SOLARIA BINARIA

Origins and History of the Solar System

by
Alfred de Grazia
and
Earl R. Milton

Metron Publications
Princeton, New Jersey

Notes on the printed version of this book:

ISBN : 0940268-04-3

Printed in the U.S.A. Limited first Edition
Address Metron Publications. P.O. Box 1213
Princeton, N.J. 08542, U.S.A.

The Authors express their thanks to Rosemary Burnard for designing and composing their book in type, and to Malcolm Lowery for his editorial counsel.

To the memory of

RALPH JUERGENS

τα δε παντα οιχιζει χεραυνοζ*

* “Lightning steers the universe”
Heraclitus, *ca*. 2500 BP,
Fragment 64

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LIST OF ABBREVIATIONS IN TEXT

BP	before the present
cf.	compare
E	evolutionary (model)
EM	electromagnetic
f.(ff.)	following page(s)
fn.	footnote
Gm, Gy	gigameter, gigayear (= aeon)
ibid.	in the same place
ISEE	International Sun Earth Explorer (a space craft)
K	Kelvin
km/s	kilometers per second
ly	light year
mks	meter-kilogram second (units)
My	megayear or million years
NMP, NRP	North magnetic (rotational) pole
o.	Omnindex *(used in the printed version of this book. This electronic version has the same information presented as Glossary, and Bibiliography)*
op. cit.	in the work cited
Q	quantavolutionary (model)
q.v.	refer to
SB	Solaria Binaria (model)
SMP, SRP	South magnetic (rotational) pole

GUIDE TO METRIC UNITS

Distances are measured in meters

Multiples of the meter, by thousands and thousands, have special names designated by a prefix, such as micrometer and gigameter. Other metric units use the same prefixes for their multiples, like microvolts, gigaergs, etc.

Prefix	*Decimal Notation*	*Useful to Measure*
nano	0.000 000 001	atoms
micro	0.000 001	cells
milli	0.001	type size
-	1.0	people
kilo	1000.0	driving distances
mega	1000 000.0	satellite diameters
giga	1000 000 000.0	star diameters
tera	1000 000 000 000.0	planet orbits

INTRODUCTION

Since 1924, when the theory of the expanding Universe was first expounded, the phenomena of astronomy have been viewed increasingly as intensely energetic. The notion of an explosive Universe has been abetted by the identification of novas, the discovery of the immense energy trapped in the internal structure of the atom, and the detecting of radio noises from vast reaches of space signaling events so extreme as the imploding of whole galaxies. What began as a whisper in scientific circles of the late nineteenth century has become, in late years, a shout. Yet, for reasons that can only be called ideological, that is, reflecting a constrained cognitive structure in the face of contradictory perceptions, scientific workers on the whole have not heard the "shout".

At the same time as the space and nuclear sciences have had to confront a new set of facts, the near reaches of space have been surveyed and the body of the Earth searched more thoroughly. The results confirm that the wars of the Universe have been disastrously enacted upon battlefields within the Solar System. Without exception, the planetary material that has been closely inspected exhibits the effects of extreme forces unleashed upon it. Mars, Moon, Venus, Mercury - all are heavily scared, Jupiter and Saturn are in the throes of internal warfare. An asteroidal belt that may be called "Apollo" represents a planet that exploded. Nor can we exclude from the common experience this scared Earth.

Consistent with the panorama of catastrophes, and additionally supplying a new dynamic form in cosmogony, there has been developed a body of knowledge and speculation surrounding the phenomena of stellar binary systems. The first binary star orbit was computed in 1822, but not until the past few years has sufficient information become available to speak about binaries systematically. Since the first discovery, a large proportion of observed stars have come to be suspected as multiple star systems.

Moreover many cosmogonists speculate that the Solar System itself was once a binary system, or at least is now a kind of fossil binary system, with Jupiter exhibiting star-like traits. It may be pointed out, for instance, that the distance between the principal bodies of the Solar System is comparable with the distances between the separate components in many binary systems.

Hence it becomes logical that a cosmogony of the Solar System should be modeled after the theory that it was, and is, a binary system, a Solaria Binaria, accepting and applying for the purpose of the model what is known and thought about the observed stellar binaries elsewhere.

The explosive or catastrophic Universe poses basic problems to chronology. The span of astronomical time has been increasing dramatically even in the face of time-collapsing explosive events that reduce drastically the constraints upon time as a factor in change. Great stellar bodies exhibit rotations and motions that accomplish in hours phenomena that would on a gradual timescale be accorded millions or billions of years. It appears that one has to work with a paradox: even as one studies a Universe that changes over billions of years, one studies local events where changes are measured in microseconds. Consequence, which is the last hope of causality, is often strained in the straddling of time.

When the Solar System comes to be viewed in the light of newly discovered universal transactions, the idea necessarily arises that it has developed under time-collapsing conditions. Time measures - radiometric, geological and biological - that have been painstakingly manufactured to give billions of years of longevity to the system - must submit to a review of their credibility.

The need to generate a new chronometry is enhanced by current reassessments of legends and knowledge that ancient and prehistoric human beings possessed. The authors would not have ventured upon this reconstruction of the recent history of the Solar System were it not for the fossilized voices whose shouts about their catastrophic early world and sky sound louder even today than the shout heard in contemporary science about the exploding Universe. Those anthropologists, archaeologists, and scholars of ancient humanity who believe that these shouts must have been mere whispers confront the same impasse ideologically as those scholars who overlook the larger meanings of explosive cosmogony today. What the ancients said, and did not say, about the world are to be taken into account. Both their concepts of time and their visions of events deserve consideration.

This consideration and the others advanced before direct this monograph towards resolving the cosmogony of the Solar System into a model of a Solaria Binaria, the last stages of whose quick and violent quantavolution have been witnessed by human eyes. The model stands as plaintiff, confronting the model of uniformitarian evolution as adversary. Although a note on method is appended to the present work, it may be well to stress in the beginning that a prerequisite of scientificity is the ability to suspend judgment on a case being tried. This is especially painful when one is expert on the matter at issue. Even so, a scientist who cannot suspend judgment must be deemed as incompetent as the judge who cannot suspend judgment while hearing a case in a court of law.

Part One

ORIGIN AND DEVELOPMENT OF THE BINARY SYSTEM

CHAPTER ONE

THE SOLAR SYSTEM AS A BINARY

Contrary to the hypothesis that the Solar System was born as and has evolved as a single star system, it is here claimed that the Solar System was and is a binary system. The binary system was formed when the primitive Sun fissioned. Several planets were generated in the neck of the fissioning pair and co-revolved about the Sun synchronously with the companion (see Figure 1).

The remaining planets were generated, one or more at a time, in several episodes, as the companion became unstable because of a changing galactic environment which we will discuss in Chapter Three.

