The Truth About Temporal Eternity

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If we reflect over the span of known history to date, it is sometimes permissible, even required, that one speak apocalyptically, but without either intending, or being construed as intending to prophesy an Apocalypse. Europe's plunge into the so-called "New Dark Ages" of the mid-fourteenth century is a case in point.

Look at the period from the death of the Holy Roman Emperor Frederick Hohenstauffen, through the "New Dark Ages," and on to the fifteenth-century Golden Renaissance. We are reminded that it is those who warned against a "New Dark Age" at the onset of the fourteenth century, whose words prompted the movement for the later Renaissance. On the secular side of public policy, the most famous such was Florence's Dante Alighieri who sought to prevent the "New Dark Ages," and in so doing rallied the networks which played a leading part in creating the Renaissance.

On that account, the present circumstances of the late twentieth century are comparable to, and probably more ominous than Europe's situation during the early fourteenth. Since no later than 1905, despite some elements of progress, even some admirable ones, the overall pattern of this century has been one of global decay of civilization through two ruinous world wars. Over the period since the assassination of U.S. President John F. Kennedy, there came a worse, presently ongoing collapse, into a neo-Malthusian "New Dark Age," into a "New Ager's post-industrial utopia." Despite the notable accomplishments which also have been contributed during these decades, the twentieth century has been, in the large, not "modern history," but rather "modernist history."

World War I was horrible, but the aftermath was worse. The moral decay dominated the 1920's everywhere, notably including post-war Weimar Germany.

Like Friedrich Nietzsche, these followers of Comintern cultural commissar Georg Lukacs were all exis-

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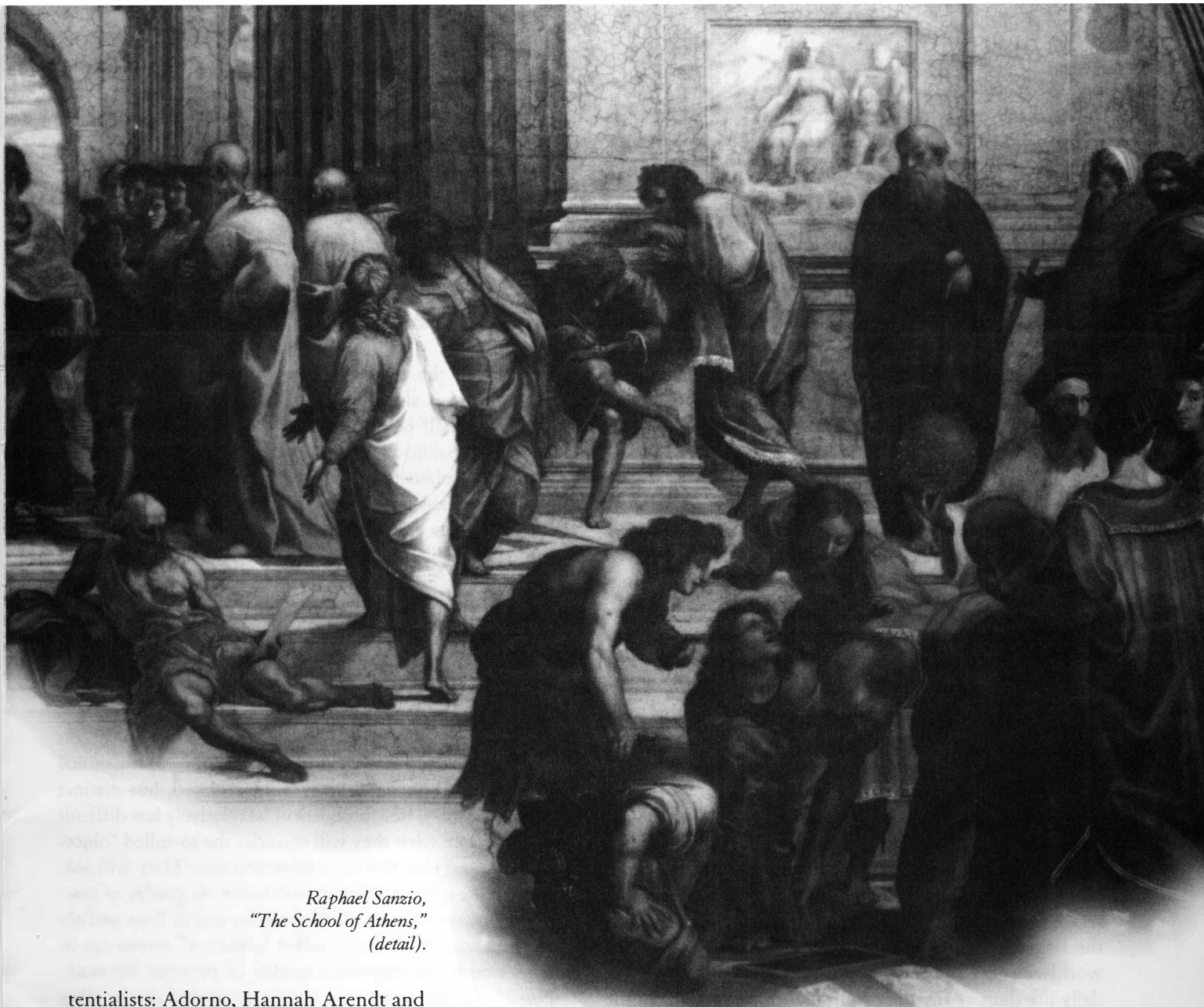
Raphael Sanzio,
"The School of Athens,"
(detail).

tentialists: Adorno, Hannah Arendt and her lover Martin Heidegger, Horkheimer, and the rest of the Weimar Republic's "Frankfurt School." The difference among these positivist synthesizers of Sigmund Freud and Karl Marx, if only temporarily, was that Heidegger became Hitler's chief custodian of the Nazis' Nietzschean philosophical purity, while others, being Jewish, soon found their 1930's careers outside of Germany.[1] At the end of that war, while the post-war Heidegger was being excused (rather hastily, some thought) for his propounding of Nazi dogma, the doctrine of the Frankfurt School's Adorno and Arendt was applied to certain among Hitler's opponents. Thus, some German Catholic theologians, in particular, were instructed by the Anglo-American occupation to teach the democratic principles of Arendt's former lover, the then-recent Nazi celebrity, Martin Heidegger.[2]

Heidegger thus became a leading post-war influence among the theologians at Germany's Tübingen University. Karl Rahner, and the famous "liberation theologist," Hans Kung, among many others, reflect this. If it were "not politically correct" these days to mention the rope in the house of the hanged, similarly, even the bare word "truth" might be deemed offensive in the existentialist precincts of the Frankfurt School, or of its admirers.

Meanwhile, from France, existentialist Heidegger's cousins, so-called "Deconstructionists" such as Jacques Derrida, have spread their campaign against even the mere name of truth through the U.S.A.'s Modern Language Association; they have established their nihilist

views as the reigning dogma of "multiculturalism" at most universities in the U.S.A. today.[3] There, especially over the past two decades, truthfulness has come to be virtually banned, outlawed not only in the classrooms, but even from many Federal courtrooms. The most extreme version of the law of the racist Confederate States of America now reigns at some of the highest levels of those courts. As a result, more and more, Federal decisions embody a worse than Nazi-like,[4] "new McCarthyite" radical positivism derived from John Locke,[5] a positivist hostility to truth which has now virtually replaced those principles of Leibnizian natural law originally embedded within the U.S. Declaration of Independence and Federal Constitution.[6]

More broadly, although Queen Victoria's worldwide empire of gunboats and musketry is ostensibly a thing of the past, London had used its position as the most witting of the victors in two World Wars of this century to impose the empiricist, "Third Rome" ideology of Shelburne's and Palmerston's imperialism[7] as *a more or less globally hegemonic way of thinking.* That empiricism rules imperially, still, the opinion-shaping of most leading circles not only in Britain's former colonies, but also within the majority of most influential public opinion throughout most of the world, in politics, in the news media, in the classroom, and in the simple-minded whinings of the populists.

So, when the time came that Pope John Paul II issued his *Veritatis Splendor* to the Roman Catholic bishops throughout the world,[8] that world had come into an apocalyptic time, like that of Biblical Sodom and Gomorrah, a time when official and private lying had become the hegemonic policy of public and personal practice worldwide, more pervasive in both official and private daily life than at any time in modern recollection. In the year 1993, as among Christian communities, the general condition of mankind was far worse overall than at that time, decades earlier, when the dupes of satanic Theodor Adorno first instructed the German theologians to adopt the the dogma of Hannah Arendt's former lover, Heidegger's neo-Rousseauvian "liberation" dogma, that one should unleash upon the world one's inner, infantile swine.

In the preceding paragraphs we have glimpsed a significant segment from a continuing current of European conflict between opposing forces for and against the cause of truth. We have defined thus a period extending through approximately seven-hundred-fifty years of European history, from the death of Frederick II to the release of *Veritatis Splendor.* Therefore, now consider the proposition: *After having once fallen into an apocalyptic, fourteenth-century collapse of a formerly bright civilization,* *and later escaped from that "New Dark Age" into the brightest moment of rebirth in a millennium and a half of world-history, the fifteenth century's Golden Renaissance, how is it that Europe would permit itself, ever again, to be lured into yet another "New Dark Age"?*
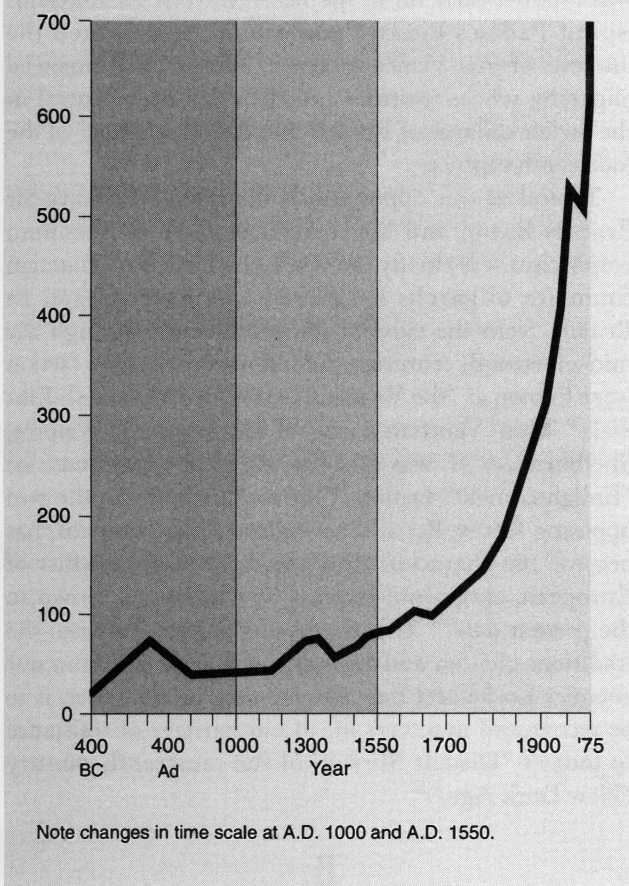
I.
The Golden Renaissance

Let us view the cause of truth, as the essence of an ages-old conflict is shown most clearly by the most recent five and a half centuries of European history, since the A.D. 1440 sessions of the ecumenical Council of Florence.[9]

Today's plausible reading of the available empirical evidence is that the human species, as we might define it for today, has existed upon this planet for not less than some two millions years. Yet, speaking from the vantage-point of Leibniz's science of physical economy, we can report with certainty, that the increase in the potential population-density of mankind during the recent five-hundred-fifty-odd years, since that Council, exceeds the sum-total of all such human development over the millions of years preceding that.

The search for the secret of the unprecedented success of the revolution launched in the setting of that Council directs our inquiries into two interrelated, but distinct lines of inquiry. For most, it will be relatively less difficult to appreciate what they will consider the so-called "objective side" of this historical phenomenon. They will ask: *What is the efficient connection between the quality of practical measures taken by the Renaissance and its heirs, and the practical results?* Those so-called "objective" results can be expressed in the improved quality of personal life made possible for the many, and may be expressed also in other ways which correspond to a sustainable pathway of successive increases of mankind's *potential population-density.* The other side of this history, which is to receive the more intense consideration here, is *the "subjective side": the study of those forms of mental life through which such efficient means of progress were rendered intelligible subjects both of conscious reflection and of willful practice of desired change.*

The study of the interrelationship between those two sides of our topic, but with emphasis upon the subjective side, is the route by which we shall explore here a rigorous proof of a principle of existent truth. To this purpose, we shall emphasize those aspects of this proposition which can be addressed competently only from the included standpoint of the author's fundamental discoveries in the domain of physical economy.[10] Once a few indispensable preliminaries are satisfied, we shall

Figure 1. *European population growth since pagan Rome.*

700

600

500

400

300

200

100

0

| 400 BC | 400 Ad | 1000 | 1300 | 1550 | 1700 | 1900 | '75 |

Year

Note changes in time scale at A.D. 1000 and A.D. 1550.

focus directly upon the indicated two sides of the matter. First, we must summarize those clinical features of the Golden Renaissance which define the scope of the key historical evidence required as the most critical zone for our investigations.

The central feature of the growth unleashed so uniquely by the Golden Renaissance's influence, has been the establishment of a new kind of political institutions, the institutions of a system of sovereign nation-state republics, each based upon a literate form of a popular language, and all dedicated, in their internal affairs and relations with other states, to a form of *natural law* which is traced historically[11] through St. Augustine's writings,[12] and reaffirmed by Gottfried Leibniz. The Renaissance's rich comprehension of such natural law also defined the notion of science in a new way.

This new form of political institution, wherever it emerged, was committed, inclusively, to fostering those beneficial changes in individual and national practice which are made available to mankind through fundamental scientific progress.[13] It was this coincidence of natural law with both the new notion of a sovereign

nation-state republic, and a consistent notion of physical science, which has caused the increase of the total human population from the several hundred millions maximum of times prior to A.D. 1400, to over five billions today (SEE Figure 1),[14] and potentially to a technologically-determined, and rising level of more than twenty-five billions.

The natural principle which was responsible for this sudden upward turn was not new. That ancient principle, called into play to produce this Renaissance effect, is that characteristic of the individual person which has always set the human species absolutely apart from, and above all other known creatures existing within Temporal Eternity. Through creative potential inherent in each human individual, but by no different means, the human species is enabled *to increase its potential population-density willfully* in a manner and degree which is impossible for any other species. As we shall stress here, this definition of the term *creative* is most easily recognized as the quality of mind typically embodied in the valid axiomatic-revolutionary discoveries of physical science.

This principle of creative potential within the individual person is the same quality of man's likeness to God already known to Mosaic Judaism in Genesis 26-28.[15] In Latin, Genesis 1:27 is referenced by the words "*imago Dei* (in the image of God)." We shall demonstrate, in the most rigorous way, that, as we have just stated, the two meanings, the power of valid "fundamental," or "axiomatic-revolutionary" discovery in physical science, and the creativity of "*imago Dei*" differ no more than as but different facets of one and the same quality. If human individuals were not endowed with this distinctive quality of *imago Dei,* science were impossible.

Presently, the earliest known trace of mankind's development of an actually scientific form of knowledge, is the surviving elements of the demonstrably prehistoric solar-sidereal astronomical calendars of Vedic Central Asia, China, and Egypt. The already advanced Vedic solar astronomical calendars date explicitly from no later than 6,000-4,000 B.C., the Chinese perhaps earlier, like the pre-Vedic Indo-European, and the pre-pyramid Egyptian solar astronomy probably as early as the Vedic, or approximately so. It is possible that calendars and navigation based upon scientific knowledge of equinoctial and longer sidereal and solar cycles date from a much earlier time; we have grounds to infer this, but corroborating material evidence of this is unreported to us presently. Nonetheless, once we become familiar with the distinctive characteristics of creative-thought patterns—as opposed to deductive ones—conclusive evidence of a creativity coherent with *imago Dei* is reflected to us as its faded, fragile shadows cast tenderly upon mere shards of even the most primitive ancient artifacts.

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There are many precursors of modern science, including those works of Plato which are the nearest approximation of its principle from ancient history. We neither exaggerate, nor do we dishonor the contributions from the distant past if we insist upon the demonstrable truth that these were but precursors of the science first established by the Renaissance.

Indeed, the practical difference between that Renaissance and earlier forms of Christian civilization, is epitomized by that founding of modern science. The key conceptions on which this development was premised are included topics of Nicolaus of Cusa's *On Learned Ignorance* (*De Docta Ignorantia*).[16] From the standpoint of mathematics, among the many topics which that book addresses, the crucial feature is a demonstration of the proper application of the socratic method to overturn ultimately even the most widely and deeply believed professionals' axiomatic assumptions of all known formal mathematics existing up to that time. Hence, this use of Socratic method is named *de docta ignorantia*. The key illustration employed to this latter effect in that book, is his successfully axiomatic-revolutionary application of the principle of Plato's *Parmenides* to solve the ontological paradox in Archimedes' theorems on quadrature of the circle.[17]

As the relevant considerations of that time are articulated in the most concentrated and rigorous way by Cusa, this Renaissance revolution in political and scientific institutions proceeded from the evidence that *all things which are knowable to mankind are accessible to intelligibility, and, therefore, that all mankind, through its leading institutions, is implicitly accountable to God for knowing natural law and acting accordingly.*

The environment of the scientific revolution erupting in this Renaissance Italy is identified by such contemporaries of Cusa's as Filippo Brunelleschi and Paolo del Pozzo Toscanelli, and, later, by not only such avowed students of Cusa's works as Luca Pacioli, Leonardo da Vinci, and Johannes Kepler,[18] but also Pascal, Huygens, and Leibniz.[19] An enhanced view of Cusa's influence on fifteenth through nineteenth-century scientific progress is afforded by reference to Cantor's writings on relevant highlights of the history of science, at the close of the nineteenth century.[20]

Unfortunately, European history since A.D. 1440 has not been so one-sidedly good as the foregoing might suggest at first reading. Unfortunately, there was an extremely powerful opposition, which has been working ruthlessly from the fifteenth century to the present day in the attempt to exterminate even modern memory of those policy measures which characterize both the Renaissance Council of Florence and the science which

that Council contributed crucially to setting into motion. That hate-filled opposition to the Renaissance, which was typified early on in the neo-Averroist Aristotelianism of Padua's Pietro Pomponazzi, represented the interests of that Venice-centered, international financial oligarchy whose usurious practices had been central in the earlier collapse of Europe into the "Dark Age" of the fourteenth century.

Typical of this opposition is the case of Britain's Sir Francis Bacon and his empiricist faction. Baconian empiricism was chiefly the work of a faction of Venetian financier oligarchs headed by one Paolo Sarpi. In Britain, from the close of the seventeenth through the mid-nineteenth centuries, the followers of Sarpi's faction were known as "the Venetian party," or "the British Liberals." This "Venetian party" of Marlborough, Walpole, Shelburne, *et al.* was also known as the *Illuminati,* or "Enlightenment" faction. This conflict between the two opposing forces, Renaissance versus Enlightenment, has become the characteristic, defining internal conflict of European, and, more recently, world history, down to the present date.[21] This continuing conflict between the traditions of Cusa and Leibniz, on the one side, and our enemies Locke and the existentialists, on the other, is to be recognized in today's life as our heritage of resistance to today's "Distant Mirror" of the fourteenth-century "New Dark Age."[22]

II.
Creativity Defined

A competent critical reading of every proposition crucial to what we have to report from this point onward hangs upon the reader's ability to recognize the constructive[23] definition of the term "creativity" as that term is employed here. For that reason, we now summarize that same definition which we have employed on other locations.

For our purpose here, it were sufficient to say that Plato's *Parmenides* dialogue is, without exaggerating, the most important scientific pedagogical exercise composed during no less than the recent two and a half thousand years. The same conceptions are present within other dialogues of Plato; the *Parmenides* not only makes the most crucial point respecting all formal mathematics or mathematical physics, but accomplishes this with a stunningly rigorous compactness which the greatest thinkers since might have but dreamed of matching.[24] The most crucial issue of all formal scientific utterance is embedded in the single ontological paradox which that dialogue defines. As in other locations where this present

writer addresses that topic, he hinges the definition of scientific creativity upon the demonstration of Plato's *Parmenides* principle which is typified by Nicolaus of Cusa's "De Circuli Quadratura."[25] The construction of the *Parmenides* ontological paradox is most simply illustrated in a way which is also the most useful pedagogically, by taking up Archimedes' quadrature of the circle as a topic to which Plato's principle is most aptly applied.

