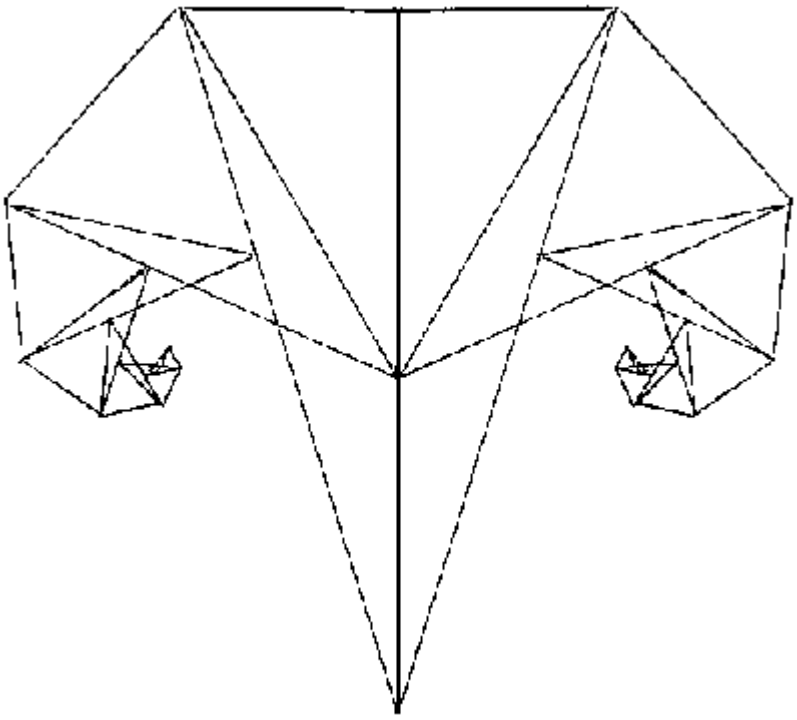
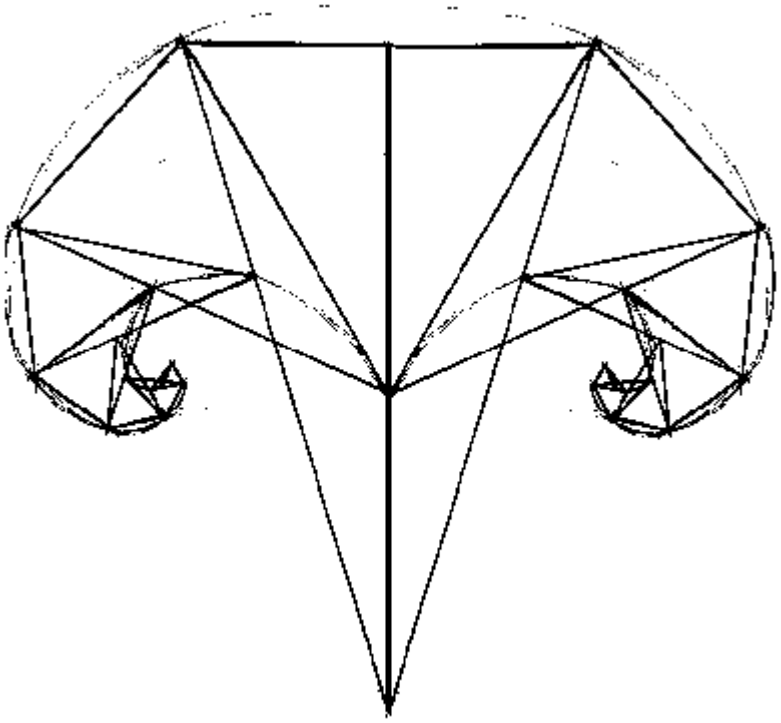
The Shofar Cornucopia





Double Spiral Resembles Ram's Head And Horns

The drawings on the previous page show a combined pi/phi fractal spiral. The generator consists of an equilateral triangular segment of a regular hexagon embedded inside a segment of a regular decagon. The shared "outer" sides of the polygons (we can call them the "bases") are equal, but the radii are related by a constant ratio of 1.77, the decagonal radius, of course, being the longer of the two. Phi appears as the ratio of the decagon's radius to its base.