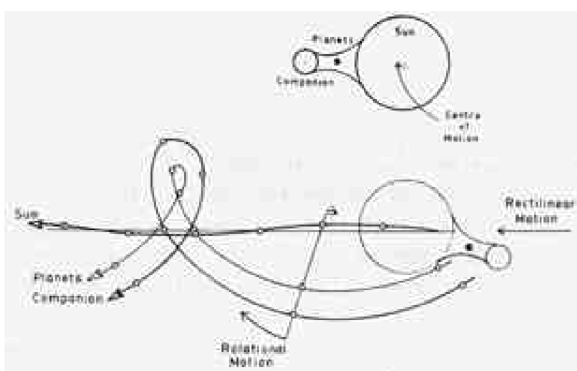

Figure 1. Dumb-bell Motion of Solaria Binaria (Click on the figure to view an enlarged version. Caution: Image files are large.)
The binary system rotates like a lopsided dumb-bell as it moves through galactic space. The Sun orbits about the planets and the companion as they also orbit about the Sun. To be precise, all bodies in the system orbit about its center of motion with the same period.

Jupiter can be taken to be the remnant binary partner [1].

This => *quantavolutionary* [2] conception of a rapidly developed solar binary system is consonant with observations of nearby star systems. To seventeen light-years, or about one hundred million times the Earth-Sun distance of 150 => *gigameters*, there are forty-five star systems consisting of sixty stars and seven dark => *unseen bodies*. Among these are many => *physical binary systems.*

Sixty-one percent of the sixty nearest stars are components of a double or triple star system. Inasmuch as we cannot judge the organization of distant star systems, this statistic may or may not characterize the starry Universe. Even within our sample of sixty nearby stars, the star density and the binary frequency drop with increasing distance (van de Kamp 1971, p109), a suspicious fact.

Nothing that we know of the Sun is exclusively a property of a single star system or would be surprising if found in a => *double star* system.

On the average the => *principals* in a physical binary system are separated by approximately 18 => *astronomical units*. At one extreme, separations of up to twelve thousand astronomical units are deduced; at the other, the stars orbit one another with their surfaces in contact (see Technical note D).

We see Solaria Binaria as a double star system evolving from the close extreme to a system showing increasing separation of the principals with time.

The typical => *visual binary system* that has been analyzed contains principals whose separations, periods, total masses, and orbital shapes are not markedly different form the Sun coupled with any one of the major planets of the present Solar system (Note D). The present Solar System differs from other visual binaries only when the => *luminosity* and mass rations of the principals are considered. The observed features of visual binary systems are not an inconsistent final state for a physical binary system evolving in the manner that will be proposed here for Solaria Binaria.

The present mass ratio between the Sun and its planets would seem inconsistent with observed binary systems were it not for the fact that these latter are all visually observed and do not exclude the potential presence of binaries where the minor principal is undetectable presently by any observation. Further, as we shall show in Chapter Four the brightness of the Sun and its companion(s) was markedly different in the binary phase than in the present system.

The currently accepted cosmogony of the Sun and the planets is dominated by concepts of gravitation, great stretches of time, and the stability of stellar and Solar System motions. In this cosmogony one looks backward and forward in time, confident that the world has been and will be found in place under known conditions. One assumes the order of things in accord with a three-hundred-year-old theory backed up by centuries of systematic observations. Occasionally, but nowadays with increasing frequency, new scientific discoveries are “surprising” or anomalous, within the frame of the cosmogony. For instance, devastation has been wide-spread both on the Earth and on the other planets whose surface details are visible. Because theories had not predicted such instability, these disruptive events are insistently termed episodic and localized, and relegated to remote times. As will be shown, the prevailing cosmogony of science cannot cope with increasing numbers of surprising and anomalous observations. Sooner or later an alternative cosmogonical theory is invited. The mutating evidence suggests that a cosmogony can be constructed which does not require a long time to evolve our habitable world, within which major readjustments of the planetary orbits and environments are possible, and which redefines the set of forces that bring about change (see Technical Note C)

We began with the theory that the Solar System originated as a binary star system and has evolved to the present as such. In the course of elaborating this theory, we shall have to develop and use new tools of analysis - a general concept of electricity (see Technical Note B); new ways of viewing the origins of the atmosphere, lithosphere, and biosphere; an unusual form of legendary and historical inquiry (see Technical Note A); and revised measures of time for the process.

Accepting the notion that the Solar System may be presently at the end of a long binary trail leads to a theory that the Sun is electrical. This fundamental idea is the topic of the next chapter.

Notes on Chapter 1

1 We acknowledge the conceivability of a recent theory that a large remote planet or a dim distant companion of the Sun seems to be disturbing the planetary system (van de Kamp, 1961, 1971; Brady; Harrison, 1977) and might be a remnant binary partner in addition to Jupiter.

2 See ahead to glossary.

CHAPTER TWO

THE SOLAR SYSTEM AS ELECTRICAL

The Sun, as star, radiates energy into the space surrounding it. Stars can be conceived to have originated from electrical cavities in the structure of space. Space, to our mind, is an infinite electrical medium. It is electrical in that it is everywhere occupied by a charge, which, when it moves, assumes the character of electrons, that is, “negative” charge (see Note B). The movement energizes and carries material into the cavities which become and are the stars.

Such electrical cavities or stars are observed in the millions, and inferred in the billions, in a fairly random distribution about the Sun. They form a lagoon of stars that is called the Galaxy, through which the Sun moves in a manner, and with consequences, to be described in the next chapter. Materially, a star is an agglomeration of all that has accompanied the in-flow of electrical charges from surrounding space. The cosmic dust which astronomers see throughout the galaxies is matter yet to be forced into stellar cavities, or matter that has been expelled after a star dies. This dust is detected in greatest amounts in the vicinity of the most highly active stars [3].

Once in the cavity, the material cannot readily escape; it acquires increasing density because of electro-chemical binding and electrical accumulation. A cavity or star is increasingly charged but during its lifetime it cannot be more charged than the medium around it [4]. The Sun is highly charged, as some scientists have lately concluded (Bailey, 1960).

The life history of any new star may normally proceed as its cavity acquires first matter, and then charges continuously until its charge density reaches equilibrium with the surrounding medium, which is to say that the cavity has then been filled. Thereupon the star releases or mixes its material with the medium until it no longer possesses distinction as a body. This "normal" procedure is conditional upon the star's transacting with the space around it in a uniform manner. The majority of stars seem to transact quietly with their surrounding space, whether they are small red stars, or giant red stars. They end their existences as they lived, quietly, passing their accumulated material into the medium of space, eventually becoming indistinguishable from the medium itself.

However, the fact that the star is in motion within the galactic medium poses an occasional problem. It may journey into regions of the Galaxy which present it with greater or lesser electrical differences than it has been used to. Then quantavolution occurs. The star becomes one of the types to which astronomers pay the most attention - the variable stars, the highly luminous stars, the binary stars, the exploding stars.

It was in one such adventure in space that the original Super Sun lost its steady state, fissioned, and became Solaria Binaria. The system then consisted of a number of bodies, acting first as small "suns" with a primary partner, as is to be related in Chapter Four.

In recent times, according to the central theme of this book, this Solaria Binaria encountered a galactic region whose characteristics rendered the lesser stellar partner of the system unstable. In a series of quick changes the binary was transformed into today's Solar System.

Bruce (1944, p9) sees the process of stellar evolution as a cyclic build up of an electrically charged atmosphere above the star. As we see it, galactic potentials will determine the nature of the "surface" presented to the outside observer. As the star journeys through galactic space, its surface nature changes in response to differences in galactic potential. A change in the local galactic environment can lead to an instability which results in catastrophic electrical redistribution of the whole stellar atmosphere and sometimes of material found well beneath the star's surface layers [5]. In short, the star becomes a nova.

