CHAPTER SIX

THE ELECTRICAL AXIS AND ITS GASEOUS RADIATION

The binary electrical system was distinguished by an electrical flow between the principals. This was a highly energetic discharge which generated chemical, and probably nuclear, transformations among the gaseous constituents of the plenum. It provided the heat and energy for life to emerge.

The gaseous plenum initially seems to have contained an excess of hydrogen. The combination of electrical arc with hydrogen-rich gases favored the quick production of organic molecules and of biological systems (Miller and Urey) within the plenum.

An electrical current flowing along the axis of the binary of the order of 10^{14} amperes (100 => *teraamperes*) would produce sufficient magnetic field intensity to constrain the plenum gases up to 64 000 kilometers from the axis (see ahead to Chapter Seven). Electrical breakdown can occur in dense gases where the electric field intensity is of the order of 25 kilovolts per centimeter (Schröder, p90). The longer the electrical column the greater the potential difference required between the principals in order for breakdown to occur. Once breakdown occurs the voltage drop at a place decreases from kilovolts per centimeter to tenths of a volt per centimeter [35]. Along the discharge column the voltage drop varies considerably. It is greatest near the electrodes and is very small at most points in the body of the discharge [36].

It is difficult to estimate the energy that would be released by a discharging arc unless the voltage drop across the arc is known. Since we do not know this value for Solaria Binaria, we must define the arc's parameters in terms of other criteria. One must be preoccupied with the thermal constraints upon the Earth and its developing biosphere.

It is known that transverse heat flow is hindered by the presence of a strong magnetic field (Kapitza, p962). Also the gases insulated, diffused, and rendered uniform the intermittent blasts of the arc by the time the radiation reached the region occupied by the planets. Nevertheless, the closer the Earth to the arc, the more energy it would have received. For some time the Earth gained its energy almost entirely from the arc source. It is reasonable to assume that Earth's temperature must soon have devolved below 325 K. If the Earth-to-arc distance is chosen to be fixed at 64 000 km from the arc, the Earth is irrotational with respect to the arc, and it absorbs all incoming energy (see ahead to Chapter Thirteen); the heat flowing away from the binary arc cannot much exceed 2.6×10^{14} watts per kilometer of arc. Such an arc would dissipate at least 3.1×10^{22} watts within the sac. Given the constraints to radial heat flow cited above, the actual arc could have been much more energetic than we calculate here.

Thus, the discharge should have produced a small region of hot gas centered along the electrical axis. Surrounding the gases of the discharge was a large opaque mantle of cool gases. Within the cooler gases were the electrically charged planets, which had been repelled from the arc but caught up in the magnetic tube (see ahead to Chapter Seven).

In terrestrial lightning the period of electrical build-up (leader process) compared to the time of discharge (return stroke) is in the ratio of hundreds to one. The recovery time before the next stroke has built up is often 800 times the duration of the stroke. Thus it would be reasonable to conceive of the Solaria Binaria arc as discharging about one-thousandth of the time.

A lightning-bolt leader moves about 300 kilometers per second. Thus late in the history of Solaria Binaria it would have taken about 350 000 seconds [37] for the leader to work its way along the 105 gigameters between the principals. The return discharge propagates faster, taking only 2190 seconds or 36 1/2 minutes.

Did this arc, so necessary to life, persist even into the time of human awareness? As Super Uranus receded from the Sun, and the planets redistributed themselves farther apart in its wake, it is logical to assume that the intensity of the arc declined and its

flow became intermittent. Hence, at around thirteen thousand years before the present an observer on Earth would have seen a great flickering and coiling axis or column of fire.

Solaria's electrical binary connection differs from a terrestrial lightning stroke of today in that it involves many concurrent (but not necessarily simultaneously launched) arc channels. A close analogy would be the granular cells seen at the bottom of the discharge channels between the Galaxy and the surface of today's Sun. In this latter case the difference between the arc in Solaria Binaria and the radially directed discharges on today's Sun is the absence of a closely spaced non-electrically neutral companion body. This proximity, which was present in Solaria Binaria, induced a continual series of electrical explosions to be conducted along the electrical tube joining the closest localities of the surfaces of the two stars.

