*CHAPTER SIXTEEN*

# VENUS AND MARS

It is no longer fashionable to believe that Venus and Mars are beautiful bodies, with some congenital blemishes. Like Moon and Mercury, like Earth itself, they shriek of more recent disasters. The major question now is " How recent is 'recent'?" We address the question to their peculiarities of motion, position, composition, and behavior.

Myth and legend (in its deliberate attempts at science) afford voluminous material about both planets, their transactions with each other, and their encounters with Moon and Earth. Research of the past generation has evidenced that the planet Venus dominated the human cosmogonical mind in the years between 3 500 and 2 000 BP and that the planet Mars entered upon the competition to catastrophize the human mind in the latter 800 years of this period. Venus had hundreds of names and identities, many of them secret, sacred, and obfuscated. For example, the Hebrew word "shakris" means the Evening Star, Morning Star, to sacrifice, to kill something, to make sacred.

Logically, one initially seeks information about the first appearance of these celestial bodies; when were they born? In the case of Venus, legends of the Near East, Greece, Rome, the Teutons, the Hindus, and the Meso-Americans seem to speak of a special time of birth of a deity with a homologous syndrome of traits (Velikovsky, 1950).

Although the name "Venus" may not originate directly from "venire" ("to come"), as Cicero would have it (Lowery, Grant), it may well emerge even more significantly from *Venus*, which Bloch translates as "blooming nature", hence, as we see it, something new-born and rapidly expanding. The lotus and lily, two life forms suggestive of blooming cometary images, are

employed in widely separated cultures as Venusian symbols [106].

Clearly conformable to an astronomical operation is the birth of Greek goddess Athene, who sprang fully armed with a shout from the brow of Zeus (Hesiod b). The Hindu Devi is remarkably similar in the commotion that she causes when born (Isenberg, p90). Various studies analyzed by de Grazia (1981, 1982a) set the time of her birth near 3,450 BP, in accordance with older studies by Velikovsky (1952, pp1-53, 98-101). The time coincides with the Exodus of the Hebrews from Egypt under Moses, an event so fraught with catastrophe that it remains the substratum of the Judaic, Christian and Islamic religions.

If Venus was erupted from Jupiter, it conceivably burst from the disturbed area of the Great Red Spot. Although not demonstrable, this is hypothetically feasible. It was Jupiter's greatest discharge, its last attempt to rid itself of ions and gain electrons. It succeeded; it retired; and its offspring was unleashed into the inner Solar System, where all massive fragments had gone hitherto.

Unlike Uranus Minor, Neptune, and possibly Pluto, Venus was of low electrical density and fell victim to encounters with Earth, then Mars, and remained within the inner circle of planets. Both the Earth and Mars took electrical charge from Venus, not without extensive physical "damage" to themselves; they both moved away from the Sun after their encounters with Venus (Ransom and Hoffee, Table 1).

Venus was not rich enough in electrons to be coveted by the Sun. By the legendary and historical evidence, it took hundreds of years to achieve a "safe" orbit from where it would not venture close enough to Earth to endanger it and cause electrical damage. Until then, it may have threatened the Earth about every 52 years. During a seven hundred year period both the Jews and the Meso-Americans observed a great "Jubilee year" on those occasions; the inference from the holiday is that the proto-planet, still behaving as a comet and undergoing continuous electrical transaction, was due to arrive in the vicinity of Earth but prayerfully would design not to destroy the world. It is significant, as one of numerous details in the Venus mosaic, that the

American Pawnee Indians until a century ago celebrated a Venus festival on each occasion of the reappearance of Venus, sacrificing a virgin to the star. But many another celebration of Venus could be cited.

Granted that history and legend impart an aura of youth to the planet Venus, one can search for and find confirmation of youthfulness in the present state and observable behavior of the planet. We cannot do more than summarize here the debate upon the question, which has involved leading figures in Astronomy and Physics (see de Grazia *et al.* 1963; Talbott *et al.*, eds., 1976; Ransom, 1976; Goldsmith, 1977; Greenberg *et al.*, 1977, 1978; and many others referred to in de Grazia 1984d). We let the reader appraise the arguments dispassionately with the caution that theory must always bow to the demands of direct observation. We advance the following points in respect of the anomalous nature of Venus when viewed from the standard cosmogonical model, but implying the recency of Venus and its electrical nature in consonance with the thesis of this work. The 925 K surface temperature measured by landed space probes has not been explained satisfactorily (see for example. Firsoff; Velikovsky, 1978b; Forshufvud; Greenberg, L.M., 1979; Morrison) by any theory other than recent and continuing electrical transaction. The observation that the lowest thirteen kilometers of the atmosphere are glowing (Panagakos and Waller, 1979, p3) and that lightning occurs in the Venusian atmosphere (Taylor *et al.* ) encourage us in our view that electrical currents flow between Venus and surrounding space. The two localities which were photographed show evidence of recent surface devastation. Seemingly the surface of Venus is similar to those of its neighbors even though the latter lack atmospheres (Ksanformaliti *et al.*; Florensky *et al.*).

One of the major surprises greeting the explorers of Venus and the theorists who welcomed their data was the demonstration of the slow retrograde rotation of the planet. Several non-electrical explanations have been offered to explain how Venus might have reversed its original forward rotation (Singer, 1970; Ingersoll and Dobrovolskis; Kundt). In a two-planet encounter involving electrical polarization (which induces aspherical shapes onto both bodies) strong “tidal forces” act and can alter spins, or flip planets over, as Warlow shows. The five bodies of the inner Solar System exhibit a spectrum of spins and orientation,

running from fast-direct (Mars and Earth) to slow-retrograde (Venus), with Mercury and the Moon in between, Given a number of encounters among these five bodies over the past several millennia, many combinations of rotational alteration must be expected: it is probable that none of the spins are virginal.

The atmosphere of Venus presents another type of problem. Its carbon dioxide composition is like that of Mars, unstable over a long time due to photolysis by ultraviolet radiation. That most of it has not reacted with the exposed surface rocks is termed "surprising" [107], possibly Venus' atmospheric gases have recently been modified.

The chemistry of the deep and dense Venus clouds has been inferred only by indirect evidence despite the passage of several spacecraft through them. Above the clouds, which seemingly insulate the planet, temperatures resemble those found at comparable altitudes above the Earth. Insolation and heat radiation from the clouds do not betray the hellish heat that was discovered below. Even at the base of the cloud layer (which is twenty kilometers thick), temperature, pressures and winds remain Earth-like (Burgess). It is the descent through the remaining forty-nine kilometers that confounds expectations and confuses the instruments of the descending space probes (making some of them inoperative and the data from others uninterpretable): here Venus does not resemble any environment yet penetrated by instruments. We find a murky and stagnant inferno under crushing pressures many times greater than those on Earth. There, lightning occurs frequently (Taylor *et al.*), indicating an electrical instability in excess of that found on Earth, and an electrical glow, noted above, permeates to the bottom of the murk.

Even the edge of Venus' sphere of influence has produced the unexpected. Venus is only trivially magnetic; yet its interaction with the solar wind produces 80 percent of the effect generated by the three-thousand-times more strongly magnetized Earth (Russell, C.T. *et al.*, 1979). Since Mercury, whose magnetism is similarly miniscule, also interacts strongly with the solar wind (Ness *et al.*, p480) we are drawn to conclude that the interface between planets and solar wind is electric, rather than magnetic.

The bow wave in front of the planet and the long tail in the wake of the planet represent the junction of two electrospheres: the solar wind flows on one side of the junction and the planet driven ions and electrons flow on the other side. Electrons traversing this junction behave differently at Venus (and Mars), for there they are slowed, rather than accelerated as happens with Earth, Mercury and Jupiter (Simpson et al: Wolfe et al). Electron-deficient solar wind atoms seemingly penetrate and are absorbed by Venus' upper atmosphere (and Mars' surface). The magnitude of the effect indicates that Venus is farther from equilibrium with its surroundings than are the other planets. This finding may be the "Rosetta Stone," telling us why near Venus' surface the heat is infernal. Any unequivocal evidence of disequilibrium tells us that Venus is indeed young (Van Flandern) [108].

Earth's history of the period around 3 500 BP, so far as it is known, provides proof of extraterrestrial damage. In this respect, the following propositions have garnered enough probative support to be acceptable as leading hypotheses [109].

1. *Astrosphere:* the skies were disturbed and celestial motions were reportedly irregular. Astronomical alignments of before this age are out of line with references of the period following. No temple can be adduced whose orientations have remained the same through this time.

   For instance, the second rupestral temple at Wadi es Seboua(s) in Upper Egypt was originally orientated before 1 500 BC from its rear, through its portal, via a faraway mountain saddle to the winter solstice bearing 30° 9' 0" South of East. It was destroyed by fire. Much later it was excavated and rebuilt. Again it was orientated to the winter solstice, this time, however, to 35° 49' 12" South of East (Roussel).

   Possibly a block of the Earth shifted northward or else the axis of the Earth tilted; both are possible, and each may have contributed to the need for realignment.

2. *Atmosphere:* There were radical disturbances and some lasting changes in atmospheric electricity, radioactivity, temperature, winds, climate, and solar radiance. The Book of Exodus can be read as a meteorological journal - one encounters electrostatic phenomena, gales, dense clouds, a unique darkness, falls of manna (compound manufacture in the atmosphere), dense rains of stones, fire (often apparently electric), a mass of dead quail (driven down by electrical storm and hurricane winds and said to be poisonous to eat), and radioactivity (see de Grazia, 1983a).

A sharp rise in C-14 levels occurs about now (and at the time of the Mars incursions 700 years later) (see de Grazia, 1981). It is doubtful that C-14 is a valid and reliable clock, since its formation and absorption rates are so easily altered by changed environmental conditions, and so evidence of this nature, though favorable to the hypothesis, must be discounted.

3. *Geosphere:* Every geophysical process gives evidence of quantavolutionary stress. Widespread earthquakes are part of the destruction of towns to be referred to below. There occurred “a major westward shift in the Euphrates system of channels as a whole during Kassite times” (Paterson) (of this age, we believe). A set of natural disasters plunged the Harappan culture of India into a fatal decline now too.

4. *Biosphere:* Unusual biological behavior occasioned by habitat disturbance and environmental stress is evidenced. The behavior of animals during the Plagues of Egypt is well known and not to be dismissed as a myth: it is typical of well-observed disaster behavior (Galanopoulos and Bacon, p192-9; Lane). In the Black Sea, a large belt of coccoliths at the bottom returns a 35-century-old Carbon-14 date at a level below the sea floor [110].

5. *Ekosphere:* All human settlements suffered destruction or damage from natural causes. In one study, we read, “In the middle of the second millennium BC the ancient cities of Southern Turkomenia declined and were

abandoned by the inhabitants. The South Turkomenian civilization perished at about the same time as the Proto-Indian ... and the reasons are still unknown." (Kondratov, p164) Schaeffer's survey of some 40 most important archaeological sites in the Near East arrived at the same conclusion for the same time [111].

6. *Historiasphere:* All contemporary accounts or chronologically assignable legends dealing with the period mention a general natural disaster. The prime case is the Bible. The Pallas Athene instance is also referred to. The Ipuwer papyrus has strong support now as an eyewitness account of the catastrophe ending the Middle Bronze Age in Egypt (Velikovsky, 1952, pp22-9; Greenberg, 1973; Sieff, 1976, p14; Bimson).

7. *Anthroposphere:* Every culture-complex changed markedly. We have mentioned several major civilizations which declined sharply or fell - Egyptian, Indian, Kassite, Turkomenian, and others of the Near East. One might add the Minoan of Crete and the Chinese. Social organizations, religions and modes of life were altered. A corollary is that no god of before 3500 BP remained without change of status or serious accident, citing the advent of Athene and the Mosaic renewal of Yahweh as examples.

8. *Holosphere:* In summation of the foregoing seven propositions, we may assert that all spheres of existence quantavoluted about 35 centuries ago. Nor does any sphere change independently of quantavolutions in other spheres. Since all spheres are changing, a general cause must be sought. There can be only one necessary and sufficient cause of the set of quantavolutions, which must be a very large body encountering the Earth. By observation and later commentaries, cometary behavior is indicated. Nothing but a god-like comet could have produced the phenomena of 3500 years ago.

It follows, finally, that every institution, behavioral pattern and natural setting that exists today, if its history is complete, will reveal an inheritance of effects from the (Venus) quantavolution. The de-traumatizing of the human

> mind by designing and propagating new models of natural and human history would appear to be a necessary preliminary to peace and progress. For the later time, about twenty-six centuries ago, the Mars case offers a similar set of propositions, although the evidence argues for a level of destruction appreciably lower than that obtained form he earlier Venus-Earth encounter [112].

Around the solar year 2776 BP, human activities related to celestial disturbances were generated respecting Mars, as well as Venus, and are notable in the Near East and Mediterranean world (Velikovsky, 1950, p265ff). Enough subsequent benchmarks were provided by legends and practices for Velikovsky to surmise that a large heavenly body, apparently Mars, was threatening collision with the Earth at fifteen-year intervals. The Mars encroachments may have been initiated by Venus, which, pursuing an ever-shortening orbit, perhaps encountered and displaced Mars from its earlier orbit between the Earth and the Sun (Rose, 1972).

The Romans were Mars-worshippers *par excellence*, and the legends, rites and early reports that tie Mars to the history of Rome are not to be disregarded; “archaeological and epigraphic discoveries” continue to demonstrate that “the legendary guise of the traditional material actually masks a real foundation of authentic events” (Bloch, 1085).

By contest with Venus, Mars seems to be an old god. Much less is made of his origins and birth in the Mediterranean world. When he bursts upon the world scene in the eighth century BC he is already well known. Least personable of the Olympian deities, Ares (Mars) is portrayed as a ruthless warrior. Hercules seems to be one of his more interesting identities. New militaristic nations, particularly the Romans, the Assyrians, and the ancestral Aztecs, forged empires under his inspiration. The Roman dedication to Mars is well known. He was believed to be father of Romulus, their founder. In the old calendar they named the first month after him.