In his cosmogony Bruce argues that binary stars form by division of an original stellar nucleus. When the star becomes a nova, the returning nova discharge, transacting electrically with the normal outward flow of => *stellar wind* off the star, induces the outbursting star to rotate. A possible reverse jet blast from the explosion might also cause the rotation to occur. Stars then, should have maximum rotation during the nova outburst. Fission of the star into a binary would then logically happen most frequently by rotational fission (Kopal, 1938, p657) immediately after a nova outburst. Close-binary pairs should be found among the post-nova stars (Clark *et al.*, 1975, p674-6; Cowley *et al.*, 1975, p413).

The Solar System is probably the descendant of a Super Sun, a body containing at least eleven percent more material than the existing Sun, which became electrically unstable and underwent a nova explosion.

When the Super Sun erupted as a nova it divided into a close binary pair, whose primary became our present Sun; and its companion was a body about ten percent the size of the Sun (see Lyttleton, 1953, pp137ff) [6], henceforth to be called Super Uranus, Enveloping the binary was a cloud of solar material constituting at least one percent of the Sun's material. Also created in the fission were the seeds which grew into the so-called "inner or terrestrial planets", probably Mars, the Earth, Mercury, and one that will be called Apollo. Apollo's fate is discussed in Chapter Fifteen.

Turning our attention to the Sun itself, we observe an opaque layer called the photosphere. This layer is regarded ordinarily as the Sun's surface. Above the photosphere lies the transparent solar atmosphere, which is difficult to observe. First comes the => *chromosphere* and then the corona. Perhaps the key to star behavior is the distinction between the photosphere and chromosphere. Each is examined and known by means of spectroscopy, that is by observing and measuring its spectrum of => *radiation.*

The spectrum of the photosphere shows radiation produced when the atoms, => *ions*, and electrons of the photosphere collide, and therefore the spectrum reflects the state of atomic collisions there. The light is emitted during the collisions. It appears that the photosphere is a region of => *plasma* and atoms where the motion of the material is chaotic, randomized. Collisions occur after short journeys, after short mean free paths of electrical accumulation. The electrical field is small. A high kinetic energy of collision is registered in the temperature of several thousands of degrees. Energy is transmitted with some, but not great, amounts of conversion of energy into internal atomic structures (excitation).

By contrast, the spectrum of the chromosphere represents the release of the internal energy of excited atoms and ions. Light is emitted not so much at the moment of collision among atoms, but it is cast off by rapidly accelerating atoms moving to and from collisions, that is, between rather than during collisions. The chromosphere is a region of directed, vertically moving electrons descending into the photosphere, and atoms and ions escaping into the corona and the => *solar wind*. The mean free path is long, not short. The electrical field is large, not small as in the photosphere.

The photosphere, thus, is a region where the transmission of energy is observed. The chromosphere is a region where the => *transmutation* of energy is what is observed. The temperature “measurements” of the two regions are not helpful in understanding the dynamics, because in one case, temperature is “low” where short paths lead to frequent collisions, and in the other, temperature is high because of infrequent long--path collisions. What is important is the contribution of each region to the electrical system of the Sun.

The photosphere glows brightly with a silver color (Menzel, 1959, p24). Blemishing this visible face of the Sun are dark, slightly cooler regions called sunspots, the average spot lasts less than a day (Abell, 1975, p527). Viewed by telescope, the whole photosphere, except where sunspots obscure it, shows a granular appearance. These => *granules* are bright patches, hot tufts of gas that live for only a few minutes (Juergens, 1979b, p36).

The photosphere and the behavior of the solar atmosphere which lies above it can best be explained using a model based upon electrical processes. Bruce (1944, p6), and later Juergens (1972, pp9ff) and Crew (1974, p539) have shown that photosphere granules have the properties of a large number of parallel electrical arcs. Further, Juergens maintains that highly energetic electrons are transmitted from the Galaxy down through the solar atmosphere to the photosphere.

As in the Earth's atmosphere, the gas density and pressure in the solar atmosphere decrease with height above the photosphere. Where the atmospheric pressure falls to a value equal to one percent of the atmospheric pressure measured at the Earth's surface, collisions between gas atoms can no longer dominate the exchange of energy between the atoms. Instead it is the electrical processes that govern the energy exchanges in the solar gas. We see this transition as the hot chromosphere. The bladed or spiculed structure of the chromosphere consists of jets of gas moving upwards at about 30 kilometers per second. These spicules rise some 5000 to 20 000 kilometers above the photosphere (Abell, 1975, pp531ff) [7].

Instabilities in the arc discharges lead to a build-up of charged regions in the solar atmosphere. These eventually produce electrical breakdown; sudden discharges occur, causing bright => *faculae* [8] and the temporary extinction of some photosphere arcs. The result is a sunspot (Bruce, 1944, p6).

The upper atmosphere of the Sun is the apparently intensely hot corona [9].The gas atoms of the corona have been stripped of several electrons [10] by collisions with inflowing energetic cosmic electrons. The removed electrons are drawn towards the Sun so other ions can flow outwards into the corona allowing the coronal ions to recede into the solar wind. The spectrum of the lower corona shows the atoms stripped of several electrons emitting light between collisions, and the emission from the energetic electrons during collision.

The corona seems to be constantly ejecting its contents into space as the solar wind. The fraction of the solar output represented by the solar wind is about one-millionth. Haymes states that the whole corona is lost and replaced in about one day [11].

Some of this material flows past the Earth's orbit as a cloud of energetic protons and helium nuclei, accompanied by electrons, known as the solar wind. In every second 100 million solar ions arrive above each square centimeter of the Earth's atmosphere.

The more luminous the star, the faster its stellar wind carries away mass, and, in general, the more rapidly the gases flow away from the star. Stellar wind flows of 10^{-10} to 10^{-5} . Sun masses per year have been inferred with measured velocities from 550 to 3800 kilometers per second respectively (Lamers *et al.*, Table 1, p328).

Sudden explosive eruptions, called flares, occur above the solar surface. Energy in the form of light, atoms, and ions, is accelerated away from the Sun. The energy in a single flare could supply the Earth's population with electrical power for millions of years. A large flare releases in an instant about one-fortieth of the continuous solar output.

Flares start near sunspots, with associated faculae, and develop over hours. They move as if driven by an electrical potential difference between the Sun's surface and the higher atmosphere (Zirin, pp479ff, Obayashi, pp224ff). Once accelerated, the flare gases escape the Sun and modify the solar wind significantly. The cause of flares is baffling to conventional theories, which underplay electrical forces in cosmic processes. Most flare models involve some kind of magnetic driver to blow the gases from the Sun with great force (Babcock, p420, p422-4). The presence of magnetism implies an electric source. As we shall show in Chapter Six, the Sun once had an electrical connection to its companion, within which energy was released that created and sustained life within the binary system. Today's flares represent an undirected remnant of the inter-companion arc of yesteryear.

The solar wind consists of coronal gases which have been boiled away from the hot solar atmospheric discharges. It conducts the Sun's electrical transaction with the Galaxy. It is the Sun's connection to the Galaxy. The electron-deficient atoms (ions), by escaping from the Solar System, increase the negative charge on the Sun. This brings the Sun towards => *galactic neutral* and thus, in time, would end the Sun's life as star.

