

## CHAPTER 3

### What Caused Venus and Mars to Shift Their Orbits?

WHEN VENUS became a new member of the solar system, it moved on a stretched ellipse, and for centuries imperiled the other planets. Because of its dangerous circling, Venus was diligently observed in both hemispheres, and records were kept of its movement.

In the last centuries before this era, the 288-day year of Venus, and apparently also its orbit, were practically the same as in modern times. As early as the second half of the seventh century before this era, Venus, watched until then with anxiety, had already ceased to be a cause of dreadful expectation; it probably reached then the orbital stage in which it was found in the last centuries before this era, and where we still find it today. What caused the change in the orbit of Venus?

I shall pose another problem besides the first. Mars did not arouse any fears in the hearts of the ancient astrologers, and its name was seldom mentioned in the second millennium. In Assyro-Babylonia, in inscriptions made before the ninth century, the name of Nergal is found only on rare occasions. On the astronomical ceiling of Senmut Mars does not appear among the planets. It did not play any conspicuous part in the early mythology of the celestial gods.

But in the ninth or eighth century before this era, the situation changed radically. Mars became the dreaded planet. Accordingly, Mars-Nergal rose to the position of the frightful storm and war god. The question must then present itself: Why, previous to that time,

did Mars signify no danger to the earth, and what caused Mars to shift its orbit nearer to the earth?

The planets of the solar system move in nearly the same plane, and if one planet were to revolve along a stretched ellipse, it would endanger the other planets. The two problems—what caused Venus to change its orbit, and what caused Mars to change its orbit—may have a common explanation. The common cause may have been some comet which changed the orbits of Venus and Mars; but it is simpler to suppose that two planets, one of which had a greatly elongated orbit, collided, and that no third agent was necessary to bring about that result.

A conflict between Venus and Mars, if it occurred, might well have been a spectacle observable from the earth. It is not impossible that the two planets came repeatedly into contact, each time with different results.

If a contact between Venus and Mars really occurred and was observed from the earth, it must have been commemorated in traditions or literary monuments.

### When Was the *Iliad* Created?

A mighty strife had waxen great  
Within the members of the sphere.  
—EMPEDOCLES<sup>1</sup>

To this day it has not been established at what date the *Iliad* and *Odyssey* were composed. Even ancient authors differed greatly in reckoning the time when Homer lived. It was estimated to be as late as -685 (the historian Theopompus) and as early as -1159 (certain authorities quoted by Philostratus). Herodotus wrote that "Homer and Hesiod" created the Greek pantheon "not more than 400 years before me," which would mean not prior to -884, -484 being regarded as the year of Herodotus' birth. The question is still debated. Some authors argue that there was a long interval between the time when the epic works of Homer were composed and the time when

<sup>1</sup> *The Fragments of Empedocles* (transl. W. E. Leonard, 1908), p. 30.

they were put into writing; others think that these works must have been created not long before the Greeks acquired the art of writing, about -700.<sup>2</sup> It is also argued that the Greeks must have known this art long before -700 on the assumption that the Homeric works were created much before that date. It is generally assumed that the fall of Troy antedated Homer by several generations, and also that the great epic works were the creation of generations. The fall of Troy is sometimes thought to have taken place in the twelfth century.<sup>3</sup>

On the other hand, it has been shown that the cultural background of the Homeric epics is that of the eighth or even the seventh century; the age of iron was well under way, and many other details would preclude an earlier scene.<sup>4</sup> It is highly probable that the Homeric works were created at that time or shortly thereafter. Whether these poems were first sung by a bard who lived centuries after the destruction of Troy depends on the time when Troy was destroyed. The tradition about Aeneas who, saved when Troy was captured, went to Carthage (a city built in the ninth century) and from there to Italy, where he founded Rome (a city first built in the middle of the eighth century), implies that Troy was destroyed in the eighth or late in the ninth century.

