need to trust to what other students – who have examined and studied both very carefully – have to say of them. As asserted by the Egyptian Priests to Herodotus, who was informed that the terrestrial Pole and the Pole of the Ecliptic had formerly coincided, thus was it found and corroborated by Mackey.* [*'The Mythological Astronomy of the Ancients Demonstrated' **[p. 2]** by a strangely intuitional symbologist and astronomer, a kind of self-made adept of Norwich, who lived in the first quarter of this century.] For he states that the Poles are represented on the Zodiacs in both positions, 'And in that which shows the Poles (polar axes) at right angles, there are marks which prove that 'it was not the last time they were in that position; *but the first* – after the Zodiacs had been traced.' 'Capricorn,' he adds, 'is represented at the North Pole, and Cancer is divided, near its middle, at the South Pole; which is a confirmation that originally they had their winter when the Sun was in Cancer; but the chief characteristics of its being a monument commemorating the *first time* that the Pole had been in that position, are the Lion and the Virgin.' **[MA, 3]** . . .

[S]ince the Dendera Zodiac shows the passage of three sidereal years, the great Pyramid must have been built 78,000 years ago, or in any case . . . this possibility deserves to be accepted at least as readily as the later date of 3,350 B.C.

Now on the Zodiac of a certain temple in far Northern India, as on the Dendera Zodiac, the same characteristics of the signs are found. Those who know well the Hindu symbols and constellations, will be able to find out by the description of the Egyptian, whether the indications of the chronological time are correct or not. On the Dendera Zodiac as preserved by the modern Egyptian Coptic and Greek adepts, and explained a little differently by Mackey, the Lion stands upon the *Hydra* and his tail is almost straight, pointing downwards at an angle of forty or fifty degrees, this position agreeing with the *original* conformation of these constellations. 'But in many places we see the Lion (*Simha*),' Mackey adds, 'with his tail turned up over his back, and ending with a Serpent's head; thereby showing that the Lion had been "*inverted*"; which, indeed, must have been the case with the whole Zodiac and every other Constellation, when the Pole had been inverted.' **[MA, 3]**

Speaking of the *Circular* Zodiac, given also by Denon, he says:– There, 'the Lion is standing on the Serpent, and his tail forming a curve downward, from which it is found that *though six or seven hundred thousand years* must have passed between the two positions, yet they had made but little difference in the constellations of Leo and the Hydra; while *Virgo* is represented very differently in the two. In the *circular* Zodiac, the *Virgin is nursing her child*; but it seems that they had not had that idea when the pole was first within the plane of the Ecliptic; for in *this* Zodiac, as given by Denon, we see *three Virgins* between the Lion and the Scales, *the last of which holds in her hand* an ear of wheat. It is much to be lamented that there is in this Zodiac a breach of the figure in the latter part of Leo and the *beginning of Virgo* which has taken away one *Decan* out of each sign.' **[MA, 3-4]** . . .

. . . The three 'Virgins,' or Virgo in three different positions, meant, with both, the record of the first three 'divine or astronomical Dynasties,' who taught the Third Root-Race; and after having abandoned the Atlanteans to their doom, returned (or redescended, rather) during the third Sub-Race of the Fifth, in order to reveal to saved humanity the mysteries of their birth-place – the sidereal Heavens. . . . In Mackey's 'Sphinxiad' the speculations of the bold author must have horrified the orthodox portion of the population of Norwich, as he says, fantastically enough:–

'But, after all, the greatest length of time recorded by those monuments (the Labyrinth, the Pyramids and the Zodiacs) *does not exceed five millions of years* (which is not so)*; which falls short of the

records given us both by the (esoteric) Chinese and Hindus; which latter nation has registered a knowledge of time for seven or eight millions of years**; which I have seen upon a talisman of porcelain. . . .' **[MA, 6]**

*The forefathers of the Aryan Brahmins had their Zodiacal constellations and Zodiac from those born by Kriyasakti power, the 'Sons of Yoga'; the Egyptians from the Atlanteans of Ruta.

**The former, therefore may have registered time for seven or eight millions of years, but the Egyptians *could not*.

SD 2:768

[T]here must have been a good reason why an Asiatic nation should locate its great progenitors and saints in the *Ursa Major*, a *northern constellation*. It is 70,000 YEARS, HOWEVER, SINCE THE POLE OF THE EARTH POINTED TO THE FURTHER END OF URSA MINOR'S TAIL **[MA, Pt. 2, 74]**; and many more thousand years since the seven Rishis could have been identified with the constellation of Ursa Major.

See part 3, section 1, note 14.

SD 2:785-6

Astraea, the goddess of justice, is the last of the deities to forsake the earth, when the gods are said to abandon it and *be taken up into heaven by Jupiter again*. But, no sooner does Zeus carry away from earth Ganymedes (the object of *lust*, personified) than the father of the gods throws down Astraea back on the earth again, on which she *falls upon her head*. Astraea is *Virgo*, the constellation of the Zodiac. Astronomically it has a very plain significance, and one which gives the Key to the occult meaning. But it is inseparable from *Leo*, the sign that precedes it, and from the Pleiades and their sisters, the Hyades, of which Aldebaran is the brilliant leader. All of these are connected with the periodical renovations of the earth, with regard to its continents – even Ganymedes, who in astronomy is Aquarius. It was already shown that while the South Pole is the *pit* (or the infernal regions figuratively and cosmologically), the North Pole is geographically the first continent; while astronomically and metaphorically the celestial pole, with its pole star in *heaven*, is Meru, or the seat of Brahmâ, the throne of Jupiter, etc. For in the age when the gods forsook the earth and were said to ascend into heaven, the ecliptic had become parallel with the meridian, and part of the Zodiac appeared to descend from the north pole to the north horizon. Aldebaran was in conjunction then with the Sun, as it was 40,000 years ago, at the great festival in commemoration of that Magnus Annus, of which Plutarch was speaking. Since that year (40,000 years ago) there has been a retrograde motion of the equator, and about 31,000 years ago Aldebaran was in conjunction with the vernal equinoctial point. The part assigned to *Taurus*, even in Christian mysticism, is too well known to need repetition. The famous Orphic hymn on the great periodical cataclysm divulges the whole esotericism of the event. Pluto (in the pit) carries off Eurydice, bitten by the (polar) serpent. Then Leo, the *lion*, is vanquished. Now, when the Lion is *in the pit*, or below the south pole, then Virgo, as the next sign, follows him, and when her head, down to the waist, is *below* the South horizon – she is *inverted*. On the other hand, the Hyades are the rain or *Deluge* constellations; and *Aldebaran* (he who follows, or *succeeds* the daughters of Atlas, or the Pleiades) looks down from the eye of Taurus. It is from this point of the ecliptic that the calculations of the new cycle were commenced. The student has to remember also, that when Ganymedes (*Aquarius*) is raised to heaven (or above the horizon of the North Pole) *Virgo* or Astraea, who is *Venus-Lucifer*, descends head downwards below the horizon of the South Pole, or the pit; which *pit*, or the pole, is also the Great Dragon, or the Flood. Let the student exercise his intuition by placing these facts together; no more can be said. **[MA, 43-8]**