One might begin the classroom blackboard exercise with a circle and a pair of respectively inscribed and circumscribed squares. Next, double repeatedly, at an equal speed, the number of sides of each of these respectively inscribed and circumscribed polygons. At that point in the lesson, our attention must be turned to the famous "method of exhaustion" associated with a mathematician of Plato's Academy of Athens, Eudoxus.[26]

Let the class ask itself: What is the relationship between the circular perimeter and the perimeters of the polygons when the n of 2^n becomes extremely large? Focus upon two adjacent sides of the inscribed polygon at that instant of the ongoing process, as if in a suitably powerful microscopic enlargement. Examine the relationship between the two polygonal perimeters in that vicinity, and the segment of circular perimeter lying between them. Extend the process to a value of $2^{(n+n)}$. Repeat the microscopic scrutiny. Extend the process to the degree that a polygonal side the length of one micron would require a circle larger than the currently imagined largest size of our universe. It changes, but it remains the same: the polygonal species and the species responsible for the existence of the circle can never become congruent.[27]

At this point, the Classical scholar must recognize that this problem of quadrature has affinities with Plato's *Parmenides*. It appears that the circular action, which both generates the circle and is crucial for constructing the polygonal series, defines and bounds externally[28] all the polygons of this series, but can never be a member of the series which it defines in a subsuming way.

At this juncture in the experiment, the student might pick up his drawing compass, studying it very thoughtfully: This compass has no place to exist within the set of axioms and postulates of what we term Euclidean geometry! This Archimedean construction which we followed so faithfully has a terrible error of assumption built into it, at least as that theorem has been ordinarily presented in schools. The act of *circular rotation,* which defines and bounds the polygonal series, is not allowed within the set of Euclid's ontologically axiomatic notions of point, and straight line as a "shortest distance between two points." The latter set belongs to the domain of mere *space*; *circular action* belongs to the domain of *space-time*—as Johann Bernoulli and Gottfried Leibniz proved the latter in 1697, when they established non-algebraic mathematical physics, and did so on the basis of the physical-geometrical principles of refraction of radiated light.[29] Some of the deeper implications of this for mathematical physics awaited those fundamental discoveries which Georg Cantor presented two centuries later, in 1897.[30]

The "hand-waving," *brotgelehrter* professor[31] before the blackboard ends his treatment of that topic with the sophistry of presuming that the possibility of increasing the mathematical approximation of the curve by the polygonal perimeter indefinitely signifies that "ultimately" the two must coincide. Cusa's refusal to accept that sophist's fraud was the basis for the later, 1697 establishment of the non-algebraic higher mathematics of space-time by Bernoulli and Leibniz.

The construction actually proves directly the opposite to what the "hand-waving" professor asserted so blithely. To a scientific mind, that construction proves that never can the two coincide, because they represent different species of existence. In the domain of mathematical physical science, that quality of socratic negation is the onset of a creative mental act of axiomatic-revolutionary discovery.

This leads to a further step. If we avoid the trap of reading the word "halving" in an empty, arithmetic way, we are obliged to examine the construction by means of which the series 2^n might be generated in visual and further-extended space-time. The construction itself is bounded by circular *action*. The proposition must be restated accordingly: The possibility of generating indefinitely the series 2^n depends upon circular *action*; *circular action* is thus the crucial feature of the *generating-principle* of construction of the *transfinite*[32] series of polygons, both the respectively inscribed and the circumscribed series treated as a single series. Thus, the same quality of *circular action* which bounds the inscribed series *externally* and the circumscribed series *internally* also determines the generating principle of both series, and, in that sense, bounds the combined series *externally,* from outside and above the set of axioms and postulates upon which a Euclidean geometry of simple space depends for all its consistent theorems.

Thus, creative mentation concludes, the difference between the species of polygons in Euclidean space and circular action is an ontological difference; therefore, the use of Archimedean construction to approximate a circular perimeter by averaging the difference between the two polygonal 2^n series, prompts the eruption to view of an underlying *ontological paradox*. The species of circular perimeter can not be generated honestly as a theorem

from the set of axioms and postulates of formalist Euclidean space. Thus, the two species are distinct.

Yet, by multiply-connected circular actions, we can generate all of the valid spatial existences and theorems of a formal Euclidean geometry of simple space, without resort to Euclidean ontological axioms. Thus, the circular perimeter's existence cannot be comprehended from the standpoint of the formal Euclidean geometry, but the Euclidean geometry, minus its failed ontological axioms, can be fully comprehended from the standpoint of substituting the axiomatic quality of circular action for the ontological axioms of Euclidean formalism. The space-time of axiomatic circular action, is ontologically the superior, relatively higher species of existence.

Furthermore, that which is thus shown to determine the existence of that transfinite series, the which fully comprehends that series, is not a member of the formal theorem-lattice for which the members of the series are each ostensibly theorem-members. That is precisely an illustration of the *ontological paradox* which Plato used, in his *Parmenides,* to demolish the "hereditarily" Eleatic method of such sophists as the immoral rhetorician Aristotle.[33] Formally, this is Plato's root for the 1897 work of Georg Cantor, in his *Beiträge.*[34] On this point, Cantor is echoed famously by the original work which established Kurt Gödel as one of the first-rank scientific minds of our century, Gödel's beautifully elementary and devastating, axiomatic obliteration of the scientific pretensions of Bertrand Russell.[35]

The generation-principle which is a higher species than any member of the theorem-set of a transfinite ordering, stands ontologically outside and above each and all members of the set. It is the One which subsumes, thus, the Many. Plato's principle precisely. The One is distinguished from the Many by the quality of *change.* So, in the instance of Cusa's discovery of what became known later as non-algebraic or transcendental functions, circular action is the principle of *change* which bounds and defines the double polygonal series. The circular perimeter, whose ontological content is *change,* is a singularity, relatively an absolute, virtually zero-dimensional mathematical discontinuity, which both unites and separates absolutely the two series, the inscribed and circumscribed, as avowed student of Cusa's work Johannes Kepler explores the astrophysical and other implications of this around the beginning of the seventeenth century.[36]

Over the years, this writer has adopted the following pedagogical device to assist students in conceptualizing what we have just described here, but in a more general way, as a matter of a general principle.[37]

Let us consider any case of a creative discovery formally analogous to what we have adduced just now from the case of Cusa's Platonic solution to the quadrature paradox. Take into account the comparison made among Plato's *Parmenides,* Cusa's "De Circuli Quadratura," Cantor's *Beiträge* and related discoveries, and Gödel's devastating exposure of the axiomatic blunders of Bertrand Russell.

Let us, in the manner of a Socratic dialogue, consider the proposition that all scientific propositions can be reduced ultimately to the terms of a perfected update of today's principles of generally accepted classroom mathematics. Then, let us take into account the proofs given refuting that proposition, successively, in various forms, of the principle of Plato's *Parmenides:* those of Plato, Cusa, Cantor, and Gödel, notably. Let us represent this treatment of the proposition in the following way.

Let us therefore propose to represent all axiomatic-revolutionary discoveries in physical science by a series of the form

$$A, B, C, \ldots, |n|$$

(for which "n" is the number of the ith term of this series).

Let "A" signify a formal Euclidean geometry of simple space, and "B" signify a non-algebraic geometry of the Cusa-Kepler-Leibniz species-type. Formally, we may proceed from the axiomatics of "B" to generate all valid theorems of "A," although none of these will be consistent any longer with the set of axioms of "A"; we may not reach any of the consistent theorems of "B" from the axiomatic basis of "A." From the standpoint of formalism, to reach "B" from "A" we must make an intellectual leap of the sort which Cusa effected in solving the ontological paradox of Archimedean quadrature. To the formalist, this "leap" appears an "un"-rational act of blind intuition; as we shall indicate in the next topical section, it is that "intuitionist" view which is blindly irrational.

Let "C" signify the higher transfinite types discovered by Cantor. As a matter of informing the reader who may not have been aware of these relevant historical facts of earlier, we report the following additional considerations respecting Cantor's discovery.

The first statement of the mathematical problem solved formally by Cantor (1897) is Leibniz's *Monadology,*[38] as that *Monadology* was attacked falsely by Leonhard Euler in the latter's "Letters to a German Princess" (1761).[39] Leibniz's notion of a *monadology* had its formal mathematical basis for intelligibility in his general notion of an *analysis situs.*[40] This issue came freshly to the surface among the collaborators and other students of the work of Carl Gauss, notably Lejeune Dirichlet, Bernhard Riemann, and Karl Weierstrass. As Riemann put the point, the issue among those leading mathematicians is that in continuous space-time no naive denumerability

of the kind attributed to an ideal purely arithmetic domain is possible.[41]

As the White translation of Riemann's paper puts the point, "[t]his path" (a continuous manifold in the domain of mathematical formalism) "leads out into the domain of another science, into the realm of physics."[42] Such were the ontological implications of Georg Cantor's discoveries in mathematics, which provided formal intelligibility of this continuum problem within the domain of the transfinite. This is also the related implication of Gödel's referenced work, as systems-analysis founder John Von Neumann failed to comprehend this significance of Gödel's proof. Cantor's discovery supplied the mathematical conceptions appropriate for the domain of the non-denumerable in *physical space-time*: the domain of those virtually null-dimensional, but curiously efficient singularities, the which are the hallmarks of the modern physics of the quantum field, and which are the cornerstone for a notion of "not-entropic" function in the science of physical economy.[43]

What we said of the non-commutative formal relationship between *A*, the algebraic domain, and *B*, the non-algebraic or transcendental, is also applicable to the relationship of *C*, the higher transfinite domain, to *B*. From *A* to *B*, and from *B* to *C*, we can proceed upward only by what must appear as "arbitrary leaps" to an observer self-blinded by his own obsessive adherence to radical formalism.

Such radical formalists, such as the Aristotelian or quasi-Aristotelian formalists Pietro Pomponazzi, René Descartes, or Immanuel Kant, can interpret such "leaps" only as mysteries, as blind, irrational mysticism. Those formalist professors and their credulous admirers delude themselves as a man who denies the existence of that of which he has deprived himself. On no higher authority than their own refusal to comprehend the reality lying outside the domain of their formalism, for them, what they have not succeeded in attaining has no intelligible, has no more than a mystical existence. As Gasparo Contarini showed himself to have understood his teacher, Pietro Pomponazzi's own soul could exist for poor Pietro only once that Paduan had proven, by rigorous Aristotelian logic, that he had no soul; his God existed for him only in a similar way, a Kantian unintelligible *thing-in-itself*. Pomponazzi's soul was for him, as an Aristotelian, an imaginary object which existed only in that domain of paganist theologians' irrational mysticism. It existed only within that domain of irrationalist fictions where dwell William James' "varieties of religious experience,"[44] within the ancient heathen domain of delphic faiths adored by consistent Aristotelian sophists.[45] This is the tendency of weakness in today's commonplace forms

of attempts to assert a principle of truth: that commonplace which has been exploited with such frequent, gloating success by the existentialists Friedrich Nietzsche, Bertrand Russell, Carl Jung, and Martin Heidegger.

Fortunately, it is not absolutely necessary to be as foolish as these formalists. What appear to the professional ignorance of the formalist as "arbitrary leaps," are fully intelligible actions, fully susceptible of unassailable proof. On that basis, an intelligible principle of creative acts of axiomatic-revolutionary discovery is accessed similarly, an intelligible principle of natural law, of universal truth, most usefully described otherwise as "The Truth About Temporal Eternity."

Thus far, we have situated the "leap" which we have designated as the formal representation of the occurrence of an axiomatic-revolutionary, or creative act of scientific progress. To render human creativity intelligible, we must define it next as also a mental object of conscious thought.

III.
The Education of Creativity

The Golden Renaissance and its continuation through some nineteenth-century expressions of it, is typified by the mode of Christian humanist education traced from such a fourteenth- through mid-sixteenth-century model as Groote's and Thomas à Kempis' teaching-order, the Brothers of the Common Life. It may be traced thereafter through the Prussian educational reforms, according to the prescriptions of Friedrich Schiller, as developed and introduced by Wilhelm von Humboldt.[46] This Christian humanist tradition is the only model policy yet developed which explicitly addresses the task of fostering the development of the powers for creative discovery in the student—in direct opposition to popularized forms of "textbook-based" education. We include in this Christian humanist tradition, much of the work of the French Oratorians, for example, as echoed in France's 1794-1814 Ecole Polytechnique under the direction of founder Gaspard Monge.[47]

Return to the leading point introduced earlier, under the rubric of "Golden Renaissance."[48] The development of the potential population-density of mankind, first in western Europe, and then throughout this planet, which occurred since the beginning of the fifteenth century, exceeds the accumulated net development of society throughout all man's existence on this planet before that. This is the case despite the evil, typified by Britain's "Venetian" empire, and by empiricist immorality, which has been the powerful adversary of the Renaissance, and

of mankind, through all of these recent six centuries. Acknowledging the great indebtedness which that Renaissance has to the contributions of many branches of humanity earlier, the active principle of this Renaissance is the highest form of society, morally, intellectually, and materially, which has existed on this planet up through the present time.

It was born in Europe, as the Christian humanism epitomized by the writings and related work of Nicolaus of Cusa; but, as a glance toward the educational grounding of Cusa himself attests, the power of Christian humanism lies in its unmatched capacity for treasuring the greatest known true contributions of all mankind before it. Christian humanism was rooted in the rise of European civilization, as the early Indo-European (Classical Greek) contributions were reflected in the Platonic tradition known to the Hellenic world of the Christian apostles inside and outside of Palestine. The principles of Christian humanist education, typified as we indicate here, are the source of the extraordinary, unprecedented power of this European Renaissance.

Today, whatever parent wishes to afford his child, or his nation, the fullest possibility for equality of achievement, must turn to the heritage of these Christian humanist, Renaissance principles of education. It is this Platonic tradition, as reflected in Classical humanist education, which affords us, uniquely, the means for rendering intelligible "the truth about Temporal Eternity." Once the implications of a science of physical economy are situated with respect to an intelligible principle of scientific creativity, known in these Renaissance terms, the certainty of that truth becomes for us a fully intelligible object of conscious thought.

Gather up a selection of the brightest youth of secondary-school age, with no distinction made among their putative social rank. Rally them under a program of Classical studies, emphasizing early the greatest productions in Classical Greek and Latin, but, above all else, teaching the students, in succession, as they are prepared for each next step, to relive the known, original great, axiomatic-revolutionary discoveries of all human history to date. The case we have outlined for replicating Cusa's discovery of an axiomatic-revolutionary solution of the Archimedean quadrature's ontological paradox, is a model for what we signify as "reliving the original discoverer's state of mind during the act of effecting the original discovery."

For the case of mathematics, and so forth, the student gains not a scorable classroom, textbook mastery of approved observations, experiments, and standard formulas, but, instead, an actual reliving, within himself or herself, of the intellectual experience of the original dis-covery. Thus, a part of the living tissue of the student's mind is occupied by a living quality of replication of the mind of the greatest, long-dead discoverers. That student learns thus to command the living minds of the greatest discoverers of the past, revived within himself or herself, to master the original problems of the present.

What transpires, during the reliving so of a succession of original discoveries, is the mustering of the student's inborn and partially developed capacity for the kind of creative thinking which appears in the mistaken opinion of an Aristotelian formalist as an "irrational leap of intuition." The occurrence of that re-enactment of the mind of the original discoverer within the mind of the student, defines that experience as an object of the student's consciousness. This mental object appearing to the student's consciousness in that way, is constructed of the student's own, mustered capacity for an act of creative discovery congruent with that of the original discoverer. The content of that constructed image is nothing other than a process of creative thinking, a species of thinking absolutely distinct from logical formalism.

Indeed, it is our ability to contrast the creative "thought-object"[49] with those of our own states of mind we recognize as merely the inferior level of logical formalism, which is the basis for most scientific creative work.

As the chosen example of Cusa's discovery illustrates this point, most of the fundamental and closely related mathematical-physical discoveries in all known history correspond to this particular model of what is termed Platonic *higher hypothesis.* One drives a logical construction to beyond its limits, in the most rigorous way possible, searching for a devastating, axiomatic quality of ontological paradox in those extremes of vastness or smallness. Once such a paradox is provoked into appearing, the Eudoxian "method of exhaustion" by means of which the paradox is evoked, is examined from the standpoint of the solution-principle of Plato's *Parmenides.* That tactic, or method of generating a succession of revolutionary *hypotheses,* represents thus an *higher hypothesis.*

The formalist state of mind is obsessed with method of formal proof, formal consistency with a set of underlying, axiomatic assumptions. Creative discovery signifies overthrowing some of those axiomatic assumptions; for such a case a formal proof is not possible.[50] The person who does not immediately recognize the empirical distinction between the two distinct species of thinking, is neither a scientist nor a competent policy-shaper or other professional in the field of education.

The student advantaged to enjoy such a Christian humanist mode of secondary education, thus locates knowledge not in mere "facts," but in the process of gen-

erating knowledge within those creative processes which are empirically defined for that student by the repeated reliving of the moments of valid discovery by original discoverers. That student, by the time he or she is graduating from such an institution, can recognize readily the significance of Plato's term *hypothesis.* He or she can recognize those kinds of discovery achieved through overturning previously held axiomatic assumptions: valid such discoveries are Platonic *hypotheses.* Similarly, once the student comprehends individual *hypothesis* in this mode, the student is able to employ the method of *hypothesis* to define the higher One subsuming a large array of individual valid, axiomatic-revolutionary discoveries (*hypotheses*). All of the discoveries which, as a (e.g., transfinite) series are generated by a common (higher) *hypothesis* respecting the method of generating such discoveries, are a Platonic Many commonly subsumed by a Platonic One. That higher *hypothesis,* the One, is a *higher hypothesis.* We have already indicated the use of the solution-principle of Plato's *Parmenides,* to solve a paradox generated by "method of exhaustion," as a model example under the definition of *higher hypothesis* supplied here.

Similarly, the existence of alternative forms of *higher hypothesis* obliges the student trained in consciousness of *hypothesis* to hypothesize *higher hypothesis,* in the sense that *higher hypothesis* is defined by hypothesizing *hypothesis.*

Admittedly, we are employing the term "hypothesis" here in a manner different from that in generally accepted classroom use, or, in the formalization of plane and solid geometry. In rebuttal to any objections along those lines, three points can and should be made. One: Plato was there first; two: his definition of hypothesis conforms to an adequate definition of mathematics and physical science. As the emergence of, first, non-algebraic, and, later, transfinite mathematics demonstrates, mathematics as a whole becomes incomprehensible unless we approach the matter historically from the standpoint which Plato represents by his definition of hypothesis. Three: Today's commonly accepted classroom definition of "hypothesis" came into being because Aristotelian and Hellenistic formalists sought to castrate geometry, by degrading it from a constructive (e.g., synthetic)[51] geometry, to a sterilely fixed, formalist theorem-lattice.

Wherever modern science occupied itself with fostering revolutionary progress in mankind's power to survive as a species, rather than rote teaching of dead algebraic dogma, the practical revolutionary implications of Plato's notion of *hypothesis* came back into play.

Hypothesis, considered formally (i.e., statically) signifies what modern theorem-lattice doctrine would recognize as an "hereditary principle." Given, any set of axioms and postulates, treated as interdependent, the expandable array of theorems which may be derived as consistent with each and all of those axioms and postulates is transfinitely defined as a Cantorian *type.* Thus, formal proof belongs only to the inferior domain of showing consistency with such a fixed *hypothesis,* as representable formally by a fixed set of axioms and postulates. The theorems of that fixed lattice are a Platonic Many, and the corresponding *hypothesis* a Platonic One.

However, *hypothesis* is not located fundamentally in terms of the fixed theorem-lattice with which the results of a particular hypothesis may be associated. As the *Parmenides* indicates, the ontological content of *hypothesis* is *change,* the Cantorian *type* of *change* which it incorporates as the process of creative-mental action which brought it into being. It is in this aspect, as *change,* that a succession of *hypotheses,* as a Many, corresponds to its appropriate One, an *higher hypothesis.*

IV.
'Generally Accepted Mathematics'

Consider now the implications of the following series of conditions.

