

CHAPTER 10

The Synodical Year of Venus

THE PLANET Venus, at the present time, revolves around the sun in 288 days, which is the sidereal year of the planet. However, seen from the earth, which revolves around the sun on a larger orbit and at a lower speed, Venus returns to the same position with respect to the earth after 584 days, which is its synodical year. It rises before the sun, earlier every day for seventy-one days, until it reaches the western elongation or its westernmost point away from the rising sun. Each morning thereafter the Morning Star rises lower and lower and for 221 days approaches the superior conjunction. About a month before the end of this period, it is eclipsed by the rays of the sun, and for over sixty days it is not seen because of the sun's rays: it is behind the sun or in superior conjunction. Then it appears for a moment after the setting sun, being now the Evening Star and east of the western sun. For 221 nights it retreats from the middle point of the superior conjunction, and beginning with the evening on which it first appears as an Evening Star, each night it appears farther from the setting sun until it reaches the eastern elongation. Then for seventy-one nights it approaches the sun. Finally it enters the inferior conjunction, when it is between the earth and the sun. It is usually invisible for one or two days, and thereafter appears west of the rising sun and is again the Morning Star.

These movements of Venus and their exact duration have been known to the people of the Orient and the Occident for over two thousand years. Actually a "Venus year," which follows the synodical

revolution of Venus, was employed in calendars of the Old and New World alike. Five synodical years of Venus equal 2919.6 days, whereas eight years of 365 days equal 2920 days, and eight Julian years of $365\frac{1}{4}$ days equal 2922 days. In other words, in four years there is a difference of approximately one day between the Venus and the Julian calendars.

As I shall show in more detail in my reconstruction of ancient history, the Egyptians of the second part of the first pre-Christian millennium observed the Venus year. A decree published in Egyptian and in Greek by the conclave of priests which took place in Canopus in the reign of Ptolemy III (Euergetes) in -239 was intended to reform the calendar "according to the present arrangement of the world" and "an amendment of the faults of the heaven," replacing the year regulated by the rising of the star Isis—and Pliny says that Isis is the planet Venus¹—with a year regulated by the rising of the fixed star Sothis (Sirius); this would make a difference of one day in four years, so that, as the decree says, "the festivals of the winter should not arrive in the summer because of the change of a day every four years in the rising of the star Isis."²

The reform intended by the Canopus Decree did not take root because the people and the conservatives among the priests kept faith with Venus and observed the New Year and other festivals on the days regulated by it. As a matter of fact, we know that the Ptolemaic pharaohs were obliged to swear in the temple of Isis (Venus) that they would not reform the calendar, nor add a day every four years. Julius Caesar actually followed the Canopus Decree by fixing a calendar of $365\frac{1}{4}$ days. In -26 Augustus introduced the Julian year in Alexandria, but the Egyptians outside Alexandria still continued to observe the Venus year of 365 days, and Claudius Ptolemy, the Alexandrian astronomer of the second Christian century, wrote in his *Almagest*: "Eight Egyptian years without a sensible error equal five circlings of Venus."³

As this period of eight years can be divided in two, each part being

¹ Pliny, *Natural History*, ii. 37.

² S. Scharpe, *The Decree of Canopus in Hieroglyphics and Greek* (1870).

³ Bk. X, Chap. iv.

equal to two and a half synodical periods, the dividing point being alternately at a heliacal (simultaneous with the sun) rising or setting of Venus, the Egyptians of the second half of the last millennium before the present era observed a four-year cycle. This is the meaning of Horapollo's information that the Egyptian year is equal to four years.⁴ In like manner the Greeks counted by four-year cycles dedicated to Athene: the Olympic games took place every fourth year (in the beginning, every eighth year⁵), and time was reckoned by the Olympiads. The Olympic games were started in the eighth century. At the Parthenon in Athens every fourth year was celebrated by the Panathenaic processions in honor of Athene.

The Incas of Peru in South America and the Mayas and Toltecs in Central America observed the synodical revolution of Venus and the Venus year in addition to the solar year.⁶ They also calculated by groups of five Venus years equal to eight years of 365 days. Like the Egyptians and the Greeks, the Mayas observed the four-year cycles,⁷ from the inferior to the superior and from the superior to the inferior conjunctions of Venus. The Incas correctly marked the Venus calendar by tying knots in their quipus,⁸ and the Mayas, in the *Dresden Codex*, correctly gave the length of the Venus synodical cycle as 584 days.⁹ The astronomical observations of the Mayas were so precise that in computing the solar year, they arrived at figures not only more accurate than the Julian year, but also more accurate than the Gregorian year, introduced in Europe in 1582, ninety years after the discovery of America, which is our calendar year today.¹⁰

All this proves that the Venus calendar preserved its religious significance for a long time, down to the end of the Middle Ages and

⁴ A. T. Cory, *The Hieroglyphics of Horapollo Nilous* (1840), II, lxxxix. See also Wilkinson in G. Rawlinson, *The History of Herodotus*, II, 285.