It follows that in the past, when the Sun was less negatively charged, more current flowed from the Sun to the Galaxy. Thus the present flow of solar wind is less than the flow in ages past when the Sun was more out of equilibrium than it is now.

The Solar wind varies with the ongoing “evolution” and “quantavolution” of the Sun.

In the past the solar wind flow was very complex because we believe that the Sun was a binary star and its companion, Super Uranus, was not in electrical equilibrium with it. The system eventually approached => *internal neutrality* because a large solar wind, electrically driven, flowed directly between the two principals.

In this connection we may explain the origin of the heavier elements in the Solar System. They were not built up from primordial hydrogen and helium, which show up so prominently in spectroscopic observation, but rather represents an accumulation in a period measurable in thousands of years of the fragments of heavy materials scattered initially near the Sun, near its binary partner, and along the electrified axis between the two (see ahead to Figure 7).

The theory that heavier elements are sparse in the interior of the Sun is probably incorrect. Spectroscopy cannot penetrate to beyond the photosphere; therefore it must show only a cloud of hydrogen admixed with metal and molecular vapors (Ross and Aller, Table 1, p1226) at low density [12].

The mass of the Sun is calculated as a function of the orbital motion of the planets. Probably here, too, a methodological error is occurring that serves to produce the illusion of a light mass. Thus the model of the composition of the Sun depends upon the assumed structure of the solar interior and then the Sun’s mass is probably incorrectly known.

Both incorrect theories- regarding the elements and mass - contribute to the major error of conventional Solar System theory, which is that the Sun is powered by thermonuclear processes, specifically the fusion of hydrogen atoms, in its interior.

Regarding the processes which power the Sun, most astronomers believe that there is an energy source deep in the solar interior obscured from view behind the opaque photosphere. If this belief is correct then the interior of the Sun must be hotter than the photosphere.

Knowledge of the conditions within the Sun is inferred as the consequence of the physical forces *assumed* to be governing the stability of the Sun (Smith and Jacobs, pp223ff). It is usually inferred that near the center of the Sun the gas is sufficiently hot and dense enough to bring about => *nuclear fusion* on a large scale.

A thermonuclear Sun is an attractive theory since the Sun seems to be composed mainly of hydrogen. By compressing itself into a nuclear-powered core the Sun might radiate energy long enough to accommodate the gradual evolutionary processes believed necessary for the biological and geological developments that have occurred on the Earth.

However, thermonuclear fusion processes must dispose of large numbers of => *neutrinos*, and a vastly insufficient number of neutrinos have been detected on Earth in experiments specifically designed to capture the normally elusive solar neutrinos (Parker, p31). Before the nuclear Sun theory was presented, several mechanisms were proposed to explain the Sun's output of radiant energy [13]. All of these led to a radiant lifetime that was too short to satisfy the excessive time needs of the evolutionists.

Fatal, furthermore, to all theories of an internally powered Sun is the minimal temperature of the photosphere. How can the "surface" of the Sun remain cool when it is blanketed by hotter regions below and above whose temperatures reach millions of degrees (Parker, p28)? The usual answer is that the Sun's atmosphere is heated by turbulence within the Sun's outermost interior layers below the photosphere (Wright, p123). Somehow this process which, overleaping the photosphere, heats the Sun's atmosphere is supposedly divorced from the flow of radiant energy from the Sun's interior. Since such separation of processes is unknown elsewhere this explanation is unacceptable [14].

Lastly, the observed turbulence (the granules) on the photosphere and its opacity are not compatible with the properties of hot gas of solar composition and condition (Juergens, 1979b, pp33ff). Since Bruce has shown the Sun outside the photosphere behaves like an electrical discharge, the theory, originally by Juergens, that the origin of the Sun's energy is external and electrical, is accepted here.

Consistent with the electrical phenomena of the Sun's atmosphere, we propose an external source of solar power. The Sun's light and heat output arises from the energy released by a flow of highly energetic electrons arriving from the Galaxy [15]. This electron current is enhanced by the flow of energetic solar wind protons away from the Sun [16]. The detected plasma a density near the Earth's orbit is 2 to 10 ions per cubic centimeter [17]. The ions flow outwards. Near Jupiter's orbit the Pioneer spacecraft measured no increase in the velocity of the solar ions over their velocity measured near the Earth [18].

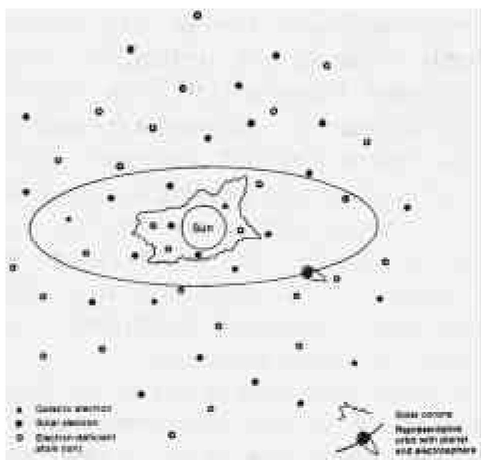

Figure 2. The Sun's Connection to the Galaxy(Click on the figure to view an enlarged version. Caution: Image files are large.)

Outward-flowing solar wind ions carry an electric current between the negatively charged Sun and the more negatively charged galactic space that surrounds it. The solar wind flows through a "transactive matrix" (see Technical Note B) of solar electrons, which permeate the interplanetary space but do not flow through it as do the ions. Inward-flowing galactic electrons, travelling at velocities close to the *speed of light*, carry energy from the Galaxy to the solar "surface" where it is released and radiated as light and other electromagnetic waves, which constitute the solar luminosity.

At the edge of the Solar System, escaping protons, accelerated to high energy by the drop in electrical potential between the Sun and the Galaxy, become galactic => *cosmic rays* and flow in all directions towards other stars. The protons expelled by other stars arrive in the Solar System as cosmic rays [19]. For energies above 100 GeV about six cosmic rays impinge upon each square meter of the Earth every second, but these few energetic particles carry inwards about one-twentieth of the energy flowing outwards with the solar wind at 1 AU.

That electron-deficient cosmic ray atoms continuously flow to Earth enhances the probability that the Earth is electrically charged. Juergens (1972) has argued that both the Earth and the Sun can have an excess (negative)charge.

At energies below 100 GeV the Sun somehow modulates the number of cosmic rays arriving in the inner Solar System (van Allen, p133). This presumably represents the maximum driving potential between the Sun and galactic space, with which it is transacting electrically. Cosmic rays with energy greatly in excess of 100 GeV would not be impeded meaningfully by the Sun's opposing driving potential.

Where the solar wind ends is yet to be determined. It was once believed the wind stopped inside Jupiter's orbit, later near Pluto, but today the wind is deemed to flow well beyond Pluto (Haymes, p237).

Somewhere the "galactic wind" meets the solar wind; there a boundary exists where the flow of incoming cosmic ray protons balances the outflowing solar wind protons. This is the edge of the Sun's discharge region, the limit of the Solar System.

To conclude, a star is born when an electric cavity forms in the charged medium of space, and matter rushes along with the charged space to fill the cavity. Then, after the cavity fills, the star dissipates into charged space, spilling out its matter simultaneously. No tombstone marks its demise; no derelicts travel forever through space. Indeed, existence is an attempt to achieve nothingness. Pockets of lesser negativity become existence by seeking to accumulate enough electric charge to emulate universal space, at which time they are capable of disappearing into nothingness.

