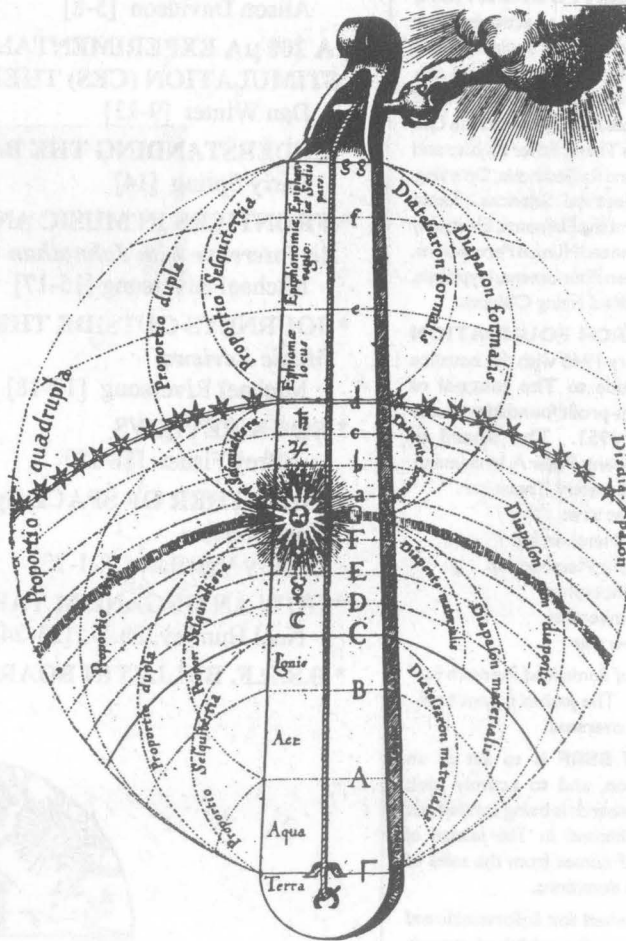


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September-October 1991



THE MUSICAL UNIVERSE

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RHYTHMIC FORMATIVE FORCE

and the evolution of music

Part II

by Michael Brian Theroux



Inquiry into the nature of interval relationships usually leads us on a direct path through the western diatonic or twelve-

tone chromatic foundations of familiarity. Although this discussion will turn to our perceptions of the more common interval relationships through time, we have a need to understand that these particular intervals are a product of artistic invention and not naturally occurring formations of scales and harmonic tissue. Music cannot, and does not rest solely upon unalterable natural laws.

In addressing the melodies of song we find that their alterations of pitch take place by intervals and not by the continuous transition of notes in a scale. "The musical scale is as it were the divided rod, by which we measure progression in pitch, as rhythm measures progression in time."¹ Now if we observe the progression of the interval through musical history, we will almost always find the intervals of the octave, fifth, and the fourth in all musical scales. It has been said that the origin of all scales can be explained by the assumption that all melodies arise from thinking of a harmony to them, and that scales arose from breaking down the fundamental chords of a particular key. But scales existed long before the experience of harmony and ancient composers had no feeling for harmonic accompaniment, as non-harmonic scales are far more numerous than harmonic scales. (see table on pg. 2)

THE TONIC SOL-FAISTS

There really exists only one harmonic scale; one that contains notes with pitch numbers composed of products and multiples of the powers of 2,3,5,7,17,etc., etc., etc., but the term 'harmonic' has been extended to include all tempered imitations of scales and these are not truly harmonic. As for the many and varied systems of tuning, it can be stated that there is

more disturbance in listening to very falsely tuned thirds amidst correctly tuned intervals, than to hear intervals which are all equally out of tune and are not contrasted with others in just intonation. This, and the fact that the high development of contrapuntal music could not have been achieved without the advent of tempered intonation are its only advantages. But, in just or natural intonation, we can really only say that it is natural for uncorrupted ears;



ears that have not become accustomed to tempered intonation. There is quite a complicated calculation of intervals necessary for the completion of the natural scale. The just scale also increases the manual difficulty of performance on instruments with fixed tones, such as the pianoforte, but not so for the singer or the musician who plays on unfretted instruments such as the violin. The natural system is really only complicated to the theoretician whereas musicians may find it an instinctive process provided they allow themselves to be guided by their ear. A fine example is the Society of the Tonic Sol-faists. This is a group

of people in England dedicated to singing in natural intonation. The Tonic Sol-faists represent the tones of the major scale by using the solfeggio, or the Tonic Sol Fa system of notation in which the syllables doh, ray, me, fah, soh, lah, te, with certain modifications, are used in place of notes, staff, clefs and ordinary characters of musical notation. When the tonic changes in modulation, the new tonic is called Doh and is pointed out in the notation. The advantage of this system is that it allows the singer to relate each tone to the tonic whereas ordinary notation gives nothing directly but absolute pitch in tempered intonation. "I think that many of our best musical performances owe their beauty to an unconscious introduction of the natural system, and that we should oftener enjoy their charms if that system were taught pedagogically, and made the foundation of all instruction of music, in place

of the tempered intonation which endeavours to prevent the human voice and bowed instruments from developing their full harmoniousness, for the sake of not interfering with the convenience of performers on the pianoforte and the organ."¹

INTONATION AND THE HISTORY OF MUSICAL PITCH

The intentions thus far have shewn that there are still many avenues of experimentation left to the inventive musician. As for the composers of the Renaissance and Baroque periods, it may be restated that they were the discoverers and architects of the contrapuntal songform and even through their many and varied applications of counterpoint, they still upheld melody above harmonic structure. But, it would appear that with the introduction of equal temperament and the predominance of the pianoforte in composition and instruction, there was but this brief period of exploration into the dimensional possibilities of music only to be woefully overthrown by the newly enthroned harmonical geniuses of modern technical and social conformity.

It may be likened to the discovery of alternating current where once the electrical sciences figured out how to use the energy, they stopped investigating the natural properties of electricity itself.

Upon returning to interval relationships, we need to examine the early theorists methods of determining the interval's virtues. It is fairly obvious that singing was the first music, later to be accompanied by drums and instrumentation, but it would seem that strings (a very late form of musical instrument) are where most experimentation has taken place.

In determining intervals from string lengths one comes across many variables which are not generally considered. On any stringed instrument the string has to rise further and further from the fingerboard as the string proceeds from the nut to the bridge. The pressure created by the finger in stopping the string either on the fingerboard or the fret increases the tension of the string making the note sharper than it would be if it could be stopped at its natural height. This could only be achieved in all practicality by the use of a slide such as used in slide guitar, but even then the results cannot be considered accurate. So, the law that the number of vibrations is inversely proportional to the length of the string can be at best an approximation. Moreover, the margin of error is wholly dependent on the compositional structure of the string; diameter, temperature, and material ingredients of the string being most important. Therefore, the old intervals are not so accurately tuned.

Musical pitch (tuning pitch) has undergone continual change throughout history. Tuning pitch or the tuning note is here classified as the 'A' of the violin from which the pitch number of all other notes in the scale must be calculated from the temperament and method of tuning in use. Now, the pitch of musical instruments has always varied greatly and "...since the ancients were not accustomed to play in concert with all kinds of instruments at the same time, wind instruments were very differently made and intoned by instrument makers, some high and some low."³ It is well known that for higher instruments such as the mandolin, trumpet, violin, etc., the higher one tunes, "the more freshly it sounds and re-sounds."³ For the deeper instruments, the lower they are tuned, "...the more majestic and magnificent is their stately march."³ The general rise in standard tuning pitch began at the Congress of Vienna in 1814, when the Emperor of Russia bestowed upon his Austrian regimental band new and sharper instruments. This band became noted for the brilliancy of its music, and gradually tuning pitch at Vienna rose from A' 421.6 cycles per second (Mozart's pitch), to A' 456.1 cps or nearly three quarters of a tone. As far as recorded history is concerned, standard pitch has undergone changes from Delezenne's A' 373.1 cps (1640?) to Steinway's orchestral pitch of A' 460.8 cps (1880) and seems to have stabilized at around A' 440 cps today.

CHARACTER OF MUSICAL KEYS

It is now apparent that there are many modifications of interval relationships, intonations and standards of pitch pertaining to the art musical. These anomalies do have a remarkable influence on whether or not each

particular key in music possesses its own individual character. One must understand, however, that only specific instruments will allow for the distinction between keys. If we were to choose an instrument of fixed tones with uniform tuning, and magnitude (such as the synthesizer and other electronic instruments usually of the keyboard type) one could not distinguish between the absolute character of keys. On the other hand, there is a decidedly contrasting character in the disparate keys on stringed instruments which the following experiment may reveal. If we take two different instruments, tuning one in such a fashion that its D flat is the same as the C major of the other, we will notice that on both instruments the C major retains its brighter and bolder character while the D flat remains soft and veiled. This is of course due greatly to the differences in the quality of tone of strings which being stopped at different places on the fingerboard will no

doubt alter the intonation in comparison to the open string's perfect intervals of tuning. Differences of character on wind instruments can be even more striking.

SUMMARY OF THE ABOVE FINDINGS

In review of the above material, we can see that all intervals suggested are mere interpretations of approximations due to intonational differences, pitch differences, etc., and no two can really be alike. When we speak of the interval of the fourth, fifth and so on, we are really speaking of the ideas that these applied titles represent. Our perception of intervals rests solely upon how we divide the octave, be it into twelve equal parts or one hundred unequal parts as the octave is our only musical boundary. The definition of intervals can only be limited according to esthetic and artistic creation. However, whether fortunate or unfortunate, our musical history demonstrates a

Most Ancient Form of Greek Scales with 7 Tones and Octave.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
25. Lydian	o	182	386	498	702	884	1088	1200
26. Phrygian	o	182	316	498	702	884	1018	1200
27. Doric	o	90	294	498	702	792	996	1200
28. Hypolydian	o	204	386	590	702	884	1088	1200
29. Hypophrygian (Ionic)	o	204	386	498	702	884	1018	1200
30. Hypodoric (Eolic)	o	204	294	498	702	792	996	1200
31. Mixolydian	o	112	294	498	610	814	996	1200

Later Greek Scales with Pythagorean Intonation.

32. Lydian	o	204	408	498	702	906	1110	1200
33. Hypophrygian (Ionic)	o	204	408	498	702	906	996	1200
34. Phrygian	o	204	294	498	702	906	996	1200
35. Eolic	o	204	294	498	702	792	996	1200
36. Doric (same as No. 27)	o	90	294	498	702	792	996	1200
37. Mixolydian	o	90	294	498	588	792	996	1200
38. Syntonolydian	o	204	408	612	702	906	1110	1200

Al Farabi's Greek Scales as reported by Prof. Land.

39. Genus conjunctum medium	o	204	408	590	702	906	1088	1200
40. Genus duplicatum medium, or ditonium (same as No. 38)	o	204	408	612	702	906	1110	1200
41. Genus conjunctum primum	o	204	435	639	702	933	1137	1200
42. Genus forte duplicatum primum	o	204	435	666	702	933	1164	1200
43. Genus conjunctum tertium, or forte æquatum	o	204	386	551	702	884	1049	1200
44. Genus forte disjunctum primum	o	204	435	617	702	933	1115	1200
45. Genus non continuum acre	o	204	471	622	702	969	1120	1200
46. Genus non continuum mediocre	o	204	520	639	702	1018	1137	1200
47. Genus non continuum laxum	o	204	590	664	702	1088	1162	1200
48. Genus chromaticum forte	o	204	471	690	702	969	1088	1200
49. Genus chromat'um mollissimum	o	204	520	613	702	1018	1111	1200
50. Genus mollissim. m ordinantium	o	204	590	647	702	1088	1145	1200

Arabic and Persian Scales as reported by Prof. Land.

51. Zalzal, see No. 66	o	204	355	498	702	853	996	1200
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Highland Bagpipe made by Macdonald of Edinburgh.

52. Observed	o	197	341	495	703	853	1009	1200
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Modern Arabic Scale as reported by Eli Smith.

53. Meshāqah, theoretical	o	200	350	500	700	850	1000	1200
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Excerpt from table of non-harmonic scales.¹

natural leaning toward a diatonic and twelve-tone chromatic system which we as its creators can not ignore.

THE SPIRITUAL SIGNIFICANCE OF INTERVALS

The real experience of the interval is most appreciated by our thoughts, feelings and by our spiritual being. Music can reflect such sundry and diverse characters of motion as "Graceful rapidity, quiet advance, grave procession, and wild leaping, ...and as music expresses these motions, it gives an expression also to those mental conditions which naturally evoke similar motions, whether of the body and the voice, or of the thinking and feeling principle itself."¹ As thoughts and feelings march about, so do the melodic motions of tones, by imitation and expression. We may deal with the multifold complexion of motion in music at a later time but, for now, let us deal with our awareness of consonant intervals.

FROM THE OCTAVE TO THE SECOND

The true feeling for the octave has really not yet been developed in humankind. As one may perceive the differences that exist between intervals up to the seventh in relation to the tonic, one cannot actually discriminate between the octave and the tonic on a spiritual level. We simply do not use the octave in the same manner as the other intervals. Although, we can certainly distinguish the difference between the tonic and its octave by difference of frequency, we have not yet acquired its feeling, and this will be developed in time. "...in the future the feeling for the octave will be something completely different, and will one day be able to deepen the musical experience tremendously, ...and will become a new form of proving the existence of God."⁴

Returning to an earlier period in human evolution, all musical experience (according to Steiner) saw its first development in the Atlantean age with the experience of the seventh (these concepts will start to make more sense as the other intervals begin to unfold). If we could go back to this age, we would find that the music, having little resemblance to today's music, was arranged according to continuing sevenths and all other intervals were absent. This experience, which has become an unpleasant effect as of the post-Atlantean era, was based on the interval of the seventh through the full spectrum of octaves and gave one the feeling of transportation from our earthbound existence. This feeling of the seventh eventually became somewhat offensive and was replaced by the feeling of the fifth as the human being wished to incarnate more deeply into the physical body.

Music that progresses in fifths is actually still connected to the transported feeling of the seventh by experiencing motion outside of physical organisation. This becomes more evident when we take the scales through the range of seven octaves and realise that it is possible for the fifth to manifest itself twelve times within these seven scales. This, of course, has always been considered a Pythagorean invention for it has been stated (historically) that he constructed the whole diatonic scale from this series of fifths thusly;

F + C + G + D + A + E + B,

and calculated all intervals from the above scale. The fact is, the Greek scale was actually derived from the tetrachord, or divisions of the fourth. If we proceed upwards from C by fourths, we obtain:

C F B \flat E \flat A \flat D \flat G \flat C \flat F \flat B $\flat\flat$ E $\flat\flat$ A $\flat\flat$ D $\flat\flat$,

and if we continue downwards we get:

C G D A E.

The notes after G \flat in the first series, are actually:

B E A D G C,

and are the same as those related to by Abdul Kadir, a celebrated Persian theorist of the fourteenth century. This system can be seen throughout the whole Arabic and Persian musical system which seems to have developed before the Arabian conquest, and "...shews an essential advance on the Pythagorean system of fifths."¹ (Note that the Arabic lute is tuned in fourths.) All of this is really only important for its historical significance in reference to our interval experience.

In the earlier music of the fifths, the

human being felt lifted out of the physical. We still find remnants of this in the pentatonic scales of the Chinese and the Gaels. Many of the ancient Chinese, as well as Scotch and Irish tunes have neither a fourth nor a seventh in them. As far as these Celtic melodies are concerned it may be of some interest that early bagpipes (upon which, most of this music was composed) were constructed without these two intervals. In most of their melodies, the omissions in both major (the 4th and the 7th) and minor (the 2nd and 6th) scales are so premeditated as to avoid the intervals of a semitone, and are replaced by intervals of a tone and a half (see below). This, of course, gives the music a certain quality which may indeed give one the feeling of being transported to the 'Land of Faerie'.

With our experience of the fourth, we may reach out to the forgotten self in the spiritual sensations of the fifth, and also return inwardly to our inner being in the experience of the third. Our common 1-4-5 progression exhibits this border phenomenon of the fourth. In the experience of the fourth, we may move about between the spiritual and physical worlds. The sixth also expresses this border sensation only on a higher level.

Now we may come to the most significant experience in the interval of the third. Something new appears with the arrival of the experience of the third. Now we can encounter the feelings aroused by major and minor keys. With the third we can color the musical entity with mood, and this displays for us the inner life of feeling. This is the predominant experience of the present age, or the age of introver-



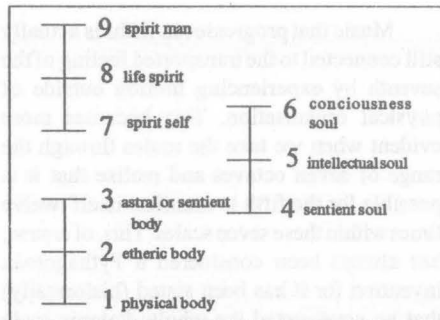
Without the second or sixth: The Scotch air, Cockle Shells.



Without the fourth or seventh: A Chinese temple hymn.

sion. As the more inward element tends toward the minor side, the more outward element tends toward the major side. If we consider the seventh's role in our present age, we see that minor and major sevenths tend to rule composition in what is considered popular music. This appears to be the channel of enslavement most have come to accept, although it is not an eternal predicament.

The perception of the interval of the second establishes the intensification of our inner life, and this is only a recent experience. It is usually only encountered under the guise of the ninth chord which brings us to an interesting conjecture. In ancient traditions our sevenfold nature is referred to quite often. Spiritual experience of that age had developed in part from the observation that the number of planets in the solar system corresponded to the seven scales and that the twelve signs of the zodiac equalled the twelve fifths of the seven scales. But, a disturbing revelation came with the changeover from the ancient geocentric system of seven planets to the modern helio-



centric system of nine, rendering the system of correspondences imperfect. One may see the blooming of our technological and materialistic age from a galloping (or should we say hobbling?) science of discovery taking shape in some of the more recent musical trends as well. Discovery without regard to spiritual interpretation may not always be such a good thing.

In conclusion, we can view the whole of the experience of the intervals from Rudolf Steiner's graphic depiction as seen above.

Since 3 and 4 overlap, as well as 6 and 7, Steiner has cleverly arrived at the human being's sevenfold nature through a ninefold organisation.

*"The facts of human evolution are expressed in musical development more clearly than anywhere else."*¹⁴

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Fresh Transplutonian Info

SCIENTISTS SAY THEY FOUND PLANET OUTSIDE SOLAR SYSTEM

British astronomers say they have discovered the first planet ever to revolve around another star. These scientists said that radio measurements provide "indirect but persuasive evidence" for a planet 10 to 12 times as large as the earth to be orbiting a pulsar some 20 to 30,000 light years away near the constellation Sagittarius.

Some astronomers are not sure how a planet could exist around a pulsar as they do not see how it could have survived the near destruction of its parent star millions of years before. They're apparently basing their findings on the peculiar characteristics of the pulsar, which as it spins it emits pulses of electromagnetic energy about three times

A PLANET THAT ORBITS A PULSAR

British astronomers claim to have discovered the first known planet outside our solar system. The planet orbits a very dense, compact star called a pulsar.

SUN

Center of Milky Way

Approximate location of star

COMPARATIVE SIZE:

New planet
about 10 to 12 times the mass of Earth and two or three times bigger

Pulsar
about 20 miles in diameter

Earth
7,930 miles in diameter

The planet orbits its star at about the distance that Venus is from our sun. Its orbit takes six months. The discovery was made by analyzing pulses of radio waves from the star. The pulses varied in speed as the orbiting planet pulled the star back and forth.

Pulsars spin and emit pulses of electromagnetic energy.

Source: Nature, Discovering the Universe

a second. This 'blinking' of the pulsar is an extremely precise clock, but the astronomers found that at times the PSR1829-10 (the pulsar's handle) pulsed fast or slow by up to one-hundredth of a second.

The simplest explanation that these scientists have come up with is that the pulsar is being alternately pulled about 750 miles closer and 750 miles farther away by an unseen companion.

David Black, director of the Lunar and Planetary Institute in Houston, said operators of other radio telescopes will immediately check the British observations. Black says, "Everybody wants to find a planet, and this is the best candidate yet. ... We should get confirmation within a year."

MBT

CHRONICLE/ASSOCIATED PRESS GRAPHIC

PLUTO

and beyond

Alison Davidson

As Pluto orbits in its wide sweep the remote reaches of our solar system it encompasses all of the other planetary bodies within its sphere. They are all touched with Pluto's influence, the outermost, enigmatic wanderer.

Astronomers have little to say about Pluto, so distant it is a thousand times fainter than its nearest neighbour Neptune, so small its diameter is estimated to be only 1400 miles, about the size of Mars. The great distance of Pluto, at its maximum orbit around 4,600,000,000 miles from the Sun, gives it a year equal to approximately 250 Earth years. Thought to be coated with a surface of methane ice Pluto is, in comparison to our warm and sunny Earth, a remote and shadowy glacial world, an infinitely strange and lonely outpost receiving and transmitting the solar and galactic forces.