To expand the spiral, take the radius of the generator's decagon segment as the side of the next adjacent equilateral triangle. Erect the other two sides of the equilateral triangle. Then extend the nearest side of the smaller equilateral triangle (the one embedded in your generator). Bisect the "base" of the new equilateral triangle and erect a perpendicular that extends out the apex until it intersects with the extended line from the generator triangle. Then draw a line joining this intersection point with the base of the new equilateral triangle. This completes the next larger iteration. Take this iteration as your new generator and repeat the process as many times as you like.

Since the ratio of a decagon's radius to its base is always phi, and the radius of each decagon forms the base of the next larger decagon, the ratio of each larger decagon base is related to its previous smaller decagon base by the ratio phi. Thus the spiral unfolds in ratios of phi.

Winding the spiral inward is a bit more complex, since you need to construct 72-degree angles. Starting from the generator segment, the side of the embedded equilateral triangle forms the radial side of the new decagonal segment. Probably the easiest method from here is to use a protractor and erect a line from the base corner of the generator at an angle of 72 degrees. Then erect another line from the one you have drawn such that it forms an angle of 72 degrees and passes through the apex of the equilateral triangle of the generator. From the point where the two new lines intersect forming the 72-degree angle erect another line 60 degrees from the first line. This will meet the side of the generator and form an equilateral triangle. You can also connect the two apexes. This completes a smaller iteration. Take the smaller decagonal slice as your generator and repeat the process.

As an exercise you may want to construct a 72-degree angle. Along with it you can also make regular pentagons and five-pointed stars. There may be a simpler way, but here's how I do it.

Construction of a 72-degree angle

* Construct a double square rectangle -- that is, two squares with unit sides (arbitrarily so defined) that are placed so as to be contiguous and aligned.
* Draw a diagonal to the rectangle.
* Extend the diagonal from one corner of the rectangle.
* Taking that corner as center, mark off a radius equal the height of the rectangle -- that is, a unit radius -- along the extension to the diagonal.
* Taking that marked point as center, draw a unit circle.
* Again, taking that marked point as center, draw a large circle with radius equal to

the diagonal plus the extension you just marked off.

* From the far corner of the diagonal draw a chord across the large circle such that it is tangent to the small inner circle.
* Draw a second chord across the large circle such that it is tangent to the other side of the small inner circle.
* Connect the end points of the two chords where they cut the large circle on the far side.
* This completes construction of an isosceles triangle with base angles of 72 degrees.

(Because of the complexity of the construction, it is probably easier to use a protractor to mark off your 72-degree angles.)

Generate a five-pointed star.

* From each of the base corners of the isosceles triangle draw chords tangent to the small inner circle on its unoccupied side.
* Do the same from each of the points where these chords cut the large circle.
* This completes construction of a regular five pointed star inscribed in a circle.

Generate a regular pentagon

* Connecting the chords where they intersect the large circle forms a regular pentagon.

Generate a bracelet of ten tangent unit circles around a large circle

* From each point of the star draw a diameter through the center of the large circle to the opposite side of the large circle.
* At each point on the large circle that has been cut by a chord or diameter draw a unit circle with that point as center.
* This gives you a bracelet of ten tangent unit circles centered on the rim of the large circle..

The "shofar cornucopia" figure is an interesting manifestation of phi. I do not think it is the spiral that describes an electron vortex. However, it may model another process.

Just for fun, here are a few other little munchies.

The Symphony Principle

Imagine that you are attending a concert given by the New York Philharmonic Orchestra. You arrive at the concert hall and find your seat. The orchestra enters and begins to warm up. First the oboe plays an "A", and then all the instruments tune themselves by that note so that they can produce harmony together.

In a few moments the conductor enters and walks to the podium. He is greeted by applause. He bows to the audience to acknowledge their applause and then turns to face the orchestra. About 50 musicians are arranged about him in a semicircle on the stage. The conductor raises both his hands as if to embrace the orchestra. The baton is in his right hand. He holds that pose for about 5 seconds while total silence descends on the concert hall, and all eyes of both the musicians and the audience are riveted on the conductor.

Suddenly the conductor swings his baton and signals the opening notes of the symphony. At this moment a very amazing process begins to unfold. The conductor imagines in his mind the notes of the score. As his attention moves over the sequence of notes, his brain amplifies the basic rhythm and tonal shape of the score into a series of baton movements and hand gestures that by convention are familiar to the musicians. The conductor' s gestures form a dynamic real-time light field that propagates as spheres of energy expanding at the speed of light to reach each member of the orchestra at virtually the same moment.