The Romans irreconcilably claimed both Aeneas, Prince of Troy, and Romulus as their founder. Aeneas was, and is, placed in the twelfth or thirteenth century BC with the Trojan Wars, by older scholarship. Recently the Wars have been brought into later

times, along with Homer, who sang of them (de Grazia, 1984a). This is but one step in a reconstruction of chronology that eliminates the several centuries of a so-called Greek Dark Age and pulls the disastrous collapse of the Mycenaean civilization down to the eighth century as well (Isaacson). Roman legend has Romulus and Remus (abandoned and miraculously suckled by a wolf in their infancy) [113] founding a town called Rome, which Romulus rules until he is lofted into the air, possibly by a cyclone, to join his father, Mars.

It seems to us reasonable that around this time, Aeneas and his band of experienced and cultivated Trojans might have impressed themselves upon, or been welcomed by, the local Latins of the new town, and perhaps even helped by their neighbors to the North, the Etruscans, who themselves were of Anatolian origins.

It is an age of destruction and movement. The powerful nearby Etruscan state was staggered by natural disasters and a decline. According to Pliny, their city of Volsinium, where stands Lake Bolsena today, was destroyed by a thunderbolt. Both Mount Vesuvius and Mount Etna underwent => *Plinian* eruptions around the same time.

Many peoples were on the march or fleeing -- possibly the Etruscan elite had not preceded Aeneas by long. They were from the general area of Ilium (Troy). Southern Italy and Sicily were being heavily settled by Greeks, in trouble themselves and profiting from natural disasters that were besetting the earlier inhabitants. And at that time the Dorians (Heraclids, sons of Hercules-Mars) were moving in upon the hapless Myceneans.

All of these loose connections and temporal references need a thorough analysis; indeed, we require nothing short of a total review of the most ancient history, legends, and the records of excavations. Even then the human record, like the fossil record, is scanty. One may hope for, but not expect, that the thousand-to-one chance will occur, and that a tablet or papyrus describing clearly the behavior of the planet Mars in these times will be found. The earliest Etruscan, then Roman, calendar was of ten solar months. That the later twelve months alternated at thirty and thirty-one days does not fit the present lunation, which is better suited to the 29- and 30-day alteration used in all

surviving lunar calendars. The indication is that Mars disrupted the month in its transaction with the Earth and/or Moon.

The Aztec Mars was Huitzilopochtli, born of Mother Earth from a ball of humming-bird feathers that fell from the sky. His color was blue, his totem the eagle, and his weapon the blue snake. The interminable human sacrifices of the Aztecs were in his name or to the Sun in his name; the Sun, "the Eagle who rises", was believed to require the hearts of an unending stream of prisoners-of-war if he was to remain constant in behavior. The High Priest of Huitzilopochtli was called Feathered Serpent, priest of Our Lord; but "feathered serpent" is rendered Quetzalcoatl, who at a much earlier time was the ruling deity of Meso-America and was identified unfailingly as the planet Venus by many scholars.

The Assyrians of the eighth and seventh centuries, "like the Romans, those other stepchildren of Mars, and more than the Hittites, its victims, had a lively reverence for the planet Mars: 'Nergal, the almighty among the gods, fear, terror, awe-inspiring splendor', wrote Essarhaddon, son of Sennacherib." Evidence of physical destruction by fire and earthquake is abundant everywhere in these years, and it was "beneath the exploits of Mars ... that Assyria marches to world power", Sieff (1981) declares. Patten *et al.* argue that the Assyrians timed their major offensives to coincide with cosmic approaches of Mars to profit from the physical disorder and consternation of their enemies.

In general, the same hypotheses that we stipulated earlier for the Venus encounters may be translated for and applied to the Mars encounters seven centuries earlier. That is, we can adduce some evidence from around the world of deep disturbances in the six spheres and of their interconnections in the holosphere.

Ancient astronomers and writers appear to have had no difficulty in considering (or perhaps they were really reflecting upon) historic encounters governing the planets; yet we can observe in their own times the strengthening of three psychological defense mechanisms that made historical reconstruction involving quantavolution difficult: denial and suppression of memory, religious and literary sublimation, and abstract philosophy [114].

Modern cosmogonists, sternly trained in the principles of uniformitarianism and gradualism under a very long whip of time, are loath even to consider large-body departures from presently observed motions. And it is true that the constraints on motions required by strict obedience to such physical laws as the principle of conservation of angular momentum are formidable; immense forces must be invoked from somewhere so as abruptly to alter the motion of bodies. Calling upon gravitational force, as this is presently perceived in science, requires "impossible" conditions even if an encounter seems "reasonable" to expect.

However, if the moving bodies are charged and are transacting electrically, many "surprising" and selectively violent alterations can happen. The observations by the ancients that passing celestial bodies appeared like the objects we, today, classify as comets are understandable. Juergens (1972, p7) has shown how comet-like behavior (and appearance) results when astronomical bodies move quickly from a region with one level of electrification into a remote region differently electrified. Milton (1980/81) has generalized Juergens explanation to apply it to other "non-gravitational" celestial motions. Encke and later astronomers have noted with surprise how cometary bodies sometimes alter their angular momentum in seemingly sporadic episodes (Sekanina). By this point in our study of Solaria Binaria, we should not have to digress further in order to establish the capabilities of electrical motions.

We can go further. The Moon has undergone its tribulations whenever the Earth has been engaged. Legends, and myths of Moon encounters with Venus and Mars, are at least as numerous as those involving Earth alone. Documentation has been presented elsewhere.

Juergens (1974, 1974/75) has analyzed reports of various disparities between surface features of Moon and Mars, and explained them as effects of anode and cathode behavior that would be excited in close encounters. He has suggested, for instance, that some of the hill ranges of the Moon are so morphologically anomalistic as to represent a job of "electric welding" done by Mars [115]. To extract from these hills and from the canyons of Mars comparable material is presently impracticable, even though we may conceive of chemical tests to apply to the material thus obtained.

Juergens has gone further in the investigation of electrical encounters between Moon and Mars. On the assumption that the ray-surrounded crater Tycho (the most prominent feature on the Moon under high-angle lighting, that is, near Full Moon) could have been blasted out of the lunar highland rock by an electrical explosion liberating almost $10^{17}$ megajoules of energy and requiring a transfer of $10^{11}$ coulombs of charge between the Moon and Mars, Juergens sought a suitable anode site on Mars' surface which might receive this discharge. He found a likely receptor in the mountainous feature called South Spot (now, Arsia Mons). He writes,

> this spot is an enormous pit 140 kilometers across at the crest of an impressive 17 kilometer rise from the floor of the Amazonis basin to the west.

He observes that this volcano-like structure has no known counterparts on the Earth. Tycho also represents a lunar high point: it is some 1.2 kilometers above the hypothetical lunar sphere. The electrical connection between this feature and the Martian South Spot could have resembled Figure 36 just before the discharge occurred.

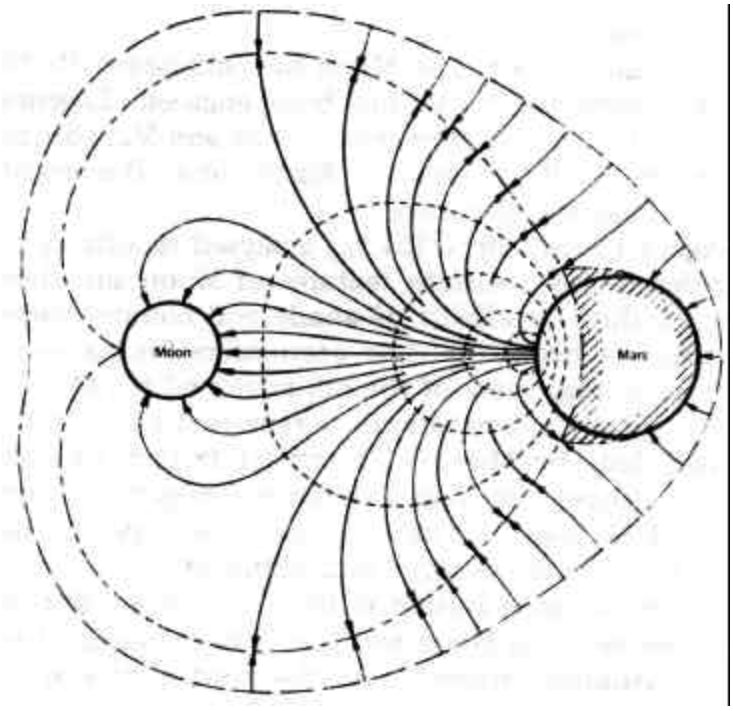


*Figure 36. The Electric Field between Mars and the Moon*

During the close passage of Mars and the Moon, *circa* 27 centuries ago, devastation was produced on the surface of both bodies, the result of interplanetary discharges across the gap between the two bodies. Here we see the electric field lines (arrows) and the lines of equal electric potential (variously dashed) prior to the breakdown that produced electric discharges from the Moon (the cathode) to Mars (the anode). The outer equipotential depicts the sheath boundary between the electrosphere of the charged bodies and the interplanetary plasma.

-- courtesy of the estate of Ralph Juergens

Juergens' analysis might well serve as a launching platform for decades of detailed studies, using a quantavolutionary electric and recent-time model of each planet's topographical peculiarities.

As with Moon and Mars, so with Venus and Mars. perhaps, in the end, we shall come to regard a famous scene of the Iliad of Homer as an eyewitness account, garbled, to be sure: that is where the goddess Athene, archetype of planetary Venus, engages in awful sky combat with the god Ares, who is recognized as the planet Mars.

> Athene drove her chariot towards Ares, bane of mortals, and drove her spear deeply into his belly. Thereupon arose a huge black cloud, and he bellowed like 10 000 warriors and fled into the high heavens.

Some 2700 years later, the United States of America sends Mariner 9 into space and photographs the most prominent feature of Mars, the Coprates Canyon complex. It is a 12 megameter line of seemingly extruded mountains, enormous beyond anything on Earth, leading into a canyon 3,600 kilometers in length, 500 km. wide, and 6,100 meters deep, ending in another string of great volcanic outbursts. Some 8.5 million cubic kilometers of rock have disappeared. The wound stretches across half the circumference of the planet.

Allan Kelly has offered a scenario. The total eruption

> is a product of the same event, when some very large comet or other massive intruder from space passed too close to Mars .... This intruder literally sucked the lava from the interior of Mars to form the huge volcanoes .... As it came closer it caused a tremendous bulge, miles high, that burst

> open along the top and spewed out lava and great chunks of Martian crust; much of this material followed the intruder into space.

There is no evidence of water erosion of the steep stairs of the canyon, no sedimentation, delta fans or stream beds cutting the lengthy lips of the wound. The intruder, be it Athene, Ishtar, or Venus, both repelled and implanted charge onto the defenseless Mars. Leaders of lightning from Venus incised the masses that had assembled in a belt of Mars along half its girth. In the ripping blast that followed, Mars flung them upon the intruder, and, lighter but more heavily charged, withdrew. So the aforesaid “garbling” of history lay partly in not perceiving that Mars laid a mass upon Venus and that the greatest spear thrusts of lightning were exchanged beneath the dense cloud that poured from Mars’ wound.

## Notes on Chapter 16

106 The lotus was used earlier in imagery portraying the central arc of fire arising to Saturn, which probably lent force to the Venus symbolism on the logic that the electric arc, thought to be lost, now reappeared, freed to roam the heavens.

107 On Earth the sea water contains 98% of the total potential atmospheric carbon dioxide as dissolved gas (Plass; Sundquist *et.al*.). The carbonate rocks of the crust have locked away most of the potential supply of this gas.

108 Van Flandern, in a letter to C.L. Ellenberger.

109 From a paper by A. de Grazia, 1980, to the Society for Interdisciplinary Studies in London. Published in de Grazia, 1984c.

110 But this is subject to questions concerning all C-14 dates before 500 BC (Blumer and Youngblood).

111 Here we use the traditional Exodus date for the corresponding end of the Middle Bronze Age rather than the date, about 150 years earlier, used by Schaeffer.

112 This is expected because Mars is smaller than Venus. When Mars “struck” the Moon the damage was very great.

113 The wolf (cf. Fenris in Norse myth) is often a Mars symbol.

114 Aristotle (*Metaphysics*); de Grazia, 1977, 1978, 1981, 1983a, 1984a; Stecchini; Velikovsky, 1982.

115 Personal communication to A. de Grazia.

*CHAPTER SEVENTEEN*

# TIME, ELECTRICITY AND QUANTAVOLUTION

With the model of Solaria Binaria constructed here along the lines of short-time electrical quantavolution, we have presented physical and cultural evidence of several major historical happenings, as well as some lesser events that need not be summarized here.

1. The succession of great gods in human history coincides with a succession of ages of destruction and renewal that may tentatively be numbered at seven. These are carried in Table 6.

2. Human nature originated abruptly with a complex culture in the first age of binary instability, precipitated by electrical and hormonal changes, and displaying anxious self-awareness and a grasping for self-control.

3. The Moon was ejected from the ancient southern hemisphere (the modern Pacific Basin) later in the same period in an electrical encounter with a piece of planetary debris originating from an explosion of a star that we call Super Uranus.

4. The planets have assumed their present order in the past few thousand years, responding to a principle of mutual maximum repulsion.

5. The Solar System sac and the plenum which it contains are now so enlarged, and hence distant from us and dilute, that they have been overlooked by observers. The binary electrical axis has been diffused into a pervasive solar wind, which permeates the planetary plane. The once-substantial binary partner is dispersed into at least a dozen sizeable fragments and myriad

fragments of smaller debris. All of this has happened in fourteen millennia.

6. All major chemical and biological developments occurred in a period of a quarter of a million years at the beginning of Solaria Binaria. The number of species peaked in the period of Pangean Stability and has been steadily reduced by catastrophes.

7. The planets and the Sun are accumulating electric charge and have separated greatly, whereupon their ability to discharge (take charge) from one another is diminishing with time. If the trend continues without sudden galactic interruption, the planets will disappear upon attaining the higher level of charge found in the Galaxy surrounding us.

Contemporary cosmogony may be said to lack a binary model for solar and Earth history, and this we have attempted to provide with Solaria Binaria. We have conveyed it by means of a short time chronology, a concept of quantavolution, and a fully demanding theory of electric behavior.

