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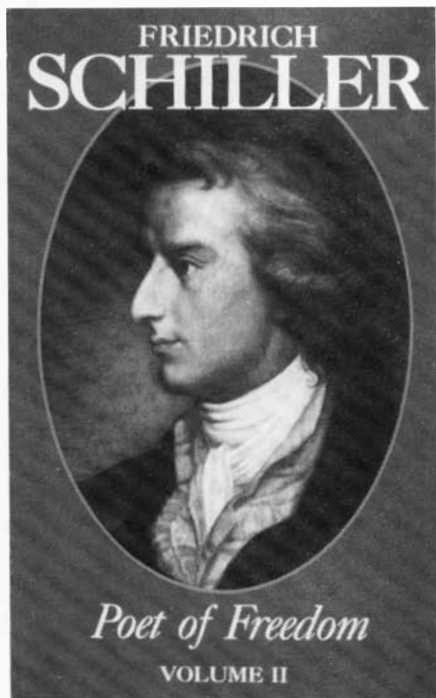
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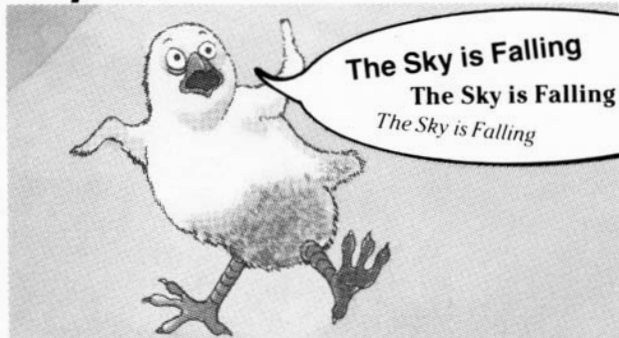
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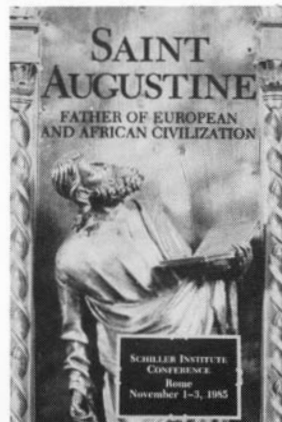
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From the Editor

We depart from our usual news and analysis format to devote this issue entirely to a series of communications by Lyndon H. LaRouche, Jr., to his close philosophical collaborators, which took place over the past summer, and which he called "Project A." This project is different from previous writings of his, in which he unfolded his scientific method, the method which has led to the extraordinary accuracy of his economic forecasting (for example). Project A was not actually "written," but dictated over the telephone in short bursts, transcribed, and then edited for publication, but without attempting to smooth over every aspect that derived from the conversational way in which it was actually produced.

In the course of producing these voice-tapes, Mr. LaRouche frequently received queries or comments from his interlocutors, and he called his responses, which sometimes appear to interrupt the flow of the chapters, "intermezzi," evoking the musical or dramatic sense of the term. As a result, some parts will read like a conversation overheard between a great man and his collaborators. The text is often reminiscent of the style of St. Paul's epistles to the young Christian churches and to his closest friends and converts.

There is an important parallel to the Pauline letters, which grew out of the struggle to build the church in the hostile environment of the pagan Roman Empire. As most of you already know, Mr. LaRouche is in federal prison, locked up as the result of a "political enemies" operation of the Eastern Liberal Establishment.

Today, as I write, on Oct. 19, claims for multimillions of dollars in compensatory damages have been filed against the U.S. government for the fraud it perpetrated—as two federal judges determined over the past year—in forcing several companies and scientific societies associated with LaRouche into involuntary bankruptcy in spring 1987. As a result of those forced, fraudulent bankruptcies, the government unleashed a chain of further fraudulent actions designed to put LaRouche in jail where, in their plans, he would rot and die. The process of reversing that operation and freeing LaRouche has begun. "Project A" represents the quality of ideas that cannot be put behind bars.

Nora Hamerman

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Plato, as depicted by Raphael in the "School of Athens," a Christian view of the contributions of ancient science to human development. Rome, Vatican Palace, ca. 1510.

Project A

*LaRouche discusses his solution to
the 'riddle of the ages,' the
Parmenides paradox of Plato*

by Lyndon H. LaRouche, Jr.

Foreword

These essays were composed at a time when the United States of America appeared to be plunging toward its self-destruction. The Bush administration appeared to be as mad as the Biblical King Nebuchadnezzar, and this for similar causes. Such madness is the characteristic feature of a "Thornburgh Doctrine," which elevates the mere whim of a U.S. President above all international law, even higher than the natural law of Almighty God.

Since the spring of 1989, it has become increasingly obvious that, using the imagery of the ancient Chinese philosopher Mencius, "the Mandate of Heaven" has fallen away from each and all of the three empires lately dominating our planet: the Anglo-American ("Animal-Saxon"), Moscow's, and the Communist Chinese dynasty. As all three are visibly doomed, so, "whom the gods would destroy, they first make mad."



Raphael painted "Socrates teaching" in this detail from the "School of Athens," Rome, Vatican, ca. 1510. St. Augustine, whom the artist follows here, adopted a Christian Socrates in scientific method in arts and science, while rejecting the flaw in a merely pagan Socrates.

The ongoing economic and moral breakdown of those three empires may suggest, that the dreary object-lesson of this waning century is the common worthlessness, and consequential folly of those ideas associated, respectively, with the names of Adam Smith and Karl Marx. If we examine the same contemporary facts from a more appropriate standpoint, the preceding twenty-five centuries of European history as a whole, we are led to those deeper truths which are the subject of the essays in view here.

All European history, including European civilization's unfolding in the Americas, is characterized by a single principle of conflict, a conflict between *republicanism*, on the one side, and *oligarchism*, on the other. Such was the conflict between the young United States of America and the oligarchical regimes of King George III and the Holy Alliance powers. Since the Achaemenid empire of oligarchical aggression against the Ionian Greek city-state republics, the only real issue within European history as a whole, has been the conflict between the *republican* followers of Solon, Socrates, and Christ, on the one side, and the opposing, usury-ridden heritage of Babylon, Canaan, and pagan Rome.¹

This pertains not merely to political history, but to every important development in the arts and sciences for as far back in the existence of mankind as our knowledge can reach.

Most simply, *oligarchism* signifies a division of the families of which every society is composed, a division between a relative few, powerful, ruling families, and a relatively great mass of the oppressed families which are the mere objects of rule by the ruling families. The apotheosis of oligarchism is the Greek pagan, olympian pantheon of Zeus and other immortals, playing with merely "mortal" men and women in the fashion a cruel, bullying, capricious child plays with, and breaks his dolls.

The distinction between *oligarchism* and *republicanism* arose in literary history with the defense of the Greek city-state republics against the oligarchical enemies from Babylon and Canaan. The idea of *republicanism* grew up and evolved during many successive battles for freedom. Thus, when a truthful historian speaks of the history of republicanism, he offers two primary sets of distinctions. He refers to the succession of struggles, beginning with the constitutions of the ancient Ionian city-state republics, continuing through the work of Solon of Athens, Aeschylus' Prometheus, Socrates, and Plato. The historian concurs with St. Augustine's relevant letter, on the point that Christianity adopts a *Christian Socrates* as to scientific method in arts and science, but sees a crucial single flaw in a merely pagan Socrates. So, we have the history of republicanism, and the crucial distinctions emerging in the course of that history.

1. See Friedrich Schiller's "The Legislation of Lycurgus and Solon," for an exposition on the differences in the law-giving of Lycurgus and Solon, in *Friedrich Schiller, Poet of Freedom*, Vol. II, The Schiller Institute: Washington, D.C., 1988.

The essays before us peer into the deepest features of the historical conflict. The mind of the oligarch sees "God," "man," and "nature," in an entirely different way than does the mind of the republican. It is the axiomatic quality of those deep epistemological differences which the essays address, thus continuing the work of the 1989 book *In Defense of Common Sense*. The object of the present essays, and the indicated predecessor, is to demonstrate the possibility of *intelligible representation* of an entire class of conceptions. These conceptions share the common quality of showing that the choice between an oligarchic or republican political-philosophical world-outlook leads, as a consequence, toward a congruent set of ideas in every field of rational thinking and discourse, including both art and physical science.

What the author has done, in connection with the two sets of philosophical essays referenced, is to revive the Socratic method by recasting it, as it were, *de novo*, and doing this from the standpoint of the best knowledge available in the present century. Thus, *In Defense of Common Sense* was written in the form of such a commentary upon the topics of Plato's *Thaetetus*, and also, implicitly, the *Sophist* and the *Parmenides*. The purpose was to illuminate the potential intelligibility of Plato's method and conceptions, by presenting a more advanced, twentieth-century vision of the same topical areas.

Relative to *In Defense of Common Sense*, the objectives of Project A are more specialized ones. In the latter, we address directly, chiefly, certain crucial problems of modern mathematical physics, and also the underlying principles to be employed for effective conduct of winning republican "cultural warfare." Different as those two topics might appear to be, the text of the essays shows that they are, in reality, the same topic.

The crucial *formal* issue addressed in the essays, is the definition of the *ontologically elementary* in physics. The following comments conclude these preliminary, summary observations as a whole.

Modern classroom physics begins only after it has successfully ignored those topics upon which the very idea of a rigorous physical science might be premised. That is, mathematical physics begins from the starting-point of certain naively conceived, and provably false ontological assumptions taken as axiomatic.

At the center of those such popular, ignorant follies upon which so much of modern classroom physics is premised *mathematically*, is the popular delusion, the axiomatic assumption, that the elementary form of "matter" must be *simple substance*. The essays identify the readily accessible, conclusive proof that such a popular assumption is false. The nearer to the very small we reach, the more that substance in the very small partakes of all of the complexity inherent in a *negentropic* form of *universe as a whole*.

This view, just expressed here, was already implicit in the Socratic work of Plato, and in the work of Nicolaus of

Cusa and Gottfried Leibniz—among others—in the founding and elementary elaboration of modern physical science. For them, as for Professor Bernhard Riemann, the universe as a whole is “axiomatically” *negentropic* (mathematically), and substance in the very small reflects this negentropic quality, this “nonlinearity” of the universe as a whole.

These essays’ approach to the most crucial among the problems of present-day physics, brings us back, directly, to the political issues as such, and does this in a most interesting and profitable way.

The proper basis for a physical science is found by means of an adequately rigorous reflection upon the question, “What is it possible for the mind of the human individual to know, and that by means solely of the individual’s sovereign potential for creative reason, the sovereign potential which sets mankind apart from, and above the beasts?”

This required demonstration is immediately at hand, as *In Defense of Common Sense* and these essays combine to show. The showing of the central role between, on the one side, a sovereign individual potential for (anti-Kantian) creative reason, and, on the other side, a *negentropic* form of existence of the universe taken immediately in its indivisible entirety of unitary existence, is the key.

By means of developed (individual) creative reason, we are each capable of making our own conscious thought a process rendered an intelligible subject of the same quality of conscious thought. In the language of the mathematician Georg Cantor, we are able, on a higher level of consciousness, to adduce the ordering-principle characteristic of a relatively inferior, observed aspect of our same conscious process. In mathematical physics, this is the “hierarchical ordering” of *transfinite* orderings. In this same way, we are enabled to become efficiently conscious of a *transfinite ordering* of a direct relationship between our conscious, sovereign powers of creative reason, and an undivided universe as a *negentropic* form of *elementary existence*.

The exploration of that conscious appreciation of that transfinite connection between “monad” and universality, shows us that this transfinite process is the only form in which a true physical science is possible.

Then, by exploring the higher, “nonlinear” forms of transfinite ordering associated with this “maximum minimum” connection, we are enabled to find in this transfinite

realm the higher correspondent to the formal “hereditary principle” in the deductive modes. On that basis, we have begun to practice a truer physical science; on the same basis, we have established, at last, a true *political science*.

Finally, now, the following observations.

The map of the universe just identified, is peculiar to the deepest epistemological implications of the Christian form of Socratic thinking, of the Christian form of republican world-outlook. It is the physical science of a Cardinal Nicolaus of Cusa, a Gottfried Leibniz.

This fact is key to understanding modern physical science properly, as the complicated reflection of a four hundred years’ war within the ranks of science, between the opposing republican and oligarchical factions within science: the republicans Brunelleschi, Cusa, Leonardo, Kepler, Pascal, Leibniz, Carnot, Monge, Gauss, and Riemann, against the oligarchists Descartes, Locke, Newton, Cauchy, Kelvin, Clausius, Maxwell, Rayleigh, Boltzmann, and so on.

First, the oligarchical world-outlook is incapable of understanding the nature of creative reason, and could never understand the most crucial conceptions of a Plato, Augustine, Cusa, Leonardo, Kepler, or Leibniz. The closest approximation to a science of which the oligarchical mind is capable, is the pseudo-rational, deductive formalism of an Aristotle, Descartes, or Kant. (Otherwise, oligarchism is mere, arbitrary irrationalism, akin to that of a David Hume or a Friedrich Nietzsche.)

Second, the present form of mathematical physics is chiefly the result of the political power of the oligarchical faction over the monied institutions of science and education. It is the past hundred-odd years’ rise to superior political power by the usury-practicing, “New Age,” oligarchical faction, which has caused the classroom triumph of arithmetic-algebraic formalism over the more natural mathematics of non-euclidean constructive geometries.

Third, the scientific inferiority of the oligarchical world-map, is a crucial, potentially fatal tactical vulnerability of the oligarchical political-philosophical faction as a whole. The included purpose of Project A, is to foster among republicans the knowledge needed to exploit that feature of the oligarchists’ “genetically” determined tactical inferiority.

Finally, the time has come, when the oligarchical faction’s corrupting influence can be tolerated not much longer.

This is a project which pertains to all kinds of tactical and strategic, educational, and scientific matters. It is stimulated partly by the work we are doing in the strategic area, as defined by a few electronic memoranda I have made on this recently. It reflects my struggling with some of the lingering problems in the scientific area of my work, which I have been reviewing afresh. recently. For example: Winston Bostick's sequel to his "Plasmoid construction of the superstring" prize essay, which I have been looking at; Daniel Wells's paper "On quantization effects in the plasma universe"; and various other things.¹ Similarly, an item recently came to my attention pertaining to the subject of noisy foam in astrophysical space; these matters are very messy; and the reason they are messy is obvious to me.