But for what purpose do I burden my present work with this question? It may seem that the two problems—how Venus changed its orbit to a circle, and how Mars changed its orbit so as to come in contact with the earth—are weighted with a third problem from a far-removed field and in itself complicated. And even if these matters have something in common, how can a problem with three unknowns be solved?

We shall come closer to a solution of the astronomical problem

<sup>2</sup> See R. Carpenter, "The Antiquity of the Greek Alphabet" and B. Ullman, "How Old Is the Greek Alphabet?" in *American Journal of Archaeology*, XXXVII (1933) and XXXVIII (1934), respectively.

<sup>3</sup> When the ancient site was discovered, Schliemann identified the ruins of the second city (from the bottom) as those of the Ilium of the *Iliad*; but later explorers disagreed and pronounced the ruins of the sixth city as those of Homeric Troy.

<sup>4</sup> G. Karo, "Homer" in Ebert's *Reallexikon der Vorgeschichte*, Vol. V.

with which we are concerned and the problem of the epics of Troy if we recognize the cosmic scene of these epics.

A simple test can be made. If Ares, the Mars of the Greeks, is not mentioned in the creations of Homer, this would support the view that the *Iliad* and *Odyssey* were created in the tenth century or earlier, or at least that the drama they describe had taken place not later than this time. But if Ares is presented as a war god in these epics, it would indicate that they were composed in the eighth century or thereafter. It was in the eighth century that Mars-Nergal, an obscure deity, became a prominent god. Epic poems, rich in mythology, that originated in the eighth or seventh century, would not be silent about Mars-Ares, who became "outrageous" at that time.

With this yardstick at hand, the epic poems of Homer must be re-examined. The task will not be difficult; the *Iliad* is full of descriptions of the violent deeds of Ares.

In this epic the story is told of the battles which the Greeks, besieging Troy, waged against the people of Priam, king of Troy. Deities took a prominent part in these battles and skirmishes. Two of them—Athene and Ares—were by far the most active. Athene was the protectress of the Greeks; Ares was on the side of the Trojans. They were the chief antagonists throughout the epopee.

At first Athene removed Ares from the battlefield:

And flashing-eyed Athene took furious Ares by the hand and spake to him, saying: "Ares, Ares, thou bane of mortals, thou blood-stained stormer of walls, shall we not now leave the Trojans and Achaeans to fight?" . . . [She] led furious Ares forth from the battle.<sup>5</sup>

But they met together again in the field; "furious Ares" was "abiding on the left of the battle."

Aphrodite, the goddess of the moon, wished to participate in the war also, but Zeus, presiding in heavenly Olympus, told her:

"Not unto thee, my child, are given works of war; nay, follow thou after the lovely works of marriage, and all these things shall be the business of swift Ares and Athene."

<sup>5</sup> *The Iliad*, Bk. V (transl. A. T. Murray; Loeb Classical Library, 1924-1925).

Thus the god of the planet Jupiter admonished the goddess of the moon to leave the combat that it might be fought out by the god of the planet Mars and the goddess of the planet Venus. Phoebus Apollo, the god of the sun, spoke to the god of the planet Mars:

Then unto furious Ares spake Phoebus Apollo: "Ares, Ares, thou bane of mortals, thou blood-stained stormer of walls, wilt thou not now enter into the battle?" . . .

And baneful Ares entered amid the Trojans' ranks. . . . He called: . . . "How long will ye still suffer your host to be slain by the Achaeans?"

The battlefield was darkened by Ares:

And about the battle furious Ares drew a veil of night to aid the Trojans . . . he saw that Pallas Athene was departed, for she it was that bare aid to the Danaans.

Hera, the goddess of the earth, "stepped upon the flaming car" and "self-bidden groaned upon their hinges the gates of heaven which the Hours had in their keeping, to whom are entrusted great heaven and Olympus." She spoke to Zeus:

"Zeus, hast thou no indignation with Ares for these violent deeds, that he hath destroyed so great and so goodly a host of the Achaeans recklessly? . . . Wilt thou in any wise be wroth with me if I smite Ares?"