BCW 14:365-8

In an article entitled 'Secret Cycles', not published in her lifetime, Blavatsky refers to Mackey as 'an unknown but very clever amateur Astronomer', and adds: 'His theory about the Hindu Yugas and their length is curious – as being so very near the correct doctrine.' This is followed by a very lengthy quotation, extracts from which are given below:

[In Hindu scientific books] we find the heavens and the earth divided into *five parts* of unequal dimensions, by circles parallel to the equator. . . . [F]rom them arose the division of their Mahâ-Yuga into its four component parts. Every astronomer knows that there is a point in the heavens called the pole, round which the whole seems to turn in twenty-four hours; and that at ninety degrees from it they imagine a *circle* called the *equator*, which divides the heavens and the earth into two equal parts, the north and the south. Between this circle and the pole there is another imaginary circle called the circle of *perpetual apparition*: between which and the equator there is a point in the heavens called the zenith, through which let another imaginary circle pass, parallel to the other two; and then there wants but the circle of perpetual occultation to complete the round. . . . No astronomer of Europe besides myself has ever applied them to the development of the Hindu mysterious numbers. [In the latitude of 36°N] the circle of perpetual apparition would extend up to 72 degrees altitude, and from that to the zenith there are but 18 degrees, but from the zenith to the equator in that latitude there are 36 degrees,

and from the equator to the circle of perpetual occultation there are 54 degrees. Here we find the semi-circle of 180 degrees divided into four parts, in the proportion of 1, 2, 3, 4, *i.e.*, 18, 36, 54, 72. Whether the Hindu astronomers were acquainted with the motion of the earth or not is of no consequence, since the appearances are the same; and if it will give those gentlemen of *tender consciences* any pleasure I am willing to admit that they imagined the heavens rolled round the earth, but they had observed the stars in the path of the sun to move *forward* through the equinoctial points, at the rate of fifty-four seconds of a degree in a year, which carried the whole zodiac round in 24,000 years; in which time they also observed that the angle of obliquity varied, so as to *extend* or *contract* the width of the tropics 4 degrees on each side, which rate of motion would carry the tropics from the equator to the poles in 540,000 years; in which time the Zodiac would have made twenty-two and a half revolutions . . . or what amounts to the same thing, the north pole of the ecliptic would have moved from the north pole of the earth to the equator. . . . Thus the poles become inverted in 1,080,000 years, which is their Mahâ-Yuga, and which they had divided into four unequal parts, in the proportions of 1, 2, 3, 4, for the reasons mentioned above; which are 108,000, 216,000, 324,000, and 432,000. . . .

[For the pole to return to its original position] must have taken 2,160,000 years: and this is what the Hindus call the Prajanatha Yuga. . . .

Enough has been said to prove that the Hindu books of science are not disgusting absurdities, originated in ignorance, vanity, and credulity; but books containing the most profound knowledge of astronomy and geography. . . .

S.A. Mackey, *'Mythological' Astronomy of the Ancients Demonstrated*, Norwich, 1822/23 (Wizards Bookshelf, 1973)

Pages 2-6

Of the Antiquity of Egypt.

This Country, though now in the most degraded state, shews, by its monuments, that, it must have once been the Mistress of the Universe – as Rome formerly was of Europe. And yet even here, I have never been able to trace, by the monuments which have come within the compass of my knowledge, a higher antiquity than about four millions and a half of years.

We are told by Herodotus, that, the CHOEN or men of learning in this country, informed him, that, the Pole of the Earth and the Pole of the Ecliptic had formerly coincided. I have seen, in Denon's second volume of Travels in Egypt, **[p. 3]** two ancient Zodiacs, from a temple in *Tentyra* or Dendera, where the Poles have been represented in both situations: and in that which shews the Poles at right angles, there are marks which shew, that it was not the last time they were in that position: but the first. Capricorn is, therein [i.e. in the rectangular zodiac], represented at the North Pole; and Cancer is divided near its middle, at the South Pole; which is a confirmation that, originally they had their winter when the Sun was in Cancer. – But the chief characteristics of its being a monument commemorating the first time that the Pole had been in that position, are, the Lion & the Virgin.

The Lion is, therein, drawn, standing upon the *Hydra*; and his tail is almost straight, and pointing *down* in an angle of 40 or 50 degrees. Which position very well agrees with the original formation of those Constellations. But, in many places[*], we see the Lion with his tail turned up over his back, and ending with a Serpent's head; thereby, shewing that the Lion had been *inverted*: which, indeed, must have been the case with the whole *Zodiac*, and every other Constellation, when the Pole had become inverted.