Then we have the problem, that people, sometimes, were a bit wild on geometry, ignoring what I had insisted earlier,

The topics



Raphael's image of ancient science centers around Archimedes teaching a geometrical proof to his students flanked by figures representing cosmology and geography (detail, "School of Athens," Rome, Vatican, ca. 1510). LaRouche's essential discovery in physical geometry is "that scientific conceptions are geometrically ordered in a transfinite way."

following upon as the ordering principle, an *hereditary ordering principle* in constructive physical geometry. Let me just emphasize that for a moment.

People say, "Okay, we are going to find a geometrical construction which conforms to a physical design; a physical concept." That seems to satisfy the requirement which Prof. Felix Klein had for his graduates back at Göttingen, but not quite. It certainly does not satisfy *my* design; and, it does not satisfy the requirements of physical science.

My essential discovery in physical geometry, and therefore, bearing upon physics generally, is that scientific conceptions are geometrically ordered in a *transfinite way*. That is, if you construct things, such that the same construction with one action added (one ply of action, to put it properly), in a multiply-connected manifold, this ply has the requirement not only of generating an additional singularity, but actually, or implicitly, re-defining the entire process, the entire nonlinear function. So, the rate of generation of singularities is increased.

That is, if we set up any kind of a notion of a constant, arbitrarily small length, we might take Prof. Winston Bostick's reference to the Planck length, 1.6×10^{-33} centimeters. Take a length like that, and say: *The increase of the density of singularities* within that arbitrarily chosen interval of action, is a measure of negentropy.

That obviously applies to Bostick's construction in all kinds of ways, provided you assume this is not a black hole. A Planck length is not really a very arbitrary choice of length, but will serve the same purpose as an arbitrary one. For that process, an increase of the density of singularities per unit of action, as referenced to that length, would do all kinds of wonders for that kind of representation; and it obviously is relevant.

The *hereditary principle* means that we start from the simplest notion of a multiply-connected circular action, with reference to the simple isoperimetric concept, but not limited to it.

I have emphasized earlier that that little critter is actually an envelope. We are obviously following the pathway of non-algebraic curvatures; and, continuing with all the things we have discussed, we are finding a pathway which is, for any point of reference, a consistent pathway of growth of density of singularities per interval of action. That would be a demonstration of, that would be a specification, a rigor for an hereditary principle.

1. Bostick's sequel, titled "How superstrings form the basis of nuclear matter," is being prepared for publication in the Fall 1990 issue of *21st Century Science & Technology* magazine. The paper to which it is a sequel is titled, "The plasmoid construction of the superstring: morphology of the photon, electron, and neutron," and will be published in the same location. Wells's paper appeared in *IEEE Transactions on Plasma Science*, 17:270 (April 1989). "Noisy foam in astrophysical space" is a reference to research subsequently reported in *New Federalist* newspaper, June 22, 1990, p. 11 ("Is the universe cellular in the large?").

You don't have to be perfect; but you always have to be moving in the right direction, and whatever you do has to be based on what has gone before. You can do nothing which is not based on what has gone before. Otherwise, you are cheating: When you jump up out of the sky, and say, "Ah, we can do this," you are cheating. If you do that often enough, you'll go absolutely mad; because cheating means thinking without a mooring; and the more attractive it is, the more dangerous it is. So, don't cheat; everything must go in a succession.

To that end, and to other ends, it is obviously my responsibility, my pleasure, my duty, to address what I said before, on various aspects of this, once again, perhaps in a clearer way than before.

We have two things to consider, primarily.

First of all, as we did in connection with the recent Martin Luther King Human Rights Conference,² the discussion of principles: the sovereign, creative-reason potential of the individual, and the relationship of that creative potential, as a sovereign capability, to the totality of existence. The immediate, non-mediated, relationship of that individuality to the totality, is the primary distinction which sets man apart from and above all other species.

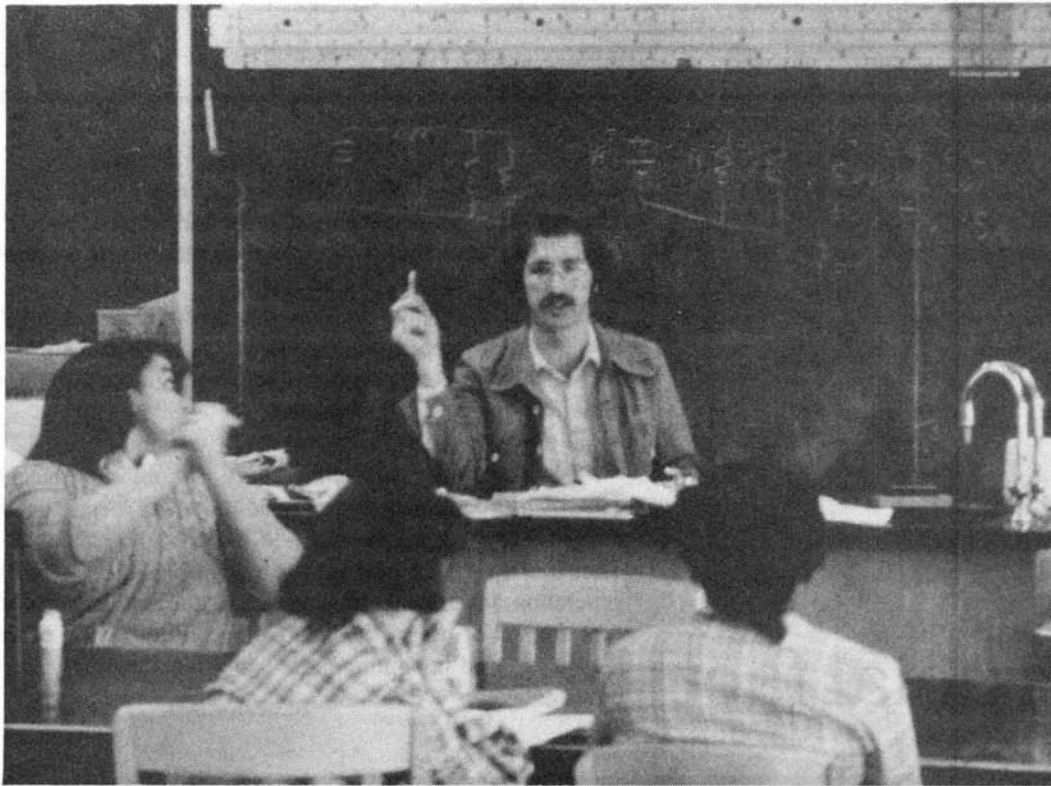
All law, all natural law, and all proper law otherwise, is derived from that consideration, *never goes away from it*, is always subject to it. So, any law which does not meet that requirement, or is inconsistent with that requirement, is to be nullified as unlawful; that is its character.

The second aspect to consider is: How do we describe the mapping of that mind which knows, or the activity of the mind which is in the process of knowing the universe, of knowing the law, of knowing art, and so forth?

I would emphasize again in this same setting the human factor, the individual human potential, the divine spark of reason.

Look at the physics of this. There can be no true law of physics which is not in conformity with what I have indicated. That is, the ability of the mind to understand the universe, from the standpoint of not merely abstraction, but for practice, depends entirely upon this capacity of the human being: this sovereign potential of creative reason, and primarily, the unmediated or direct relationship between that poten-

2. The Schiller Institute sponsored a conference of the Martin Luther King, Jr. Human Rights Tribunal on "Democracy Movements and the Fight Against Judicial and Political Repression" on June 2, 1990. At that conference, held in Silver Spring, Maryland, three panels discussed the connection of human rights and natural law. Mr. LaRouche submitted a paper, titled "On the Subject of Human Rights and in Honor of the Late Martyr, the Reverend Martin Luther King," the text of which was adopted as a resolution by the 500 persons in attendance, founding an international Human Rights Coalition. That resolution was motivated for passage by American civil rights leader Amelia Boynton Robinson, recently honored with the Martin Luther King Foundation Freedom Award for her work with Dr. King in Selma, Alabama, to bring about civil and human rights for all Americans during the civil rights movement of the 1960s.



A New York City high school physics class. Among thinking, rigorous people, most of the problems that arise, that are persistent, take the form of trying to adapt what we know, empirically, to the limitations of commonly accepted, classroom deductive mathematics.

tial and the whole, as well as all other kinds of relations. Therefore, there can be no law of the universe which is correctly presented in any contrary terms, which can be represented intelligibly in any contrary terms.

So, those are the two facets:

The one is the principle of law of the individual, the strategic implications of that as I have addressed that; and, second, as I have addressed earlier, the map of the mind in the act of knowing the lawfulness of the universe, including the lawfulness of physics, is of that form. There is no other way in which the mind could know the universe; therefore, all knowledge of the universe is expressed in that form.

This brings us back again to the sticking point: People say, "We must use accepted classroom mathematics to explain mathematical physics." Among relatively responsible,

thinking, serious, rigorous people, most of the problems that arise, which are vicious (that is, of a persistent nature), are all of the form of trying to adapt what we know, empirically, experimentally, to the limitations of what is commonly described as "commonly accepted, classroom deductive mathematics."

In no way can deductive method represent the process, except, as I show in *In Defense of Common Sense*, we can use the deductive method negatively. We can use the inductive method less reliably, but the deductive method negatively to show that what we are looking at is what it is not, what the deductive method is not.

That is the definition of the project; so, when I refer to "the project," please note that that scope of this introductory outline is that to which I refer.

The general scope of our inquiry is the following:

1) The demonstration that creative reason sets mankind apart from and above all other species.

2) That this creative reason, this potential, when developed, or as developed, is *sovereign*. That is, that all creative acts of discovery occur within the sovereign domain of an individual intellect. This includes:

a) the generation of a discovery.

b) the transmission of a discovery. (In order to transmit a discovery you must in some degree assimilate it—a generated discovery—and you must, in a sense, regenerate it.) Though the requirements are not as rigorous as they are for generation, the effected transmission requires a very significant amount of use of the creative powers of reason of the person engaged in nothing more than even apparently mere transmission.

The crucial fact



Nicolaus of Cusa (1401-64), in the portrait on his tomb by Andrea Bregno (Rome, St. Peter in Chains, 1465). This great cardinal of the Church and scientist, developed the concept of man in the Living Image of God. This means that in God's creation, man is the only species which in the Eyes of God has a self-subsisting reason for existence.

c) the assimilation of this discovery, or this principle by the human mind for employment in practice or in reshaping, as if axiomatically, the practice of the individual who ingests this.

3) Although the sovereign individual act of creative reason is conditioned by a social context, ultimately, the primary relationship within society is a direct, as if to say *unmediated*, relationship between the individual person and all of past, present, and future historical existence of mankind.

The social aspect is twofold. The social aspect, in terms of relations to other people as if they were particles in a Cartesian space, is: This image enables us only to show that others are acting upon the individual to develop individual potential; and, it also shows that the individual is acting on others around him, so that there is a kind of radiation of an idea through transmission.

Nonetheless, the essential, efficient aspect of any discovery is its effect upon the potential rate of progress of the power to exist of the human species as a whole. This includes, as we have said before, the fulfillment of contributions from the past which are incorporated implicitly, or directly in the discovery. Thus, every action in the present, which is created, as opposed to non-created or deductive, acts upon the entirety of mankind's past. In the same way, but also in a different way, every truly creative act in the present, or the omission of such an act in the present when required, acts upon all future human existence, directly.

That is, it is not the communication that is mediated; it is what the communication transmits which affects the whole. That which is transmitted is what affects the whole; it is not the transmission as such which does so. That confusion, implied there, must be avoided: Communication is not knowledge. Communication is the transmission of a stimulation of a capacity within the recipient. It is that which is conveyed to creative reason, implicitly in this manner, which acts directly upon the universe; it is not the literal so-called message. *The medium is not the message, and the message is not the medium*, even though communication is essential. Those are preliminary conditions.

Since the existence of the species depends upon its creative capacity, two things follow. Since, if only for purposes of illustration, animals could be substituted hypothetically

for human beings, it is thus shown more clearly, that the propagation of human beings with this power of reason, is the most essential self-interest of the human species. The activation and development of this creative potential determines the potential, the relative potential of the human species to continue to exist.

This has many implications.

The human species is the only species which is in the Living Image of God, in the Image of the Living God, by virtue of being the only species which as a species, as well as individual members of the species, is creative, and verifiably so.

Thus, in that sense, the human species is its own reason for existence. That is not true of any other species.

That does not mean that man sets himself against God; that means, in God's creation man is the only species which in the Eyes of God has a self-subsisting reason, sufficient reason for existence. And that is God's love of mankind.

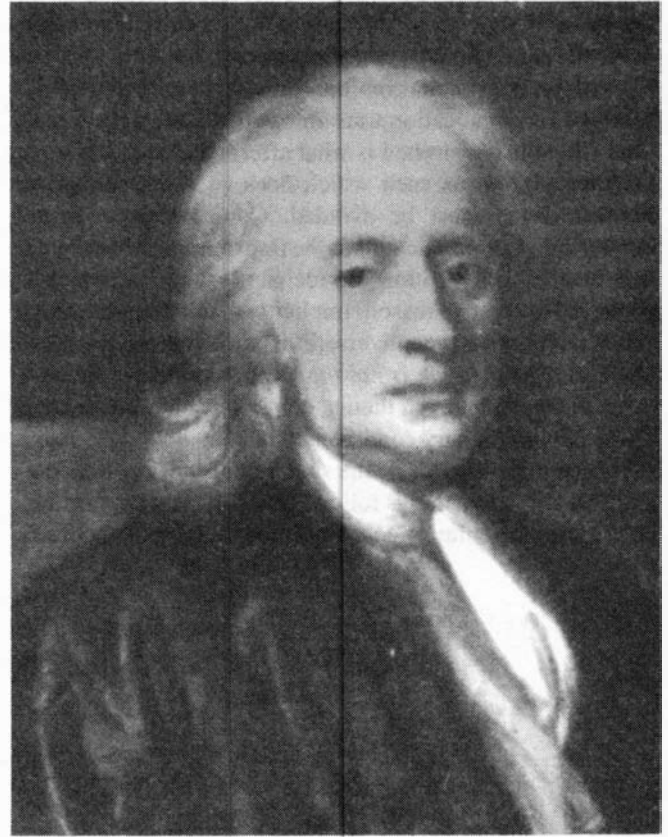
From this flows natural law in its entirety. Natural law consists of propositions which satisfy the so-called equation which we have just set up between the totality of human existence and the creative individual, the sacredness of the sovereign, creative potential for reason of the human individual.