Several major observations promoted consideration of the Solar System as a binary development. A growing realization that our star system is embedded in a Universe largely composed of multiple star systems led us to match known characteristics and behaviors of these systems in their varied stages of development with our own system as it might have been, is and might become. Evidence mounts, too, that planet Jupiter has stellar traits, as have, less obviously, the other major planets.

Exploration of the inner planets, not excepting the Earth and Moon, reveals the progressive destruction of their surfaces over time. Understandably , conventional cosmogony seeks to fix the destruction in a convenient episode close to the birth of the Solar System. However, the evidence speaks not of a day’s work of a passing body four aeons ago, but rather of the normal work expected of a binary system.

Furthermore, ancient observers and philosophers who were neither primitive nor naive, an who were also reporting the ideas of other experts of hundreds and thousands of years before them, affirm that the bodies of the Solar System and the stars changed

their behavior and their motions. These men were cognizant of, and disciplined by, religious systems that were sky-obsessed, and which moved continually between celestial behavior and mundane behavior, in supreme efforts to let happen on Earth what happened in Heaven, and *vice versa*. As we have reviewed their ideas and reports, coupled with evidence emerging from legends and archaeological excavations, we found reason to think that they might be living in a world that was strikingly different from our own and that was recognizably a late phase of a stellar binary system.

The prospect before us, then, was to understand an ancient science and tradition which had large heavenly (god-like) bodies hovering over the Earth in what today we would classify as a synchronous orbit. If the Earth were locked between the partners in a binary, much of what the ancients spoke of as their own experiences, or related as the experiences of their ancestors, makes sense.

By no means were their ideas purely deductive. They recited experiences; they made empirical statements; they claimed knowledge of a world into which the human race was born. They discussed a set of events that should occupy, by temporal schemes in vogue today, millions (if not billions) of years, and that treat matters such as the acquisition and transformation of the Moon and the recession of the planets deeper into space.

As soon as we began to draw upon ancient opinions concerning cosmic events, we had to take a position respecting chronology. In this we were encouraged by the binary concept itself to call time into question. Binary systems offer evidence of great forces operating over short times to produce large effects. They illuminate short-cuts in the creation of the raw materials for planetary, atmospheric and biological development. As they transact, the large bodies separate and fragment within the system, creating and destroying worlds while retaining their parts. It may be fair to say that only a binary model can supply those scientists -- admittedly a small minority -- who are inclined to shorten natural history with an adequate theoretical instrument.

The binary model suggests and may even require, a short-time scheme for natural history. A short-time Solar System requires high energy and precise interventions at levels of nature ranging

from the Galaxy to the atomic nucleus. It is specifically this sort of intervention that is evidenced time and time again in natural history. All "absolute chronometries" become variable in a quantavolutionary world. The rampant inflation of this century, which has expanded the time scale for the lifetime of the Universe from 40 million to 80 billion years, may end in a catastrophic implosion.

As if their technical difficulties were not sufficient to disable long-time chronology (de Grazia, 1981), ancient human voices seem to testify against it. These earliest humans unmistakably assert, among other things, that Heaven and Earth separated, that suns appeared, that gods fought in the skies and invaded the Earth, that the world was repeatedly built and destroyed. They are neurotically obsessed with all celestial bodies and motions, and engage in all known extremes of behavior in imitation and appeasement of the behavior observed in the skies.

It is not possible to claim that this is primate activity, nor hominid, nor that it is primitive, nor finally that it is a collective psychosis of early civilizations. Modern social psychology and psychiatry can document, and even replicate, such human behavior today. The earliest cultures, those that are "guilty" of this behavior, invented social organization, agriculture, manufacturing, science, and the arts. To think that they could do all this without a firm "reality principle", as Freud has termed it, must be in error.

The skeptic of our interpretation may be reduced to postulating that "*illud tempus*" must have been exciting and stressful, but could not be so very exciting and stressful as they would have us believe. Reasoning similarly, one could assert the contrary: the real foundations of the ancient excitement and obsessions must have been even worse than we are given to believe, because the ancients were used to disasters and hence were less traumatized by them; "war is hell", but less hellish to old soldiers than to recruits. It seems to us that both *a priori* views -- that the ancients were excitable or that they were blasé -- may obstruct the necessary work of delineating, bit by bit, the experiences of the ancients from the conglomerated assemblage of fragmentary records, legends and geological and archaeological facies, and then exposing them to analysis in the light of the sciences today.

A persistent theme of the ancient voices is quantavolution, that is, that the world and all that is in it owe most of their changes to forceful torsions and saltations. That quantavolution plays a role in the theory of natural and social science has never been denied. But the role has been grotesquely reduced by ignoring it and stressing evolution, by consigning manifestations of it whenever possible to times beyond mind, by framing scientific principles in prejudicial terms, by associating quantavolution with disreputable or outmoded religions and scientific beliefs and by unconscious editing of the evidence.

To our view quantavolution affords an instrument for scientific inquiry as useful as and perhaps superior to that allowed us by evolution. We find that the morphology of the Earth and the patterns and compositions of the skies bespeak quantavolutions. In biology, we see in the decline of evolutionary power over time, in the absence of transitional types in evolutionary branching, in the waves of extinction of species, and in the failure of evolution to provide an internal guiding dynamic, sufficient reason to promote the concept of quantavolution.

The guiding dynamic for quantavolution, whether in biology, geology or astronomy, may be electricity, a “strong force” that has been generally accorded a weak place in most sciences. For several reasons, we believe that electricity is the necessary and sufficient impulsion of cosmology. We noticed that a strong force is needed to accomplish change, whether in biology or astrophysics. Basically, electricity is to “gravitation” (if such exists independently of electricity) as $10^{36}$ is to 1.

The behavior of stellar bodies, including the Sun, can be described in electrical terms. The composition of “space” is a plenum of charges and ions, field and currents, winds and relatively stationary matter, of orbiting bodies shifting orbits as they transact, at times attractively but usually repulsively.

The fact that electricity is present in all matter, and an aspect of the existence and activity of all matter, presents us with the opportunity to study all matter and motion in an electrical perspective. Electrical attraction and repulsion seem to operate simply and flexibly in cosmology as well as in microbiology, and

can be accommodated to the concept of inertia, the two together constituting a powerful instrument for the analysis of nature.

Finally we would point out one more helpful attribute of electrical theory. Invoking electricity enables us to avoid the mechanical blasting, usually required of gravitational and explosive mechanics, that brings inordinate destruction and thermal excess to situations where we seek quantavolutionary change with a maximum of selectivity and minimal mechanical bursting.

Despite their ubiquity, electrical phenomena have been isolated from the rhetoric of causality. When treated, they have been allowed as only secondary or even tertiary effects; instead mechanical and gravitational processes of enormous magnitude are postulated as the forces playing the primary (causal) role. Sometimes magnetism (usually not observed directly) is seen to play an intermediary, or secondary, role in the deduced causal train which leads to the observed effect. But our outlook has changed. Once practically dismissed as inoperative in celestial matters, electricity, together with electrical effects, has increasingly been recognized to play a role in cosmic actions.

In every natural and biological process -- creation, accumulation, structure, function, storage, dissipation -- electrical theory is at home. The smallest observable or inferable operation of a molecule, and the largest explosion of a nebula, can be referred to the unified language and lawful behaviors of electricity.

*Part Three*

# TECHNICAL NOTES

# TECHNICAL NOTE A

## *On Method*

Scientific method goes far beyond such tasks as washing test tubes antiseptically or inventing a better particle shield. It is more than a logical or mathematical calculation. On any question of importance, as here in cosmology, it invokes a sociology of science and a philosophy of being and change.

In the famous Piltdown Hoax, a deliberately buried modern brain case and orangutan jaw were exhumed in 1912 and pronounced an exciting discovery in human evolution (see Johanson and Edey, pp77-83). Most scientists, led by an authoritative English group, assigned to the discovery an age of half a million years and Piltdown, England, became a sanctuary of anthropology for a long generation.

Harry Morris was a bank clerk and amateur archaeologist. he collected “eoliths”, artifacts of the Neolithic period. But his finds were rejected and ridiculed. The hoaxer of Piltdown had cast some eoliths among the relics; suddenly these were received as *paleoliths* and respected as part of the Piltdown assembly. Morris wrote letters accusing Dawson, the discoverer and a likely culprit, of fraud. To no avail.

In 1926 Edmonds published a geological map of the area of Piltdown, which placed the gravels of the discovery site in the upper Pleistocene of fifty thousand years ago, one-tenth of the age assigned to the hoax material. This was not noticed until 1937 when Oakley, doing fluorine research on the Piltdown bones, discovered flagrant discrepancies between the supposed parts of the same being. Finally, in the nineteen-fifties, the hoax was exposed (Weiner, p19).

For us the most important lesson of this case and similar ones rests not so much in the immorality of the hoax and cover-up, with their prolonged damaging of scientific anthropology, but in the ever-present sociological process, which here demonstrated how authority in science has the same kinds of effects as it does in religion and politics - to turn attention from anomalous facts,

to block inquiries, to discriminate against outsiders, and to maintain and boost reputations.

These effects are normal to authority and countervailing to the also normal productive effects of authority in organizing work and maintaining morale. Embedded in the social process, scientific method is fully susceptible to fashion, also. Fashion is a modern guise of authority - there are fashions in religion and politics, too. it impels scientists to seize enthusiastically upon directing hypotheses as truths that justify a monopoly of attention, making work difficult for others concerned with conflicting hypotheses. Recently, a colleague, James Christenson, who had worked with the 1980 Nobel-award-winning Cronin-Fitch experiments in particle physics, reflected that they indicated nature to be biased in favor of running forward in time. For a generation, highly touted theory had worked upon the hypothesis that "time" was neutral to direction, contrary to human mental expectations. He went on to say that the "big bang" theory of the origin of the "expanding" universe should not have been implicated in these varying experiments. "The Royal Academy made a big deal out of the cosmological stuff because it looked like astrophysics. That's purely speculative and involves an unstable proton." Scientific models of time and motion continually change in these years, often with only the slightest evidence, but pretending a great deal of it.

In 1980 an interdisciplinary conference at the Field Museum in Chicago devoted itself to examining what some members called "macroevolution" and we have called in this book and elsewhere "quantavolution". The proceedings were not to be published, but the thrust of the meeting was publicized as denoting the prominence, if not pre-eminence, and even necessity, of geosphere and biosphere changes, of abrupt, large-scale, intensive events. The new stress is interpretable as a veering towards, and a cautious detour around, the barricaded door of scientific catastrophism with an ultimate crashing through the gates of extra-terrestrialism.

In hundreds of cases since 1942, when a coded message was flashed from Chicago that "the Italian Navigator has landed", scientists have unco-ordinatedly begun to tap into the paradigm that looks upon nature as quantavolutionary. In all of these cases, we may perceive that a brilliant research technology is at

work, a technical methodology operating with a great many electro-chemico-mechanical devices, but also that this technology inherently must depend upon the ability to ask questions and make mental combinations that position the Universe in new ways, whether examining nuclear particles, cell functions, organisms, or gross shapes of the landscape and skyscape. The theory of Solaria Binaria, typical of cosmology, depends for its success upon fashioning an appealing and effective combination of the advanced technical methodology and the guiding questions and scientific imagery of the age.

*The Scientific Reception System*

Like laymen in a court of law, scientists who cross disciplinary boundaries are chagrined to discover that in another scientific jurisdiction their "best" evidence is inadmissible. For reasons similar to those of a court of law, and with consequences that are often acknowledged by the court itself to be dysfunctional as well as functional, evidence must be limited to certain kinds, pre-processed in a certain manner, and presented in a certain way. To all else, the court is determinedly and deliberately blind.

In schools of law, realization of this large fact of the pre-eminence of legal procedure can be traumatic to the naive beginning student. In schools of science, the same pre-eminence of procedure will often cause the same shock in the student, but is mitigated by the more confident assurance of the teaching authorities that the process is fully rational, not mythological or conventional in any way or form.

The scientific petitioner, assuming that he has a truth which, if properly heard, would be acknowledged, may try to win his case by several strategies. He may fashion his evidence so as to be heard in the court - framing it as a hypothesis, eliminating value-judgments, quantifying its procedures, obtaining expert witnesses, publishing related material in a most reputable journal, and putting himself forward in academic regalia.

Failing to win a subsequent judgment, the scientific petitioner may resort to a court of different jurisdiction, another discipline - history of science, say, rather than astronomy. Or he may appeal to a higher court, the cosmological and philosophic jurisdictions, for instance.

If these resources are denied him, or give judgment against him, he may seek to replace the judges (as for example, Franklin Roosevelt did with the U.S. Supreme Court), or to create a new court (as Courts of Equity were established to give justice in cases unframable for ordinary judicial consideration).

If rebuffed in these attempts, or if his creations fail him, he can go to “the bar of public opinion”, where by an adequate display of persuasiveness, power, and intelligent support, he may intimidate or enlighten the judicial institutions, and obtain in one way or another a rehearing or a favorable verdict that is masked as a rehearing.

Finally, in a revolutionary setting, and with the justification that the system is too rigid for reform, he can try to overturn the juridical order and replace it by a new juridical establishment operating under new rules for the admission and hearing of cases and evidence.

Probably most scientists who have had occasion to test the reception system of science, and whom repeated frustration has not reduced to emotional confusion, will recognize this order of possibilities in pursuing the truth as they see it.

They might also acknowledge that in the past half-century the reception or court system has been elaborated ingeniously, if unconsciously, to provide a modicum of success to everyone - so that there are more judges than petitioners, and a court for every conceivable case and procedure. The bureaucratization of science in academia, government and corporations promotes such a development. This tends to trivialize the caseload of all courts, and sends up a miasma of mutual deference to ward off critics. The resulting rigidity tends to create a revolutionary opposition from the start, a point that has evaded most writers seeking to explain the plethora of anti-scientific books and movements. It is not too far-fetched to compare the situation with that in worldwide politics that has produced so much terrorism.