[*Note:
R.C. Leonard mentions the Arezzo Chimera of the Etruscans as an example (*Quest for Atlantis*, Manor, 1979, pp. 220-1). This celebrated work in bronze, discovered at Arezzo in 1534, has the body of a lion, a goat's head springing from its back, and a serpent for a tail, though the latter is said to be a modern restoration. The goat's head, pierced through the neck, is already dying, and the rest of the creature is writhing in agony from this and another wound it has received from the spear of Bellerophon (http://www.bowdoin.edu /dept/library/classes/clas/305/index.html). One of the two lions in the circular zodiac of Dendera also has its tail turned up over its head, though the tail does not end with a serpent's head (see appendix 5, figure 1).]

The Chimera of Arezzo.

There is also, in Denon's second volume, a *circular* Zodiac, where the Lion is standing on **[p. 4]** the Serpent, and his tail forming a curve downward: from which we find, that, though six or seven hundred thousand years must have past between the two positions, yet they had made but little or no difference in the Constellations of Leo and the Hydra; while Virgo is represented very differently in the two – in the circular Zodiac, the *Virgin* is *nursing her Child*: but it seems that they had not had that idea when the Pole was first within the plane of the Ecliptic; for in *this Zodiac* [i.e. the rectangular zodiac], as given by Denon, we see three Virgins between the Lion and the Scales; the last of which holds, in her hand, an ear of wheat. It is much to be lamented, that, there is in this Zodiac, a breach of the figures in the latter part of Leo and the beginning of Virgo, which have taken away one *Decan* out of each sign.

There are three Monuments in this Country, which shew that the Poles have been three times within the plane of the Ecliptic. These are the *Labyranth*, the column called *Cleopatra's* Needle, and their *Abraxes*.

THE LABYRANTH

Has been described by various Authors, who agree, in stating, that, it was a Building full of **[p. 5]** intricate windings and turnings; and containing between three and four thousand little chambers. They likewise agree in stating that the chambers were in rows, facing inwards to *winding Allies*, which went round the Building, ascending and winding from the surface of the Earth; forming a spiral line from the middle upwards; and descending and winding, forming a spiral line from the middle downwards. Which is precisely the figure described by the North and South Pole of the Earth, in passing from the Ecliptic, till they coincide with the North and South Pole of the Heavens – describing at once, the precession of the Equinoxes, and the diminution of the angle of the Poles.

Who can, here, mistake the design of this, hitherto, mysterious Building? Other nations have registered the rounds made by the Equinoctial points, and have given us the same number; each, in a way peculiar to itself: but none has imitated nature with so much simplicity as the people of Egypt.

But the Historians inform us that there were three Spiral Allies, and three tiers of little chambers, which shew, that the Pole had repeated its ascent and descent *three times*: and we find the **[p. 6]** Symbol of the sun (i.e. the Hawk) is placed three times upon the top of Cleopatra's Needle. And we find the Bull there as often: as if the Bull had been as often at the Pole. And if it be true that the Gem called Abraxes, has marks about it which proves it to have been three times repeated, then, their *Abraxes proves*, that, the Bull had been *three times* at the Pole: for its name means THE BULL AT THE POLE; and is compounded of ABIR the Bull, and *Axis* the Pole. . . .

But, after all, the greatest length of time recorded by those monuments does not exceed five millions of years: which falls short of the records given us both by the Chinese and Hindoos: which latter nation has registered a knowledge of time for seven or eight millions of years: which I have seen upon a *Talisman* of Porcelain, which is now in this city.

Pages 38-9

21. AXIEROS &c. – These were the distinctive appellations given by the ancients to the two poles, which were called, conjointly, the *Cabirim*: by which, was understood *powerful gods* . . .

They are called the most powerful of all the gods. But let us see in what that power consists. Their name of *Cabirim*, is the *measure of the heavens*: it is compounded of *Cab*, a measure; and *Irim* or *Urim* the heavens; thus *Cabirim* is the measure of the heavens.

It is said they are the most powerful of the gods. **[p. 39]** Their distinctive names imply *principle of generation*: for, what we now understand by the word *sex*, was formerly understood by *ax*; which by being spoken with vehemence, has, in our time, settled into sex. (see Encyclo. Londinen at the word *aspiration*.) Now, if we give the aspirated sound to Axieros, it would become *sax*, or *Sexieros*; and the other pole would be *Sexikersa*. The two poles would thus become the generators of the other powers

of nature – they would be the *parents* of the other powers; therefore, the *most* powerful.

But independent of these derivations, do we not know that the *pole* of the heavens, *generates* the seasons according to the angle with which he *penetrates* the *centre* of the earth, – when *parallel*, we have constant spring; but when he penetrates through the equator; the ravages of the elements, must be dreadful!

Pages 40-1

Herodotus, in his Thalia, number 77 records, that, when CAMBYSES entered the Temple of the *Cabirim* in Egypt, he derided the indecent appearance of the *personified poles*. Indeed I do not see how any man could refrain from laughing, beholding a man, in an erect position, accompanied by a woman whose position was *inverted*, and surrounded by attributes of the most **[p. 41]** whimsical and fantastical kinds. Seeing the woman's head by the feet of the man, Cambyses did not know that it was intended to commemorate the passing of the original North Pole of the Earth, to the South Pole of the Heavens! But the Egyptians had various ways of representing the angle of the Poles. In '*Perry's View of the Levant*' there is a figure representing the *South Pole* of the earth in the constellation of the *Harp*. In which the poles appear like two *straight rods*, surmounted with hawks wings to distinguish the north from the south. But the symbols of the poles, which modern folly has denominated *powerful Gods* are, sometimes, in the form of *serpents*, with the *heads of hawks* to distinguish the north from the south end.

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Eusebius informs us also, that the Egyptians represented the universe by a *sky-coloured* and fiery circle, with a *serpent* having the head of a hawk, reaching from side to side, something like the Grecian *theta*; or like the diametre to the circle. Here we see the pole of the earth within the plane of the ecliptic, attended with all the fiery consequences that must arise from such a state of the heavens: when the whole Zodiac, in 25,000 years, must have 'redden'd with the solar blaze;' and each sign must have been vertical to the polar regions.

This *great truth* cannot be ascertained with too much certainty: for it will give us the *master key* to the ancient mysteries . . .