This applies to strategy, in the sense that all proper conflicts in society involve issues directly pertaining to natural law as I have just defined it—that is the second general topic. Therefore, strategy and strategic issues represent conflicts between cultural impulses, which are effectively institutionalized cultural impulses, which are either more or less negentropic, or, more or less entropic as opposed to negentropic.

Thus, oligarchism, which is inherently entropic for the existence of mankind as a whole, as demonstrated, is the enemy of mankind; and, the weakness of mankind is the tendency to have less negentropy than mankind requires in its battle against oligarchism. Hence, republicanism versus oligarchism is the basis for strategy. Propositions which are not stated in those terms of reference are not legitimate propositions.

And thirdly, which we will concentrate upon in my next note in this Project A, is the map of the human mind as it pertains to knowing and transmitting scientific knowledge.

Leibniz's mind



Left: Gottfried Leibniz (1646-1716). From this universal thinker LaRouche learned the principle that the efficiency of creative reason is represented by the nature of the connection of each isolated individual who does creative reasoning in the present, with the past, present, and the future. Right: Sir Isaac Newton (1642-1727), the British enemy and plagiarist of Leibniz.

Now, we turn to the question of scientific thought.

Some time ago, I made a reply to a paper in which Euler had attacked Leibniz's *Monadology*.¹ In that connection, I emphasized two things about Euler's attack on Leibniz, beyond the bare fact that it is simply incompetent. I emphasized the fact that Euler's argument was not physics, in the first place, and showed what its fallacies were geometrically, the nature of its geometrical fallacies. I also emphasized that the empirical basis for knowing the *Monadology* does not lie in some abstract, arbitrary, geometric construction, but rather, lies in a very simple demonstration of physics.

For example, it is shown that all creative reason, and therefore all knowledge of the lawful ordering of our universe, is associated with a sovereign power of creative individual reason in the individual personality. Hence, that individual is, as Leibniz emphasized, a *monad*. Hence, the

organization of the universe is based on the action corresponding to creative reason by monads. That is physics. It can be demonstrated that in no other way can we possibly achieve science.

The notion that a science, an empirical science leads us to a different kind of view, i.e., the Euler view, is absurd.

For example: In a universe which undergoes change, we can demonstrate creative reason in the case of human behavior, that is, historical behavior, as the creative lawful ordering of change. In such a universe, one can know the lawful ordering of things only by a knowledge of a transfinite ordering, which corresponds to that lawful ordering, the creative lawful ordering. For example, as I indicate this extensively—and I think in what is a very happy mode of representation, of pedagogy—in my *In Defense of Common Sense*, only the principle which determines the ordering, implicitly, of the successive scientific revolutions, i.e., as I did with the A through E lattices, only that principle represents knowledge. Only that principle corresponds, even in approximation, to a lawful ordering of the universe.

Therefore, any knowledge of the universe as to the principle of ordering can only arise from the standpoint of the creative reason, i.e., the sovereign creative reasoning powers of the individual: being conscious of those sovereign creative reasoning powers and other creative phenomena which are

1. See *Appendix*. Euler's material was sent to my attention by Larry Hecht.

analogous, shall we say, to what happens in creative reasoning.

That gives us the essential map of the universe in germ. To go further, we have to take the other principles into account. We have already demonstrated again, socially, that the efficiency of creative reason is, in first instance, represented by the nature of the connection of each isolated individual who does creative reasoning in our society in the present, with the past, present, and the future, as I have indicated earlier. That demonstrates that that causal relationship is the nature of the efficient relationship between creative reasoning and the universe. That is, the individual, creative reasoning, and the universe. This gives us the map.

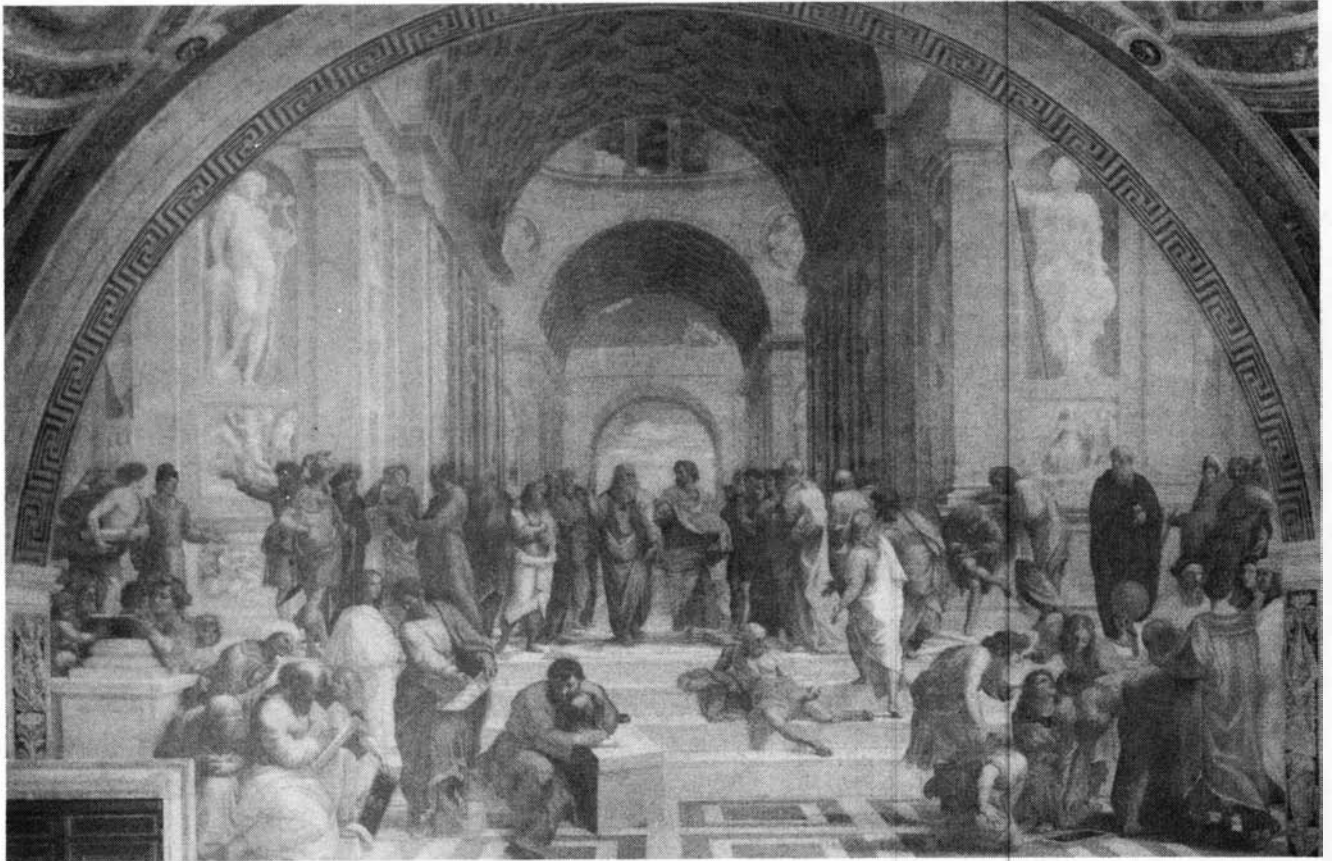
Whenever we go away from this map, we are wrong. Whatever we build, there is a fundamental fallacy in it, if we depart from this map. Hence, the *Monadology* is perhaps the most essential document in all of physics.

You will note that Leibniz, in essence, says, in his own terms of reference, exactly what I say here—which is not entirely accidental; about the age of 13 to 14, I learned this from Leibniz, directly. I wrestled with it then for over a year, and I got it into my head; so today, I don't have it necessarily in the form I learned it from Leibniz, although I was stimulated to my discovery by him. I have learned it in my own way; but, I can go back now, and find that what I am saying and what he is saying are really the same thing, in the sense we are talking about exactly the same phenomenon, and are posing exactly the same questions.

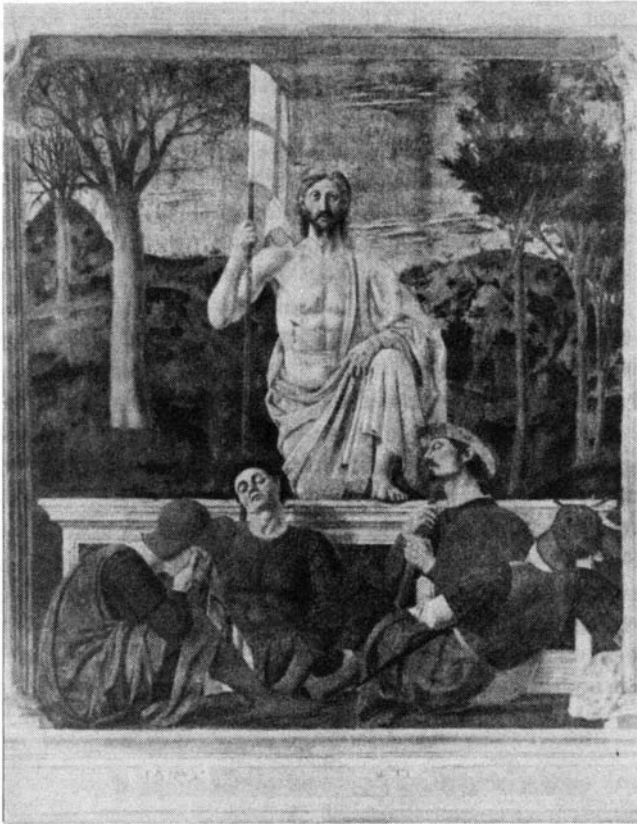
Plato's 'the One'

The human mind, as I have represented this in *In Defense of Common Sense* and other locations, is characterized by the creative processes of that mind, as those processes are developed. That is, the potential of the human mind is the form of essential behavior of that aspect of human mentation which sets man apart from the beasts, and which distinguishes the function of the human mind as human, as distinct from bestial. Those are the characteristic features of the mind as a whole: the creative processes as they may be developed, and show their potential.

This potential is a potential for mastery of the universe, in which the creative potential of the individual mind is sovereign. At the same time, this sovereign, individual creative potential is in what I have previously described as an unmediated, efficient relationship to the universal, by the following steps.



Plato and Aristotle debate under the arch at the center of Raphael's famous mural of the "School of Athens," ca. 1510, in the Vatican in Rome. Plato points upward to the concept of the One; while Aristotle, his opposite, seeks knowledge in simple substance.



In this Italian Renaissance painting of the mid 15th century, by Piero della Francesca, *Christ's Resurrection* transforms the landscape from barren winter (left) to flourishing spring. "We are not trying merely to represent or mirror what is happening in the universe; we are acting on the universe, to such effect that creative reason itself is the cause of those significant changes which are effected."

First of all, if every human mind is engaged in fruitful, creative activity, according to principles of creative reason, it is efficiently acting upon the past, the present, and the future, of mankind. By acting upon mankind, i.e., mankind's practice, we are acting upon the universe as a whole, past, present, and future. This, as I have said, is the individual, the sovereign creative power of reason in the individual, unmediated relationship to universality.

Thus, the practical relations of mankind, in terms of the individual, to the universe are so defined. So, the substance of the practical relationship between the individual on the one hand, and the universe, and the human species in the universe, and all aspects of practice subsumed by the human species or impinging upon the human species, are in a relationship so defined; that is, defined in terms of this principle of practical reason.

That means that the universe is defined for us as composed of sovereign monads: human creative reason, in this kind of multiple relationship to the universe. The universe,

taken as a whole, is thus *One*,¹ an unmediated *One*, as indicated, the essential *One*.

Otherwise, reason is related to other objects in the universe, other created objects, and so forth, in that universe. But, always in its relationship to other objects, the primary, unmediated relationship between the particular and the universal subsumes, and is the substance, of all relations to other objects.

Let us pause at this point, and imagine that you think back and forth several times over what I have just said, and its implications. What this means, among other things, is that *the idea of simple substance must be eliminated from physics*, if we are to have a correct physics. Simple substance, simple space, simple time, or even a simple form of space-time-matter, must be eradicated from our thinking, if we are to have a correct view of physics. That, of course, is a difficult thing to do, because we study physics in textbooks and classrooms in which the deductive version of mathematical physics is the accepted classroom version. Therefore, for nearly all among us, nearly everything we know about physics, including our description of the experimental evidence, is couched in terms of this deductive classroom physics.

Yet, I have just said, on the other hand, that a true view of the universe rejects the most axiomatic features of mathematical physics of the classroom variety, on two counts. First of all, generally we must reject the deductive axioms, or deductive axiomatics, of a mathematical physics. To say the same thing in a more profound way, the idea of a simple matter, simple time, simple space is rejected; but, also a simple space-time-matter, is also rejected by this, shall we say, nonlinear characteristic of creative reason.

In Defense of Common Sense, for example, illustrates what we mean by that which is essential, that which is in relationship to the universe as a whole; everything to which that individuality is related within the universe, it is related to in terms of that nature of relationship between the individual, creative reason, and the universe as a whole. Therein lies the essence of the matter.

Let us proceed from that. Is this real knowledge, or is this merely a form of knowledge? In other words, is it the case that because our mental apparatus is so organized, as I have just indicated (as the apparatus of knowledge), that the only form of universal physical knowledge we need to know, is in that form? That, whatever form universal physical law external to that form we might expect to be, we do not take into account? Or, does it mean that universal physical laws are *efficiently* in the form they *must* be properly represented by the mind to accommodate to the imagery of unmediated relationship between particular and universal, as we just indicated? Yes! That latter is what we mean.

Now, let us look at the thing as to form. Let us assume

1. See Plato, *Parmenides*.

hypothetically, that we are examining now the proposition, that whatever the form in which physical reality is ordered, external to our perception of it, we can only understand that form when it is translated into the form in which our thought must proceed, or *by virtue of*, or *in coherence with*, this notion of the unmediated relationship between the particular creative reason of the individual and the universality. That is the proposition to be examined.

That is where the fallacy lies in most thinking: to say that we have deductive, that we have geometric, that we have other forms, and so forth, and that in this way we may choose different forms of representation to represent the common reality, or to distinguish as in a more general way, between an objective realm, which is not directly known to our senses in its own form, and the perceived or subjective form in which that realm and its efficient relations are reflected upon the form in which we are capable of thinking. That is the obvious issue. Can we make that distinction?