⁵ E. N. Gardiner, *Olympia* (1925), p. 71; Farnell, *The Cults of the Greek States*, IV, 293; Frazer, *The Dying God* (1911), p. 78.

⁶ Brasseur, *Sources de l'histoire primitive du Mexique*, p. 27.

⁷ J. E. Thompson, "A Correlation of the Mayan and European Calendars," *Field Museum of Natural History Anthropological Series*, Vol. XVII.

⁸ Nordenskiöld, *The Secret of the Peruvian Quipus*, II, 35.

⁹ W. Gates, *The Dresden Codex*, Maya Society Publication No. 2 (1932).

¹⁰ Gates in De Landa, *Yucatan*, p. 60.

the discovery of America, and even thereafter, but that already in the eighth century before the present era an eight or double four-year cycle of Venus was observed in time reckoning and therefore must have been established in the celestial sphere.

A few decades after the discovery of America, the Augustinian friar Ramón y Zamora wrote that the Mexican tribes held the Morning Star in great veneration and kept a precise record of its appearance: "So exact was the book-record of the day when it appeared and when it concealed itself, that they never made mistakes."¹¹

This was a very old custom originating in a past when Venus moved on an elongated orbit.

The movements of Venus were carefully watched by the ancient astronomers of Mexico, India, Iran, and Babylonia. Temple observatories for the cult of the planets were built in both hemispheres. The *bamot* or "high places" so often mentioned in the Scriptures were observatories as well as places for offerings to the planet-gods, chiefly Venus (Baal). On these high places idolatrous priests, ordained by the erring kings of Judah, burned incense to Baal, to the sun, and the moon, and to the planets.¹²

In the second half of the second millennium and in the beginning of the first millennium, Venus was still a comet; and though a comet can have a circular orbit—there is such a comet in the solar system¹³—Venus was not then moving on a circular orbit as it does now; its orbit crossed the orbit of the earth and endangered it every fifty years. Since, by the second half of the eighth century before the present era, Venus' cycle was similar to what it is today, it follows that some time before then Venus must have changed its orbit and achieved its present circular path between Mercury and the earth and become the Morning and Evening Star.

The irregularities in the movements of Venus must have been observed by the ancients; the data in the ancient records must differ

¹¹ Seler, *Gesammelte Abhandlungen*, I, 624. ¹² II Kings 23 : 5.

¹³ The Schwassmann-Wachmann comet, the orbit of which is between the orbits of Jupiter and Saturn.

very much from the figures on Venus' movements given at the head of this section.

Venus Moves Irregularly

In the library of Assurbanipal in Nineveh were stored astronomical books of his and of previous ages; in the ruins of this library Sir Henry Layard found the Venus tablets.¹

There arose the question: From what period do the observations of these tablets date? Schiaparelli investigated this problem and "as an example of method his work is excellent."² He decided that "the inquiry could be limited to the seventh and eighth centuries."

The year-formula of an early king, Ammizaduga, was discovered on one of the tablets, and since then the tablets are usually ascribed to the first Babylonian dynasty; however, a scholar has offered evidence to the effect that the year-formula of Ammizaduga was inserted by a scribe in the seventh century.³ (If the tablets originated in the beginning of the second millennium, they would prove only that Venus was even then an errant comet.)

Following are a few excerpts from the Venus tablets:

"On the 11th of Sivan, Venus disappeared in the west, remaining absent in the sky for 9 months and 4 days, and on the 15th of Adar she was seen in the east."

The next year, "on the 10th of Arahsama, Venus disappeared in the east, remaining absent 2 months and 6 days in the sky, and was seen on the 16th of Tebit in the west."

The following year Venus disappeared in the west on the 26th of

¹ Published by H. C. Rawlinson and G. Smith, *Table of the Movements of the Planet Venus and Their Influences*. Sayce's translation was printed in the *Transactions of the Society of Biblical Archaeology*, 1874; a more recent translation by S. Langdon and J. K. Fotheringham was published as *The Venus Tablets of Ammizaduga* (1928).

² Fotheringham in Langdon and Fotheringham, *The Venus Tablets of Ammizaduga*, p. 32. See Schiaparelli, "Venusbeobachtungen und Berechnungen der Babylonier," *Das Weltall*, Vols. VI, VII.

³ Kugler ascribed the Venus tablets to the first Babylonian Dynasty, because he read a year-formula of Ammizaduga in one of them. In 1920, F. Hommel (*Assyriologische Bibliothek*, XXV, 197-199) declared that the year-formula of Ammizaduga was inserted into the Venus tablets by a scribe in the reign of Assurbanipal, in the seventh century.