Pages 43-8

We are told that the Gods *forsook the earth* – and that *Justice* or *Astrea* was the last of all the celestial train that was *taken up into heaven*. And when Jove took Ganimede up into heaven, then *Astrea* was thrown down and fell head foremost upon the earth! . . .

[p. 44] The stories of the Pagans concerning the ascension of their gods into heaven, and their descent into hell, have produced, in the minds of modern Europeans the most absurd notions, – notions that never entered the minds of the first Astronomers, who divided the heavens into three grand divisions, in the most simple manner imaginable: they observed, towards the north, that a certain circuit in the heavens always appeared above the horizon; this they denominated one great empire; and as there is a point in the middle of it which is always stationary, this they made the seat of Empire, and subjected it to the government of a Monarch, who could from his throne, i.e. the Pole, behold all the nations of the earth, both by night and by day.

They could not but be sensible of that part of the vast concave that is for ever hid from our sight, surrounding the south pole; this was distinguished as another grand division of the flame besprinkled concave, and called the PIT in contra-distinction from the opposite, which was called the MOUNTAIN. Hence, among the ancients, arose the epithets of HELION and ACHERON, which meant nearly the same; as *Heli-on* is the *Sun* in his highest: which the Greeks pronounce Heli-os – i.e. *Elios*, the *most high*. Acheron, is **[p. 45]** generally translated *Hell*. It is compounded of *Achari*, i.e. the *last state or condition*; and *On*, the Sun, *Achar-on*, signify the *last state*, or *condition* of the sun: alluding to his annual disappearance in those constellations which were in the neighbourhood of the south pole. I have seen, in Denon's 2nd vol. a zodiac with a Crab at the south pole; but the time of the greatest splendour of the Egyptians, was about 2000 years before that time; when *Leo* must have been there. The celebrated *Orphic hymns* are made to deplore the loss of *Euridice* in the *regions* below. Euridice is generally understood to be the *wife* of the ancient poet – 'twas the theme of which he wrote – 'Twas his Muse &c. But let us see for whom or for what this imaginary Poet of the ancients lamented, while Pluto held the object of his *delight* in his *bottomless abyss*. It was for *Ari-dacah*, i.e. the *poor Lion* – the *vanquished Lion*. The Greeks, who could not pronounce the Phenician term *Aridaca*, softened it into *Euridice*, and said that it was the Poet's Wife, that had *gone down* into the regions of misery. The Jews, however, whose language is similar to that of the Phenicians, inform us that *Benaiah*, i.e. the Son of God, *slew a Lion* in the *midst of a pit* in the *time of snow*! Now, when the Lion was in the Pit, i.e. at the south **[p. 46]** pole; then, as *Virgo* is the next sign, her *head and shoulders* must have been lost *below the south horizon*: meanwhile *Aquarius*, with his *pitcher of water*, was at the north pole. This was *Ganimede* the

cup-bearer of Jove, who was taken *up into heaven* when the celestial *virgin* was thrown head fore-most upon the earth!!!

Thus, we see, that, the precession of the equinoctial points, mov'd, when the pole of the earth was in the plane of the ecliptic, just as they do in our time! And that, while one sign was sinking into the *bottomless pit* another sign was *ascending* into heaven, i.e. rising up towards the pole.

As the people on the earth are insensible of the motion of the earth, they thought that the pole of heaven revolved round the pole of the earth. And if we assume a time when the poles were parallel: the pole of heaven, in eight times 25,000 years, would seem to have described a pericyclosical figure round the pole of the earth like a serpent coiled eight times; and as each volve is *four degrees* asunder, the figure of the serpent described by the pole of heaven round the pole of the earth in 200,000 *years* would sweep a circle, the diameter of which would be 64 degrees **[p. 47]** i.e. 32 deg. above the pole, and 32 below it: and would be found to touch the northern horizon in the latitude of 32 degrees. In that age, at noon, the ecliptic would be parallel with the meridian, and part of the Zodiac would descend from the north pole to the north hoziron; crossing the *eight coils of the serpent*, which would seem like an imaginary *ladder* with *eight staves* reaching from the earth up to the pole, i.e. the throne of Jove! Up this ladder then, the Gods, i.e. the signs of the zodiac, ascended and descended! The Hebrew Historians relate that one of their Patriarchs saw a *ladder* which reached from earth to heaven, on which he saw some non-descript beings called Angels ascending and descending. It is more than 400,000 years since the Zodiac formed the *sides* of this ladder. Could the Pagans borrow this notion from the Jews: or did the Jews receive some feint traces of antiquity from their masters?

22. ALDEBARAN. – The names given to this brilliant star shew the uses to which it was applied by the ancients in all parts of the world. Its name of Aldebaran, signify *rule or guide*. It was called by the Latins *Palilitium*, which signifies the *rule of festivals*; from *pha*, the *mouth*, i.e. *proclaiming*, and lilia or liloth, festivals. This **[p. 48]** star was in conjunction with the sun 40,000 years ago, when, they held their grand autumnal festival; from which circumstance, it is very likely to have been so called from the first; before they had observed the retrograde motion of the equator. But, after a run of about eight or nine thousand years, it was found to be in conjunction with the *vernal* equinoctial point. This seems to have produced a new aera in astronomy; as it is a well known fact that, the Celestial Bull is highly venerated in *China*, in *Hindoostan*, and various other parts of the world, as well as in Egypt. This bright star, so venerated by the ancients, was, from its name of guide or *leader*, a point in the *Ecliptic* from which they measured the *longitude* of the equator, and regulated their time: and when the equator had gone through all the parts of the Zodiac, they began a new reckoning – a new series of 1, 2, 3, &c.; 'till having counted another round of 25, or, 26 thousands of years, began again with 1, 2, 3, &c. of the third round: and so on. As a proof of their reckoning from the conjunction of the equator with Aldebaran, I shall mention two facts from the histories of *China* and Babylon; which are well known to all the learned in Europe. . . .