And Zeus replied:

"Nay, come now, rouse against him Athene . . . who has ever been wont above others to bring sore pain upon him."

So came the hour of the battle.

Then Pallas Athene grasped the lash and the reins, and against Ares first she speedily drove. . . . Athene put on the cap of Hades, to the end that mighty Ares should not see her.

Ares, "the bane of mortals," was attacked by Pallas Athene, who sped the spear "mightily against his nethermost belly."

"Then brazen Ares bellowed loud as nine thousand warriors or ten thousand cry in battle, when they join in the strife of the War-god."

Even as a black darkness appeareth from the clouds when after heat a blustering wind ariseth, even in such wise . . . did brazen Ares appear, as he fared amid the clouds unto broad heaven.

In heaven he appealed to Zeus with bitter words of complaint against Athene:

"With thee are we all at strife, for thou art father to that mad and baneful maid, whose mind is ever set on deeds of lawlessness. For all the other gods that are in Olympus are obedient unto thee . . . but to her thou payest no heed . . . for that this pestilent maiden is thine own child."

And Zeus answered:

"Most hateful to me art thou of all gods that hold Olympus, for ever is strife dear to thee and wars and fightings."

The first round was lost by Ares. "Hera and Athene . . . made Ares, the bane of mortals, to cease from his manslaying."

In this vein the poem proceeds, its allegorical features being only too readily overlooked. In the fifth book of the *Iliad* Ares is called by name more than thirty times, and throughout the poem he never disappears from the scene, whether in the sky or on the battleground. The twentieth and twenty-first books describe the climax of the battle of the gods at the walls of Troy.

[Athene] would utter her loud cry. And over against her spouted Ares, dread as a dark whirlwind, calling with shrill tones to the Trojans.

Thus did the blessed gods urge on the two hosts to clash in battle, and amid them made grievous strife to burst forth. Then terribly thundered the father of gods and men from on high; and from beneath did Poseidon cause the vast earth to quake, and the steep crests of the mountains. All the roots of many-fountained Ida were shaken, and all her peaks, and the city of the Trojans, and the ships of the Achaeans. And seized with fear in the world below was Aïdoneus, lord of the shades . . . lest above him the earth be cloven by Poseidon, the Shaker of Earth, and his abode be made plain to view for mortals and immortals . . . so great was the din that arose when the gods clashed in strife.

In this battle of gods above and beneath, Trojans and Achaeans clashed together and the whole universe roared and shivered. The

battle was fought in gloom; Hera spread a thick mist. The river "rushed with surging flood, and roused all his streams tumultuously." Even the ocean was inspired with "fear of the lightning of great Zeus and his dread thunder, whenso it crasheth from heaven." Then rushed into the battle a "wondrous blazing fire. First on the plain was the fire kindled, and burned the dead . . . and all the plain was parched." Then to the river turned the gleaming flame. "Tormented were the eels and the fish in the eddies, and in the fair streams they plunged this way and that. . . . The fair streams seethed and boiled." Nor had the river "any mind to flow onward, but was stayed," unable to protect Troy.

Upon the gods "fell strife heavy and grievous." "Together then they clashed with a mighty din, and the wide earth rang, and round about great heaven pealed as with a trumpet. . . . Zeus—the heart within him laughed aloud in joy as he beheld the gods joining in strife."

Ares . . . began the fray, and first leapt upon Athene, brazen spear in hand, and spake a word of reviling: "Wherefore now again, thou dog-fly, art thou making gods to clash with gods in strife . . . ? Rememberest thou not what time . . . thyself in sight of all didst grasp the spear and let drive straight at me, and didst rend my fair flesh?"

This second encounter between Ares and Athene was also lost by Ares.

He [Ares] smote upon her tasselled aegis. . . . Thereon blood-stained Ares smote with his long spear. But she gave ground, and seized with her stout hand a stone that lay upon the plain, black and jagged and great. . . . Therewith she smote furious Ares on the neck, and loosed his limbs. . . .