Although the astronomer Percival Lowell is generally credited with the calculations leading to Pluto's discovery in 1930, it was an amateur astronomer at the Lowell Observatory named Clyde Tombaugh, who spotted the tiny moving star-like object in a series of photographs taken of the night sky. But the true nature of Pluto only came to light in 1978 when James Christy of the US Naval Observatory discovered a large orbiting satellite, half the size of Pluto itself and twenty times closer to Pluto than our Moon is to Earth, which he named Charon. Scientists speculate through spectroscopic analysis that Charon, unlike Pluto, is covered with a surface of water ice. Together these mysterious twins are locked in rotation, turning their faces forever towards one another "like two dancers who spin one another around an invisible center."

As the only binary planet we know Pluto is unique in our solar system, but its orbit is also quite unusual being more markedly elliptical than any of the other major planets. The orbital planes of all the other planets lie within 7° of the plane of the Earth's orbit, called the 'plane of the ecliptic,' but the orbit of Pluto is inclined 17° to that plane. In comparison, the plane of Uranus is less than 1°, the closest to that of Earth.

During its innermost orbit Pluto swings in closer to the Sun than Neptune, a rare event and one we are now witnessing as Pluto moved into this position in 1978 (the year of Charon's discovery) and will remain there until 1999.

THE PLUTONIAN FACTOR

Since Pluto's discovery astrologers have been greatly interested in defining the nature of its influence, both on an individual and on a planetary level. Through studying countless birth charts a picture of the Plutonian character has emerged, but like the planet itself there is an unfathomable quality to the Plutonian forces.

"It seems there is always something hidden about Pluto," astrologer Stephen Arroyo writes, "something subtle and difficult to conceptualize in ordinary logical terms... Pluto always symbolizes a form of *extremely concentrated power*. This power is so intensely concentrated that the physical shape or size of Plutonian phenomena (like the planet itself) is irrelevant...although smaller than the Earth, its "influence" affects life on Earth in a proportion far greater than its size would indicate."

Described as a tremendous force for transformation, Pluto represents processes that are essentially unseen and unconscious, operating at a level hidden deeply beneath the surface of life. Although discovered and named so recently, it is curious to see how closely Pluto's nature is allied with the deity after whom it was named. In magical traditions it is believed that the power of a thing is contained in its name, that to use the true name of something is to invoke its power, which makes one wonder how strongly the naming of a planet affects the influence of that sphere on life and human consciousness. If the planets had been given different names, would different forces have been invoked, with correspondingly different effects on Earth? Although this seems a far-fetched idea, consider the fact that the gods ruling the planets since Greco-Roman times have been a predominantly male hierarchy witnessing, and also helping from their lofty abode, the rise and entrenchment of powerfully patriarchal religions across the world, hostile to any expression of female spiritual strength. Only two goddesses are admitted to our planetary pantheon -- Luna and Venus -- the others, on the whole, are named after warring kings and jealous tyrants. Mercury alone is ambivalent, the androgynous one. If the planets had been named instead after goddesses of ancient power, would there have been a corresponding elevation of the female principles, a reverence towards the beauty and life-giving power of Nature instead of the destruction, fear and violence which characterize our times?

In Greek mythology Pluto was the fierce and inexorable god of the underworld, ruler of the invisible universe, the 'nether' or 'other' realm which lies beyond the world of the living. According to this story Pluto seized the goddess Persephone and carried her off to his lower world to live for six months of every

year, a myth closely connected with the growth and fertility of corn and the vegetation on earth, as both Persephone and her mother Demeter were ancient corn-goddesses symbolizing the mysteries of birth and death, the cosmic rhythms of the seasons, of light and darkness.

"Pluto can be said, in one sense at least, to symbolize the seed falling into the humus made of the dissolved and chemicalized remains of the ending cycle of annual vegetation (the product of a Neptunian process of dissolution)," astrologer Dane Rhudyhar comments.

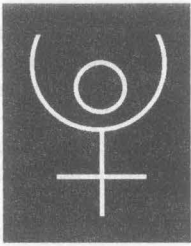
Buried deeply within the earth the structure of the seed is destroyed to give birth to a new form of life. Its roots remain forever in the dark spaces of the night but its sprouting leaves are drawn upwards to the light and warmth of the Sun. Likewise the physical body at death decays and returns to the earth but the soul, on entering Pluto's darkness, is ferried by Charon the boatman across the river Styx, and passes through the underworld into the light of the spiritual Sun.

Being the regents of the lower world Pluto and his queen Persephone also control all of the treasures found underground, especially the metals whose source lies in the dark womb of the earth. Mined and extracted, smelted and cast, Pluto's treasures have been brought into the world and created our civilization. Without these gifts of Pluto there would have been no bronze or iron age, no industrial revolution, no sophisticated technology as we know it. But do we ever stop to wonder where the metals we take for granted come from, of the chain of events that brings iron, for example, from one part of the world to be processed in giant steel mills in another part, and passing through further factories and countless hands reaches the store where we exchange more metal in the form of money for the final product. If by some chance the source of our metals vanished, if we could no longer obtain anything made from metals, our way of life would be totally transformed -- almost overnight we would find ourselves returned to live in a new stone age.

"THE TRANSFORMER"

From the mid-1980s to the mid-90s Pluto is not only in its closest orbit to earth but is also passing through Scorpio, the zodiacal sign it rules, a time remarked upon by astrologers as a period of crucial and revolutionary changes both in human consciousness and in the structure of the planet itself.

In the power of the sacred substances hidden underground which evolve and grow according to their own laws, Pluto's dual nature of transformation is expressed. "The



ancient miners who brought metals up out of the earth and treated them in their furnaces thought of the metals as seeds planted in the earth by gods," writes Michael Jones.² But while metals have been

used with reverence throughout history to create tools and implements useful to humanity, objects of beauty, art and worship, these precious substances have also served to place fabulous wealth in the hands of a few select cabals.

While individual artisans still honour the beauty and soul nature of the metals with which they work, the vast multinational corporations who now control most of the mining operations throughout the world no longer have any regard for the spiritual qualities of the metals. For them these "condensations of the stars" exist purely for personal profit and power. It is not surprising then that Pluto is found to be a strong influence in the birth charts of bankers, powerful industrialists and politicians, the corporate gangsters who are mainly responsible for the stripping and poisoning of Nature, adept at the manipulation of public opinion while keeping their own motives well hidden.

It's interesting to note in passing that Pluto's discovery coincided with the first television transmissions by Philo Farnsworth, an invention that has transformed the world perhaps more than any other during this century. What a tremendous tool for education and creative adventures it was first thought, until the authorities also recognizing television's revolutionary potential, took control and turned it into a vehicle for propaganda and brainless violence.

But while the Plutonian shadow masters scheme and plot for ultimate global power, other forces are stirring, elemental forces which are far beyond even their control.

Deep in the earth beneath our feet Pluto's passing is marked by increasing seismic activity as tremendous chthonic powers build up in the movement of vast tectonic plates to discharge unpredictably in earthquakes and volcanic eruptions. Ancient prophecies warn of catastrophic events to come, of earthquakes tearing the land apart, submerging whole continents and pushing up new land from the ocean floor. Ancestral memories of Atlantis and Lemuria linger to haunt the imagination of ancient upheavals that destroyed most of the Earth's inhabitants and sent the survivors to live in subterranean caverns. There is an underlying tension and unease in the world of Nature, an increasing apprehension of the dam-

age that humans have inflicted upon the planet. How much more abuse can the organism of the Earth tolerate before it begins to die?

As 'the transformer' Pluto destroys the old, the outworn and outgrown to make way for the new, breaking through any blockages to evolutionary growth and demanding change when its tremendous creative potential is resisted. Its influence is seen in the sign Scorpio, in the hidden processes of sex, death and regeneration, the unseen mysteries in the world of nature and spirit, described in the *I Ching* as "the mysterious place where all things begin and end, where death and birth pass one into the other."

On a personal level Pluto compels us to confront our deepest desires and fears, the atavistic forces and memories of the past that are a deep and driving influence behind our actions; the fear of death and what lies beyond. Death is the forbidden subject for westerners, even more so than sex. It is dangerous and irrational and may force us to look into the unknown from which we came, and into which we will all return.

While the ancient traditions taught a thorough knowledge of the death process and the future life of the soul as shown, for example, in the *Tibetan Book of the Dead* and the *Egyptian Book of the Coming Forth By Day*, such knowledge is abysmally lacking in modern religion. When someone dies the vultures gather, to claim the body for the sanitized mortuary, and the soul for heaven or hell. While the Egyptians provided a system to guide the souls of the dead through the labyrinth of the underworld, there is no way out of the christian hell. But with a knowledge of the actual process of death, through all the stages of dissolution and detachment from the material, etheric, astral and other more subtle bodies, the soul is consciously aware of its own transition into the spirit world. With knowledge the fear of death dissolves, and it becomes easy to understand why our ancestors celebrated birth and death equally with joy.

With Pluto's passage the taboos of the old order which have served to bind the soul into a rigid and artificial morality and dependence on external authorities are breaking down, and in the deeply ingrained taboos surrounding sex and death are found potent keys to the occult knowledge and power which lies beyond orthodoxy, a knowledge which is based not on dogma and superstition, but on a direct perception and understanding of Nature's cycles.

ANCIENT OF ANCIENTS

On the Qabalistic Tree of Life Pluto is attributed to the first cosmic sphere called Kether, the Crown, and "the Hidden Intelligence," but rather than a sphere Kether repre-

sents the ultimate *point* of power which emerges from the primal chaos. Described as "the intensest form of existence, pure being unlimited by form or reaction... underlying, maintaining, and conditioning all," Kether is also "the abyss whence all arose, and back into which it will fall at the end of its epoch."³

"Pluto represents the outermost power-zone, the pylon set at the utmost rim of the planetary system beyond which stretch the vasts of Outer Space," occultist Kenneth Grant writes. "When applied to the microcosm (the world of human consciousness) Pluto represents the pylon at the gates of the sanctuary of Inner Space. Kether, the Crown of the System in the Outer and in the Inner, is thus equivalent to the Height (and Depth) of physical and psychological space.... It is the ultimate gate to both Outer and Inner Space."⁴

As the most intensely concentrated point of cosmic power, Pluto signifies the *bindu* or seed of creativity from which all form evolves, from the simplest geometric form to the most complex organic systems. Here is the source of primordial cosmic energy, identical to the orgone energy of Dr Wilhelm Reich which he isolated and scientifically verified, the basis of all the natural fields of force in the world and the vehicle of the life-force in the human organism. It is this raw psycho-sexual energy which is taken and transformed by way of an inner alchemy into magical and spiritual power.

Artist and occultist Michael Bertiaux describes this potency of Pluto as "the fundamental magical energy at the root of sexual radioactivity,"⁵ the energy which fuels the traveler of inner space and the gnostic explorer who seeks illumination in the hidden mysteries. Symbolized by the black dragon in its dormant state, this serpent power is aroused from its sleep at the base of the spine and raised through the subtle energy body to its height in the Crown centre, the Thousand Petalled Lotus above the head to bring "a knowledge of the divine beyond any human concepts."

But always manifesting in opposites there is a shadow side to Pluto, a dark and chaotic realm of primordial power evoked from the depths of the unconscious in such grimoires as the *Necronomicon* given life by H.P. Lovecraft who calls Pluto by the secret name of Yuggoth, ruler of qliphothic and alien nether worlds haunting the void between the stars, a brooding ancient intelligence ever seeking entrance to the human world.

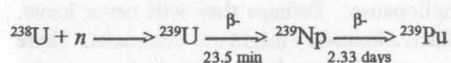
THE "DARK SEED"

There is no metal which traditionally corresponds to Pluto as the Sun does to gold, or silver to the Moon. Although a kinship was shown between the Uranian energies, electricity and radioactivity, and Neptune evoked the

invisible ocean of etheric forces which underlies the material world, with Pluto we are dealing with the *source* of all the various energy fields, with the immeasurable qualities of the soul, with evolution, with creation and annihilation.

But if we were to take a substance to *symbolize* the intensely concentrated Plutonian power in its most negative and destructive aspect, we could choose the heaviest element known on Earth which shares its name -- plutonium. The discovery of nuclear fission in the 1930s coincided with Pluto's discovery, and some 12 years later the silvery metal plutonium was isolated for the first time (it was also the first creation of a synthetic chemical element) marking our entrance into the atomic age and the beginning of a potent transformation of life upon this planet. Scientists had discovered how the structure of an element could be destroyed and, more importantly, the enormous amount of energy released in the process.

Plutonium is not a metal found naturally on earth, except in extremely minute quantities, rather it is a man-made, artificial element created by the neutron bombardment of uranium; the uranium first forms neptunium which is then transformed into plutonium.



Because it is so extremely toxic, plutonium requires special handling. All work is carried out inside 'glove' boxes filled with helium or argon to prevent the plutonium and its alloys from being attacked by moisture and atmospheric gases, and to prevent the workers from ingesting or breathing even the smallest quantity.

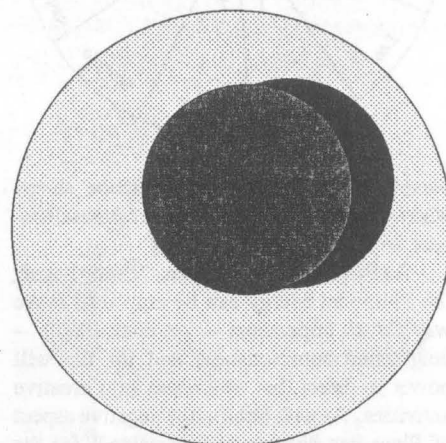
Used in nuclear power reactors throughout the world plutonium is a lethal but concentrated fuel where one lb of the substance is said to be equal to 10 million kilowatts of electricity. It is also used to power the fantastically expensive space exploration into the outer regions of the solar system, such as the Voyager expedition, and on the Apollo lunar mission to power seismic and other experimental instruments placed on the Moon's surface.

But the first nuclear reactors were for the military to produce plutonium as an explosive ingredient in nuclear weapons -- it is produced primarily to kill. Atomic scientists and the governments that fund them have discovered Pluto's power to destroy substance and life, but they are powerless to control the consequences.

The greatest danger of plutonium is not only as an explosive but also in its storage and the disposal of its waste. In his book *Atomic*

Suicide Dr Walter Russell describes plutonium as the most deadly of all the radioactive metals. "Its great importance as a killer, lies in the fact that it loses only half of its radioactivity in 23,000 years. Its primal effect upon the human body is in its direct attack upon the bone marrow where human blood corpuscles are formed. Together with strontium, these super calciums could cause more defective skeletal births and agonizing deaths than any plague heretofore known to have hurt mankind."

Radioactivity also attacks the human reproductive cells; the hidden processes of sex and procreation ruled by the zodiacal sign of Scorpio, the fusing of sperm and egg in the body at conception are the very areas most



Charon casts its shadow over Pluto in this graphic representation

vulnerable to damage. According to a statement from the National Academy of Sciences:

"Any radiation which reaches the reproductive cells causes mutations that are passed on to succeeding generations. There is no minimum amount of radiation which must be exceeded before mutations occur. Any amount, however small, that reaches the reproductive cells can cause a correspondingly small number of mutations. The more radiations, the more mutations. The harm is cumulative. The genetic damage done by radiation builds up as the radiation is received, and depends on the total accumulated gonad dose received by people from their own conception to the conception of their last child."

The danger is not only to human reproduction but to all species, as the matrix of the seed pattern itself is altered, gradually making regeneration impossible and causing widespread sterility in every form of animal and vegetable life. There is little protection from radioactivity, the silent and invisible killer... "The idea of constructing shields of any material at all

for protection against uranium and plutonium is only a temporary expedient." Russell warns. "The time will come when the shields will be as dangerous as the cause. The time element may be long, but when that time comes, the greatest migration history has ever known will take place, and its road will be paved with millions of dead, largely from leukemia which will rapidly increase until it becomes a scourge."

This is the fear of the nuclear shadow under which we live; that life on earth will be destroyed and the world turned into a barren wasteland.

OCCULT PLUTO

"Nuclear power is a frightening symbol of death and decay. It sums up the horror of our times." Michael Jones

There exist two forms of motion in Nature, one that builds up and creates, and the other that breaks down and destroys depending on whether the driving force is centripetal (moving towards the centre) or centrifugal (moving towards the outside). In Nature there is a continuous interplay between these two opposing forces but modern technology, particularly nuclear technology, concentrates on the destructive force of explosion.

Apart from the devastating physical destruction caused by nuclear explosions there is a more subtle and insidious damage inflicted on the invisible etheric web which underlies and sustains the material world. While based in the desert during his rain making experiments Dr Wilhelm Reich commented on the state of the atmosphere after atomic tests, producing what he called DOR or Deadly Orgone Radiation that filled the desert, seeming to suck the life-force from the atmosphere, the earth and all living beings.

The research of some contemporary occultists has also focussed on the repercussions of nuclear technology on the subtle energy body, the aura of the Earth and the human being.

"Our world is surrounded by a thin atmospheric skin which protects and sustains the balance of life on Earth, but when a breach is made in this protective ionized envelope the delicate balance is destroyed. Nuclear explosions release tremendous pulses of electrical energy from the spaces between the nuclear particles, and as the very fabric of matter is torn asunder these forces rend holes in the protective ionized barrier of our atmosphere... Through this breach internal forces can escape or external forces seeking entry can pour through."

"Pluto opens the gateway of Chaos," Grant writes, "the way of reversal to the 'nightside' of the Tree of Life" He goes on to

say: "These forces which have been gaining momentum through successive aeons, are pouring astrally from the averse side of the Tree and are threatening to overwhelm human consciousness with the waves of negative vibration that underlie all positive (i.e. phenomenal) existence. It is not therefore surprising that sensitive souls are now recoiling in horror because they have seen -- in the swirling black mirror of the abyss -- the shades massing for an unprecedented influx into the cosmos."⁴

In this bizarre Plutonian world where art and magic join in their most extreme forms, ancestral memories merge with visions of the future to give fleeting glimpses of strange and alien worlds, transmissions from trans-Plutonian dimensions beyond any human point of reference. Evoking the mythology of primordial powers, of the Ancient Ones who stir restlessly in the depths of pre-human memory, Bertiaux observes: "Dagon will come again, as will mighty sorceries... for the mighty beasts of the deep have been unleashed and they have gone about their pathway of destruction, and far worse is expected..."

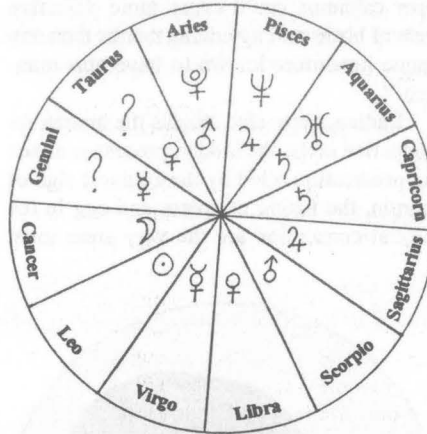
Alone the shaman in native traditions descends into the underworld, into the vertiginous qliphotic tunnels of the soul to confront the demons of darkness within, to overcome these monstrous projections and discover the knowledge and power within.

Today there is no need to seek the underworld beyond. Through the forces unleashed by nuclear technology the whole human race has descended into Pluto's sub-atomic realm, or rather the underworld has risen to meet us, called up by a profane science which worships death over life.

But it is not only in nuclear technology that the death-wish of our civilization lies, although the domed reactor temples are the ultimate symbol of humankind's insane race towards destruction. We now live in an unreal, artificial, backwards world, no longer fed and nourished by Nature. Our rivers and lakes are dying, polluted and stagnant, our forests and wilderness are rapidly being destroyed. Our agricultural land poisoned with chemicals and pesticides grows poisoned food for our children to eat, even the oceans have increasing "dead zones" where nothing lives any more. Once sacrifices were made in return for the precious metals and treasures given in trust to humans by the subterranean gods and spirits. Now they are repaid with underground nuclear blasts which reverberate throughout the planet. Surrounded by the death of Nature, we have become the souls seeking passage through the darkness of Amenta.

But returning to the myth of Pluto, and even our existence will be a myth in some future aeon, we remember Persephone who

was abducted to live in the realm of death but who returned to the sunlit world for half the year, to become the queen of both. In Pluto all polarities, all extremes are mated; the destruction and creation, the pain and the healing, the Dark Ages and the Ages of Illumination. The influence of Pluto is shown in every birth chart, and any aspects it makes with other



planets in the individual horoscope shows where the deepest metamorphosis of consciousness will take place.

As Stephen Arroyo writes: "In any house, the Plutonian energy can be tapped to make way for an impersonal -- yet controllable -- heightened consciousness and for the will power to direct that awareness into creative activities. As with Saturn, the negative aspect of Pluto has been over-emphasized; for the real power of Pluto only becomes negative if we are seeking to interfere with its work."¹

WHAT LIES BEYOND PLUTO?