Appendix, page 23

It is not to be expected that I can be able to decypher all the historical traits which may be registered upon these *ten* Avatars, that may regard their national concerns; – their peace; their wars; their national refinements, &c.; that may have happened in each Avatar, or round of the Zodiac; but it will be a great point gained to science, to shew that, 'These *poor benighted Hindoos*' have registered a knowledge of Astronomy for ten times 25,000 years since the *Flood*, or *Age of horror* in the latitude of Banares.

Appendix, pages 25-6

Now, we have seen, that the tropics would recede from the pole four degrees in each revolution from the equinoctial points; from which we know, that in *ten* revolutions they would be removed *forty* degrees. But 40 and 25 are 65. Thus then at the end of *ten* Avatars, or rounds of the equinoctial points, *the tropic would be vertical at Benares*! – The tropic would be but *twenty five degrees from the equator*! And as we know in our time, that the tropic is but twenty-three degrees and something less than half a degree from the equator; it has still to move two degrees and nearly half before the formation of another round or Avatar, or age; which take about 16,000 years to perform. And as we know that about 9,000 years have elapsed since the tropic was vertical at Benares, so we know that the TEN AVATARS bring down the knowledge of Astronomy to that period.

Part 2 (*The Key of Urania*), pages 23-4

Christian Theologians think it their duty to write against the long periods of *Hindu Chronology*; and in them it may be pardonable: but when a man of learning crucify the names and the numbers, of the ancients; and wring and twist them into a form, which means something quite foreign to the intentions of the ancient authors; but which, so mutilated, fits in with the *birth* of some *maggot* pre-existing in his own brain with so much exactness, that he *pretends* to be amazed at the discovery, I cannot think him quite

so pardonable.

Part 2, pages 69-70

But we will take our leave of the Daityas, or demons of the White Island, whose king was *Neptune*, called by the Hindus SANC'HASURA, from *sanc'ha*, a sea shell: and let them remain quietly in the ocean, while we consider the latitude and longitude of the lost island, and of the remaining Mount *Az-burj*. It was on the seventh stage of the world, i.e. in the *seventh* CLIMATE or MEASURE OF HEAT, which is between the latitude of 24 degs. and latitude 28 degs. north, and this White Island, which is called, also, Adbhi'-tanaya, or daughter of the ocean, is frequently described as lying in the west; and the sun is represented as *setting at the foot of Mount Azburj* to fight (scorch with his vertical beams) the White Devil or White Island. From these expressions, which are very poetical, we shall be able to ascertain the longitude of this White Island of the Hindu historians, which will be found to be in that place where Plato had placed the ATLANTIS.

[p. 70] In the above accounts the Hindus speak of this island as *existing*, and in great power; it must therefore, have been *more than eleven thousand years ago*: and if we assume that time when the summer tropical colure passed through the *pleiades* then would *Cor Leonis* be upon the equator; and when *Leo was vertical* at the island of Ceylon at sunset. Then would *Taurus* be vertical at the island of *Atlantis at noon*. And we are informed in the A.R. [*Asiatic Researches*] that Ceylon was so called from *singha*, a Lion! And in 9th vol. p. 78, that the *Ox Nandi* resided in the White island! These are very remarkable occurrences which must have happened about 23,000 years ago: at which time *the obliquity of the ecliptic* must have been *rather more than 27 degrees*: and consequently Taurus must have passed over ATALA or ATALANTA.

Part 2, page 74

In one place in the A.R. it is supposed that the seven stars in Ursa-major were the seven rishas [rishis]. It is a *long while* since they were the *seven steps on Meru*: and it is still longer since they extended from LANCA to DELHI.

Men should be careful how they endeavour to support false systems. It is 70,000 years since the pole of the earth pointed to the *tip of Ursa-major's tail*!

Additional passages on the Dendera zodiacs

Mythological Astronomy

Part 2, page 134fn

In the CIRCULAR and OBLONG ZODIACS from the Temple of Tentyra or Dendera, we see the constellation of Aquarius represented by whole-length human figures pouring down the contents of inverted BOTTLES. In the oblong Zodiac the first Decanate has a man standing on the back of a Swan, – symbol of snow; in the third the symbol's head is decorated with flowing feathers, which seem to indicate that the downfall from its INVERTED BOTTLES is snow.

Part 2, pages 139-41

In the oblong zodiac of Tentyra, each of the twelve signs is divided into three parts of ten degrees, and each part is represented by a human figure (with attributes expressive of his functions) called a Decan; and as each sign of the zodiac has three of these, the first of each was called a powerful leader of three. To this company of thirty-six decans they attributed the management of the seasons. These were the *powers* whose functions were more durable than those of the twelve Zodiacal Constellations which are still found to alter their position every 2,000 years, relative to the seasons; and to move, in that time, through a space of thirty degrees from the equinoctial points. Not so the more powerful and constant gods called the Decans, or Eloim; those of that rank which are fixed at the equator are still supposed to compel the sun to shine twelve hours a day all the world over; and those at the opposite parts of the equator constantly *prepel the sun the same way* through their dominions; i.e. those at the *spring node* will not suffer the *sun* to pass out of their palace the same way by which he entered; but order him to move on to the sign more northward. This is known to be the constant order of the sun, moon, and planets; which must continue till the CABIRI, the MOST *powerful* of all the gods, shall unite; and then the functions of the Decans are at an end; and one unbounded spring shall govern all; until A POWER MORE *powerful* than the *Cabiri*, shall cause the poles again to separate; when the seasons will again return, and the Decans again take their stations: but now, *observe*, all *topsy-turvy turned*! and what before was north, the northern pole forsakes! The Lion now, which trod *beneath his feet* the hydra Nile, is decorated with a *hydra tail*, that casts his *venom* over the *Lion's Back*!!! And now *the Decan-trio* of the wintry sign, when ever the Lion comes within their reach, decoy

the sprawling monster backwards down; but by such slow degrees, that in twelve visits, seen from *Delhi's plain*, he still is free from *Swayambhuva's* den. But steady to their dreadful *word of woe*, when the *great twelve* have *ten more* circling revolutions run, *hell's central Pivot* strikes the Lion's heart.