As each musician perceives the oncoming images of the conductor' s movements, he interprets this as a signal prompting him to play his individual part of the symphony. Each musician sees the same set of gestures, but each interprets it as the cues for his specific part in the symphony. Because of professional familiarity with the signal code and a sufficient amount of rehearsal time with the conductor, the musicians are able to respond to the baton cues with a minimal lag time. The remarkable thing is that the ensemble of musicians responds in a holistic way that recreates the score that is playing through the imagination of the conductor. so the conductor experiences the symphony three times simultaneously: once in his imagination, once as a set of hand signals, and once as the physical recreation of the sounds of the symphony coming from the musicians. These three manifestations of the symphony are virtually simultaneous and form a complete integrated wholeness that is enjoyed by the audience, the conductor and the orchestra musicians.

This process is a simple form of superluminal signaling. The thought form of the score spreads outward from the "point source" of the conductor via his gestures. It then echoes back as the precise sound of the score generated by the ensemble of individual musicians. Ordinarily a signal from a point source bounces off its environment incoherently and is dispersed. However, in this case the environment is coherent and reflects back from all sides the exact image that was projected to it. Each point in the environment of the orchestra reflects a portion of the total "message", and the total environment of the orchestra reflects the total message of the symphony.

The superluminal effect is achieved by the parallel processing of information. Serial processing would mean that first the oboe played, then the violin, then the trumpet, then the drum, then the flute, and so on. With intelligent parallel processing all the musicians play the score simultaneously. The ability of the environment to reflect back the message that is radiated out to it in an apparently dissipative manner shows that we have time reversal and coherent information processing. The conductor imagines a chord --

C, E, and G. He then hears the notes C, E, and G coming back to him from various points in the orchestra, just as he imagined them.

The generalization of this Symphony Principle leads to the ability of an individual to entertain any thought -- such as the idea of having an apple --, perform some small symbolic gesture that represents the notion of the apple, and have an apple promptly manifest before him. This seems like magic, but we experience such magic regularly at the symphony or at a restaurant or market. It is only necessary to develop an intelligent, sensitive rapport with the environment, and then discipline oneself with the proper gestures for eliciting the desired response. Then anything is possible.

Sets From the Bottom Up, Top Down, Inside Out, and Outside In

The mainstream notion of set theory begins with a null, or empty, set, and then builds up an ever-increasing collection of sets in the direction of **V**, the universe of all possible sets, or Absolute Infinity (Big Omega). Using the Reflection Principle it is possible to generate an endless march of ever more humongous transfinite cardinals, but never to actually reach the Big Omega itself, in much the same way that it is not possible to reach *w* (little omega) by simply counting off finite ordinals. We can call this the "Bottom Up" approach to set theory. It moves "up" from the "bottom" (the null set), but can never quite reach the "top".

Recently Paul Corazzo has proposed that by starting from Big Omega and using the notion of embedding, it is possible to include the wholeness of Absolute Infinity within the richness of the universe of set theory. Thus, instead of coming out of the null set, all sets or ordinals would come out of **V** or Big Omega by a kind of self-referral process. We can call this the "Top Down" approach to set theory. It has the nice feature of including "both ends" of the abstract continuum.

J. Conway has proposed a third approach. Conway starts with the Dedekind cut: {|}, {0|}, {|0}, {0|0}, etc. In this way he achieves all the richness of the universe of sets by working from the "Inside Out".

One characteristic of all three systems is that they are fundamentally abstract. Somehow, no matter how far the sets go, they never succeed in becoming concrete. This weakness shows up in the problems of measurement theory. It is difficult to define a meaningful metric. Therefore, following in a general way Corazzo's "Top Down" approach, but in an entirely different "direction", we can develop sets from the "Outside In". This means that we first establish an absolute and objective "external" metric as the basis for our sets. For this metric we accept Nottale's nomination of the Planck length (Lpl), which is about 10^-33 cm. The Planck length forms the lower boundary of the universe of physical sets that may exist in the universe. Assuming that the universe turns out to have a radius of about 2x10^26 cm, then we get a diameter on the order of 10^59 Lpl.

