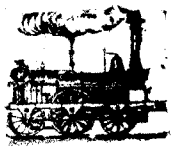

LOVE AND SCIENCE

(Speech Text)

by

Charles E. Hansen

DEDICATED TO WESLEY L. TENNANT

This speech is condensed from the text of a forthcoming book, written with the assistance of Wesley L. Tennant.

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(Speech text and references are based on excerpts from a forthcoming book entitled *The Technology of Love*, written with assistance of Wesley L. Tennant to whom the speech is dedicated.)

If Love and Science were to get together, most of us would expect Science to move in on Love -- and then probably kick Love out in the end.

Then again, this might not be the actual result. When Freud went looking for scientific principles at work in the human psyche, he concluded that love was one of the foremost factors operating within us humans. He found love to be closely tied to the initial principle of all life forms; what he called the "pleasure principle." Freud even went so far as to suggest that love might be a basic force of nature. And Jesus hints at a most fundamental role for Love when he suggests that even the rocks can express their affection toward him if the people do not.

Modern physicists will not likely be impressed with such words, but it is such hints of love being related to fundamental operations of Nature that catches our scientific eye. As, for example, when Freud writes that all of our "life's instincts... are best comprised under the name *love*; their purpose would be to form living substance into ever greater unities, so that life may be prolonged and brought to higher development."[1]

This human tendency toward "higher development" caught the scientific eye of Abraham Maslow. He suspected some fundamental principle at work which could account for it. Maslow found that we humans have certain basic needs such as air, water, food, shelter, sleep and sex. But he also found that safety and security, love and belongingness, and self-esteem, and esteem by others were basic needs -- humans actually become mentally ill and even physically ill without them. After these basic or "survival" needs are satisfied, he found that a more developmental thrust emerges in humans, a human tendency to pursue more expressive or growth needs.[2] These Maslow defined as the need for Meaningfulness or Purposefulness in our lives, the need for Self-sufficiency or Self-organization, for a bit of Spontaneity or playful amusements which frequently involve elements of Chance, the need for Effortlessness or Efficiency, the need for Richness or Complexity. Yet we also have needs for Simplicity, Order, Organization, Nonpartiality, and Completeness. He found the need for Necessity; that is, we have to be able to consistently depend on some things. Maslow found the need to pursue Perfection, even if we never reach it; the need for Individuality or Uniqueness, Aliveness, and a Wholeness to include what one of his subjects, Einstein, labeled "the ideals that had lighted his way": Beauty, Goodness and Truth.[3]

Maslow found this pyramid of "needs" to include those which, as Einstein's words reflect, guide us toward our highest development, our fullest self-actualization as individuals. Maslow found these needs to be irreducible innate tendencies; our need for Simplicity cannot be met

by our need for Order any more than we can meet our need for sleep by eating more food. The problem is that Maslow's work has long lacked an integrating factor, a fundamental principle, which ties all these needs together. Actually, Maslow suspected and wrote, much like Freud, that Love may be just such an integrator.[4]

And we are now ready to do what Maslow left undone. If we consider our actual experience we do find something of Freud's "pleasure principle" at work within us. But we seem to base our needs-fulfilling judgments not on just *immediate* satisfaction or pleasure; rather it seems the more appropriate broker of our needs is that subtle, more encompassing calculation of *being pleased*. This broader calculation may even accommodate pain; and frequently this calculation involves *pleasing others*.

And we humans are not alone in figuring out this calculus, nor were we first to have it. Trainers of dogs and other advanced species tell us that these animals do not perform just in order to be fed, but *to please* their masters; praise is the trainer's greatest tool. Many would, in fact, consider evidence in dogs and dolphins a surer sign of a scientific principle at work than that found in man, woman, and child.

And just what is this scientific principle that seems to be at work at the core of Maslow's pyramid of needs? If we follow Freud and Maslow's clues, and a few others, we will find that it is the invariant element at the core of Love, the *intent-to-please*. Our entire human endeavor can, in fact, be summarized as an *intention to please* our internal needs-structure, or that of others. We see that *to please* always means meeting this pyramid of needs; whether in the form of food or shelter, or in the form of meeting needs for Efficiency, Order, Individuality, Wholeness, or any of the other needs up through Beauty, Goodness or Truth.