We have to reject that distinction. In the process, by the nature of creative reason, we are not trying merely to repre-

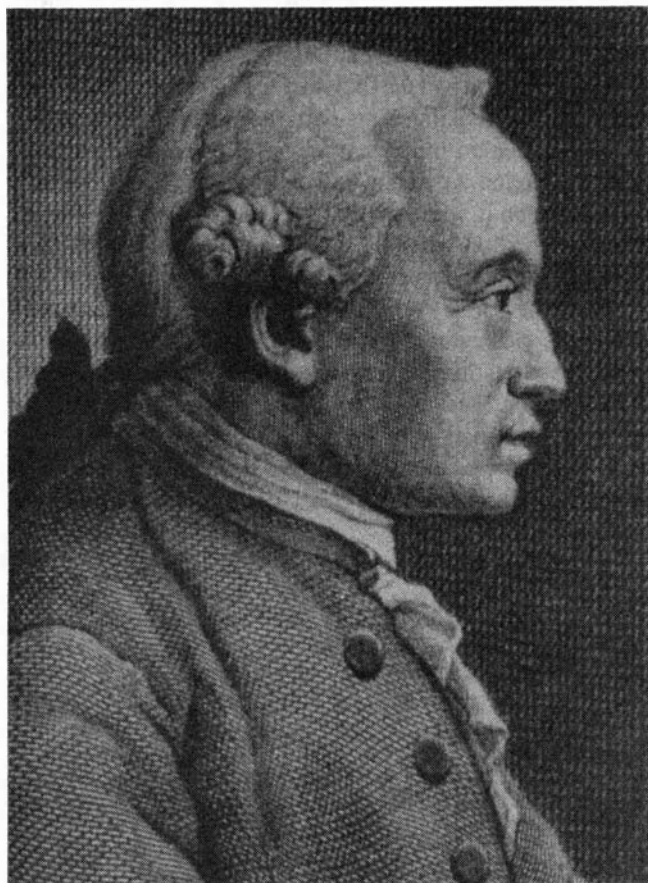
sent or mirror what is happening in the universe; we are acting upon the universe, to such effect that creative reason itself is the cause of those changes which are effected. At least, those which are *significant* changes.

Therefore, creative reason itself, in the form in which we represent it, is a cause of existence in the universe: It is a characteristic of substance, of substantiality. Thus, there is no difference between the form, in the proper *form of reason of knowledge*, and the *subject of knowledge*, the *object of knowledge*. No difference in form whatsoever, except to the degree we have failed to perfect the quality of creative reason to know this latter.

So, knowledge is practice in this sense: not knowledge of practice in the pragmatic sense, but knowledge of universal practice. That is, the practice which has the universal effect, such as the scientific discovery. That is, the scientific discovery has a universal effect as it is transmitted and assimilated by the human species. It changes everything; that is practice.

Nothing is practice, except as it can be so represented, respecting universality, in these terms of reference.

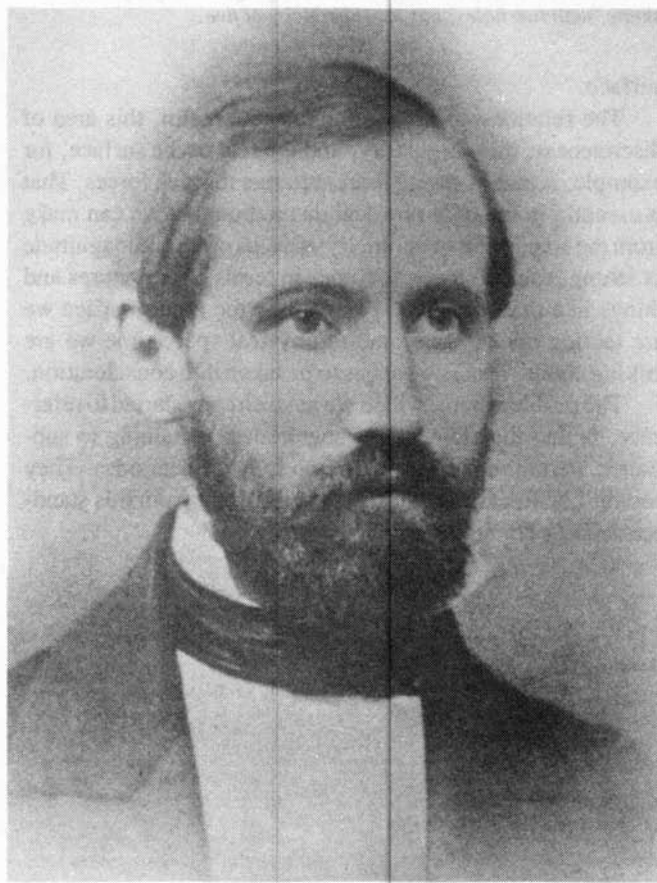
Matter is not simple

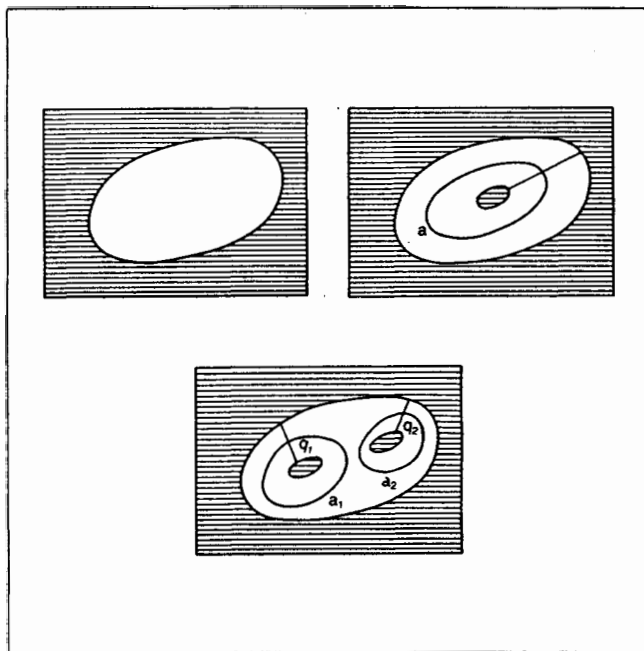


Immanuel Kant (1724-1804), left; Bernhard Riemann (1826-66), right.

Up to now, we have indicated in general outline the scientific method flowing from our development of the *Monadology*. This can be contrasted, in all cases, with the Kant-Leibniz controversy on the *Monadology*, and, also, compared with what we have referenced earlier on Euler's error on infinitesimal division. This is not to say that we start with the idea of a predetermined discrete existence.

What we are referencing, geometrically, in these monads, are zones of what appear to be negative curvature. That is, imposing negative curvature upon the surface of a Riemannian sphere, projectively, would be the kind of image that corresponds with these discrete existences. That is, they are not discrete in the sense that the deductive method teaches discreteness; rather, they are discrete in the sense of generated singularities which take the nature of these negative curvature indentations, so to speak, in a Riemannian spherical





Schiller Institute

The Riemann Surface Function, showing multiply-connected surfaces. The topology of the projection of a sphere (constant positive curvature) has simply connectivity; there are no singularities (holes), only poles. The projection of a torus, with its center hole, is triply connected, and the projection of a pretzel shape, with two holes, has a connectivity of five.

surface.

The relationship among the discrete realm, this area of discreteness, this singularity, and the rest of the surface, for example, is that of strong forces relative to weak forces. That is essentially the only physical distinction that we can make from the standpoint of geometry: various orders of magnitude of strong, relative to weak forces in terms of curvatures and things like that. So, that is essentially the kind of space we are talking about, the standard physical space-time we are talking about. That is what has to be taken into consideration.

The problem here, which we have already started to reference, is that the elementary magnitudes, pertaining to substance, pertaining to action, are no longer linear ones. They couldn't be linear in any case. Just look at it from this standpoint: They are not linear.

That is, mass is not a linear magnitude, nothing else is a linear magnitude. Interaction is not a linear magnitude. There are no linear magnitudes, linear expressions in the system. We might be able to approximate some of the nonlinear ones, under special conditions, by linear approximations; but that does not mean, by virtue of approximation, that the elementary is simple. As we eliminate, by necessity, the notion of an elementarity as being of the quality of simple, we reject the simple.

We must reject the simple in respect to the notion of substance, to the notion of discrete existence; we must reject the notion of the simple in terms of the so-called space-time relations, of interaction in space-time. So, *simple* is not a quality which we allow in our universe; we cannot allow it, for reasons already given.

That which is seemingly most simple, even if it does or does not, in itself, act as creative reason does on the universal, is in a similar relationship to the universal (as in the case of lesser monads, or the lesser lesser monads), if you choose. That is, the fact that a singularity exists, and that it does not act in a certain manner, or under certain circumstances, or under all circumstances, is itself the act of omission of that kind of action which we would expect from a creative magnitude, such as the creative human personality.

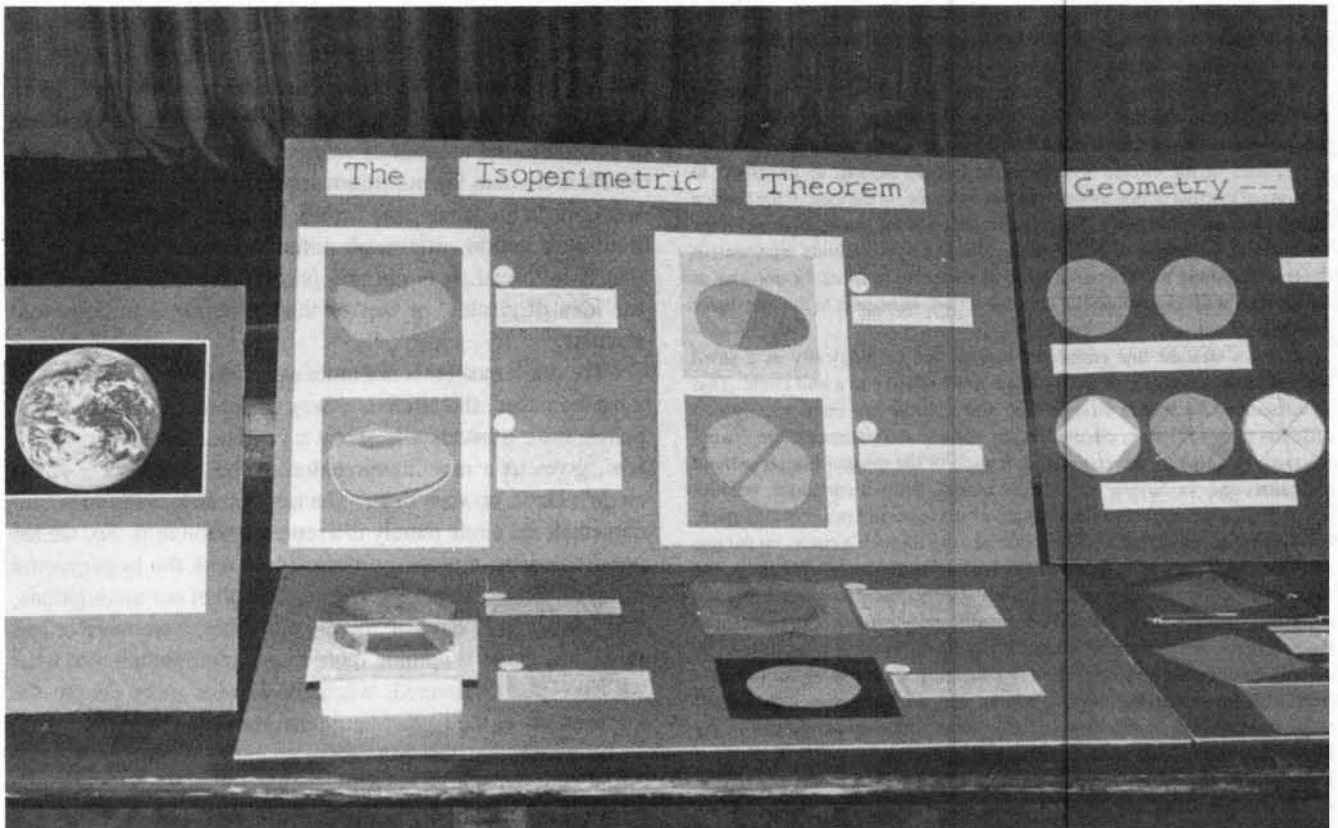
So that, in all cases in dealing with pair-wise, or other, more localized interaction, we are dealing with something whose complexity is defined, implicitly, by the relationship of creative reason and the individual, as a process, to universality. We are looking at the pair-wise relationship in terms of its own relationship to that universality: the pair's action, or lack of action, upon that universality. Or, what they must do to act upon it, the condition they must satisfy to act upon it, or the condition they must satisfy not to act upon it, that is, not to alter it in some sense.

Since the primary action in the universe as a whole is itself nonlinear, elementary, but not simple, thus, the conditions which these relationships, or local relationships must satisfy, in description, and ought to be consistent, be part of the universe, are functionally defined in the same nonlinear way as we define the relationship between the higher-ordered monad, the creative individual, creative action, and the universe as a whole.

Reaction to a query

The tendency is to take a reference point in what is called "credibility," classroom credibility.¹ You take a textbook point such as *isochronicity*, defined in a certain way, and start to reason from that to fill in things, rather than employ my method. Most people are really rather uncomfortable with a method which is rigorous as to axiomatics: what is called in German *streng*, for example, a rigorous Platonic dialectical method.

What people do often, is to adopt a definitional approach, to reference something which they think is unchallenged, and use that definition, to make a construction, and to determine from a deductive, inductive standpoint of construction, whether that construction is *plausible* or not. That is poor physics, terrible mathematics. I recognize it is the generally accepted approach to these things, academically; but it is still rotten, because it misses everything. It misses the very thing



A pedagogical exhibit presented by the National Caucus of Labor Committees, LaRouche's philosophical association, in Los Angeles in 1983, demonstrated the isoperimetric theorem. By showing that a circle uniquely contains the maximum area within the minimum perimeter, Nicolaus of Cusa proved that the circle itself is nothing but "the maximum work done with the minimum action."

you must do to make any significant discovery, at least a fundamental one. You cannot make fundamental discoveries, empirically, and then order their representation by that poor, shallow choice of method.