We move from the "Outside In" by defining (Lpl) also to be the singularity of pure unbounded awareness. This is what gives (Lpl) its identity and importance. Pure awareness embraces the entire universe, and this means that when we look "inside" (Lpl), we find the macroscopic universe, because that scale implies the energy of the entire physical universe. Within the range of (Lpl) we are free to select any scale from which to perform measurements and calculations. But when the quantum limit (Lpl) is reached in a converging "measurement", we automatically leap to the Limit by simply adding 1 more Lpl unit, and then stop, resting inside the Planck scale. Therefore, the shortest distance between two "points" is 2 (Lpl), one for the Self, and one for an Other Self "external" to the Self. But, since the external Self is part of the universe that is embraced within the Self of (Lpl), the "external" is also measured absolutely in terms of the Self. We can explore finer and finer measurements from "Outside" until we reach the Planck scale. At that point we discover that "Outside" has become "Inside". At the Planck scale there is no separation of "Outside" and "Inside".

An interesting additional feature of this "Outside In" universe of sets is that it not only is limited to finite sets, but it also contains no representations of irrational or even rational numbers.. Even negative numbers do not properly exist within it. The "Outside In" universe of sets is made up entirely of natural numbers, simple multiples of the Planck scale. All the various sets beyond the finite natural numbers can be thought of as compressions of various natural number dimensions handled simultaneously within a single notation. They have no meaning within the objectively demonstrable metric of (Lpl) except as compressed representations of set ensembles, similar to the way we write "Inc." as an abbreviation of "Incorporated", or HUD, for "Housing and Urban Development".

The Heresy of Countableism

Any mathematical object should be representable as a set. Unfortunately, there is no precise definition of what a set is. "Set" is a primitive term that seems to mean something like a thought, or a collection of objects perceived by an observer or thinker as a wholeness due to some common feature(s), and that can be handled consistently by a one or more postulates. The problem is that not all collections of things qualify as sets, and it is difficult to predict from the arbitrary definition of a collection whether or not it can be considered a set.

It turns out that certain reasonable sounding collections, such as the collection of all sets that are ordinals, or the collection of all sets that are not members of themselves, may not be treated as sets without leading to logical inconsistencies. These collections therefore are excluded from the world of sets and handled in a special way rather than as sets.

The first number class is the collection of all finite ordinals {0, 1, 2, 3, ...} The size of the first number class turns out to be the set *w* (little omega). This is a countable infinity and is thus larger than all the ordinals. This set is called Aleph Zero.

The second number class is the collection of all countable finite and infinite ordinals {0, 1, ...*w*, *w*+1, *w*+2, ..., *w*^2, . . . *w*^3, . . . *w*^*w*, . . . e_o, . . . *a*, . . . }. This collection must be uncountable, or else it becomes a member of itself, which is not allowed in order to avoid inconsistency. The cardinal 3 is larger than each of its ordinal members (0, 1, 2). Analogously the cardinal for the collection of all countable finite and infinite ordinals -- often called Aleph 1 -- must be larger than all countable infinite ordinals (*w* and its various incarnations), and therefore must be an uncountable set.

Or must it? This is the case only if we assume that the second number case is a set. What if the second number class does not qualify to be considered a set? It turns out that there are a few mathematicians who maintain that every set must be countable. Some, such as L. E. J. Brouwer, accept countable infinity; others, such as Eduard Wette and R. Buckminster Fuller, hold strictly to finite countability. Based on what we know of the inherent grainy nature of quantum space-time, finite countability seems to offer reasonable mathematical models of the world as we presently understand it. It is odd that most mathematicians do not seem to consider "countableism" the mainstream of contemporary mathematics, even though almost all mathematicians use digital computers that are based on this concept. For example, Rudolf Rucker (**Infinity and the Mind**, p. 255) dismisses the "countableists" by simply asserting that the mainstream assumption that the second number class is a set is "harmless" and should not lead to contradiction.

But in fact such an assumption of set-hood for the second number class is not at all harmless. In fact it is inconsistent. Mathematics is the science of counting (mapping relationships). If we assume that the second number class is a set, then we get as a mathematical object a set that is uncountable. We then begin to count with the uncountable. To me this looks like a fairly obvious logical inconsistency. In **Observer Physics** we discuss non-count nouns such as water. You can have a set of water molecules, but the set of water contains only one item -- water -- because it is undifferentiated. The same is true of infinite sets. The notion of infinity may just be a fuzzy concept used to cover up an inability of the mind to precisely define something. The position of Brouwer and others that every set must be countable seems a necessary rule in order for mathematicians to maintain internal consistency with what they are doing -- precise counting of objects and collections of objects.

Of course we can always redefine what it is we are doing. For example, we might refer to the study and manipulation of "uncountable" collections as Mythematics. This would keep a clear distinction. With math we unfold logical relations among countable collections. With myth we reveal imaginative relations among uncountable, unbounded collections.