But meeting needs in the most *pleasing* manner also involves an *integration*, however subtle: we enjoy our food more if it is beautifully colored and arranged; we try to keep both Simplicity and some Order in our lives at the same time, and so on. So if we stack up all the needs in Maslow's pyramid form, (putting the basic survival needs on the bottom, and the expressive or growth needs on top, peaking with Beauty, Goodness and Truth), and then run our intent-to-please right down the core of it, we find our solution, a solution spanning all our human needs. Maslow's missing integrator is the intent-to-please.

This is, of course, the same invariant at the core of all of our energy expressions of Love. Whatever Love is, being pleased is how we ultimately experience it; much as Jesus himself defined it in his words, "I do *always* those things that *please* the Father." For Love's actions must always please the object or intend to do so. So we seem to encounter a case of perfect symmetry. Our intention to please ourselves and the intent to please others is essentially the same invariant principle at work as Jesus suggests with the Golden Rule. And it can operate *only in relationship*. We get nowhere, our development stops cold, by attempting to shortcut this symmetry and please ourselves without pleasing others in the process. In fact, modern ecology informs us that we had best consider even what pleases the trees; that is, what satisfies their needs.

We begin to see why the language of Love and its invariant, the intent-to-please, infiltrates

all of our seeking and finding -- whether we are seeking our most fundamental survival needs for food, safety and esteem, or our highest more expressive needs for Beauty, Goodness and Truth -- the peak of which to many of us is actually finding relationship with God himself and partaking of His thoughts.

Now this talk about Love and about "being pleased" is a long, long way from the cold halls of hard science. However, if we listen to perhaps the greatest scientist of our era, Einstein, we find something rather strange. Einstein expressed his entire scientific endeavor as not only one of being guided by Beauty, Goodness and Truth, but more so as wanting to "know God's thoughts." Said Einstein, "The rest are details."[5] And how is this to be done? Einstein gives his formulae: he recommends "the compassion to embrace all living creatures and the whole of nature in its beauty."[6] He even defined this "embrace" as one of "cosmic religious feeling" which embodies the highest states of being pleased. Einstein called it "joy", "wonder," "awe," and "rapturous amazement." To be more specific he compared the requisite state of mind for doing his *physics* to "that of the religious worshiper or the lover";[7] -- "closely akin to that which has possessed the religious geniuses of all ages."[8]

Of course Einstein's views are not held in particularly high regard by most scientists today. Einstein believed there are objectively real foundations in the universe, fundamental, unchanging or invariant principles that we do not invent in our heads, but have to pry out of Nature by *using* our heads. In this process Einstein held that we had to rely upon a "pre-established harmony" between ourselves and the universe. Such talk finds little favor with the prevailing scientific views that there *are* no foundations in the universe, no objective reality, but only one (or more) that we create in our minds for our minds to satisfy our local cultural and linguistic conventions. Any suggestion that we are dealing with the *real* Mind of God, and in even approximate harmony or relationship therewith, as Einstein held, is hopelessly outdated in most halls of Science.

Einstein's demise is usually credited to his loss of the famous arguments about quantum physics he had with Niels Bohr and Werner Heisenberg. Quantum theory had reached a point, with much help from Einstein, where only statistical methods could be used to make predictions at the atomic and subatomic levels. The mathematics and methods of quantum theory, by their own definition, act as kind of a blanket beneath which we cannot peek. Quantum events add up to give nice smooth curves in the blanket, but no individual event can be precisely predicted. The vast majority of physicists and other scientists considered this a sign that, at its foundations, reality operates only by randomness or Chance. Einstein, and a few others, objected. We cannot logically say *what* was happening beneath the quantum blanket, argued Einstein, and surely it could not be pure Chance because God would not play dice with the universe.

Obviously, such arguments did not carry much weight in physics. Einstein left the discussions muttering to himself and went off to work alone for the next thirty years on a better solution. Meanwhile, most of us were told that the solution was already found. However the

actual case among *physicists* is still much as Einstein expressed it in 1940: "For the time being, we have to admit that we do not possess any general theoretical basis for physics, which can be regarded as its logical foundation."[9] Today we actually have about six or seven "acceptable" versions of reality, or non-reality, among practicing physicists, and no agreeable logical foundation. As many others have pointed out, Chance holds its current position as prime contender as a matter of default, and a somewhat faulty one at that: physicists cannot actually find any *pure* Chance operating even in quantum physics. Chance always manages to behave within certain limits. Furthermore, by using it to explain *anything*, Chance actually explains nothing. It has huge support, however, from those who hold that there are no explanations. You get some idea of why Einstein referred to the new "religion" that had overtaken physics, and retired from the debate.