Notes on Chapter 2:

3 To be considered is whether this may result from the dust in near stars being more observable.

4 The consequences of the temporary overcharging are described later when we consider stellar novae (Chapter Thirteen).

5 See Bruce (1966b) for a discussion which compares a lightning discharges to the light curve for Nova Herculis 1934. Bruce (1944) mentions a discharge of the order of 10^{20} coulombs in the nova outburst. We see this atmospheric discharge as an electrical readjustment required after the star has responded to its changed environment.

6 Lyttleton (1938) has argued that rotational fission cannot result in the formation of a stable binary system, but his arguments are probably invalid if the bodies at fission are highly charged (and of the same sign)but in different amounts (Note C). In this instance, immediate electrical transaction between the stars may allow non-collisional orbits to be stable, where they otherwise would not. Later criticism and support are well summarized by Batten (1973b). The arguments they're about the stability of binary orbits over long times are in question because of the work of Bass. Likewise, the claim that fission cannot occur because stellar cores cannot remain uncoupled from stellar envelopes once rotational distortion becomes appreciable is also in question if the process producing the rotation begins in the envelope rather than in the core.

7 Juergens (1979b) believes the spicule is a fountain pumping electrons from the solar surface high into the corona. If he is correct, the upward motions detected spectroscopically in the spicules are produced by atoms bombarded by the electron flow. The electrons supplied by the spicules are necessary to allow ions to travel away from the solar surface.(See also Milton, 1979.)

8 A *facula* (Lat : "torch") is a bright region seen best near the limb of the Sun where the underlying photosphere appears less bright.

9 The temperature deduced from the spectrum is millions => *Kelvin.*

10 Specifically, atoms heavier than helium which have lost several electrons are detected. In the corona, hydrogen and helium are present too, but cannot be detected since they have lost all of their electrons.

11 Replacement of the corona in one day produces a loss of about 10^{-10} . Sun's mass each year. Haymes' estimate for the loss of solar corona is much higher than the loss expected using measurements of the solar wind flux. One such solar wind measurement cited by Marti *et al.* would produce a corona loss which is 1/10000 the value in Haymes.

12 Compared with the Earth's atmosphere, which at the surface has 1390 times the number of atoms per cubic centimeter as does the Sun's atmosphere at the photosphere.

13 Thus, the Sun, primordially hot, gives out heat as it cools; such a Sun has a life of thousands of years. Then Mayer, in 1848, supposed that the Sun is heated by in-falling meteorites. If they did the Sun would gain mass, affecting the size of planetary orbits. For his part, von Helmholtz, in 1854, showed that the Sun could radiate for tens of millions of years if it were contracting slowly. The reader is referred to the following sources for interesting and readable accounts of these mechanisms: Newcombe, Russell *et al.*, 1927; Rudeaux and de Vaucouleurs.

14 Parker argues that a man (with a body temperature of 37° => *Celsius*) can rub two sticks together to ignite them (producing a fire at several hundred degrees Celsius). He adds that there is no limit to the temperature which can be obtained by so rubbing the sticks. What he fails to recognize is that if the sticks are continuously rubbed together generating heat by friction, they will conduct heat from the region of the friction. This heat will eventually reach the stick-holder's hands. Even if the stick-holder wears asbestos gloves, the wood, which is slowly becoming hotter, will eventually catch fire. On the Sun the photosphere must likewise heat up, unless it is somehow

cooled by the warmer regions surrounding it. Such cooling is not spontaneous in nature.

15 The Sun's energy output is $4x10^{26}$ watts. If the arriving electrons have the minimum energy for cosmic rays not modulated by the Sun (see below, p. 18), which is about 100 gigaelectron volts (100 GeV), the inflowing current density at the Sun's photosphere would be $6.5x10^{-4}$ amperes per square meter. This value is a maximum; higher-energy electrons arriving lead to lower values for the electron current density.

16 The flow of the solar wind particles is consistent with a potential barrier located at infinity (Lemaire and Scherer). Moving through the potential, the protons gain energy; as they flow away from the Sun and past the Earth's orbit the protons double their velocity, increasing from 150 kilometers per second in the corona to 320 kilometers per second at the Earth. The electrons' behavior is consistent with electrons being repelled by the distant Galaxy but also being repelled by a nearby Sun carrying an excess negative electrical charge, as was postulated much earlier by Bailey (1960).

17 Zirlin remarks that spacecraft measurements of the solar wind plasma refer to protons, "but considerations of electrical neutrality require that the number of electrons per cubic centimeter equal the number of protons (although the velocities need not necessarily be the same)". Exact => *electric neutrality* cannot be assumed if the Sun is electrically powered from the outside, and thus we do not know the electron density in the solar wind unless it is measured.

18 At the rate of solar wind flow, a sphere 100 AU in radius could be filled with plasma to 5 protons per cubic centimeter in about 10 000 years. However, moving at 300 km/s, a proton would travel about ten light years in this time, about 6300 times 100 AU. The material flow would be about 10^{17} tons (1/35 000 of an Earth).

19 Conventionally, no origin other than "galactic" or "extragalactic" is ascribed to arriving cosmic rays not certainly identified with the Sun (Watson). The paucity of electrons in the

cosmic ray flux is unconvincingly explained except by the notion of a star as an electron-deficient cavity in space.

CHAPTER THREE

THE SUN'S GALACTIC JOURNEY AND ABSOLUTE TIME

Conventionally viewed, the formation of a solar-type star and planets from a cloud of gases and cosmic dust takes on the order of several hundreds of millions of years. After accretion, an Earth-like planet supposedly takes another one or two thousand million years (1-2 gigayears or => *aeons*) to develop a stable lithosphere, which when formed allows the much slower evolution of a viable biosphere from the materials and energy available at the planetary surface (Oparin). To us, these processes seem too slow and rely too much upon random occurrences to be viable.

However, the processes forming stars and planets and leading to living things may proceed much more rapidly. Our cosmogony employs electrical cavities, charges and forces to accomplish change. These produce changes which are much more powerful and are highly selective.

Electrical force, as measurable by the repulsion between two electrons, compares with the apparent gravitational attraction of the same two electrons in the ratio of 10^{36} to 1 [20]. Conventional models of cosmic processes employ almost exclusively the trivially weak force termed gravity to produce and govern the Universe.

Electricity is a greater sculptor of change because it operates more variably within a given cosmic setting. A simple lightning bolt can cause extensive surface damage, liberating megajoules of energy within a few meters of surviving observers. Only thousandths of a second are involved in the event. Yet, too, an undisturbed geological surface may be the setting for a large number of biological mutations provoked by a radiation storm of cosmic origin.

What “gravity” is supposed to accomplish in aeons, electricity could quickly accomplish before the eyes of the earthly observer. Driven by the powerful motivator, electricity, quantavolution becomes not only possible - but also essential. Furthermore an understanding of electricity’s role provides a powerful new and *unified* explanation of most observable phenomena.

If the evidence cited in Chapter One has permitted us to proceed, viewing the developing Solar System as Solaria Binaria, and similarly, if in Chapter Two we end up viewing stars, and in particular, the Sun as an electric phenomenon, then we can hope to inquire about the time scale over which the Solar Binary developed. To be more specific, may we have a stellar binary which develops over a short interval through some of the most significant phases of the history of the Solar System ?