Spend a year of your life doing that kind of thing, and come up with a few important, although not fundamental, discoveries, which you spend most of your life refining. You are not going to make a really fundamental discovery by those methods, by that kind of thinking. To make a fundamental discovery, you must resort to a different way of thinking,

1. This part of the argument is presented a little early, prompted by a note from Khushro Ghandhi on Christiaan Huygens. Ghandhi mentions the connections between the principles of least time and least action—this isochronicity, by the way, has to be looked at a little more carefully—and between least area (minimal surfaces) and least perimeter. But here I will comment on his elaboration of the relations of cycloid, epicycloid, and hypocycloid as members of a single family, with the shared characteristic that in every case the involute is identical with the original figure.

Ghandhi proposes to relate the epicycloid to the cycloid by allowing the radius of the circle that does not roll to become infinitely large, such that its circumference constitutes a straight line. The essential thing here, which I have stressed all the way through, is what I've referred to, for pedagogical reasons, as the hereditary principle of a properly ordered constructive geometry; and, in this connection, I have located the ontological actuality of physical space-time, in respect to that hereditary principle, as the primary reflection of ontological reality. Thus, that which unifies all of these figures in a single, shall we say, virtually monotonic expression of this transfinite, this hereditary principle, is the referent for ontological actuality in physical space-time. That's the essential point.

What you're seeing with the circle, and the relationship of the spiral to the circle, is the character of an envelope. What must not be forgotten, is that we're also seeing the way in which the discrete is defined, harmonically, by sections of the circle, or sections of circular action, or in respect to sections of circular action as we have, for example, in the case of the Golden Section and its significance. So the relationship of the circle, as an envelope for cycloids (which is what the epicycloid and hypocycloids represent) is the essential thing to be borne in mind in respect to defining the universe as based upon multiply-connected circular action, in respect to the hereditary principle.

Now, a straight line cannot be represented ontologically as a small portion of the perimeter of a very large circle relative to a unit circle. That is fallacious, because a straight line and a circle are ontologically two different things. That is, circular action, the circular perimeter, they're not the same thing: One, the essential definition of the straight line, is *without* curvature; and we have a very simple means, without curvature, because it's defined with respect to both negative curvature and positive curvature, two ways you can define a straight line passing through a circle; on the one side, internally, it is in respect to negative curvature; outside the circle, the same line extended is in respect to positive curvature. It's normal. It's not something that lies upon the perimeter sufficiently extended; it's normal to the perimeter, the perimetric action. It's quite different. So, we have to be careful about that. The straight line is something we derive by construction from multiply-connected circular action, and we can derive it in various ways from multiply-connected circular action, but they all amount to the same way, in the final analysis. The essential thing is, we must derive it together with the notion of a point, within any definition of circular action, within any particular transfinite ordering, to go through the corresponding elaboration of the specific geometry analogous to a constructive version of a Euclidean representation, that we must develop this in order to make that particular phase construction at each, shall we say, point, in the transfinite series generated by hereditary action.

which I have been emphasizing so far in this Project A series.

It appears on the one hand (the Kantian view), that a certain kind of geometric thinking is inherently, *a priori*, synthetic *a priori* geometry, even though we can't account for its derivation. That it is axiomatic why it should be that, rather than something else *a priori*; "It just sort of is." All these kinds of views are Kantian, in one sense or the other, or Kantian in this respect. That is not the way the real universe works.

The isoperimetric theorem

Think of an isoperimetric construction: people are always trying to correct my language on this, and their corrections are wrong.

Most strictly, the so-called circular action should not be thought of as circular action ontologically. It should be called, ontologically, *isoperimetric action*, or, simply, *action*. And the rate of action tends toward the notion of *power*. See, we don't have "energy" anywhere in this thing, because nowhere does energy legitimately arise, except by an arbitrary axiomatic addition based on Kelvin's and Clausius' misreading of the competency, or the scope of competency of Sadi Carnot's work on heat, and of the work of Fourier on heat (particularly Sadi Carnot's work on the thermometer scales and heat).

The isoperimetric theorem represents ontologically exactly what it does: It is the maximum *work* with a minimum *action*; that is all. The rate of that, of the maximum work from the minimum action, is *power*. Any other kind of action is related to the amount of work accomplished which is not worth more than the minimum action to accomplish the same work, or in the same time frame, the same power, using the minimum action, minimum pathway of action. That is all that is involved. It is not any particular geometry; it is not the idea of circles, or this or that; it happens to come out circular.

We don't mean this is a more elaborate way of interpreting a circle; rather, the circle is a way of representing this. Most people have it backwards. They say, "The isoperimetric theorem, gives us a new interpretation of the construction of the circle": bunk, no such thing. The isoperimetric theorem is fundamental; the circle merely is a representation of it. So, we are not discovering a property of the circle with the isoperimetric theorem; rather, we are discovering that all of our assumptions, which we called "circular" before that point, were more or less false. The circle is nothing more than a representation of what we have just discovered, when we explore more deeply the implications of the isoperimetric theorem.

So, from that, we can derive an entire geometry, up to a point. But you cannot, as Euler does, put indefinite divisibility in there. Nowhere, in the construction, did we have any basis for introducing the assumption of infinite divisibility, nor did we demonstrate it. So, how the devil does Euler *dare* insist it is obvious, that infinite divisibility is possible? No

such thing: not obvious at all: not true, on top of it. But that doesn't mean that the universe is made, as Descartes indicates, of preexistent, self-evidently discrete particles: also not true.

That is the kind of problem we are dealing with here: People have difficulty in thinking in my terms of treatment of axiomatics.

They don't examine the assumptions. They say, in their method, "These are good rules for making definitions. All we are doing," they say, "is making a very elementary kind of definition, simple definition. We are following rules of representation which everybody accepts. Don't you see? This is a proof."

It is no proof at all. I'll take your proof, if you use that method; I'll tear your proof apart, show that what you have done, is build an edifice on quicksand. Underlying what you have done, are assumptions which are unproven, just as in the case Euler says, wrongly, that it is ridiculous to say that an angle is not infinitely divisible. Well, it is not ridiculous at all. Euler makes an arbitrary assumption; there is no proof, and there could be no proof for it. He makes that the geometric basis for refuting Leibniz on the point of the monad. Whereas, as I have indicated earlier, the monad is as self-evident as anything; but that does not mean a self-evident, discrete particle in the simple sense of simple substance.

Just as a matter of reprise, here.

The problem inclusively being addressed, by this series of sections, is the tendency of people to slip back into an academic mode of thinking, a way of thinking which prevents certain questions from being addressed effectively; and, which, worse, leads to the propagation of serious errors in approaching problems. That is, when you depart from the Socratic method, to the business of elaborating definitions based upon what are deemed non-controversial beginning-points, or beginning-points "which ought not to be controversial among professionals," then you have laid the seeds of disaster; you have indulged in arbitrariness.

The essence of Socratic method, and the essence of scientific method, as opposed to what is taught in the mathematical-physics classroom these days, is *absolute rigor*. *Nothing can be assumed on the basis of popular sense*; "common sense," professional, or otherwise.

We have referenced the case of the isoperimetric theorem in geometry, and reported that the isoperimetric theorem is not an explanation of the circle; but, the circle is nothing but an image, properly, of the isoperimetric theorem, and that every other understanding of the circle is wrong. That is, when you understand the circle as self-evidently something this or that in geometry, and then say that the isoperimetric theorem is a good explanation of it, you have it backwards. Rather, the circle (provided it means multiply-connected circular action), is a good representation of the isoperimetric theorem.

It is the isoperimetric theorem which is provable; the

circle is not provable, it is merely a representation. Only to the extent that the circle is multiply-connected circular action, is elaborated in a manner consistent with a notion of isoperimetricity, as I have defined it, only then is geometric construction valid; and it is only valid to the extent that this isoperimetric principle, and its implications, are applied to the notions of multiply-connected circular action in a manner which is truly consistent with a hereditary principle of construction based on nothing but what is directly implicit in the isoperimetric notion.

That is rigor.

Again, or deeper rigor, more specifically: that Euler's attack on Leibniz's *Monadology*, specifically, Euler's absurd insistence, implicitly, for example, that any angle of circular action, no matter how small, is divisible, is typical of an unscientific absurdity of the type we are attacking here.

For it can be shown, as I have indicated, that the possibility of all knowledge, human knowledge, depends upon the potentiality of a sovereign principle of creative reason, sovereign to the individual person, a principle which is implicitly in unmediated relationship, not only to all generations of humanity past, present, and future, but through humanity as a whole, and its interaction with the universe as a whole, to the universe as a whole, past, present, and future. The fact is that that is what is provable. The possibility of knowledge would not exist, unless that were the way the universe is arranged. Therefore, that is the starting point, rather than the isoperimetric theorem, or any merely formal, topological construction.

In that physics context, however, the isoperimetric proof, the minimum-maximum, which is a derivative of Cusa's minimum-maximum principle, is the formal foundation of all mathematical physics, properly defined. Not as the implications of the circle, but the circle of multiply-connected circular action as a representation, an image, albeit a defective one, of the maximum-minimum principle in terms of the isoperimetric view.

Remember, the maximum-minimum of Cusa, in terms of its scope and implications, is identical with what I said about the *Monadology*; and, the unmediated relationship of the individual powers of creative reason, to the extent that creative reason is the active aspect we are considering of an individual, with not only the human species past, present, and future as a whole, but also the universe as a whole. Maximum-minimum being thus reflections of one another, in the sense of *imago viva Dei*, the living image of God. That is the basis of everything: philosophy, statecraft, strategy, law, and physical science.

It is only to the extent that one can begin with that, and nothing but that, and trace a hereditary pattern, e.g., in physical science, that one has a rigorous notion of a physical science. A physical science premised on anything different than that, is an unrigorous notion of physical science, which can be no better at best, than a collecting and rationalizing of

reconciliation of assorted elements of experimental evidence and related evidence, in the configurations which are subject to later interpretation, subject to later knowledge.

The typical situation in physical science, without the rigorous approach which I have indicated, is to list an array of constraints of added equations, added conditions, added constants, and so forth and so on, a list which may grow larger, larger, and larger. Obviously this list of equations is not science; it may be necessary work, but it is not scientific knowledge. Scientific knowledge occurs once this array of equations is reduced to a single principle, which is derived in a truly hereditary way from the only fundamental axiomatic sort of assumptions which are permitted, as I have indicated.

That is what I am trying to address again here with this series: to point out to you that I confront often among us, constantly, a lack of rigor. I have confronted this in a most exemplary way in the matters of physical science, where people say, "Start with." "Start with," famous last words. Or "Let us be practical." Or "It is well established that. . . ." Whoaaa, nothing is well established, except the underlying fundamentals.

It is precisely the acid of criticism, of Socratic dialectical criticism, of bringing forth assumptions, and tracing them to their ultimate roots, and overthrowing entire systems of thought, entire conceptions, on that basis; that, and nothing less than that, is true science.

It is more important to get that, than to solve any particular problem in physics; because, once we establish a science that is free of the Newtonian deductive heritage of mathematical physics, which is based on those principles we are defending here, then science will go forward at great speed. Whereas, we have come to the point that the clinging to deductive mathematics, the so-called accepted classroom mathematics, is the greatest impediment to physical science within the ranks of physicists, apart from extraneous things that such irrationalists as the environmentalists, the ecologists, and so forth, introduce from the outside.

On the true nature of substance

In the preceding section we referred to some basic principles. Let us review some material from a more advanced standpoint than we had previously, in light of what we have just said.

First of all, in Cusa's *De docta ignorantia* (*On Learned Ignorance*), for example, the circular action arises as a kind of metaphor, to represent the relationship between the maximum and minimum, i.e., between the Creator and the individual personality, not the other way round. Thus, the substance of the discussion is this relationship, the maximum-minimum relationship; the circle arises, and various aspects of the circle arise, as a way of representing, symbolically, so to speak (a little more than symbolically, but symbolically in one sense), what we have discussed as the substance. Therefore, the circle is not the substance. The circle is a kind

of mirror image, symbolic mirror-image, of the substance; the substance is the relationship between the Creator and man, *imago viva Dei*: the maximum-minimum relationship.

Let us look at this circular action with that in view, saying, "We know the circular action, but not a linearity of the space, or even space-time, when we speak of circular action. The circle, in itself, by which the circular action is being represented, is not substantial, it is not material." Let us define the materiality, in the sense of, "Let us discover, in the imagery of the circle, an idea of the circle, or circular action, which corresponds to the substantiality of the maximum-minimum relationship between the Creator and the individual person, *imago viva Dei*."

We start very simply, obviously with *action*. We don't have circles, because circles don't exist; they come into being. Nothing exists as such; we have to account for the method by which it comes into existence, otherwise it does not exist. The proof of existence is to define that which is subject to this proof in terms of *becoming* existent. The *becoming* existent of the circle is isoperimetric, for example: circular action. It is a representation of it, and what that connotes: coming into existence of the circle, and circular action.

So we no longer speak of circles, as such; we speak of *circular action*. The circle, in itself, comes into existence as a result of the circular action, which is defined as a self-bounded area. *Self-bounded*: So the perimeter is included in the circular area, is a self-bounded existence, brought into being by perimetric circular action, or that to which circular perimetric action pertains, or isoperimetric action pertains.

Therefore, we have an *action* in relationship to a result. The result is *work*. The self-bounded circular area is the *work* accomplished by circular *action*. *Action, work*. We put that into the context of a power relationship. We have *power* as the rate in time, at which the circular *action* creates *work*. Now, for example, the number of cycles per second, in terms of circular *action* or isoperimetric *action* creating circles. That is one way of measuring *work, power* of *work*. *Power* to do *work*. How much *work*? We have a unit circular area, self-bounded circular area, and the number of units per second accomplished by isoperimetric *action* is a notion of *power*.

We actually don't measure this in units of simple space. In all important functions, we have nonlinear functions. Why they have to be nonlinear, why elementary functions are nonlinear, is already implicitly indicated in the maximum-minimum relationship. You have this creative characteristic of the sovereign individual, *imago viva Dei*, as is indicated in *In Defense of Common Sense*; it is a nonlinear relationship. So, the elementary form of existence of the individual, the elementary form of existence of the universe as a whole, is immediately a nonlinear process, a very special kind of nonlinear process.

For reasons previously considered, all relations within the universe, other than those which are simply the direct

relationship of the individual, *imago viva Dei* to the universe as a whole, are also subsumed by that same nonlinear function. Thus, the *most elementary form of substance* in the universe, the most elementary form of action, is of this nonlinear form. That, its elementary substance, is of this nonlinear form.

Thus, we must look at this circular imagery in terms of the *action* itself being of that nonlinear character, and the work accomplished as being of that nonlinear character. Therefore, we are speaking of the power of a form of action which has that nonlinear character. Therefore, we are dealing with a slightly higher form, implicitly, of that nonlinear process.