Ulul (Elul), remaining absent from the sky for eleven days, and was seen on the 7th of intercalary Ulul in the east.

The year thereafter Venus disappeared in the east on the 9th of Nisan, remaining absent for 5 months and 16 days, and was seen on the 25th of Ulul in the west.

In the fifth year of the observations, Venus disappeared in the west on the 5th of Ayar (Ijar), remaining absent from the sky for seven days, and reappeared in the east on the 12th of Ayar; the same year it disappeared on the 20th of Tebit in the east, remaining absent from the sky one month, and on the 21st day of Sabat (Shevat) it appeared in the west, and so on.

How explain these observations of the ancient astronomers, modern astronomers and historians have asked. Were they written in a conditional form ("If Venus disappeared on the 11th of Sivan . . .")? No, they were expressed categorically.

The observations were "inaccurately" registered, decided some authors. However, inaccuracy may account for a few days' difference but not for a difference of months.

"The invisibility of Venus at superior conjunction is given as 5 months 16 days instead of the correct difference of 2 months 6 days," noted the translators of the text, wonderingly.⁴

"The period between the heliacal setting of Venus and its rise is 72 days. But in the Babylonian-Assyrian astrological texts, the period varies from one month to five months—too long and too short: the observations were defective," wrote another scholar.⁵

"The impossible interval shows that the data are not trustworthy." "Obviously, the days of the month have been mixed up. As the impossible intervals show, the months are also wrong," wrote still another author.⁶

It is difficult to imagine how such obvious errors could have been committed. The dates are written in a contemporary document; they are not a poetical composition but a dry record, and each item in the

⁴ Langdon-Fotheringham, *The Venus Tablets*, p. 106.

⁵ M. Jastrow, *Religious Belief in Babylonia and Assyria*, p. 220.

⁶ A. Ungnad, "Die Venustafeln und das neunte Jahr Samsuilunas," *Mitteilungen der altorientalischen Gesellschaft* (1940), p. 12.

record is stated in dates as well as in the number of days between the dates.

Similar difficulties are encountered by the scholars who try to understand the Hindu tables of the movements of the planets. The only explanation proposed is: "All the manuscripts are completely corrupted. . . . The details referring to Venus . . . are very difficult to unriddle."⁷ "No attention at all was paid to the actual movements in the sky."⁸

The Babylonians did not note these irregular movements merely as matters of factual interest; they were dismayed by them. In their prayers they expressed this dismay.

O Ishtar, queen of all peoples . . .
 Thou art the light of heaven and earth. . . .
 At the thought of thy name the heaven and the earth quake . . .
 And the spirits of the earth falter.
 Mankind payeth homage unto thy mighty name,
 for thou art great, and thou art exalted.
 All mankind, the whole human race,
 boweth down before thy power. . . .
 How long wilt thou tarry, O lady of heaven and earth . . . ?
 How long wilt thou tarry, O lady of all fights and of the battle?
 O thou glorious one, that . . . art raised on high, that art
 firmly established,
 O valiant Ishtar, great in thy might!
 Bright torch of heaven and earth, light of all dwellings,
 Terrible in the fight, one who cannot be opposed, strong in the
 battle!
 O whirlwind, that roarest against the foe and cuttest off the
 mighty!
 O furious Ishtar, summoner of armies!⁹

As long as Venus returned at regular intervals, fear of the planet was kept in bounds; when the star passed without causing harm, as it had already done for a few centuries, the peoples were calmed

⁷ Thibaut, "Astronomie, Astrologie und Mathematik," Vol. 3, Pt. 9 (1899) of *Grundriss der indo-arisch. Philol. und Altertumskunde*, p. 27.

⁸ *Ibid.*, p. 15.

⁹ A "Prayer of the Raising of the Hand" to Ishtar (transl. L. W. King) in *The Seven Tablets of Creation*.

and felt themselves out of danger for another period. But when Venus, for some reason, began to move irregularly, fear grew intense.

The priests of Iran prayed: ¹⁰

We sacrifice to Tistrya, the bright and glorious star,
for whom long flocks and herds and men,
looking forward for him and deceived in their hope:
When shall we see him rise up, the bright and glorious star
Tistrya?

The *Zend-Avesta* answered for the star:

If men would worship me with a sacrifice
in which I were invoked by my own name . . .
then I should come to the faithful
at the appointed time.

The priests responded:

The next ten nights, O Spitama Zarathustra!
the bright and glorious Tistrya mingles his shape with light,
moving in the shape of a golden-horned bull.

They glorified the star that made "all the shores of the ocean boiling over, all the middle of it boiling over." They heaped up sacrifices to the star, imploring it not to change its course.