To tackle the problem of chronology we shall, as we have done before, look to the skies for the crucial clues. We must, in so doing, introduce a seemingly radical conception, one which we feel can be defended with the evidence to follow. We assert, in line with the past chapter, that stars take their properties less from the material which they contain and more from the electrical difference between the cavity, which creates the star, and the surrounding medium of electrified space (see => *space infra-charge*).

Translated into more common astronomical language, the luminosity of the star depends upon its galactic environment rather than upon the amount of material which it contains (see behind and to Technical Note B, fn. 116). The conventional notion that the more luminous the star, the more massive it is, was induced by Eddington from the analysis of a small sample of binary stars. As we interpret the same data, the more luminous the star, the more it transacts with its companion, and so the companion completes its orbit more rapidly (see Technical Note D). Unfortunately Eddington’s Mass-Luminosity relationship is well established in astronomical formalism, so that today stars are assigned masses as soon as their luminosities are estimated.

There is a problem inherent in Eddington’s method of massing the binaries. He calls upon “gravitational force” and nothing else to bring about motion within the binary system. The problem is compounded when luminosities are introduced as a way to measure mass in non-binary systems. Luminosity can only be known where the distance to the star can be measured. Star distances are computed using the annual parallax produced by viewing the displacement, as the Earth orbits the Sun, of any nearby star against the back-ground of very distant stars. The parallax measurement involves measuring minute angle at the apex of an isosceles triangle whose base is the diameter of the Earth's orbit about the Sun [21]. Parallax angles are very small; the closest star, Alpha Centauri, is only displaced through 1.52 => *arc seconds* over the year. This parallax, the largest, was not measured until 1839 (Baker, R.H., p317) Parallaxes are difficult to measure and they cannot be determined for stars farther from Earth than 652 => *light-years*. Such a small distance encompasses only one thousandth of the sphere of stars under close observation by astronomers. Thus the majority of reported star distances and luminosities are derived by theory rather than measurement. Of the twenty first-magnitude stars (the apparently brightest stars in the sky) only five are closer than 26 light years, the next five take us to 84 light-years; the next seven to 217 light years; and the last five to the measurement limit. In this sample are six supergiant stars; the parallax of one of these stars is only an estimate, two of the others are at the extreme limit, the last three are between 171 and 192 light-years distant. None of the most luminous supergiant stars are in this sample; thus all luminosities given for such stars are estimates ! Even where parallax is measured, the measurement is rarely precise; uncertainties of 25% and larger are common, leading to luminosities which are most likely erroneous in the order of at least 56% (about half a magnitude unit). Near the measuring limit the possible deviations grow immensely, often exceeding considerably the number measured.

The famous => *Hertzsprung-Russell diagram*, the Rosetta Stone of modern astronomy, plots stellar luminosities against surface temperatures, determined from the star's spectrum. Since the spectrum is often difficult to classify, placement of the star on the diagram is not always easy (Baker, R.H., p342). To circumvent that difficulty astronomers now rely upon color indices in place of spectrum classes [22]. Such measurements are even more strongly theory dependent than the former in terms of their applicability to stellar emissions (see Wyse, p49), but they are more quantitatively formulated and therefore they lead to an unjustified sense of satisfaction with the computed result of the stellar condition. For our purposes they offer no help.

What we would say about the classification of stars is the following. In going from stars whose surface temperature appears to be high, to those which appear cooler, there is a gradation of the lines present in the stellar spectra. The hotter stars show absorption produced by helium atoms. As we look at progressively cooler stars the helium lines decline and abruptly hydrogen lines appear, increase in intensity, and slowly decline. As the hydrogen declines, the lines of the metals and metal ions increase in intensity through the solar type stars; they dominate in stars slightly cooler than the Sun, only to be surpassed in the coolest stars by band spectra produced by various simple molecules, notably hydrides and oxides. In some of the coolest stars compounds of carbon are prominent. Although astronomers may continue to seek a more precise classification for stars, we are content to employ the traditional spectral types for the present study.

Besides the Hertzsprung-Russell diagram that is used to classify the stars, astronomers have also divided the stars into populations according to their location within the Galaxy.

Some striking results were obtained:

1. The most luminous and apparently hottest stars are found within gaseous clouds containing much cosmic dust. These stars are confined in clumps to a thin plate that forms the equator of the Galaxy. Similar stars define the highly visible spiral arms seen in other galaxies.

2. Bright, cooler stars like Sirius are located near the equator of the Galaxy but are not confined to the galactic arms.

3. The disc of the Galaxy is populated with moderately hot stars (with 5000 to 8000 K surface temperatures); these stars resemble the Sun and populate the arms, the spaces between the arms, and make up part of the stars that occupy the central core of the Galaxy.

These disc stars are the most numerous group of stars observed.

4. The disc of the Galaxy is enveloped in an ovoid shell of red giant stars whose spectra show fewer metals than stars of comparable type in the disc population. That these stars are mostly giant stars is usually explained by claiming that the smaller stars in the population are not likely seen because of distance from the Earth. It is possible that the latter are absent. Most of what is known about these stars is from the study of giant stars within star clusters and intrinsically varying giant stars, where the star's luminosity varies in some characteristic way over an interval of days to months.

5. The Galaxy itself is embedded in a halo of cooler stars. Most of what is known of the galactic halo is deduced from a study of a few nearby small stars and 120 globular star clusters which surround the core of the Galaxy. One of these globular clusters, Messier 13 in the constellation of Hercules, has been described as a "celestial chrysanthemum" (Baker, R.H., p451). The number of stars in this cluster cannot be counted; but estimates around 500 000 are made. Averaging this number of stars over the volume of the cluster (not precisely known) it would seem as if the stars are about two light-years apart, much closer than the stars near the Sun. Some small halo stars are observed passing through the disc stars in the Sun's vicinity. Barnard's star is an example.

In summary:

-- the most interactive stars and gas clouds form clumps which are the galactic arms

-- around the arms is a disc of less interactive stars

-- enveloping the disc are variously shaped ovoids and halos alleged to be progressively more "metal deficient" stars.

It has been proposed that the stars of the different populations of the Galaxy follow orbits about the galactic core which are characteristic of the population. Supposedly the arm stars have the most circular orbits; the disc stars follow slightly elliptical paths. Some are deemed to move inclined slightly to the galactic plane, like the asteroid orbits of the Solar System. The halo stars move in strongly elliptical orbits with random inclinations to the galactic arms, like the comet orbits of the Solar System. As they pass through the Sun's locality the halo stars betray their presence by large annual displacements compared to the disc stars.

All of the stars in the Galaxy are in motion. Since there is no standard of rest all we can detect is the motion of one star relative to another. Two streams of stars are observed moving past the Sun parallel to the Milky Way (the arms of the Galaxy). The two streams move oppositely at a relative speed of 40 km/s, the outer stream moving towards Orion, the inner one to Scutum. These motions apparently reflect differences in the motion of consecutive galactic arm segments in the Galaxy. The stars in the Sun's "arm" we assume move with the Sun at 275 km/s [23] towards the constellation of Lyra near Cygnus, which is a motion away from the stars of Puppis.