Although stalled in his pursuit of a solution, Einstein tells us that in order to make any progress in establishing more logically coherent foundations for physics we would have to search out some new fundamental principle of Nature.[10] It would, in fact, have to encompass the totality of our experience, up to and including humanity itself. Its general features would have to be quite easily grasped: it could not be called a "logical foundation" if only a few experts could understand it.

Now we normally think that breakthroughs in physics require crucially complex mathematics, super-computers, and billion dollar particle smashers. On the other hand, many of the crucial breakthroughs in modern physics have been the result of attempting to explain the most obvious. Modern quantum theory arose from a discrepancy in physics that had hot metals glowing the wrong color -- something the average iron-monger could observe. And Einstein's monumental achievement of General Relativity he credited to the simple thought of a man falling off a roof!

I bring these examples to attention not to suggest that we should avoid penetrating into nature's hidden realms, but that by simply observing "what is before our sight," as Jesus suggests, we might understand "that which is hidden."[11] From this perspective, it seems that, while we spend vast resources interrogating everything from quarks and electrons to the far distant stars and galaxies, the most profound unification of physics, chemistry, and biology -- Humanity itself -- exists right before our eyes. And similar to the "ultraviolet catastrophe" which marked the end of the old physics, humanity does more than glow the wrong color. According to our most advanced physics, we humans should not exist at all -- except perhaps as a "fortuitous accident" that logically cannot be distinguished from the impossible.

There is no question that Science has accomplished great things while keeping humanity in a "separate department of accidents." However, it is highly unlikely that any ultimate unification of scientific knowledge -- including physics -- can occur with such segregation in effect. There are sound reasons, therefore, why top physicists, such as Roger Penrose, author of *The Emperor's New Mind*, are now looking at the peak of humanity, the human mind, as the possible key to the future understanding of the laws of physics.

Penrose suggests that the most fundamental laws of nature are somehow displayed in the operations of our consciousness and its intentional creativity, essentially the way our mind operates -- surely one of the least likely places for traditional physics to look. In his book's Foreword we are told that "Penrose is one of an increasingly large band of physicists who think that Einstein was not being stubborn or muddle-headed when he said his 'little finger' told him that quantum mechanics is incomplete." Penrose asks, "Is there a level beyond quantum mechanics..., perhaps even deeper laws, essential for the operation of a mind?"[12]

If we spelled that mind with a capital "M" we would, of course, be heading back toward "God's thoughts" where Einstein held physics to begin. If the universe itself does proceed from God's Loving thoughts, Nature itself should, one would think, bear some indelible mark of this in its most fundamental sense and dynamic. Indeed it probably does: recall that the invariant at the core of Love is not derived from any considerations of God or theology. That is not, for example, how Freud encountered it, nor why he granted Love cosmological status. Love's invariant is derived directly and solely from the most general features of how our minds operate in our everyday needs-fulfilling experience. As some of you will recall from "The Mathematics of Love," it appears to be an invariant that penetrates all of Reality on much the same order as any other scientifically founded invariant principle. The Urantia Book takes much this same approach. On page 137 we find what appears to be the invariant at the core of Love described: "There is operative throughout all time and space and with regard to all reality of whatever nature an inexorable and impersonal law [invariant principle] which is equivalent to the function of a cosmic providence."

This sure sounds like something Science is bound to encounter sooner or later -- and will have to learn to live with.

So let's take a closer look at physicist Penrose's work. Here we find some common ground to investigate regardless of whether we create reality in our heads or use our heads to *relate* to a Reality that is really "out there."

Whichever view we take, we find the most fundamental language used by Science to describe reality is mathematics. Although mathematics is an invented language, "created" in our minds we might say, the first mathematics were probably not developed to solve "mathematical" problems in just our heads. Mathematics was more likely developed because someone needed a simpler or more efficient method of ordering everyday, real-world, experience -- keeping track of fish, sticks, stones and loans. This suggests that the human strivings for Simplicity, Efficiency, and Order, predate or "underlie" the first mathematics.

In fact, even the most advanced mathematics, which we usually consider as depending solely on deductive Necessity, actually depend on many other equally valid, pre-logical, "judgement-forming criteria," as Penrose labels them. They are almost innate tendencies of the human mind, long pre-dating mathematics itself.