We sacrifice unto Tistrya, the bright and glorious star
who from the shining east moves along his long winding course,
along the path made by the gods. . . .
We sacrifice unto Tistrya the bright and glorious star,
whose rising is watched by the chiefs of deep understanding.

The star of Venus did not appear in the prescribed seasons. In the Book of Job the Lord asks him: "Canst thou bring forth Mazzaroth in his season . . . ? Knowest thou the changes of heaven?" ¹¹

¹⁰ *Zend-Avesta* (transl. Darmesteter), Pt. II, pp. 94 ff. The belief sometimes expressed, that Tistrya is Sirius, is an obvious error: Sirius does not travel in a winding course. The star in the shape of a golden-horned bull was Venus. Also, inaccurate movements of Sirius could not occur without similar irregularity on the part of all the stars.

¹¹ Job 38 : 32-33. The King James translation has, "Knowest thou the ordinances of heaven?" The Septuagint has "the changes of heaven."

There exists an extensive exegetic literature on this Mazzaroth,¹² from which it can be concluded only that "the meaning of Mazzaroth is uncertain."¹³ But the Vulgate (Latin) translation of the Bible has Lucifer for Mazzaroth. The (Greek) translation of the Seventy (Septuagint) reads: "Canst thou bring forth Mazzaroth in his season and guide the Evening Star by his long hair?" These words of the Septuagint seem very strange. I have already mentioned that the Greek word *komet* means "the long-haired one," or a star with hair, a comet. In Latin, *coma* is "hair."

Mazzaroth means a comet, wrote an exegete, and therefore, he argued, it cannot mean Venus.¹⁴ But in any case it is said that the Evening Star has hair. Actually, Mazzaroth means Venus and a hairy star.

Venus ceased to appear in its seasons. What had happened?

Venus Becomes the Morning Star

Since the latter part of the eighth century before the present era, Venus has followed an orbit between Mercury and earth, which it has maintained ever since. It became the Morning and Evening Star. Seen from the earth, it is never removed more than 48 degrees (when at its eastern and western elongation) or three hours and a few minutes east or west of the sun. The dreaded comet became a tame planet. It has the most nearly circular orbit among the planets.

The end of the terror which Venus kept alive for eight centuries after the days of the Exodus was the inspiration for Isaiah when he said:¹

"How art thou fallen from heaven, O Lucifer, son of the morning! how art thou cut down to the ground, which didst weaken the nations! For thou hast said in thine heart, I will ascend into heaven, I will exalt my throne above the stars of God."

¹² See Schiaparelli, *Astronomy in the Old Testament*, p. 74.

¹³ Cambridge Bible, Book of Job, by A. B. Davidson and H. C. Lanchester.

¹⁴ J. S. Suschken, *Unvorgreifliche Kometen-Gedanken: Ob der Kometen in der heiligen Schrift gedacht werde?* (1744).

¹ Isaiah 14: 12-13. See also *infra*, p. 259.

Septuagint and Vulgate both translate Morning Star or Lucifer. What does it mean, that the Morning Star was assailing the heavens and rising high, and that it was cut down low to the horizon, and would weaken no more the nations?

More than a hundred generations of commentators have occupied themselves with this passage, but have met with failure.

Why, it is also asked, should the beautiful Morning Star, called Lucifer, the Light Bearer, live in the imagination of peoples as an evil power, a fallen star? What is in this lovely planet that makes her name an equivalent of Satan, or Seth of the Egyptians, the dark power? In his confusion, Origen wrote this question to the quoted verses of Isaiah: "Most evidently by these words is he shown to have fallen from heaven, who formerly was Lucifer, and who used to arise in the morning. For if, as some think, he was a nature of darkness, how is Lucifer said to have existed before? Or how could he arise in the morning, who had in himself nothing of the light?"²

Lucifer was a feared prodigy in the sky, and its origin, as illuminated in this book, explains how it came to be regarded as a dark power and a fallen star.

After a great struggle, Venus achieved a circular orbit and a permanent place in the family of planets. During the perturbations which brought about this metamorphosis, Venus also lost its cometary tail.

In the valley of the Euphrates, "Venus then gives up her position as a great stellar divinity, equal with sun and moon, and joins the ranks of the other planets."³

A comet became a planet.

Venus was born as a comet in the second millennium before the present era. In the middle of that millennium it twice made contact with the earth and changed its cometary orbit. In the tenth to eighth centuries of the first millennium, it was still a comet. What caused such further changes in the motion of Venus in the first millennium that it became a planet on a circular orbit?

² *The Writings of Origen, "De principiis"* (transl. F. Crombie, 1869), p. 51.

³ A. Jeremias, *The Old Testament in the Light of the Ancient East* (1911), I, 18.