## *Cosmogony: A Ghost Field?*

In the present work, we have directed ourselves to the discipline, or court, of cosmogony. This, we might think, is logical, since the work concerns ultimate causes of the physical and biological world. Unfortunately, however, the field of cosmogony hardly exists. Such is indicated, for example, in the latest (1974) *Encyclopaedia Britannica*, where neither "cosmogony" nor "cosmology" is allowed a place between the substantial essays on "cosmic rays" and "Costa Rica". Further, in a mere several paragraphs of the "Macropaedia" (vol. 3, pp. 174-5) we are led to perceive these subjects as special areas of astronomy (the "big bang" hypothesis, etc.) or of mythology and ancient speculations about the Universe.

Now are cosmology and cosmogony offered, much less required as subjects of study in universities; exceptions are rare and usually to be found in schools with a religious bias. Writings on cosmogony are likely to run off the pens of elderly astronomers, "born-again" physicists, and uncomfortable priests. A discipline without a method is a risible contradiction in terms, but such happens to be the situation.

Since the court of cosmogony is largely imaginary, we may expect an *ad hoc* panel, drummed up from various professions, to sit in judgment on our work. For their troubles they will find little that can be termed a cosmogonical method. Rather, they will find in one place the methodology of spectroscopy, in another place that of microbiology, then again that of Egyptian mythology, and now, too, that of theology. It is not because we possess any distinction in these, or in other fields, that we treat of them, but because of the broad and general nature of our problems and of our desire to be as denotative and technically correct as we can be.

At the same time, as must benefit topics so large and fundamental, we avail ourselves of the general operational logic that is accessible to every educated person when working upon any subject whatsoever. We regret, as much as every last reader, the paucity and unreliability of data - in astronomy and physics, we hasten to interject, as well as in mythology and the history of science - and that therefore frequent speculation is necessary, although controlled to be sure, up to the final leap. By way of

consolation, one of the auxiliary functions of our study may be to bring to our readers a poignant awareness of how speculative indeed is the basis of the sciences that are concerned with our subject matter.

Thereupon one may appreciate why we must concern ourselves with the simplest of logical and psychological operations in a work of the highest scientific pretensions. For example, the important idea that the Greeks and Romans named planets to correspond to the rank order of importance of the gods is realized only after prolonged study. Saturn, as the retired god *(Deus Otiosus)* of a planet, is second only to Jupiter in size. But how could the ancients have known this without telescopes? And why would Saturn then be made "father" of Jupiter? Jupiter, the largest planet, is king of the gods, wherever his name or a version thereof is employed. Then come the children, Mars, Mercury and Venus, the others (Neptune, Uranus, the asteroids, and Pluto) being invisible. Mercury (Hermes, Thoth) is more important, earlier and absolutely, than Mars, even though it is smaller in the sky. This we think is significant.

Striking, too, is the widespread ancient insistence that planet Venus, the brightest and most conspicuous starry object to the eye, is an offspring of Jupiter; for its size and brilliance should have identified it as the ruler of the planetary gods. The significantly larger-sized Sun and Moon are part of most religious, but have not received over the past several thousan years the frenzied and obsessive worship of the others. The Earth, of course, as Mother Goddess, closely identified with the human race, related as a being to, but was not placed in, the category of planets. The recency of Venus is suggested; also, one may surmise that the order of the planets and gods has been overlooked because observers, believing Venus to be a primordial planet, would not notice this coincidence. Thus several simple facts can lend their weight to our theory.

Another example occurs from ordinary psychology. Obsessiveness (and compulsiveness associated with it) is a common behavior. In the history of religion (and what is not associated with religion in earlier times?), obsessive-compulsive behavior is the main trunk of the human mind. Furthermore, this obsessiveness pursues a direct line of extraterrestrial concerns, such as we have incorporated into this book and elsewhere (de

Grazia, 1981, 1983b, 1983c, 1983d). Yet many scientists and experts, in putting aside their own subjectivities so as to pursue objective, value-free truths, put aside the subjectivities of their patients (the myth-makers and myth-preservers ) and discuss the infinitely varied product of the mythic mind as if it were bubbling up randomly and without reference to objective reality.

Human obsessive-compulsive behavior has causes; it differs from the compulsive instinctive reactions of animals; yet it does not come from a mental *tabula rasa*. It is both logically and psychologically proper to descend the trunk of the human mind in search of those causes until one finds at its roots events adequate to have brought about a heavy dedication of mind and culture to them. Insistent rites, pronunciamentos, testimony, and affirmations demand the recognition of these events as the peculiar causes of compulsions. We think it more plausible than man was watching a sky model and emulating it than that, say, a hominid, who mumbled words and killed his kind, should become casually interested in the sky and use celestial imagery to describe his behavior.

### *The Humanist-Scientist Divorce*

In the absence of a field with its special jurists, and of a guiding methodology, the often-decried misunderstanding between the sciences and the humanities is sure to come to the fore. There is no barrier to the negatively conditioned response of physicists to the humanities and of the humanists to the claims of physics (1984d).

An historian of science, Livio Stecchini (1978, p117) has written appropriately:

> Most readers of science, except for the very top layer, reveal themselves as being naive realists without any knowledge of scientific epistemology. An expression of this is that some of them declared that Velikovsky's earlier activity in neurology and psychiatry disqualifies him from discussing question of cosmology. However, it was just from an interest in neurology and psychiatry that Kant moved in his investigation of the phenomenology of space and time, which is the foundation of non-Euclidian geometry and Einsteinian physics....

Snow, Polanyi, Barzun, Conant and others have taken their turns at deploring the misunderstanding. Curricula are reformed to correct it. Yet in continues unabated.

The negative conditioning separating these large groupings of savants grows out of a tendency, in the first place, to define one's field in terms of one's special interests, these not necessarily constituting the general interests of the field. A common pattern of individual behavior in both groups is to proceed by an ever-narrowing path towards the proof of a special theory; any cracking of the frame of the theory will being a heavy cost of retracing the path and finding another or a broader way. Hence even an extended approach within the field is not to be countenanced. Only under optimal and rare conditions, too, does a modern discipline possess clearly defined goals, consequently, intra-disciplinary frustrations are common, as paths without ends are pursued, whereupon, in a typical response to frustrations, scientists will reproach out-side fields for the faults that they dare not denounce in their own fields.

Inasmuch as internal confusion is a rather general state of affairs in a field of knowledge, it is ordinary for scientists, seeking an opinion upon a matter where an outside field intrudes upon their own, to seek out authorities in the intruding field to obtain opinions concerning the intrusion. However, the very fact that they are challenged in their own field by someone in another field suggests that this person is a maverick from the other, and increases the likelihood that, when they approach the authorities in his home field, they will receive an unfavorable account of the maverick. For instance, authorities in mythology regard legends as expressive of a culture and of some historical value; but they exercise the same control over legendary testimony as do their counterparts in geology and astronomy over the evidence of these latter fields. Hence, it is not especially useful to inquire of them concerning events that not only they themselves deem improbable, but also which they themselves have already heard from geological and astronomical authorities to be impossible. So the vicious circle is set up.

This happens even with "depth" psychology. Jung ends with mental archetypes, Freud with the oedipal complex. These are myths, scientific myths to be sure insofar as they are objective in their formulations, which advance evidence, but such myths are

as far from reality as the creation myths of the tribes of Borneo, not to mention those of the Bible. Conversely, should archaeologists or mythologist have the temerity to ask astronomers whether the Moon could be young or geologists whether a great land might be inundated, they can be fairly sure of a negative answer.

We stress that on many facts and principles of cosmogony one has to be especially careful of what authority to interrogate. All fields of scientific study employ fictions -- abstractions, concepts, metaphors, models, and probabilities. All fields of study have private languages, which, useful as they may be to insiders, tend to persuade outsiders of a grasp of reality that may be quite weak.

With such conditions prevailing in the field of cosmogony, a method is proper whose premises and goals are clear, whose terms are defined, which offers proof from the "best" evidence available, and whose propositions fairly reflect and summate all "good" evidence from whatsoever quarter or, lacking means to formulate all of it, admits the exclusions and justifies them on methodological grounds.

The method may be called a "model" when the integration of hypotheses is such as to enable the behavior of a part to be predicted from the behavior of the whole and vice versa, "missing parts" to be deduced from described parts, and the whole to operate as an intelligible system through time.

In sum, the procedures demanded by scientific method are clear and accessible, but misunderstandings among the sciences are psychologically and materially indulged. In cosmogony, the situation is grave regarding clarity and accessibility of materials, as well as in psychological and material inducements to discord.

### *Physics and Legends*

Usually "misunderstanding" between "humanists and scientists" is especially heated on current topics such as euthanasia, crime, nuclear disarmament, vulgarization, and the like; yet nowhere is the malice of natural science towards the humanities so readily vented as when legends are taken seriously. At the risk of

controversy , we must nevertheless stress some congruencies between natural science and mythology.

Initially we may compare the structures of legend and science. Any topic of legend can be a topic of science, and vice versa. A legend is an observation or a set of them; so is science. Legend states its observations in human language, rich in metaphor, and carries them orally from one generation to the next and, later, in writing; science seeks non-metaphoric, denotative and quantitative language, and records its observations in information storage and retrieval systems, Legend seeks to retain the functions of moral teaching (“should” and “ought” are persuasive, while “must” is a punitive “should”); science seems to limit itself to precise descriptions and observable relations among events. Legends refer to anthropomorphized sources; science to abstracted forces; both refer, overtly and covertly, to paradigms and ideologies.

Legends are trifled with and tampered with in pleasant times when amnesia overlies historical memories and optimistic wishes can be indulged. In disaster, legends become more important and, under heavy pressures, change significantly . Science changes under the guidance of rules of evidence, the raising of unconscious factors to awareness, and the forging of more and more links in causal chains. Also, science changes by responding to heavy political pressure (Grinnell, pp131ff).

The motives behind legends are moral teachings (religious control), and the achieving of a tolerable level of amnesia, involving fun, fantasy and aesthetics, all of which are the more obvious forms that sublimation takes. Although these motives occur in science as well, and science itself is a form of sublimation, science is anxious lest they vulgarize, popularize, distort, and divert its work.

We permit ourselves here, by way of illustration, to speculate and generalize upon an as yet undeveloped series of observations: a systematic study of the oldest nursery rhymes will ultimately discover that every one of these “little classics” (“Chicken Licken”, “Hey, diddle, diddle”, “Sing a Song of Sixpence”, “Ring around the Rosie," etc.) is based upon some historical drama or catastrophe. It will help those scientists and humanists who tend to be snobbish, puritanical or majestic about

their material and scornful of the concerns of mythologists with "silliness and superstitions" to reflect upon how much of natural science has come out of amusement, as when early electrical science generated advances from shocking kisses (Heilbron, p236). Myth, science and amusement alike play games with trivia, but the grave cosmos is always unconsciously in mind.

Finally, neither in legend nor in science can the observer have escaped wholly the grip of the ambiance of observations: the observer is part of the observations. The various relativity theories, ancient and recent, make much of this fact. All in all, legend-making and science-making are not foreign to each other but have much in common. Each has its own good reasons for refusing marriage while maintaining liaisons.

Recently, some scientists have named a conjunction of electro-gravitational influences causing natural disorders on Earth the "Jupiter Effect" (see Goodsavage, pp144-56). They seem to be able, on good evidence, to demonstrate that Jupiter is not isolated, but has certain fearsome transactional capabilities, which may be exercised upon occasion. An astrologer would say that he has known this all along. Most ancients were obsessed with many "Jupiter effects". We say that these astrological fossils go back to real Jupiter effects that were incomparably stronger than the ones occasioning the present excitement. The ancients, seeking to control the effects, sought to control human behavior aimed at propitiating Jupiter, "lest you die". Our contemporaries do the same, suggesting more pragmatic (effective) means of protecting sectors prone to earthquakes and tidal waves (Gribbin and Plagemann, pp132-48).

We would say that the legendary sources are cognizant of grave past effects, and had little new evidence and less control over expected effects. The astrologers inherited confused observations of the past, which further confused them, and could prove no new evidence because they were helpless and incompetent. Our contemporaries possess but disbelieve ancient observations, and also some new evidence of recent times that may have practical value and may lead to a systematic review of ancient celestial behavior. Ancient accounts become simply another source of observations.

The Phaeton legend has been recited to young and old alike for thousands of years: Phaeton, son of Sun, incompetently drives his father's chariot too near to and too far from the Earth, causing great fires and frost. The correspondences between this flight and a cometary encounter are so numerous that many scholars are convinced of Phaeton's historicity, that is, that a comet cut a destructive swath across the tottering globe around the middle of the second millennium before Christ. As Kugler showed, material of scientific value is obtainable from the careful analysis of the legendary stuff on Phaeton (and his namesakes in other myths).

There is adequate reason why the ancient "Jupiter effects" such as cosmic thunderbolts, the Phaeton legends, the natural events reported in Exodus, the Cosmic Egg mythology, the phenomenon of the *Deus Otiosus*, and the divergent "non-astronomical" sacred calendars of the Meso-Americans, Egyptians, and others - to mention only several proto-scientific or disguisedly scientific reports - should be given ordinary treatment, in an integrated manner, in histories of science and textbooks of astronomy, earth sciences, paleontology, and human behavior, including anthropology, prehistory and ancient history. It is perhaps obvious, also, that the ancient accounts of quantavolutionary events find all mankind in the same situations, building related cultures, seeing them destroyed, and recreating them. Once scientists decide to reach back to natural events and primordial human cultures with the hypothesis of Solaria Binaria, they will discover a most inspiring ecumenicalism for our most threatening of times.

# TECHNICAL NOTE B

## *On Cosmic Electrical Charges*

In this work we forgo the concept of opposite charges, which has been in general use since Benjamin Franklin established it. Thus, we revert to a position being argued by other early electricians, who saw no need to introduce "plus" and "minus" charges (Heilbron, pp431-38, p481). The one-charge idea suits our concept that the Universe possesses a net electrical charge and that all star systems can be represented by cavities which are deficient in that charge. Where the word "negative" occurs in this work it means only the electron and does not imply the existence of an opposing or second type of charge.

For a time we, like others before us, considered the solar charge to be of positive sign, because of the gradual acceleration of the proton wind as it moves away from the Sun. However, this same phenomenon can be viewed as a flow of ions towards a surrounding region of negative electrical charge.