"...hear the mournful sigh of the vortex, the mad rushing of the Ultimate Wind that Swirls darkly amongst the silent stars."⁸

The search for more distant planets continues. Scientists say that Uranus and Neptune have perturbed orbits which cannot be caused by Pluto and Charon alone, theorizing another giant planet "X" that is yet to be found. Some have imagined a dark companion to the Sun (a hypothetical dark star like the dwarf companion to Sirius) which they call Nemesis, while Soviet astronomers have speculated, from the orbits of groups of comets, that two other planets might be present -- at 5 billion and 9 billion miles from the Sun, with orbits of thousands of years.

They suggest that the orbits of these infinitely distant planets periodically (over millions of years) disturbed comets, some of which collided with the Earth. "A large planetary body moving in an orbit reaching to the Oort cloud of comets, possibly in a highly inclined orbit, would dislodge comets each

time the planetary body passed through the aphelion of its orbit," possibly accounting for past cataclysmic events on our planet.

Astrologers have also speculated on the existence of two further planets to complete the zodiacal pattern of 12. In the diagram to the left, Carl Payne Tobey shows how the discovery of Uranus, Neptune and Pluto logically fits in with this pattern. In this system he assigns the creative energies of Pluto to the fire-sign Aries, to co-rule Scorpio, but two spaces yet remain to be filled.

Zecharia Sitchin also attempts to prove the existence of a 12th planet known to the Sumerians by drawing on ancient Mesopotamian texts, such as one tablet transcribed as meaning "all in all, 12 members where the Moon and Sun belong, where the planets orbit," and another Sumerian list of 24 celestial bodies that paired the twelve zodiacal constellations with twelve members of the solar system. In occult lore, Grant names this planet, describing Pluto as "the gateway to transplutonic æthers (dimensions), symbolized by the planet Isis."

While the Pioneer and Voyager spacecraft travel deeper into space never to return to Earth, scientists wait in anticipation to find out where the Solar System ends and interstellar space begins, a boundary they refer to as the heliopause. Perhaps they will never know. Such a boundary might not even exist. There are no arbitrary boundaries in inner space, only an infinite unfolding of consciousness.

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A 200 μ A EXPERIMENTAL CEREBRAL ELECTRO-STIMULATION (CES) THERAPY UNIT, Part II

Circuit and Construction

by Dan Winter

Referring to Fig.1 the machine has 7 sections -- an astable oscillator, a 7 stage binary divider, a D-C level shifting section, a white noise voltage source, a mixer/amplifier section and a voltage controlled constant current source (VCCS) output. Plus, this is all powered by a dual polarity (+or-12V), regulated power supply. This is a very straight forward circuit. The CD4093 quad, nand, Schmidt trigger chip has one section used as a simple, wide range, astable oscillator. The 4093 was chosen because it was found to be an exceptionally stable oscillator even when the other 3 sections were used as oscillators at near and multiple frequencies. The output of the 4093 is divided by 64, by the CD 4042 divider chip. This provides two advantages: (1) The astable oscillator doesn't have to operate at ultra low frequencies allowing the use of smaller value components in that section and (2) using a binary divider, the output is a squarewave pulse whose duty cycle is 50-50%. The precision of this duty cycle is limited only by the stability of the timebase feeding it. This feature helps to meet John Lilly's requirement for nerve stimulation without injury. The output of the 4024 then goes to the level shifter which is one amplifier of the LF 353 dual operational amplifier. This op-amp. is operated as an inverting amplifier whose operating point is set by the 100K pot. (R10) so that the squarewave pulses from the 4024 which swing from almost zero volt to a value of nearly +12 volts now emerge from the amplifier with a swing to the same value of (+) and (-) polarities. This also helps meet John Lilly's requirement. The other half of the LF353 chip is used as an inverting, summing amplifier (mixer) whose inputs are the now biphasic squarewaves and the white noise voltage supplied by transistors Q₁ and Q₂. Q₁ is an NPN transistor whose base-emitter junction is back biased to operate as a zener/noise diode whose output is directly fed into the base of Q₂, a transistor amplifier. Q₂ must have a forward current gain (h_{ef}) of at least 400. The noise "diode", Q₁, must be batch picked to supply enough noise voltage (after amplification) to where the noise voltage is approximately 1/4 to 1/3 of the total output waveform (ie, 1/4 to 1/3 the voltage of the squarewave). After amplification by Q₂, the noise voltage is fed to the mixer half of the LF 353 chip. The gain of the mixer/amplifier is controlled by the variable resistor R13 (25K) which functions as the current level

control for the output current. This pot. varies the output voltage of the mixer amplifier which drives the last stage, the voltage controlled constant current source (VCCS).

Briefly, the VCCS (the 741 op-amp) works on the basis that the input terminal to an operation amplifier tends to see a zero current because the feedback circuit supplies an inversion of the same amount of the current supplied the amplifier input terminal by an external current source. This feedback current remains constant (within limits) despite any variations in the value of the resistance of the feedback path. Thus, the amount of current supplied by the 741 op-amp to the feedback loop is directly controlled by the output voltage of the LF 353 mixer/amplifier and the variable resistor R16 (47K). The current in the 741 op-amp feedback loop can swing to each polarity (+or-) so that acts as a bilateral (biphasic) voltage controlled constant current (VCCS). Note that the load resistance (the brain/CNS) is a floating load, not referenced to the circuit ground. The 741 chip is the best one I've found to date for this type of circuit (high impedance load [Z]). The military versions of the 741 chip work the best of all.

The CES and power supply circuits are constructed on ready made Radio Shack Circuit boards which have been modified by foil cuts and jumper wires. (While many electronic experimenters prefer to make a custom printed circuit board for each and every project I've found that I prefer the ready made boards.) Planning jumper wires for the ready made is no more time consuming the planning a custom board and frequently the custom P.C. board is "rescued" by jumper wires anyway. In using the ready made board, the etching steps, (smelly chemicals!) and the trouble of drilling hundreds of little holes is avoided and the attendant phenolic or epoxy and fiberglass dust (!) is also avoided. Further, you end up with much better foil patterns for I.C. sockets than with home-made boards. This is why I use ready made boards!) First, make the indicated foil cuts ("x") in Fig.2 and then solder in the I.C. sockets so as to be able to judge clearance for the jumper wires. Hint: let the jumper wires be flexible so they can be moved if they cover a solder hole for a component. Next, solder in the jumper wires. Try to use different colors of wires for these say, white wires for signal paths, red wires for the (+) polarities and blue for the (-) polarities and, of

course, black for circuit ground, etc. (The jumper wires will require some time and effort but, so would the making of a custom P.C. board!) Then, solder the components as shown by Figs.3&4. Check your work carefully at each of the above stages.

The next step is to make the housing for the project. I used the Radio Shack (#270-232) project box as it is a good size for this circuit. Everything is mounted on the aluminum cover lid of the project box as this affords easy access for servicing. The layout for mounting parts is shown in Fig.5. The 10 MEG pot. for frequency control is provided with a 4" dia. dial which is made by gluing a middin' sized knob (your choice!) on to a 4" circle cut out of heavy mat board (mat board scraps can be had at any picture framing shop). Clear RTV silicone makes a good glue for this. Hint: First scribe a pencil circle the size of the knob for centering during the gluing and cut a large enough hole in the center of the dial so as to clear the mounting nut of the 10 meg pot. The use of a 4" dial affords a scale length of approx. 9" so that even with a logarithmic compression of the higher frequencies the 0.5Hz to 12 Hz band is easily marked on the dial during calibration.

A cursor is made for the dial by drawing a 1/2" long, deep scratch as shown (Fig.5) so that approx. 3/8" of the scratch shows beyond the edge of the dial. Paint a white square around the scratch and when this dries, refurbish the scratch and mark it with ink.

Also, cut a stiff paper circle for the current level control. This should be 1/2" longer than the current knob and have a center big enough for the pot mounting nut. Before cutting this hole, draw a circle that clears the control knob by about 1/16". This line will help you calibrate the current level control. Now glue this paper circle about the pot. mounting hole with RTV silicone.

As is apparent, some of the mounting screws for the P.C. boards lie under the dial. Use flathead screws in chamfered holes so that the screw heads are flush with the cover lid. Hint: You should use a few slightly, oversized washers and a nut on the backside of the lid for these screws for orientation and ease of assembly. Having drilled the necessary mounting holes in the AL cover you then mount the parts including a rubber grommet for the A-C power cord to pass through the lid. The P.C. boards are hung on the underneath of the AL cover by screws and insulating (non-conductive) spacers so that the foil surfaces of the P.C. boards clear the frequency and current level control pots by 3/16" to 1/4". At this point solder twisted leads from the CES circuit to the control pots, the output jack and the power leads between the CES circuit board and the power supply and from the transformer to the power supply board, and the leads to LED from the power supply. It is easiest if these are taken off the AL cover, soldered and

put back again. Next, bring the leads to a 5' or 6' power cord through the grommet and put a slip knot in the power cord for strain relief. Then solder up the A-C side of the circuit, the on/off switch, the fuse, etc.

Now, using the appropriate anti-static precautions install the 4093 and 4024 chips into their IC sockets taking care that they are not reversed. Then install the LF 353 and 741 chips. At this point you will want to make up the dummy load -- solder the 1K resistor to one of the non-ground lugs of an 1/8" stereo plug and solder one 12" wire to the other end of the resistor. Then, solder another 12" wire to the other non-ground lug. Then solder a 50K pot to the ends of the lead. You will need this to adjust the VCCS.

Now, you are ready to adjust the circuit for operation: Plug the A-C power cord and switch the power on with the AL cover and circuits on a non-conductive surface. After being satisfied that there is no undue heating of components (Note that the Zener diodes and attendant resistor(s) will run warm normally.), which would signal a wiring mistake, set both the freq. control and current level control to midrange. Connect an oscilloscope to Pin (11) of the 4093 astable to check for correct operation (rectilinear pulses) and then, check to see if the 4024 divider is working correctly, Pin (4) (Square wave pulses -- you might want to increase the frequency to observe these.). Next, connect the 'scope to the switch side (SW2) of capacitor (C2) and adjust R3 (50K) until you see a maximum amount of white noise appear on the 'scope trace and equal amounts of noise voltage on each side of the 0 volt axis. Use R3a (1K) to do this. It is important to have a noise voltage of equal (average) polarities. Then, make sure SW2 is open.

The next step is to set the level shift. The 'scope must have a C-D vertical amplifier to do this. Connect the 'scope to Pin (1) of the LF 353 chip and adjust R10 (100K) until the squarewave is symmetrical about the 'scope trace. Use R11 (5K) for fine adjustment. Then, connect the 'scope to Pin (7) of the LF 353 to adjust the offset of the mixer/amplifier. Use R15 (10K) to do this. Next turn the current level control to maximum and see if the symmetry holds. If not, adjust R15 further and then recheck the midrange setting for symmetry. The next step is to adjust the VCCS for maximum current output with good regulation. Plug in the dummy load with the 50K pot set to mid value and set R16 (47K) to approx. 40K (guess!). Set the current level control to about 2/3rds of maximum and connect the 'scope to Pin (6) of the 741 chip. Adjust the output of the 741 to a symmetrical squarewave with the offset pot R18 (10K). Disconnect the 'scope when this task is done and then connect a DIGITAL MULTIMETER (DMM) across the 1K resistor of the dummy load with the DMM set to at least 2.000V A-C (Note: You can use the

D-C 'scope instead of the DMM here but, it will pick-up some 60Hz A-C "HUM"). The voltage read across the 1K resistor indicates the current supplied through the dummy load ($E=IR$). Next, turn the current level control to maximum. Now, run the 50K pot in the dummy load to maximum, then to zero; if the DMM voltage remains constant then the VCCS is in the range of supplying a constant current. If the DMM voltage climbs to 2.0 volts or beyond then the VCCS is receiving too much drive (input) voltage and the value of R16 (47K) will have to be increased to reduce the input voltage. Then sweep the 50K dummy load from maximum to minimum again and monitor the DMM reading. Eventually you will find a point (adjusting R16) to where you find a maximum DMM reading that varies by only a few millivolts when the 50K dummy pot varies from maximum to minimum (and vice-versa). This is the maximum regulated current your particular 741 chip will supply. With the "C" series of 741s the maximum, regulated current should be about 200uA (approx. 0.200V A-C on the DMM). Some consumer electronics versions of the 741 will be found to supply about 100-150uA at maximum. If you find yourself with one of these you will have to decide whether to live with this or find another 741 chip. Some military versions of the 741 will supply as high as 220-250uA of current. Whatever the value, mark it on the current level dial and divide the rest of the dial proportionately (0-50uA-100uA-150uA-200uA, etc.).

At this point you are ready to introduce the white noise to the waveform. Disconnect the DMM, set the dummy load pot to mid value, set the current level control to mid range and reconnect the 'scope to Pin (6) of the 741 chip. Switch SW2 closed so as to supply white noise voltage to the LF 353 mixer amplifier. Check the 'scope to see if equal amounts of noise voltage appears of the (+) and (-) parts of the squarewave form. If it doesn't, adjust pot. R3a (1K) until it does. Next, turn the current level control to maximum. At this point, the noise voltage should appear as subtractions to the squarewave form. There should be equal amounts of subtractions to the (+) and (-) parts of the squarewave. If not make further slight adjustments to pot. R3a. Then, check the balance of the noise voltage at mid current levels. Adjust until the noise signal is balanced at both mid and high current levels. You may have to re-adjust the 741 offset voltage, R18 (10K) to do this -- this will require a light touch! Then recheck as above.

At this point, you are ready to calibrate the frequency dial. To do this, connect a frequency/event counter across the 50K dummy load pot. Set the pot to a level to where the frequency counter triggers reliably on the VCCS output. Set SW2 to the open position as the noise

voltage will trigger the counter randomly.

Now if you are lucky enough to own an ultra-low frequency counter, one that works below 1.0Hz, you are lucky. If you do not, then the lowest frequencies, below 20Hz, will have to be determined by the following method. Set the frequency counter to operate as an event counter and use a stopwatch and a calculator. You enable the counter and count events for periods as long as 200 seconds. Dividing the number of events by the number of seconds gives the frequency (Hz). Mark your results on the dial lightly with a hard pencil and remark these later with ink. If you've wired the freq. control pot up correctly, and 0.5 to 5.0Hz band should take up half the dial which is fine as the most interesting CES frequencies for the convenient, earclip electrodes lie in this band. I recommend the dial be marked at 0.1Hz intervals to about 50Hz and at 10Hz intervals beyond that. You may discover that at some place beyond 80Hz the output frequency will suddenly jump to a higher frequency (100-120Hz) and stay there. This only indicates that you've reached the residual resistance of the 10 MEG pot. Mark this point on the dial as the highest usable frequency. You are now ready to put the CES machine into the project box (switch SW2 to the closed position!) and secure the cover lid with the four screws provided.

At this point the only other thing required to use the CES machine is electrodes. There are two forms of these -- the earclip electrodes and scalp electrodes and both are easily made. The electrodes are configured as shown in Fig 6. The earclip electrodes are made from common, nickel plated hair clips ("Clippies!") which are painted with layers of fingernail polish or model makers enamel paint. Hint: Paint the jaw part and hinge part separately. Place small dowels either at the front or back of the jaws as needed to hold the jaws open. Dry by hanging from wires. The disk part of the electrodes are made from copper sheet stock obtained from a hobby store. The scalp electrodes use disks of 3/4" to 1" dia. The disks for the earclip electrodes are 5/8" dia. maximum. (Some people have small earlobes; 1/2" dia. is probably optimal.) It is best to buy the "O" rings and cut the disks to fit these. The disks for the earclip electrodes have a smaller tab 1/16" wide so that it and the wire lead soldered to it will fit through the open jaw side of the clip. Obtain a 4-5' length of twin lead wire, split approx. 18" of it and put a loose slip knot at the 18" point to hold the split. Solder the ends of the 18" length to the tabs of the disks. Then, using RTV silicone glue to "O" rings to the disks. When this has dried cover the backsides of the disks and the tab/lead junction with RTV silicone. In the case of the earclip disks, at this point you position these, RTV and all between the jaws of the (painted) hairclip and let the jaws hold the disks until the silicone dries. Next,

solder the other ends of the twin lead wire to the non-ground lugs of a 1/8" stereo plug. This gives you a pair of scalp electrodes and a pair of earclip electrodes to use with your CES machine. Place balls of cotton made moist with (plain) saltwater (saturate solution) for the earclip electrodes. For the scalp electrodes work electrode gel (purchased from a medical supply house) into the well formed by the "O" ring. You will find that hair has a way of quickly wicking salt solution away from cotton for this to be used with the scalp electrodes. An easy way to hold scalp electrodes in place is to wrap the head with an elastic bandage and place the scalp electrodes beneath this.

Now, you have the complete instrument. How to use it? The author suggest that you get a diary and start out with the earclip electrodes and try starting out with a couple of 20-40 minute sessions at 0.5Hz and then work your way up the frequency dial in 0.5Hz or 1.0Hz increments. How much current to use? Most neophytes find that the electrodes tend to "bite" at first and usually manage only about 50uA the 1st few times. Now at this point the author will recount his own experience in using this machine: Basically during the past 8 months I have used primarily the earclip electrodes at frequencies below 2.0Hz and current levels of 100-150uA. The frequency I seem to like best is 0.5Hz. The higher frequencies don't seem to do much with the earclip electrodes. Perhaps, this is because the brainstem tends to be the target organ with this arrangement. The most notable effect is a sense of calm after a typical 30-40 minute session ($f_o=0.5\text{Hz}$, $i_o=100-150\text{uA}$). When using a current of 1.0Hz or below there is a sense of cycling of consciousness -- one minute you feel very relaxed and could easily go to sleep. A few minutes later you notice you've never been more awake in your whole life. A few minutes later yet, it is suddenly very easy to day dream and so on. The most apparent long term effect has been one of anti-anxiety. Normally, I'm a fairly high strung person and the events of the day "get to me"! Since starting to use CES I've experienced just about the opposite -- a sort of Satori. The other notable long term effect has been a continual, small improvement in my memory, especially short term memory.

Eventually, I will get around to trying my scalp electrodes and the effects of higher frequency CES currents. I will report the results of this. The above is the author's experience. Remember human brains are highly individual in their working. One warning! Don't go to sleep while using CES! The author has done this twice and each time the result is a restless, irritable state that takes 3-4 days to go away. Strangely, a further CES session seems to cure this! If you are like most people, you won't notice much of anything happening when using

a CES machines, the results of CES use being an accumulative sort of thing which of course, will be a disappointment to those who were hoping CES would be a sort of "electrode LSD". So what do you do while being exposed to CES? 1) You keep up on your diary to keep track of what it (CES) is doing and 2) you presumably are doing CES to see if there are any benefits to your mind so you can read some challenging literature or get that math book down you've been meaning to get around to learning the contents of and do your sums as it were. In short do what you should.

VARIATIONS: HIGHER CURRENT AND MULTIPLE CURRENT CES MACHINES.

The machine shown in this article can be made to deliver more output current. It would require using a power supply that delivered (+or-) 18 volts to the LF 353 and 741 section of the machine while still retaining a (+) 12 volt supply for the CD 4093 and CD 4024 section. Probably such a machine could deliver 300uA or more to a 1K to 50 K load. Note that military versions of the 741 chip have a maximum supply voltage rating of +or- 22 V which could boost the output to almost 400uA. There are high voltage op-amps (LM 343H, LM 344H) that have maximum supply voltage ratings of +or- 34 V but, these are expensive and the author doesn't know how well these will perform in a VCCS circuit. Perhaps someone will run an experiment with these chips (LM 343H, LM 344H) and report the results. Note: For commercially made CES machines with an output of over 100uA, the FDA requires a Doctor's prescription and supervision for the purchase of the machine.

Multiple current CES machines: Is there a use for multiple current CES machines? Yes! There is a commercially made CES machine that supplies two output currents and the frequencies of the two channels are independent of each other. The users of this device reverently refer to it as the "God Box"! At this point it should be explained it is thought by CES researchers that an input of two CES currents into the brain at different frequencies causes interference patterns (cancellation and re-enforcement of parts of the two waveforms) and thus they cause selective stimulation of various brain organs. This is an exciting prospect but, one that would have to be approached very carefully experimentally!