The plenum gases at this time, especially near the arc, were dense enough to be opaque to radiation. A discharge that is opaque appears to radiate from its surface rather than from the whole volume of gas. In consequence energy flows diffusely away from the central discharge into the surrounding gas, some as radiant energy, some as the flow of excited matter, some by thermal conduction (by kinetic energy exchange in collision). Collisions will act so as to maintain an outward flow of energy (Somerville, p42).

Usually ions and electrons diffuse radially from the column. Later they recombine giving up the energy of ionization to the gas. Also, excited atoms, especially those which are long-lived, flow away from the column carrying internal excitation energy which they can release when deactivated by a collision with a non-excited atom or molecule.

The relative importance of radiation when contrasted with conduction for redistributing the arc's energy will depend upon the composition of the gas and the gas pressure. Some gases, like hydrogen and helium, are not efficient radiators of visible light. However, for all gases, high pressures make radiation more important than conduction in the transfer of energy.

In the laboratory, electric-arc current flows are of the order of 10 amperes per square centimeter. If such an arc were to flow

between the early Sun and its close companion, Super Uranus, it need strike only a rather small area of the latter. A discharge column, if encompassing an area of only 10^{13} square centimeters, would produce an arc current of 100 teraamperes.

In an electric arc the gases "burn" [38] in a relatively narrow column. The higher the gas pressure the narrower the discharge column and the more difficult it becomes to sustain a uniform current through the discharge (Somerville, p19). Strong arc discharges, such as lightning channels, seem to bend into a helical shape. Such bending seems to generate a condition within the arc which can terminate the discharge (Blevin, 1964b, p473, Somerville, p54). "Non-electrical" gradients in the conducting electrified gases are usually offered as explanation for the curving of the discharge channel. These "mechanical" drifts set up within electrical discharges are probably better explained as electrical drifts, but neither explanation goes very far at present.

Revolution of the gases around the longitudinal axis of laboratory discharge columns tends to stabilize the discharges [39]. When they do, the rotating gases are said to create a radial "gravitational" field (Somerville, p20). Similar vortical stabilization is noted in rotating air; it is suggested in tornadoes where almost continuous vortical lightning activity occurs (Chalmers, p340).

The rotating gases surrounding and driven by the magnetic tube in Solaria Binaria would act to keep the electric discharge going when it otherwise would have gone out. In the laboratory, high current discharges are so unstable that continuous operation is not easily maintained. The pinch effect usually extinguishes the discharge. With the current removed, magnetic field relaxation occurs, so that the hot electrified gases begin to diffuse away, cooling the discharge column. Electrical forces quickly re-establish the current, stopping the outward flow of hot matter. So it was too in Solaria Binaria; the arc pulsed regularly responding to some natural rhythm between the forces leading to extinction and the forces promoting resurrection.

High gas densities favor brief, frequently recurring, pulses of arcs (Somerville p55). Could this mechanism be the origin of

the regular pulses of radiation observed in celestial objects called => *pulsars*? As the gas density decreases, the arc's pulsing frequency would decline; pulsars show a slowing of the pulse rate with time (Hewish, p1083) [40].

The electric arc operating in Solaria Binaria is a cosmic discharge of long duration. Bruce, in the course of seventeen letters about Cosmic Electrical Discharges (1958-1964), has documented examples of smaller arcs of shorter duration and of longer arcs lasting to millions of years. We concur in his conclusion that electric discharges on a cosmic scale explain many phenomena observed in the astronomical realm. Bruce has convinced us that only scale differentiates lightning discharges, observed regularly in the Earth's troposphere, from solar flares, periodic discharges in the giant envelopes of gases surrounding certain variable stars, and the enormous eruptions moving through the entire volumes of certain "active" galaxies (see, 1966a).