Pallas Athene broke into a laugh. . . . "Fool, not even yet hast thou learned how much mightier than thou I avow me to be, that thou matchest thy strength with mine."

Aphrodite came to wounded Ares, "took [him] by the hand, and sought to lead [him] away." But "Athene sped in pursuit. . . . She smote Aphrodite on the breast with her stout hand . . . and her heart melted."

These excerpts from the *Iliad* show that some cosmic drama was projected upon the fields of Troy. The commentators were aware that originally Ares was not merely the god of war, and that this quality is a deduced and secondary one. The Greek Ares is the Latin planet Mars; it is so stated in classic literature a multitude of times. In the so-called Homeric poems, too, it is said that Ares is a planet. The Homeric hymn to Ares reads:

Most mighty Ares . . . chieftain of valor, revolving thy fiery circle in ether among the seven wandering stars [planets], where thy flaming steeds ever uplift thee above the third chariot.<sup>6</sup>

But what might it mean, that the planet Mars destroys cities, or that the planet Mars is ascending the sky in a darkened cloud, or that it engages Athene (the planet Venus) in battle? Ares must have represented some element in nature, guessed the commentators. Ares must have been the personification of the raging storm, or the god of the sky, or the god of light, or a sun-god, and so on.<sup>7</sup> These explanations are futile. Ares-Mars is what his name says—the planet Mars.

I find in Lucian a statement which corroborates my interpretation of the cosmic drama in the *Iliad*. This author of the second century of the present era writes in his work *On Astrology* this most significant and most neglected commentary on the Homeric epics:

"All that he [Homer] hath said of Venus and of Mars his passion, is also manifestly composed from no other source than this science [astrology]. Indeed, it is the conjuncture of Venus and Mars that creates the poetry of Homer."<sup>8</sup>

Lucian is unaware that Athene is the goddess of the planet Venus,<sup>9</sup>

<sup>6</sup> *The Odyssey of Homer with the Hymns* (transl. Buckley), p. 399. The translation by H. Evelyn-White (Hesiod volume in the Loeb Classical Library) is: "Who whirl your fiery sphere among the planets in their sevenfold courses through the ether wherein your blazing steeds ever bear you above the third firmament of heaven." Allen, Holliday, and Sikes, *The Homeric Hymns* (1936), p. 385, regard the hymn to Ares as post-Homeric.

<sup>7</sup> These divergent views are offered by L. Preller (*Griechische Mythologie* [1894]), G. F. Lauer (*System der griechischen Mythologie* [1853], p. 224), F. G. Welcker (*Griechische Götterlehre*, I [1857], 415), and H. W. Stoll (*Die ursprüngliche Bedeutung des Ares* [1855]).

<sup>8</sup> Lucian, *Astrology* (transl. A. M. Harmon, 1936), Sec. 22.

<sup>9</sup> In the same sentence Lucian identifies Venus with Aphrodite of the *Iliad*.

and yet he knows the real meaning of the cosmic plot of the Homeric epic, which shows that the sources of his instruction in astrology were cognizant of the facts of the celestial drama.

My interpretation of the Homeric poem, I find, has been anticipated by still others. Who they were, it is impossible to say. However, Heraclitus, a little known author of the first century, who should not be confused with the philosopher, Heraclitus of Ephesus, wrote a work on Homeric allegories.<sup>10</sup> In his opinion, Homer and Plato were the two greatest spirits of Greece, and he tried to reconcile the anthropomorphic and satiric description of gods by Homer with the idealistic and metaphysical approach of Plato. In Paragraph 53 of his *Allegories*, Heraclitus confutes those who think that the battles of the gods in the *Iliad* signify collisions of the planets. Thus I find that some of the ancient philosophers must have held the same opinion at which I arrived independently after a series of deductions.