The big question is whether in math any collections exist that can contain all sets that are ordinals, or that can contain all sets that are not members of themselves, or that can contain all countable sets. Such collections may only live in the realm of myth.

Yes, Virginia, There is a Santa Claus, But He is Not Who You Think He Is

Modern mathematicians have derived a hierarchy of transfinite ordinals from Big Omega, a hypothetical Absolute Infinity (AI) that lies beyond all the ordinals; and a lofty world of higher cardinals from **V**, the Universe of Sets.

Since **V** turns out to be on the same level as Big Omega, we can talk about all transfinite entities in terms of Absolute Infinity (AI). AI is absolutely inconceivable. But, by the Reflection Principle, any conceivable property of AI must exist as a set.

As an example, Dr. Rudy Rucker derives *w* (little omega) from Big Omega by observing that Big Omega is "bigger than all the finite numbers *n*." (**Infinity and the Mind**, p. 80). Therefore, by the Reflection Principle, he says, "There must be some existing ordinal, call it *w*, that is also greater than all the finite *n*." Bingo, by reflection he has justified the existence of the first transfinite ordinal *w*.

This is a misunderstanding of AI. The infinity of AI is indeterminacy. AI lacks all properties such as size, shape, direction, and so on. It is undefined. Therefore, a reflection of AI in the world would be the reflection of the **lack** of a defined property such as "bigness" rather than some abstract version of "bigness". It would refer to objects with certain indeterminate properties. AI is not **bigger** than all the finite numbers *n*, nor is it **smaller** than the finite numbers *n* either. In terms of *n*, AI reflects the **indeterminacy** of *n*'s value. Thus *n* may be 0, 1, 27, 546, 10^25, or any other natural number. The indeterminacy of *n* is the infinity of *n*. What in algebra we call a *variable* is a reflection of AI.

With our new approach to the Reflection Principle physical demonstration of infinity becomes possible, and even commonplace. When the referee flips a coin at the beginning of a football game, the coin spins in the air in a state of "infinity" relative to the purpose of the toss. Only when the coin lands on the ground does its value become finite. When the lottery manager pops balls out of a rotating cage to pick a winning number, the winning number is infinite -- all the possible numbers producible by the balls -- until the balls pop out and the digits form a winning number that may be found on someone's ticket. A wife who can't make up her mind which dress to buy also expresses a property of infinity.

A quantum probability wave expresses infinity until an observer collapses it with a measurement that produces finite events with certain values.

The experience of pure restful alertness during the practice of the Transcendental Meditation program is direct subjective experience of infinity in the physical world. This state of consciousness is notable for its lack of all properties. It is a totally transcendental subjective experience that can happen while a person is alert and awake. Yet it is real and has psycho-physiological traits that we can measure objectively as

"evidence" that it "happened".

So we conclude that, no, Virginia, you can not find the imaginary Santa Claus in the real world, nor can you find *w* anywhere except as a symbol in some books and in some imaginative theories of some mathematicians.

Wherever you look, you will only find generous people and finite numbers, or people holding back in a prelude to generosity and numbers hovering variably at the brink of finiteness. And the only experience of pure infinity you will ever find will turn out to be your own Self.

Looking-Glass Land (Part I): A Superluminal Window into the Past

When you look into a mirror, what do you see? The mirror seems to be a window through which you can see a reversed image of the room in which you stand. Exactly opposite you, staring back at you, is a reversed image of yourself, eyes locked onto your eyes.

Suppose that you stand with your face one foot away from the mirror. You will see your face in the looking-glass room, also standing one foot away from the back of the mirror. Your face will therefore seem to be two feet away from the face of your mirror twin.

Now suppose that we have a special crystal clock that oscillates, or ticks, at exactly the interval it takes light to travel one foot. We can then refer to the distance between your face and the mirror as one tick on our clock as well as one foot in distance. For the moment, let' s disregard the time taken for the light field to be absorbed and re-emitted by the electrons in the reflecting surface of the mirror. Then we will measure two ticks on the clock for any specific photon, or "frame" of the light field, to travel from your face to the mirror and then back again to your face. This is the space-time distance covered by the actual light field. On the other hand, we also have the virtual light field that appears to come in a straight line from your mirror twin to you -- passing through the back of the mirror. The virtual field also travels through two light ticks of space-time.