From the historical vantage-point identified thus far, it is implicit that no generally accepted mathematics has the qualifications for proving anything but consistency; in the search for scientific truth, we must rely upon entirely different means. The appropriateness of any particular choice of mathematics is located in the adducible Platonic form of *hypothesis* to which that mathematics, representable as a theorem lattice, corresponds transfinitely. Yet, neither consistency, nor appropriateness are synonyms for scientific truth. The quality of relative truth of an *hypothesis,* if it, in particular, satisfies the conditions of relative truth, is derived from the principle of generating *hypotheses.*

That principle also may be termed a *method of scientific discovery* which subsumes that *hypothesis.* This principle is an *higher hypothesis* in the same sense that the application of the solution-principle of Plato's *Parmenides* to an Eudoxian ontological or related paradox has been used here as illustration of a relatively common choice of *higher hypothesis.* Even relative truth is to be found in no place inferior to the domain of *higher hypothesis.*

Consider another notion of mathematical form of higher hypothesis, one not included in the terms of that higher hypothesis premised upon a Platonic treatment of Eudoxian ontological paradoxes: Consider harmonic

orderings which are either coherent, or not coherent with the Golden Section as an externally bounding, asymptotic limit: the higher hypothesis upon which Johannes Kepler premised his construction of the solar system according to a quantum-field principle.[52] The history of this harmonic principle for generating hypotheses, from Plato, through Kepler, and beyond, is also an *higher hypothesis.*

Those two higher hypotheses may be combined, to form a third. The first, Eudoxian form of hypotheses corresponds to the sense of vision = space-time. The second, quantum-field, corresponds to the sense of hearing, and of natural vocalization by a full spectrum of the six characteristic adult voice-species of spoken/sung languages.[53]

The consideration (hypothesizing) of these three, each well-defined notions of higher hypothesis, illustrates the significance of the term *hypothesizing the higher hypothesis.* This mental activity locates us *ontologically* within a domain which Plato terms "The Becoming." This definition of "Becoming" Georg Cantor equates to his generalized Transfinite.[54]

This poses, as Cantor emphasizes, the equivalence of what Plato identifies as the "Good" to what Cantor designates as his "Absolute." This Becoming, or generalized transfinite, corresponds to the highest possible ontological significance of physical space-time, as does Cantor's generalized transfinite. This, generalized, corresponds to what this writer chooses to identify, descriptively, as "Temporal Eternity." That descriptive term, Temporal Eternity, is required to distinguish a transfinite notion of "eternity" from the "timeless absolute" of the Good.[55]

That Good, or Absolute, is defined by hypothesizing the generalized "hypothesis of the higher hypothesis." The resulting conception can be nothing but the bounding of Temporal Eternity by an intelligent, timeless Absolute which is efficiently coincident at each moment, in each place, with all moments and places of all Temporal Eternity: *The Absolute One, the Good.*

That is the road-map to guide us through the work now to follow.

In significant part, the implications for classroom mathematics of what has been presented here thus far, is fairly straightforward. Let us go directly, therefore, to a point which may not seem to be so straightforward. Next, let us construct the relevant anomaly; then, examine that anomaly's import for the determination of truth. We begin so, next, with the most crucial feature of a science of physical economy: the issue of "not-entropy."

Leibniz, Hamilton,[56] and others have defined the general form of the physical-economic transformation which corresponds to successful growth of any economy. It is implicit in that statistical "model," that there exists a level of growth—of net increase of the *per-capita, per-*household, and *per-*square-kilometer "productive powers of labor"[57]—which is just barely above the level at which entropy ("dying") takes over. In order to construct a system of linear inequalities to describe the form of the phenomenon, it is not necessary to know in advance the precise value at which that transition from entropic to "not-entropic" occurs. Initially, we are designing the experiment, so to speak; that experiment will indicate to us the relevant values for scaling.

So far, so good. Then, comes the excitement. The mathematical function so described is formally non-deterministic, no matter what the scaling values prove to be. One of the early results of this experience, is to look at all of generally accepted classroom mathematics, and mathematical physics in a disturbingly fresh way.

Let us now build up a mathematical description of the conditions which must be satisfied to maintain the current human population of this planet above the level of entropy in mankind's *potential population-density.*[58] Note, that a zero-entropy, "equilibrium" state, between entropy and not-entropy, is, in this function, a mathematical discontinuity corresponding to a condition which does not, and could not exist in a real-life physical-economic process (and not in a respectable conjectural model, either).

The description begins with a simple requirement that the rate of increase of potential population-density be greater than zero. This requires some improvement: in effect, technological progress; this is a modification of social behavior which enables man to overcome some boundary condition ostensibly barring the way to maintaining an above-zero level of increase of potential population-density. This is expressed as a transmission of a self-improving culture, to the effect of improved skills being added to the heritage of earlier generations' contributions.

This already defines three constraints: increases *per capita, per* square kilometer, and of physical productivity *per capita* and *per* household.

This function is delimited not only by technological progress, but by the conditions required to realize that progress. Those conditions are expressed chiefly as improvements in the appropriateness of the area used, *per* square kilometer and *per capita,* and improvements in the tools and materials of production. These require expression in terms of structural changes in the division of physically-productive labor.

Look at this general model under conditions emerging millions of years later, especially the changes required to sustain the progress (in potential population-density)—where they have occurred, in fact—during the

recent six hundred years of European and North American development.[59] The significance of focussing upon this segment of the evidence is that the vastly more rapid rate of increase of mankind's potential population-density, beginning in the Renaissance, more than five-hundred-fifty years ago, affords us a more concentrated expression of the determining quality of change.

The characteristic of this recent six hundred-odd years of European culture and its influence, is the increase in the rate of urbanization. The reasons for that increase are implicit in the set of constraints already listed here: the requirement of increasing emphasis upon improvements in suitability of land-area and in tools, and also the implicit cultural requirement of an increase in the physical standard of household consumption and in life-expectancies. Such changes imply already an increase in urbanization relative to the percentile of the total labor-force required for physically essential rural occupations. These changes are much slower and marginally more modest in earlier periods of history (and, of course, pre-history), but, nonetheless, are efficiently present always, positively or in their neglect.

Urbanization signifies more than a rising intensity of these changes. New categories of change emerge lawfully from out of the belly of the old. Not only does the *per-capita,* and *per*-square-kilometer requirement of general infrastructural development (water, transportation, power, sanitation, etc.) become much more significant, but the effects of an indispensable rise in capital-intensity and power-intensity, *per capita* and *per* square kilometer, produce side-effects of great significance. These required qualitative structural changes in the social division of (principally) physical-productive labor, confront us with the required set of descriptive constraints in their most anomalous form.

It is sufficient for our purposes to consider only a few of the outstanding features.

Make a cut in time, through an interval in that physical space-time process which is the role of production in effecting the social reproduction of the human species. The combination of skills of productive labor and preconditions for productive employment of that labor, represent a social cost. Designate the rate of flow of this total social cost, seen as the productive process in flux, at the brief moment immediately before the cut, as "energy of the system." See the rate of useful physical output of the productive process, at the brief moment after the cut as "output of the system." Compare these two values in terms of an implied function corresponding to changes in the values of a ratio of the two: of "output of the system," thus defined, to "energy of the system," thus defined.

Consider this ratio in terms of the *per-capita, per*-household, and *per*-square-kilometer values of each of these respective terms of the ratio, and of the ratio itself. Effect this comparison, in these listed terms of reference, in terms of "market-baskets." There are two broad classifications of market-baskets: households' consumption market-baskets, expressed *per capita* and *per* household; producers' market-baskets, *per capita* and *per* square kilometer. Both are expressed in terms of projectible potential population-density (e.g., The Netherlands or Belgium as a comparative standard of reference for humanity today, at today's level of technology available).

There are two magnitudes chiefly to be measured: time (in available working-years of adult life of members of the labor-force), and comparative quantity and quality of physical goods contained within each of households' and producers' market-baskets. To these physical goods must be added several required types of services: education, medical, and science. These latter three are included in both the households' and producers' market-baskets.

The result of applying such categories of measurement to the actual modern history of physical economy is chiefly the following. The increase of the potential population-density of society as a whole is dependent chiefly upon the following constraints, applied to the function of the ratio as we have just described it.

1. The *per-capita* and *per*-household consumption must increase in terms of comparative quality and quantity of contents of the total market-basket. Yet, the time required to produce that enhanced *per-capita* and *per*-household market-basket must be less than that required to produce the earlier, poorer quality and quantity of *per-capita* and *per*-household market-baskets.

2. Urban physical-productive employment and market-baskets output must increase relatively over rural, up to an asymptotic limit of feasible reduction in percentile of rural.

3. Producers' goods market-baskets must increase relative to households' goods market-baskets, both in time of production and in quality and quantity of *per-capita* and *per*-square-kilometer composition.

4. Thus, the designated "energy of the system," *per capita, per* household, and *per* square kilometer, must increase absolutely. However, the following must also apply. Let the difference between the numerator and denominator of the ratio, after deducting for "overhead" factors, be designated as relative "free energy" of the process; the ratio of "free energy" to "energy of the system" must increase.[60]

These four constraints, so situated, describe a process

which satisfies the definition of "not-entropic." The "history" of the evolutionary development of the Earth's biosphere, is also such a "not-entropic" process, as, not irrelevantly, Cardinal Nicolaus of Cusa defined the correct notion of evolutionary development in his "Vision of God."[61]

We have thus defined a powerful anomaly, the most important and most ancient in known science since the time of Plato. This "not-entropic" image of both processes, the physical-economic and the evolutionary development of the biosphere, can be measured in the manner we have indicated here, and in analogous, more or less refined ways. It is always measurable so; in that sense, it satisfies broadly our general notion of a succession of terms of a mathematical function, a function which may indeed be contrasted with any modern statistical model for any of various sorts of entropic functions. The effect of this comparison upsets people, especially semi-literate science-sports fans cast in the roles of cheering spectators in the grandstand of the mathematical-physics professionals' derbies. We are confronted thus with an anomaly: for numerous among the relevant professionals, an extremely disconcerting sort of sharp formal discontinuity in the domain of generally accepted classroom mathematics.

From some professionals' quarters, in recent decades, the popularized response to the appearance of this disturbing anomaly has been what we might fairly describe by the term "reaction formation," the radical positivist's dogma of "negentropy": the low probability assigned to a virtual time-reversal of the Boltzmann H-theorem function for statistical entropy in a stereotypical mechanical gas, or analogous system.[62] We suggest the term "reaction formation," since there is plainly no conformity between the constraints of the "not-entropic" form of the process described, and a simple time-reversal of the H-theorem determination of statistical entropy. The popularized response is the wildly desperate "hand-waving" of the professor hoping to escape from the lecture-hall unscalped. Rather than resort to such desperate, and ultimately futile hand-waving gestures, the professional need but examine some fascinating, very revealing characteristics of this anomaly.

Put most simply, although we can describe the process mathematically, either in the terms given here, or more refined terms to the same net effect, no extant form of generally accepted classroom mathematics can represent this process as a *deterministic mathematical model*. Rather than collapsing to mewl in muted hesychastic hysteria over the mortal injury to his beloved textbook formalism, the professional ought to experience joy, to discover here a phenomenon in the physical world which every competently trained twentieth-century mathematician knows from the domain of higher mathematical formalities: the principle of the *ontologically transfinite* implicit in Georg Cantor's 1897 *Beiträge*.

Focus upon the physical-economic process, as represented in the modern industrial-society phase outlined. The source of the increases in physical productivity which define the determination of the function described, is a process of continuing scientific-technological progress subsumed (as a Platonic "Many") by a higher process of valid axiomatic-revolutionary forms of scientific (and analogous[63]) discovery. Those axiomatic-revolutionary discoveries have a form of absolute mathematical discontinuities, relative to any formal theorem-lattice, such as a formal logic or mathematics. Consequently, in relationship to any generally accepted classroom mathematics of today, any valid mathematical description of the effects of a not-entropic physical-economic process is *axiomatically non-deterministic*.

There are two other cases immediately to be considered, to address the matter of not-entropic processes more generally. First, obviously, the case of the evolutionary biosphere, over the most recent billions of years. Second, the relevant, analogous conceptual overview of the Mendeleyev Periodic Law, as the evidence stands today. The advantage of choosing the physical-economy form of not-entropy as the subject, is that this shows us that some analogous form of discontinuity, analogous to axiomatic-revolutionary forms of mental creativity, necessarily distinguishes a merely chemical process of the relevant sort from a living one. Reciprocally, this urges us to consider a view which is admittedly conjectural, but a compelling one, that mental creativity is a qualitatively higher species of the same not-entropic principle which distinguishes living from non-living processes. Is this principle also reflective of processes whose ostensibly elementary location appears in the sub-nuclear domain, perhaps more deeply ensconced than 10^{-18} centimeters? A quantum-field view of the Periodic Law suggests this is a case to be investigated, employing what we know of not-entropic processes in physical economies.[64]

Our views on approaches to questions of not-entropy in living processes and the Periodic Law so indicated, we can dispense for the moment with further consideration of such other topics; it is the determination of not-entropic economic processes by creative forms of mental activity which is our immediate subject here, from which we shall derive what is to be said on the subject of certainty of truth.

We, speaking of ourselves collectively as Leibniz's and U.S. Treasury Secretary Alexander Hamilton's modern industrial society,[65] have in our hands the readily com-

prehensible evidence of the way in which valid axiomatic-revolutionary discoveries in physical science cause directly increases in the productive powers of labor.

The translation of the discovery of an (Platonic form of) hypothesis into its formal mathematical or related expression, requires a revised set of axioms and postulates for all relevant topical areas of scientific thought. This revision defines corresponding differences between the old and new theorems for every subtopic of application of the respectively new and old theorem-lattice. Each such case of a difference implies a corresponding form of crucial experiment, for which the salient points of axiomatically determined differences serve as the critical features of design of such experiment. The refinement of such a valid experimental design is implicitly the model for design of corresponding, new machine-tool or analogous principles. The transmission to the "point of production" of both the knowledge provided by the discovery, and improved design of work-place, etc., yields the relevant increase in physical productivity *per capita, per* household, and *per* square kilometer.

All of the effects of this transformation are implicitly measurable, and intelligible in that form. However, the very nature of the motive-force of the increase in physical productivity signifies that the not-entropic function apparently represented by these measurements, unlike statistical "negentropy" so-called, is not a deterministic one. Such are the relevant limits of authority of generally accepted classroom mathematics.

V.
The Theory of Knowledge

In these next remarks, we shall employ almost exclusively the references we have made up to this point on the subject of physical science. That this emphasis's significance not be misinterpreted, or its intent otherwise misunderstood, the immediately following preliminary remarks of caution must be interpolated.

It is to be re-emphasized, that the material presented here is an outgrowth initially of the author's project of discovery during the interval 1948-1952.[66] Further development of that discovery was done during the later 1950's, and, at a less significant rate, during the recent three decades. The first portion of that period, 1948-1951, was focussed upon describing the similarity of the not-entropic function represented respectively by biosphere evolution and the impact of technological progress upon physical economy. The initial period of work, 1948-1951, generated the paradoxical view examined here in the immediately preceding pages. The solution for that paradox was provided, during much of 1952, by intensive working-through of Cantor's *Beiträge*. During the remaining portion of 1952 came a re-examination of Riemann's seemingly prophetic *Habilitationsschrift,* as referenced above; this re-examination was done from the standpoint of the Cantor studies.

At all times during that 1948-1952 study, it was the author's governing hypothesis that Immanuel Kant's dogma on aesthetics,[67] which has been the prevailing twentieth-century view taught within those professions, is an epistemological and aesthetic fraud: it was, and is this author's defiant posture against generally accepted modernism of the 1940's, 1950's, and now, that the Kant dogma of Professor Friedrich Karl Savigny[68] decreeing an hermetic separation between *Naturwissenschaft* (physical science) and *Geisteswissenschaft* (e.g., "art for art's sake," etc.), was directly and provably contrary to natural law.

During the summer and autumn months of 1952, the author rounded out his discoveries in the science of physical economy with a treatment of the Cantorian principles of musical creativity as exemplified by compared samples of the German *lied* from the compositions of Mozart, Beethoven, Schubert, Schumann, Brahms, Hugo Wolf, and some relatively minor but influential contemporaries of those composers.[69] In recent years, the same method of proof by crucial examples has been worked through for the case of Classical tragedy.[70] In collaboration with colleagues who are professionals in matters of the plastic fine arts, crucial examples are shown in painting for such notable cases as Leonardo da Vinci and Raphael Sanzio.

Once the internal principles of creativity intrinsic to the Classic modes of musical and dramatic composition have been identified, by aid of reference to crucial examples, it is shown beyond doubt that the relationship of the student's mind to the original discovery in the fine arts is the same in principle as we have indicated to be the case for original scientific discoveries. It is clear, as the case of Plato's dialogues ought to suggest to the student, that the two branches of knowledge, natural science and Classical forms of fine arts, are not only parallel in these respects, but complementary and mutually indispensable. There are, for example, relatively few great physical scientists of the nineteenth and early-twentieth century who were not also professionally trained, or at least passably competent in some way in Classical music.[71] The coincidence between scientific excellence and Classical fine art is not in any way accidental.

Everything which is presented here as true for physical science is in fact, and by this author's intent, also true for the Classical fine arts.

From the standpoint of physical economy, the validity of a scientific discovery lies in the demonstrable relative validity of the principle of discovery (Platonic higher hypothesis) which governs both the generation, and also the demonstration of that specific hypothesis. The relative validity of the *higher hypothesis* thus subsuming a generation of particular hypotheses, is shown to physical economy by increase of the potential population-density of that society which governs its investment and production policies according to such higher hypothesis, or which, perversely, demonstrably fails as a consequence of failing to do so. The validity of a mode of hypothesizing the higher hypothesis is measured in terms of the study of human history and pre-history from this same standpoint of the science of physical economy.

This point should be restated in the following terms.

Physical production is the kernel of mankind's relationship to the universe in general. Precisely, it is the kernel of the relationship between the process of continuing reproduction of the existence of the human species and the universe as a whole.

Up to this point, that relationship is expressed primarily in terms of mankind's relationship to what nuclear scientist and geobiochemist Vernadsky termed usefully the *noösphere* of the planet Earth.[72] We must acknowledge the essential role of solar-sidereal forms (as distinct from lunar forms) of astronomical calendars in paving the way for the appearance of civilization in ancient Vedic culture, in China's culture, and the culture of pre-third millennium Egypt. Those early developments in astronomy presage man in the age of space exploration and colonization, mankind in the process of becoming man in the universe, man recognizing that his natural relationship to his own existence is in direct relationship with the universe at large.[73] As we express physical-economic processes in terms of *per-capita, per*-household, and *per*-square-kilometer statistical magnitudes, the square-kilometer of the Earth's surface corresponds functionally, in all corresponding calculations and conclusions, to mankind's interface with the universe in its entirety.

At that juncture, we come "bump" against that widespread psychopathetic condition called "empiricism," or, often disguised as a form of "populism." This specific form of mental illness was recommended as theology and political philosophy by John Locke, as scientific method by David Hume, as political economy by Adam Smith, and as sodomy by Jeremy Bentham.[74] Empiricism prohibits beliefs other than those associated with discrete sense-impressions, and also with the philosophically existentialist quality of the affective states (e.g., pleasure or pain) which those sensations evoke more or less blindly, irrationally in the perceptor. Empiricism is the immoral dogma of the "hard fact"; it is the existentialist philosophy which degrades the believer, by profession, into Hobbes' amoral, predatory beast. It is the British Venetian's liberal philosophy, fairly described as blind faith in the immutability of "human de-nature."

If we propose that the term "human knowledge" refer to some quality which is tied up with mankind's capability for reproducing its species as a type, then empiricism and everything like it is to be excluded from the category of "knowledge." *Knowledge* is restricted to that which bears upon mankind's ability to act willfully and appropriately to further the survival of our species as a type. This ability, as our survival itself, is premised upon that creative power of reason by means of which we increase our species' potential population-density not-entropically: as no other species can do this. That is our "species-type"; "human knowledge" is a quality corresponding to that *type*. The claims of empiricism are to be studied from this vantage-point.

What is called "a fact," is a theorem belonging to some theorem-lattice which is determined, in turn, by an associated set of axiom-like, underlying ontological and formal assumptions. As that set of ontological and formal assumptions is altered, so, the perception of "fact" will be changed for each case, accordingly. *Knowledge* lies outside each individual such axiomatically determined perception of such particular judgments misnamed "facts." *Knowledge* pertains to something which is independent of each such axiomatic state; knowledge is something which could not be a beast-like sensory impressionism as such. It is that which is constant relative to all such changes, that which becomes intelligible (i.e., knowledge) only under the condition that those changes constitute a series apprehended as a *type*.

Consider two of the simplest such virtually axiomatic cases: the perception of "point," and of "line."

We see a point? Or is that something which we find it convenient to term a "point"? Is that phenomenon itself a point? A point is nothing but a *metaphor,* signifying a *type* of a class (series) of phenomena we judge to warrant the label, "point."[75] The metaphor itself signifies not a sensory phenomenon, but what we would loosely, but fairly term an "ideal point." In the simplest, unrefined case, to use the term "point" to signify "point of light," "where two lines intersect" (or a "mind of a bureaucrat"), causes no ontological confusion in the process of communication, on condition that those communicating will tolerate the other employing the variable notion of an "ideal point" as a metaphor for such occasions.[76]

That usage belongs to the simplest class of metaphor in the sense of a Cantor *type;* it is nonetheless a true metaphor, a true *type*.[77] However, if one were to forget

that word "point" is being used as referent for a metaphor, not a sensory phenomenon, in that instant the metaphor and phenomena became tangled in ontological paradoxes, to the degree that none of the conversationalists really know any longer what they are saying.