The problem of the date when the Homeric epics originated was raised here, to be solved with the help of this criterion: If the cosmic battle between the planets Venus and Mars is mentioned there, then the epics could not have originated much before the year -800. If the earth and the moon are involved in this struggle, the time of the birth of the *Iliad* must be lowered to -747 at least and probably to an even later date. The first earthshaking contact with our planet had already taken place, and for this reason Ares is repeatedly called "bane of mortals, blood-stained stormer of walls."

Homer was thus, at the earliest, a contemporary of the prophets Amos and Isaiah, or more likely he lived shortly after them. The Trojan War and the cosmic conflict were synchronous; the time of Homer was not separated from the time of the Trojan war by several centuries, possibly not even by a single one.

The statement by Lucian regarding the inspiring drama of the Homeric epics—the conjunction of the planets Venus and Mars—can be refined. There was more than one fateful conjunction between Venus and Mars—at least two are described in the *Iliad*, in the fifth

<sup>10</sup> *Heracliti questiones Homericæ* (Teubner's ed. 1910). Cf. F. Boll, *Sternnglaube und Sterndienst* (ed. W. Gundel, 1926), p. 201.

and the twenty-first books. The conjunctions were near contacts; the mere passage of one planet in front of another could not have provided material for a cosmic drama.

### Huitzilopochtli

The Greeks chose Athene, the goddess of the planet Venus, as their patron, but the people of Troy looked to Ares-Mars as their protector. A similar situation existed in ancient Mexico. Quetzal-cohuatl, known as the planet Venus, was the patron of the Toltecs. But the Aztecs, who later came to Mexico and supplanted the Toltecs, revered Huitzilopochtli (Vitchilupuchtli) as their protector-god.<sup>1</sup>

Sahagun says that Huitzilopochtli was "a great destroyer of towns and killer of people." The epithet "blood-stained stormer of walls" is familiar to us from the *Iliad*, where it is regularly applied to Mars. "In warfare he [Huitzilopochtli] was like live-fire, greatly feared by his enemies," writes Sahagun.<sup>2</sup>

In his large work on the Indians of America, H. H. Bancroft writes: "Huitzilopochtli had, like Mars and Odin, the spear or a bow in his right hand, and in the left, sometimes a bundle of arrows, sometimes a round white shield. . . . On these weapons depended the welfare of the state, just as on the ancile of the Roman Mars, which had fallen from the sky, or on the palladium of the warlike Pallas Athene. By-names also point out Huitzilopochtli as war god; so he is called the terrible god Tetzateotl, or the raging Tetzahuitl."<sup>3</sup> Bancroft proceeds: "One might be led to compare the capital of the Aztecs with ancient Rome, on account of its warlike spirit, and therefore it was right to make the national god of Aztecs a war god like the Roman Mars."<sup>4</sup>

But Huitzilopochtli was not like Mars, he was Mars. The identity of their appearance, character, and action is dictated by the fact that Mars and Huitzilopochtli were one and the same planet-god.

<sup>1</sup> J. G. Müller, *Der mexikanische Nationalgott Huitzilopochtli* (1847).

<sup>2</sup> Sahagun, *A History of Ancient Mexico* (transl. F. R. Bandelier, 1932), p. 25.

<sup>3</sup> H. H. Bancroft, *The Native Races of the Pacific States* (1874-1876), III, 302.

<sup>4</sup> *Ibid.*, p. 301.

The conflict between Venus and Mars was also symbolized in religious ceremonies of the ancient Mexicans. In one of these ceremonies the priest of Quetzal-cohuatl shot an arrow into an effigy of Huitzilopochtli, which penetrated the god, who was then considered dead.<sup>5</sup> This appears to have been a symbolic repetition of the electrical discharge that Venus ejected toward Mars.

But the Aztecs would not concede the death of Mars, the bellicose destroyer of towns, the god of sword and pestilence, and carried on their wars against the Toltecs, the people who looked to the planet Venus. These wars between the Toltecs and the Aztecs must have taken place earlier than is generally supposed; they might have occurred before the present era, when there was rivalry between the peoples devoted to Venus and those devoted to Mars, and when the memory of the cosmic conflict was still vivid.