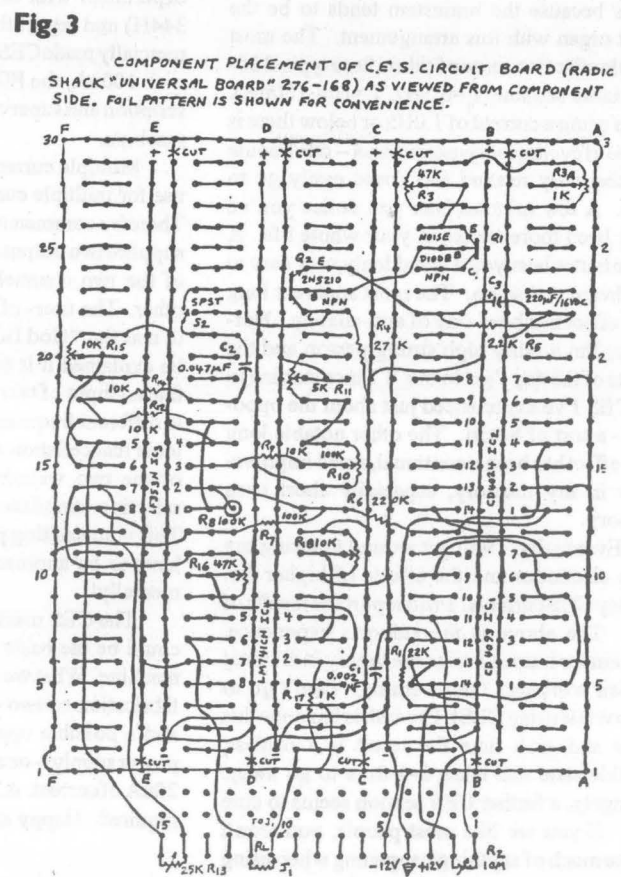
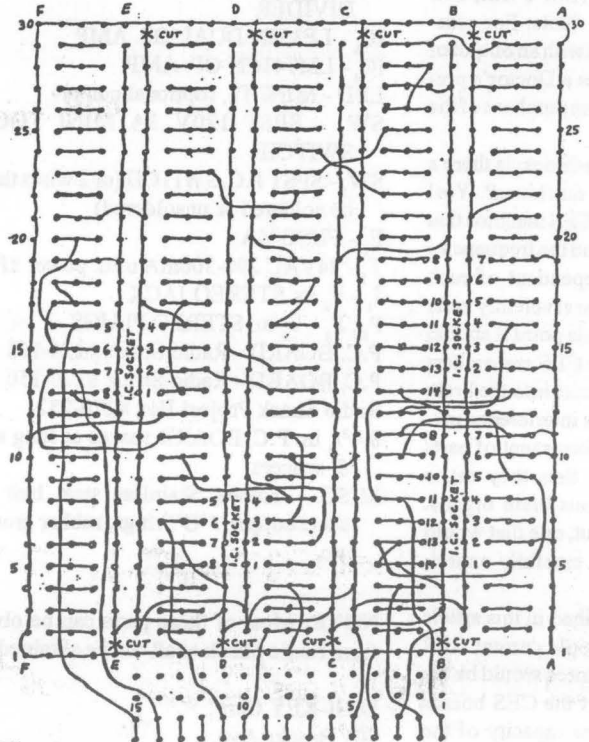
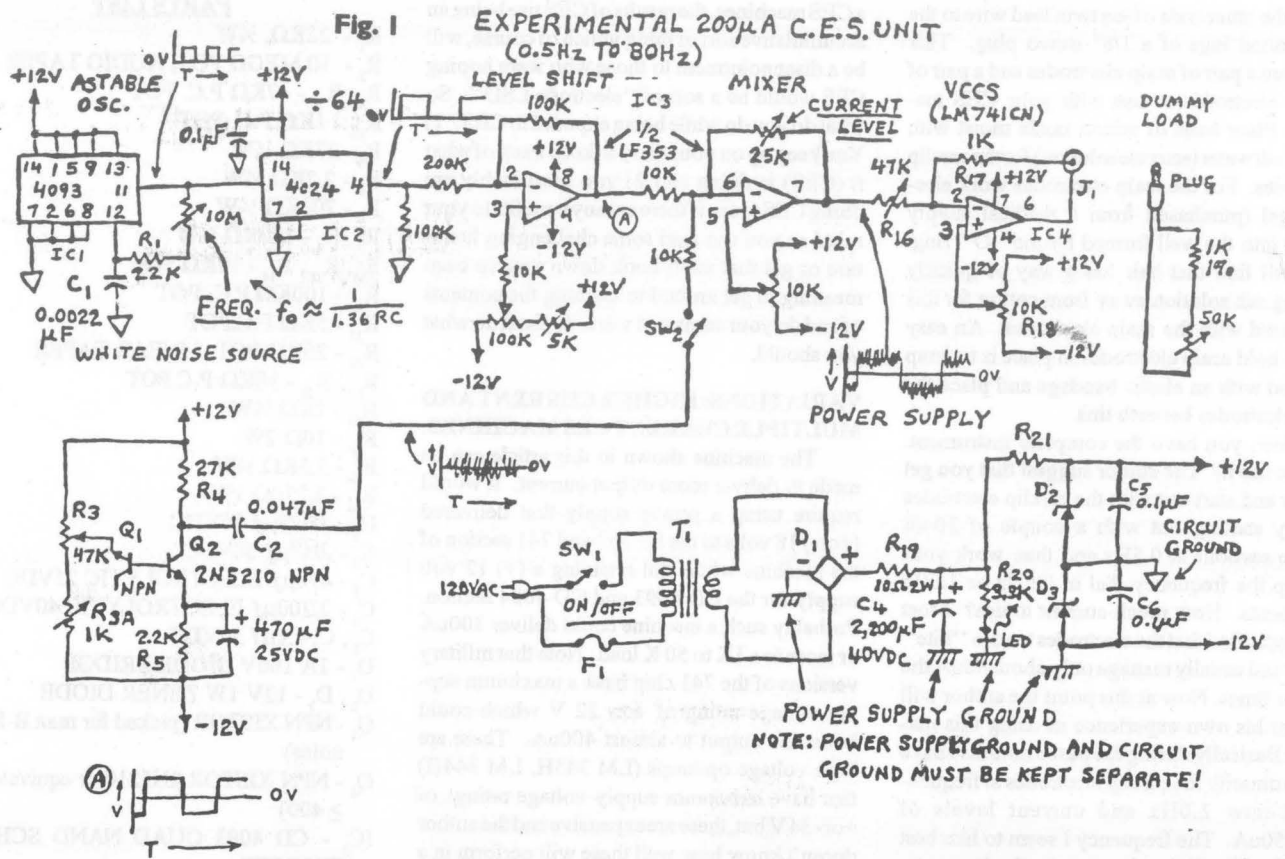
The CES machine described in this article could be the basis for a multiple current CES machine. What would be required would be the fabrication of two or more of the CES boards and a possible upgrade in the capacity of the power supply -- one CES board requires approx. 20uA of current. A larger housing would also be required. Happy experimenting!

PARTS LIST

- R₁ - 22KΩ, ¼W
- R₂ - 10 MEGΩ POT, AUDIO TAPER
- R₃, R₁₆ - 47KΩ P.C. POT
- R_{3A} - 1KΩ P.C. POT
- R₄ - 27KΩ ¼W
- R₅ - 2.2KΩ ¼W
- R₆ - 200KΩ ¼W
- R₇, R₈ - 100KΩ ¼W
- R₉, R₁₂, R₁₄ - 10KΩ ¼W
- R₁₀ - 100KΩ P.C. POT
- R₁₁ - 5KΩ P.C. POT
- R₁₃ - 25KΩ POT, LINEAR TAPER
- R₁₅, R₁₈ - 10KΩ P.C. POT
- R₁₇ - 1KΩ ¼W
- R₁₉ - 10Ω 2W
- R₂₀ - 3.3KΩ ¼W
- R₂₁ - 2,270Ω 1W
- C₁ - .0022μf 50VDC
- C₂ - .047μf 50VDC
- C₃ - 470μf ELECTROLYTIC 25VDC
- C₄ - 2,200μf ELECTROLYTIC 40VDC
- C₅, C₆ - .1μf 50VDC
- D₁ - 1A 100V DIODE BRIDGE
- D₂, D₃ - 12V 1W ZENER DIODE
- Q₁ - NPN XISTOR (picked for max B-E zener noise)
- Q₂ - NPN XISTOR 2N5210 or equivalent ($h_{fe} \geq 400$)
- IC₁ - CD 4093 QUAD NAND SCHMIDT TRIGGER
- IC₂ - CD4024 7 STAGE BINARY COUNTER/DIVIDER
- IC₃ - LF353N DUAL OP. AMP
- IC₄ - LM741CN OP. AMP
- LED - MINI T1, (optional color)
- SW₁ - SPST 120V 3A MINI TOGGLE SWITCH
- SW₂ - SPST P.C. SWITCH (or 2 wires that can be soldered & unsoldered)
- F₁ - FUSE ¼A
- T₁ - 24VAC 200-300mA min. power xformer
- J₁ - ¼ in. STEREO JACK
- P₁, P₂ - ¼ in. STEREO PLUGS
- P.C. BOARD - Radio Shack #276-168
- P.C. BOARD - Radio Shack #276-150
- Radio Shack Project Box #270-232
- 8 - ¾ in. P.C. BOARD spaces or long screws & spacers
- MISC. - Knobs, Stainless steel hair clips, sheet copper, "O" rings, rubber grommet, etc.

NOTE: Most of these parts can be obtained from Radio Shack or all can be obtained from:

DIGI-KEY Corp.
701 Brooks Ave.
P.O. Box 677
Thief River Falls, MN 56701-0677
Phone: 1-800-344-4539



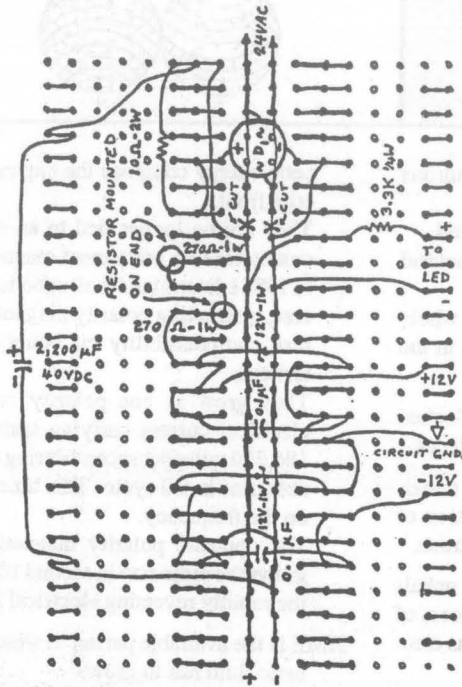


Fig. 4 POWER SUPPLY BOARD (RADIO SHACK "MULTI-PURPOSE BOARD", 276-150) AS VIEWED FROM COMPONENT SIDE. FOILS, AND 2 CUTS ARE ALSO REPRESENTED.

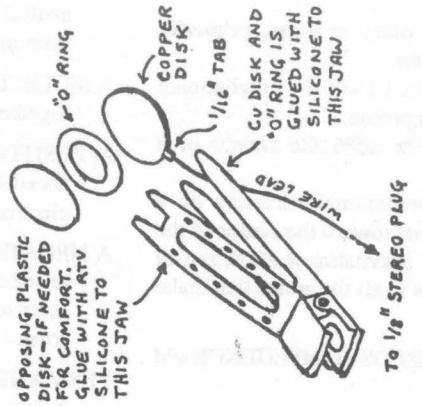
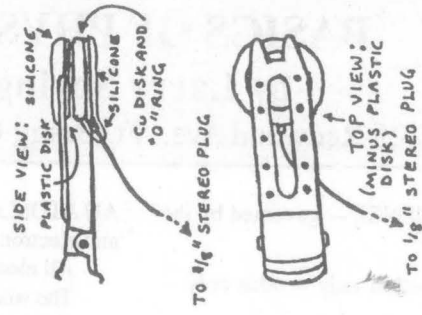


Fig. 6 DETAILS OF EAR CLIP ELECTRODES.

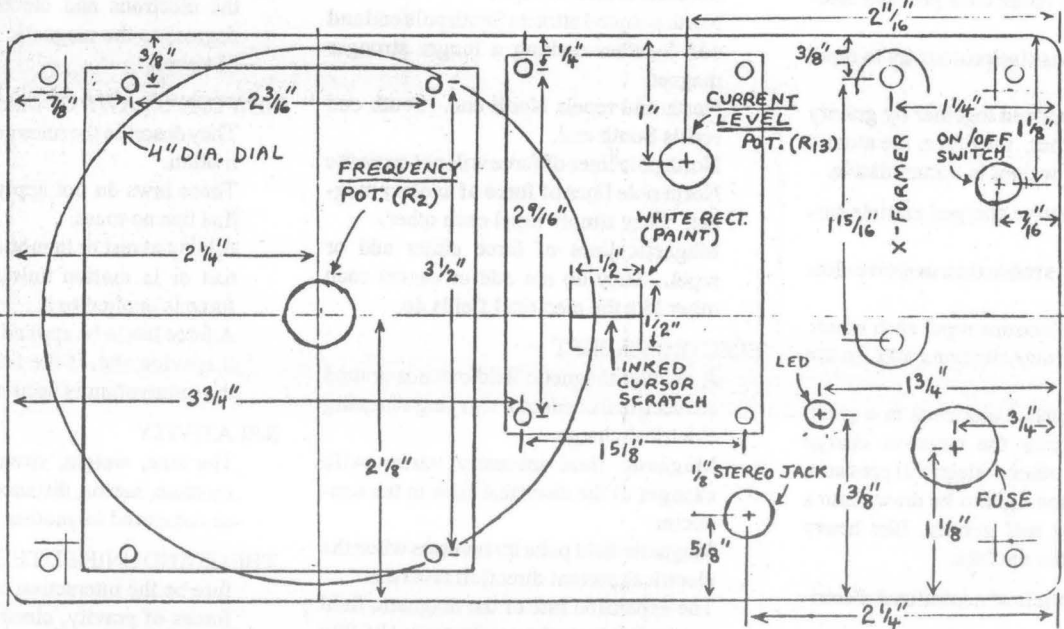


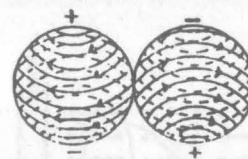
Fig. 5 LAYOUT OF MOUNTING HOLES AND COMPONENTS ON ALUMINUM LID OF RADIO SHACK PROJECT BOX (270-232). NOTE: MINIATURE (200-300 mA) 24V TRANSFORMERS ARE HARD TO FIND. THE LAYOUT OF THE RIGHT HAND PART OF THE LID MAY HAVE TO BE CHANGED DEPENDING ON THE SIZE OF THE TRANSFORMER USED.

UNDERSTANDING THE BASICS OF PHYSICS

by Larry Spring

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LARRY SPRING'S ELECTROMAGNETIC SPHERES



FIELDS of INFLUENCE -- governed by the inverse square law.

GRAVITY = attraction only -- adds only -- accumulative.

Gravitational charge cannot be removed or canceled.

Attraction of mass to mass, primarily proton to proton.

One electron is 1/1840 the gravitational attraction of a proton.

One electron is .05% the weight of a proton.

Weight is gravitational attraction on a particle or mass toward the center of the accumulative gravitational attraction of all the protons in all the atoms that make up our earth.

ELECTRICAL FIELDS of INFLUENCE add or cancel.

Proton = positive electrically charged particle surrounded by an electrical field. Protons always retain their positive electrical field.

Like charged positive protons try to repel each other.

As a tight group held together by gravity toward each other, they form the atomic nucleus. Their weight is accumulative.

ELECTRON is negative charged particle surrounded by a field.

Electrons always retain their negative electrical field.

Like charged electrons repel each other.

As a spaced group electrons add, so are accumulative.

The more displaced electrons in a given place, the greater the negative charge repelling each other -- electrical pressure. Electrons are too light to be drawn into a tight group by self gravity, like heavy protons form the nucleus.

NEUTRON is a particle of neutralized electrical charge.

A neutron is a proton and an electron locked together by the attraction of unlike charged particles.

A neutron is only slightly heavier than its proton component.

The 1/2 life of a neutron is about seventeen minutes.

It separates into a proton and an electron.

AN ATOM is equal parts of protons, neutrons and electron.

All electrical charges are neutralized.

The whole atom is an electrically neutral charged particle.

Gravity is the only field left in the whole neutral atom until magnetic fields in the form of heat are introduced.

A MOLECULE is two or more atoms locked together by mutually sharing electrons.

A POSITIVE ION is an electrically unbalanced atom due to loss of an electron or electrons. It wants to attract electrons.

A NEGATIVE ION is an electrically unbalanced atom due to receiving an excess of electrons. It desires to repel excess electrons.

PERMANENT MAGNETS

Magnetic fields of influence surround permanent magnets.

Magnets attract or repel.

North pole end attracts South pole end and add together making a longer stronger magnet.

North end repels North end. South end repels South end.

North pole lines of force will not cross the North pole lines of force of another magnet. They simply repel each other.

Magnetic lines of force either add or repel. They do not add or cancel each other like the electrical fields do.

ELECTROMAGNET

A circular magnetic field extends around an electrical conductor carrying a moving electrical charge.

Magnetic field intensity varies with changes of the electrical flow in the conductor.

Magnetic field polarity reverses when the electrical current direction reverses.

The expansion rate of the magnetic field perpendicular to the conductor is 186,000 miles per second.

One polarity magnetic field is driven off (radiated) when the reverse polarity magnetic field forms inside it, created by the reversing electrical alternating current (AC).

FREE FLYING SPHERES of radiated mag-

netic energy compose the expanding energy front.

They are no longer tied to an electrical conductor or a permanent magnet.

In 1985 I determined their spherical shape, size, alternating polarity magnetic structure, compressibility and bounce characteristics.

They grow in one polarity around an electrical current carrying conductor at 186,000 miles per second during the available time in 1/2 cycle. This time depends on the frequency.

The opposite polarity magnetic sphere grows the same size in second 1/2 cycle of the rapidly reversing electrical current.

TIME is the available period in which a magnetic field has to grow.

Time in which, traveling at 186,000 miles per second, it reaches a conductor at a distance that cuts the free flying magnetic sphere's lines of force, thereby driving the electrons and electrical current 90 degrees to the magnetic field's direction of travel.

NEWTON'S LAWS OF MASS & MOTION.

They describe the rules governing mass in motion.

These laws do not apply to pure energy that has no mass.

A body at rest or in motion will remain at rest or in motion unless some external force is applied to it.

A force has to be applied to a body to start it moving and, if the force is continued, the momentum is accumulative.

RELATIVITY

The size, weight, strength, speed, momentum, inertia, distance etc. of one thing as compared to another.

THE GRAND UNIFIED THEORY must therefore be the interaction between the basic forces of gravity, electrical fields, magnetic fields, free flying spherical magnetic fields, all of which are acting on and influencing the protons and electrons within the atoms, Newton's laws applying to mass and motion, and time in which to form, to travel and to act.

LOGIC CAN EXPLAIN IT ALL.

FRONTIERS IN MUSIC AND HEALING

An Interview With

Jonathan Glasier & Linnea Reid

by Michael Riversong

Michael Riversong, a musician and regular contributor to the *Journal of Borderland Research*, conducted this interview at the International New Age Music Symposium in Los Angeles, on April 26, 1991. Just prior to this interview, there had been a panel discussion involving Jonathan Glasier, Jonathan Goldman, Bill Wesley, and several other innovators in music. The discussion had centered around the possibilities of using music for healing in specific ways. The Interval Foundation also had a display room at the conference where several kinds of new instrument designs were demonstrated.

Jonathan Glasier is the founder and director of the nonprofit Interval Foundation. This organization is dedicated to exploring alternative musical universes, thus expanding the boundaries and capabilities of music. For several years, he published *Interval Magazine*, a journal of microtonality. The magazine suspended publication in 1988, but may be revived sometime in the future. Meanwhile, he is doing significant work in extending the frontiers of music, with implications for education, science, and healing.

Linnea Reid is a consummate networker, who has worldwide contacts in education and alternative technologies. She was chosen as one of the world's greatest educators by a United Nations committee. As one of the founders of Light and Sound Research Corporation, she has been involved in the design and marketing of one of the first automatic relaxation systems, which integrates sound and light pulses to induce specific brainwave frequency states.

MR: How did the Interval Foundation get started, and how long have you been working with it?

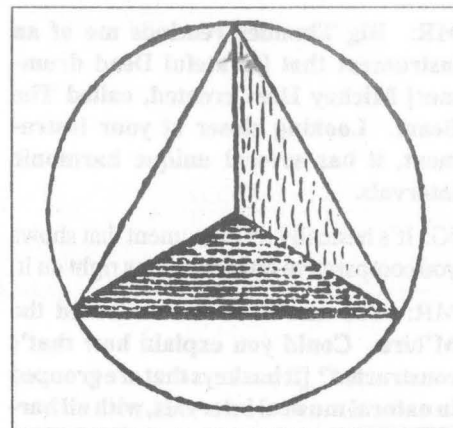
JG: Interval Foundation began in 1978, and it was a vision, actually a mission, because I had the wonderful thing of something to say. That was the material I received from

having the legacy of Harry Partch. He was a master musician who created a holistic idea of theater, music, and dance. He didn't like the idea that opera put the instruments down in a pit. He wanted everything on stage. He also wanted to bring ritual back into theater and into life. He was a fairly unhappy man, and I had to make a deal that, if I was going to do this mission, I would never be as unhappy as he was. Four years after he died, I met another man who was doing similar work, Ivor Darreg. He is another genius visionary way ahead of his time. Again, living on almost nothing, but still creating. The instrument called Big Thunder [set up at the conference] is a contrabass slide guitar. It's actually a spruced-up prototype of Ivor's instrument called the Megalyra. This is saleable to the public. It's a beautiful instrument that creates the first four harmonics; a whole rainbow of sound. And this is a healing instrument. It goes from 32 cycles a second on up. So starting Interval Foundation came from meeting all these geniuses, and especially Harry Partch. I've been collecting them ever since. I feel that my mission is to keep microtonality from dying. I saw that, with the death of Partch, it was threatened. I actually dropped out of college to work with him. I saw all these geniuses who were writing voracious letters to each other with numbers and all this stuff, and they were just way above other people. I said, "this needs a framework, and a forum". And this also needs to be put into a style where everyone can understand it. There were already some journals that were mostly numbers, and so I put some pictures in of real people and their real instruments. So I feel that I needed to ground all this incredible energy about not only microtonal music, which is exploring the harmonic series to as full a potential as we're able to. Also I found that pattern recognition, patterns of space, like things of Buckminster Fuller, fit completely like a glove. I totally agree [with Linnea] that we need a different edu-

cational system, that's based on reality.