He proposed that an electrical discharge liberating energy comparable to that ascribed to the => quasars was capable of transforming elliptical galaxies into spirals. It would seem that the quasar phenomenon is in fact a galaxy in transformation. This is the grandest of the cosmic lightning discharges; in its wake the spiral arms of the galaxy form with their "metal-rich" stars. Bruce speculated that in the enormous temperatures generated in these discharges, nucleosynthesis transmutes smaller atoms into larger ones. It is this latter possibility that leads us to postulate that nuclear transformations were accomplished in the arc of Solaria Binaria. If they were, they probably occurred most vigorously at the beginning, when the discharge current was greatest.

Despite the many problems with laboratory experimentation in this area, some supportive work has taken place. Using a pulsed high current arc discharge, Russian workers produced beams of 40 kiloelectron volt => *deuterons* at instabilities in the discharge (Somerville, pp55ff). This achievement is consonant with certain proposed nucleosynthetic processes that occur in low energy flares above star surfaces (Canal). Zirin gives a mechanism for the generation of solar flares resembling processes which might occur within regions of a pinched electrical arc.

Even more closely related to the situation in Solaria Binaria is Joss' speculation that X-ray burst sources result from thermonuclear flashes. X-ray burst sources are episodic; in some, bursts are much more frequent. Many burst sources can be inactive for weeks. X-ray sources, steady and bursters, are associated with binary star systems. If, particularly, the burst sources are due to thermonuclear reactions in close binary star systems, then we can be confident that these reactions occurred in Solaria Binaria and that they were instrumental in shaping its chemical and biological structure [41].

Inasmuch as these thermonuclear events were part of the earlier history of the electrical axis, no human would have observed this part of his ultimate creation. The last chapter mentioned what the earliest true humans would have generally perceived, but it postponed treating their special experience with the electrical axis. A correlation of the electrical axis with early legends about a central fire may be probative.

At one region of the Earth, the axis might be expected to appear as a kind of rainbow of fire or "neon-tube" glow across the sky ending at Super Uranus. In another region the arc might appear more short at the horizon and stretch to the red star. In the opposing hemisphere, the arc might be visible alone, first, and then might reach for and finally attain the Sun, with the axis blossoming at the Sun, thus "creating" it, or vice versa. The flickering of the arc, when slowed down enough to be noticeable, might resemble red coiled snakes, intertwining and crawling brokenly towards the great red god.

The snake and dragon accompany very early gods and goddesses. "The Serpent of the Jupiter-type myth is always seen to be a creation of the proto-Saturn god" (Tresman and O'Gheoghan, p39), that is, Uranus. The Saturnian image with snakes from India and the Chinese painting of the espoused deities, shown in Figure 12 and Figure 32, are suggestive. Serpents are among the earliest symbols of art and myth. The color red is widely used and sacred in archaic, perhaps Paleolithic Uranian times (Wreschner). However, the abundance of such symbols is countervalenced by their generality as referents. Lacking specific applications to phenomena, they are unreliable indication of the electrical axis.

Certain symbols associated directly with Saturn (of the time of => *Super Saturn*) are also suggestive of the arc. These include the courtly long-gowned figure of the god, the tree of life (including the Christmas tree), the sacred mountain , and others (Talbott, D.N., ch. 8) that convey the image of the god atop a cone-shaped or pyramidal design on top of the World.

In Iroquois legend, at the beginning of things, the Chief of Heaven, in a fit of jealousy towards his spouse, uproots the tree whose flowers illuminate the celestial world. The Sun and Moon did not exist at the time. He cast his wife, "Fertile Earth", into the hole and replaced the tree (Eliade, 1967, pp146ff).

Figure 12. The Planet Saturn in Ancient Indian Art (Click on the figure to view an enlarged version. Caution: Image files are large.)

Brahma, the planet Saturn, encircled ring-like by serpents, testimony from an early time of the serpent motif in cosmogony.

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Among the Nagdju Dayak of Borneo, the Creator couple, dwelling as birds in the tree of life, fight and damage the tree badly. Some time after the first humans are born of their efforts, the tree is destroyed (*ibid,* pp77ff).