If we begin at Mathematics' foundations, we find Meaningfulness first on a long list of notions that are themselves more fundamental than mathematics. As Penrose reminds us, "It

is indeed 'meaning' -- not blind algorithmic computation -- that gives mathematics its substance."[13] In addition, we of course find Simplicity, Efficiency, and Order vital to mathematics, followed closely by "pre-logical" criteria of Completeness, Perfection, Complexity, Nonpartiality, and, of course, deductive Necessity. Then there is Self-sufficiency or Self-organization: a beauty of mathematics is this tendency to almost organize itself. Other notions such as Chance or randomness are vital to many mathematical undertakings. We find that even Individuality enters in at the foundations of mathematics in terms of the discreteness and uniqueness of each natural number. Mathematics also uses the more inclusive criteria of Wholeness. And Penrose points out how vital the "pre-logical" notion of Beauty is to mathematics, not as an extraneous frivolity, but as one of its core guides. Plato even equated mathematics with Goodness, and modern mathematician Whitehead noted a similar affinity. Finally, we find mathematicians must employ some notion of "truth" which exists before and goes beyond mere mathematical equations.

Now we have quite a laundry list here, with a bit more to add. What is missing is a means of integrating all of these notions. We need an integrator or we should, for example, end up pursuing Simplicity without regard to Completeness, or Order without regard to Efficiency, and so on. I think here we find our most likely suspect; and it, too, predates formal mathematics. Mathematicians will recognize it as that constant wrangling *to be pleased* with the endeavor at hand.

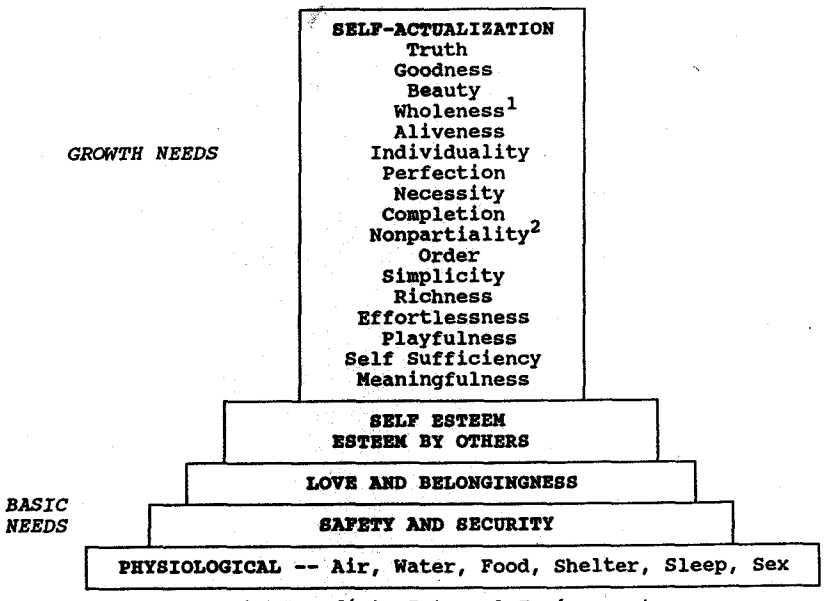
Indeed, the integrator of all of the pre-logical criteriaupon which mathematics stands, seems to be the *intent-to-please* which actually begins as the arbitrator of the the most fundamental judgment-forming notions of Simplicity, Efficiency, and Order -- and peaks as those aesthetic experiences of elegance and Beauty, and a certain "joy" that mathematicians acclaim when they find a solution or grasp some major "truth."

It is not surprising that Penrose concludes that the *non-algorithmic* "judgement-forming" criteria which underlie mathematics are closely related to the operations of our mind as a whole. They might even require the notion of Aliveness which, so far, we can't quite get on a silicon chip. That mathematics must reach outside of itself for its own foundations has been acknowledged since Kurt Gödel's famous proof on the question; but we are now able to describe such foundations more accurately and more objectively. These are not subjectively imagined foundations. Mathematical Simplicity, Efficiency, Order, Completeness, Perfection, Beauty or even "Truth" cannot be just in the eye of the beholder; Indeed, Penrose finds that we must appeal to "*one* universally employed" non-algorithmic system by which judgment of mathematical truth occurs and can be communicated among mathematicians themselves.[14]