There are many problems with the notion of the "ideal point" itself. Firstly, it has no axiomatic existence in space-time, but resides within it as a special kind of hole, a mathematical discontinuity, a singularity. Ostensibly, materially, that form of the point is not particularly interesting; mathematics shows that poor space-time is the most raggedy beggar one might ever imagine; it is filled with such holes, most of those pockets ostensibly empty ones.

The Euclidean line is similarly flawed. How thin is it? As thin as you wish, and a bit more. It is a most ductile image, which may be drawn so thin that, should one cut one such line by another, there exists no denumerable position on the first to show where it is cut by the second; yet, although this piece of spaghetti is virtually zero in radial magnitude, it is not quite zero. Both the space-time point and the space-time line are merely shadows within the space-time realm, shadows cast by efficient singularities existing only in the ontologically transfinite domain of physical space-time. It is also to be considered, that space-time itself is also only a shadow.

And, so on . . . .

The virtually limitless number of such varieties of paradox are each and all merely reflections of a single underlying flaw of assumption in the popular reasoning of today's credulous: the notion of the "self-evident fact." The attempt to equate "substance" with particularized sensations putatively located in mere space-time, is one such paradox.[78] To compound that paradox with the delusion that one's opinionated image of such a sensation is a "self-evident fact"—a Kantian "thing in itself," is an indefensible axiomatic folly. This fallacy underlies the class of chimeras belonging to the same general type as commonplace assumptions of a special quality of axiomatically ontological existence of ideal points and ideal straight lines. This is the Aristotelian, or kindred fallacy of arbitrary assumption that the ideal point and ideal straight lines are the efficient "soul" of that which mere sensation apparently presents to the credulous materialist or empiricist. Such Aristotelian or related views commit the folly of considering ideal points, lines, etc., not as the metaphors they are, but as if these phantasms of the senses were actually existing integers, points, lines, etc., *per se.*

On such matters generally, as the "know thyself" of Plato's Socrates and, more recently, Nicolaus of Cusa's methodological principle of *docta ignorantia* stress this

fact, learned men and women would begin to know much more, if they would discover the courage, and thus also the personal honor, to begin afresh by claiming to know almost nothing.[79] Let us agree to do just that for the purpose of addressing the class of problems posed by the popularity of both doctrinaire and naive materialism, as one form of the problem, and empiricism as another form of expression of the same underlying problem. Let us look at this matter from the standpoint of the not-entropy of physical economy; let us put aside wild claims for the self-evident materiality of facts, and adopt a definition of substantiality which does not depend upon the ignorant assumptions of pagan sensationalism. Let us adopt "efficiency" as our yardstick.

The crux of the matter is summed up in a single paragraph, thus:

In a rigorous science, all that we can assert that we really know elementarily is *change* from a relatively lower to a relatively higher *per-capita* power of mankind over the universe. This knowledge is located solely, in ascending order of authoritativeness, in two places: *hypothesizing the higher hypothesis* (Temporal Eternity) and *hypothesizing* an *hypothesis of the higher hypothesis* (Plato's Good, or Cantor's Absolute). The *efficient substance* of the domain of higher hypothesis, is that *change of hypothesis* which is reflected as an increase of mankind's *per-capita* power over nature. The efficient substance of *hypothesizing the higher hypothesis* is change of higher hypothesis.

In respect to which we must add a few qualifying words of caution:

As to the Absolute, we can know of its necessity, and what it is not; however, since our faculties of knowing depend upon cognizing change of higher hypothesis in terms of space-time relations, we can not cognize the Absolute which is not subject to time or space, but efficiently coincident with all time, all space. Our knowledge of truth and truthfulness is limited in its highest degree to knowing this much concerning that *intelligent* Absolute which is Plato's Good; the rest of man's knowledge lies in Plato's domain of the Becoming, Cantor's Transfinite, a realm otherwise best described as "Temporal Eternity."

Among the putatively educated today, the most widely accepted objection to those facts is blind faith in the so-called "objective science" of the materialists and empiricists. Usually, that blind faith is centered around the assumption that we can know nothing more than sensations as primary truth, except as we may also be able to reach certain useful generalizations through formal, deductive-inductive analysis of that same primary—objective—sense-data. In its more widespread expression, this widely popularized positivist assumption is presented

to us as the stubborn conviction among today's burgeoning majority of scientifically illiterate university graduates, that "truth" is a synonym for "statistical," that we can know nothing more than the "bare facts," except by statistical arrangements of those "facts."

It is sufficient merely to add mention of a variant of that latter, popularized aberration. As a variant of the type of materialist or empiricist just identified, there are those radical positivists who carry empiricism to its opposite extreme, willing to call the reality of sense-impressions into question, but locating "scientific objectivity" in the statistical patterns.

Such are the popularized obstacles to facing the following sequence of constraints:

1. Relative truth is a matter of demonstrable efficiency.

2. For the human species, truth is not a matter of individual experience, but of the individual's contributions, *qua* sovereign individuality, to the successful survival of whole nations, and of the human species as a whole.[80]

3. "Successful survival" includes, and rests upon sustaining progress in the potential population-density of the human species.

4. Thus, truthfulness lies in defining the individual state of knowledge which coheres with a general fostering of that potential population-density.

5. That individual state of knowledge is not a fixed set of beliefs, but rather a method for testing and improving the general efficiency of beliefs, as measured inclusively, and crucially, in terms of potential population-density.

6. This knowledge is of the form of successively efficient changes in the hypotheses, to the effect that this succession fosters efficiently an increase in humanity's potential population-density.

Those *changes,* the Heraclitan *change* of Plato's *Parmenides,* are the *ontological* actuality of those objects which are the true subject of human knowledge. These *objects* are *thought-objects,* a term which signifies more or less the same phenomenon of the mental creative processes as Leibniz's *monads* or the *Geistesmassen* of Bernhard Riemann's posthumously published commentaries on Herbart's Göttingen lectures of the mid-1840's.[81] This designation of "thought-objects" includes the student's consciousness of his or her replication of the original discoverer's mental act of axiomatic-revolutionary discovery.

This is related to the character in a drama, such as Shakespeare's Hamlet in the two famous soliloquies, sharing with the audience his (the character's) knowledge of those his own conscious processes underlying his own behavior within the body of the drama; that, his own conscious processes, are a "thought-object." So, are the audience's reflections on its own thoughts, hearing those soliloquies, and forced to compare these with its own ideas on the same material addressed by the soliloquies.

The present writer, responding then to the impact of Cantor's 1897 notions of the transfinite, long ago adopted the custom of referencing such conscious hypothesizing of one's own conscious processes as his own preferred usage of the descriptive term "self-consciousness." As Plato's *Parmenides* illustrates this, the minimal state of mental organization which must be evoked is the following structuring of states of such self-consciousness. The first level of the process of finding creative solutions, is one's consciousness of the paradoxical character of an array of thoughts which one is attempting to conceptualize as a unit: the paradox of the One and the Many. This forces us to take this frustrating thought-process as a single object of consciousness; one focusses *self-consciously,* so, on the behavior of that conscious process thus taken as an object of self-critical conscious deliberation. That latter is *hypothesizing.* This process of hypothesizing must itself be adopted, in turn, as an object of self-critical conscious deliberation: *higher hypothesizing!* The most common reference-point for this higher hypothesizing, is comparing the task of hypothesizing a solution for the paradox with an available repertoire of successful higher hypothesis, as typified by the stored-up memory of one's having re-lived many original discoverer's mental experience of axiomatic-revolutionary discovery. And, so on . . . .

The bringing together of a notion of appropriate principle of *higher hypothesis* with self-critical consciousness of the mental life of the paradox itself, is the focal point of the act of discovery.

Thus, implicitly, the person who has benefited from either the type of Classical secondary education we referenced here earlier, or a personal development which is effectively equivalent to that, has a mind richly populated by a very-much-living assembly of some of the greatest original discoveries in history. That fortunate person has employed his or her own creative-mental powers to relive the act of original creative discovery; in doing that, that person brought the related moment of the original discoverer's mind back to life within his or her own mental life. There, that moment lives as a living fragment of the innermost personality of the original discoverer, even though that be Pythagoras, or Aeschylus' "Prometheus," or Plato, or Archimedes, or Cusa, or . . . .

There, like figures in Raphael's "The School of Athens," they are all assembled; in search of a suggestion as to how to solve a problem, one may call upon their assistance as one might any living person.

One does not merely call upon them for suggestions. As in the case of Archimedes' quadrature of the circle, many of them committed errors which have been either embedded in the heritage of science down to the present day, or which typify such persisting errors in current work. One may thus reach back across centuries, or, as Cusa did with Archimedes, millennia, to settle the matter. Such is the nature of all serious, scholarly scientific work. It is not quoting the words of famous personalities of putative authority, as if to borrow their authority for oneself; it is reliving, if not the whole of science to date, at least a considerable part, through calling into play the reconstructible moments of great discovery, or related endeavors, from a quorum from the entire community of approximately 2,500 years of development of pre-science and science.

The secret of good scientific work is, to be suspicious of all that claims bare-faced the authority of popularized general or professional opinion: to assert nothing except the solution one has replicated, as construction, in one's own creative mental processes. The result of that is a "thought-object," not an approved procedure merely committed to the memory of one among those Schiller pitied as the *brotgelehrten*; this recreation of a moment from the living thought of a personality, in one's own mind, is the foundation for scientific work, including the indispensable, but sometimes dangerous work of creatively changing the past, by correcting the influence of its efficiently transmitted blunders, especially its epistemological blunders.

These inhabitants of one's creative mental life, of this, one's personal, living "School of Athens," are persons whose mortal existences are representative of three thousand years of the accumulation of progress in human knowledge. Against the millions of years before the most senior of these minds, these persons represent more development of mankind, and of knowledge than during all of the millions of years before. They are thus, in principle, a special kind of authoritative, representative body for all mankind to date. They are the sitting senatorial body for all human scientific and related thought and knowledge to date. They are the surrogate for all of man's Temporal Eternity to date.

Include among them a fair representation of the greatest philosophers and Classical fine artists of the same span of history. For them, what is yesterday, even if it were a millions years in the past, or tomorrow, if it were a millions years yet to come? These, my dear friends and I,

including the Disciple John and Apostle Paul, and Philo Judaeus of Alexandria, too, share a Temporal Eternity together, and have thus a much keener sense than most of you, of the purpose of this all, and of the Intelligent Good, touching all places and all times, including each of our own, from an Absolute where there is neither time nor place.

Turn now to those my friends, my personal "School of Athens"; in this moment their attention is turned toward us. Ask them, now: What are Paradox, *hypothesis, higher hypothesis,* hypothesizing the *higher hypothesis,* and hypothesizing the *hypothesis of the higher hypothesis* as the certainty of the Intelligent Absolute Good above the limits of space and time? Their eyes will tell you, those are not mere words, mere doctrine; they are the living reality of creative scientific mental life. They are the certainties of self-consciously self-critical mastery of that universal principle of *change* in efficient knowledge, which is the subjective reality of knowledge of the truth of Temporal Eternity.

The truth of Temporal Eternity is mastering the hypothesizing of the higher hypothesis, as the efficiency of that quality of change is measured for us, as better or poorer, in terms typified by the physical economist's notion of *per-capita, per*-household, and *per*-square-kilometer values for not-entropic improvement of relative potential population-density. The same principle of universally intelligible *natural law* can be expressed approximately in many ways, as has been the case down through the ages. It is expressed most precisely in terms of physical economy viewed as that has been described here.

VI.
'Chaos Theory' Is
The Great Lie
Of 'Free Trade'

In conclusion, let us now apply these thoughts to a few matters of current practice of nations. Permit the author here to speak accusingly, not as a judge or prosecutor, nor as an Old Testament prophet, but as a philosopher and teacher.

Class! Let this be our concluding lesson for today. Let us use the legendary privileges of this classroom setting to pose here facts whose utterance in the offices of Lower Manhattan would probably taunt those despairing heathen masses into homicide or worse. That proposition to be considered now, is:

No Christian, nor any other follower of Moses, can tolerate

the philosophy of John Locke or the "free trade" dogma of the slave-trading, opium-trading British East India Company's hired apologist, Adam Smith. To promote the practice of "free trade" is to break every part of the Decalogue into little pieces, and, having done that, to spit in the Face of God. This is no mere opinion, nor is it exaggerated; it is provably a scientific certitude more relentless than the laws of planetary motion of our solar system. It is long past the time someone ought to have said that straight out, loud and clear.[82]

The purpose for submitting this illustrative proposition is to show that the method for determining truthfulness or falsehood in all important matters is application of a principle perhaps best described as *efficient implications of belief*. Let it be accepted, that, by that standard, in every trial of every kind, must every judge, prosecutor, defendant, and juror be tried alike.

Pontius Pilate's position as Roman imperial Procurator of Judea was the rotten fruit of a connection to the Emperor Tiberius which was, and is disgusting. He had, shall we say, the matrimonial qualifications for his perpetration of history's most infamous exhibition of judicial hypocrisy. By the standard of the post-World War II Nuremberg Trials for crimes against humanity, can we say that Pilate either knew, or should have known the foregone result of casting that innocent Jesus Christ to those jurors? The charges against Pilate only scratch the surface of the case; we shall not let the Roman Empire off so cheaply.

What was this Roman Empire, really? Not the popularized fairy tale which used to be told to the credulous secondary-school academic matriculants in those long past days, more than a generation ago, when something distantly related to actual history was still taught. What was the real-life Roman Empire, this "higher hypothesis" of criminality, of which Pilate was but a transient corollary? There is a story to be told on this account. The story is true, and well suited to be told with brevity, pungency and force. The telling will be brief. The story's importance, and its relevance to the proposition raised will soon become clear.

For centuries, although the Achaemenid dynasty sought to establish a world empire, the achievement of that goal was denied, chiefly by repeated defeats on its European front, defeats administered by a relatively small force of Greeks which came to be the circle of collaborators of Socrates[83] and Plato's Academy at Athens. A protégé of Plato's Academy, later called Alexander the Great, came to the throne of Macedon, and destroyed first the evil Tyre and then the power of Babylon and that ruling whore-goddess Ishtar known in Greece as the Gaia of the Delphi Cult of Apollo. Alexander was poisoned; Aristotle, at that time the openly bitter enemy of

Alexander and of Plato, and a known specialist in poisons, was suspected, and fled for his life. Yet, Alexander had completed the first part of the mission on which the Academy of Athens had guided him: Ishtar's Babylon was crippled, the projected empire of the Mediterranean not to be attempted again for three centuries, and, even then, never again in Mesopotamia's own name.

Three centuries later, the Mediterranean region was dominated by three powers, the Cult of Mithra in the Syrian Middle East, the Hellenistic Cult of Isis in Ptolemaic Egypt, and the Legions of Rome. From among a circle of the Legions' leaders, including the prototypical fascist, Julius Caesar, decades of bloody civil wars marked the struggles of contending ambitious leaders. Which clique might outlive this attrition, to become the ruler of a world-empire born of combining the cults of Mithra, Isis, and the delphic pantheon of Rome into a single imperial force? Crassus, Pompey, Julius Caesar, Brutus and Cassius, Marc Antony, or perhaps even Octavian? Would the capital of that empire be, perhaps, Rome, or Alexandria? The bleeding soaked the Mediterranean littoral for decades.

So, the time came, that Marc Antony had aligned himself with the ambitious Alexandrian Queen Cleopatra. Octavian, the heir of Julius Caesar soon to rename himself Caesar Augustus, met upon the Isle of Capri with the representatives of the Syria-based Cult of Mithra. A pact was struck. The cause of the pigs Antony and Cleopatra was slaughtered in near Asia by the combined swine-hordes of Octavian and the Mithra cult's Syrians. The Isle of Capri was consecrated to Mithra and rendered for about five centuries therafter the hereditary property of the heirs of that Caesar Augustus.

Thus, in the time of the Emperor Tiberius' prolonged residency in the Mithra cult's Capri, the innocent Jesus Christ was murdered in Judea, under the reign of that Pilate whose position was secured through a perverted marriage to the perverted ward of the perverted Tiberius of Capri.

Some years later, in the time of the pervert Nero, Jesus Christ's Disciple Peter came to Rome on a mission of evangelization to combat that evil priest of Mithra known as Simon the Magician. This was the same Simon Magus otherwise known as the founder of pseudo-Christian gnostic cults, more than a thousand years before the Cathars of Albi and the Rhône. It was suspected at that time, that it was Nero's methods of real-estate development which had provided the pretext used for the emperor's crucifixion of St. Peter; in any case, it was done on behalf of the same Cult of Mithra which had murdered Christ.

About 1,900 years after the fateful pact between Octa-

vian and the Mithra cult, Capri was re-dedicated to Satan by Sweden's notorious Dr. Axel Munthe; the island became notorious as the world capital of sodomy and also of Maxim Gorky's satanic cult of such sometime Grotto habitués as Lenin and Stalin. The spirit which was to move Comintern cultural agent Georg Lukacs and such of his Frankfurt School followers as Heidegger, Adorno, Hannah Arendt, and Horkheimer, radiated from that Grotto of the Swedish Dr. Munthe's—and Tiberius'—perverted domain.

Today, the radiated influence of the Frankfurt School of Arendt, Adorno, and Horkheimer lives on, doing evil now as then. Simon the Magician dwells still in the hearts and minds of the followers of Tübingen's veteran-Nazi Frankfurt-Schooler turned liberationist, Martin Heidegger.

So transpired nearly 3,000 years of history.

Raffaello Sanzio (Raphael to many of you) would know and agree with the point we are developing by aid of that true short story. This can not be doubted; stand in the old papal apartments, now part of the Vatican museum. Stand facing the famous "The School of Athens," a subject on which a bit has been said here already. The reasons you must be there in Rome to receive in full the message being sent personally to you across nearly five hundred intervening years, should be obvious to anyone who sees it there.[84] In the meantime, as very few of you are presently visiting that Museum, concentrate upon any of the better reproductions of this mural; the less the reduction in scale, relative to the original, the better for our purposes here. It will help you to situate yourself mentally, as if you were actually standing in that great hall depicted there.

As you stand there, call that mural to life. Look around inside that mural; which of these are old friends of yours? You never met any of them face to face, but most of those in the hall never met one another in the flesh, either. Yet, you have relived a most intimate moment of the mind of each of some of them, reliving one or more of their creative moments of discovery. First, pick those whom you know in that way. You know Plato, and are acquainted with Aristotle. Are there not two or three in the foreground? As you focus upon the ideas, especially those ideas which represent original axiomatic-revolutionary discoveries, or something proximate to that, one figure after another within this busy hall comes alive for you. As for the others, I believe you know most of them already by reputation.

Think of the number of generations of history spanned by the personalities gathered here within this hall! Radiating from that hall, there is a sense of being embraced, where you stand, by some living intelligence proximate to Temporal Eternity. That radiance fills the small room in the old papal apartments.

Raphael understood the point well enough to design and transmit a message, this mural, which would reach both of us, nearly five centuries later, standing with our minds within that mural's assembly within the great hall. It is no fantasy; it is a painting of a scene the like of which this writer has seen within his own mind, many times. It is a scene which Raphael painted from life, with the gathering of the inhabitants of his mind as living models. It draws from life those relationships within Temporal Eternity which are higher, and more efficient than any drawn in ordinary space or ordinary time. Those are the direct relationships of creative minds' ideas, which dissolve centuries into the span of a pleasant day's assembly, and bring vast spaces comfortably into a room no larger than that which contains this mural.

This mural is no mere symbolism, nor an imagined room in Paradise. It is a moment of *deja vu*! It is a portrait of Raphael's relations to the most intimate acquaintances of his daily mental life, all captured so to share the companionship of a moment in Temporal Eternity.

That mural is also a religious experience. When the social reality of Temporal Eternity compacts centuries into a morning's gathering in such a fashion, the universe of time and space is shrunken to such a smallness that we seem almost to wrap it all within our mind. In such a circumstance, we are impelled to hypothesize higher hypothesizing in such a way, that an eerie sense of a timeless Absolute Intelligence's efficiency is aroused within us.

This is no daydream. In that spacious hall, with its two-score-odd assembled, all of which Raphael has brought so comfortably within the confines of this small room of the old papal apartment, lies the practical response to the proposition set before this day's final class session.

When the relationship of the individual person to mankind in general, and other persons in particular, is measured in the space and time of the generation and transmission of those qualities of ideas associated with valid axiomatic-revolutionary discoveries, what a short distance a mere few centuries become! The order of necessary predecessor and necessary successor is preserved: the intelligence of the timeless Absolute is not zero-motion; the lack of spatial division is the consequence of being simultaneously everywhere, such that there is nothing in between any two experiences which would require us to experience time, except as, for us the onlookers, a sense of a timeless ordering of development. For us, the onlookers, just so, the duration of space and extent of time shrink almost to the vanishing-point.