MR: What you're saying then, is that the patterns of sound and of space as illustrated in Fuller's *Synergetics* book are pretty much the same?

JG: Basically, yes. I feel that the tetrahedron is the template of reality.



JG: There are other people I haven't mentioned that really belong in this picture. Partch and Darreg pretty much guided me to accept my mission to bring this to people. Now there are 400-500 people that are making new instruments, and looking at the territory between the octaves. Now I haven't put out a magazine in three years. Basically, my mission has been accomplished. What I need to do is reassess and see what my new mission is.

MR: How does your organization get funded?

JG: There is a woman who gives us some money every year, but that's not much. We've basically been struggling for the past few years, until Wilbur came along. He's not a musician, and he's really focused. He does see that essence of what we have to offer. We're all visionaries, and we're all kind of floating out there in the ozone, being futurists.

LR: I call it being spiritual adventurers.

JG: So Wilbur is trying to make some money for the company. He keeps saying, "why don't you make a record?" So he paid Jeff Staton to record us with Bill Wesley. [This is the material now available as the Interval Sampler cassette.] Bill is now part of Interval. I basically found him

on the street. He's the one who made the Array M'bira, based on an African design, with precise Pythagorean tuning. I've been building musical sculptures for playgrounds and things like that. In the last couple of years I've been going to workshops and interfacing with people, building up my network. I'm constantly looking for people I can create the new universe with.

MR: Big Thunder reminds me of an instrument that [Grateful Dead drummer] Mickey Hart created, called The Beam. Looking closer at your instrument, it has several unique harmonic intervals.

JG: It's basically an instrument that shows you comparative music systems right on it.

MR: You also have demonstrated the M'bira. Could you explain how that's constructed? [It has keys that are grouped in natural musical intervals, with all harmonic notes of each key together.]

JG: It has the wonderful idea that harmonies should be friends. When Bill said that, the lights went off for me. I'm interested in creating instruments that are easy to play, so you don't have to go into a musty practice room for five years to be able to come out with a simple sonata. You can play wonderful, beautiful music -- anyone can. And another instrument in that display room was made in Mexico, called the Harmony Harp. It came from the tradition of Julian Carrillo. This has 100 tones in one octave. It sounds like angels.

MR: The human ear can hear all those intervals. It's amazing.

JG: If you have just a few notes, like five per octave, there are no wrong notes. At a hundred tones, there are no wrong notes.

MR: I noticed that when playing with it yesterday, because I'm a harp player. I want to go back to the M'bira, because when I tried playing it like I thought it should be played, based on experience with keyboards and the harp, I had a terrible time. Then, when Bill explained it the panel earlier today, I got it, and thought, well, why don't they make everything like that?

LR: From the information that I picked up, about the M'bira, we're not working with just the physical body but with the emo-

tional body. This is part of why I'm so fascinated with the new technologies of sound.

MR: This brings us into the next aspect of this whole article. I get hits when I hear your music, like on the Interval Sampler tape. In listening to that this morning, I felt, "wow, there's a lot in there", and of course each part of the tape had a completely different effect. What are the healing aspects of this interval technology?

JG: You know, I really can't answer that, because I just feel that they are many, and that they are basically unlimited. I would just like to state over and over again that we need to expand beyond those twelve equal tones, in order to even know what the healing possibilities are. All I know is that I'm following my heart, and my ears. I'm not sure exactly which comes first.

MR: You've mentioned Harry Partch, and his unhappiness during his life. I've listened to a lot of his music in the past, and my feeling is that he was close to something, but didn't quite get there. He had a 43-tone musical scale?

JG: Yes. Actually, he called that the "one-half truth of the one-fourth fact." His scale was expansive, and he used intervals other than the 43, but that was the intervals on his Chromolodean instrument, and it seemed to be the way that people could identify him and put him in a cage. Basically, just intonation can use a whole myriad of intervals. Just intonation is where the notes of the scale correspond to the harmonic frequencies. And so it's all based on one, which is called 1:1, and so it's a tonal-centered system.

MR: Precisely mathematical instead of tempered then.

JG: Which means ratios of string lengths.

LR: To the scientific mind who is looking at mathematical frequencies and the tonal harmonics, and then jumping into the future and thinking about getting this out to future generations -- what can you say about your foundation and the people that you've attracted?

JG: Let me just tell you about some of the things I've done. First of all, I care very much about education and the future gen-

erations. I've built some instruments already. One is in the Exploratorium in San Francisco; it's called the Pentaphone -- five tones per octave, five different materials, five sides. We need to understand five, and what that means. It's part of translating ourselves up into a higher consciousness. We live in boxes. We turn on our little box, and we are glued to that little box. But what about pentagonal dodecahedrons? Those are wonderful shapes, also. There's no way that I feel we're going to advance until we get out of our boxes.

LR: So you think we could do this with tones?

JG: I think we can do it with tones, and shapes, and with colors, but they need to be coherent. And they need to be in concert with each other. I think this is what Partch was trying to say. We also need to bring it down into a ritualistic level, and re-connect with our heart selves and use these as toys to inter-relate to each other.

MR: It's happening. There are people doing all kinds of rituals around the country. Now the idea of music with the ritual is beginning to come in. I have a vision of people playing new, spontaneous music for little rituals all over the country, from Pentecostal churches off in the boondocks all the way to big Catholic temples in the cities.

JG: But we need to redefine ritual. It used to be like the newspaper, and tell the stories from the past. Now we have so much electronic media to tell us about the stories from the past, we need our rituals to tell about the future!

LR: And to trigger those visions within each person who carries that in their cellular reference. And that is what I think the new systems that are being created here, and synergy, are creating. That's where we are.

JG: So I've created this instrument at the Exploratorium, which, by the way, is one of the most successful exhibits there. This is a beautiful place. It's one of the best science museums in the world. This instrument not only shows you something, it listens to creativity. I've been a teacher all my life, and I wanted to make an instrument where I wouldn't have to be there as the teacher; that the instrument would do the teaching. I

have a video tape of this. What I'll do, is put it together with a gallery that I've started, called the Sonic Arts Gallery. What the Sonic Arts Gallery did, was a hands-on, "please touch" gallery, which is totally different from most art galleries. That's the one thing music has. People would come into my gallery, and in five minutes, they'd be in kindergarten. People really need this. They need much more outlets than we have. My theory is, that we've pacified ourselves into a corner that it's very difficult to get out of. We need more activity, of life, and interchange with arts and sciences. As I said, we live in our boxes, and come in and turn on our boxes, and where is the human interchange? People live in neighborhoods and don't even know who their neighbors are. One of the reasons society is crumbling is there are not enough interesting things to do. But there are really a million interesting things we can do to re-create ourselves. Music is being cut out of education almost altogether now. Why not just put musical sculptures into the environment? So right now I'm working on building a musical playground for a country school in San Diego. That's one thing I want to definitely be connected with. One reason that I started the Sonic Arts Gallery is to have a museum of sound and light. Of course in order to afford it—it was downtown, in a bad location, with cockroaches and all that, but I proved that people will support this. Now I've just opened up a new studio called The Performance Lab, and I'm working with a dancer, who I worked with eight years ago. We had a beautiful improvisational group called "The Sound and Movement Choir", and we're going to get back into a kind of Partchian idea of creating improvisational music, dance and drama. But we're working from the inner in creating. This is based on rapport, and meeting once or twice a week, until something formulates, and then presenting it. I'm looking forward to re-starting a publication but it needs a different face. What I'd like to do is integrate more with sound, with light, and with proportion. But it has to stay grounded and I don't have quite all the parts to put it together yet. There are now five or six magazines where there once was just mine about microtonality itself. I no longer feel that I need to just say that but I would like

to integrate the idea also of sound healing. When you heard Jonathan Goldman and myself do this vocal harmonics, this is the single best way, I know, to immediately remove stress. I would just love to give this to the universe. The ability to sing harmonics in the car or traffic or anything; sing harmonics and your stress will leave, I'll guarantee it if you really concentrate on that. We are all vibration and if you allow yourself to be a tuning fork, as it were, then you're aligning your own vibrations. Your body is going to love it, if you align the vibrations in your body. Now, certain vibrations, you'll find, your body likes, and certain vibrations your body doesn't like. Jeff Thompson is doing a lot of interesting work on this. But just start singing these harmonics.

LR: Do you have a tape of the harmonics available?

JG: I never made a tape of my harmonics, but I would love to make a tape with Jonathan Goldman or someone like him. I think I might do that. I have a wonderful network of friends, like Charles Lucy, Bill Wesley, and Ivor Darreg. They are gems, and I spend a lot of time helping them with their work. What I really want more than anything, is a research and development center where I could get both of these electronic and acoustic ideas and bring these people here and say look, just relax, and let's do our things. I want to know where you're at and where you're going. But also, I want to produce a product because ultimately I'm looking for a research and development center to bring together these people that have so much to offer but that society does not reward. My mission is to bring these people together so they can just create and so we can build the new toys and the new tools for the next time we're here.

RESOURCES: Jonathan Glasier Interval Foundation. P.O. Box 620027 San Diego, CA 92102 (619)299-7809

Jonathan Goldman Spirit Music & Sound Healers Association. P.O. Box 2240 Boulder, CO 80306

Linnea Reid Light & Sound Research Corp. 6991 E. Camelback Rd. #C151 Scottsdale, AZ 85251

Michael Riversong Light Age. P.O. Box 36387 Lakewood, CO 80236

JOURNEYS OUTSIDE THE TONE LINES

MUSIC REVIEWS
by Michael Riversong

We all have familiar musical patterns in our lives. What happens if we go exploring outside the tightly prescribed tonal boundaries of our society? For one thing, we may have a difficult time finding any music. Once we do, much of it will sound so strange that running rapidly back to our familiar tonal boundaries and never leaving again is a temptation. So what is the advantage of exploring this strange realm?

Pythagoras, who developed mathematics, music, and healing as one science, used a mathematically proportional scale, which is the basis of all music in the West. While this scale may have disadvantages when used in a royal orchestra composed of instruments from widely diverse families, it is closer to the way Nature actually operates. That means mathematically proportional scales may be more effective for healing work than the familiar tempered scale. Bach did a small amount of fractional re-tuning to standardize the ancient Pythagorean proportional scale so that groups playing diverse instruments along with keyboards could more easily harmonize. Our familiar musical patterns are cherished and cultivated, and most of them fall within this tempered scale.

Over the years, several alternative proportional scales have been developed. Each one of these has a particular "mood", and so may constitute an alternative means of expression. These systems could also be conceived of as alternate universes, thus giving us insight into a wider range of possibilities in science, mathematics, and technology.

Here are four tapes that use alternative musical scales, to assist you in your explorations.

INTERVAL SAMPLER—Interval Foundation, featuring Jonathan Glasier, Jeff Stayton, Bill Wesley, and Ivor Darreg. This presents a good overall view of the possibilities inherent in alternative musical universes. Bill Wesley has invented an instru-

ment especially suited to this work; the Array M'birra. It is based on the idea of African thumb pianos, with keys arranged in an innovative way that makes playing much easier than with standard keyboards. The geometry of Bill's key arrangement could revolutionize music in the next generation. Some of the other instruments are modifications of well-known instruments such as guitars and synthesizers. Overall, the quality of this music is high, even though the tones are definitely foreign to most ears. Ivor Darreg played the only tune found to be irritating, but it is short and a helpful illustration for practicing composers. I highly recommend this tape as a "primer" to anyone interested in hearing a completely new kind of music. Interval Foundation P.O. Box 620027 San Diego, CA 92102

SEQUENTIA — Susan Alexjander. Setting up a new scale system to correlate with DNA chemistry is a challenging and exciting prospect. Unfortunately, this tape did not work out that well. It is obvious that a great deal of work went into the compositions. Technically, the tape is well-produced, including the live performance section. But one can't escape a rather depressing tone to the whole first side. The second side's live performance is more pleasant to listen to, but it is too short. Then, it is followed by a long, technical discussion that really doesn't belong on a music tape. It can be of use to technicians who would like to follow this work, but we must wait for another composition from this obviously capable artist before we can truly appreciate the possibilities of her system. Science and The Arts P.O. Box 791 Davis, CA 95617

VORTEX — Shira Chandler. According to the ancient Vedas of India, the purest music is that of the human voice, and all instruments are just a pale imitation of its capabilities. Few people demonstrate this principle better than Shira, who has put together a definitive collection of vocalizations. This tape has a specific therapeutic purpose, which is to break up stagnation in life. Therefore, it is certainly not for casual listening. This tape can be safely used for meditation in the ancient Hindu tradition, or for psychological "clearing"

sessions. Shira uses the full range and power of the voice, transcending all known musical scale structures to give us this useful work. P.O. Box 99074 San Diego, CA 92109

LUCY SCALE SAMPLER — Charles Lucy. Here is a limited edition tape by one of Earth's greatest pioneers in alternative scales. He has figured out exactly how to retune synthesizers for all sorts of different scales, and has published the specifications. He has also redeveloped guitar designs to accommodate alternative scales. These compositions are, as Charles explained it, an illustration of what is possible using his system of alternative scales. They all have a pleasant character. This tape is suitable for general listening, but its greatest value is as a coherent set of explorations that can assist future composers in gaining ideas for alternative scale melodies. A warning — this tape may be very difficult to obtain. Lucy Scale Developments P.O. Box 5146 Laguna Beach, CA 92652

BOOK REVIEWS

by Jeffrey Fisher

THE PERSECUTION AND TRIAL OF GASTON NAESENS The True Story of the Efforts to Suppress an Alternative Treatment for Cancer, AIDS, and Other Immunologically Based Diseases

by Christopher Bird.
318 pp, paperback, \$12.95, ISBN 0-915811-30-8, H J Kramer Inc., Tiburon, CA.

Gaston Naessens is a biologist, an inventor and a true genius, an original thinker blessed with intuitive insight. His ideas and thoughts originate not in a crystalized scientific view of our universe, but from somewhere beyond the complacency of our common dominant paradigm. In the 1950's he developed a lens configuration for a microscope, "...capable of viewing living entities far smaller than can be seen in existing light microscopes." As recently as 1989, his achievement has been hailed by microscopy experts.

"6 September 1989.... What I have seen is a remarkable advancement in light microscopy.... It seems to be an avenue that should be

pursued for the betterment of science." (p.4), Rolf Weiland, Senior Microscopy Expert, Carl Zeiss Optics.

"Naessens's microscope and expertise should be immensely valuable to many researchers." (p.4), Dr. Thomas G. Tornabene, Director, School For Applied Biology, Georgia Inst. of Technology (Georgia Tech).

Because no one can explain why Naessens' lens configuration works, he has not been able to patent his invention. This fact alone has shed a baleful light on all of Naessens' subsequent discoveries. As the first man to peer into it's eyepiece, he was a pioneer, an explorer in an uncharted world. Like Galileo, who declared that the earth was not the center of the Universe, Naessens has borne a brunt of reaction from established medical and scientific authorities.

"With his exceptional instrument, Naessens next went on to discover in the blood of animals and human -- as well as in the saps of plants -- a hitherto unknown, ultramicroscopic, subcellular, living and reproducing microscopic form, which he christened a *somatid* (tiny body). ...this particle was seen by Naessens to develop in a pleomorphic (form-changing) cycle, the first three stages of which -- somatid, spore, and double spore -- are perfectly normal in health organisms, in fact crucial to their existence.

Even stranger, over the years to somatids were revealed to be virtually *indestructible!* They have resisted exposure to carbonization temperatures of 200° C and more. They have survived exposure to 50,000 rems of nuclear radiation, far more than enough to kill any living thing. They have been found impossible to cut with a diamond knife.

The eerie implication is that the new miniscule life forms revealed by Naessens microscope are imperishable. At the death of their hosts...they return to the earth, where they live on for thousands or millions, perhaps, billions, of years!" (p.4-5)

From his initial discovery of the somatid, Naessens went on to find, "...that if and when the immune system of an animal or human being becomes weakened or destabilized, the normal three-stage cycle of the somatid goes through thirteen more successive growth stages to make up a total of *sixteen* separate forms, each evolving into the next.

All of these forms have been revealed clearly and in detail by motion pictures, and by stop-frame still photography, at Naessens's microscope.

By studying the somatid cycle as revealed in the blood of human beings suffering from various degenerative diseases such as rheumatoid arthritis, multiple sclerosis, lupus, cancer, and most recently, AIDS, Naessens has been

able to associate the development of the forms in the sixteen-stage pathological cycle with all of these diseases." (p.9)

"Even more importantly, Naessens has been able to predict the eventual onset of such diseases long before any clinical signs of them have put in an appearance. In other words, he can 'prediagnose' them.

Having established the somatid cycle in all its fullness, Naessens was able, in a parallel series of brilliant research steps, to develop a treatment for strengthening the immune system. The product he developed is derived from camphor... Unlike many medicinals, it is injected into the body, not intramuscularly or intravenously, but intralymphatically -- into the lymph system, via a lymph node, or ganglion, in the groin." (p.10)

Naessens' discoveries have serious implications regarding prevailing theories about the causes and onset of diseased conditions in the human body. For his discoveries to achieve acceptance and respectability, the scientific and medical establishment must question the very foundation of their treatment and diagnosis premises. Medical science bases much of its diagnostic and treatment premise on the theories and discoveries of Louis Pasteur. Pasteur believed that disease originates outside of the human body. A healthy system is invaded by viruses, or bacteria. The medications and treatments prescribed are given to fight this invasion. The disease is considered to be invasive, and medical intervention often follows an invasive course of treatment. Often the side effects of treatment are as disruptive to the health and well being of the body, as the disease itself. Witness the effects of chemotherapy and radiation treatment for cancers. Naessens believes that disease and its causes originate in the body itself, via a suppressed immune system. "Naessens attributes this weakening, ...to trauma, brought on by a host of reasons, ranging from radiation or chemical pollution to accidents, shocks, depressed psychological states, and many more." (p.9)

In scientific and medical circles, the clash of such extremes is inevitable. Naessens is especially vulnerable because he provides documentation that his Camphor and Intralymphatic treatment has a 75% remission rate for cancer and AIDS. "Innovators are rarely received with joy, and established authorities launch into condemnation of newer truths, for... at every crossroads to the future there are a thousand self-appointed guardians of the past." Betty MacQuitty, "Victory Over Pain: Morton's Discovery of Anesthesia".

Most of Bird's story does not concern itself with technical details of Naessens's discovery, but rather with the persecution Naessens has endured from the Canadian Medical and

Cancer Research establishment. Naessens was brought to trial in Quebec for practicing medicine without a license and for murder. One of his patients, a woman with terminal inoperable cancer was not part of his 75% success rate. The charges were not brought by her family, but by the Canadian Medical establishment.

The outcome for Naessens and for millions of cancer and AIDS patients is still uncertain. Bird's book makes for fascinating reading. Most of the information is presented in terms that a layperson can understand. It makes one wonder: how many other legitimate scientific discoveries are molding away in basements and laboratories. As is said, "ignorance is legion."

This exceptional book also contains referential materials on Royal R. Rife's work which foreshadows Naessens's discovery of the somatid.

A must read.

***WITH THE TONGUES OF MEN & ANGELS**

A Study of Channeling

by Arthur Hastings.

232 pp, paperback, \$12.95, ISBN 0-03-047164-8, Holt, Rinehart & Winston, Inc.

"There is no proof, no irrefutable and conclusive evidence, to completely and appropriately define this area of centuries-old reported phenomena and make it a commonly accepted everyday reality for all. Yet, for those who have had the experience, there is no question or doubt. All attempts to explain it satisfactorily have gone begging for centuries. Even hard-nosed critics and cynics, and many 'doubting Thomases,' have had life-changing experiences when confronted by their own moment of entry into this unexplainable and uncharted realm." Excerpt from Foreword, p. ix.

For many of the readers of this Journal, channeling is not a question of possibility. We don't ask, is this possible. We should be asking, however, is this channel a legitimate one.

Channeling has become chic in our social vogue. In many ways, it has become a replacement for the true spiritual work at hand.