## Tao

What is it that we call the Tao?  
There is the Tao, or Way of Heaven;  
and there is the Tao, or Way of Man.

—KWANG-TZE

Planets of the solar system were disturbed by the contacts of Venus, Mars, and the earth. We have already referred to the annals of the *Bamboo Books*, where it is written that in the tenth year of the Emperor Kwei, the eighteenth monarch since Yehou, "the five planets went out of their courses. In the night, stars fell like rain. The earth shook."<sup>1</sup> The disturbances in the family of planets were caused by collisions between Venus and Mars. The battles of two stars appearing as bright as suns are mentioned in another Chinese chronicle as having occurred in the days of the same Emperor Kwei (Koei-Kie):

"At this time the two suns were seen to battle in the sky. The five

<sup>5</sup> Sahagun, *Historia general de las cosas de la Nueva España*, III, Chap. I, Sec. 2.

<sup>1</sup> James Legge (ed.), *The Chinese Classics*, III, Pt. 1, 125.

planets were agitated by unusual movements. A part of Mount T'ai-chan fell down."<sup>2</sup>

The two battling stars are recognized by us as Venus and Mars. In the language of Eratosthenes, the Alexandrian librarian of the third century before this era: "In the third place is the star [stella] of Mars. . . . It was pursued by the star [sidus] Venus; then Venus took hold of him and inflamed him with an ardent passion."<sup>3</sup>

In an astronomical chart dating from the Middle Ages (1193), used in the education of emperors and known as the Soochow Astronomical Chart,<sup>4</sup> it is asserted on the authority of the ancients that it happened that planets went off their courses. It is said that once Venus ran far off the zodiac and attacked the "Wolf-Star." A change in the course of the planets was regarded as a sign of heavenly wrath, since it occurred when the emperor or his ministers sinned.

In the old Chinese cosmology "Earth is represented as a body suspended in air, moving eastward,"<sup>5</sup> and thus was understood as one of the planets.

The following passage from the Taoist text of Wen-Tze<sup>6</sup> contains a description of calamities which, as we have found, belong together:

"When the sky, hostile to living beings, wishes to destroy them, it burns them; the sun and the moon lose their form and are eclipsed; the five planets leave their paths; the four seasons encroach one upon another; daylight is obscured; glowing mountains collapse; rivers are dried up; it thunders then in winter, hoarfrost falls in summer; the atmosphere is thick and human beings are choked; the state perishes; the aspect and the order of the sky are altered; the customs of the age are disturbed [thrown into disorder] . . . all living beings harass one another."

Hoei-nan-tze, a Taoist author of the third century of this era, speaks of the sun and the earth leaving their paths; he transmits the tradi-

<sup>2</sup> L. Wieger, *Textes historiques* (2nd ed., 1922-1923), I, 50.

<sup>3</sup> Eratosthenes, ed. Robert, p. 195.

<sup>4</sup> *The Soochow Astronomical Chart* (transl. and ed. by Rufus and Hsing-chih tien).

<sup>5</sup> J. C. Ferguson, *Chinese Mythology* (1928), p. 29.

<sup>6</sup> Wen-Tze in *Textes Taoïstes*, transl. C. de Harlez (1891).

tion that "if the five planets err on their routes," the State and the provinces are overcome by a flood.<sup>7</sup>

Taoism is the dominant religion of China. "The term Tao originally meant the revolution of the way of the heavens about the earth. This movement of the heavens was regarded as the cause of the phenomena on earth. The Tao was located about the celestial pole which was considered to be the seat of power because all revolves about it. In the course of time Tao was viewed as the universal cosmic energy behind the visible order of nature."<sup>8</sup>

## Yuddha

In an old textbook on Hindu astronomy, the *Surya-Siddhanta*, there is a chapter, "Of planetary conjunctions." Modern astronomy knows only one kind of conjunction between planets, when one planet (or sun) stands between the earth and another planet (differentiated only as superior and inferior conjunction and opposition). But ancient Hindu astronomy distinguished between many different conjunctions, translated as follows: *samyoga* (conjunction), *samagama* (coming together), *yoga* (junction), *melaka* (uniting), *yuti* (union), *yuddha* (encounter, in the meaning of conflict, fight).<sup>1</sup>