So, if the mind of any among us is sufficiently devel-

Raphael Sanzio, "The School of Athens" (1509).

Inset diagram: Personalities gathered toghether by Raphael.
(1) Plato, (2) Aristotle, (3) Socrates, (4) Xenophon, (5) Æschines,
(6) Alcibiades, (7) Zeno, (8) Epicurus, (9) Federico Gonzaga,
(10) Averroes, (11) Pythagoras, (12) Francesco Maria Della
Rovere, (13) Heraclitus, (14) Diogenes, (15) Archimedes,
(16) Zoroaster, (17) Ptolemy, (18) Raphael's self-portrait.
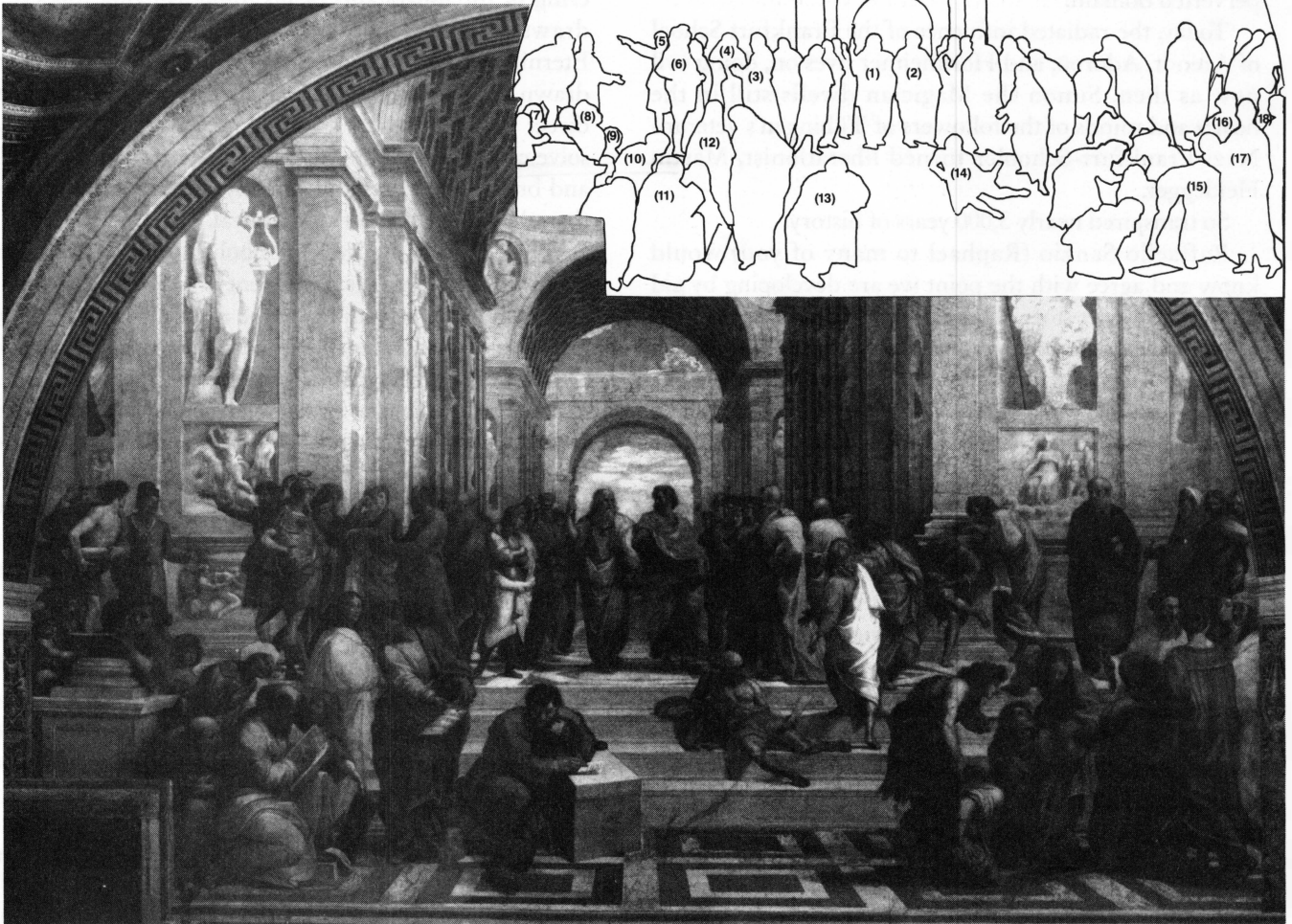*(Diagram courtesy Vatican Museums.)*

oped to grasp the transmission of a valid axiomatic-revolutionary discovery, effected by one person, to cause the reliving of that act of discovery of that conception in the mind of a single person hundreds of years, or even millennia later, whoever has gained those qualifications is able to see the world as that mural portrays its more essential features. Once that step is made, he or she is able to see the essential relations of humanity as Raphael portrays that viewer's relationship to his "School of Athens" mural.

Those preconditions met, then standing before the mural in fact, or in his or her mind, the proximity to the perception of intelligible truth is wonderfully immediate. The truth lies accessible to us on condition we are able, as Raphael's mural tells us, to comprehend the reality of Temporal Eternity as a form of human existence measured in terms of *efficient* relationships among axiomatic-creative qualities of ideas. Every other notion of human relationship is no better than a poor, thickly befogged approximation of that more fundamental one.

While that thought occupies one's mind, move through the rooms of the old papal apartment more thoughtfully, catching every aspect of Raphael's work there. Does it not occur to you, that the somewhat less

than 3,000 years of history packed into the short story above, is a moment of Temporal Eternity which could be such a mural as one of those Raphael left as messages for us?

For some, probably most, our presentation of this mural has eerie overtones. Whence this uneasiness? Is it not the case, that at the same time that pride in being intellectually honest compels those who accept the formal truthfulness of the description of the mental reality portrayed by the mural, many would be most uneasy were it demanded that they accept also the mural's depiction of intellectual relationships among people as a replacement for what they probably consider the customary, or "normal" notion of interpersonal relations.

If that were the case, then, addressing those among us who experience such uneasiness, would it not be fair to say that their notion of customary social relations pertains to interaction within the same sensory domain recommended by John Locke? Would it not be fair to say, that while they are willing to contemplate relationships based *primarily* upon ideas in what we might name the abstract, they are unwilling to carry that thought much beyond quiet contemplation?

Would it not be fair to surmise, that if they are sympathetic to the thought that truly high-minded[85] people would seek to base social relations on the quality of idea-relations attributed to the mural's imagery, that they would view this as supplanting the normal state of mankind with something which, if an improvement, is a matter of supplanting the real, the normal, by the artificial?

To what degree are you, for one, prepared to consider that such varied feelings of antipathy, eerieness, or merely uneasiness may not reflect any actual abnormality in what has been proposed here in connection with that mural? Obviously, the terms "normal" and "abnormal" are not employed here in the sense of "average." "Normal" should signify a condition cohering advantageously with the quality of the human individual as a species-type. Therefore, would you be willing to consider, at least briefly, the proposition, that—only perhaps—those reactions themselves symptomatize a prevailing, but nonetheless abnormal opinion?

Class! Is it not the case, today, that people's responses to the problems and opportunities of life appear to be shaped chiefly by a sense of pleasure and pain?

"Granted."

Are some among us implying that that empiricist teaching is abnormal?

"Yes."

In that case, you might ask: "Do you mean that in the sense that an infant lacks the quality of behavior appropriate for an adult person?"

The reply to that is: In a somewhat kindred sense, but not that sense.

"Or, do you mean that what most people consider normal reactions are in some sense pathological?"

In part, yes?

"Your responses seem evasive; tell us what you do intend to signify."

Agreed: an appropriate analogy might be the notion that certain adult mental disturbances have the appearance of being infantile regressions. It would be strictly appropriate to say, in this functional sense, that Francis Bacon, John Locke, Giammaria Ortes,[86] Adam Smith, Jeremy Bentham, and Thomas Malthus are not philosophers or economists, but contagious mental diseases. It is not only fair to describe their influence as disease; speaking functionally, it is perhaps the only effective way to understand and treat the problems which their influence causes.

That response continues, as follows.

Select two types from the range of responses to today's presentation of Raphael's mural. Select the person who is prepared to be entertained by contemplating the notion of relationship based upon causal sequences of revolutionary ideas, rather than sensory experience in space and time, but who rejects going beyond a merely heuristic consideration of this matter. Select another person, who is willing to consider putting this outlined image into practice, but considers that reform as essentially contrary to the natural condition and endowments of mankind, however desirable this departure from such natural conditions and endowments might be.

Reformulate those issues in the following terms.

If the human species were to adopt any fixed *hypothesis* as permanent,[87] that commitment would lead toward the extinction of the human species. The recent six hundred years' experience of the relationship among axiomatic-revolutionary discovery, consequent technological progress, consequent increases in the physical productive powers of labor, and consequent increases of potential population-density, is a concentrated expression of the problem to be addressed. Fixed modes of human productive and related behavior must lead toward an entropic collapse of the human species.

The essence of human survival is Heraclitus' principle: the relative constancy of a policy of *change*. Not a constant rate of change, but a constant policy of *change* of hypothesis: valid axiomatic-revolutionary forms of discovery. That means *higher hypothesis*: a valid principle of axiomatic-revolutionary discovery, *efficiently* subsuming a series of valid hypotheses. The human species' continued existence relies upon *change* of *hypothesis* (scientific

knowledge), and, in turn, *hypothesizing the higher hypothesis of change* (philosophy as defined by Plato). For a few moments of this discussion, now, restrict the usage of the term "idea" to those qualities of conceptions of change in such science and such philosophy.

These ideas cannot be transmitted as modern systems analysis proposes.[88] Such ideas cannot be transmitted by any form of coded communication, dictionary nominalism included. They can not be communicated at all, at least not according to today's popularly accepted, professional or laymen's usages of the verb "communicate." Ideas are distributed from the original discovery only by means of regenerating the equivalent of the act of original discovery in the mind of the recipient.

Only after that replicated generation has occurred, can such an idea be identified by a word, a phrase, a statement.[89]

Such is the first approximation of the significance of the term *efficient truth.*

An animal species operates on the basis of a delimited range of variability of behavior, with results approximating the notion of a fixed hypothesis, a behavioral stereotype. The human species alone depends upon a knowledge of valid approaches to willful change as a precondition for the successful survival of its species. The members of animal species survive in terms of sensual space-time; the human species relies upon a different elementary quality of relationship within the species, relations defined in terms of ideas of change of hypothesis.

Consider the practical implications of this same point from the standpoint of the earlier description of the Christian form of Classical humanist education, from the Brothers of the Common Life through the Humboldt reforms in nineteenth-century Germany. In that process, shift the scope of the inquiry to ideas in general.

First, to restate the point from which this broadening of the definition of "idea" proceeds: Discoveries are ordered in the manner implicit in the Classical humanist mode of education based upon primary sources for crucial discoveries. The social relations defined in that or analogous ways, are the relations within society upon which the continued survival of our species depends. Those relations, transmitting the replicated generation of valid axiomatic-revolutionary discoveries, are therefore the primary form of normal human relations, as distinguished from the empiricist's or materialist's alternatives, of sensory relationship in space-time.

To wit: any valid axiomatic-revolutionary discovery is effected in the manner described here earlier.[90] The demonstration of the existence of what is, in some sense, a fatal paradox within some established or proposed body of formal knowledge drives the mind to muster its creative mental faculties, to create a rigorously demonstrable solution for that fatal flaw. This is the method by which such discoveries (ideas) are transmitted. The original discoverer's confrontation with the relevant paradox is reconstructed, by description employing a literate form of language. The student, for example, is thus confronted with the statement of the paradox which requires a mustering of the student's creative faculties. As a matter of elementary principle, there is no other way in which original axiomatic-revolutionary discoveries can be passed on. Valid ideas are not transmitted by formal-deductive-inductive methods of indoctrination; only the mouthing of words, somewhat like a parrot's, is accomplished by such mind-deadening methods of drill and grill. Valid ideas are transmitted only by prompting the student to muster his or her creative faculties to rediscover the relevant truth, the valid idea, for himself or herself.

Not just any among such ideas can be transmitted so to anyone, at just any time. There are prerequisites, as may be illustrated by a glance toward the known history of Archimedes' theorems on quadrature. There are prerequisite discoveries, which must be mastered as a precondition for defining the paradox which leads to the discovery of other ideas. It is a fair statement of this to say that ideas are ordered in a sequence of "necessary predecessors" followed by "necessary successor."

From the standpoint of Classical philology, as this topic was known to the Humboldt brothers, *all valid ideas originally appeared in human existence as creative discoveries.* Originally, we may estimate fairly, each appeared as a rude awakening, accompanied by an eerie feeling of "abnormality." This we know from our own replication of ideas in our elementary and secondary school years. It is what we see in the re-discovery of commonplace ideas, in block-construction play, and other forms, among very young children. We often say that this creative development of the young persists, until schools, peers, college professors, and employer's officials terrorize that developing person into becoming quasi-decorticated specimens of the radical-positivist philosophical race, to cease asking "Why?"

We observe rather readily, from the experience and observation of "growing up," that the potentiality for grasping specific ideas has an ordering, which is approximately a constant for all students, irrespective of the age at, or alacrity with which, such individual's knowledge is acquired.

Even in the simplest aspects of useful human knowledge, we are the dependent beneficiaries of the cumulative, ordered generation of ideas by our predecessors, over millions of years before us.

Three additional considerations must be added to that

educational picture, to describe this historical process accurately. Death, not history, is the posture of perfectly quiet contemplation. The efficient significance of the forward march of ideas is *change* of human practice. Through change of human practice, we see yesterday's experience differently. In addition to this expansion of our ability to see the world as it already existed yesterday, we have also changed the world around us. So, we change our experience of the universe as a whole. Ideas which appeared to be adequately true under conditions associated with earlier practice, no longer appear adequate as we are forced to view the universe in terms of the changed conditions which our practice of earlier discoveries presents to us.

This poses to us a practical sense of Plato's higher hypothesis—in the historical view of practice most emphatically. On the one side, we have humanity's experience, typified as scientific progress, as valid changes in hypothesis. On the other side, we have the experience of those increases in potential population-density which have depended upon that scientific progress. We must focus upon the interaction of the two sides of that historical experience. The results of, or lack of scientific progress create that paradoxical image of prior knowledge upon which the generation of new discoveries depends. In each moment of history, the progress of ideas depends not only upon necessarily preceding ideas, but upon the efficient effect of those preceding ideas in producing the newly revealed conditions to be considered.

In the mural, see Plato and Aristotle quarrelling as they approach the main hall from the world outside. Something has occurred in that outside world, which is to be the issue of a discussion about to begin in the main hall.

Those two aspects of historical experience, taken as one process, constitute the image of the dependency of humanity's continued existence upon relations defined elementarily, not according to the linear scale of simplistic space-time, but in terms of mankind's relationship to physical space-time, a relationship which is defined elementarily solely in terms of social relations measured on the scale of Temporal Eternity, the scale of the efficient interaction of ideas, as Raphael painted this in that mural.

For example:

We are told, whether it is true or not, that our solar system's sun will wind down considerably, and the solar system as we know it will collapse, after a lapse of time. Is that an Apocalypse for the human race? Not really. On the basis of even the rates of efficient human scientific progress during the troubled recent six hundred years, we know that it would come to pass, long before the forecast tragedy of our sun might occur, that we shall have

either colonized large regions of this galaxy, or, possibly have altered the structuring of this solar system and its sun. Whatever might be done, the simple point to be made is that we do have alternatives, provided that future history is organized according to the principle of the Golden Renaissance.

Whenever some neo-Malthusian Cassandra prophesies the death of our sun, ask him: "How many millions of years do we have before this might occur?"

We have plenty of time. It is true, as we have emphasized that here, that, within relations of Temporal Eternity, the distance between today and our human ancestors two millions years or so ago, is very short. So, this mural of that apartment wall portrays such relationships among efficient ideas. Even a span of hundreds of millions of years yet to come is a very short time, within the domain of Temporal Eternity. In both those cases, we are measuring the sequence of events in terms of relations among persons engaged in the efficient generation and propagation of valid axiomatic-revolutionary ideas. We have far more than sufficient time to deal with the threatened senility of our sun.

For the future, if we proceed in the footsteps of the Golden Renaissance, the rate of progress in potential population-density sweeps hyperbolically upwards, into mankind's early colonization of nearby space, and beyond. That, as Krafft Ehricke put the point in his own way, is mankind's Extraterrestial Imperative.[91] If we follow that course, there will be no solar Apocalypse for mankind. However, if we did not, the truth of Temporal Eternity would administer to this species a most crushing punishment for failing to conform to the quality of *imago Dei* within each of us all.

What is "normal" for our species is to be defined from the standpoint of the question: What are the characteristic preconditions for the continued existence of this species? For that case, the normal relationship among persons is that defined by the efficient discovery of valid, axiomatic-revolutionary ideas, as in this mural.

Turn to the proposed new mural, the span of evil, from Ishtar's Babylon, through that Roman Empire which, as in all its later incarnations, is the Whore of Babylon, to the continuing evil of the Frankfurt School's influence today. Just as in the first mural, Plato's raised hand points in the upward direction of a process governed by hypothesizing the higher hypothesis, the ever-delphic Aristotle points downward, as the Roman imperial tradition of Ishtar, Gaia, and Astarte does. So, Jena historian Friedrich Schiller defined all European history to date as a struggle between two opposing conceptions of mankind, that of Solon's constitutional reform at Athens, and the evil of Lycurgus' delphic composition of a society

based upon the practice of helotry.[92] That struggle between the opposing forces of Solon and Lycurgus, as Schiller described it, is the nearly 3,000-year moment of Temporal Eternity portrayed in our short story.

To portray history as an inductive summation of the materialist's chronicle of interpersonal transactions on linear scales of space and time, is a hoax. History is the conflict between opposing principles. These principles are typified, on the one side, by Plato's seeking to serve the Good through changes introduced into Temporal Eternity which are governed by hypothesizing the higher hypothesis. On the other side, we have the opposite principle. In form, the first, like life itself, is typified by the "not-entropic" development of man and the universe; the second is represented by entropy, by death.

The short story will continue, to be told afresh by someone else, perhaps in a coming century or more. Before we leave this classroom today, let us leave aware of the dangers which may await us there. Pause to study a recent picture of the face of evil lurking along the way.

Adam Smith's dogma of "free trade" is derived from the work of the gnostic Venetian cleric, Giammaria Ortes, which is axiomatically consistent with the misuse of the term "freedom" ("liberty") by John Locke. Locke accomplished nothing essentially different than his forerunner's, Thomas Hobbes', sodomic design for degradation of mankind into the bestiality of a "war of each against all." Locke, who changed sides in enough wars to have learned this possibility from experience, modifies Hobbes only in his emphasis upon introducing into a realm of endless warfare, a periodic respite, to prepare new wars. That respite is called a "social contract."

We have indicated the general character of that enterprise, in reference to Smith's own version of it, above.[93] The bestiality of Hobbes', Locke's, and Smith's designs is rooted in the degradation of relations within society, from the efficient realm of Temporal Eternity, into the realm of morality among dumb rocks and beasts, mechanistic relations in linearized space-time.

Recently, since John Von Neumann's systems analysis and the British intelligence brainwashing of a "cybernetic" America through the auspices of Tavistock's Josiah Macy, Jr. Foundation, we have experienced the addition of a purported new dimensionality for the schemes of Ortes, the so-called "Chaos Theory" of Ilya Prigogine, et al.[94]

Once again, the notorious tailors have been back at their famous swindle. Once again, Hans Christian Andersen's Emperor is parading naked before his subjects. In reality, "Chaos Theory" does not exist; it dwells only in the credulity of the susceptible. As soon as the newly concocted public relations packaging is removed, what lies within, in all its disgusting nakedness, is the old slave-trading drug-peddler's swindle of the British East India Company's hoaxster, Adam Smith.

Simon the Magician offered the Romans his "National Enquirer" version of the Gospel according to Mithra. Prigogine, in defending "Chaos Theory," has done little more than repeat the same moth-eaten swindle which he has been attempting to peddle among my lazier-minded students for about two decades. He claims, yet once again, that he has discovered "true negentropy." This time, he offers in evidence not the famous property-title to the Brooklyn Bridge, but a kaleidoscope of linear marginalities from the mad nights of the computer software specialist: "Fractal Theory," "Mandelbrot Figures," and so on. Hordes of duped personal-computer-owning illiterates are ecstatic.