In all religious systems where the growth ascendancy of the human spirit is recognized and potentialized, we hear the warnings. Beware of distraction, psychic and spiritual phenomena are the results of spiritual evolution. They are a tool, a mean, if you will, of awareness and self-knowledge. They are not an end in and of themselves.

Hastings addresses these and many other

issues in this excellent study of channeling and mediumship. First, channeling is not just a contemporary phenomena. Hastings traces its' history. He touches upon the Oracle at Delphi, Old and New Testament prophets, medicine men and women, the Spiritualist Revival in the 1800's and then brings us back to our contemporaries.

Always Hastings advises: Do not give your personal power over to the Channeler or the entity being channeled. He recounts one instance when Ramtha, who is channeled through J.Z. Knight, advised channelling workshop participants to invest their money in Ms. Knight's newly begun horse breeding business. Did anyone accuse Ramtha of J.Z. of a conflict in interest?

Hastings points out, that the most accurate channels made their livings, not through their channeling, but through some unconnected (to channeling) trade, skill or labor.

No spiritually enlightened entity would demand blind obedience or investment, especially through such an unverifiable source. When the time comes for such surrender, it is something to be accomplished with out hearts, and our own inner voice. Not someone else's.

Neither Hastings, nor this reviewer disparage the idea of channeled information. He cautions us however about indiscriminate belief. Many channels, while passing valid information about one subject fall short in many other areas. The stories of end of the world cults are legion in number. We are still here. Hastings touches on some of these in this book. He also touches upon the success and validity of channeled information. There is a chapter devoted to "A Course in Miracles" and one on Jane Roberts and the Seth material. He discusses Alice A. Bailey and the Tibetan and other channels as well. He devotes time to the discussion of channeled literary, painting, and musical compositions. I recommend this book for those who desire a rational look at so irrational a subject.

***MYSTERIES OF THE CRYSTAL SKULLS REVEALED**

by Sandra Bowen, F.R. 'Nick' Nocerino, and Joshua Shapiro.

298 pp, paperback, \$17.95, ISBN 0-929781-26-0, J&S Aquarian Networking, Pacifica, CA.

It is not known how the human sized crystal skulls discussed in this book were formed. The art of their creation far surpasses the known technology and sculpting techniques available to contemporary crystal workers.

"Yet throughout recorded history there have been many baffling discoveries of artifacts, monuments, and unusual patterns or

designs left by the ancients." (P.xiii)

In fact, so unusual are these ancient artifacts that in October of 1970 the most famous of these, the Mitchell-Hedges Skull, discovered in an ancient Mayan ruin in 1924 was brought, "...to Hewlett-Packard in Santa Clara, California, for extensive scientific analysis. Hewlett-Packard has one of the most sophisticated laboratories for crystal research.

...their researchers claimed that it would be virtually impossible to duplicate this crystal skull. Through their tests, the skull was shown to have an elaborate inner mechanism of prisms and lenses that would refract and reflect light projected upon the Crystal Skull in specific ways. This system of lenses displays a technical competence that has only been achieved recently (please note that this skull was found in 1924, when no computers or lasers existed). After shining polarized light upon the skull while it was bathed in a benzyl alcohol solution, they discovered that whoever carved or made the skull had totally disregarded the natural axis of the crystal itself. (The crystal should have shattered.)

Another highly puzzling detail was that no matter what temperature the researchers subjected the Mitchell-Hedges Skull to, it always remained 70°F. All of the findings were so astounding that one of the crystallographers at Hewlett-Packard was quoted as saying, "The damn thing simply shouldn't even be." (P.xviii)

It was also discovered, (the Mitchell-Hedges Skull has a removable jaw piece) that both the skull and the jaw were originally one piece of crystal.

Another one of these skulls is sculpted from a large piece of Amethyst. It has a unique feature. Hewlett-Packard tests show that this skull was formed from not one, but two separate pieces of Amethyst. A noticeable suture line runs from the back to the front of this skull. How this fusion was accomplished is not known. Even the most advanced laser technology on the planet today can not accomplish this.

Especially interest, because it is concurred, even in scientific circles, that all of these skulls had their origin in a pre-Columbian indigenous culture. There are various theories regarding the carvers, the cultures and the purpose of these skulls. Atlantis and the antediluvian world has been mentioned. One theory suggest a laser technology much superior to our own. Others suggest an extraterrestrial origin for the skulls. Another theory suggests the use of a hitherto unknown plant substance that when placed on hardened minerals makes it malleable and therefore amenable to sculpting by finger pressure from a human hand. Proponents of this theory also

point to its use in Mayan and Aztec architecture, rather than known techniques of stone masonry. There is also speculation that the skull was carved, rather formed through the applied use of high level mental activity channeled through the third eye. Sculpting through mind. Finally, and the theory favored by contemporary scientists, is the formation of the skulls by simple hard work. Grit and polish. However, even the supporters of this theory admit that it would have taken a minimum of 300 years of labor hours to accomplish this.

Theories also abound regarding the purpose of these skulls. There is an excellent photo in this book showing a holographic image of what appears as a disc or flying saucer that spontaneously formed in the Mitchell-Hedges Skull. Some people suggest some type of crystal computer or a library of ancient records and images. As of this publishing, the answer has not been found.

"Mysteries of the Crystal Skull" is full of photographs and information. Read it.

***ELECTRO POLLUTION How to Protect Yourself Against It**

by Roger Coghill.
192 pp, paperback, \$9.95, ISBN 0-7225-2307-6, Thorsons Publishing Group, Northamptonshire, England.

Coghill presents compelling evidence regarding the pathological effects of microwave and electromagnetic fields upon the human body. He documents the increased incidences of childhood leukemias, cancers, and crib death syndrome in direct relation to proximity of high voltage power lines, radio signal transmitters, and electrical transformers.

This book also contains some practical applications for protecting ourselves from these dangers. Electro magnetic field differentiations are easily measured. Symptoms of lethargy, irritability, and migraine headaches can often be traced to prolonged contact with electro magnetic fields. In some experiments documented symptoms disappeared when the power main to a house was switched off. Many appliances in our homes, microwave ovens, computer terminals, television sets, and radios are not as environmentally sound as we believe. When someone says, "Nuke it" in a microwave oven, they may not be too far from the truth.

I now find myself paying attention to the location of electrical power lines and transformers. Be careful out there, in here, and everywhere. Good reading on an important topic, though at some points too technical for the layperson, including myself.

***THE BODY OF LIGHT History & Practical Techniques For Awakening Your Subtle Body**

by John Mann and Lar Short.
189 pp, paperback, \$12.95, ISBN 0-936385-14-6, Globe Press Books, NY.

This basically is a self help manual on the practice of meditation and the awakening of the Kundalini. A study of Kundalini and Chakra based religious theory and cultural context is followed by a practical guide to practices and techniques. Illustrations are plentiful and relate well to the text. At one point, the authors liken the awakening of the subtle light body to riding on an elevator.

While this reviewer can not vouch for the efficacy of the exercises contained herein, nor for the credentials of the authors, I do believe they are worth a try, as human advancement dictates that we progress in our knowledge of the finer forces. However, I must caution the reader. Historically yoga and mediation exercises have always been performed in a cultural and religious context. When the chakras awaken and the snake coiled at the base of the spine (kundalini) begins its climb, numerous and hitherto unexperienced phenomena occur. This can be frightening and confusing as the practitioner often lacks a personal context for integration. What may seem frightening and unknown may actually be a common experience for all practitioners of the form. Maybe what we need, with the preponderance of books on this subject, is an 800 number for yoga and meditation practitioners. Somewhere some entrepreneur probably has a 900 number for such emergencies. But who needs to pay \$3.00 a minute when you already bought the book? Always, be cautious and discriminate.

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THE ETHER OF SPACE

by SIR OLIVER LODGE

BOOK REVIEW by Gerry Vassilatos

Students of the physical sciences are well-acquainted with the illustrious name of Sir Oliver Lodge. This one name not only conjures up images of Victorian England and the ivy-covered walls of British Academia but far, far more. Like Baron von Reichenbach in his time, Sir Oliver Lodge was one of those academicians who dared delve into the parapsychical worlds. He was possessed of sufficient personal force, regional respect, and positional power to make his researches serious enough to be considered by his peers. The companions of Baron von Reichenbach would not be quite so kind with their illustrious colleague in Germany, but Sir Oliver ever held the distinction of respect among his contemporaries. It is in this very text, so long unobtainable, that Sir Oliver Lodge actually begins the jump from the material world into the ætheric and astral worlds. His researches are herein chronicled in a superbly British style. The atmosphere of the volume is artfully Victorian, covering that magnificent time of the 1890's. It is a fitting tribute to these predecessors that Borderland is making such excellent works available at our own century's turn.

Sir Oliver Lodge was one of those theoretician-experimenters, sufficiently versed in the most important frontiers of physics in his day. Awash in an ocean of new and stunning possibilities afforded the scientists of his time, he was quick to grasp the singular importance of all varieties of experiments having to do with the Ætheric Continuum. He himself had designed, built, and tested his own "æther machines" in hopes of discovering some new knowledge concerning spatial realities and dynamics. Though his initial discoveries actually gave strongly positive results, we shall see that the sufficiently powerful pressures of certain academic groups would force him to so alter his views and experimental procedures, that no detection of etheric drifts could be reported. One feels intuitively in all these reports of his (throughout the text) that Dr. Lodge remained truly disappointed and aesthetically unable to accept the explanations of all the many "negative results" found. We also become aware of the numerous researchers (world-wide) who performed different kinds of tests directly upon the ætheric continuum. These tests were made in order to determine very specific aspects and qualities of the æther.

Each such experiment was performed from an inertialistic viewpoint, discounting all subjective sensation or participation in the ætheric

sensual presence. The inertialists were predictably destined to remain alienated amid the ætheric worlds, being quite incapable of detecting any but the inertial effects of lightbeams upon the æthers. This base of flawed axioms was responsible, in total, for the many failed readings and falsely assumed means of performing æther tests. In spite of these varieties of failures, we yet find numerous examples of positive readings amid the garden. We remain awestruck over the many varieties of æther examinations, and are genuinely devoted to such flowing gems of endeavor; they stand forth against the blackness of space as rare flowers.

Though underground researchers are aware of the detection experiments which had given strong positive reactions to a drifting æther, we find Dr. Lodge speaking between the lines to us at every turn. All too capable of handling the rigors of mathematical explanations and the mind-distorting twists of the relativists, Sir Oliver has let us know that the Victorian views of æther and Space yielded a more potent and fruitful legacy than that which was to follow (relativity theory). The text, originally presented as a series of lectures, should be required reading by everyone in the underground scientific academy. It is, I believe, the most thoroughly comprehensive notation of the state-of-affairs at that pivotal time period in science history. The text deals almost entirely with the opto-mechanical species of inertial æther-reading devices.

His first chapter leads us into the ancient waters of time; the history of "æther" and "ætherion" has timelessly archaic roots. Allowing us to glimpse clearly into the true nature of æther as "dreamy, mythical space" he takes us into the growing inertialistic view which climaxed during his day. The analogies given by his predecessors, through which attempts were made to isolate the geometro-ponderant effects of æthereal substance, is recounted to us. Dr. Lodge retells his own mathematical examinations of the incomprehensibly multiple aspects of the (inertial) æther. Its seeming tensile strength in excess of any known metal, its unbelievable transparency and near-vacuous gossamer-like quality, its ability of supporting magneto-electric and gravitic fields, its ability of conducting varieties of wave phenomena, as well as other inconsistent aspects -- all these are thoroughly discussed. We found his analogies between gravitation and steel columns especially fascinating. We know that he was to delve into

parapsychical research, even as Sir William Crookes had done; we sense that he is on the verge of uttering the inner conviction that æther is far more than some "ultra-substance" -- something possibly incapable of being measured by mere physical device.

Chapter 2 and 3 bring us into and through the pertinent theories of his day. The æther as "interstellar medium" is broadly discussed in strictly physical terms. All the astrophysical observations made up to that date are clearly presented in a thorough discussion. This includes certain optical principles, aberrations of light in space, lightbeams through the interstellar medium, and the critically important concepts of Fizeau and Fresnel: to prove the mutual effects of material, æther, Space-viscosity and inertiality. Nearly every possible aspect of interactions between æther and materials, or æther and lightbeams, is presented for the reader. This is, perhaps, the best textbook for retracing the very steps which led to the brink of relativity theory, and the subsequent misdirection science had decided to accept wholeheartedly. Theories of light, aberration, effects of media, refraction -- indeed, all the phenomena associated with fundamental (inertial) light principles are brought together under one chapter heading. There is possibly no other text which I have found to be so direct and comprehensive in such historical matters.

The fourth chapter portrays all the designs for mechanical æther-detecting machines. The engraving which show us these almost forgotten alternative experiments are truly wonderful. We are given the marvelous sense of his time; days of private invention, free-enterprise cottage industry, and empirical experiment. In these drawings and their intended purpose, described by our eloquent narrator, we are made to understand the very great difficulty of designing mechanical æther-sensitive machines. Sir Oliver, a true professor of the academic world, explains in summary fashion the theoretical reasons for choosing certain designs. The accompanying optical requirements, degrees of accuracy, and expected findings are presented to us. Of course, one feels the weight of concern and embarrassment in this lecturer's words at every mention of a "negative" result. The very structure of the scientific paradigm was "balanced upon a pinpoint" in Space, and these æther machines were far more than mere measuring devices. As the inertialists conceived the æthers, limiting and defining them in the absence of personal participation, so they proceed in their determinations.

Dr. Lodge has presented the case held by the community of his day concerning the many reasons for seeking certain æther-drifts. He also mentions other ætheric drifts believed to exist; recounting the history preceding the choice of specific materio-ætheric interactions. It is here that we are made to understand exactly why

certain æther-machines were designed. The inertial physics, invariable conclusions of the "realism" which took hold of academic circles, led all the eyes of science to these æthero-physic devices (we will describe this aspect in a subsequent article). The quest of the inertialists was destined to failure by spectator-scientists and their flawed logic. What can only be known through participational experience, what can rarely be (inertially) measured, was sought. To find the Very Absolute remains the aim of all science. It is at such edges of perception that the participant realized the true experience of mind-expansion. The reactions of Space during such expansion, and the intelligent astral regions explored and adored by more (archaic) sensitive races, must be rediscovered and developed. When each age seeks to determine the foundations of Absolute experience, it is then that new technology appears. As each questing group extends the borderlands of understanding, so we reach new exposed heights. Dr. Lodge has gone into great detail concerning the æther-drift sought, and the various means of measuring those drifts, we see this important text as increasingly vital in tracing out clues to our present academic positions. Realizing errors, omissions, and successes of the quest (for identifying the ætheric continuum), we will personally ask strangely new and potent question.

Each Victorian device is explained with sufficient brevity as to permit a rapid acquisition of "Victorian" understanding. We are shown the simplicity of certain schemes made to measure the various æther-drifts, and the strangeness of the (supposed) "negative effects". Of course Lodge was perplexed, searching for answers to this powerful paradox. Though he knows more than he says, he shows us the utter frustrations involved with the experiments. Some used specially treated optical paths.

A thorough examination of expected opto-ætheric mutations is given (shifts in light frequency, velocity, persistence of ray-linearity, and mode of propagation). He gives reasons why optical paths were chosen in the very first place. He finally recounts the Michelson interferometer as detector of infinitesimal movements, and its importance as a diagnostic tool in possibly detecting drifts in a static æther. [Curiously enough, none of these inertial æther-explorers questioned their negative results as powerful confirmations of the geocentric theory of reality. It was always assumed that both earth-rotation and earth-revolution would be revealed as fringe-shifts in optical æther detectors. But such motions were never to be found. Each positive effect was always one which revealed a "cosmical" motion: one whose specific angularity of effect seemed to descend from Space. No earth motion has ever been found. Sir Oliver's findings always involved "gliding fringes across the field of view."] Fizeau used

running water to slur the æther. Hock, Mascart and Jamin used stagnant water as a medium for amplifying the æther "slur effect" upon lightbeams. Fresnel discussed the effects of very thick glass upon æther and light.

Chapter 5 allows us an in-depth look at some very different experiments performed in the ætherial surroundings. These were the attempts of Dr. Lodge to find ætheric drifts through the use of ætherial viscosity (which none of the others had attempted in free air). These experiments of Lodge were novel, and display his attachment to certain parapsychical concepts. The experimental apparatus of Lodge allowed introduction of electrical and magnetic charges. The significance of these latter experiments, especially in their defined effect upon gravitation, would later be revealed in time by such notables as Nipher, T. Brown, Saxland and others. Sir Oliver chose a design which incorporated a stack of very heavy metallic discs which were to be rotated rapidly. This device was, essentially, a Tesla turbine. Its massive presence was effective in creating shears within the æther.

His hope of stirring and dragging the viscous æther by such an "ætheric engine" was fulfilled: we find Dr. Lodge making the astounding first report of a positive result. In the light of the subsequent experiments by Michelson and Gale (in which Michelson himself attempted to prove his multiple measurements of a positive effect), and the excellently documented experiments of Miller (in another great publication by Borderland), Lodge himself recounts his astonishment at the initial findings. Yet, we see him believe, doubt, and sink -- in that very order! He says that he was "unable to believe" these first findings -- he "distrusted" the spectacle which was repeatedly witnessed in the eyepiece of his apparatus (pages 73-75); a fascinating recovery of historical significance!

The reader of this text will obtain, firsthand, the fascinating description of Dr. Lodge's "spurious positive effects" made with neutral, electrified and magnetized whirling discs. Informing us more than he realized, Professor Lodge offers a grand bibliography for further branching studies. It is obvious that Lodge continued to maintain the belief in an ætheric continuum in spite of all criticisms (the results of experimental evidences). Not having seized his positive results, and failing to see them as true records of ætheric driftings, he conceived every other possibly alternative to explain his continued belief in æther.

Chapters 6 & 7 are marvelous sources for those interested in the zero-point dynamics. We are presented with a thorough discussion of the density, material viscosity, energetic equivalences and independent nature of the ætheric medium and its quasi-physical aspects. While we have developed concepts of the æther as forms of Space (and personal resonances of

awareness within those spaces), we are shown the steps of Victorian inertialists in their quest toward the astral knowledge. Dr. Lodge brings us into the deep waters of subjects such as ætheric strength, ætheric energy and material substance, material presence and ætheric energies. Students of Moray should read these topics in conjunction with the writings of Dr. Gustav Le Bon, (*Evolution of Matter and Evolution of Forces*, available from Borderland Sciences).

The last chapters of the text are appendices. These excellent discussions of certain problems (essentially, the viscosity, strain, tensions, and potential energies of the æthers) round out the reader's increasing fund of knowledge. The bibliography excellently serves us in branching outward into other periodically of that time-period. Along with this text, we strongly suggest that the reader seek after articles which described electro-ætheric devices.

[Phillip Lenard performed several such tests using Plucker discharge tubes, proving that Space conducts charge anisotropically. The works of Sagnac, who also found positive æther-drift results (using rotating tables of mirrors) should be sought out. The recent positive results of Maurice Cooke in Canada (1983), using magnetic fields and inert-gas laser-beams, must be studied closely. One also must begin to realize the all-importance of personal experience with ætheric currents and winds. Such findings have been reported by such notables as W. Reich, T. J. Constable, B. Payne, and H. Meinke in psychotronic applications. The works of others, who have employed devices which conduct æther directly, must be read (G. Hodowanec, T. T. Brown). The legends who discovered diurnal and seasonal variations in radionic-ætheric procedures must also be intensely studied: Abrams, S. Rodgers, T. G. Hieronymous, De LaWarr, L. Kolisko, R. Hauschka.] Many of these works are available through Borderland Sciences.

This text is a bibliomancer's dream. Definitely a must for all ætheric researchers and for developers of new tekology.

THE ETHER OF SPACE

Sir Oliver Lodge

Contents: The Luminiferous Ether and the Modern Theory of Light; The Interstellar Ether as a Connecting Medium; Influence of Motion on Various Phenomena; Experiments on the Ether; Special Experiment on Ethereal Viscosity; Ethereal Density; The Density and Energy of the Ether; Ether and Matter; Strength of the Ether; General Theory of Aberration; On Gravity and Ethereal Tension; Calculations in Connection with Ether Density; Fresnel's Law a Special Case of a Universal Potential Function.

B0033, 11x8-1/2, 180pp, staples \$15.95 + postage & handling (see back cover for rates)

HOW AN ORGANISM TAKES ITS SHAPE

by Noel Huntley, Ph.D.

One of the mysteries in the science of biology today is how a living entity acquires its form. It is considered that the DNA will eventually reveal this missing information, and as we shall see this is both correct and incorrect depending on the context. In fact, the information in the DNA strands is so complex that we sometimes refer to such systems as random. However, what we shall be mainly concerned with here is specifically how the geometry of a living organism takes

All creation begins with a higher-dimensional vortex which we shall refer to as 4th dimensional since this is sufficient for our purposes. We would picture this as spherical, and larger than the final product to be. A very crude analogy, but possibly helpful, is that of a sculptor who works in stone. He begins with a block larger than the final object which we can imagine as, say, a figurine at the center of the block. Envisage the block of stone as spherical, corresponding to the vortex. An

experienced artist will chip away surface layers of stone gradually going from a generalized state to one of increasing degrees of specificity to the final specification at the surface of the figurine.