More closely correlative with the axis in the linguistic frame of modern science is the concept of the "Central Fire" that occupied early Greek philosophy. This has particularly descended through the fragments attributed to Philolaos, the

Pythagorean (Dreyer, p40-3). Rose has thoroughly explored the material. Philolaos was the first of the secretive Pythagoreans to publish a book and his treatment by Plato leaves little doubt that he represented a considerable school of archaic science [42].

Some thirty-two attributes of the "Central Fire" are to be elicited from Philolaos and Heraclitus, as presented by Rose, all of which can be accommodated to the theory of the electrical axis of Solaria Binaria. The Central Fire was thought to have been a layer of fire above a layer of air. It is the center of the world. It is cone-shaped. It never sets, and has always the same location in the sky. It is "alone", the "highest", "unmoving", "stable", the beginning of everything. The Earth orbits around the Fire, but Earth does not rotate upon itself. Nor has the Earth any obliquity.

The Fire is not counted among the numbered bodies of the celestial sphere. It is not called Saturn or by any other name except that it was termed the "Mother of the Gods". It is called the "hearth of all", the "residence" of Zeus, his "throne", his "tower", his "fortress". It is a "divine ruler and teacher. It is the "altar", the "bond", and the "measure" of nature. The Sun borrowed light from the Fire; the Sun orbits around it [43]. The Moon, planets, and stars orbit the Fire.

Heraclitus reported it as "an ever-living fire, kindling itself by regular measures and going out by regular measures". He said that "it advances and retires" (Rose, 1979, p26) [44]. Earth turns always the same face towards the Fire. A Counter-Earth exists, which is closer to the Earth than to the Fire, and obscures the Fire from view [45].

The match of Solaria Binaria's axis of "electrical fire" (as electric discharges were called until the nineteenth century) with the attributes of the Central Fire in Greek cosmogony is close. The mention of celestial bodies can be explained as reflecting later observation of some traits.

Notes on Chapter 6

35 The voltage drop occurs about a microsecond (one-millionth of a second) after breakdown (Bruce, 1955).

36 Francis discusses conditions in the positive column of a short discharge tube. The estimate of 0.1 V/cm given above is a simplistic linear extrapolation from the data given for the voltage drop across an entire discharge tube. Actual values in the discharge are difficult to measure (Juergens, 1977a). In the plasma away from the electrodes the voltage drop is miniscule and could be one thousand times less than the average value.

37 4.06 present Earth days (sidereal).

38 The gases in an electric arc do not burn in the sense of combustion, rather they are excited electrically, sometimes giving off light.

39 The Gerdien arc, where stationary gas is surrounded by a rotating flow of water, shows very marked peripheral cooling, enabling a high axial temperature to be attained.

40 Besides pulsing at intervals of one second or less, pulsars also show saltatory changes, named glitches (sudden decelerations of the object astronomers presume to be rotating). In the event that the pulsations are discharge phenomena, as we presume here, the => *saltations* could result if sudden outbursts altered the gas density irreversibly within the discharge column.

41 See behind, Chapter Two, where we argue that thermo-nuclear fusion does not occur in the interior of the stars. Theoretical models for the interior of solar type stars lead to the conclusion that their interiors, even if compacted, would not be hot enough to initiate nuclear fusion (Milton, 1979). Notwith-standing any contradictory calculation, the paucity of neutrinos emitted by the Sun must be considered as fatal to internal nucleosynthesis in stars (Juergens, 1979a). In solar flares and the other discharges mentioned below, temperatures significantly higher are measured. Thus only in the cosmic discharges does nucleosynthesis occur.

42 Rose supposes that the Central Fire is Saturn, the planet, as it anciently functioned, with which interpretation of the data we disagree, believing that the evidence is heavily in favor of its identification with the electrical axis.

43 At a late time the Sun would appear to orbit the axis, as would Super Saturn, when these globes would appear to rotate around the point of the axis cone striking into them, as the Earth moved in its orbit around the axis.

44 The Fire might advance and retire optically as it flared on and off in its decaying state.

45 This probably is a phenomenon that followed the beginning of Earth's rotation perpendicular to the ecliptic, or refers to the era when the arc was no longer visible (see ahead to Chapter Fifteen).

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