Part 2, pages 156-7

I cannot conclude my remarks on the Noachidae, or people who inhabit extensive plains in the age of horror, without observing the necessity of taking into their *arched flotillas* some of their most useful cattle, which must otherwise have perished: this we are certain of *without a revelation*! and in the oblong zodiac of Tentyra, where we find cancer at the south pole; and the divisions of Gemini crowded with seven persons all busily employed in arranging matters of some serious importance, previous to their getting into winter quarters, we find, also, in the last decanate but one, to the south pole, there is actually *an OX placed in a* BOAT: this is not the constellation of Taurus, for that is on the other side of Gemini, where we see him with a circle on his neck which informs us that there was a full moon in the last decanate.

The figure of an ox (or cow) in a boat with six stars above it, to which Mackey refers, is similar to the figure of a cow in a boat with a star between her horns in the circular zodiac. The latter figure is generally considered to represent Sirius. (See Appendix 5, figure 4, no. 54, and figure 3, no. 43.)

Part 2, pages 168-9

Abram, which was the original name of *Abraham* is precisely the *Brama* of the Hindoos: it seems that this people had a way of placing the *as*, of foreign words last in order, as in this word *Abram*; by transposing the a, it becomes brama; again, when India was conquered by the King of Egypt, they called him BRAMA *Gypta*: here we see the a transposed; which seem to shew that they were fond of an a terminal: but whether the meaning of the name remained the same I am not certain: we know, however, *Brama* was their grand name for the Deity, we know, also, that they held the Bull in high veneration, but whether there was any connexion in their minds with the Bull and Brama, I am not certain; but we know that ABIR signifies the BULL; which the Greeks corrupted into *Apis*: both names, however, are compounds, and are applicable to the Bull, in consequence of his being the most distinguished constellation in the zodiac, and of his being used in ploughing the ground; which last employment procured him the epithet of *Apis* or *Ab-is* – AB-ISIS, contracted: *Isis* with the ear of corn is the symbol of harvest, and as the bull ploughed the ground, he was the *figurative father of harvest* i.e. Abis from AB, *father*; and ISIS, harvest. In the circular and oblong zodiacs from *Tentyra* (both of which may be seen in DENON's Travels in Egypt) the *bull* is the *most distinguished* of all the animals, in the solar round, he was, therefore the FATHER of the FIRES, i.e. he was *Ab-irim*. The bright star in that constellation, is the most brilliant of all the stars or *fires* in the zodiac, it was the FATHER FIRE, i.e. it was AB-IR and this etymology is confirmed by the arabic name of that bright star, which is *Al-de-'bir*-AN, i.e. the-great-father of fires. The city of ABBIR*opolis* in Goshen, and ABAR*is* in Hindoostan were so called from the abundance of cattle.

***The Two Zodiacs of Tentyra, and the Zodiac of Thebes*, Norwich, 1832**

pages 2-3

In speaking of the origin of the Zodiac; Mr. Goodacre observed, that *modern* Astronomers were satisfied that the antiquity of the Zodiac was not more than 2,200, or 2,400 years at the most; and beginning at Aries, he said the ram was placed in the zodiac, in the month of April, because in that month the lambs were produced. In May, a bull was placed in the zodiac, because in that month the cows brought forth their calves; and then, proceeding to the month of June, (fearing we may suppose, to offend the ladies) he turned the two boys into two *kids*, saying, that in the ancient zodiacs, the Gemini were represented by two kids, because in the month of June the goats brought forth their *kids*. Having filled one quarter of the zodiac, he paused before he set out for the hot month of July. In the meanwhile a man in the *gallery* [Mackey] asked Mr. G. if he would have the goodness to state in what zodiac those *kids* were to be found. He, (Mr. G.) said in the zodiac of Dendera (Tantyra). The man replied, there are two, but there are *no kids* in either of them. Have you seen them said Mr. G. – seen them! said the man in the *gallery*, yes, sir, and many other men in Norwich; we are quite familiar here, with these *precious gems* of ancient science, and we know that there are no kids in either of them. A *long painful silence ensued*, and the man in the gallery exclaimed, – you see, sir, that the people of Norwich are not quite so ignorant as you may suppose them to be. Mr. G. said the interruption was *ungenteel*, and hoped he might be allowed to think himself quite exonerated from any further reply, and so he went on with the next three signs, which ended with Virgo, as the month of harvest in Egypt, the month of September.

In what estimation can this man be held by those who know that the harvest month in Egypt is in the month of March, i.e. in *that part* round about Tentyra. Now had Mr. G. allowed the ram to have been

originally an *autumnal* sign, he would have found the virgin, with her *spike of corn*, (symbol of harvest) with the sun in March, the harvest month in that country. But this great truth would have embarrassed Mr. G. who had before stated that *Seth, the grandson of Adam* was the first astronomer. If *his* Seth had known the ram as an *autumnal* sign, he must have lived *fifteen thousand* years ago.

pages 9-10

We are assured by well authenticated documents, that, Cambyses, king of Persia, who lived 2,356 years ago, conquered Egypt and Ethiopia, and *murdered all the men of learning* that could not escape. Hence, the origin of *scientific wanderers* called *gypsies*.

As the history of science was . . . written [in the Dendera zodiacs], in a character which was known to none but those venerable men who were exterminated, all its fine shades have disappeared, but the grand outline is indestructible. – Those men, however, who are desirous of not being deceived, must be careful in their choice of books; for, already there are works in print containing *corrupted* zodiacs of Dendera (Tantyra) in which all the marks of their antiquity are carefully omitted.

In the time of Cambyses, Aries was a *vernal* equinoctial constellation, and the Crab coincided with the *summer* tropic; but in the zodiac A [the oblong zodiac], the *winter* solstitial colure divides the Crab near its middle, and the Ram must of necessity be an *autumnal* sign, and if we allow 25,600 years in that time for one round of the equinoctial points, half that sum 12,800, which being added to the time since Cambyses, will give 16,156 years at least, since the Crab was posited, as in the long zodiac of Tantyra, which I shall demonstrate so clearly that all who know the summer noontide sun is *higher* than that of winter, and that our heads are above our feet, shall be satisfied that *cancer* in the long zodiac of Dendra, is a winter sign.

pages 15-21

The Oblong Zodiac of Tantyra explained.