Insofar as solar wind electrons have, if any, only trivial anisotropy in their motion and since detected cosmic-ray ions - which Juergens (1972) has described as the spent wind from the most luminous stars - outnumber cosmic-ray electrons by at least two orders of magnitude, it is logical to conclude that within the region of the Sun most electrons are occupied with sustaining the transaction tending to eliminate the solar cavity. These electrons are *not free*: they form a => *transactive matrix* enveloping the Solar System.

Cells, and maybe even whole biological organisms, are surrounded by charged "skins" or "sheaths" (*Ency. Brit*., 1974, *Macro.*, vol. 3, pp. 1045 ff.) Their interiors are even more charged than their perimeters, which indicates to us that these biological entities are electron collectors. This, we argue, also applies to the operation of the Sun.

Atoms may be considered in the same way. The atom has long been known to be characterized by electric transactions forming both the inter-atomic linkages (which create molecules of many

kinds) and the inter-atomic coupling, which defines the "electron-shells" of the atom and may even delineate the chemical elements themselves.

The atom is modeled here as a plenum of charge enveloping a nucleus, which we regard as a massive, dense, compact electrical cavity. Like the cell, the atom exposes to the world a negatively charged perimeter. We therefore chose in this work to avoid speaking of negative and positive ions (say, for example, electrons and protons) being produced when an electron is removed from an atom. Rather we speak of electrons and electron-deficient atoms.

This rhetoric then allows us to describe net charges on bodies that are "negative" (as with the Galaxy, the Sun and the cell) without specifying the sign of the charge. When we refer to ions in this work, we always mean electron-rich atom or molecule. It is noteworthy that atoms are almost always detected and measured when their electrons undergo some form of transition that defines the energy levels and reactions of the atoms. Electrons seem to be the monetary currency of the Universe; stars, cells, and atoms transact and transform to obtain them.

It seems to us that the Solar System's development from creative-nova into binary, through the destructive nova which freed the planets and in the subsequent rearrangement and destructive encounters, is also a story of electron exchanges on the grandest of scales.

The elementary principle governing Solar System behavior is that planets act to accumulate electrons from their surroundings, but in reality they are forced, by the Sun and by their orbital motion, into that space where the electron supply is least capable of yielding electrons to them [116]. Planets are also constrained by their electric charges to avoid other planets to the maximum extent. In terms of conventional gravitational models this latter behavior has been described as least-attraction interaction; we see it simply as mutual repulsion between bodies of similar charge density.

Further, planets maximize their capture of the locally precious electrons by developing an electrosphere about their solid surfaces. Atmospheric layers, when present, are within the transac-

tive junction between the planet and its electrosphere. The current flow across the lowest 20 kilometers of Earth's atmosphere is evidence of such a junction. At the outer perimeter of the electrosphere, the "magneto-pause" and "shock front" mark the transactive layer through which the Earth attempts to absorb interplanetary electrons and to exclude solar wind ions. The junction is not always successful: cosmic ray ions regularly break into the Earth's domain, as do bursts of energetic ions generated by solar flares. These ions make the Earth's task Sisyphean: it accretes electrons only to be forced also to take in electron-deficient ions that are hungry as well for the electrons.

An examination of the electrospheres present in the Solar System [117] reveals a "shielding" that protects the charged planets, for they are immersed in a flow of plasma, which must remain close to charge-neutrality. In the plasma, the local differences between electron and ion densities is small, as it is in a metallic conductor through which an electric current flows. Hence in some proportional fashion the small quantity of incident electrons from the Galaxy are distributed to all of the bodies within the cavity by way of the nearly "neutral" plasma. But, in the main, electron accumulation is accomplished by the ejection of ions into the interplanetary plasma from the solar and planetary electrospheres.

By launching ions towards the periphery of the cavity, where electrons are still available, the Sun gains galactic electrons; by contributing to the ion flow the planets gain an appropriate number too. Protons are observed flowing into the solar wind from the electrosphere of the Earth and Jupiter. This outward flow perplexes those analysts who assume electrically neutral planetary environments. Yet it need not, for it can be understood as the only effective method of accumulating electrons within an electron-poor cavity. The planet "disguises" its charge level by surrounding itself at great distances with an increasing proportion of ions to electrons. In this way, so to speak, the planet can defend itself in a system where the central Sun voraciously devours any available electrons and jettisons ions onto any reachable electron-sink. The planets, like flotsam, deal with the solar jetsam. Thereupon, the view from each planet is through an electrical fog [118].

The methodological problem posed in describing quantitatively an electrified cosmos is an experimental problem common to all systems where the instrument disturbs the measured systems. The dilemma cannot be resolved simply by recognizing that the instrument and that which is measured are rendered indistinguishable. We can scarcely imagine how to go about measuring the actual complex of charge-levels existing within the planetary spheres. The problem of determining the charge on a cosmic body resembles the long-established problem of determining how we can feel at rest on the Earth whilst hurtling at fantastic speeds on the globe, in orbit, through the Galaxy, and in the Universe [119]. Should electrical charge prove to be at one and the same time the fundamental element in the Universe and unmeasurable, then we may have to hammer one more nail into the coffin of deterministic physics.

For the first time we are confronting processes occurring at the interactive junctions between large bodies. The very size of the transactions permits humans to observe them broadly, and even to fly among them. (On the microbiological cell level the membrane problem is equally important and complex and there is hampered by technical problems of observation.) Still, the definition of perspectives is difficult in the cosmic sphere, and this is in turn the result of confusing the identities of the actors and the sets. Given the electron and electron-deficient atom as the principal actors, and the scenery of electrospheres, plena and sheaths, the cosmic drama can begin to unfold understandably.

**Notes on Technical Note B**

116 Here again, as with stars (as noted earlier in Chapter Three), it is apparent that space itself is the primary determinant of behavior. The stars, planets, and other material in the space compete for the contents of space. These contents not only seem to be atoms and electrons but also a spatial infra-charge, which is not normally available to the body in the space, but whose presence governs all transactions which can occur.

117 Conventional descriptions of the planetary exospheres describe their electrical properties only as adjuncts to their magnetic properties hence they are there called magnetosphere. Here we consider their magnetic properties secondary manifestations of the fundamental electrified state (see Chapter Thirteen).

118 The screening of the planets from the Sun resembles the "view" that the valence electron has in, say, a sodium atom; it does not "see" the full nuclear charge because it is screened by the shells of the intervening electrons.

119 The Earth's equatorial velocity due to rotation is 0.46 km/s, in orbit Earth travels 30 km/s, the Sun moves through the Galaxy at 19 km/s and orbits the galactic center at about 275km/s. The galaxy itself may be traversing the universe at speeds near 540 km/s. Only the first two motions are known with confidence.

# TECHNICAL NOTE C

## *On Gravitating Electrified Bodies*

In this work we conceptualize "gravitational fields" as an effect of electrical forces acting between charged bodies moving within a charged cosmos (Milton, 1980/81): two bodies respond and move to maintain the greatest separation. In the co-planar orbits of today's Solar System this electrical repulsion among the planets is deemed by us to manifest itself in the Titius-Bode law of commensurable planet periods (e.g. five Jupiter orbits in approximately [120] the same time as two Saturn orbits). Until now the "law" has been an unexplainable observation.

In an electric "gravity" system a tangential inertia [121] is coupled to a radial electrical force whose nature depends upon the electrical state of the bodies orbiting. The electric force can vary between strongly repulsive in close encounter to strongly attractive when electrical flow joins the two bodies (see Table 5 and Figure 38). When the bodies are widely separated and relatively insulated, as are the planets now, the electric trans-action among them is repulsive, but is opposed by the surrounding cosmic charge trying to fill the electron-deficient cavity, which is the Solar System; the two repulsions nearly cancel out, leading to the illusion that something called gravity produces a very weak attraction between the Sun and a planet or between a planet and its satellite(s).

The fact that gravitation, the Great Mother Goddess of physics, has never been found sensibly to exist has nurtured a mild scandal in science for three centuries. After manipulating logically the relevant parameters (the separation of planets from the Sun and their motions in orbit) Isaac Newton concluded that the gravitational force acted everywhere in the same way: it was a universal force (Westfall). That his conclusion was erroneous is becoming apparent. New gravity models incorporate the notion that the strength of the gravitational force (relative to, say, the electrical force) weakens with time (Dirac; Jordan; Dicke, 1957, p356; Hoyle and Narlikar; Canuto *et al.*, p834).

If indeed the relative strength of the gravitational force declines with time, it means that the mechanical units customarily used to

describe celestial motions cannot be interchanged freely with the units employed in atomic physics. Also there is evidence that the gravitational constant varies between experiments (Heyl and Chrzanowski, p1, pp30-1; Long, 1974). The experiments can be interpreted as evidence that the gravitational constant of proportionality is a function of the spatial separation between the masses gravitating and, in some instances, even of the quantity of mass involved in the "attraction" [122]. If gravity is dependent upon time and locality, conclusions about the world based upon a universal force ruling over cosmic motions without intrinsic dependency become erroneous.

More specifically, the mass of a body becomes a function of how its mass is established. Its transactions become environmental rather than absolute. For example, if sex, age and occupation explain a person's consumer behavior, but elements of all are inextricably in all, the decision according to sex alone never occurs but always varies as a function of the other two factors. So here masses measured using transactions in the celestial realm need not be conformable with those determined by transactions between atoms.

Extrapolations between the cosmic and atomic spheres become meaningless. The bizarre quality of conclusions about recently observed cosmic processes has already spawned the question "Do we need a revolution in Astronomy?" (Clube). All of the dilemmas cited by Clube as confronting astronomers can be resolved in a universe where electric forces are conceived to dominate.

For a long time chemists who concern themselves with the mechanics of collisions between atoms (which are admittedly dominated by the forces between electric charges) have agreed that a collision between two atoms can be treated as a sequence of alternating attractive and repulsive actions (see Figure 37). At great distance the atoms mildly repel one another because their perimeters are sacs of negative charge (blurred electrons). Closer together, electron coupling produces the possibility of bonding and the atoms attract, but further inside, beyond the coupling range, the atoms again repel (this time very strongly). So it is with a "gravitational field", which is then really an electrical field.

The behavior of bodies orbiting in electric transaction differs from those experiencing the conceptually simpler, weak, attractive gravitational force caused only by their mass content. The way in which planets move was shown by Kepler to depend upon the magnitude of the semi-major axis of the orbit [123]. Later, when Newton quantified the "gravitational force" into a relation containing the quantity of matter in each body and the separation of the "gravitating" bodies, Kepler's Harmonic Law was modified to allow celestial systems to be massed (see ahead to Technical Note D).

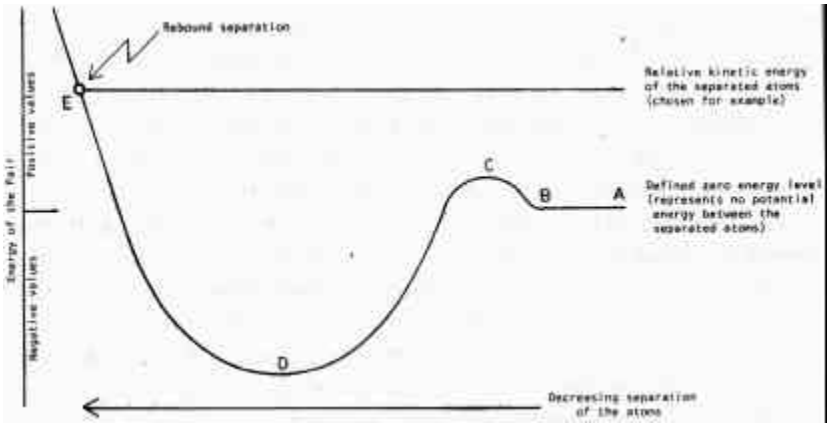


*Figure 37. Potential Energy Curve for the Collision of Two Atoms*

When two atoms collide, electrical force between them acts to alter the energy state of the system compared to the energy which the two atoms posses when they are greatly separated and at rest, the "zero" energy level. Usually two colliding atoms will have more energy than this "zero level"(some positive value). Their kinetic energy of approach determines the closeness the pair can attain in the collision. For a specific energy (the horizontal line drawn above and intersecting with the potential energy curve) the system of two colliding atoms has a surplus of energy represented by the vertical distance between the curves for any chosen distance between the atoms. Where the curves intersect they both represent the same energy; there is no surplus. As the atoms begin to collide, the approaching pair at first do not affect one another (from A to B), but as their electron clouds meet a slight electrical repulsion occurs (from B to C); then electron coupling, as in a chemical bond, produces an increasing attraction between the atoms (from C to D) until a critical separation is attained, when electron decoupling, described elsewhere as internuclear repulsion, begins and produces an increasing repulsion (from D to E) that finally overcomes the inertia (motion) of the pair and causes them to rebound (at E, where the electrical repulsion equals their inertia).

The law relates three variables: the period over which the complete orbit occurs, T*i* ; the average separation of the bodies form the Sun, a*i* ; and the total mass of the system of the Sun and the N - 1 orbiting planets, $\Sigma$ M*i*, where the summation is from *i* = 1...N. The Harmonic Law, expressed in mathematical terms, states that the square of the period equals the average separation cubed divided by the mass of the system :

$$T_i^{\,2} = 4\pi^2 a_i^{\,3} / [\, G \Sigma M_i \,]$$

where the summation in $\Sigma$ M*i*, is from *i* = 1...N, and the subscript *i* refers to the motion of the $i^{th}$ planet about the Sun. G is the proportionality factor applying to gravitating systems, and was first evaluated by Henry Cavendish (Shamos).

As traditionally perceived the causal mass terms are invariant hence the other parameters, the separation and period, must as well remain fixed. Given electrically caused orbits, the inter-body force depends upon the charge difference on the various bodies in the system. As indicated in our text, we believe that the bodies "gravitate" differently when great charge density differences exist within the system than when they do not (Figure 39).