The problem here is that such an accounting of the virtual event assumes that the light field is travelling from another person standing in the virtual mirror room. The fact is that the person you see there is yourself! This means that to account for the entire experience of seeing yourself in looking-glass land, we must combine the actual and the virtual events into a single total reality. This reality consists of a total of FOUR light ticks -- one from you to the mirror, one from the mirror to your twin, one from your twin back to the mirror, and one from the mirror back to you. Or, if you add the two light field events together, you get one trip from you to the mirror, one trip from your twin to the mirror, and two trips from the mirror back to you. We thus require FOUR light ticks to get a light field containing the information expressed by your face to be sensed by you as being TWO light ticks away. The total reality of the image you see of yourself in the

mirror is processed at the speed of 2 (c), or twice the speed of light! Moreover, the image you see is a flash from the past, since it is already two ticks old when you perceive it. If the mirror happened to be ten light years away, you could theoretically look into the mirror and then come back twenty years later to see your former youthful self, like looking at a snapshot in an old family album. Thus an ordinary mirror is a crude time machine for projecting images from your past, just as a movie camera does. However, it can only carry images "down" time by alternating motion in space. The relatively few degrees of freedom in the light field keep the dissipating effects of entropy to a minimum, and you see a fairly true image of yourself passing down time. The "faster-than-light" effect comes from reversal of the image in space due to interaction with the nonlinear medium of the mirror' s reflecting surface. Interestingly, when such a system is pumped with coherent light, the images reverse time-wise rather than space-wise and true four-wave mixing phase conjugation occurs.

Looking-Glass Land (Part II): Virtual Space-Time Warps

In the above discussion we discovered that your virtual mirror image twin is a light field of information that is processed at roughly twice the speed of light. Now we are going to expand our field of vision to include other objects in Looking-Glass Land.

Once again, stand about one foot in front of a mirror. This time hold a cup in your right hand two feet from your nose parallel to the mirror. Instead of looking straight ahead at your own eyes, let your eyes swivel slightly to the right so that they focus on the image of the cup reflected from the mirror. You will see the cup held aloft in your mirror twin' s left hand, two feet to the left of the twin' s nose.

The "actual" light field bearing the information of the cup' s image passes from the cup in your hand to a point on the mirror midway between the perpendicular rays extending from your nose and the cup to the mirror' s surface. Then the image reflects from the mirror to your eyes.

The "virtual" light field passes in a straight line from the virtual image of the cup held in the hand of the mirror twin in the looking-glass room through the "midway" point on the mirror' s surface to your eyes.

Using our special clock we time the transmission of the light field. We have established one tick to be the time taken for the light to travel one foot. So the diagonal paths of the cup' s light field on its way to your eyes apparently will be the square root of two (2^1/2) ticks for each trip to or from the mirror. The actual light field takes 2(2^1/2) ticks, and the virtual light field also takes 2 (2^1/2) ticks. The total event thus seems to take 4 (2^1/2) ticks.

However, light behaves such that it always takes the shortest path available to it. The time-space interval of 4(2^1/2) ticks is not the shortest path for the cup' s light field to

transmit the information as received by you. The shortest path is for the cup' s image to proceed straight from the cup to the mirror via a perpendicular path 1 foot long, then proceed through the mirror and on behind it to a distance of 1 foot as a virtual image. The virtual image then reflects the light field and you perceive the portion of the virtual reflected field that passes in a diagonal through the "midway" point in the mirror and so on to your eyes. Therefore the total path traveled by the cup' s information is 2 + 2(2^1/2) ticks. In general, if you and the object are both one foot from the mirror and the object is 2D feet from your nose, then the total event path T = 2 + 2S ticks. By the Pythagorean relation we see that S = (D_1^2 + D_2^2)^1/2, where D_1 is the distance from the object to the mirror, and D_2 is the distance from your nose to the object. This means that, unless the object is YOU, and therefore D_2 = 0 and T = 4 (assuming D_1 = 1 ft.), then T will be greater than 4 D_1, but less than 4 times the diagonal paths, which is

* 4(D_1^2 + D_2^2)^1/2

We can call this discrepancy a virtual space-time warp. The virtual hyperspace warp is maximal when viewing the self. The image transfer of a distant cup occurs roughly at (c). The image transfer of your own face occurs at 2 (c).