Every body knows that the summer sun rises higher at noon than the winter sun does. When the sun has acquired its greatest altitude in Summer, we say it is Midsummer, and the sun *turns* back again; that point then is called the Summer Tropic, the upper or highest part of the zodiac, – the *top* part, and when the sun has descended to his lowly place in midwinter, from that point he turns back, and that point is termed the lower tropic, the bottom of the zodiac.

Upon our globes, at this time, the constellation of Gemini is the highest point of the zodiac, and Sagittarius at the bottom; but in the time of Cambyses, the crab was at the top, and capricorn at the bottom, and as the progressive motion of the zodiac makes an entire revolution in about 25,000 years, in that time all the constellations will have been at the top in summer, and all, at the bottom in winter; therefore when we see a celestial globe, we can ascertain its antiquity by the *position of the zodiac*.

But the zodiac of Tantyra is not placed upon a globe: how then, are we to ascertain its top from its bottom? In Dr. Jamieson's Celestial Atlas, is given what is there called, the Zodiac of Dendera; but in that there is not the least mark of its antiquity retained: the crab is put *all* on one side, and the goat is transplanted to the contrary side to the correct plate of Denon.

Other authors have given the same corrupted and mutilated engravings, said to be the zodiacs of Tentyra. For what purpose is all this cutting and slaying? Does the malignant spirit of Cambyses still *haunt* the science of those whom he murdered? Vain attempt! since the labours of DENON have met a kindred spirit to their own. . . .

Here [in the oblong zodiac] we have the 12 constellations in two strait parallel bands, placed between two female figures embracing the whole; here is a *pole* with a knob at one end, indicative of the *top*; but to prevent doubt, the knob is placed touching the *mouth* of the female, and no one can suppose for a moment that the *mouth in the head*, was intended to represent the bottom of the zodiac;– here then at the *top* of this zodiac we find the goat, and at the bottom, at the *feet* of the figure we find the crab divided near its middle. Here then, in this celebrated zodiac, we have the most satisfactory evidence, that the crab was formerly a winter constellation, and the goat, at the top, a summer constellation; and this was the first cause of the stars in that part of the zodiac being called the goat – it was at the top of the zodiac – the top of the hill; which is the delight of the goat. It was the 'high station' of the sun, from which he looked down with a smile upon the earth in all his glory; as a son of Crispin from *his* high station, might *look down* upon Mr. Goodacre. Every body knows that the sun in descending from the Summer to the Winter, passes over the equator in the Autumn; and here we find the Summer sun, quitting his high station in the Goat, to arrive at his *cellar* in the Crab, has to pass over the equator in Autumn in the constellation of the Ram. The Ram then was an autumnal sign. How could *Mr. Goodacre* have the impudence to stand before an audience in this city, and assert such palpable falsehoods in the science of astronomy as he did. But he did do it. He said the zodiac of Dendera did not show an antiquity of more than 2,200 or 2,400 years at the *most:* but here is the zodiac itself, proclaiming an antiquity of 16,000 years at least, and he said, also, that in the zodiac of Dendera, the space now filled by the twins, was occupied by two kids. But here are *no* kids; here we see a group of three men and women, whose attitudes seem to express, an agreement with a fourth

woman on terms of accommodation on board her husband's boat. Well may the *Cambysesians* of the present day send into the world *spurious zodiacs* of Dendera. Do they fear that the materials of Noah and his family should be recognised in this division which Mr. Goodacre said contained two kids?

Having shown that the Ram was formerly an autumnal constellation, and that about 15 degrees of cancer was touched by the wintry tropic, I shall now proceed to notice a few things expressed on this zodiac, for which, (to use the words of Denon), I think, I shall deserve well of the *learned* in Europe.

We see in this plate [the oblong zodiac] one large wing on the pole, which is in the plane of the zodiac. What can that allude to? According to Eratosthenes, who was in Babylon in the time of Alexander the Great, Berosus, the Babylonian Historian, informed him that 403,000 years before that time, the pole of the earth was within the plane of the ecliptic. Here we have the testimony of another great nation, that the pole of the earth was once within [the] plane of the ecliptic. Well might the detestable monster of Persia [Cambyses] desire to destroy the sacred tower of Babel, – the only monument in that country, that commemorated the spiral motion of the pole. But let us contemplate the pole in the plate before us – the pole with *one* wing. The pole of the earth describes a spiral figure among the stars. Why did the sages of Egypt represent the pole with only *one* wing? I know of no animal in nature with one wing only. But when I was a boy, at Walton, near Languard Fort, we used to have our Winters so severe that the *shop tub* used to be frozen up: then the men sallied out with long *fowling pieces*, to shoot the wild fowl that came over our heads in vast numbers:– these were wounded in every possible way, but when one has had *one* of its wings broken, it described in its descent, by the use of the other wing alone, a figure in the air similar to that described among the stars by the pole of the earth!!! This *one-winged* pole is not in the spurious zodiacs, nor are the 37 [38] little boats, which I shall now notice.

What can these *37 little Boats have done*, that they are not to be tossed about upon the billows of time? – these thirty-eight little boat-like divisions of the year, contain thirty-eight inmates, the greatest half of which holds in his hand an augurial staff, as a predictor of the weather, or perhaps other events.

In the Encyclopaedia Londonensis, at the word Egypt, are given the two above zodiacs coloured; in the long one there are but thirty-one boats, and about one-third of a boat. Perhaps the number is of no importance, for I know of no astronomical division of the year into 38 or 31 parts.

In the breach of the ceiling between Leo and Virgo, there is in *Denon's* zodiac, a space of two boats, but in the Ecyclopaedia Londinensis, the breach occupies but the space of one boat, – these differences ought not to exist, even if the things are of no importance.