Looking only at the net motion of stars close to the Sun we detect the drift of the Sun within its arm of the Galaxy. This analysis reveals a motion of 20 km/s towards the constellation of Hercules (away from the constellation of Canis Major)(Mihalas and Routly, p103).

Neither of the Sun's motions is precise but they should suffice for our purpose. The Sun's motion within its arm carries it four astronomical units per year. It takes nearly 22 500 years for the Sun to drift one light-year from its present position. But, when the galactic revolution motion is considered, the Sun is moving up to fourteen times as fast. In the extreme only 1107 years are required to displace the Sun one light-year, so in ten thousand years the Sun moves nine light-years, and in one million years it travels about 904 light years.

If our hypothesis is correct and the stars derive their properties from the space in which they are embedded, then a look at the stars presently in the Sun's wake will tell us how the Sun appeared in ages past. Unfortunately the path of the Sun over the last million years, within which we believe Solaria Binaria developed and collapsed, is not wholly within measured space. Luminosity assumptions need to be made during the first two - thirds of the binary's lifetime.

The Sun's total motion now is directed away from a point within the constellation of Right Carina (the solar antapex at 8.4 hours Right Ascension and declination - 62° [24].

This antapex was determined by Strömberg using the radial velocities of globular star-clusters (Menzel *et al.*). In his sample, the Sun's drift and the Galaxy's revolution combine to produce a net motion of 286 km/s away from the antapex.

For star systems close to the Sun, adjacent stars are about 10.3 light-years apart, each thus occupying a sphere containing 578 cubic light years of space (Allen, 1963, p237). Given such a low star density, a rather large volume must be examined around and along the Sun's wake to ensure that some stars are included. We have constructed, therefore, a cylinder thirteen and one-quarter light years in radius about the Sun's path. Moving for ten thousand years through this cylinder the Sun will "encounter" about 5000 cubic light-years of space. In such a volume there would reside about nine stars or star systems at the average local star density. Over the sixty-five light year swath through space covered by the *Gliese Star Catalogue* there are only fifteen star systems. It appears that along the Sun's path, the actual star density is only twenty seven percent of that expected. The Sun entered the region included within the Gliese catalogue about 74000 years ago. Within that volume, our analytical sample of stars is reasonably complete . Beyond it, many of the stars located along the cylinder do not have published parallaxes and so they cannot be located in time; they cannot be used in the analysis.

The region of space which includes those stars which now occupy the space once passed through by the Sun on its galactic voyage is represented on a star map by a cone centered on the solar antapex [25].

The base of the cone in the present includes stars over one half of the sky. As time progresses backwards the frustum of the cone projected upon the sky diminishes in area (Figure 3). The frustum of the cone 3 500 years ago is a circle 76° in radius, encompassing stars from Orion's belt across the South Celestial Pole to the Scorpion's tail. Moving back twenty thousand years shortens the radius to 36°, thereby including the region from the feet of the Greater Dog to the Centaur's right foot. The area has only a 13.5° radius sixty thousand years ago; it shrinks to less than a 3° circle after three hundred thousand years.

Through recent time the Sun's trail is very close to a straight line projected towards the antapex. It is shown in Figure 4 and the stars included are listed in Table 1.

The stars occupying the space inhabited by the Sun through the current era (the Period of Solaria)[26] and during the time of the Late Quantavolutions, to be discussed in part Two of this book, are in this sample. Here, we find the nearest star system, the Alpha Centauri triple. The largest star is very similar to the Sun (Dole, p112).

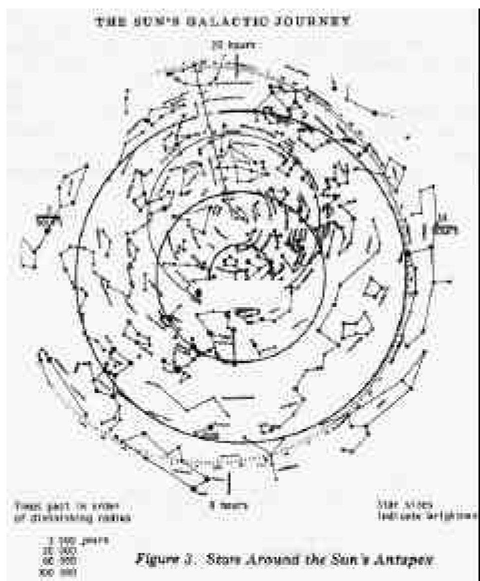

Figure 3. Stars Around the Sun's Antapex(Click on the figure to view an enlarged version. Caution: Image files are large.)

The Sun's path traced backwards through the stars of the Galaxy passes through a cylinder of space whose axis stretches from the center of the Sun through the point on the celestial sphere with co-ordinates 8.4 hours of right ascension and -62° of declination. The edge of this cylinder, chosen to have a radius of 13.25 light years, is represented for different eras by the series of circles converging onto the solar antapex.

Its first companion is 23.5 astronomical units away moving along an elliptical orbit (Menzel *et al.*, p467). This star is slightly cooler and fainter than the Sun. The second companion is located almost two degrees away in the sky. It is over 550 times more distant than the separation of the closer pair. Frequent eruptions superpose bright emission lines on its otherwise faint class M spectrum. It is a flare star; its flaring might be associated with some intermittent transaction with the pair of distant companions. Unfortunately the a-Centauri triple is the only occupant within the space transited by the Sun during the series of quantavolutions preceding the historical period. It gives us no clue to an understanding of that space besides learning that solar-type stars can exist there.

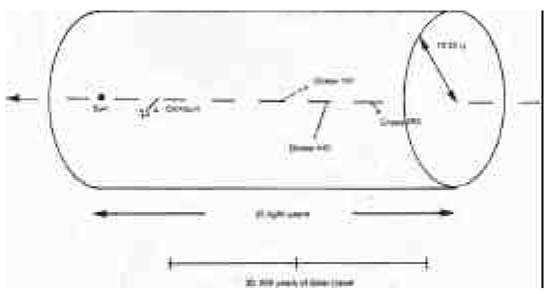

Figure 4. Nearby Stars in the Solar Wake (Click on the figure to view an enlarged version. Caution: Image files are large.)

The sun's path through the space now occupied by the stars listed in Table 1. This space represents the region traversed by the Sun while it quantavoluted from Solaria Binaria into the Solar System we see today.

TABLE 1

STARS BEHIND THE SUN
(to 25 000 Years Ago)

Identification of Star	**Distance from Sun (in ly)**	**Years in the Sun’s wake (see Fig 3-2)**
Alpha Centauri: Triple Star, main sequence componenets, dwarf “G”, “K”, and “M” stars; emission lines in the type “M” spectrum	4.3	4 860
Gliese 191: MO main sequence dwarf star	13.0	14 750
Gliese 440: White dwarf start (class A)	16.1	18 200
Gliese 293: White dwarf start (class t-g)	19.2	21 700

Limiting magnitude of sample + 18

The three remaining stars are all low-transaction objects. This space we would suspect to hold a lower electric charge density than the space closer to the present. The closest of these three faint stars is located within the zone we believe was occupied by the Sun in the time before the eruptions began which eventually broke up Solaria Binaria. That instability of the recent past may well have been created as the Sun passed between the lower and higher regions of the transaction represented by these six nearby stars. The likelihood is that the Sun, late in the Period of Pangean Stability (Table 6), was less luminous than it is today.