Looking-Glass Land (Part III): You Are Everywhere

Place a common object such as a cup on a table in the middle of a room. Stand back a few feet away and observe it. You should see the image formed by the light field of the cup. Now try standing in various different parts of the room and observing the cup. As long as no intervening object obstructs your view of the cup, you should be able to see the cup.

The light field reflecting from the surface of the cup and carrying the information describing its image expands outward in all directions. Therefore, you have only to point the receptors in your eyes in the direction of the cup and you will receive that information. Even behind obstructions a proper set of lenses, mirrors, and amplification devices can reveal the presence of the cup' s image.

Now put yourself in the position of the cup. At all times the information that defines your image radiates out from you at the speed of light in all directions. When someone else observes you, they receive your image passing through the intervening space at the speed of light. But, if your image reflects off a mirror before it reaches the observer, then the inertial frame of the image changes and takes on the quality of motion. This motion is at an appreciable fraction of the speed of light and determined by the angles of incidence and reflection of the image on the mirror.

However, if the observer becomes you, and you observe your own image in the mirror, you have caught up with the light field image that has moved forward from your body at the speed of light. This means that you must be moving at the speed of light relative to the image. Therefore, you seem to "catch up" to the image. You see the right ear as

the left ear and the left ear as the right ear. This reversal of the image occurs, because you have caught up to your image in space.

You do not notice that you are moving, because you are not accelerating. If someone walks toward you, and you stand still, you might as well be walking toward him while he stands still. The mirror reverses the direction of the light field so that it travels toward you instead of away. Since it travels toward you at (c), you might as well be travelling toward it at (c). Another way of looking at this situation is to consider that if you can keep up with your own light field image that is travelling at (c), then you must be going at (c) also. The only way you can see your own face is to travel at (c). The mirror serves as a space-time warp that lets you ride the light field' **s**lip-stream.

Like a skilled surfer, you do not seem to move, because the entire relative inertial frame consisting of yourself and the room is at rest. The whole package goes along together. The total light field that you perceive is the visible part of your own sphere of consciousness. The appearance of an object moving through the environment of your consciousness is the result of your own willing. The act of willing is a localized distortion of the consciousness mirror that is shared by all observers within perceptive range. The distortion of the mirror of consciousness is fundamentally undefined, but from the viewpoint of the willing individual, represents an action taken to enhance or preserve its template of imagined existence. By the reflection principle, this is a localized version of the field of undefined awareness spontaneously breaking symmetry through self-perturbations in order to maintain its undefined nature.

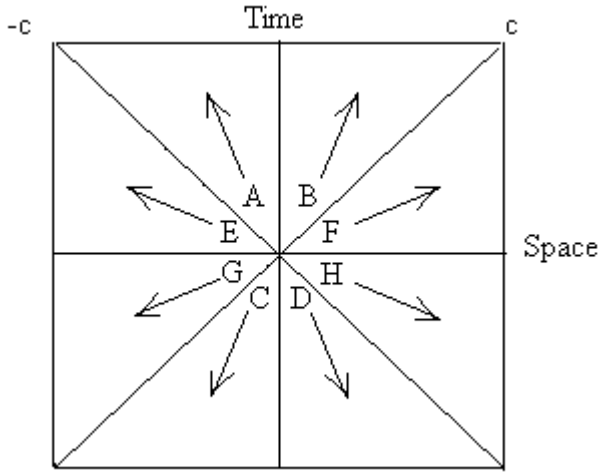
Time is usually connected to periodic motion. But that is not its primary function. Motion may exist without any sense of time. Pure random motion is a-causal and without any fixed sequence as long as the observer has no bias toward it. Therefore, there is no "arrow" of time associated with it. Time with a specific direction is a function of a consciousness in which the number of degrees of freedom of action has reached a threshold of complexity and is combined with self-awareness. Such a complex system is constantly threatened by the dissipative tendency of entropy and feels the pressure of every choice that it makes. This pressure is the reflection of resistance on the part of the observer. This pressure is called time. Lacking such pressure for the survival and evolution of a given informational template, there is no sense of time, even though the environment may pulsate everywhere with random oscillations of motion.

In the state of undefined awareness there is no time. There is only a field of all possibilities, all of which are of equal value. In this state of absolute symmetry, all transformations are invariant, and there are no degrees of freedom. By willingly opening your awareness to that level, we discover that we are indeed everywhere, and all possible images of reality are experienced in terms of our Self.