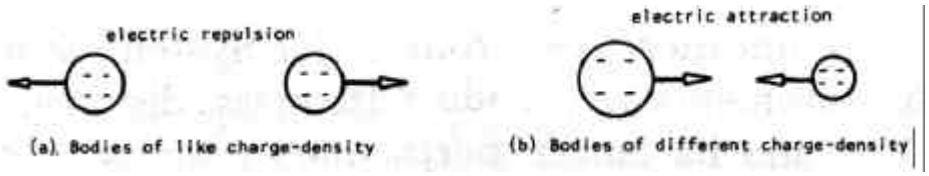


*Figure 38. Electric forces Between Celestial Bodies*

By analogy with the collision between two atoms, charged celestial bodies in collision, if governed by the action of electrical force, also exhibit various possible degrees of attraction and repulsion as they approach one another. In (a) two bodies of like charge and like charge-density experience electrical repulsion as they approach collision. In close encounter polarization of their atoms may redistribute their charges in such a way that some electrical attraction will occur during a part of their approach, but ultimately the two bodies will repel one another and rebound from the collision. In (b) two bodies of like charge but of unlike charge-density initially attract one another as they come together. Polarization may enhance this attraction at closer range and the possibility is great for an

electrical discharge between the two bodies as they pass. After the discharge(s) the colliding pair may attain the state of the bodies in (a) and the collision proceeds to closest approach, where the like charges repel the bodies into rebounding apart.

For example, in Solaria Binaria the Sun and Super Uranus never attained electrical equilibrium [124] throughout the lifetime of the binary; their electrical differences persisted, though diminishing with time. The inter-stellar arc was the Sun's attempt to recapture lost charge [125]. It represented an attractive force between the two stars. So long as their electrical natures remained attractive, the inter-star flow continued. If the two had attained equilibrium, that is, had Super Uranus charge-density declined to reach that of the Sun, the two would no longer have attracted one another electrically; their equal charge-densities then would have produced an electrical "neutrality" in an inertial state.

During the interval when the orbiting stars were seeking electrical equilibrium, the mass of the binary system, as measured using its period of revolution (by Kepler's Law) would have seemingly diminished. As the interval transaction that was accelerating the stars in relation to one another declined, the binary would appear to lose angular momentum. In part this "loss of energy" would be an artifact of the measuring theory; what really was occurring would be a recession of the principals to conserve and gain charge; but a dispersal of charge into the plenum would be occurring as well, causing the plenum to expand and hence the calculated mass of each transacting body to decline.

Taking another example from the Solar System, Jupiter's angular momentum (the product of its mass, distance from the Sun, and its tangential (perpendicular) velocity in orbit) is $2.03 \times 10^{43}$ (mks units). If it were orbiting at the Earth's distance from the Sun but with this same angular momentum, Jupiter would move at 68 kilometers per second, two and one quarter times faster than the Earth's orbital velocity of 30 km/s. The Jupiter year would be a little longer than 161 Earth-days. The Sun's "mass" required to hold Jupiter, so moving at this closer distance, would have to be five times its present value ! If Jupiter were more closely positioned than above, its year would be even shorter, and the Sun's mass would seem even greater.

The Story of Solaria Binaria recounts the consequences of the ongoing enhancement of the Sun's charge resulting in the continuously growing repulsion of the planets to regions farther from the solar surface. Analyzed in mechanical terms this repulsion has been reported as a weakened gravitational force over time, it could equally have been as a decline in the Sun's mass (its gravitational ability).

Orbits changing under varying electrical transaction behave differently than the conventional view of very slowly evolving gravitational orbital elements. The objects are drawn together or forced apart by changing radial forces. Literally, an object like Venus, born from Jupiter in a charge-deficient condition, spirals inward, driven radially by electrical force and increasing its tangential velocity in sustaining its angular momentum. It is no "lucky billiard shot" that Venus encountered all planets inferior to its initial position near Jupiter. Following an initial diminishing spiral path generally close to the same plane as the other planetary orbits, Venus could not avoid close (i.e., effective) encounter with each body it passed en route to its present orbit. The events described in this book are the recorded, recollected and inferred consequences of many planetary encounters both before and after the excursion of Venus made famous in our time by Immanuel Velikovsky.

**Notes on Technical Note C**

120 The divergence with theory may be attributable, not to "time of accommodation", but to the complex electrical fields in which the charged planets move.

121 "Inertia" is usually defined as the quantity of motion (momentum) within a body. It also can be considered as a measure of the difficulty in altering a body's motion (accelerating or decelerating it). For an orbiting body the motion is directed tangentially to the orbit while the force which changes the motion is directed radially.

122 The implication is that very close and very distant satellites may experience significantly different gravitational transactions with their primary; that is, the force need not remain exactly proportional to the inverse square of their distances as the => *Newtonian formulation* would have it. Since G can have somewhat different values for different separations, then the force function becomes more complex than Newton's Law can handle accurately. Another complexity arises if G also changes values as the amount of mass involved is altered. Such a variation would mean that a binary companion or a Jupiter sized mass would not orbit with a force simply proportional to the force keeping an asteroid or a tiny meteoroid in orbit.

123 Its average separation from the Sun.

124 At equilibrium no net change occurs in a system with the passage of time. Here, interbody electrical currents would cease to flow.

125 $3 \times 10^{22}$ coulombs might have been exchanged between them over one million years. This represents a transfer of $2 \times 10^{44}$ electrons and a tiny fraction of the mass which flowed between the stars through the plenum. Even with this electrical exchange, the charges moved are negligible compared to the number in a body like the Sun or Super Uranus. If the Sun were an electrically neutral body of mass $2 \times 10^{27}$ tons, the flow would represent an exchange of one electron per one hundred thousand million electrons present. A stellar body carrying net

charge, as these were, would be exchanging an even smaller portion of its charge.

# TECHNICAL NOTE D

## *On Binary Star Systems*

In the sample of the sixty nearest stars to the Earth we include the Sun. Accompanying seven of these stars is at least one dark unseen body. These unseen bodies are inferred because a wobble is detected in the peculiar motion of the star associated with the dark body (as in Figure 1). Including the unseen bodies as small stars we find sixty-seven stars grouped into forty-five systems. There are three triples, sixteen doubles, and twenty-six single stars. Sixty-one percent of these objects are thus components in a double or triple star system.

There are potentially many binaries in the Galaxy. Since faint companions are unlikely to be detected by any means, many of the binary systems which exist will not be recognized by observers.

In general, binaries fall into groups separable only by the technique used for their detection. Where the principals sufficiently separate they can be resolved by visual observation through a telescope: these are the visual binaries. When the principals are closer together spectroscopic detection is sometimes possible. For very close pairs eclipses are sometimes seen as the stars orbit one another. In some cases other phenomena are seen which show regular periodicity betraying the binary nature of the system. Discovery of this type has become increasingly frequent in recent years, greatly expanding the number of known binary systems.

Visual observation of the binary companion depends upon several factors: the proximity of the binary system to the Earth; a sufficient separation of the principals to allow resolution of their images by a telescope; and the occurrence of small differences in the luminosities of the principals, otherwise the view of the => *companion* will be obscured by the light of the => *primary.*

Tens of thousand of binary systems can be resolved by telescope into two separate stars. In about twelve percent of these visual binaries the orbital motion can be measured, but only a few satisfactory orbital analyses have been completed [126].

Where the orbit of the companion relative to the primary star can be measured, and where the distance to the principals can be measured, the physical separation of the pair is known. If the period of revolution of the binary is known, then, temporarily accepting Kepler's Harmonic Law, which is based upon Universal Gravitation as the only force binding the principals, the total mass of the binary system can be calculated (Chapter Three). This calculation based upon Kepler's Harmonic Law is the primary clue to the masses of all stars [127] (but see Chapter Two).

Allen (1963) tabulates the distribution of the stars against the calculated total "mass" of the binary system. For systems equal to or greater in mass than the Sun, only thirty-two percent of the stars are not members of double or multiple star systems. In those star systems of lesser "mass" the percentage of single stars rises dramatically [128]. For the mass range 0.5 to 0.25 Sun, eighty-five percent of the stars appear single. No star below 0.1 Sun seems to have a companion (*ibid*). This surely indicates that the ability to see companions near such poorly luminous stars is limited, if not nil.

For a typical visual binary one revolution of the companion about the primary takes a few decades. The orbits of the companions have dimensions comparable to the orbits of the major planets in the Solar System, but their shapes are much more elliptical than are the planetary orbits (see Figure 39). For a typical visual binary superposed on the Solar System the => *apastron* (near Neptune) is three times as distant as the => *periastron* (near Saturn).

The shorter the orbital period for revolution, the more circular the orbit of the companion. Systems which revolve in less than ten days have relative orbits whose shape resembles the orbits of the planets Mars and Saturn. Where the orbit is less than 100 days the orbit is less elliptical than the orbit of the planet Mercury. For orbits over 100 days distinctly elliptical orbits are noted and apastron is about twice as distant as periastron. These orbits are more elliptical than the orbit of the planet Pluto, where aphelion is sixty-seven per cent further than perihelion.

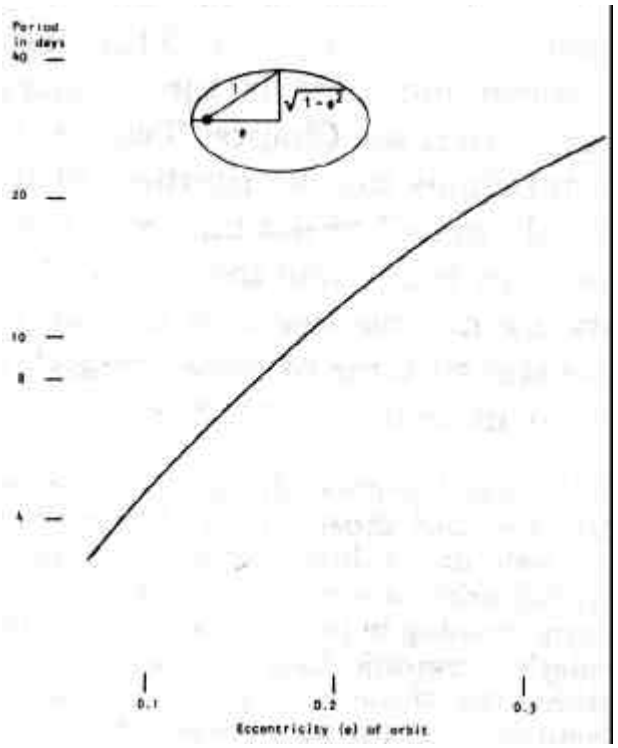


*Figure 39. Binary Orbits of Short Period*

Binary stars show a relationship between the shape of their relative orbit and their period of revolution in that orbit. For those pairs orbiting in times from a few days to a few weeks the orbits are found to be somewhat like the more elliptical planetary orbits found in the solar system. Elliptical orbits are described in terms of their difference from a circular orbit using a quantity called eccentricity. Eccentricities for closed orbits have values between 0 (a circle) and nearly 1 (which would be a parabola). The ellipse above the graph shows how the eccentricity is measured for a particular ellipse.

In some binary systems the separation of the components is too small to allow resolution in a telescope. Sometimes the detection of the binary still can be made because when the distance between the principals is small enough the stars move in orbit with high velocities. The binary can be observed because a Doppler shift occurs in the spectrum lines of the orbiting companion.

Spectroscopic detection favors binary systems in which the stars are highly luminous and especially where the orbiting star is

equal in brightness to, or brighter than, the more stationary primary. The orbital periods for spectroscopically detected binaries range from days to weeks. In such systems the orbital period is determined from the time taken for the spectrum lines to shift through one complete cycle; canceling the motion of the binary system itself, the spectrum of the companion shows a velocity of approach, then no velocity, a velocity of recession, no velocity, finally returning to a velocity of approach.

Nineteen percent of all bright stars show variable Doppler shift in their spectrum, implying a companion (usually unseen). Of these, forty-seven percent show double spectrum lines; the duplication arises because the motion of both of the principals is detected, indicating that the two stars are comparable in brightness.

Lastly, some binary systems are detected because the light received from the stars is seen to vary as the principals eclipse one another. The stars in these eclipsing binary systems usually revolve about one another in less than one month. If indeed these light variations are eclipses, the principals are very close together or, alternatively, at least one, and sometimes both, of the stars have a very large radius compared to the Sun. Orbits have been calculated for almost 100 eclipsing binaries.

About nine percent of the spectroscopic binaries are also eclipsing binaries. To have such a high percentage of eclipsing systems in the spectroscopic binary sample is surely an anomaly.

Eclipsing binaries include principals with the smallest separation; the close binary stars belong to this group. About sixty percent of eclipsing systems can be described as detached, which means that the light curves of the eclipse produced as one star obscures the other show that the principal bodies are roughly spherical in shape; the Algol star system falls into this group of eclipsing star systems.

The remaining eclipsing binaries are the semi-detached star systems. Here the surface of at least one of the principals is distorted into an ellipsoidal shape, and forms at the extreme a teardrop-shaped body “in contact” with the other star. The Beta Lyrae system is a semi-detached binary.

Though there is no physical distinction between all of the detached binary systems, that group transacts differently and less strongly than the remainder of the sample, all close binaries. These binary stars transact much more strongly because of the proximity of the two stars. The behavior of the close binaries can be characterized by its violence, in some examples episodic, in others sustained. Here the stars are in competition with the locally available energy supply and for the space with its infra-charge.

Of special interest are the so-called contact binaries, systems in which one of the stars has seemingly expanded so as to touch, or in some cases even to envelop the companion star within its tenuous atmosphere. Some contact binary systems appear to revolve about one another in a small fraction of one day.

Seldom do the close binaries resolve into two stars, nor do their spectra often show duplication. They are the binary systems with the greatest internal transaction. Many of them show gas flowing between the stars (Chapter Ten), some exhibit emission lines, in other one of the components, usually a dwarf star, erupts regularly (*ibid*). This eruptive behavior seems to be linked to the gas flow, which produces a hot spot on the recipient star, representing a cataclysmic extreme in activity of the type exhibited by the close binary group as a whole.

Systems containing the dwarf novae fall into a group which also resembles systems containing old novae and W Ursae Majoris binaries (Glasby, p146). All of the principals are underluminous. In contrast, many close binaries contain one “overly large” principal. The Wolf-Rayet stars are found paired with a smaller overluminous companion (Glasby, p143). Frequently, B-emission stars are members of close binary systems (Maraschi *et al.*). As early as 1938 Haffner and Heckmann proposed that in open star clusters, stars lying above the Main Sequence (overluminous stars) were members of binary systems. It seems that a property common to close binary systems is deviant luminosity of one or both principals. This may indicate the importance both of the transaction between the components in such systems, and of the competition of these stars for the contents of their surroundings. We maintain that these transactions are electrical.