Then, we find that that higher form is itself subsumed by that; so, we simply have such a kind of reflexive relationship. Since we can conceptualize the transfinite arrangement, which includes functions of different power (that it is on that level higher than one order of magnitude, or one order higher than the notion of power), that transfinite level, that, at minimum, human creative reason functions, that substance in the relationship between the Creator and *imago viva Dei* individual is located, is the level that all laws of the universe are located.

What this comes down to, in the simplest aspect, is that we count *power*, and we count *action*, in terms of singularities, meaning the kind of singularities which are generated by multiply-connected, self-similar action, derived from the

self-similar isoperimetric action of the most elementary kind. In particular, in terms of *power*, functions of power, we are looking at different rates, or variations of rates.

So, we are looking at *rates of increase* of the generation of singularities, as that power function. That means, we go one step beyond the ordinary Cantor function in this respect—the Cantor function which pertains to the implicit enumerability of the density of mathematical discontinuities within an arbitrarily small interval chosen. Now, take the same interval, as we indicated earlier, and increase the rate at which these singularities have been generated for that unit. Then, the notion of power, as of the second order, as the rate of increase of that rate of generation of these singularities, becomes the immediate notion on which we focus.

In that area, in the still-higher ordering subsuming that concept, lies, at least implicitly, the proper notion of substantiality. So, instead of looking at a circle as a self-bounded singularity on a plane sheet of paper, so to speak, without looking at that piece of paper itself, the *substance* is the still-higher ordering of power relationships, that nonlinear function, which we have just referenced. That, becomes, then, the functional notion of *substantiality*.

Now, let us just reference this to the Planck length. This would mean that the number of singularities contained within a sphere, or cross-sectional circular area, or something approximating that, of that Planck length in diameter, would



"The function of music is expressed by the correlation of this keener sensing of this emotion of sacred love (agapē) with the overall process of development of a composition to encompass one or more creative discoveries, a development which is itself the composition."
Pictured: Chamber musicians Seth Taylor and Eugenie Alecian play a sonata by Beethoven.

be increasing in the density of singularities within it. We are looking at increasing density of singularities in that illustrative sense. So, that is the essence of the nature of substance.

That illustrates to us rigorously, from an axiomatic standpoint, why no linear system of simultaneous equations, or inequalities, can represent anything actually in our universe. Why all deductive mathematics and mathematical physics is intrinsically, axiomatically absurd.

The case of classical music composition

Continuing as before, switching momentarily to music to introduce another point relevant to art in general, and, more broadly, to creative reason in general.

In the case of classical composition, in the case of counterpoint (not in the sense of schoolbook texts, but strictly in the sense of principles—provided that this is based on the proper tuning, of course), there is a very elementary kind of illustration of the creative principle, from the standpoint of the representation in my *In Defense of Common Sense*, for example: the simple singularities, which occur as harmonic or rhythmical dissonances, not arbitrarily, but *generated* from the lawful elaboration. These dissonances have to be resolved. These are not resolved in order to reestablish the theme as subject of the composition. Rather, the resolution of the dissonances in this form, in well-tempered polyphony, is the subject of the composition.

That is, the composition exists for the purpose of defining and resolving the dissonances. The solution to that, as expressed in respect to what is chosen as the thematic material, so-called, employed to create the ironies, becomes the composition as a whole.

Thus, the elaboration of the irony, the dissonances to be resolved, the treatment of the material afresh from the standpoint of this development, these complete the statement of an idea, and present us with a creative discovery which is precisely analogous in that respect to a fundamental, valid, scientific discovery. It is not merely analogous, but employs the same faculties of the mind, maybe in a different mode in some respects, but the same essential faculties of the mind.

In creative scientific discovery, and in the proper composition, performance, and hearing of music so performed, there is a distilled expression of the quality of emotion which is called sacred love, as opposed to profane love: *agapē*, for example. The function of music is expressed by the correlation in that way of this keener sensing of this emotion of sacred love (*agapē*) with the overall process of development of a composition to encompass one or more creative discoveries, a development which is itself the composition.

This applies to poetry, from which music is derived; it applies to drama, which is a branch of poetry, in another sense; it applies to classical visual art, where the same thing is done.

Exemplary is the case of the work of Leonardo da Vinci, in whose work this particular implication of classical method

is made explicit as we have discussed, for example, in the case of the “Virgin of the Grotto.” It exemplifies that sort of thing. (See page 62.)

So, art and science are derived, contrary to Kant, from this same faculty, this faculty of creative reason, with these qualities. That is the point to be emphasized, particularly with respect to music, and also with respect to science.

For example, how does the mind actually know that it is coming close to a creative scientific discovery? Or how does the mind of the composer, the great classical composer, know, that he is on the right track, so to speak, to a major composition, or toward something of the quality of a major classical composition? Or in any other classical work of art?

We find that even the successful composers, and scientists, are dreadfully lacking in certain kinds of what plausibly is the required knowledge to solve the problem they are solving. They solve it nonetheless. From the outside, people say, “Well, that is insight,” as if insight were a magical quality, some “unerring instinct,” so to speak, which guides them to a solution for which they have no explicit, formal basis for their solution as a whole. Something is added to the material they know, to cause them to leap, as it were, it appears, to the right solution.

We find that, particularly the great performer of classical works, is guided to the right interpretation, under the influence of a strong sense of sacred love. Whereas, the romantic is driven, as in the case exhibited most boldly by the case of Wagner’s famous “Liebestod,” by nothing but the erotic emotion. The erotic is equivalent to linearity, to entropy; whereas, the sacred is, in a sense, explicitly equivalent to negentropy. It is by *following the pathway of negentropy*, to give the sacred love another descriptive form, that the discoverer is led to the solution.

It is more than just being led by following a trace, as of the trace of sacred love; along this track one finds sacred love. The driving motive of creative discovery, the motive which supplies the potential of the concentration span required, is the same quality of emotion. Thus, we see something here. The idea of beauty, as we associate it with great classical art, emphasizes an aspect of the creative processes of mind, which is otherwise essential to creative scientific work; this emotion we can associate with the word *agapē*.

So, we see, in even this aspect of life, in the relationship between the artistic and the scientific experience of the scientific worker, that the scientist *requires* classical art, including classical music, in order to be a better scientist. The experiencing of a form of creative activity, which generates beauty as the classical form of experiencing a stronger impulse of *agapē*, in the development aspects of the composition, is a strengthening, a well-source, so to speak, for continued, creative, scientific work as such. Not only are the two based on the same principle; but the one is necessary to the other. A scientific sense, whether in the scientist or not, is necessary for classical musical composition, for example, as obvious

for the case of classical arts as Leonardo da Vinci and others exemplified this. The more essential thing to bear in mind, is that classical art is essential for the moral development of the scientific creative potential of the scientist.

This is not restricted to that. In every aspect of life, classical art is essential to enhance the experience and command of that which separates man from the beast. Thus, we give to this combination of classical art, and this emotion, the name *beauty*. In the truthfulness of this classical art, insofar as this art imitates creative scientific work by means of beauty, we have the equivalence of truth and beauty, and beauty and truth. So the function of classical art is essentially to give mankind an experience of truth and beauty, and beauty and truth in this way: to give mankind the light of this beauty, to illuminate scientific thinking, scientific potential, and, indeed, every aspect of life. So bury Kant.

On natural law and the rights of man

Let us go to the question of natural law as such. We have covered some introductory, axiomatic features of the basis for a hereditary, constructive approach, to a constructive physical geometry, consistent with Leibniz's and my own definition of monads. Now let us look at natural law in a broader sense, as it applies to political, or historical processes, and see it correlate to that.

We have also considered art, an inclusion which gives us, in total, a general social setting of the individual.

This historical question brings us right smack into the middle of the principal topic of *In Defense of Common Sense*. That is, the significance of the individual's behavior, is the impact of that behavior on the enhancement of the survival of not only present and future generations of mankind as a whole, but also, past generations. Just to get that little irony out of the way first: past generations? How so?

We are the past of our future. The question which ought to occupy our attention, particularly in light of the current and recent behavior of President George Bush, and some others, is whether the United States, in the future, will survive. In other words, will the outcome of our having lived and acted survive?

In some degree, that question is left to the future, to decide whether we, in the past, their past, have survived, or not. So, similarly, today, look back at the Founding Fathers of the United States. Did they survive? Did their principal work, the United States, a Federal Republic based on constitutional law (informed, poorly, but nonetheless definitely, by natural law, in the Augustinian, not Grotius's sense): Did they survive? Well, of course, they died; but did they survive? Did their actions lead to a survival of that cause for which they acted? Were they fulfilled in the future? And for how long in the future? This is the meaning of, "Did the United States, for how long, survive?" The answer to that question might very well be "no" at this point.

So, we, in the present bear now, and for the future, the

responsibility for the survival of those our forebears. Clear?

You come from one or more varieties of any, say, ethnic extractions, from many parts of the world. Let us take the American Indian. Now, did the American Indian survive? Very interesting question. Do American Indians today play any important part, or any particular American Indian, in the survival of the human species? Are they essential to the survival of the human species? Well, there is some doubt of that; obviously, some Indians have; but, in general, the great majority of Indians today, those who are confined to reservations, are denied the right to the survival of their ancestors. That is, after all the killing and the starving and the dying, and all these kinds of things that went on with all these people who once roamed the forests and plains and so forth of this nation, this area; did anything good come out of it all? Well, that is placed in doubt, isn't it? Shall we say, to make a pun, which is a rather cruel pun, perhaps, but appropriate in the circumstances: Did the American Indian survive? Did it all amount to anything? We could say, "One must have reservations on that subject."

It is a very important question. Not only is it a practical question, but as illustrated by the case of the American Indian, it is a very poignant question. Not only did the United States survive, but did the entire American Indian population, as an American Indian population, survive? Did it produce something of lasting value, as the Cherokee nation tried to produce before that great Democrat, Andrew Jackson, committed his genocide, his Nazi-like crimes, as the Cherokees would rightly view him? Did the American Indian encounter European culture, did they assimilate its best component, did they rid themselves of barbarism, to bring out that which is the best in them, in conjunction with the European culture they encountered? And did these American Indians thus go on to play, at least in proportion to their numbers, an essential role in ensuring the future success of the United States, and the survival of the human race? They mainly did not; they were denied that.

Ah! Therein lies the essence of a human right. And therein lies more than a right for the American Indian, descendant of those forebears, and responsibility. Therein lies the key to the whole question. *Are you given the right to be fit to survive?* Are you given the right to do something which will contribute to humanity's survival, in the present, and future, and the past?

This is not giving a loaf of bread, as such; this is not producing something. This is contributing something culturally, to the advancement of culture, in some way. Even the raising of a child, who might become creative; or whose children in turn, their grandchildren, might become creative. Even that is a contribution. Were you given the right to do this? Have you done it, if you were given the right to do so? What does it mean, to be given the right to do so? Doesn't it mean an education, doesn't it mean the social environment which is at least somewhat conducive to that? I don't mean

a privileged social environment, I mean one in which you are not yelled at so constantly that you can't think; not living in a neighborhood where it is so noisy with screaming and screeching and yelling all the time, that you have no rights to think: the typical victimization of the black or Hispanic ghetto, our slums today. Give them every material right, in one sense, but let the yelling and the screaming and the howling, the noise-making go on; nothing good much can come out of that.²

So, these are the kinds of questions we have to consider in general.

Now, let us look at this as a matter of principle, as we do in *In Defense of Common Sense*.

The test of the rightness of an opinion is that it must be *more* than an opinion. A mere opinion is worthless. Any man's opinion, insofar as it is merely an opinion, is worthless.

We see this illustrated today by Project Democracy. Project Democracy is a fascist movement. It was called, in the early 1970s, "fascism with a democratic face"; or "fascism with a smiling face"; or "fascism with a liberal face." It is a "democratic" form of fascism. The content of Project Democracy's policy is fascism, in the sense that we use the term fascism for the policies of Adolf Hitler. It is based axiomatically on the theory of opinion, that there is no right or wrong, which is how fascism crawls in through all the windows and doors—"because there is no right or wrong, don't you see?"

Jeffrey Sachs, who is, in fact, a fascist, who teaches at Harvard, and who is imposing fascism on the Poles, can argue, under liberalism (under liberal democracy), there is no right or wrong; there is only opinion. There is majority opinion; there is authoritative opinion; there is a consensus. A consensus doesn't say something is wrong; it is not wrong, you see: "*Alles ist erlaubt*": "All is permitted." A game of power. A Nietzschean game of power.

Who has this power? The bankers; the government that works for the bankers; the thieves; and those who work for them, and so on: fascism. But on the surface, it is democratic.

Do you wish to express publicly an opinion that there is a fascist government in Washington, or fascist policies of the

2. It is part of their right to have silence, to have some of these characters shut up, so they get a chance to read and think and concentrate, so that they don't have to listen to people yelling that stupid word "motherfucker" over, and over, and over, and over again, as if it were almost the only word in their vocabulary. A right to be free of that word, of hearing that word, is also a right, to put a fine point on the matter.

government in Washington? If you do, you'll be victimized by the Department of Justice.

Now, express your opinion. All say what your opinion is; stand up and say one after the other, what your opinion is; what is the majority opinion here? The majority opinion: It were discreet to support the present fascist policies and method. Ah! We have, at last, achieved a democratic fascism.

In the longer run of things, a nation which does as the United States under Bush is doing today, will not survive. A wrong opinion, if it prevails, ensures that sooner or later, that nation will be exterminated. The great debate today is which of the two superpowers, the Anglo-American or the Russian, is Sodom, and which is Gomorrah? At present, if we project the outcome of their present policies, their present cultural policies, as well as their economic policies, their political policies, including legal policies, we project that the United States and Soviet Union, the Anglo-American power and the Soviet power, will not survive. And therefore, all who contribute to the present policies or the present administration, are persons who have rendered themselves morally unfit to survive, by virtue of the fact that the net effect of their existence, is to render the nation unfit to survive, and to cause it not to survive.

That is the essence of natural law. Natural law pertains to the sacredness of individual life, by virtue of nothing else but the sovereign individual potential for sovereign creative reason.

The capacity of the individual for opinion is not sacred. It is not worth a damn. Experience of the individual, as knowledge, as mere experience, is not worth a damn. Democracy is not worth a damn, at least as it is fabricated by the Anti-Defamation League's Carl Gershman, the nominal head of that fascist Project Democracy, which gave us the drug-running Contras, among other things.