The first paragraph of this chapter, "Of planetary conjunctions," of the *Surya-Siddhanta* tells us that between planets there occur encounters in battle (*yuddha*) and simple conjunction (*samyoga samagama*). The force of the planets, which manifests itself in conjunctions, is called *bala*. A planet can be vanquished (*jita*) in an "apasvya encounter," struck down (*vidhvasta*), utterly vanquished (*vijita*). A powerful planet is called *balin*, and the victor-planet in an encounter, *jayin*. "Venus is generally victor."

To the last sentence the translator of *Surya-Siddhanta* wrote: "In this passage we quit the proper domain of astronomy, and trench upon that of astrology." Aside from the introductory lines in which the work is presented as a revelation of the sun (a common introduc-

<sup>7</sup> Hwei-nan-tze in *Textes Taoïstes*.

<sup>8</sup> L. Hodous, "Taoism," *Encyclopaedia Britannica*, 14th ed.

<sup>1</sup> *Surya-Siddhanta*, Chap. VII (transl. Burgess).

tion in many astronomical works of the Hindus), it is written in very sober terms. It makes use of square roots and geometrical figures, and speaks in algebraic terms; every sentence of the work is in scientific language, very precious, indeed.<sup>2</sup>

This manual of the *Surya* contains also the correct notion of the earth as a "sphere" or "globe in the ether," showing that the Hindus of early times knew that the earth is one of the planets, though they thought it to be situated in the center of the universe.<sup>3</sup> Aryabhata held the opinion that the earth revolves on its axis.<sup>4</sup> Like the author of the Book of Job, who wrote that the earth hangs "upon nothing" (26 : 7), the *Surya* knew that "above" and "beneath" are only relative: "And everywhere upon the globe of the earth, men think their own place to be uppermost—but since it is a globe in the ether, where should there be an upper, or where an under side of it?"<sup>5</sup>

The strange chapter of *Surya-Siddhanta* dealing with the conjunctions of planets and with their conflicts when in close proximity made modern scholars think that this portion did not have the scientific value of the rest of the work, and was a product of astrological invention, or even an interpolation. We know now that this chapter has equal scientific value with other chapters of the work and that encounters between planets actually took place a number of times in the solar system.

In Hindu astronomy a junction of the planets is called *yoga* [yuga]. Very revealing is the fact that the world ages are also called *yogas*, planetary conjunctions<sup>6</sup> (or more precisely, junctions).

### The Bundahis

Theomachy, the battle of the gods, described in the Homeric epics, in the *Edda*, and in the Huitzilopochtli epos, is related also in the

<sup>2</sup> The following formula may serve as an example of the *Surya* method: "Multiply the earth's circumference by the sun's declination in degrees, and divide by the number of degrees in a circle; the result, in *yojanas*, is the distance from the place of no latitude where the sun is passing overhead." (Chap. xii.)

<sup>3</sup> Tycho Brahe, in post-Copernican times, still adhered to this view.

<sup>4</sup> *Surya-Siddhanta*, note to p. 13.      <sup>5</sup> *Ibid.*, p. 248.

<sup>6</sup> Bentley, *A Historical View of the Hindu Astronomy* (1825), p. 75: "The periods themselves were named Yugas, or conjunctions."