In summary, the close binary stars feature one principal which is a degenerate object. At least one of the principals shows anomalous luminosity. Transactions within these systems produce various degrees of violent outburst: some flicker (Chapter Ten), all exchange material and, we believe, electric charge. These unusual characteristics of close binary systems appear to represent a competition for space and electrical charge; some scholars, perplexed by these same behaviors, have proposed that unimaginable concentrations of matter have been observed and are causing the observed violence. From the evidence presented in this book, it seems that Solaria Binaria quantavoluted through the gambit of close binary phenomena before its principals became detached and its binary nature became disguised. The electrified star system, simple in concept and understandable in its development, was the stage on which the pageant of mythology, pre-history, and written history begins to unfold as parts of the common cosmic voyage.

## Notes on Tecchnical Note D

126 Batten (1967) notes the great difference between the number of systems known to exist and those which have been studied. A highly special sample has well determined orbits, even fewer systems have known masses. Typical orbits are given in Allen.

127 We use the term massing in preference to weighing. An example of massing using Kepler's Harmonic Law; the satellite Triton is 353 megameters form Neptune: the Moon is 384 megameters from the Earth. If both Earth and Neptune had the same mass, the periods of revolution for Triton and Moon about their primaries would be about the same. They are not; the Moon takes 22.3 days to orbit while Triton orbits in 5.9 days. This leads astronomers to conclude that Neptune is 17 times the mass of Earth. Any transaction equal to 17 times the gravitational pull of *one Earth mass* on Triton would suffice to cause Triton's rapid orbiting of Neptune as observed. So with the stars: the more intensive the transaction between the principals, the more rapidly the pair will orbit about one another.

128 In systems which show no evidence of any periodic phenomenon, the star's mass has been inferred using theoretical considerations (see Chapter Three).

# TECHNICAL NOTE E

## *Solaria Binaria in Relation to CHAOS AND CREATION*

In 1981, one of us (Alfred de Grazia) published *Chaos and Creation*, which presented the model of Solaria Binaria as part of a general theory of quantavolution. During the last years of its writing, he discussed first with Ralph Juergens and then with Earl Milton the idea of a book on the subject, that would establish it upon firmer foundations and raise it to a new conceptual plane. Juergens' direct participation had hardly begun when he died; but his encouragement and his writings were inspiring to both of us and so we dedicate this book to him in gratitude and friendship.

While *Chaos and Creation* was going through the toils of publication, its author was well aware that he had only spoken the first words on the topic of Solaria Binaria, and that his books would need amendment as soon as a new book could be written. This is not an unusual phenomenon in rapidly developing areas of theory and research, and he is even pleased to constitute a case in point for the pragmatic view that science is never a final statement of truth, and to acknowledge the technical and theoretical superiority of the present work in regard to the model of Solaria Binaria.

Most prominently, our collaboration in the preparation and writing of this book has led to a purely electric theory of the Universe. *Chaos and Creation* still speaks of electro-gravitational forces, although it relegates gravitation largely to inertial phenomena and stresses the universal electrical energies that are generated and employed in cosmic encounters.

The electrical theory of *Solaria Binaria* further dispenses with two-sign charges, designating only the electron as the independent variable of electricity, and describing relevant natural events by the extent to which they are electron-deficient or electron-rich. We rely exclusively upon electrical charges to motivate transactions within the cosmic realm.

We present our propositions, principles and evidence without resort to the concept of gravitation. This is the first work to present a history and dynamics of the Solar System in an entirely electrical form. It offers the first electrical cosmogony.

Looking specifically to *Chaos and Creation*, there de Grazia states how the electrical manifestations declined because, he claimed, the Sun's charge has "always" been diminishing as the galactic input declined. While the galactic transaction was indeed declining and will ever continue to decline (because the Sun's cavity is filling up) the solar charge has increased steadily. But time has evened out the charge distribution within the cavity as well. And so intra-cavity electrical transfers are much less frequent and are of much lower intensity today than ever before. So de Grazia was right in that "electricity" has declined, but not because the solar charge has diminished as he once claimed.

Later, de Grazia described how Super Uranus met its end, using electrically induced rotation to produce mechanical rupture of the star. Here we describe the same process in terms of an electrical instability in Super Uranus' outer layers. Both processes eject debris into the magnetic tube; both would produce sudden fission; but electrical instability would be more easily produced and could focus its effect towards the Sun and the other planets, giving both the recession of the old star and injection of the new partner into the binary position in line with the ancient string of planetary beads lying along the electrical axis.

Again de Grazia talks about differences between electrical and gravitational systems. There, he notes that electrical differences are quickly erased (non-conservative behavior) while gravitational properties exist. In the strictest formal sense, as used in Physics, both fields (electrical and gravitational) are conservative. The strong electrical field in an excited state can relax itself quickly (by emitting electromagnetic radiation as in the atom) while the weak gravitational field cannot. Translated into phenomena, the overt electrical properties of the system would be the first to disappear, supporting the illusion of a non-conservative electrical presence as claimed in *Chaos and Creation*.

Finally, in *Chaos and Creation*, after the explosive extraction of the Moon's material from the Earth, its phases inciting the early humans to a period of lunar worship (*circa* 11 500 to 8 000 years ago). To conclude that the Moon immediately orbited about the nearby Earth (its motion being somewhat disturbed by the Sun's gravity as it is today) is necessary when the driving force for the orbit arises mechanically or by some mechanical-electrical mix. But in the purely electrical field that we employ here, the Moon can remain suspended in the Earth's sky as we propose. The question of why humans worshipped the early Moon does not depend upon the Moon's motion in that era: its size, its prominence, and its observed birth and subsequent assembly before man's eyes provide sufficient motivation for worship.

The time span of *Solaria Binaria*, unlike that of *Chaos and Creation*, includes the whole of the geological, atmospheric and biological development of the Solar System. The authors feel that, although they may have drawn liberally upon *Chaos and Creation*, they have introduced so many novel concepts and solved so many hitherto unrecognized cosmological problems in the present writing, that this book appears as a complete and independent treatise on cosmogony, which, whether or not *Chaos and Creation* is well known to the reader, can be comprehended in its entirety, from beginning to end. In addition, we have introduced a number of formal, stylistic, structural, and mathematical innovations that make the present book, despite the passage of only several years, the work of a new generation in the theory of quantavolution.

# ABBREVIATIONS USED IN THE BIBILIOGRAPHY AND GLOSSARY

| | |
|---|---|
| abr. | abridgment |
| Ap. | appendix |
| art. | article |
| bk. | book |
| cf. | compare |
| Ch. | chapter |
| col. | column |
| ed(s) | editions(s), editor(s) |
| Eng. | English |
| esp. | especially |
| *et al.* | and others |
| f.,ff. | and the following pages(s) |
| Fig. | figure |
| fn. | footnote |
| l. | line |
| loc. cit | in the same place |
| o. | omnindex |
| orig. | originally |
| partic. | particularly |

| | |
|---|---|
| pl. | plate |
| pt. | part |
| priv. | privately |
| publ. | published |
| q.v. | see |
| repr. | reprinted |
| rev. | revised |
| [sic] | thus, indicating an irregularity in this items |
| sci. | science, scientific |
| Sp. | Spring |
| Su. | Summer |
| tr. | translated, translator |
| unpubl. | unpublished |
| v., vols. | volume(s) |

# GLOSSARY

*Glossary especially designed for Solaria Binaria, but look up these same words and many other terms of the book at the front of the CD, in the suggested index list, or simply by employing the search engine, from anywhere on the CD.*

*aeon*
is usually an indefinitely long time, here to designate the order of the conventional age of the planetary system, a billion (or thousand million) years. Also equivalent to gigayear.

*afterglow*
in a molecular gas, is produced by a pulsed electric discharge through pure nitrogen. The afterglow has been observed to persist to the darkness-adapted eye for several hours (Strutt); it is strongly visible for minutes (Ruark et al.). Other common gases produce weaker, shorter-lived afterglows.

*Age of Jovea*
is the period following the Deluge (about 5700 BP) to the time of Mercury's encounter with the Earth circa 4400 years ago.

*Age of Saturn*
brackets the period eight thousand to fifty-eight hundred years before present.

*Age of Urania*
is the first age of the Quantavolutionary Period, assigned to run from 14000 to 11000 years ago. Also called the Uranian age.

*albedo*
is the fraction of light reflected from a cosmic body.

*anode*
is an electron-deficient region in an electric discharge. It is the place towards which electron flow occurs, and can be the

source of an ion (q.v.) current - the ions being electron-deficient atoms.

*apastron*

means the greatest separation of the principals (q.v.) in a binary. It is a homologue of apogee for an Earth satellite, and aphelion for a planet. The term apocentron is used elsewhere in place of apastron to describe the farthest point on an orbit.

*arc-second*

is the smallest unit of angular measurement using the scale where the circle is divided into 360 degrees. The degree has 60 arc-minutes. Each minute consists of 60 arc-seconds.

*astronomical unit (AU)*

is the present value of the Earth-Sun distance. It is equal to 149.6 gigametres (149.6 million kilometres).

*barads*

is a biblical term which can be interpreted as the fall of meteorites from the heavens. The Seventh Plague of Egypt. Stones such as are found in great fields on the Arabian desert. *See* Sieff.

*cataclysm*

is a sudden dense material deluge from the atmosphere altering biosphere and/or lithosphere.
*see*, quantavolution

*catastrophe*

is a sudden large-scale, extremely harmful event; the word probably originated from two Greek roots meaning a “falling star” but came to have assigned to it two different roots, meaning “down-turning” and applied to the denouement of a Greek tragedy.

*cathode*

in an electric discharge is the source of electrons for the conduction process. The cathode usually will be the most electron-rich region.

*Celsius (degree)*

is the unit of temperature using the scale of 100 degrees between the freezing and boiling points of water at one atmosphere, air-pressure. It was formerly called the Centigrade degree. One Celsius degree is 9/5 of the Farenheit degree still used in both the United States and Great Britain in 1982.

*Central Fire*
also, *axis*, electrical

*charge* (electrical), *see* electric charge

*chromosphere*
the gases of the solar chromosphere appear to be hotter than the photospheric gases which lie below them. In the chromospheric region temperature rises abruptly by several tens of thousands of degrees Kelvin. Similar temperature increases have been detected across the chromosphere of other stars (Wright, p.124). This layer of solar atmosphere can be viewed as an electric double layer between the plasmas of the solar photosphere and the corona.

close binaries, *see* binaries

commensurabilities, *see* mutual repulsion

*companion*
in a binary system is a body which revolves about the major component (q.v. principal) in the system: the orbiter; as the Earth about the much larger Sun.

corona, *see* solar corona

*cosmic pressure*
on the theory that the Universe is pervaded by a continuum of electric charges, the notion arises that where charge-deficient cavities (stars) exist within the Universe a pressure results driving material within the cavity into one or more aggregations (stars, planets, etc.). The materials within these bodies are confined by cosmic pressure.

*cosmic rays*
: are highly energetic electron-deficient atoms (mainly protons) which impinge equally upon the Earth from all directions. The average cosmic ray has an energy of 7 GeV. Cosmic ray electrons exist but they are only one hundredth as abundant as the protons (Hillas. pp. 67-9). The sky "shines" as brightly with cosmic rays as it does with starlight (Watson). The most energetic cosmic rays have an energy at least 100 billion times the average. Such cosmic rays are very rare.

crater, *see* astrobleme

*Curie Temperature*
: (after Pierre Curie) is that temperature at which magnetic materials undergo a sharp change in their magnetic properties. Remnant magnetism appears in rock below this temperature and is erased if the rock is heated above it.

*Demiurge*
: refers to a grand original intelligence who acted to produce the real world, as described in cosmogonies of early peoples and philosophers.

*deuteron*
: is the nucleus of a heavy hydrogen atom. Fusion of two deuterons is one step in the thermonuclear fusion of hydrogen.

*double layer* (electric)
: is the juxtaposition of an electric sheath containing an excess of electrons upon an electric sheath which is electron-deficient. Such a double layer is formed whenever two plasmas of differing electric charge densities meet, for example, between the Sun's photosphere and its corona and between the solar wind and the Earth's plasmasphere. The former double layer forms the solar chromosphere, the latter the Earth's magnetosphere and bow wave.

*double star*
: is a synonym for binary star.

early-type stars

are those which, using conventional star-evolution-theory sequences, must be younger. Herein, using Bruce's scheme, these are the post-nova stars. They are in our system also high transaction stars.

*electric neutrality*

as used in this work is a local rather than an absolute condition. The existence of a measurable transaction between local bodies (like the Sun and the Earth) indicate there is not neutrality within the locality. If *the galactic neutral* is one too many electrons per million atoms, while in the Solar System there is one too many electrons per ten million atoms, then a current will tend to flow between the Sun and the Galaxy in order to make the Sun *neutral.*

*electrophoresis*

is the motion of particles (of atomic or larger size) under the influence of an electric field. This motion implies that the particles bear an electric charge.

eon, *see* aeon

epoch, *see* time

*evolved-star*

is one which does not obey Eddington's Mass-Luminosity law. Stars in close binary systems are usually of this type, indicative in our view of an intensive electric transaction between the principals in such binary systems.

*faculae*

are irregularly shaped unusually bright patches above the solar disc generally associated with sun spots. They are active regions in the photosphere and have their equivalent higher in the atmosphere as chromospheric plages and coronal condensations. (Chromospheric calcium plages are sometimes called flocculi.)

force, electrical, *see* electrical force

*fossil assemblages*
: are aggregates of fossils uncovered at a single location. They often exhibit ecological unconformity.

galactic neutral, *see* electric neutrality

*giga(metre)*
: The prefix giga is used to designate thousands of millions; called billions in the United States but not in Great Britain where billion refers to one million million (or $10^{12}$). One gigametre is one million kilometres.