TABLE 2

STARS BEHIND THE SUN
(from 25 000 to 75 000 Years Ago)

Time (BP)	Star Name	Type
27 300	Gliese 257	M4 +
33 500	Gliese 341	M0
36 400	Alpha Mensae	G6
47 600	Gliese 269A	K2, Binary
53 500*	Gliese 333	M3
53 500	Gliese 375	M5 +
54 300*	Gliese 391	F3, Subgiant
64 700	Gliese 294A	F8, Triple
68 300	Gliese 298	M
73 800	Alpha Chamaeleonis	F5

Limiting magnitude + 18

* These stars are 25 ly apart, the Sun passes through space at their respective distances at the beginning and end of a 760 year interval.

Extending the Sun’s line farther into the past to the limit of the Gliese catalogue (table 2) we find no stars as luminous as the present Sun until we go back 54 000 years. Then along the path are positioned three stars that exceed the Sun in luminosity. The closest, an F3 subgiant, is five times more luminous; the second, the primary star in a triple system, is only 1.44 times brighter. Its two companions are very faint. The last of the three brighter stars exceeds the Sun’s output eight-fold.

At the 75 000 year limit to Table 2 we reach the edge of the reasonably complete star sample. So far there are no conflicts with our theory. Stars of different spectral classes are well separated in space. In fact the cooler and hotter stars seem to be sorted: the class M stars tend to lie above the Sun's route while the class F and G stars are below it [27].

If our calculated course is correct, the Sun's past behavior, as mirrored in the listed stars' present behavior, would show significant variation in luminosity over the tens of thousands of years represented here. Noteworthy, there are no highly luminous stars thus far along the Sun's trace.

Beyond 65 light-years, the magnitude limit of the available star catalogues containing measured parallaxes limits severely the completeness of the star sample. We can list no stars that are intrinsically fainter than today's Sun (Table 3). The catalogue from which the sample was taken covers only stars whose visual magnitude exceeds 6.25 (Becvar) whereas the Gliese catalogue includes known nearby stars above magnitude 18. Almost all of these stars show some distinguishing characteristic. The majority are binary, another has nebulous spectrum lines. These stars are positioned about the solar antapex in Figure 5. All could reflect plausible conditions for the early stages of Solaria Binaria's Period of Pangean Stability, and possibly also for the earlier Period of Radiant Genesis which followed the binary's creation.

At the limit of our proposed time (about one million years before present) using the *Atlas of the Selected Areas* (Vehrenberg) we count about 39 stars brighter than magnitude 12.5 in a target zone 40 by 40 arc-minutes adjacent to the Sun's antapex. Unfortunately no distances are given for the stars in this atlas.

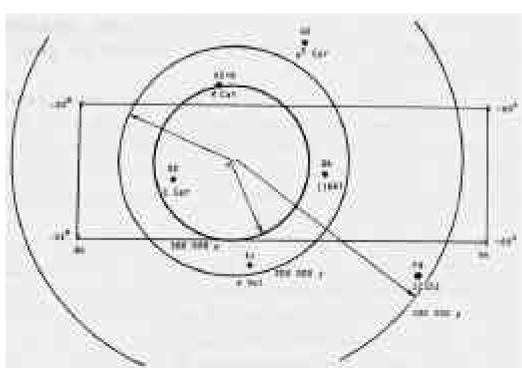

Figure 5. The Solar Antapex(Click on the figure to view an enlarged version. Caution: Image files are large.)

Map showing the brightest stars surrounding the solar antapex (see Table 3). The circles represent the described cylinder of space around the Sun at the ages shown. The successive radii are centered upon a slowly displacing point representing the solar antapex. The displacement, seen at this map-scale, occurs because the Sun rapidly orbits about the center of the Galaxy as it slowly moves through the arms of the Galaxy; its path therefore is a curved rather than a straight line.

TABLE 3

STARS BEHIND THE SUN
(over 75 000 years Past)

Time (BP) (in Thousands of years)	Distance (in ly)	Star Name	Spectral Type
124	112	β Volatis	K1
134	121	C Carinae	A2, binary
139	125	GC 12253	F0, nebulous lines
258	233	GC 11867	G8, binary (M=+1)
301	326	ε Carinae	K0,B; Spectroscopic binary

Limiting magnitude + 6.5

The sample ends at the edge of measured space.

Since our calculated solar target shows no stars the deficiency of the present measurable sample is confirmed. Nevertheless we see that the last listed star, 300 000 years BP along the Sun’s run, is a spectroscopic binary whose class B primary is orbited by a class K secondary; a system not unlike our view of the early Solaria Binaria.

In our analysis more distant stars cannot be located in time along the Sun’s path. Yet we can place, although uncertainly, several bright blue supergiant stars at locations surrounding the antapex in all directions and at distances corresponding to times between one-half and three million years ago. Several of the stars are components in binary star systems. Within or on the periphery of this highly transactive region of space, the original Super Sun may have parturitioned to give birth to Solaria Binaria.

Although proof is hardly forthcoming from this analysis, at least evidence disproving the hypothesis is absent. We are encouraged to retain the idea that the behavior of star systems depends, if only in part, upon the celestial charge level of the space through which they pass. It seems as if this electric charge is contained not only by material residing in the space (stars, atoms, and electrons) but also, in part, as a charge embedded in the space itself, what we shall call a space infra-charge. Literally, the space infra-charge means that a vacuum (empty space) contains normally unavailable electric charges (here electrons) which generate the structure of that space and affect the behavior and properties of all matter occupying the space.

Notes on Chapter 3

20 Incidentally, the Universe, conventionally asserted to be held together by gravity, is said to be 10^{26} meters in radius; the atom, admittedly bound by electricity, has a radius of 10^{-10} meters. These radii are curiously in the ratio of 10^{36} to 1.

21 In practice, the parallax is half of the annual angular displacement of the star, and the base of the triangle, now right-angled, is one astronomical unit.

22 The color index is determined by measuring the brightness of the star through two or more colored filters and comparing the intensities obtained with calculated laboratory profiles of intensity versus wave-lengths for various temperatures.

23 We choose this value from a list of several, spread between 167 ± 30 km/s and 300 ± 25 km/s, the values obtained using different samples of celestial objects (Mihalas and Routly). The choice can never be free of theoretical bias, nor of indeterminate bulk velocities possessed by the sample objects. Here, the choice is a compromise between accepted values for the galactic rotation (Menzel *et al.*) and the higher value derived from measurements within the Local Group of Galaxies (Mihalas and Routly).

24 Negative declinations indicate co-ordinates south of the celestial equator.

25 Because of galactic rotation the cone is bent slightly. Over one million years the path bends eastwards by a shade less than one degree , corresponding to a sideward displacement of 15 light years.

26 See ahead to Table 6 (p.124) for a summary of the periods during Solaria Binaria's lifetime.

27 Given a small error in the solar motion (which is uncertain because the Sun's drift velocity, especially in the direction of the Galaxy's rotation, is variously reported with a twenty percent range), It path could be veering somewhat, either upwards or downwards relative to the path we have calculated. If so in this

period the Sun might have become significantly brighter, or alternatively, remained much fainter than at present.

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