Indo-Iranian text of the *Bundahis*.<sup>1</sup> "The planets ran against the sky and created confusion" in the entire cosmos.<sup>2</sup>

In the long battle of the celestial bodies, one of them made the world entirely dark, disfigured creation, and filled it with vermin. This act of the cosmic drama was recognized by us as the first contact of the earth with the comet Typhon, the same as Pallas Athene. Other acts of the drama followed. The planetary disturbances lasted for a long time. "The celestial sphere was in revolution. . . . The planets, with many demons, dashed against the celestial sphere, and mixed the constellations; and the whole creation was as disfigured as though fire disfigured every place and smoke arose over it."<sup>3</sup>

The planet named Gokihar or "Wolf-progeny" and "special disturber of the moon,"<sup>4</sup> and a celestial body called Mievissh-Muspar, "provided with tails," or a comet,<sup>5</sup> brought confusion to the sun, moon, and stars. But in the end "the sun has attached Muspar to its own radiance by mutual agreement, so that he may be less able to do harm."<sup>6</sup>

In this description of "the battle of the planets," we recognize the wolf-progeny and disturber of the moon, the planet Gokihar, as Mars; Muspar with tails apparently is Venus, called also Tistrya, or "the leader of the stars against the planets." As the final result of these battles, the sun made Venus into an evening-morning star or put Lucifer lower down so that it could do no harm. In the *Bundahis* the conflicting forces are called, not "gods," but merely "planets."

### Lucifer Cut Down

It can be said that the planet Mars saved the terrestrial globe from a major catastrophe by colliding with Venus. Since the days of Exodus and Joshua, Venus was dreaded by the peoples of the earth.

<sup>1</sup> *The Bundahis, Pahlavi Texts* (transl. West).

<sup>2</sup> "Die Planeten rannten, Verwirrung stiftend, gegen den Himmel an." J. Hertel, "Der Planet Venus in Avesta," *Berichte der Sächsischen Akademie der Wissenschaften, Phil. hist. Klasse*, LXXXVII (1935).

<sup>3</sup> *Bundahis*, Chap. 3, Secs. 19-25. <sup>4</sup> See *infra* the Section "Fennis-Wolf," note 5.

<sup>5</sup> Olrik, *Ragnarok*, p. 339. <sup>6</sup> *Bundahis*, Chap. V, Sec. 1.

For about seven hundred years this terror hung over mankind like the sword of Damocles. Human sacrifices were made to Venus in both hemispheres in order to propitiate her.

After centuries of terror, one sword of Damocles was removed from above the heads of mankind, only to be replaced by another. Mars became the dread of the peoples, and its return was feared every fifteen years. Before this, Mars had absorbed the blow, even the repeated blows of Venus, and had saved the earth.

Venus, which collided with the earth in the fifteenth century before the present era, collided with Mars in the eighth century. At that time Venus was moving at a lower elliptical velocity than when it first encountered the earth; but Mars, being only about one-eighth the mass of Venus, was no match for her. It was therefore a notable achievement that Mars, though thrown out of the ring, nevertheless was instrumental in bringing Venus from an elliptical to a nearly circular<sup>1</sup> orbit. Looked at from the earth, Venus was removed from a path that ran high to the zenith and over the zenith to its present path<sup>2</sup> in which it never retreats from the sun more than 48 degrees, thus becoming a morning or an evening star that precedes the rising sun or follows the setting sun. The awe of the world for many centuries, Venus became a tame planet.

Isaiah, referring figuratively to the king of Babylon who destroyed cities and made the land into a wilderness, uttered his remarkable words about Lucifer that fell from heaven and was cut down to the ground. The commentators recognized that behind these words applied to the king of Babylon must have been some legend about the Morning Star. The metaphor regarding the king of Babylon implied that his fate and the fate of the Morning Star were not dissimilar; both of them fell from on high. But what could it mean that the Morning Star fell from the heights? asked the commentators.

Significant are the words of Isaiah about the Morning Star, that it "weakened the nations" before it was cut down to the ground. It weakened the nations in two collisions with the earth, and it weak-

<sup>1</sup> Eccentricity of Venus' orbit is .007.

<sup>2</sup> Inclined 3° 4' to the plane of the ecliptic (Duncan, 1945).

ened the nations by keeping them in constant fear for centuries.

The Book of Isaiah, in every chapter, provides abundant evidence that with the removal of Venus, so that it no longer crossed the orbit of the earth, danger was not eliminated, but became even more threatening.