There is a precedent for this "Chaos Theory" swindle: Sigmund Freud's fraudulent essay on Leonardo da Vinci. It is now public that Freud was indeed the closet homosexual which his attack on Leonardo shows the organization of Freud's own mind to have been.[95] Freud was a clever pornographer, whose self-explorations aided him in gauging the depths of depravity, both in himself and his clientele; but, there is nothing in any of his work which warrants the term "creative"—excluding the special meaning which the criminal code might supply to it. Leonardo da Vinci is an exemplar of the creative intellect, one of the greatest in all history. The nature of Leonardo's creative genius is, like his great paintings, clearly intelligible in form, if not easily replicated. For the wretched Freud to attribute Leonardo's fertility of creation to "repressed homosexuality" is one of Freud's most shameless exhibitions of what he himself would term "narcissism."

Prigogine, similarly, fancies himself not merely learned (which he is in some degree), but actually creative. He fancies that that sort of diddling which he periodically represents as "negentropy," has something to do with creativity. It is a creative talent for which the used-car lots of America are well known. Behind the latest production of that sort, from him and his co-thinkers, is this "Chaos Theory" concoction. The basis for this concoction is Leibniz's *monadology* turned upside down.

There are two aspects to the form of mathematical discontinuities on which the fractalist proposes to premise an allegedly sophisticated basis for asserting that chaos is intrinsically creative. The first is the fact of "holes" of non-denumerability appearing naturally in any illiterate's attempt to force the type of metrical relations of a discrete manifold upon a continuum.[96] The second is, that any succession of valid-axiomatic revolutionary

discoveries appears, with respect to the associated formal theorem-lattices, as a sequence of absolute mathematical discontinuities. Confuse both of these two issues at the same time, and then use the mere appearance of discontinuities without any understanding of the scientific history of either mathematical paradox, and—Shazamm!—you have "Chaos Theory." These fellows are saying, in effect: "Since creative processes appear chaotic to our poor brains, won't creating chaos generate creativity spontaneously?"

Stripped of that persiflage, exotically packaged "Chaos Theory" turns out to be dirty old John Locke, dirty old Adam Smith, and their simply constructed mechanistic system of assured entropic collapse of the society foolish enough to apply their recipes for "democracy" and "free trade."

Truth lies not in the individual creative act *per se*. It lies in the authority of those guiding principles, known as *higher hypothesis* and *hypothesizing the higher hypothesis*, which govern the method employed by the developed mind to choose a pathway to a creative solution of a current paradox. The truth of the selection of such an higher hypothesis is proof that this transfinite type of principle of discovery accords with mankind's increasing power over the universe—as according to Moses' Genesis 1. To measure that accordance, that truth of Temporal Eternity, is the chief business of the science of physical economy.

APPENDIX A

The Ontological Superiority Of Nicolaus of Cusa's Solution Over Archimedes' Notion of Quadrature

Archimedes' theorems for quadrature of the circle are given in *The Works of Archimedes,* T.L. Heath, trans. and ed. (1897) (New York: Dover Publications), pp. 91-98, and also conveniently referenced in Ivor Thomas, trans., *Greek Mathematical Works: I. Thales to Euclid,* Loeb Classical Library No. 335 (1939) (Cambridge, Mass.: Harvard University Press, 1980), pp. 316-333 of Section IX.2 (pp. 308-346). The kernel of Archimedes' construction is given in the two diagrams in the latter work, on p. 318 and 319, respectively. For our purposes here, consider the entirety of pp. 308-346 as the relevant portion of the background against which this appended note is written.

The issue addressed here, will almost certainly prove to have been the principal, putatively scientific objection to our portrait of Nicolaus of Cusa's reformulation of Archimedes' quadrature of the circle. We shall focus narrowly upon that ontological point of difference between Cusa's and Archimedes' constructions which defines Cusa and his radiated influence, on the point of this single crucial issue, as the initiator of all progress in mathematical science over the interval A.D. 1440-1897, and beyond. Our proof of this point is very elementary, indeed, but we believe also rigorous.

Reference our description of the construction of the paired transfinite series of inscribed and circumscribed regular polygons, under sub-topic "II. Creativity Defined," above. Compare that with the construction given for Archimedes, e.g., as in Thomas, p. 318. Now, consider what has been passed down over the millennia since as Archimedes' triangular solution, e.g., Thomas, p. 319. Describe Archimedes' solution as follows.

Represent the circumference of the circle as an unknown multiple of the diameter of that circle: "πd." Thus, the radius of circle being designated by "r," the circumference may be expressed in the alternative by "$2\pi r$." Archimedes uses the iterative process of construction of the transfinite series of polygons, as detailed in all essentials by the Thomas text, to reduce the putative limit of that iteration to equivalence to a right triangle, whose short leg is of length "r," whose long leg is of length "$2\pi r$," and those area is, therefore, "$2\pi r^2/2$."

The crucial issue posed by that construction is this.

Archimedes has proven (see Thomas, pp. 320-333) that the value of π must lie between two values, the perimeter of the inscribed and of the circumscribed regular polygons, respectively. He has also proven, in the same way, that the estimated numerical value of π, "(circumference)/$2r$," can be refined to enormously great relative precision, by extending the transfinite series of regular polygons to a very large value of n for the expression "$2n$," as we have noted under topic "II. Creativity

Defined." This arithmetic achievement by Archimedes' Eudoxian construction is not contested, as Cusa emphasized, and is as matters should be on that account.

The remaining issue is akin to the fallacious, but commonplace assertion by numerous mathematicians, that the surface areas of the sphere and relevant pseudosphere are equal, when they are not. In the sense of near-approximation, they are equal, to an enormous degree; but, as in the related case of quadrature, they are neither equal, nor of the same ontological species of existence. This is where Cusa's genius shone above all his leading contemporaries and most of the mathematicians who came after him, to the present day. This is, in terms of the relevant formalities, the point of Cusa's discovery from which the entire progress of modern mathematical science has been derived. In respect to the formalities, this is the point of generation of all modern science's achievements.

Cusa accomplished a fundamental discovery in mathematical physics, at exactly the juncture—it must be said fairly—only a relative few leading mathematical physicists to date, before him or since have not failed. His genius is expressed, at first glance, as a quality for which Karl Weierstrass is famous, his determination to stick to the fact, that, although this (transfinite) difference, between Archimedes' construction of the estimated value for π and the actuality of the circular perimeter, is very tiny, even virtually zero arithmetically, it has a fundamental significance for mathematical thinking. This difference, however small—however clearly virtually null-dimensional, defines an absolute mathematical discontinuity, a singularity, as an ontological quality of difference between two species of constructive-geometrical existence.

Beginning from the mathematical thinking of Classical Greek culture, we subsume the thinking about mathematics by Greeks such as Archimedes by saying that, today, we know four types of number: *rational, irrational, transcendental* ("non-algebraic"), and *transfinite.* Of these, only the first two were known formally to Greek mathematics. Archimedes believed that π was an irrational magnitude, to be treated as the best Greek constructive geometry of that time addressed the problem of "incommensurables," as if they were "irrationals." The idea of a "transcendental" magnitude did not exist in his ontological vocabulary for the formal side of constructive geometry. What Cusa did, on this latter account, was to recognize that π is not, ontologically, an irrational, but a number of a higher ontological type than irrationals, of a higher species.

One of the collateral problems contributing to relevant misjudgment of this issue among modern mathematicians, is the myth fostered in part by Georg Cantor's pro-

Hegelian philosophical opponent, Professor Felix Klein, the myth attached to Lindemann's formalist's proof of the transcendental quality of π.[1]

The proof, that π cannot be an irrational number, was provided conclusively, for geometry, by Cusa in 1440, 1453, and other locations.[2] The physical proof that Cusa's π must be a "non-algebraic" (transcendental) magnitude, was supplied implicitly by J. Bernoulli, Leibniz, *et al.,* in 1697.[3] Cusa's proof was premised upon the most rigorous ontological grounds; Bernoulli's and Leibniz's on the crucial experimental evidence supporting a universally efficient principle of least action (physics).

Exaggerated emphasis upon the late-nineteenth-century formalist arguments cited by Klein, those of Hermite and Lindemann, falsifies science fundamentally, not by denying their constructions, but, rather, by using the apparent success of these formalities as a pretext for overlooking the earlier, already conclusive proofs supplied during the relevant four-and-a-half-centuries-long, then-preceding internal history of modern science on this very issue. Those conclusive proofs obviously include those most celebrated instances we have pointed out here (1440, 1697). That misplaced emphasis on late-nineteenth-century formalism, puts the mere formalities (however ingenious they might be) above recognition of the ontological issues crucial to any genuine proof. Thus, Klein, otherwise of sometimes awesome achievement, exhibited a want of simple scientific rigor in his omissions. His savage outburst against Cantor's work on the transfinite is obviously relevant to the fallacy of composition implicit in his oversights in treating the transcendence of π.

More broadly, shockingly, most among the modern views examined can be fairly described as lacking literacy in this and related matters. Notably, they do not take properly into account, or they even willfully ignore the relevant preceding work of Dirichlet, Riemann, Weierstrass, and others on the related ontological implications of formal discontinuities manifest in the very small.

Such comparisons show us more forcefully, that the outstanding feature of Cusa's genius on this, is his recognizing that the proof of the ontological quality of an apparently absolute mathematical discontinuity in the very, very small, lies not merely in the form of that discontinuity, but in its manifestly correlated, demonstrable *efficiency* of existence. To the same general effect, in the Cusa tradition of Leibniz, we have the relevant concluding sentence from Riemann's *Habilitationsschrift:*

Es führt dies hinüber in das Gebiet einer andern Wissenschaft, in das Gebiet der Physik, welches wohl die Natur der heutigen Veranlassung nicht zu betreten erlaubt.

This path leads out into the domain of another science, into

the realm of physics, into which the nature of this present occasion [devoted to the formalities of presenting an *Habilitationsschrift* on matters of mathematics—LHL] forbids us to penetrate. (White trans., *loc. cit.*)[4]

What Cusa proved, contrary to Archimedes' failure to overcome blind faith in the ontological assumptions of the generally accepted Greek "classroom" mathematics (constructive geometry) of this time, was that to accept Archimedes' solution blindly, in the fifteenth century, would depend implicitly upon adopting a wildly exaggerated, unprovable claim: that there did not exist an ontologically absolute mathematical discontinuity between the two transfinite series of regular polygons, the inscribed and the circumscribed. Cusa saw that this absolute mathematical discontinuity between the two curvatures, the inside and outside of the circular perimeter, was admittedly of virtually zero-dimensional magnitude, but, that this apparently almost non-existent was nonetheless, *efficiently,* of *some magnitude.*

The issue of that *efficiency* of a true mathematical discontinuity rages, in various guises, down through the present date. That efficiency, located in the virtually-null dimensionality of an absolute mathematical discontinuity within the mathematical formalist's customarily denumerable ordering of mere space-time, is the *physics* of the cited passage from Riemann's *Habilitationsschrift,* is the foundation for the notion of a *physical space-time* in which causation dwells, out of the reach of the mathematical formalist.

Cusa solved the ontological paradox posed by Archimedes' exaggeration, by treating the matter according to the platonic solution-principle typical of Plato's *Parmenides.* For the reasons identified above, in the section "II. Creativity Defined," Cusa recognized that circular action: (a) could not be defined ontologically within the implicitly axiomatic formalities of Greek mathematics, since the circular perimeter, the locus of that *action,* was an absolute mathematical discontinuity between the two transfinite series, inscribed and circumscribed, of polygonal processes. (b) Moreover, since those polygonal processes themselves were externally bounded by circular constructions, the axiomatic formalities implicitly underlying Archimedes' constructions could not access *efficiently* the ontological domain of circular action, but circular action could determine, and thus access efficiently the processes of the polygonal constructions' domain. (c) Therefore, we must discard the implied set of axioms of Archimedes' use of the Euclidean domain, and replace those with the axiomatic quality (Platonic hypothesis) of universal circular action (later, universal least action).

The use of the combined physics of Rømer[5] and Huygens,[6] to derive a general case for the cycloid-related form of refraction of light radiation bounded by a constant, externally bounding limit of retarded propagation, by Huygens, J. Bernoulli, and Leibniz, established Cusa's discovery as the correlative of an efficient, universal principle of least action. This was presented in 1697 as the hallmark of a "non-algebraic," or transcendental mathematics, superseding the algebraic mathematics then in favored use by the followers of Descartes, Newton, *et al.* Thus, it was Bernoulli and Leibniz (1697), who had already proven the transcendental quality of π—as a refutation of the mathematical standpoints of Descartes and Newton, *et al.*—precisely two hundred years prior to Klein's 1897 commentary, in his *Famous Problems of Geometry,*[7] on the formalist constructions by Hermite and Lindemann.

From Cusa's stubborn genius on this point, came the methodological approach adopted by that famous student of Cusa's writings, Leonardo da Vinci, and the first founding of a comprehensive mathematical physics, by rightly self-avowed student of the work of Cusa and Leonardo, Johannes Kepler. In this virtually null-dimensional existence defended by Cusa, Leibniz found the presence of the *monad.*[8] Despite a politically corrupted Euler's fraudulent 1761 attack upon Leibniz's monadology on this very point, Cantor proved Euler absurd on every relevant point, and proved afresh, within the domain of the transfinite, the corresponding principles, on the subject of existent absolute mathematical discontinuities of space-time, by Cusa and Leibniz.

Both of these five-hundred-fifty-year-old issues, bearing upon the limitations of generally accepted classroom mathematics, have yet to be recognized adequately in those precincts: the formal issue respecting absolute mathematical discontinuities, and the fact that the metrical characteristics of a continuum can only be addressed in terms of the *efficiency* of such singularities, and addressed so only outside the limits of space-time, within *physical space-time.* In the domain of physical economy, the neglect of precisely those issues assaults the ill-prepared mathematical formalist with a deafening, blinding force of shock.

The greatest of all faults in the refusal of so many professionals to make themselves competently informed upon this discovery by Cusa, is that they have thus, wittingly or not, denied the entire foundation in higher hypothesis of that fifteenth-century revolution in mathematical method which is the germ of all valid modern science. If we do not prompt our young students to relive, as in secondary education, the experience of that elementary discovery by Cusa, how shall those deprived youth ever grow up with the mental development indispensable to judge competently much of anything about modern history?

1. Felix Klein, *Famous Problems of Geometry* (1897) in *Famous Problems and Other Monographs* (New York: Chelsea Publishing Co., 1955), pp. 61-77.
2. Cardinal Nicolaus of Cusa, *De Docta Ignorantia (On Learned Ignorance),* trans. by Jasper Hopkins as *Nicholas of Cusa on Learned Ignorance* (Minneapolis: Arthur M. Banning Press, 1985); see also "De Circuli Quadratura" ("On the Quadrature of the Circle"), trans. by William F. Wertz, Jr., *Fidelio,* Vol. III, No. 1, Spring 1994, pp. 56-63.
3. Johann Bernoulli, "Curvatura radii . . ." ("The curvature of a ray . . ."), *Acta Eruditorum,* May 1697; trans. in D.J. Struik, *A Sourcebook in Mathematics, 1200-1800* (Princeton, N.J.: Princeton University Press, 1986), pp. 391-396.
4. Bernhard Riemann, *Habilitationsschrift: Über die Hypothesen, welche der Geometrie zu Grunde liegen,* in *Collected Works of Bernhard Riemann,* ed. by Heinrich Weber (New York: Dover Publications, 1953), pp. 285-286; trans. by Henry S. White, "On the Hypotheses Which Lie at the Foundations of Geometry," in David Eugene Smith, *A Source Book in Mathematics* (New York: Dover Publications, 1959), pp. 411-425.
5. Poul Rasmussen, "Ole Rømer and the Discovery of the Speed of Light," *21st Century Science & Technology,* Vol. 6, No. 1, Spring 1993, pp. 40-46.
6. Christiaan Huygens, *A Treatise on Light,* (New York: Dover Publications, 1962).
7. *Op. cit.*
8. See text footnote 19.

APPENDIX B
Adam Smith Smashes The Decalogue

The concluding section of "The Truth of Temporal Eternity" begins with a proposition for which it is claimed: "To promote the practice of 'free trade' is to break every part of the Decalogue into little pieces." For those who require additional proof of that claim, this appended note is supplied. The argument presented as follows rests upon two congruent bodies of evidence, the formal and the historical.

This writer has stressed repeatedly in sundry locations such as *The Science of Christian Economy,* that the central principle of Adam Smith's doctrine of "free trade" is derived from a dogma set forth in his 1759 *Theory of the Moral Sentiments.* The kernel of that is:

> Hunger, thirst, and the passion which unites the two sexes, the love of pleasure, and the dread of pain, prompt us to apply those means for their own sake, and without any consideration of their tendency to those beneficent ends which the great Director of nature intended to produce by them.

Pause for a moment, to consider the most obvious of the implications of this Adam Smith dogma for the observance of the Mosaic Ten Commandments. What, then, of four most plainly relevant articles of that Law: Thou shalt not kill; thou shalt not steal; thou shalt not bear false witness; thou shalt not covet? Smith's law is: (1) Hunger, (2) Thirst, (3) Sexual Passion, (4) Pleasure, (5) Pain.

Whence comes the ungodly law of British "moral philosopher" Adam Smith? From his immediately preceding sentence in that same 1759 passage:

> Nature has directed us to the greater part of these by original and immediate instincts.

Then, read both of these cited excerpts within the immediate setting of the crucial features of the entire passage of which they are part. This excerpting is as presented in this present writer's *The Science of Christian Economy, op. cit.,* pp. 291-292:

> The administration of the great system of the universe . . . [and] the care of the universal happiness of all rational and sensible beings, is the business of God and not of man. To man is alloted a much humbler department, but one much more suitable to the weakness of his powers and to the narrowness of his comprehension: the care of his own happiness, of that of his family, his friends, his country . . . . But though we are endowed with a very strong desire of these ends, it has been entrusted to the slow and uncertain determinations of our reason to find out the proper means of bringing them about. *Nature has directed us to the greater part of these by original and immediate instincts. Hunger, thirst, the passion which unites the two sexes, the love of pleasure, and the dread of pain, prompt us to apply these means for their own sake, and without any consideration of their tendency to those beneficent ends which the great Director of nature intended to produce by them.* [emphasis added]

No Christian, or other follower of the Mosaic heritage could tolerate such doctrine. This is the core of the argument for "free trade" in Adam Smith's 1776 British India Company tract, *The Wealth of Nations.*

Historically:

That 1759 passage is plainly an echo of John Locke's authorship of the colonial constitution for the Carolinas. That latter served as the predecessor of the treasonous Constitution of the racist Confederate States of Ameri-

ca, as this issue is illuminated most simply by contrasting the Preambles of the Confederate and U.S. Federal constitutions.

Compare the U.S. Federal Constitution's Preamble with the cited passage from Adam Smith. The Constitution prescribes:

> We the people of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States.

This is exactly what David Hume's disciple, Adam Smith, prohibits. On the same premises, in his 1776 *Wealth of Nations,* Smith defends the opium-trafficking of his employer, for whom that latter book was written as an anti-American tract, the British East India Company. That opposition to the principles of the Constitution is in the tradition of John Locke. Yet, as an explicit statement, the cited passage from the 1759 Adam Smith goes far beyond what British Calvinists, for example, or even David Hume, had understood Locke to have intended. Already, Adam Smith stands out as a devotee of what is sometimes termed "British nineteenth-century philosophical radicalism."

Rejection of that "philosophical radicalism," the British Liberal Establishment's late-eighteenth-century break with respect for customary morality, is the basis which German empiricist Immanuel Kant cites, in his *Prolegomena to a Future Metaphysic,* as the motive for his open break with his former mentor, David Hume. Kant identifies Hume's turn away from toleration for customary morality as the issue of this break.

Smith's 1759 *Theory of the Moral Sentiments* and his 1776 *Wealth of Nations* typify the more radical reading of John Locke which was imported into the circles of Britain's powerful Second Earl of Shelburne from the work Shelburne's Venetian contemporary, Giammaria Ortes. This is Adam Smith's foreshadowing Jeremy Bentham's outline of what became known later as the nineteenth-century British utilitarian's hedonistic calculus. One must see the fuller exposition of Smith's radicalism in Bentham's *The Principles of Morals and Legislation,* "In Defence of Usury," and "In Defence of Pederasty." This radicalism of Giammaria Ortes' type, expressed openly by Smith as early as his 1759 book, is the characteristic belief and practice of the leading intellectual and political circles ruling Britain throughout the several concluding decades of the eighteenth century, as also during Benthamite Lord Palmerston's nineteenth and Benthamite Bertrand Russell's twentieth centuries.