*granule*
: on the solar photosphere about two and one half million granules exist at any moment. The average granule is 1000 kilometres across; it survives from five to ten minutes. Granules are about 100 K hotter than their surroundings. They show a turbulent motion of about 2 kilometres per second, like a bubble in a porridge pot (Abell, p. 526).

*Hertzsprung-Russell (HR) diagram*
: is a two-dimensional field of stars where luminosity (total radiation emitted) is the ordinate (dependent variable) and color (surface temperature) is the abscissa (determinant variable). This diagram is used extensively in astronomy to infer properties of stars whose distance makes direct measurement difficult or impossible. In terms of the HR diagram, evolved stars are either overluminous or underluminous for their color, that is, they are above or below the main sequence (q.v.) of the stars.

*insolation*
: is the solar energy received at the Earth's surface. Only a fraction of the insolation is absorbed, some of it reflects into space.

*ion*
: is here an atom from which one or more electrons typically present has been removed.
*see* also, electron-deficient atoms.

*ionosphere*
: is a layer of ionized atmosphere beginning at an altitude of 56 to 90 kilometers above the Earth's surface. This layer is electrically conductive. Its altitude and density varies over the day. In theory there is no upper limit to the ionosphere, yet detection of its upper layers is accomplished only infrequently.

*irradiance*
: is the radiant flux incident upon a unit area of a surface. For sunlight it is the number of watts received per square metre of the Earth's surface.

Jovean Age, *see* Age of Jovea

*Kelvin*
: is the unit of temperature using the scale zeroed at absolute zero. It is the lowest conceivable temperature. The Kelvin unit is identical to the Celsius degree. The freezing point of water is 273.15 K(elvin).

*Lagrangian point*
: in a three-body system the orbits can be computed if one of three bodies is negligibly tiny - in such a case the motion of the minuscule third body does not disturb the two primary bodies. Lagrange showed that for such a "restricted system of three bodies" there existed several points, co-rotating with the motion of the primary pair, where the third body could be trapped. The L1 point is one of these points; it lies between the two primary bodies.

least interaction action (sometimes, least action interaction), *see* mutual repulsion

*light-year*
: is a unit of distance. It represents approximately $10^{16}$ metres, the distance light travels (in theory) through a vacuum in one year ($3.16 \times 10^7$ seconds).

*luminosity*
: of a star depends upon the area of the star's surface (opaque radiating layer of gases) and upon the fourth power of its surface temperature. The luminosity of a star is a measure of

its energy output, it can be known directly, as opposed to inferred, only if the star's distance can be measured.

*magnetite*

is a black to brownish metallic stone with magnetic properties. The legendary lodestone is one of the magnetites. The magnetites are formed of octahedral crystals of mineral whose chemical structure contains the unit, $XFe_20_4$ . X may be Fe, Mg, Ni, Zn, or Mn. The first is most common; the last two are only weakly magnetic.

*main sequence stars*

obey Eddington's Mass-Luminosity Law. They constitute the majority of stars whose distance, brightness, and temperature have been measured.

*massive ion*

ions are divided into fast and slow. Ions with greatest inertia to the field are said to be massive because they are harder to move; the easier they become mobile the more lightness they are assigned. Elements of low atomic number are most mobile.

mega(watts)

the prefix mega indicates a multiplier of one million. Hence a megawatt is one million watts and a megametre is one million metres.

*memorial generations*

is the difference in years between a youngest listening child and the oldest storytellers of a society. Here we assign this interval a value of 50 years.

*milli(tesla)*

the prefix milli refers to the multiplier one-thousandth. One millitesla is thus one-thousandth of a tesla.

*mobility* (of an atom)

is the ratio of the average drift velocity (attained between collisions) to the electric field strength (which produces the drift velocity).

*Mohorovicic discontinuity*
: is the junction which separates the Earth's crust and mantle. Its depth is about 10 kilometres below the ocean basin.

neutrinos, *see* nuclear fusion

*Newtonian formulation*
: states that the gravitational attraction between two celestial bodies depends upon the product of the two point masses transacting and upon the inverse of the square of the distance separating the masses. Expressed mathematically

$$F_g \propto (M_a)\,(M_b)/(d_{ab})^2$$

In metre-kilogram-seconds units (mks) the gravitational constant of proportionality (G) relates the force in newtons to the masses in kilograms and the separation in metres. G has the value $6.667 \times 10^{-11}$ $m^3/kg\text{-}s^2$ so,

$$F_2\,(N) = G\theta M_a(kg)\theta M_b(kg)/d_{ab}\,(m)^2$$

*nuclear fusion*
: is the supposed stellar process by which the nucleii of four hydrogen atoms collide with sufficient energy to coalesce forming a single helium nucleus having slightly less mass than the original hydrogen. The mass which is destroyed in fusion reappears as radiant energy which slowly flows away to the surface. In the fusion, two protons are changed into two neutrons, two anti-electrons, and two neutrinos. The neutrons remain in the fused helium nucleus, the anti-electrons annihilate with two electrons (liberating more radiant energy), and the neutrinos escape the star immediately, travelling at the speed of light.

  On Earth, a type of nuclear fusion has been sustained for one hundred pico-seconds. No continuing fusion process has been produced. To remain luminous by conventional theory the star must fuse hydrogen continuously (Rudeaux and de Vaucouleurs, pp. 316-9).

nucleosynthesis, *see* nuclear fusion

*nucleotides*
: the monomeric unit which makes up the nucleic acid molecules. A nucleotide consists of a nitrogen base, plus a sugar, and a phosphate group.

*particle*
: is used here as a synonym for electrons, atoms and/or electron-deficient atoms (ions) which are in motion, such as in an electric discharge, or in a flowing gas or plasma. So viewed, cosmic rays and stellar/solar wind ions are particles.

*periastron*
: means the least separation of the principals in a binary. Similarly, its homologues are perigee and perihelion when orbiting the Earth or the Sun. Elsewhere, the term pericentron is used to describe the closest approach between two bodies in orbit.

*physical binary system*
: is here defined to consist of two bodies which are mutually dependent in respect to their orbital revolution about each other. In multiple star systems, which also exist, more than two bodies are in revolution about a common centre-of-motion, often designated as their baricentre.

*plasma*
: is a gas in which the electrons are separated from the electron-deficient atoms. The whole gas contains approximately equal numbers of electrons and ions.

*plenum*
: the contents of the sac of Solaria Binaria and later of the Solar System; excluding the distinctly stellar and planetary material in it.

*Plinian eruption*
: is the most violent volcanic eruption known. It is of almost incomprehensible violence such as the eruptions of Stronghyle (believed to have occurred in 1500 BC), of Vesuvius (in AD 79) and of Krakatoa in 1883.

*polymorphs*

are organisms which during their life cycle undergo a transition (metamorphosis) between forms. In some species several forms co-exist within one colony at any moment.

*polyploids*

are species of plants (and sometimes animals) whose chromosome number exceeds twice the basic set of chromosomes (the haploid number) found in the gamete cell (which) produces a new organism by fertilization with an appropriate gamete cell of the opposite gender. It is not uncommon to breed plants with double or four times the original number of chromosomes (euploids).

*primary*

is the major body in a binary system, e.g. the Sun in the Solar System. The companion(s) orbit(s) the primary. In some systems neither object can be called primary.

*principals*

are the major components in a multiple or binary star system. Referring to Solaria Binaria they would be with time, the Sun and Super Uranus, then after Super Uranus' destruction in a climatic nova eruption, the Sun and Super Saturn. After the Deluge the principals become the Sun and Jupiter whose transactions today dominate motions in the surviving Solar System.

*pulsars*

are stars, a significant part of whose observed energy output is not continuous but is emitted as distinct flashes or pulses of electromagnetic radiation. Many pulsars also emit some radiation weakly and constantly, forming a background for the more intensive pulses.

*quadrature*

is the angular aspect by which two celestial bodies are observed from a third body to be ninety degrees apart in the sky. An example is the Sun and the quarter-phased Moon as seen from the Earth.

*quantavolution*
is an abrupt, large-scale change caused by, and affecting one or more spheres such as the astrophere, biosphere, lithosphere, atmosphere, and anthrosphere.

*quasar*
is a celestial object which appears "star-like" but is not explainable in terms of the usual stellar properties. Many quasars have a visible "tail" -supposedly a jet of material expelled from the quasar. Often quasars emit anomalous amounts of radio waves.

*radiation*
is used here to denote electromagnetic waves of any wavelength. It includes, in order of descending wavelength, radiowaves, microwaves, infra-red, visible light, ultra-violet, X-rays, and gamma-rays.

*sac*
in Solaria Binaria, the container of all that can be included in Solaria Binaria, and later on the Solar System; as distinguishable from the medium of space external to it.

Saltation, *see* Quantavolution

*sidereal*
measured relative to the stars rather than the Sun.

*space-charge sheath*
is a region in which either electrons or electron-deficient atoms predominate and through which electric currents flow. The space-charge limits the current through the sheath. There, electric field strength is not zero.

*space infra-charge*
is an electrical property of space itself, not determined by the presence of electrical charges or conductor's residing in that space. The infra-charge is homologous with Paul Dirac's electron theory (1928) which postulated that the vacuum was a sea-of-electrons possessing negative energies. These electrons are not normally detectable but can be prompted into existence (that is, converted into detectable electrons) under certain conditions. The electrons of Dirac's sea affect

the energy states of atoms in space. To quote Nobel laureate Leon Cooper (606 fn.): "Thus the vacuum, rather than being an inert void responds to the presence of charges or masses and modifies their behaviour".

*specific charge ratio*

is a method of comparing the electric charge inherent in a celestial body with some other physical property such as its volume or the number of atoms which it contains. The ratio would thus be expressed in coulombs per cubic metre, coulombs per kilogram, or possibly as excess electrons per kilogram molecular mass (kilomole).

*stellar wind*

is the flow of material from a star to the Galaxy. In the electric star the stellar wind exists as one means of the star accumulating charge from the nearly “empty” space which surrounds it. By sending electron-deficient atoms to the Galaxy the star gains electrons relative to the material it contains. From the few stellar winds that have been measured, it seems as if the mass loss increases as the square root of the luminosity. In terms of the electric star model presented here, it is tempting to think that luminosity varies as the square of the star-to-galaxy current. There is some evidence that mass loss is enhanced when a close companion is present (Hutchings).

*tera(amperes)*

the prefix tera indicates one million million times the quantity. Tera- is thus a synonym for a multiplier of one billion in Great Britain, and one trillion in the United States. It is, as a measure of current, one million million amperes.

*thermonuclear fusion*

occurs in a gas of sufficient temperature that its atoms in collision will fuse in significant numbers (see nuclear fusion). A thermonuclear process is purported to provide the power radiated by the stars.

*transactive matrix*

is a quasi ordered plenum of electrons moving chaotically, which forms a medium through which ions can flow, thereby transmitting an electric currrent. The solar wind electrons

form such a matrix, their existence allows the Sun to jettison ions towards the edge of the solar cavity where electrons are readily available.

*transmutation*

as used here to transmute means to change the form of, such as from kinetic to potential energy, or to modify the structure of a molecule, crystal, or atom.

*troposphere*

is the lowest layer of the Earth's atmosphere. It is characterized by the complete mixing of the atoms and molecules of the atmospheric gases by significant vertical winds. The temperature and pressure declines with height in this layer.

*unseen bodies*

are components in a binary system which remain undetected by direct observation but are implied by some anomalous behaviour of those bodies which are detected.

*visual binary system*

is a binary system where the component stars are resolvable into separate optical images, that is, the star images are distinguishable.

*whistling atmospheric*

or whistler, is an electromagnetic wave in the audible frequency range (300 to 30 000 hertz). Its origin is in lightning discharges, and it is propagated along the magnetic field lines (see Hines). Whistlers are today audible only using an amplifier but in the environment of Solaria Binaria they should have been directly audible.

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| *Am. Beh. Sci.* | *American Behavioral Scientist* |
| *A. Chem. Soc., J.* | *American Chemical Society, Journal* |
| *An. Rev. As. Ap.* | *Annual Review of Astronomy and Astrophysics* |
| *As. Soc. Pac., Publ.(Proc.)* | *Astronomical Society of the Pacific,Publications (Proceedings)* |
| *As. & Ap.* | *Astronomy and Astrophysics* |
| *As. J.* | *Astronomical Journal* |
| *Ap. J.* | *Astronomical Journal* |
| *Brit. As. Assn., J.* | *British Astronomical Association, Journal* |
| *Can. J. Pl. Sci.* | *Canadian Journal of Plant Science* |
| *Chem. & Eng. News* | *Chemical and Engineering News* |
| *Creation Res. Q.* | *Creation Research Quarterly* |
| *Dept. En. Mines & Res.* | *Department of Energy, Mines and Resources (Canada)* |
| *Detroit Acad.Nat.Sci.* | *Detroit Academy of Natural Sciences* |

| | |
|---|---|
| *Ency. Brit., Macro. (Micro.)* | *Encyclopaedia Brittanica, Macropaedia (Micropaedia)* |
| *Ins. El. Eng. J.* | *Institute of Electrical Engineers, Journal (now Electronics and Power)* |
| *Int. As. U., Proc. 11th Gen.Ass.:* | *International Astronomical Union, Proceedings of the 11th General Assembly* |
| *Int. As. U., Proc. Colloq.No.6:* | *International Astronomical Union, Proceedings of Colloquium Number Six* |
| *J. Geomag. & Geoel.* | *Journal of Geomagnetism and Geoelectricity* |
| *J. Geoph.Res.* | *Journal of Geophysical Research* |
| *J. Opt.Soc.Am.* | *Journal of the Optical Society of America* |
| *J. Phys.* | *Journal of Physics* |
| *Nat. Bur. Std., J. Res.* | *National Bureau of Standards, Journal of Research* |
| *NY Acad. Sci., Annals* | *New York Academy of Sciences, Annals* |
| *Phil. Mag.* | *Philosophical Magazine* |
| *Roy. Anthrop. Inst., J.* | *Royal Anthropological Institute, Journal* |
| *Roy. As. Soc., Mon. Not.* | *Astronomical Society (London), Philosophical Transactions* |

*Roy. Soc. (London)., Proc.* *Royal Society of London, Proceedings*

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