Now we cannot help but notice that this "one universally employed system" of pre-logical judgment-forming criteria upon which mathematics depends and from which it has emerged is identical with the expressive attributes of Maslow's Pyramid of Needs. And we cannot help but notice that they are all brokered or arbitrated by the same invariant principle, the *intent-to-please*. Should this surprise us? Not really. Physicist Bohr explained that "...much

Figure 4-1

MASLOW'S HIERARCHY OF NEEDS



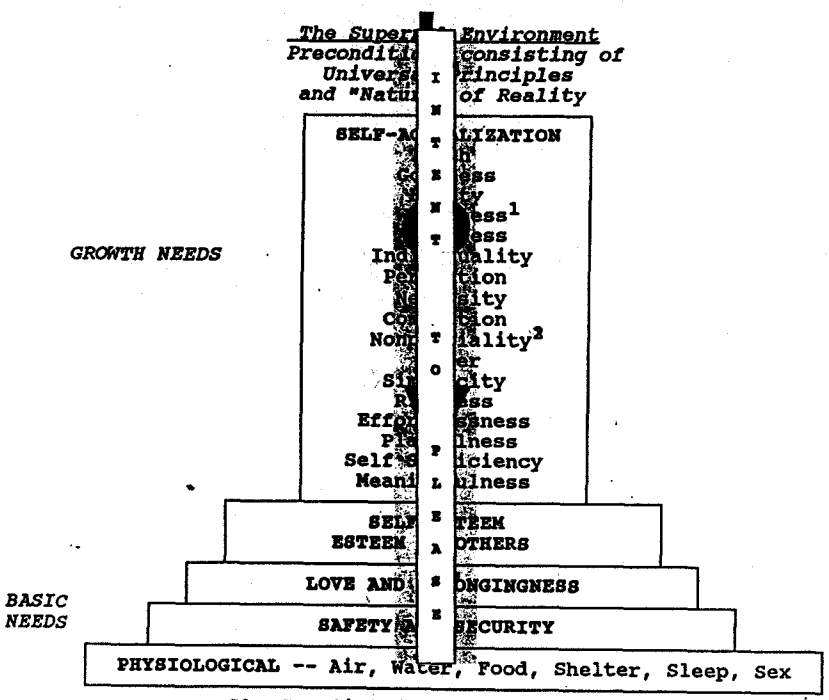
The Immediate External Environment
(Certain conditions are necessary for Need Satisfaction such as degrees of Freedom, Orderliness, and some stimulation or challenge)

[1]Maslow also included "Dichotomy Transcendence," or "resolution" of polarities (good and evil), in this attribute.
[2]Nonpartiality is used here, as also used by Maslow, rather than "Justice" which might incorrectly imply judgment.

Sources: Maslow, A.H.TFROHN,p318-319.
_____TAPOB,p83
_____RV&PE,p92-94

Figure 4-2

MASLOW'S HIERARCHY OF NEEDS
Modified to Show
Permeating, Common Core of Love
and Supernal Environment



The Immediate External Environment
(Certain preconditions are necessary for Need Satisfaction such as degrees of Freedom, Orderliness, and some stimulation or challenge)

as all living organisms are constructed in accordance with the same laws of nature, and...from approximately the same chemical compounds, so the various possibilities of logic are probably based on fundamental forms that are neither man-made nor even dependent on man."[15]

In other words, Bohr is suggesting that the pre-logical operations of our minds and Nature's operations have the same objective foundations. Einstein went a bit farther and termed this natural relationship one of "pre-established harmony," wherein the logic of our minds tends to find a match in the underlying logic of the universe around us. And Heisenberg makes it plainer: "If nature leads us to mathematical forms of great simplicity and beauty,...we cannot help thinking that they are 'true,' that they reveal a genuine feature of reality."[16] Heisenberg specifically agrees with Einstein when he says: "I believe, just like you, that the simplicity of natural law has an objective character, that it is not just the result of thought economy."[17]

Of course we are now ready to suggest that there are many more attributes involved in this relationship between mathematics and Reality besides just Simplicity and Beauty. We know on the mathematical side at least that mathematics must necessarily haul a lot more than Simplicity or Beauty along within it. This we have just demonstrated, as does Penrose. We need Maslow's entire expressive pyramid, and the invariant at its core.