Imagine thin layers all around being peeled off, very gradually manifesting the outline of the final product. One should think of these layers to be fields (within fields) and present even when the process is complete.

Now let us return to the vortex. We know that a vortex spirals inward, but remember that it requires 4th-dimensional geometry to understand its periphery. In 4D, this

means that the spiral can take two directions towards the center. These directions become more opposite nearer the center and meet, creating a standing-wave structure.² This is the true higher-dimensional form of the double-helix spiral -- see the diagrams in Figure 1.

This is also the basic unit of wholeness for all entities; atoms, cells, organs, planets, solar systems, galaxies, universe, etc. The famous Russian philosopher Ouspensky once dreamt he had discovered the secret of the universe. The following morning, on examining the sketch he had made during the night, found it to be one which is identical to (d) in Figure 1 but without the spirals.³

Now let us picture this 4D spherical vortex spiralling inward. Recognize that the

spiral is immensely fine. In fact, because of this, mathematically it can be modelled as consisting of countless concentric spheres. These are not peripheries but spheres one inside the other on a gradient 4D to 3D; each is a quantum field and fractionally different from its neighbor. Moreover, each is a field of context for all "lower" fields -- none must be missing or out of harmonic alignment or chaos will result. Now consider an intermediate stage which can be analogued from the blowing of soap bubbles when in the rare occurrence a whole group is formed of intersecting bubbles of different sizes. The vortex has divided into smaller ones; this is the nature of quantum reduction -- see Figure 2.

Note that shaping of the organism can now begin to take place according to the magnitude of the radii of the spheres and

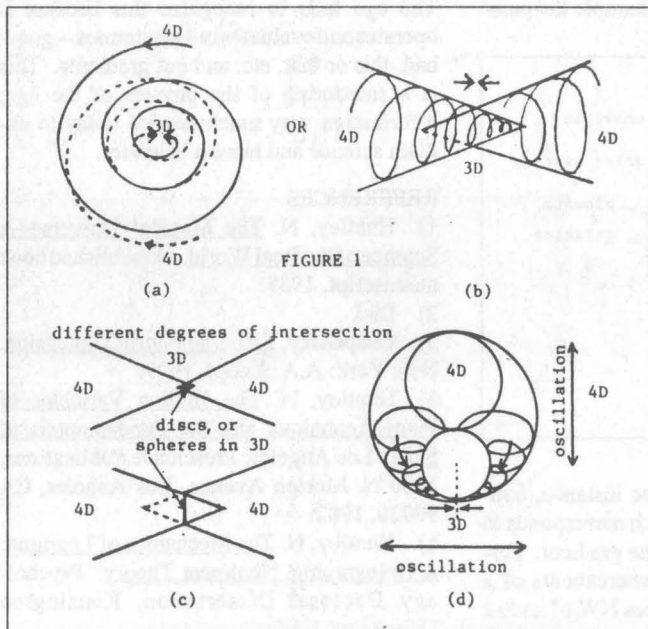


FIGURE 1

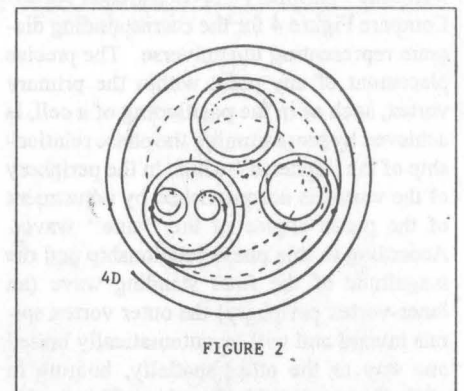


FIGURE 2

also the degree of intersection (phase relation of the oscillations). We mentioned earlier that the spirals take two paths inward and meet somewhere in the center. If they meet at a minute point in the center we get the appearance in 3D of a particle or the fundamental oscillation (stationary state) of an atom (these are actually nodes -- center region of the sine wave). However, according to the program or blueprint -- modulations within the holistic waves -- in the 4D periphery of the vortex, these two spirals can meet much sooner, creating a greater area of intersection -- study Figure 1(c). These areas of intersection are stable standing-waves structures -- they are oscillating in and out of our 3D matrix. The larger ones act as a guide for the smaller ones within. This is achieved by resonance due to harmonic relationships. These stationary-wave structures between the large vortex and the smallest within, are fractal levels -- another mystery in current science. With some effort of the imagination we see that any shape whatsoever can be created by adjusting two variables: 1) radius of the intersecting spheres, and 2) phase relations of the sine waves representing their oscillations -- see Figure 3.

Remember that only the smallest oscillation

effect.¹

A full description of even some of the subsidiary concepts involved here is not possible since we are considering processes which generalize to all fundamental systems of mind, life, and the universe; for example, how minds communicate verbally (from concepts), how physical mobility is achieved in musculature system, and even how advanced extraterrestrial propulsion systems work (which are based on nature's universal processes).

This information is not being presented in a form suitable for the orthodox scientist since there will not be the space to justify the concepts; it will be assumed the reader already has some familiarity, such as with the nature of the vortex.

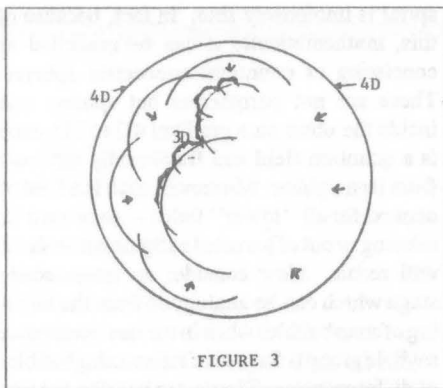


FIGURE 3

tions are fully in 3D and detectable with orthodox scientific methods and ego perception but all these "spheres" are true wholes or quantum states going into higher orders towards the "periphery" of each greater vortex. Compare Figure 4 for the corresponding diagram representing the universe. The precise placement of any point within the primary vortex, such as in the positioning of a cell, is achieved by programming the phase relationship of the "spheres" which in the periphery of the vortex is accomplished by adjustment of the phase angles of the "sine" waves. According to this phase relationship and the magnitude of the final standing wave (an inner-vortex periphery) the outer vortex spirals inward and will be automatically biased one way or the other spatially, homing in perfectly to a specific location. This is also how extraterrestrials navigate to a coordinate point during teleportation and also how, for example, a pianist instantly locates, when desired, a point of information in, say, part of a finger movement during whole complex coordinations.⁴

In reality we thus have two conditions: 1) the DNA which we know contains information for the regulation and maintenance of the organism, and 2) a higher-dimensional blue-

print or spiritual "seed" which contains infinitely greater probable information in the modulations of its sine waves in its 4D periphery.

The DNA thus provides the 3D control, and by sending its resonances up through the gradient spiral of the vortex, meeting at every level the basic program of higher-dimensional information, selection of probabilities takes place. As one goes from the outside to the inside, probabilities from the most general state are under continuous selection all the way towards complete and singular specification of each particle in 3D (quantum reduction). The DNA is necessary to precipitate the gradient (4D to 3D) into 3D specification. This is achieved entirely by resonance of information from one level to the next (the process is complex beyond imagination). Because the gradient is so fine the transmission of information is difficult to grasp. If we take a fictitious and more blatant example the point

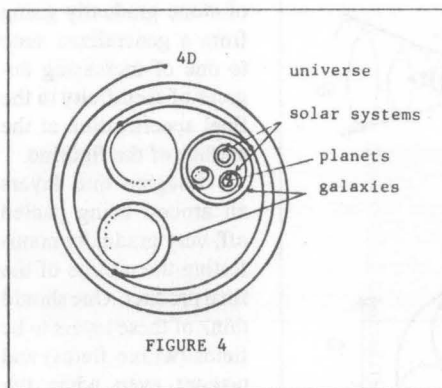


FIGURE 4

becomes more obvious. For instance, consider persons A, B and C; each corresponds to quantum fields adjacent in the gradient. Person A knows the specific whereabouts of a buried treasure, say 50 degrees NW of an oak tree. Person B knows which park the tree is in

(nothing else), and C which town the park is in. There are several trees, parks, and towns, etc. The information which each has is necessary to locate the treasure beginning at the large "quantum state", the town. Each piece of information is a context for the next "lower" information. In this manner, the most complex processes of nature can be handled including the highest abilities of coordination involved in physical mobility.⁵

Now owing to the relationship of these quantum fields which are holistic and holographic,⁶ if one looked deeply enough within the DNA going into higher-dimensional space one would in fact contact the source; in other words, the DNA would be found to contain the information for formative processes (but by a stretch of the imagination). Thus even the question posed earlier about this requires the correct context. Everything works in the relationship (the context) of something else. The ego fails to recognize this because it operates and evaluates in dichotomies -- good/bad, this or that, etc. and not gradients. This is a smattering of the physics of the ego; information very much needed today to explain science and human behavior.

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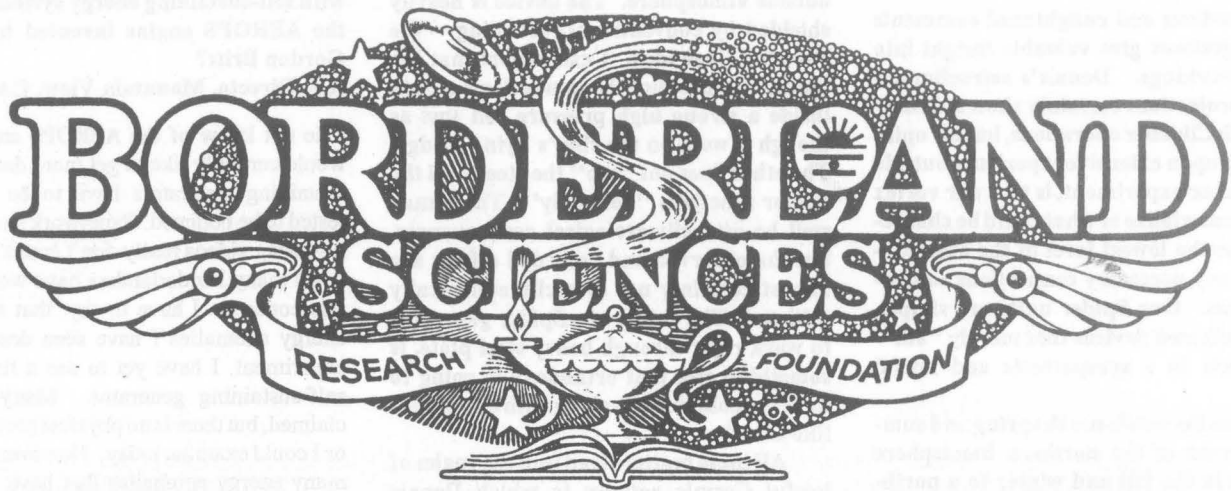
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B.S.R.F. BULLETIN BOARD

OPERATION CLINCHER

I have been a subscriber for a number of years. I was so filled with adoration for the subject and the participants in Operation Clincher that I showed the article to an old friend who is a distinguished physicist with impressive credentials. He shot down the whole story (to my embarrassment).

He says that no one yet has proved the existence of ether, or said what it is. He says that none of the data are proved other than that weather and smog fluctuate, and that the Spiders' functions have to be taken on faith. Does a working definition of ETHER exist? I have been an admirer of TJC and his writings. If his Spider is "appallingly simple", can he furnish a working diagram? This should be a boon to mankind, unless the technology is vulnerable to dangerous misuse by the uninformed.

If the whole effort is subject to loud and viscous reaction and political condemnation by those whose pockets are threatened if it is adopted by municipalities, counties or states, then the veil of secrecy should be drawn from ether technology.

What is it? How does it work? How can we reproduce the effects? You at JBR are very generous with diagrams, such as MWOs.

My friend of long standing I value as a friend and respect as a leader in his field, and I would also like to see your article more firmly founded.

Sincerely yours,
Bill James
Santa Fe, NM

*I was very much impressed by your article OPERATION CLINCHER and I would like to build a generator of etheric vortices. Montreal (Canada) does not even come close to L.A. as far as smog is concerned but it would be interesting to set up a few stations here. Is it possible to have plans of that generator so I can assemble one?

Guy Menard
Longueuil, Quebec

This is a cross section of the mail received for the OPERATION CLINCHER article. One must understand that a university-trained physicist has an understanding of the universe based on special case physical experiments. This is a profound science that, through probing what Ernst Lehrs calls the "nether border of nature", has given us our modern technology and nuclear bombs, but it lacks quite a bit of information that has been officially ignored and/or suppressed over the last century -- specifically any evidence of life energy or ether. The ether's existence has been proven definitely on several occasions. Wilhelm Reich's orgone accumulator compresses the atmospheric ether which can then be measured via luminosity and heat gain. Also, see "The Ether-Drift Experiment; the Determination of the Absolute Motion of the Earth" by Dayton C. Miller, from *Reviews of Modern Physics*, Volume 5, 1933, (reprinted by BSRF) for an exposition of the detection of the ether through scientific experiment.

The modern scientific viewpoint takes on faith that the universe is constructed on patterns determined by electrical particles cre-

ated by the experiments themselves!

The structure and operation of these instruments is proprietary as they have a profound effect on the subtle flows controlling the weather and they are not the type of units to be built as a project to see if they work. Much damage could result from misuse. Not only is knowledge of the equipment necessary, but also the astronomically regulated periodicity (like the tides) to the etheric flows. As Trevor points out on one of his videos on file here, that controversy over the ether has been raging for thousands of years -- he has jumped that hurdle and put the ether to work. Whether or not the academic world accepts Trevor's work does not stop him from accessing the ether with his original equipment. Trevor has done over 20 years of experimental work in this field and files advance notice of all his projects with the National Oceanic and Atmospheric Administration, and keeps them notified by telegram of all important changes. It is because he takes these steps that Borderland has promoted his work. We do not promote the general building and usage of this equipment -- rather we are trying to create a historical record of Trevor's work and to stimulate the open mind to probe further into the borderlands of human knowledge. The equipment is "appallingly simple" but it takes knowledge of the finer forces to both design and operate. Simply building from plans would not give the necessary information needed to interface with the natural forces properly. Rather the equipment must come as an accompaniment to the knowledge gained through proper study.

TJB

And here is Trevor Constable's reply to Dennis Klocek's letter in the last Journal:

These studious and enlightened comments and suggestions give valuable insight into etheric workings. Dennis's astroclimatological projections certainly show synchronism with Clincher operations, but my opinion based upon extensive experience outside the Clincher experiment, is that our vortex strings materialize at what could be characterized as the lowest level of the etheric — without any necessary connections to Cosmic events. Our Spider units are simple, unsophisticated devices that merely "stir" the etheric in a sympathetic and lawful fashion.

When the south-north spring and summer current of the northern hemisphere switches in the fall and winter to a north-south regime, the vortex strings manifest again, running southward from southern California into Mexico and Central America. There is perhaps, again, an astroclimatological correlation that Dennis might adduce for this. Experience has nevertheless proved over the wide expanse of the Pacific and in southeast Asia, that barometric lows in strings, with rainy consequences, ensue from the use of these simple vortex generators. Their operation in Hawaii, for example, can produce rain in California, and has often done so. We have known of this connection for many years. There may well be astroclimatological reasons for this, or astroclimatological consequences, but I am of the opinion at this point that we are just in the first stage beyond the purely mechanical, which proceeds without consciousness of etheric workings — however grossly these may impact on the ethers.

In the past two years on the high seas, these simple vortex generators have proved decisively, over and over again, and pressed down with abundant video proof, that heavy rains can be engineered inside vast high pressure cells. One can take the video camera from the ship's official barometer at, say, 1028mb, and pan it on to a deluging rain line across the vessel's bow that is more than 20 miles long by radar measurement. I could not accept at this stage, that astroclimatological factors produced this rare phenomenon rather than the Spider. The ability to do this kind of thing virtually at will while in motion over the sea, indicates on the contrary, a cooperative use of the ethers that is just about as close as one can ever get to things mechanical. We are operating at the extreme lower fringe of the etheric world.

An interesting sidelight to this, is that the Spider has been operated on shipboard below decks and below the waterline, with a

minimum in any direction of a inch of marine steel plate, between itself and the outside atmosphere. The device is heavily shielded by conventional reckoning — the Faraday Cage idea. I can report that the Spider will produce the same effects of rain inside a strong high pressure cell just as though it were on the ship's flying bridge. The ether does not "see" the steel, and the Spider functions "normally". There may well be astroclimatological consequences, but the observed and recorded effects are almost certainly not astroclimatologically initiated. The ability of a Spider generator to work right through heavy steel plate, is something else that orthodoxy is going to have to choke down — along with operations-like Clincher.

All these matters lead into the realm of lawful Cosmic activity to which Dennis draws attention. Scientists of a new generation and a new mentality, will be busy for centuries codifying and investigating all this in the sciences of tomorrow. While I accept that there is both physical risk and karmic risk in what I have initiated, greater risks are occasioned, and heavier restraints would be justified, for example, against aeronautics. Each day, thousands of airliners tear the etheric world to shreds, roughshodding without any comprehension, over the Earth's vital systems. No damage my Spiders are capable of, could compare with the worldwide life-negative consequences of all progress. One of the consequences of progress into the etheric must inevitably be the nullification of the worst consequences of a technical and scientific order erected upon ignorance of Life and denial of the ethers.

Trevor James Constable
Hauula, Hawaii

Thank you for a further clarification of your work, Trevor. In 1987-88 I was studying the work of Luke Howard (*Essay on the Modification of Clouds*, circa 1803) and spent quite a bit of time studying cloud modifications. I came to realize that the greatest impact that I saw in cloud formation came from jet planes. Their trails would modify into many different types of clouds, depending on atmospheric status. Wilhelm Reich used the jet trail activity as a signature of the ambient status of orgone energy. I have also seen a video of Trevor laying down a rain line in a 1028mb high, with visual sighting by day, and radar screen by night. We would like to keep an ongoing dialogue among BSRF Members on this subject, and we will be running more information on Dennis Klocek's astroclimatological research.

FREE ENERGY?

I would like to know if BSRF has worked with self-sustaining energy systems such as the AEROPS engine invented by Robert Gordon Britt?

R.F. Directo, Mountain View, CA

I do not know of the AEROPS engine, and would certainly like to get more details. Self sustaining generators have to be seen and tested to be believed. Paperwork and partially revealing videos really don't count. Over the years many Borderlanders have worked with this concept. I have to say, that for all the energy anomalies I have seen described by experiment, I have yet to see a functioning self-sustaining generator. Many have so claimed, but there is no physical proof that you or I could examine today. However, there are many energy anomalies that have been presented over the years, and if the focus is an all encompassing one, taking all the parameters into account, rather than a focus on so-called "free energy" then real progress will be made. Otherwise we have a scattered field of research that jumps at every popular concept and every claim of free energy. For example the term "scalar waves" was coined without any exact experiment to justify the new term, it was merely applied to other's non-related works. Now people are trying in many ways to define and prove this inert concept. The gallop came before the horse! I mention this because we have received calls from people who want "scalar wave generators" and when I ask them what a scalar wave is they never know! On the other hand we have the concept of the etheric which comes to us from a time when earth people directly experienced the natural and supernatural forces. The discursive consciousness was not focused like it is in our present stage of development. One must raise the awareness. Life, and hence energy, does not arrive from cancellation of opposites, but from rhythms between polarities. Tesla rhythmically stroked the life envelope of the earth in his successful electrical transmission experiments. And I appreciate people like Larry Spring who has developed a working model of energy completely from physical experiment. Larry is the first to admit that his spherical explanation may not be a complete concept, but that the model fits his experiments -- and he is constantly probing for any experimental work that would modify his viewpoint. The sphere is the basic shape of the cosmos, and Larry has shown that radiated transverse electromagnetic energy can be measured as spherical units with specific size related to frequency. When one works with this concept in the imagination they can weigh for themselves how it can be applied to experiments in energy generation. TJB

KERTL-SCHAUBERGER INFO

Concerning your reference in the JBR May-June 91, on how one can pursue the Kertl-Schauberger work. I started to do it but ran out of time. There are 400 tons of German World War Two documents available... I used them in my Stanford Books ... I know where the indices are located (I donated a set to Stanford but there is probably a set on the East Coast)... Its a long a job and one needs to read German. I would make the stipulation that the info is made available to Borderland or Future Technology Intelligence Report (FTIR). German Embassy in Washington has no information, I checked. Antony Sutton
Future Technology Intelligence Report
Suite 1606, 537 Jones St.
San Francisco, CA 94102

Thanks for the info. Dr. Sutton has been very helpful in helping people track down information. His FTIR has done a good job of covering a lot of diverse threads in the emerging energy fields. While the newsletter is oriented toward professionals, and is priced accordingly, Borderland Members can receive substantial discounts to help stimulate the information flows. Write FTIR and find out current info.

PAL VIDEO FORMAT !