This representation of the sundry texts of Locke, Hume, Adam Smith, Bentham, *et al.* is validated by considering the historical issues of the U.S. war of 1776-1783. The irrepressible conflict between the Americans and London was forced into a state of open warfare against the British monarchy by the implications of the British East India Company's direct takeover, by outright purchase, of the British Parliament and monarchy. The war was fought explicitly against the already practiced dogma of "free trade" presented publicly, only in 1776, as *The Wealth of Nations.* Our obligation to review this history is imposed upon us here by the widespread popularization of the plain lie, that the United States of America was founded upon the notions of "democracy" and "free trade," as associated respectively with John Locke and Adam Smith.

The United States' Declaration of Independence avows the principles of "pursuit of happiness" associated with Gottfried Leibniz, principles in direct opposition to John Locke's neo-Hobbesian dogma of "life, liberty, and property." In addition to the plain anti-Locke and anti-Adam Smith language of the Preamble to the U.S. Federal Constitution, Article I of that Constitution prescribes principles of governmental role in protectionism, the national currency, and regulation of foreign and interstate commerce which are explicitly irreconcilable with British "free trade" dogma.

These key issues of the U.S. War of Independence go back explicitly to the Massachusetts Bay Colony of 1688-1689, in the resistance to Royal Governor Andros and such key issues as the Royal suppression, by Locke's circles in London, of the Commonwealth's power to issue public credit in the form of currency. Cotton Mather's 1691 "Some Considerations of Bills of Credit," and Benjamin Franklin's famous 1729 "A Modest Inquiry Into The Nature and Necessity of Paper Currency" are forerunners of both Article I of the U.S. Federal Constitution and of U.S. Treasury Secretary Alexander Hamilton's famous Reports to the U.S. Congress on the design of the anti-British "American System of political-economy" (under the rubrics of "Public Credit," "A National Bank," and "Manufactures").

Formally:
The principal source of confusion over these matters, is that academic liberalism, including its Fabian offshoots, has long defended the ideas of Locke and Adam Smith as upholding a Protestant principle against the allegedly medieval, statist propensities of Roman Catholicism. The specious argument which the liberal academic tradition derives from this sly sophistry of theirs, is—Lo and Behold!—the Mathers, Franklin, and the overwhelming

majority among the English- and German-speaking populations of eighteenth-century North America were stoutly Protestant, in such cases as the Mathers and the Winthrops some notably radical denominations of dissenters. That line of argument is all bad history and worse theology.

The disgusting history of such phenomena as existentialist heterodoxies within the churches, ought to remind us that the essential basis for Christian belief, in particular, is not indoctrination, but the fact that each person is born in the image of God.

Admittedly, indoctrination as such can impose a relatively superficial obedience to a confession, to a doctrine, even a kind of hysterical posture of adherence. However, from the standpoint of that truth of Temporal Eternity which governs matters in the longer term, Christianity's only link to the person is the appeal to that creative power within which is the substance of *imago Dei*. Even Anatole France submitted to the evidence that one should not baptize penguins blindly.

To become adopted as knowledge, rather than superficially induced assertion of belief, taught doctrine is a promissory note which must be redeemed at the bank of *imago Dei*. That redemption may occur by methods which cohere with the Christian forms of Classical humanist education, as exhibited from the Brothers of the Common Life through the Humboldt reforms in nineteenth-century Germany. The authority of a Christian confession, as a matter of knowledge, springs from this quality of *imago Dei*. The authority of that body of religious confession, as an institutionalized body of knowledge, is dependent upon its role as a teacher according to the same principled method of education which the accompanying paper here attributes to Classical Christian humanist education generally.

The issue of confession is an issue of truthfulness. Leave any part of that confession's belief relegated to arbitrary dogma, and sooner or later that vulnerability will be discovered efficiently by someone, in some way, to one kind of effect, or another. Thus, the fifteenth-century Christian Renaissance which brought Christianity out of the wreckage it had become during the preceding "New Dark Ages," emphasized that principle of intelligibility which shines so brightly in the work of Nicolaus of Cusa.

Once again, historically:

It is in those terms, that the role of religious confession within the historical process of the American revolution must be examined.

No historical figure since Nicolaus of Cusa embodies that principle more efficiently in modern times than Gottfried Leibniz. Leibniz's powerful influence was among those international networks of the late seventeenth and eighteenth centuries which organized the emergence of the United States under its 1789 Federal Constitution. At every turn in the period of the United States' three principal wars against the British empire, 1776-1865, it was the followers of John Locke and Adam Smith, such as the members of the Perkins and Russell opium-trading syndicates, who supplied the Tories and traitors, and the influence of Leibniz which shaped the impulses and policies of the patriots. Let it be said, "God works in mysterious ways"; in this writer's experience, God works through the creative powers of reason of the person, through *imago Dei*. So, it was with every nobler movement of the history and pre-history of these United States.

Finally, formally:

The essential principle at the center of knowledge derived by the power of creative reason, is what Plato termed the Good, as this is treated in the accompanying paper. The certainty of the existence of that Good as Intelligent Being above the constraints of transfinite time and transfinite space is accessed as knowledge as Raphael's referenced mural reminds its viewer: through hypothesizing Temporal Eternity in terms of social relations defined not by linear relations of time and space, but by creative reason. It is the loving nurture of that creative development within the person, through childhood's nurture to this purpose within the family, and through educational institutions so governed, which enables the person to nurture the quality of *imago Dei* within, to turn his or her inner eyes upward, to recognize God's efficient existence.

Without that, a person knows virtually nothing of importance, and is therefore well-suited to embrace the pseudo-deistic, paganist atheism of Locke, Adam Smith, Bentham, the satanic General Albert Pike of *Morals and Dogma,* and the Victorian Liberals generally. It is dedication to the general welfare of others, to justice for all humanity as *imago Dei,* which marks the essential difference between any among those North American patriots and a libertarian oligarch's lackey, such as professional turncoat variety of lackey John Locke, or Shelburne's lackey Adam Smith. The lesson to be learned from the patriots of the American Revolution, such as President Abraham Lincoln, is the lesson of St. Paul's I Corinthians 13: Without love of mankind as *imago Dei,* there can be no true knowledge, of God or nature.

Locke's society is symbolically a galactic billiard table, whose balls, representing individual persons, have those built-in emotional spins to which British empiricism attaches the label of "human nature." The cited passage

from Adam Smith's *The Theory of the Moral Sentiments* accords perfectly with that representation of the schema of Locke's entropic ordering of convenant-generation, Locke's "democracy." It accords similarly with the derived "free trade" dogma of *The Wealth of Nations*.

If we extend that entropic model of political and economic processes to the Decalogue, we have the following principal results:

I. God does not exist in any form but the psychopathetic phantasms of Professor William James' *Varieties of Religious Experience*.

II. Jeremy Rifkin's entropy is the pagan god of such liberal conceits.

III. The name of "God" is used only as a manipulative sophistry.

IV. "What 'Sabbath'?"

V. "My parents should die with dignity before they spend all of my inheritance on such frivolities as food and medical care."

VI. "If God didn't wish them to die, he would not permit my instincts to guide me to kill them."

VII. "My sex life is my own business; if it feels good, it is right for me."

VIII. "Don't steal unless you think you can get by with it."

IX. "Truth is strictly a matter of one man's opinion."

X. "If I feel the need, I do my thing—or yours."

The lying hypocrisy of a "Christian advocacy of 'free trade,'" should be accorded the treatment appropriate for all concoctions which are truly disgusting.

NOTES

1. Michael Minnicino, "The New Dark Age: The Frankfurt School and 'Political Correctness,'" *Fidelio*, Vol. I, No. 1, Winter 1992, pp. 4-27.
2. Personal accounts of several among those German Catholic theologians to Helga Zepp-LaRouche circa the spring of 1975.
3. Webster G. Tarpley, "Deconstructionism: The Method in the Madness," *Fidelio*, Vol. II, No. 2, Summer 1993, pp. 48-54.
4. Nazi law was established under the influence of one Carl Schmitt, the author of the infamous emergency laws under which the Adolf Hitler Nazi dictatorship was established. The Schmitt current within Nazi jurisprudence is traced to the putative founder of the Romantic school of law, Berlin University Professor Friedrich Karl Savigny.
5. The root of law under the Nazis is traced from the neo-Kantian form of Romantic irrationalism, notably that of Savigny. The difference between British and German forms of fascist tendencies is defined by Immanuel Kant in his *Prolegomena to a Future Metaphysics*, in which Kant reports that the issue of his break with his former mentor, David Hume, was Hume's break with a principle of custom, to adopt the kind of radicalism usually identified as "British nineteenth-century philosophical radicalism," that of Shelburne's protégés and their successors. Kant's—and the early Hume's—cautious deference to social custom, is a distinguishing feature of Savigny's dogma. Hitler was a radical, but his regime was cautioned by fear of the lingering authority of that same German custom which it hated and sought to destroy. This is the marginal distinction between the law under the Nazi-ruled state, and that more radical, Bentham reading of Locke which flows through the philosophical tradition of Confederacy sympathizers in the U.S.A.
6. The code-words for Locke are "life, liberty, and property," in contrast to the Leibnizian "pursuit of happiness," or the Leibnizian language of the U.S. Federal Constitution's *Preamble*: ". . . to promote the general Welfare, and secure the Blessings of Liberty to ourselves and our posterity . . . ." This is in contrast to the infamous, Lockean dictum of Adam Smith's 1759 *Theory of the Moral Sentiments*, the dictum upon which he later, in his *Wealth of Nations*, premised his radical dogma of "the Invisible Hand": ". . . Nature has directed us to the greater part of these by original and immediate instincts. Hunger, thirst, the passion which unites the two sexes, the love of pleasure, and the dread of pain, *prompt us to apply these means for their own sakes without any consideration of their tendency to those beneficent ends which the greater Director of nature intended to produce by them*." [emphasis added]
7. Although the British Empire was formally established through such Palmerston-directed events as the revolutions of 1848, the Crimean War, the provocation of the so-called "Sepoy rebellion" in India, and Palmerston's "opium wars," British imperialism was established as a policy during the post-1763 eighteenth-century period under Shelburne and his protégés.
8. Pope John Paul II, *Veritatis Splendor*, English edition (Vatican City: Libreria Editrice Vaticana, 1993).
9. See Helga Zepp-LaRouche, "Nicolaus of Cusa and the Council of Florence," *Fidelio*, Vol. I, No. 2, Spring 1992, pp. 17-22; and Nora Hamerman, "The Council of Florence: The Religious Event that Shaped the Era of Discovery," *ibid.*, pp. 23-36.
10. See Lyndon H. LaRouche, Jr., "On LaRouche's Discovery," *Fidelio*, Vol. III, No. 1, Spring 1994.
11. Especially from the dialogues of Plato.
12. *Saint Augustine, Father of European and African Civilization: Proceedings of the International Conference of the Schiller Institute, Rome, Italy, Nov. 1-3, 1985*, ed. by Nora Hamerman (New York: New Benjamin Franklin House, 1985), *passim*.
13. Compare U.S. Treasury Secretary Alexander Hamilton, "Report to the U.S. Congress On The Subject of Manufactures" (1791), in Nancy B. Spannaus and Christopher White, *The Political Economy of the American Revolution* (New York: Campaigner Publications, 1977), pp. 375-442, *passim*.
14. Data for Figure 1 are taken from Colin McEvedy and Richard Jones, *Atlas of World Population History* (Middlesex, England: Penguin Books, 1978).
15. See Philo ("Judaeus") of Alexandria, "On The Account of the World's Creation Given by Moses," in *Philo: Vol. I*, trans. by F.H. Colson and G.H. Whithaker, Loeb Classical Library No. 226

(Cambridge, Mass: Harvard University Press, 1981).

16. Cardinal Nicolaus of Cusa, *De Docta Ignorantia (On Learned Ignorance)* (1440), trans. by Jasper Hopkins as *Nicholas of Cusa on Learned Ignorance* (Minneapolis: Arthur M. Banning Press, 1985).

17. Cusa later presents a recapitulation of his revolutionary solution to the ontological paradox of Archimedean quadrature, in his "On the Quadrature of the Circle" ("De Circuli Quadratura") (1450), trans. by William F. Wertz, Jr., *Fidelio,* Vol. III, No. 1, Spring 1994, pp. 56-63.

18. Brush aside the tendentious academic commentaries on the Renaissance by the gnostic spin-doctors of Ernst Cassirer's neo-Kantian Marburg school. *Cf.* Luca Pacioli, *De Divina Proportione* (1497) (Vienna: 1896); and Johannes Kepler, *Harmonice Mundi (The Harmony of the World),* in *Opera Omnia,* vol. 5 (Frankfurt: 1864); English trans.: Books I-IV, trans. by Christopher White, *et al.* (unpublished); Book V, trans. by Charles Glenn Wallis, included in *Great Books of the Western World* series (Chicago: Encyclopaedia Britannica, 1952).

19. On Pascal, the evidence of the connection is internal to his works. Christiaan Huygens, like Pascal and Leibniz, is steeped in the influence of Kepler, but also Leonardo da Vinci; together with his father, Constantin, the former patron of Rembrandt and the one-time ambassador to London, Christiaan had access to the originals of da Vinci codices then in the possession of the British. As for Leibniz, whether directly, or as echoed in the works of da Vinci and Kepler, Cusa's influence on all three of these seventeenth-century leaders in science is conspicuous.

20. See *Georg Cantors Gesammelte Abhandlungen,* ed. by Ernst Zermelow (Hildesheim: Georg Olms Verlag, 1962), especially "*Mitteilungen zur Lehre vom Transfiniten*" (1887), pp. 378-439.

21. On the "Venetian party" takeover of Britain, see the Proceedings of the Schiller Institute Conference, Feb. 19-20, 1994, Washington, D.C.: Panel 4, Sunday morning, Feb. 20, which are reproduced in full in *Executive Intelligence Review,* Vol. XXI, No. 16, April 15, 1994, pp. 4-45. See also Graham Lowry, *How The Nation Was Won,* vol. I (Washington, D.C.: Executive Intelligence Review, 1988).

22. See Barbara Tuchman, *A Distant Mirror: The Calamitous Fourteenth Century* (New York: Knopf, 1978). See also, Marilyn Ferguson, *The Aquarian Conspiracy* (Los Angeles: J.P. Tarcher, 1980). For a study of the implications of both books, see Carol White, *The New Dark Ages Conspiracy* (New York: New Benjamin Franklin House, 1980). For a more recent expression of the "New Dark Age" trend, see the Trilateral Professor Samuel Huntington's recent essay promoting the collapse of planetary civilization into something akin to a fourteenth-century "new dark age" scenario: Samuel Huntington, "The Clash of Civilizations?" *Foreign Affairs,* Vol. 72, No. 3, Summer 1993. This agenda is also presented by Max Singer and Aaron Wildavsky, in *The Real World Order: Zones of Peace/Zones of Turmoil* (Chatham, N.J.: Chatham House Publishers, 1993); and by Jean-Christophe Rufin, in *L'Empire et Les Nouveaux Barbares: Rupture Nord-Sud* (Paris: Hachette-Pluriel, 1992). On these writings of Huntington *et al.,* see Helga Zepp-LaRouche, "What We Said, Stands," *New Federalist,* Jan. 3, 1994, Vol. 8, No. 1, pp. 5-6, and "'A Boldhearted Resistance Can Bring Down Even the Raised Fist of the Tyrant,'" *New Federalist,* Feb. 28, 1994, Vol. 8, No. 9, pp. 10-11.

23. The term "constructive" is employed here in the broad sense it was employed in exemplary fashion by Professor Jacob Steiner respecting his "synthetic geometry," and by Gaspard Monge before Steiner. It is used in the sense of a method of "constructive geometry."

24. See Appendix A.

25. *Cf.* Lyndon H. LaRouche, Jr. "The Science of Christian Econo-my," in *The Science of Christian Economy and Other Prison Writings* (Washington, D.C.: Schiller Institute, 1991), *passim.* Also, similarly, his *Fidelio* "Metaphor" series: "On The Subject of Metaphor," Vol. I, No. 3, Fall 1992; "Mozart's 1782-1786 Revolution in Music," Vol. I, No. 4, Winter 1992; "On The Subject of God," Vol. II, No. 1, Spring 1993; "History as Science," Vol. II, No. 3, Fall 1993.

26. According to Ivor Thomas [*Greek Mathematical Works: I. Thales to Euclid,* Loeb Classical Library No. 335 (1939), trans. by Ivor Thomas (Cambridge, Mass: Harvard University Press, 1980)], the celebrated geometer and astronomer Eudoxus of Cnidos lived approximately from 408-355 B.C., was a student and associate of Plato, and also closely associated with Theaetetus at the Academy of Athens.

27. The fastidious will note that there is a second, even more compelling proof of this point, which is unnecessary to supply here.

28. "Externally" is used here in the sense of a principle bounding a subsumed process, not in the naive spatial sense of "inside" and "outside."

29. The so-called "brachystochrone" solution, prompted by a chain of events begun with Ole Rømer's successful approximate measurement of a constant speed of light. Johann Bernoulli, "Curvatura radii . . ." ("The curvature of a ray . . ."), *Acta Eruditorum,* May 1697; trans. in D.J. Struik, *A Source Book in Mathematics, 1200-1800* (Princeton, N.J.: Princeton University Press, 1986), pp. 391-396.

30. Georg Cantor, "Beiträge zur Begründung der transfiniten Mengenlehre," in *Georg Cantors Gesammelte Abhandlungen, op. cit.,* pp. 282-356; English translation: *Contributions to the Founding of the Theory of Transfinite Numbers,* trans. by Philip E.B. Jourdain (1915) (New York: Dover Publications, 1941).

31. A favorite term of deprecation, used with delicious appropriateness, of Friedrich Schiller. To the present writer, the term connotes a dog learning to sit up and beg, a likely imagery for the all-too-typical graduate student's propitiatory road to both academic success, and habituated banality.

32. We are introducing Cantor's notion of *transfinite* at this point.

33. All of Aristotle's work is premised on the tradition of the Eleatic opponents (Parmenides, *et al.*) of Pythagoras and Plato, as this was transmitted through Isocrates and his School of Rhetoric; both Isocrates and Aristotle were agents of Athens' enemy, Philip of Macedon. Epistemologically, their methods, and those of the Sophists generally, are of the same type; for, by denying the principle of change, the Eleatics' attack on the Pythagoreans set the stage for the emergence of the various doctrines of the method of sense-certainty. For texts and commentary on the Eleatics and Sophists, including Parmenides, Xenophanes, and Zeno, see G.S. Kirk and J.E. Raven, *The Presocratic Philosophers: A Critical History with a Selection of Texts* (London: Cambridge University Press, 1964). The moral depravity of Aristotle and his teachings is shown plainly in his (Nicomachean) *Ethics* and *Politics,* each, in itself, a suitable handbook for one aspiring to become a "Nuremberg Criminal."

34. Georg Cantor, *Beiträge, op. cit.*

35. Kurt Gödel, "Über formal Unentscheidbare Sätze der *Principia mathematica* und verwandter Systeme" ("On formally undecidable propositions of *Principia mathematica* and related systems" (1931), in *Kurt Gödel: Collected Works* (New York: Oxford University Press, 1990), vol. I, pp. 144-195. See also, in the same location, "On undecidable propositions of formal mathematical systems" (1934), pp. 346-371; and "Russell's mathematical logic" (1944), vol. II, pp. 119-141. For the purposes of this present article, Gödel's special importance is that he vindicated the work of Georg Cantor (1897), by a devastating blow against the claims to scientific reasoning of such savage adversaries of Cantor (and of

Leibniz and Riemann) as Bertrand Russell and the Vienna radical positivists generally. After the 1931-1934 work of Gödel, for example, the later claims for "systems analysis" by John Von Neumann, Norbert Wiener, *et al.* were inexcusable. Similarly, anyone who would attack from a standpoint in mathematical formalism the point we are developing, relative to Plato's *Parmenides,* here, is axiomatically discredited immediately by the implications of the Cantor-Gödel theses.

36. See Johannes Kepler, *On the Six-Cornered Snowflake,* trans. by Colin Hardie (Oxford: Clarendon Press, 1966; reprinted by *21st Century Science & Technology,* 1991.)

37. *Cf.* Lyndon H. LaRouche, Jr., "In Defense of Common Sense," in *Christian Economy, op. cit.,* chaps. I-IV, pp. 6-26.

38. G.W. Leibniz, *Monadology,* trans. by George Montgomery (LaSalle: Open Court Publishing Co., 1989).

39. *Cf.* Lyndon H. LaRouche, Jr., "Project A," Appendix XI: "Euler's Fallacies on the Subjects of Infinite Divisibility and Leibniz's Monads," in *Christian Economy, op. cit.,* pp. 406-425.