What is sacred is creative reason, as a sovereign potentiality of the individual person. The worth of this person is the degree to which he or she develops that reason. That reason is expressed, in practice, by its production of the means for the survival for the entire society, past as well as present and future. Thus are right and wrong and law defined from this standpoint.

That is natural law. That is the law of the Creator, which we know, not because it has been dictated to us, or been revealed to us in a dream by our Creator: but, because it is written on the face of the universe, that whoever violates that law shall bring about, by means of the law they violate, their own destruction.

Self-conscious reasoning

On the subject of creativity per se: The great difficulty which I observe in discussing this subject is that most people lack a conscious referent for it. I have discussed many aspects of the creative experience, that is, an empirical experience against which these kinds of concepts can be contrasted, as were it an experimental method of approach to the subject.

If you describe *agapē*, the kind of emotion involved, and recognize it in some sense, but only as a member of a listening audience to music, not as a performer or composer of music, the focus is on trying to experience the feeling, a focus which may lead sometimes to manic excursions, trying to intensify the erotic, trying to turn a surfeit of profane love into sacred love. It is quite something to watch, something I prefer not to watch.

But the obvious point is that one must set up experiments, which define the difference between the two states. I can



In Shakespeare's "Hamlet," the protagonist considers killing his treacherous uncle, but pulls back. "Using the knowledge that you have, as being yourself, and therefore having access empirically to everything that is happening to the Hamlet inside of you, you can look at some of the assumptions Hamlet is making. . . You can then see how you might change Hamlet's assumptions to cause him to behave differently."



Self-portrait, by Carel Fabritius, ca. 1649-50: "The essence of the creative method essentially is nonlinear. You conceptualize your own state of mind . . . in a Socratic way. You look at it critically. See your own follies. . . ."

indicate from experience some of the correlatives, the preconditions, the circumstances, the conditions which one must more or less consciously, explicitly, impose upon oneself in order to generate creative thinking. That is, generally creative thinking, as distinct from the deductive, and other banal types.

To actually experience it, however, and to be able to look at it self-consciously, as I shall indicate, is another thing than to describe it. Before one really knows what it is about, one should experience it wittingly, consciously, rather than merely attempt to describe it as in a faithful classroom academic exercise, describing accurately something one does not really know: typical university occupation, even in my days, and more abundantly so since.

There are several things to be considered. Let me address the emotion, the sacred love, the intense feeling of sacred love, which is always associated with the creative act. It is, as a matter of fact, the emotional state one must muster, or must be found to have mustered, before one is going to go any place with creative insight. It comes sort of intensely; it

is sometimes described as a light turning on in one's head—the sort of emotion that goes with that.

People will sometimes attribute that mistakenly to different kinds of experience; but that is a fair picture of this agapic emotional state, sacred love, as distinct from profane: the most intense experience in music, the non-erotic, the non-Wagnerian, non-romantic experiencing of music.

The other thing to bear in mind is, this doesn't work without *self-consciousness*. As some will recall, a couple of decades ago and earlier, I placed great emphasis on this business of self-consciousness. I addressed how this self-consciousness might be achieved, how one could enforce it; some of us conducted experiments in group discussions, as part of our effort, to try to understand these matters, and there was some comprehension realized in this way.

The essence of the creative method essentially is nonlinear.

You conceptualize your own state of mind, and you conceptualize it in a Socratic way, such that you don't simply admire, accept, the state of mind of yourself that you are observing, as if it were a hero in a drama, some silly soap opera or something.

You look at it critically. See your own follies; see the assumptions you make, as in tragedy. One might say, "Have consciousness of your ordinary conscious states, as you would of the progress of a tragedy; looking at your everyday self, your ordinary self of the classroom, or whatever, as you would look at Hamlet, for example." Then you are trying to be conscious, to have insight into Hamlet's mind, as you are observing it. You, being Hamlet. And using the knowledge that you have, as being yourself, and therefore having access empirically to everything that is happening to the Hamlet inside you, the one who ordinarily speaks, you can look at some of the assumptions that Hamlet is making, in order to behave the way he does, or to justify, or to perpetuate the way he behaves as he does. You can look then and see what the alternatives are, as to how you might change Hamlet's assumptions to cause him to behave differently.

In that kind of simple self-consciousness, two things happen.

The location of consciousness shifts from ordinary consciousness, the reacting, as the student in the university classroom, for example, reacts in answering an examination. Usually, the student is reacting, is generally not thinking, is reacting at a lower level. Now, put yourself up to a higher level, and look down upon yourself being that student, and describe to me what is going on in that student's mind, why the student is reacting the way he is, and what would cause his mind to behave differently.

Simple, very simple kind of thing. The important thing is not to get completely distant from the subject, the student as the subject of the examination; the important thing is to change the subject, into becoming us, the conscious self that is looking at the student's conscious self. The important

thing, then, is to place the importance upon achieving the corrections to be made: *simple self-consciousness*.

It is only in that state that any creative work can be done.

For example, to look at this experimentally: Reference my *In Defense of Common Sense*, the way I structure the argument there. If you can look at the student's mind as the mind of Kant, as I do, in *In Defense of Common Sense*, now you are criticizing the fallacy of Kant, you are criticizing the fallacies of the student. In that way, you shift the "I" from the student to the one who is looking at the student, looking at the Kantian; and what I described in *In Defense of Common Sense* as the problem to be solved, to be addressed there, is exactly what you must do in self-consciousness.

Now, with a certain quality of zeal, and a determination to persist, without losing track of what one is doing, the result is a movement toward the kind of concentration, which, extended over days, weeks, whatever, leads to creative discoveries.

I rather think that people have not only to do creative things, but have to accomplish them with aid of the viewpoint that I have just indicated, before they really know and understand what I reference as the creative processes. That one

sees, or you should be able to see, from what I have said so far, if you meet all the conditions that I have indicated, that you have an experimental setup, so to speak, in which you can begin to isolate the critter, with which you can begin to look at the creative process.

You also can see, for reasons already given in *In Defense of Common Sense*, and re-emphasized from a different, fresh standpoint here, that creative thinking is intrinsically nonlinear, as I have described nonlinearity, in describing the laws of the universe, here; that this indicates that the self-consciousness involved is nonlinear. And since it is only from this standpoint that the laws of the universe can be comprehended, for reasons already given, then the laws of the universe are elementarily not simple, but nonlinear of this neg-entropic form.

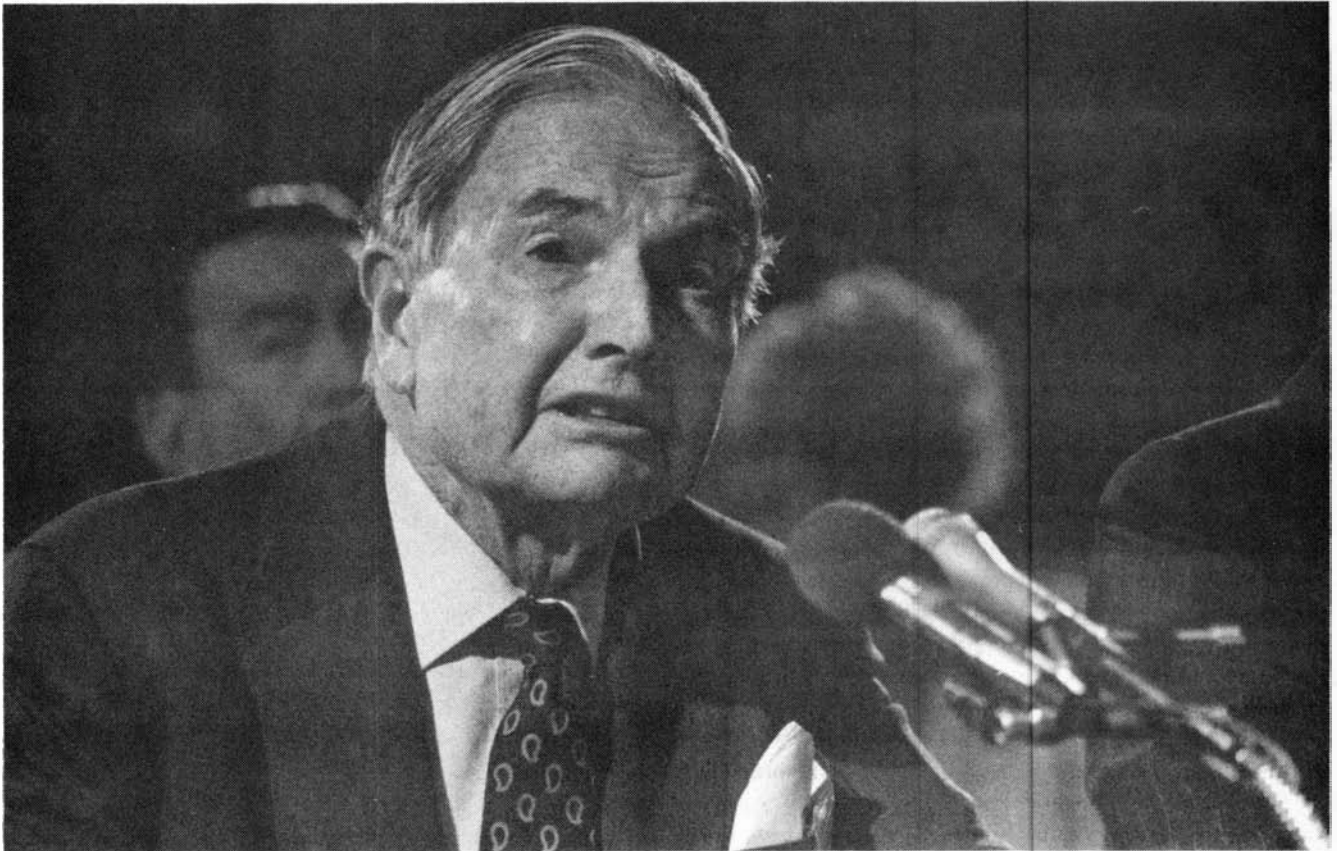
You have essentially, therefore, a universe which is not entirely dissimilar from Kepler's; in which the characteristic of the universe, as Kepler's model implicitly states, is negentropy, rather than entropy, and in which the Second Law of Thermodynamics is not tolerated, except in the loony bins of society.

Is there an American (Protestant) ideology?

I note the fact that this section is drafted on Sunday with a certain irony, because I refer inclusively to what is sometimes named the problem of the American Protestant ideology.

Contrary to the admirers of Adam Smith at the University of Chicago, such as Thorstein Veblen, the Rockefellers, Teddy Roosevelt, and so forth, the American Protestant ideology is not the hallmark of economic success which Teddy Roosevelt's New Age cult professes it to be. Let us look at the aspect of this which is relevant to this Project A.

It has been my not-uncommon experience in past years in speaking to some Americans, to speak of the fact that the financial system is collapsing, or to offer a list of catastrophes to indicate the way and the approximate time frame in which they may be expected if the United States continues its present course of action. During this, in some of these cases, some of these fellows will interrupt me to say, "Yes, I agree;



Council of the Americas chairman and banker David Rockefeller, testifying to Congress in May 1990. "Irresponsibility is the characteristic of the so-called Rockefeller variety of American Protestant ideology, and its secularized expressions."

yes, I agree; yes, I agree.”

I say, “If you agree, what are you going to do about it?”

“Oh, I’m going to wait for the Rapture, I don’t have to worry about all this. What you say is all true, it is all happening; but I don’t have to worry about it; I’m going to be raptured.”

That is one aspect; it is an extreme, if actual case, also a very illuminating one. That illustration goes to the core of the matter; it goes to the core of the worst, radical version of Calvinist dogma, and of related, radical forms appearing within Protestant dogma. The worst version of Lutheran dogma, is a variant on the radical Calvinist dogma, and is the same thing, in effect. The typical such American radical Protestant follows Adam Smith, as does the Quaker who refuses military service: “The larger matters, and the larger consequences of my behavior, I leave entirely to the ministrations of God; they are beyond me. And God will decide that, I have nothing to do with it, I have no responsibility for that. I,” he says, or she says, “am responsible only for my immediate personal affairs; my happiness, and that of my family and friends, my wealth, security, and so forth. And my personal dealings.”

The essential character of the American Protestant variety of predestinationalism, of the rapture variety, of the radical Calvinist variety, or of the Quaker variety, or of the Lutheran variety, is an essential, underlying immorality: a refusal to recognize that individual behavior has something to do with the ultimate consequences of the present for the future society, and that acts of omission are as much acts, as acts of commission, at least in many respects.

So, the failure to recognize this, is typical of the American ideology.

Therefore, I must say to my interlocutors, “You are each responsible for the outcome of your nation’s future.”

They retort, “What kind of nonsense is that? I reject that,” they will say. “I reject that. That is your opinion. I reject that. I take care of my personal affairs, I’m a moral person, and these are the matters I have no control over. I’m not responsible, I’m not responsible, I’m not responsible.”

Yes, they are very irresponsible. This irresponsibility is the characteristic of the so-called Rockefeller variety of American Protestant ideology, and its secularized expressions. This is not necessarily an irredeemable feature of the American, but it is a widely prevailing viewpoint which imposes itself upon many Americans, and which, because it is *popular*, is deemed acceptable, and authoritative widely.

The key to the weakness and the stupidity of the Americans is the term “popular,” and the equation of the term “popular” with democracy: “consensus politics,” and so forth. That truth and falsehood are rejected, and moral value is put on the “consensus”; “popular”; “majority”; and so forth, even though popular opinion usually happens to be wicked or merely stupid.

Thus, the essential thing which keeps nations going, in

times of crisis, great travail, is the role of the individual, or small group of leaders in taking the leading position—the others, recognizing that they are morally obliged to act similarly. Most of the time, that is lacking, in general, among Americans, at least most of the time.

So, the essential part of history is rarely understood by Americans.

At the same time, the importance of the individual is not understood. The so-called Rockefeller type of American Protestant, is not really a Christian.

Christianity, if we take the Gospel version, for example, or the New Testament epistles, quite explicitly casts man in the image of the living God, and does this in respect of creative reason. The Christian is responsible, in the sense that Cusa describes the relationship between the maximum and minimum, and so forth, with corresponding implications. The essence of Christianity is that “I am responsible; I have potentialities, which I am obliged to develop, to the degree of need about me; and, I am responsible to apply those developed potentialities to better the condition of mankind. I am an instrument; I am responsible; I am the agency.”