In the ancient history of Egypt, the City of Thebes is represented as containing the whole population of the Country round about it during the Winter, and in the inundation in the Summer; to which place the mode of travelling might be by way of the Nile; this would explain the busy group in the zodiac between the full moon in Taurus and the Beetle, or Cancer, – they were about to depart for Thebes, there to remain till the end of winter, in one instance, and the *retiring of the water* in the other; at which time the people would issue from their retreat to their various occupations on the land. – This going into, and coming out of *Thebes* annually, looks very like the story of the *Flood and the Ark*.

If the long zodiac A, exhibits an antiquity of more than 400,000 years, the circular one displays an antiquity of at least 540,000 years beyond that: for here we find the zodiac in the plane of the equator; in which state there would be universal Spring, and the year must then, have been sidereal, as a consequence of the great difficulty of being sensible of the true tropical year. – When our calendar was altered, *ten days* were left out: but in this calendar, zodiac, or planisphere, we find *two months* left out – Leo following Taurus. We find also in the scales, the signs of Leo and Aquarius; which shews that in that remote time they noticed the precession of the equinoctial points. We find also, that Virgo is intermixed with Leo, and the *first* of the three *virgins has her child on her lap;* the idea therefore, of the sun re-appearing in, or *being born of the virgin*, is of a still more remote antiquity. And as the zodiac and equator coincide, the pole of the earth and the pole of the ecliptic must also coincide; and here we find the present *southern* celestial hemisphere coinciding with the *northern* hemisphere of the earth, and Boötes, to the *north* of the virgin, is here placed with his corn-cutting implement in his hand, on the *south* side of the equator.

And Sirius, Lepus, and Formalhaut are on the *south side* of the *ecliptic*, but here we find all of them on the *north side* of the *equator*. The whole of which, are convincing proofs that the pole of the earth has been in the *plane* of the ecliptic, and in the plane of its axis. And there are figures in the same temple which shew a repetition of each state of the pole three times.

pages 25-6

[T]he Rev. Michael Russell . . . states, that the visit of Denon in the temple [of Dendera], was too short to allow him to be very correct in his delineations of the numerous figures, and that he has not given all the stars; that many of the figures are painted of the wrong colour; and that the two female figures (which surround the long zodiac) have nothing of the Egyptian features in them – they are mere childish faces, &c. Now I have shown that all this quibbling has not altered the antiquity of the whole, for thought the faces of the two female figures were the faces of *infants*, they are placed on their heads, and their heads are upon their shoulders, which are united by a long close dress to their well-formed feet;

pointing out, as clearly as the most exact *likenesses* can point out the *top* of the zodiac from the *bottom*, or the *summer* from the *winter*; and of course *spring* from *autumn*. In which last we find the Ram – i.e. the Ram was an autumnal sign. And as the Goat is at the top, the Goat was a summer sign. And the Crab, or Scarabeüs, at the feet, was then a winter sign.

According to Manilius, the Crab was painted on the globes of the ancients of a black colour, and without eyes (the sockets being empty). How expressive of winter!!! But Jesuitical writers take no notice of these characteristic beauties.

***The Original Design of the Ancient Zodiacal and Extra-Zodiacal Constellations*, Norwich, 1834**

pages 8-9

Cuviere has said much about the Zodiacs of Dendera; but what is it all, but *jargon*. What is all his string of quidities but a collection of sophisms to draw the mind from this plain simple truth, that the Goat is a Summer sign, and the winter Solstice is in Cancer. He also quibbles about the unequal divisions of the signs. But the whole twelve make the round, through which the Equator passes in 26,000 years nearly in our time. The unequal division of the two halves, require a serious attention. Its cause escaped me at the time of writing the Treatise on the Zodiacs of Dendera and Thebes. . . . It is well known in our time, that the summer half of our year is longer than the winter half by *eight* days. This is a consequence of the Earth being nearer the Sun in winter than in summer. . . .

But the eccentricity of the Earth's Orbit is observed to be constantly diminishing; therefore, in taking a retrospective view of Time, the eccentricity must have been greater; and consequently, the difference between the nearer half year and the remote half year must formerly have been more than eight days. And as the perihelion point moves through the Ecliptic in something more than twenty thousand years, it must be vertical to different parts of the Earth. And when over the Equator, in Autumn, the autumnal half year would be shorter than the Spring half, or in other words, from midsummer to midwinter, the Earth would require less time than from midwinter to midsummer. Now if we examine the long Zodiac of Dendera, it will be seen why *all* the Goat and half the Crab with the *five* signs between, are on one side; while on the other side there are but five signs and a half: hence there must have been, at that time, more than eight days difference between the two half years. The cause of all which is so clearly pointed out by the two *Decans* in the Ram seated on flames and pointing their fingers to their mouth, expressive of thirst, that no man of science can doubt that, at that time, the place of the perihelion point was in the *autumnal* Ram. I say, and repeat it, the *autumnal* Ram. For were we to consider the Sun returning from the winter to the Ram, there could not have been that heat and thirst experienced in Spring especially in the beginning of Spring, as to warrant the two expressive Decans in Aries.

Cuviere has strung together a few *Sophisms* about the circular Planisphere, in order to render it perplexing, by supposing the Colure may be here, or it may be there, or, or, or, &c. but he has not displayed the least appearance of knowing, that in a Planisphere where the Equator and Ecliptic coincide, there is no Solsticial point; for all the year is Spring.

pages 21-2

The ninth month, or March, was [the Egyptian] harvest month this they very properly represented by a virgin with a ripe ear of Corn in her hand, called Spica; whilst upon the, then meridian, they placed the harvest man Bootes, with a Sickle in his hand, which touches the tail of the Bear, near a small Star called *mizar* which Dr. Jamieson, in his celestial Atlas, says, means the *reaping* hook.

This virgin is thrice repeated in the long Zodiac of Dendera, one of which holds up a wheat-ear between Leo and the Balance or Scales, in the circular Planisphere there are three virgins, which represent the three Decans, into which each sign of the Zodiac was divided. But, here, the first virgin is represented with a *Child* on her knee; which proves that the story of the virgin and her child, was known to the Egyptians more than a Million of years back.

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