40. G.W. Leibniz, "On Analysis Situs," in *Gottfried Wilhelm Leibniz: Philosophical Papers and Letters,* ed. by Leroy E. Loemker (Chicago: University of Chicago Press, 1956), pp. 390-396. Nineteenth-century topology and its outgrowths, as taught today, often fail to stress the fact that *denumerability* and *non-denumerability,* as treated by Georg Cantor in terms of transfinite orderings, are crucial issues subsumed by Leibniz's notion of an *analysis situs.*

41. *E.g.,* in one of the most earthshaking utterances from a youthful mathematical genius—Bernhard Riemann—we have the following passage from his 1853-1854 *Habilitationsschrift: Über die Hypothesen, welche der Geometrie zu Grunde liegen*: "III. Anwendung auf den Raum, 3 . . . . Die Frage über die Gültigkeit der Voraussetzungen der Geometrie im Unendlichkleinen hängt zusammen mit der Frage nach dem innern Grunde der Massverhältnisse des Raumes. Bei dieser Frage, welche wohl nich zur Lehre vom Raume gerechnet werden darf, kommt die obige Bemerkung zur Anwendung, daß bei einer discreten Mannigfaltigkeit das Prinzip der Massverhältnisse schon in dem Begriffe dieser Mannigfaltigkeit enthalten ist, bei einer stetigen aber anders woher hinzukommen muß. Es muss also entweder das dem Raume zu Grunde liegende Wirkliche eine discrete Mannigfaltigkeit bilden, oder der Grund der Massverhältnisse außerhalb, in darauf wirkenden bindenden Kräften, gesucht werden." In *Collected Works of Bernhard Riemann,* ed. by Heinrich Weber (1892; 2nd ed. 1902) (New York: Dover Publications, 1953), pp. 285-286. For an English translation, see "On the Hypotheses Which Lie at the Foundations of Geometry," trans. by Henry S. White, in David Eugene Smith, *A Source Book in Mathematics* (New York: Dover, 1959), pp. 424-425: "The question of the validity of the postulates of geometry in the indefinitely small is involved in the question concerning the ultimate basis of relations of size in space. In connection with this question . . . while in a discrete manifold the principle of metric relations is implicit in the notion of this manifold, it must come from somewhere else in the case of a continuous manifold. Either then the actual things forming the groundwork of a space must constitue a discrete manifold, or else the basis of metric relations must be sought for outside that actuality, in colligating forces that operate upon it."

42. On White, see preceding footnote. As a relevant historical note, in 1952, the author's reference for this Riemann paper was the Clifford translation.

43. Recently, the author has abandoned further efforts to seek adoption as a proper dictionary definition of his own objective reference for the phenomena recognized as "negentropic" by Plato, Pacioli, Leonardo da Vinci, *et al.*—as opposed to the systems analysts' inappropriate use of the same term. Instead, he has adopted lately the term "not-entropy" for the correct objective referents.

That choice is motivated by the fact, that the latter, alternative term lends itself to the simpler and more direct exposure of relevant fraud of Professor Wiener's *Cybernetics* [*Cybernetics, Or Control and Communication in the Animal and the Machine* (New York: John Wiley, 1948)]. Wiener failed, or perhaps refused to recognize, that a notion of "negentropy" derived from Ludwig Boltzmann's H-theorem is simply as Boltzmann himself represented it, a consistent expression of statistical mechanical entropy. (See Morris Levitt, "Linearity and Entropy: Ludwig Boltzmann and The Second Law of Thermodynamics," *Fusion Energy Foundation Newsletter,* Vol. II, No. 2, Sept. 1976, pp. 3-18.) By "not-entropy" one references the mathematical models defined in an exemplary way by the reproduction of living processes, as distinct from the entropic behavior of dead organisms. The author's use of the term "not-entropy" also signifies the mathematical models represented by increase of society's potential population-densities under the influence of technologically-driven increases in the physical productive powers of labor *per capita, per* household, and *per* square kilometer.

44. William James, *The Varieties of Religious Experience; a Study in Human Nature; being the Gifford Lectures on natural religion delivered at Edinburgh in 1901-1902* (1902) (Cambridge, Mass.: Harvard University Press, 1985).

45. Pietro Pomponazzi had been one of Contarini's profesors at the Univeristy of Padua, where the basis of instruction was the reading of the Greek text of Aristotle's works. After Pomponazzi published his *Tractatus De Immortalitate Animae* (Treatise on the Immortality of the Soul) in 1516, a series of exhanges with Contarini were published, debating the issue of the soul's immortality. Pomponazzi's position, citing Aristotle, was that the soul could not be immortal, because man's intellectual faculty could never be separated from the objects of sense impressions, and thus from the body; the soul is therefore not immaterial, hence not immortal. Contarini, who wished to keep open the option of an ecclesiastical career, managed a half-hearted assertion of the soul's immortality—but allowed this immortality to become manifest only after death and as a matter of faith alone, adding that if science teaches that the soul is mortal, but at the same time faith asserts its immortality, then "we might regard those things as fables which are said to be known by supernatural revelation, and we might come to consider this light to be an illusion" [Gasparo Contarini, *Opera* (Farnborough, England: Gregg International Publilshers, 1968), p. 229]. Contarini was well aware that the Fifth Lateran Council (1513) had condemned as "three most pernicious errors" the notions "that the rational soul is mortal, or that it is one for all men," and "that this is true at least according to philosophy." Contarini went on to become a cardinal and to chair the commission on Church reform that convoked the Council of Trent. See Martin L. Pine, *Pietro Pomponazzi: Radical Philosopher of the Renaissance* (Padova: Editrice Antenore, 1986); and Elisabeth G. Gleason, *Gasparo Contarini: Venice, Rome, and Reform* (Berkeley: University of California Press, 1993).

46. See Wilhelm von Humboldt, "Preliminary Thoughts on the Plan for the Establishment of the Municipal School System in Lithuania" and "School Plan for Königsberg," which are summarized by Marianna Wertz, in "Wilhelm von Humboldt's Classical Education Curriculum," *New Federalist,* Vol. VII, No. 10, March 15, 1993, p. 8; see also *Wilhelm von Humboldt, Humanist Without Portfolio: An Anthology of the Writings of Wilhelm von Humboldt,* trans. by Marianne Cowan (Detroit: Wayne State University Press, 1963). Humboldt's reform program was directly influenced by his long association with Friedrich Schiller. See "On Schiller and the Course of His Spiritual Development," by Wilhelm von Humboldt, and Schiller's "What Is, and To What End Do We Study, Universal History?" in *Friedrich Schiller, Poet of*

Freedom, vol. II, ed. by William F. Wertz, Jr. (Washington, D.C.: Schiller Institute, 1988); see also Schiller's "On the Aestetic Education of Man," in *Friedrich Schiller, Poet of Freedom*, vol. I, ed. by William F. Wertz, Jr. (New York: New Benjamin Franklin Publishing House, 1985).

47. Gaspard Monge (1746-1818), among the leading French mathematicians of the late-eighteenth/early-nineteenth centuries, his work included the invention of descriptive geometry; topographical mapping; the theory of surfaces and envelopes; and researches in differential geometry, especially in the theory of curvature. A product of the educational tradition of the French Oratorian Order, he attended the Mezieres School of Military Engineering. Following the debacle of the French Revolution, he organized the Ecole Polytechnique with his one-time student Lazare Carnot, to provide scientific manpower for the defense of the country against foreign invasion, instituting a crash educational program based upon militarily-organized student "brigades" which were dispatched into the countryside, and which succeeded in transforming virtually uneducated peasants into the best trained officer corps in history. Through Monge's leadership of this scientific mobilization, the Ecole became the world's leading center of advancement of the physical sciences during the 1794-1814 period, and France the recognized leader in world science. In the aftermath of the 1815 Congress of Vienna, Monge was ousted from his leadership of the Ecole through political intervention, and Pierre Simon (Marquis de LaPlace) and LaPlace's protégé Augustin Cauchy were assigned to destroy the Ecole's instructional program. Despite the continued influence of collaborators of Monge and Carnot in France, French science slipped rapidly from its preeminent position worldwide, to a poor second, as Germany's scientific ascendency emerged under the tutelage of the Humboldt brothers and leadership of circles associated with Carl Gauss during the 1820's. Monge's works include *Essais sur la géométrie descriptive (1799)*; *Application de l'analyse à la géométrie des surfaces du 1er and 2me degré (1807)*; *Géométrie sur les plans et les surfaces courbés (1812)*.

48. See p. 8 above.

49. The author's term, "thought-object" can mean the same thing which *monad* signifies for Leibniz, or *Geistesmassen* for Bernhard Riemann (See "Zur Psychologie und Metaphysik," in Bernhard Riemann, *Collected Works, op. cit.*, pp. 509-520, footnote 41 above.) See LaRouche, "On The Subject of Metaphor," *op. cit.*

50. This point can, and should be, applied to those self-discredited professionals, calling themselves "scientists," who have railed against the very existence of experimental work in the field of solid-state fusion ("cold fusion"). Given a field, in which experimental results show nothing as certainly as the evidence that whatever is going on inside the process is totally anomalous with respect to presently-taught physics dogma, the favorite line of attack by the critics is the plainly unscientific gibbering of complaints that the experimental results can not be valid, because they are "anomalous." That sort of mentality is but one step removed from the insanity of the fellow who proposed that we eliminate the effort to discover astrophysical anomalies experimentally (by aid of observations), since we might, more cheaply, synthesize nicely non-anomalous images by means of computer technology, without aid of telescopes to disturb our serene complacency respecting our formalist's delusions.

51. "Synthetic" signifies Jacob Steiner's nineteenth-century improvement in teaching and application of constructive geometry.

52. Johannes Kepler, *Snowflake, op. cit.* For Kepler's presentation of the relative harmonic values of the planetary orbits, see his *Harmonice Mundi, op. cit.* For his presentation of the Platonic-Solids-keyed constructions of the planetary orbits as to relative distance, see his *Mysterium Cosmographicum (The Secret of the Universe)*, trans. by A.M. Duncan (New York: Abaris Books, 1981); chap. 2

contains his explicit reference to Nicolaus of Cusa.

53. *A Manual on The Rudiments of Tuning and Registration,* vol. I, ed. by John Sigerson and Kathy Wolfe (Washington, D.C.: Schiller Institute, 1992).

54. The references in Cantor's writings for this discussion of Becoming, Transfinite, Good, and Absolute, are chiefly the *Beiträge, loc. cit.,* and *Mitteilungen, loc. cit.*

55. These matters are the motivating consideration for Georg Cantor's initiation of his remarkable correspondence with Cardinal (Johannes Baptist) Franzelin, in *Georg Cantor Briefe,* ed. by Herbert Meschkowski and Winfried Nilson (Berlin, Springer-Verlag, 1991), pp. 3, 12, 252-258. Note that the Papacy of Leo XIII is famous for its emphasis on the principle of intelligibility which was the characteristic of the fifteenth-century, Renaissance, rebirth of the Papacy through the efforts of Nicolaus of Cusa *et al.*

56. *Op. cit.*

57. *Ibid.*

58. Compare this with the treatment of this statistical construction in the author's 1984 textbook: Lyndon H. LaRouche, Jr., *So, You Wish to Learn All About Economics?* (New York: New Benjamin Franklin House, 1984). Also, the author's recent presentation, "Physical economy is the basis of human knowledge," serialized in the weekly *Executive Intelligence Review,* Vol. 21, Nos. 9-11, Feb. 25, March 4, March 11, 1994. In the latter series, most directly relevant to the construction of the set of constraints here is the section entitled "1. Rudimentary comparative studies of physical-economic time-series" (Vol. 21, No. 9, pp. 23-33).

59. The European development of Spanish and Portuguese Central and South America, such as the improvement of the population-density and standard of living of the indigenous populations of Mexico during the sixteenth century, is not overlooked in the mind of the author; it is simply not included in this treatment, solely for reasons of simplifying the study of European culture by restricting the number of geographical considerations considered. Considering a larger geographic area here would not alter the result, but would greatly increase the data to be considered, and the work required to produce the same illustration in effect.

60. See LaRouche, *Executive Intelligence Review, loc. cit.,* Vol. 21, No. 9, pp. 23-28.

61. See William F. Wertz, Jr., "Nicolaus of Cusa and the Concept of Negentropy," *Fidelio,* Vol. II, No. 4, Winter 1994, pp. 43-49.

62. *E.g.,* Norbert Wiener, *Cybernetics, op. cit., passim.*

63. By "analogous," we signify here, as in other locations, developments in the Classical forms of the fine arts (poetry, music, tragedy, painting, sculpture, architecture, etc.). *Cf.* LaRouche, "Mozart's Revolution," *op. cit.*

64. As we shall see, this does not diminish the awesomeness of the Creator, nor diminish the significance of the term Intelligence applied to the nature of His being; rather, it brings the evidence of His existence more clearly, more intelligibly into focus.

65. Alexander Hamilton, *op. cit.*

66. See footnote 10.

67. Immanuel Kant, *Critique of Judgment,* trans. by J.H. Bernard (New York: Hafner Press, 1951), *passim.*

68. The pair, Savigny and his confederate Hegel, were the leading "McCarthyites" of the post-Vienna Congress decades at Berlin University, the apostles of the fascist Carlsbad decrees and the defiant and powerful adversaries of Alexander von Humboldt's efforts to establish the teaching of modern physical science and mathematics at that University.

69. The author's work of 1952 on the *lied* was replicated within the preparation of *A Manual on The Principles of Tuning and Registration, op. cit.,* chap. 11. See also, "Mozart's Revolution," *loc. cit., passim.*

70. With the help of work by his wife, Helga Zepp-LaRouche, on the subject of Friedrich Schiller.

71. It is more than an extraordinary coincidence that Georg Cantor (1845-1918) was a skilled participant in performance of Beethoven string quartets. According to his biographer, Adolf Fraenkel (*Gesammelte Abhandlungen, op. cit.,* pp. 452-483), on Cantor's maternal side he was a grandnephew of the famous Joseph Boehm. This is the Boehm who was famously a collaborator of Beethoven in arranging public performance of Beethoven's late string quartets; he was also the founder of the world's greatest (Vienna) school of violin performance, whose students included the great Joachim. The principles of higher transfinite orderings are, remarkably, a key to understanding those higher principles of composition which reach the yet unmatched heights of composition found in many of Beethoven's compositions from Opus 101 on, but most fully in the last string quartets.

72. Vladimir I. Vernadsky (1863-1945), founder of the Ukranian Academy of Sciences (1918), led the Russian school of "Biogeochemistry"—an interdisciplinary approach to studying the interactions between biological, geological, and chemical processes in the biosphere and its near-space. He studied extensively in Western Europe while a student of crystallography and mineralogy, and in the period before World War I, by bringing the work of the Curies to Russian science, he launched a lifelong pursuit of nuclear energy by establishing radiation studies in the East. Beginning 1911, Vernadsky had emerged as the scientific mind of the KEPS (Commission for the Study of Natural Productive Forces in Russia), whose goal was to use scientific technology and natural resources to maximize industrial development and modernization. His scientific posts included: founding director of the State Radium Institute (1926); first president of the Commission for the Study of Heavy Water (1934); organizer of the Commission on Isotopes (1939); under the direction of Kurchatov, his Institute built the first cyclotron in Moscow (1944).

73. *Colonize Space! Open the Age of Reason: Proceedings of the Krafft A. Ehricke Memorial Conference, June 15-16, 1985* (New York: New Benjamin Franklin House, 1985), esp. pp. 119-132.

74. This is an entirely fair representation of the combined wisdom of Bentham's *Principles of Morals and Legislation,* and his "In Defence of Pederasty." If one accepts Bentham's Lockean philosophy in the first publication, one has given way to his proposition in the second.

75. See footnote 25, esp. "On The Subject of Metaphor," *op. cit., passim.*

76. The best modern notion of an "ideal point" is of a virtually null-dimensional discontinuity (singularity) in the space-time field. Obviously, prior to the appearance of such refined views of this century, there were various notions of the ontological quality of a point which were of a different *type,* but which are all recognizable as approximations of the modern, virtually null-dimensional notion.

77. See footnote 25.

78. *Cf.* Isaac Newton, on the fallacies of mathematical causality included in his famous *Principia:* see Leibniz on Newton's admission of the *Principia's* "Clockwinder" fallacy (universal entropy), in the Leibniz-Clarke-Newton correspondence ("The Controversy between Leibniz and Clarke"), in *Gottfried Wilhelm Leibniz: Philosophical Papers and Letters, op. cit.,* vol. II, pp. 1095-1169.

79. Kepler's word-play on the Latin-German terminology for "snowflake"/"nothing" comes to mind in the context of the immediately foregoing paragraphs here. See Johannes Kepler, *Snowflake, op. cit.*

80. Lyndon H. LaRouche, Jr., "In Defense of Common Sense," chaps. I-IV, in *Christian Economy, op. cit.,* pp. 6-26.

81. Bernhard Riemann, "Zur Psychologie und Metaphysik," *op cit.,* pp. 507-538, footnote 41 above.

82. On the implicit violation of the entirety of the Decalogue, and more, by the toleration of Adam Smith's "free trade" dogma, see Appendix B.

83. There is strong evidence, from then contemporary and other sources, to the effect that the actual motive of Meletus' Democratic Party of Athens for putting Socrates, the leading figure of the anti-empire party, to death, may have been the known political differences then boiling-up between the defendant and his treasonous accusers.

84. Follow these instructions. Assume a position midway before the mural. Now, try moving back and forth, closer and then more distant from the mural, with your back not far from the opposite wall (and its mural). Find the two positions along that line perpendicular to the mural at which the effect of the portion of the mural immediately visible to you is the most compelling: one position which brings you into the foreground of the scene, and a more distant one which is just right for taking in the whole scene. You will recognize that the scaling of the mural and its positioning there, are very significant for the viewer.

85. The parodying of Bertrand Russell at this juncture, in the case that the reader recognized this fact, is quite intentional.

86. The Venetian cleric and economist Giammaria Ortes (1713-1790) was probably the most important direct influence on the thinking of the radical empiricists of the circles of Shelburne, Hume, Smith, Bentham, Malthus, *et al.* during the last half of the eighteenth century. He was the father of the hedonistic dogma which Bentham presents in his *Principles of Morals and Legislation,* and directly the source for the arguments on population of Thomas Malthus. See Lyndon H. LaRouche, Jr., "On The Subject of God," *op. cit.,* footnote 73, p. 47.

87. This is obviously the "zero-technological growth" model.

88. *E.g.,* Von Neumann's linear systems analysis, the "cybernetics" of the London Tavistock Institute's post-war Josiah Macy, Jr. Foundation, and the Joseph Stalin- and Bertrand Russell-sponsored Korsch-Carnap "linguistics" of Harris, Chomsky, *et al.*

89. See footnote 25 for selected available sources on the subject of metaphor as employed here.

90. Once again, reference the treatment of metaphor in the sources identified in footnote 25.

91. *Colonize Space!, op. cit.*

92. Friedrich Schiller, "The Legislation of Lycurgus and Solon," trans. by George Gregory, in *Friedrich Schiller, Poet of Freedom, op. cit.,* vol. II, pp. 273-305; see also pps. xiv-xv, xxii-xxxiii.

93. *Cf.* Adam Smith, footnote 6 above.

94. On "Chaos Theory," see Dino de Paoli, "A Refutation of Artificial Intelligence: Georg Cantor's Contribution to the Study of the Human Mind," *21st Century Science & Technology,* Vol. 4, No. 2, Summer 1991, pp. 36-54.

95. The open secret of Freud's homosexuality was given extended treatment in a monograph published almost two decades ago by the Italian priest, scholar, and broadcaster Don Ennio Innocenti. Innocenti showed that during the 1890-1900 period, Freud and his mentor, the cabalistic charlatan Wilhelm Fleiss, met repeatedly in hotels for two to three days of homosexual trysting which Freud euphemistically termed "congresses." See Ennio Innocenti, *Fragilità di Freud* (Milan: Pan Editrice, 1975), pp. 31-36. Freud's biographer Ernest Jones quotes a 1910 letter from Freud to Ferenczi in which Freud fended off the latter's advances. "You not only noticed, but also understood," wrote Freud, "that I no longer have any need to uncover my personality completely, and you correctly traced this back to the traumatic reason for it. Since Fleiss' case, with the overcoming of which you recently saw me occcupied, that need has been extinguished. A part of homosexual cathexis has been withdrawn and made use of to enlarge my own ego. I have succeeded where the paranoiac fails." See Jeffrey M. Masson, *The Complete Letters of Sigmund Freud to Wilhelm Fleiss, 1887-1904* (Cambridge, Mass.: Harvard University Press, 1985), p. 3.

96. Bernhard Riemann, *op. cit.,* footnote 41 above.