Relativistic Motion

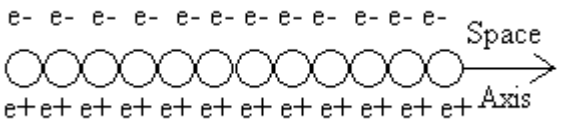
The sketch below is an abstract Feynman diagram of the major possible generic Lorentz

transformations of a single particle event in a transcendental "resting frame" showing one dimension of space and one dimension of time. If we rotate this figure around the time axis, we get a light cone. Each arrow represents the same event as seen by a different observer -- A, B, C, and so on.



Observers A and B experience the particle' s motion in an ordinary time-like manner. However, observer B sees the particle from the "other side" apparently going in the opposite direction in space from A. Observers C and D see the particle as an antiparticle -- that is, a particle moving backwards in time in one direction or the opposite direction. Of course, to them the antiparticle seems to be moving in an ordinary time-like manner, but its charge and spin are reversed. To a time-like observer the cause-effect sequence seems to be maintained, but actually it is reversed in the case of the antiparticles.

Observers E and F both can not see their respective space-like particles, nor can G and H see their space-like particles. A purely space-like particle looks like an ensemble of time-like particles at rest. This is formed by the path of a quantum field bubble chain that is carrying information from A, B, C, or D' s light cone into another cone instantly. It is like an infinite space-like superluminal phase wave in a wave guide. If you look closely at a "particle event" passing down the space axis of the F-H "anti" light cone, you "see" it zigzagging back and forth in time just as time-like particles at "rest" jiggle back and forth in space. "It" showers across space as a chain of virtual particle-antiparticle pairs fluctuating invisibly in the Planck scale of the pure vacuum state. The "shower" occurs in a single moment everywhere in the universe. This is the quantum foam.

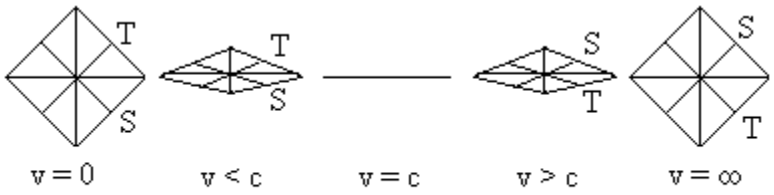


To experience the time-space distortions caused by relativistic moving frames, turn the diagram slantwise so that the light cone edge that tends up and to the left is oriented up to down. Mark off a unit length along the space axis, and let it represent the length of a fast moving stick. This gives you a size scale relative to your rest frame. Now tip the page at an angle so that the upper part of the light line (the diagonal between the space line and the time line) falls away from the eye. The time and space axes seem to squeeze together as you tip the page. The unit length on the space axis seems to shrink.

Move your eye closer to the mark so that it looks the same size as when you were in the rest frame before it tipped. Now, keeping your eye the same distance from the mark, tilt the page back to the rest frame orientation. Your eye has moved closer to the mark, so it now seems longer relative to it. The moving stick seems smaller than when both you and the stick are at rest relative to each other. This is Lorentz contraction of space. By the same principle, time intervals seem shorter in the rest frame than the same frame moving, so a moving clock seems to tick slower.

Next consider speeds faster than light. As objects move closer to (c), the time and space axes close like scissors upon the light cone' s edge, just like a wave front' s phase interaction with a klystron wall. At (c) the two axes are both at the light cone edge and are thus parallel. Space and time intervals are infinitely contracted on the rest frame compared to the time and space lines going at (c). When (c) is passed, the space axis re-emerges, but now it is above the time axis. Time and space switch places. As velocity increases, space intervals dilate and moving clocks speed up (time contraction), dilating rest frame time intervals. To see this with the drawing, tilt the paper until it is horizontal, and then continue until you see the axes separate again. Now you see them through the back of the paper from "looking-glass" perspective. This is the anti-cone containing the world lines of E, F, G, and H, -- the cone that extends to the right and left from our original right side up viewpoint.

When we explore all the possible transformations of the space-time diagram, we see the perfect symmetry of Einstein' s special relativity theory emerging like the petals radiating from a silent origin, the calyx of a beautiful flower. The Causality Postulate that arbitrarily forbids space-like events is intuitively very unsatisfying. It makes no sense for physicists to throw out half of the equations of a perfect structure simply because they happen to lack data under the current paradigm with their limited tools of experimentation and are not at present able to validate the mathematical expressions. On the other hand, careful contemplation of this diagram reveals what a beautiful illusion motion is



Relativistic Frames