And here we find a solution to the most fundamental problem facing modern physics: Why does mathematics work at all in physics? Why do mathematics and physical reality "match up" even if approximately? This problem is a logical catastrophe of the highest order -- about like hot iron glowing the wrong color, only worse. Current answers to this enigma actually include terms like "miracle," "good fortune," and "unanswerable."

Could it be that the pre-logical structure underlying mathematics is the same as the structure underlying objective reality...rocks and all? And I do not mean just for "Simplicity." I mean for the entire pre-logical structure and the invariant at its core.

By the late 1960s Maslow was already thinking along this very line, boldly claiming that orthodox science was due for "a critique (*a la* Gödel)...of the ground on which it rests, of its unproved articles of faith, and of its taken-for-granted definitions, axioms, and concepts."[18] Maslow then proceeded, in his terms, "to raise the radical question: can *all* the sciences, *all* knowledge be conceptualized as a resultant of a loving or caring interrelationship between knower and known?"[19]

Maslow said that it "looks probable" that scientific "truth" itself, the way Reality is, "is finally definable, only and altogether, by all the judgment-forming attributes we have just described. In Maslow's own words, "...truth is ultimately beautiful, good, simple, comprehensive, perfect, unifying, alive, unique, necessary, final, just [or non-partial], orderly, effortless, self-sufficient, and amusing."[20] Finally, he suggested that "knowledge through love" should be scientifically investigated in the "strictest sense."[21]

There is little room for escaping the conclusion that the way Reality is, the way Nature itself operates, is based on the same "fundamental pre-logical form" which underlies our logic and our mathematics. Maslow was only filling out what Bohr, Einstein, and Heisenberg suggested; and what several others such as physicist Charles Peirce have envisioned. As Penrose informs

us, there is no way to get these pre-logical attributes *out* of our mathematics; and there appears, then, that there is no way to get them out of Reality itself. The only thing missing in Maslow's offering is the integrator of these attributes, the same invariant at the core of Love -- which he indirectly proposed and which can now be officially added.

This would, of course, explain why mathematics works as a predictive representation, however approximate, of our real world. As Penrose observes: "There must...be some deep underlying reason for the accord between mathematics and physics."[22] He suggests that the answer will be extremely subtle, and that it will involve not only consciousness but some "non-algorithmic action" with a "role [in] the physical world of very considerable importance."[23] He then concludes that the answer must be "intimately bound up with the very concept of mind."[24] Obviously we would expect it to center about the invariant principle at our mind's core -- the intent-to-please.

Thus Love subtly makes its appearance at the foundations upon which the whole of Science stands. The reason mathematics works is that it must somehow align with Nature's fundamental operations, what Science calls Nature's *causality*. Both must play off the same invariant principle; and that principle is now coming into clearer view: It must be the invariant principle at the core of Love that is the heart of Nature's causality.

Causality takes us deeper than any identifiable force or particle of Reality; it takes us into how such fundamental processes of nature *operate*. And there is nothing more fundamental to Science. As Einstein observed, the concept of causation is "the ultimate basic postulate of all natural science."[25] And this remains true even if we invent all of Science in our heads, or claim there is no causality. This is as close to logical foundations as we can get.

Einstein in fact felt that the answer he was seeking might be found in a new "*Supercausality*."[26] It would have to *accommodate* those features of Reality's operations which could not quite fit into the old mold of Newtonian mechanical Necessity, or entirely into the new mold which attempted to credit everything to Chance....and modern thinkers have found it will have to accommodate a lot more.

It is indeed startling to find that even for our most advanced physics, the concept of causality is wide open for an infusion of the attributes and the integrating invariant I have been describing -- essentially the non-algorithmic foundations that Penrose's work touches so clearly. Nature's fundamental operations cannot be viewed as a couple of simplistic notions like Chance and Necessity any more than the foundations of our mathematics can be. Many other physicists, as far back as Peirce, have argued that something more subtle is needed to integrate Chance and Necessity; and which can also account for the Complexity, the Order, the Efficiency, the Simplicity, the Wholeness, the Individuality, the Aliveness, and so on...that we actually find in experience, peaking with the need to accommodate the creative developmental thrust we experience with the operations of life and, most notably, the human mind and its seeking after Beauty, Goodness and Truth. Peirce even proposed the solution: the Supercausality of "evolutionary love."[27]