BSRF video tapes are now available on PAL format from: Altered States, 4 Gundry Street Newton, Auckland 1, New Zealand
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RECEIVED

A partial listing of publications received. Not all are reviewed. Also see review sections elsewhere this Journal

* **CROP CIRCLE SECRETS** edited by Donald L. Cyr, published by Stonehenge Viewpoint, 2261 Las Positas, Santa Barbara, CA 93105. A compilation of articles, just in and not yet evaluated, but no doubt an astute entry to the Crop Circle field of research. Donald Cyr has put out quite a bit of interesting data on controversies over mysteries of the past, in part focusing on the "canopy theory" of atmospheric structure, which says that in the past cloud layers covered the earth and gave rise to ancient symbolisms and myth. Only through lack of time have I not fathomed the implications of this theory, but Stonehenge Viewpoint (at one time a periodical) has published a lot of intriguing materials over the years. Get a catalog!

* **ELECTRIC SPACECRAFT JOURNAL**, Box 18387, Asheville, NC 28814. Jan/Feb/Mar 1991, Issue No. 1. Electric Spacecraft

Journal (ESJ) is designed to report individual research at both the amateur and professional level, in an effort to communicate new ideas and technology for spacecraft. ESJ encourages thinking and experimentation. First issue includes a well done article on the Electrokinetic Work of T.T. Brown, which is some excellent research to build on; Searl's Levity Disc Generator, which is given a fair going over with pro and con remarks; and Electrostatic Concentric Field Generator Experiments by Charles Yost. Searl seems like a lost cause to me (TJB), but I like ESJ's fairhanded approach to the subject. Articles contain chronologies of events and are well researched and this edition contains a glossary of terms along with source data on tracking down further info. Quarterly -- \$24, Canada & Mexico -- \$29, Other countries -- \$39.

* **Planetary Association for Clean Energy (PACE) Newsletter**, Vol 6, Number 2-3, from PACE, 100 Bronson Ave Suite 1001, Ottawa, Ontario K1R 6G8, Canada. Phone (613) 236-6265. Editor Andrew Michrowski has an international network that feeds him quite a bit of data on energy sciences.

* **ALIVE AND WELL** -- *Neutralizing Environmental Radiations* by Michael J. Jofre and Robert T. McKusick. This is an interesting pamphlet describing borderland researches into electromagnetic and geopathic pollution, using dowsing as a detection tool. Lots of ideas and experiments in attempting to shield these various radiations. \$4.50 plus postage from Biomagnetic Research, Rt. 1, Box 35-D, Globe, AZ 85501, Phone: (602) 425-5051.

* **AQUA TERRA: Water Concepts for the Ecological Society**, from The Water Center, Rt. 3, Box 716, Eureka Springs, Arkansas. Phone (501) 253-6866. Vol 1, No 1, covers many different facets of water from The Tao of

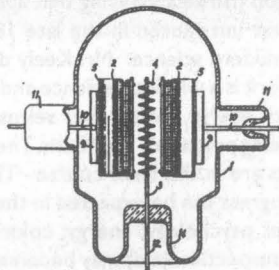
Water by Lao Tsu, through Dowsing, on to water filters and River Rehab. Or as they put it "it combines environmental, ecological and metaphysical approaches towards water." \$5.95 or \$3 each in bulk, proceeds benefit the Water Center, a non-profit clean water advocacy organization. A good effort and quite enjoyable materials.

* **GHOST NEWSLETTER**, Box 899, Irvine KY 40336. Reports of real ghost sightings, and investigations of hauntings. Interesting reading with an open-minded approach \$3/sample, \$15 year US/ \$20 elsewhere.

* **THE HEART OF HUNA** by Laura Kealoha Yardley, from Advanced Neurodynamics, 1001 Bishop Street, Pahauahi Tower #702, Honolulu, Hawaii 96813. First thing I noticed about this book was that Borderland Sciences was listed as a main source of information, but they spelled our name as "Borderline" on every occasion (except when they spelled that word wrong). How can people understand our information if they can't even read our name right?

* **SOLAR AND PLANETARY INFLUENCES** -- *A Monthly Newsletter of Analyses and Predictions* edited by Burl Payne. This is an interesting publication that covers Sunspot number predictions, Geomagnetic activity predictions, as well as predictions on the weather and human behavior. Good documentation with an analysis of past predictions. For info write: PsychoPhysics Lab, Box 6023, Boulder, CO 80306.

* **MYSTERIES AND WONDERS** by Bernice Wilson Stewart, ISBN 0-533-09224-8, Vantage Press, 516 W 34th St., NY, NY 10001. The author was "born with the gift of visions and has.. been blessed with the gifts of prophecy, ancient writings, and signs and symbols" A book about ghosts and flying saucers. \$8.95



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* **BIO-DYNAMIC Farming & Gardening Association**, Box 550, Kimberton PA 19442, (215) 935-7797, 53rd Annual Conference, Oct 11-13, 1991. Theme: **Balancing and Mediating Substances in Nature**. — *The Role of Clay and Humus*.

* **MULTISCAN** — *Total Therapy for the Entire Being*. "A new concept in wholistic therapy which enables the client to receive restorative energies to each body system, eg: Skeletal, Muscular, Nervous, Digestive. This is a complex, comprehensive treatment, which can be adapted to all individual requirements. Directed towards the body systems, rather than symptoms, it has been devised primarily to raise vital energy throughout the body. Treatment is always directed toward the entire person rather than parts. Multiscan Therapy is based upon the latest ideas of indirect therapy. It has certain similarities to Radionic Therapy, which treats people at a distance by transmitting energy through a personal focus such as a blood spot or hair sample." (We hope to get more info on this into future Journals.) Information from: Future Concepts, 198 High Road, London N22 4HH, UK. phone: 081-833-0767

* **ENVIRONMENTAL LIGHTING CONCEPTS**, 3923 Coconut Palm Drive, Tampa, FL 33619, (813) 621-0058, manufactures and distributes full-spectrum, radiation-shielded fluorescent lighting products based on patents developed by Dr. John Ott. "Together with the Environmental Health and Light Research Institute, the non-profit research organization originated by Dr. Ott in 1957, we are embarking on new clinical research to document the OTTLITE'S efficacy for cancer, AIDS and heart disease patients."

* Private party wishes to sell an **EBI Bone Healing System** developed by Drs. Robert Becker and Andy Bassett. This is offered as a research device only. Includes manuals, treatment unit, extra coils, extra battery pack, and charger. Almost new, \$4900 or best offer. Contact Tom Brown at BSRF HQ.

NEWS FROM THE BORDERLANDS

RISE IN SOLAR STORMS DOCUMENTED. Scientists speculate on health risks from particle release, The [Toronto] Globe and Mail, June 14, 1990. Since this info appeared originally in NATURE it is somewhat non-committal on what effects are actually going on. None-the-less the article claims that people in

airplanes are at risk from the large solar flares of this cycle, and that some of the radiation normally damped by the atmosphere is reaching the ground. It claims the info is in dispute, including the related concept of solar cycle influences on earth's weather, but perhaps they have overlooked books such as: **SUN-SPOTS, DUST AND RAINFALL** by George N. Newhall, S&G Publishing, Box 827, Davis, CA 95617, ISBN 0-9619881-1-8; or, **SUN, WEATHER AND CLIMATE** by John Herman and Richard Goldberg, NASA Scientific and Technical Information Branch publication NASA SP-426; or **EFFECTS OF SOLAR ACTIVITY ON THE EARTH'S ATMOSPHERE AND BIOSPHERE** edited by M.N. Gnevyshev, translated from the Russian, ISBN 0-7065-1566-8, from U.S. Dept. of Commerce, National Technical Information Service, Springfield, VA 22151. The last book listed is an amazing source of info on statistical comparison of disease rates (such as polio) and solar cycles, going back over 100 years in some cases. (Clipping Credit: Gene Duplantier, editor of DELVE, an interesting magazine covering many curious corners of the borderland worlds, such as UFOs and Hollow Earth mysteries. DELVE, 17 Shetland St., Willowdale, Ontario, Canada M2M 1X5)

SYMPATHETIC VIBRATORY PHYSICS TRAINING & CERTIFICATION COURSE -- LEVEL I

Sympathetic Vibratory Physics is concerned with the study and application of the known and yet to be known aspects of the Universal Creative Forces. These forces manifest to us as vibration. Since everything in the universe vibrates, an in depth study of the inner nature and function of vibration and vibratory physics is absolutely essential if we are to arrive at a better scientific and philosophical paradigm for the future.

This home study training course in **Sympathetic Vibratory Physics** is designed to convey an insight and understanding of the basic principles operating within the universe. Many people are familiar with the concept of vibration but lack basic knowledge of the fundamentals. Fundamentals of vibration learned in this class can be successfully applied to any number of fields of work: electronics, music, therapy (of diverse forms), psychology, vibration analysis, philosophy, art and mechanics. The fields of ultrasonics, music and color therapy, wave technology, vibroscience, vibration analysis, sound and noise pollution control, Non-Destructive Testing & Evaluation and related disciplines are some of the fastest growing job markets implying that applied vibration will have a greater role in the future.

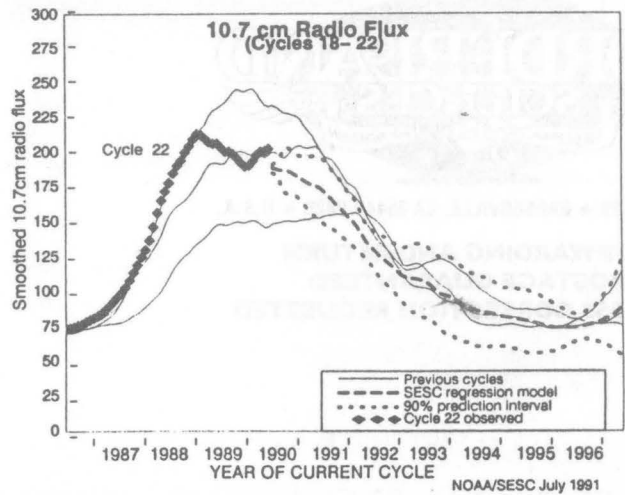
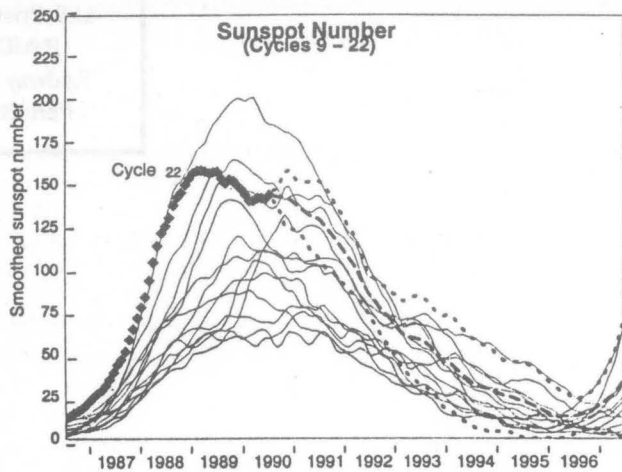
Sympathetic Vibratory Physics was first introduced in the late 1880s by John Ernst Worrell Keely (1827-1898). His revolutionary pioneer work has yet to be equaled by modern science. Mr. Keely discovered and demonstrated the fundamental basis of all natural phenomena is vibration. His completed work is a wholistic science and philosophy that respects nature and gives us a gentler and more pervasive way to understand and deal with energy, matter, our selves and each other.

More and higher levels of certification are being prepared. This Basic Theory course will be a prerequisite for all the subsequent courses. No mathematics and engineering concepts are in this basic course. These are being reserved for future training courses of a more specific nature. Without the basics little progress can be expected in the more complex and involved courses to follow. New courses will focus on health and healing, mechanical, psychology, energy, color therapy, music therapy, social, electrical, atomic and molecular applications. Qualified students (in their respective field) may become a Certified SVP Instructor. Inquire about this unique opportunity.

Course material includes **SVP - Compendium of Terms & Phrases** with over 3,200 entries, a \$29.95 value. Certification also grants you a one year membership in The International Keely Society, a \$60.00 value which also includes a one year subscription to **Sympathetic Vibratory Physics**, a monthly publication exploring the vibratory nature of the Universe, a \$48.00 value. Cost for the course and all the above materials and benefits: \$250.00 for members and \$295.00 for non-members, with shipping and handling charge of \$7.95. Check, Money Order, Visa and MasterCard accepted. Money back guaranteed. Call (719) 473-8852 or write:

SVP Certification, Delta Spectrum Research, Inc., 1309 N. Chestnut, Colorado Springs, CO 80905

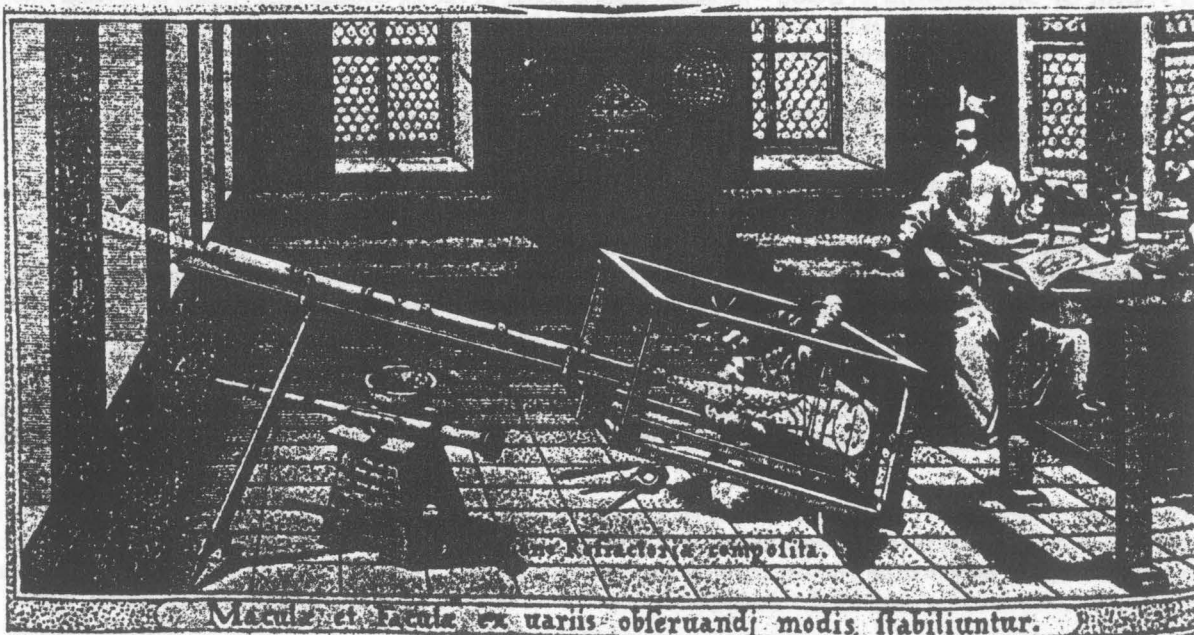
Solar Cycle 22 Compared to Previous Cycles
(Starting at Cycle Minimum)

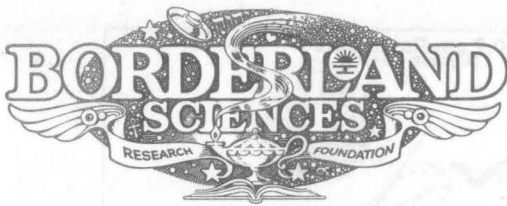


On July 11, 1991, we here at the Borderlands were fortunate to view what had been termed the solar eclipse of the century. Although our viewing did not rival what could be seen in Mexico or Hawaii it was still quite a spectacular event. From about 10:20 AM (pacific time) until about 12:20 PM, we were able to witness our partial view of the solar eclipse through all of its stages. Up to this time we considered many of the various methods for viewing the sun and its eclipse. The first device we tried out was the traditional pinhole box which allows one to see a very small projected image of the sun. This really did not have the clarity desired and it also gets rather hot with your head stuffed inside a 2' x 1' enclosure for any length of time. Filters

were also considered, but we really wanted to see what was happening in the actual light of the day. Finally, after searching through an assortment of books on astronomy, we found a 17th century depiction of two Jesuit scientists using an apparatus to view sunspots (see below). The apparatus consists of using a long-focus telescope to project the image of the sun on to a viewing surface such as a white card. We didn't have a long scope available to us but a pair of 8 x 40 binoculars worked quite well. The binoculars were attached to a tripod which in turn was mounted to a ladder, lifting the scope about 6 feet off of the ground. The projection surface lay on the ground almost directly below as the high angle of the sun demanded it. A 2' x 3'

piece of cardboard had to be fastened to the eyepieces of the binoculars to shade the viewing area from surrounding light and one of the eyepieces was left covered so as only to project one image. This apparatus gave us a fairly detailed image of the sun about 6" in diameter. You may not be able to use this setup to see an eclipse for another forty years, but it is an excellent tool for viewing sunspots and their motions. We noted several sunspots and it was very easy to follow their apparent path of travel across the face of the sun. You may want to catalog their details and motions over certain periods of time and this can be done by tracing their details right on the viewing card each day. All told, it is a very simple way of obtaining good results. MBT





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BORDERLAND RESEARCH PUBLICATIONS & REPRINTS

RADIONICS -- NEW AGE SCIENCE. The original edition by Riley Crabb was quite popular through the 1970's and 80's. This new expanded edition provides a fuller range of complementary data. Contents: History of Radionics; The Work of Ruth Drown; How to Build a Modified Drown Machine (with rates); How to Build a Radionic Tuner; Interview with Dr. Leonard Chapman; Achieving Health Through Radionics; How to Build a Rainbow Tower with updates. #B0123, 134pp, stapled. \$21.95

INVESTIGATIONS OF THE ELECTRONIC REACTIONS OF ABRAMS. This compilation contains independent tests of the original radior instruments of Albert Abrams. An important group of documents for the researcher or skeptic with an open mind. Includes: Report on "Electronic Diagnosis and Treatment of Disease; Operating Instructions of the Indicator and Intensity Gage in Diagnosis and Electronic Wave Analysis; Drug Selection in connection with Electronic Diagnosis; Magnetic, Ionic and Electronic Phenomena in Relation to Disease; and more. #B0122, 120pp, stapled. \$19.95

THE LIFE AND WORK OF SIR JAGADIS C. BOSE — *AN INDIAN PIONEER OF SCIENCE* by Patrick Geddes, 1920. Jagadis Bose ranks among the top the forgotten and ignored greats in science such as Lilly Kolisko, Rudolf Steiner and Wilhelm Reich. Bose tracked the trail of the living from human animals, through plant life, into the metals. He discovered that they all responded, at different levels of sensitivity, in the same manner to the same stimulus. He would drug metals and record the recovery times! Bose's magnificent life of discovery will provide you with a special glimpse into the scientific work earlier this century, as well as a clear view of a science of the future possible through awareness of the sensitive, living forces of the universe. This book goes into quite a bit of detail on Bose's awesome scientific work. A real gem. #B0119, 259 pp, illustrated, \$20.95

PLANT AUTOGRAPHS AND THEIR REVELATIONS by Sir Jagadis Chunder Bose, 1927 Bose developed his own special instrumentation for all his experiments. The autograph could magnify response sensitivities in plants to provide charts of life activities at extremely minute levels. Chapters include: The Silent Life; The Plant-Script; Behavior of Plants; Drugged Plants; Electrical Response; Sleep of Plants; Response of Inorganic Matter; Curvature of Life and Death; Wounded Plants. Sense of Direction in Plants; Propulsive tissue; Action of Alkaloids on pulse-beat of Animal and Man; Nerve of Plant Helios and His Leaf-Chariot. Packed with charts and diagrams showing completely how this work is done. #B0120, 120 illustrations, 240pp, staples. \$19.95

SUNSPOTS AND THEIR EFFECTS by Harlan True Stetson, 1937. While much research has been done in this area since this book was written it is still an excellent source of information. Chapters: Sunspots and Human Behavior; Sunspots and Growing Things; Sunspots and Radio; Sunspots and Business; Measuring Sunlight; Weather and Sunspots; Solar Utilities, Power and Light; Of Sunspots, the Earth's Magnetism, and Carrier Pigeons; Why Sunspots Grow; Can We Predict Sunspots?; What Makes Sunspots. Sunspot numbers 1749 to 1937, with charts to 1991 added in for reference. #B0121, 200pp, staples. \$17.95

THE ABC OF VACUUM TUBES. by E.H. Lewis, 1922. An elementary and practical book on the theory and operation of vacuum tubes as detectors and amplifiers. Explains non-mathematically the fundamental principles upon which all vacuum tube circuits are based. Includes practical circuits. Advanced energy research is now showing the vacuum to be a hotbed of forces (see Volatile Vacuums, Omni, Feb 1991) and possibly the key to free energy. This book will provide you a keen understanding upon which to build your modern research. #B0121, 132pp, illus, schematics, staples. \$9.95

POSTAGE & HANDLING: Add \$2.75/first, 75¢/additional, Californians add 7¼% sales tax

All BSRF Members's orders on these titles postmarked before October 31, 1991 will receive a 20% discount off the retail price.