For example, another expression of this cited pathology: “We must meet our responsibilities; yes, we must *pray* for the right outcome.” Pray for the right outcome? By what means do we propose that prayer will prevail in inducing this right outcome? The Christian retorts, “Prayer must, among other things, summon in me the strength to become the instrument, the solution.”

So implicitly, the misled American Protestant of the type I have described, does not accept the implications of the divine spark of reason, of *imago viva Dei*. They may accept it, in one sense, in one degree; but they haven’t made the connection to individual responsibility, the universal responsibility of the individual, and, thus, the universality of the individual.

Thus, in both of these cited varieties of regrettable tendencies, we find the inclination to a false, anthropomorphic theology: God as an anthropomorphic being; and He is portrayed in what is sometimes called an “Old Testament fashion,” in the sense of being some kind of a capricious Mesopotamian potentate, whose laws are known to us by dictate, and are arbitrary: “It is not for us to know; it is for us to accept revealed instruction: not to accept knowledge, the responsibility of knowing.”

Thus, you have the American populist. The populism and the Protestantism of the type I have described, interface.

This is not to imply that all American Catholics are virtuous heroes; Pope Leo XIII referred to “the American heresy”; this problem has been referred to from Rome many times. All too frequently, the professed American Catholic is not necessarily a Christian, even though many of them would like to be called such.

So, we are not just picking on the Protestants; we are looking at a phenomenon; we find the same phenomenon in

characteristic of what Rome has often described as defective American Catholic behavior. Such errant American Catholics are defective, and tend to be gnostic and heretic, precisely to the degree that they imitate, all too often, the New York City Episcopalian of the present New York City Cathedral of St. John the Divine. It is to that extent the American Catholic tends to be not a Christian, as the Bishop Paul Moore type of Episcopalian is not a Christian, but, is, rather, a gnostic, sometimes veers, as the Lindisfarne crypt of St. John the Divine does, toward outright satanism.

So, this is the problem we have to face in ourselves axiomatically; as those of us who are exposed to the United States, and, also others, those of us in Europe, for example, of a Kantian inclination. For both, it is the same problem. The Kantians are immoral; they are professedly irresponsible, as the overtly anti-Christian Adam Smith makes a point of it; and, as Jeremy Bentham after Smith makes the point much more clearly and much more nakedly.

These are the problems we face in pedagogy, even in a preliminary way, in approaching the subject of natural law in the United States. You are talking to Protestants, and to Catholics who are Protestantized, and so forth. Among many Jews, the same thing, or even worse (cabbalist lunacy). That is what we are dealing with.

Now, you say, "These ideas of LaRouche are not popular"; recently, truth itself is not popular in the United States. Everyone says, "Well, I'm telling the truth"; but most of them don't know what the truth *is*, so how can they be telling the truth?

Worse, not only do they not know what the truth is, but they are not truthful. That is, their errors do not flow from a method which is seeking truth. They may think they are seeking truth, but they are not looking for truth in fact; they don't accept truth in fact. Instead of truth seekers, they are poor pragmatists, who would rather seek ideas that are popu-

lar, or presumably will be popular; they test the merit of ideas by their actual or implicit potential popularity.

The lower, animal type of belief, which is the typical American popular-opinion level of the mass media, the bite-sized opinions expressed by the mass media, the buzz words, all that nonsense, that level of animal-like thinking, is characteristic of most Americans most of the time. Equate us with another type of thinking, which is truth-seeking, Socratic, critical, in the sense we described earlier; what we represent is generally rejected among liberals. So, when we are trying sometimes to be "popular," or we are being instructed how to become popular, how to become influential through becoming popular, we destroy ourselves; we become less than ourselves, and we fail.

The strength of my friends' association lies, regrettably, but unavoidably, in our being often unpopular, because of our adhering to truth and truthfulness. We follow the truth where it leads, and we find that society is sick. We find the society riddled by qualities which are rightfully subjects of scandal. We find people who call themselves liberals, who, in point of fact, through economic policies, are greater mass murderers than Adolf Hitler.

This is the kind of society in which we live; and, we, to the extent we follow the truth, and, by the path of truthfulness, make ourselves unpopular. But, by making ourselves unpopular in that way, in the service of truth, we touch that aspect of our fellow human, even of our adversary, which is human, which is *imago viva Dei*, which really seeks the truth, which seeks the path of truthfulness, and which knows that it must combat the degrading impulse to be popular, as a whore is popular.

One must fight the whore in oneself to face the sometimes dangerous pathway of truthfulness, and virtue—*virtù*, in the classical Italian sense.

So, that intermezzo is added.

Determinism and matter

Thus far, I have defined the universe as a whole, repeatedly, as *elementarily* “nonlinear,” and, *yet not simple*. *Not simple*: That is the essence of the matter.

The nonlinearity exists *primitively*, that is, *elementarily*, only in the whole; that is, in the universe as a whole. This character of the universe as a whole is expressed for our knowledge, and in practice, in what I have referred to for purposes of metaphor, as the *unmediated* relationship between the sovereign individual’s creative reason, and the universe taken directly *in its entirety*: not part by part, and not as a sort of a philosophical gas system.

In other words, the meaning of “elementary.” The process of division into ever smaller parts (again, the Euler problem), does not signify that we are approaching elementarity. The monad is not elementary because it is small; it is not elementary in the sense of being a building block.



A model of Kepler's construction of the solar system is contemplated by a visitor in 1982 at a conference in New York City. "Kepler strikes upon the nature of the curvature of space-time, and shows that all physical laws in the universe are derived from physical space-time. In modern language, that is what Kepler is saying implicitly."



Johannes Kepler (1571-1630), the German astronomer. "When you turn Kepler inside out, you see that you can directly derive from Kepler's laws all the expressions used in Newtonian physics, simply by an algebraic manipulation." But the Newtonian ratios are only distorted shadows of actual knowledge as discovered by Kepler.

The character of the monad lies in its relationship, its direct relationship, to the universe as a whole. Therefore, the little monad, is as big in this respect, *in this relationship*, as the universe as a whole.

Elementarity, the elementary, indivisible, building block of the universe *as a whole*, is the universe as a *whole*. Relationship in the universe, is defined elementarily by the relationship between the creative processes of mind, as in valid, scientific discovery, and the universe as a whole, through the action of such discovery upon the past as well as the present and future generations of all mankind, and through the totality of human existence, so represented upon the universe as a whole. Thus, also, the line is related to the universe as a whole, since that which is adduced by creative reason, is the ordering of the universe as a whole.

This lawfulness of the universe, taken as an essentially indivisible *oneness*, must include all of the changes in the universe of which mankind's creative powers shall ever become capable.

Let us look at Kepler's construction of the solar system, as opposed to the unworkable, and obviously fraudulent,

Newtonian construction.

In Newton, we have the three-body problem. Why do we have the three-body problem? Because the relationship among bodies is determined, in reality, by the curvature of physical space-time, and not by the relations among bodies pair-wise, as in Cartesian notions of matter, space, and time. Therefore, for that reason, the three-body problem rightly does not exist, in the sense that there is no solution to it, because *the solution requires another consideration not advanced by Descartes or Newton, which is the curvature of physical space-time.*

On the basis of the evidence developed by Leonardo da Vinci et al., Kepler strikes upon the nature of the curvature of space-time, and shows that all physical laws in the universe are derived from physical space-time. In modern language, that is what Kepler is saying implicitly. He says similarly: because of the relationship between the creative powers of mind, and the Creator, that the characteristic of living processes, and of the creative processes of mind as an example of the living processes made self-conscious, efficiently self-conscious, that the universe must necessarily be founded on a principle of least action, consistent with what we would call, say, in modern language, *negentropy*, negentropy corresponding to the harmonic orderings congruent with the Golden Section, living processes.

We see, for similar reasons, that creative mental processes, in the sense of any hereditary construction principle, will be ordered, in respect to that construction principle, in terms of a similar Golden Section harmonic ordering. Or, at least, we can show in respect to this, the necessary effects of the realization of such creative discoveries.

So, in this respect, mankind is not only acting upon the universe, in a practical way, through scientific discoveries, in changing the mode of behavior, as behavior on nature; but, man is also acting upon nature by understanding the laws of nature. To understand the laws of nature, even though the practice which we referenced, is human practice, nonetheless, what we are referencing directly by means of human practice, by the reflection of human practice, is the laws of the universe as a whole. Directly. So, man's mind, the creative processes of mind, are **directly related** to the universe as a whole, and not *only* through the action of mankind as a whole upon the universe as a whole.

These are the kinds of distinctions.

Then, again, as we said before, to the same effect: Given, let us say, a monad, which is not an intelligent monad, floating around in this process, we do not substitute, suddenly, a pair-wise relationship among monads of this sort, to account for their behavior. This is not a situation where we have on the one side, higher monads, which are directly related to the universal, whereas there are the lower monads which are not, because they lack this creative quality. Rather, the universe as a whole is so constructed, that the pair-wise relationship of these lesser entities, must be congruent with the nonlinear

lawfulness which characterized the universe as a non-simple elementarity: i.e., universal space-time curvature.

This is obvious in the case of Kepler.

Kepler discovered, wittingly, a law of gravity, which he regarded as, probably, an electromagnetic principle. We can understand that today; we may not have solved all the problems of correlating the strong forces of gravitation with the relatively weak forces of other electromagnetic aspects of the matter; except as we introduce negative curvature, then, suddenly, we are required to get into strong forces, relative to what we call weaker electromagnetic forces, and therefore, we see a necessary geometry, even if we have not resolved this satisfactorily, experimentally. We can see a direction in which to go. But Kepler, identifying the electromagnetic principle as the relevant one to this phenomenon of gravity, caused by the curvature of space-time, was on the right track. He did not, at that point, tackle the difference between relatively strong and relatively weak forces, or things of that sort.

When you turn Kepler inside out, as, most probably, Hooke and others did, in respect to the work of the reduction-

ists of the seventeenth and eighteenth centuries, you see, as various fellows understood this, including Planck, that you can directly derive from Kepler's Laws all the expressions used in Newtonian physics, simply by an algebraic manipulation. But how did Kepler develop that from which this Newtonian schema is derived by a reductionist manipulation, algebraic manipulation?

Kepler derived it from a principle which is consistent, or coherent with what I'm arguing in respect to elementarity, which is ontologically nonlinear, not simple.

So, what we are seeing, with the Newtonian ratios, are nothing but the distorted shadows of actual knowledge, the actual knowledge being the Keplerian form, and the Newtonian merely a shadow.

We see the same thing in Galileo. Galileo was informed of Kepler's work, and parodied it, with corruption, to assert things which he did not actually, empirically, prove; but simply to show that, in effect, he could have claimed to have discovered empirically what he did not discover empirically, and, thus, show that Kepler's method was not necessary; was, in other words, superfluous.

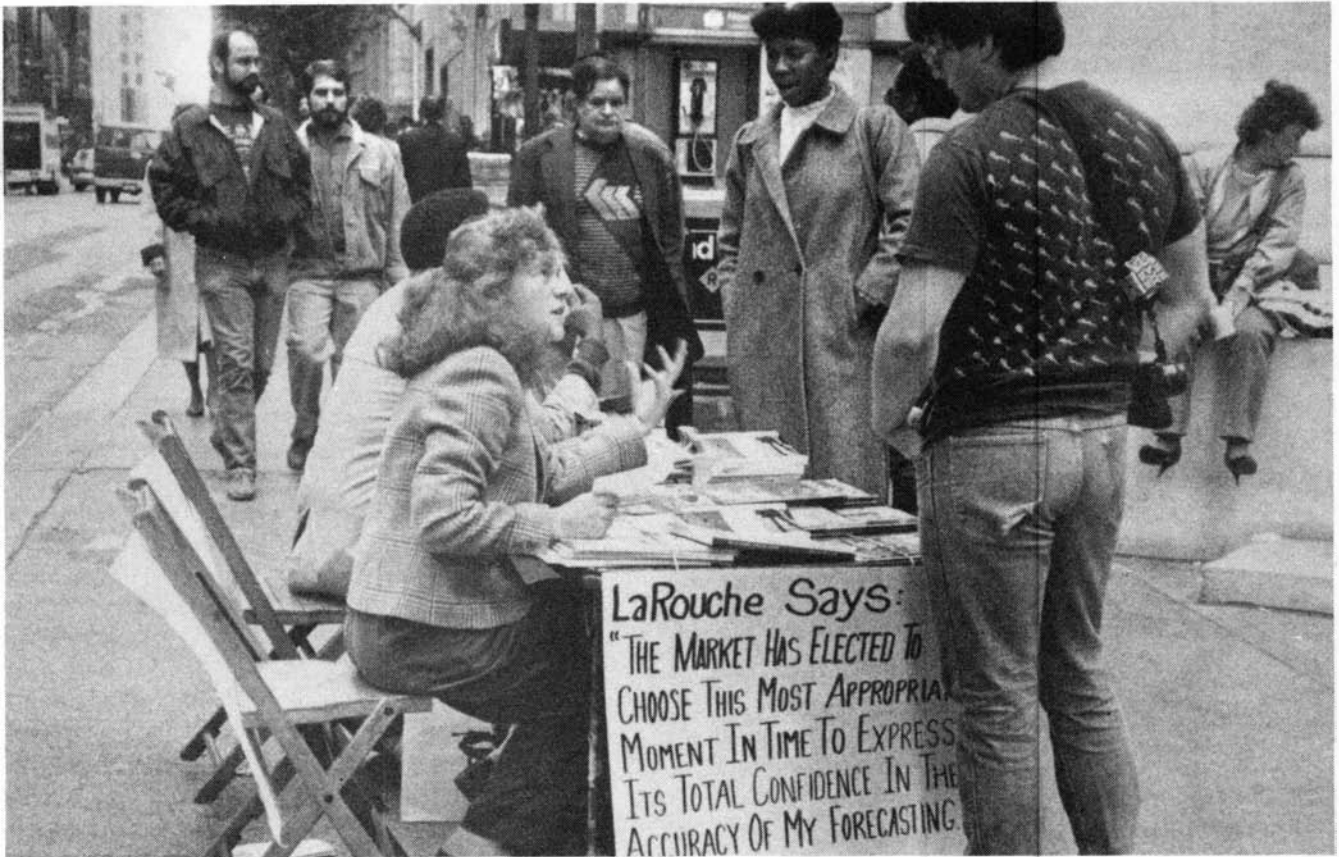
What is change?

It is most useful to consider an apparent anomaly at this point. The anomaly is: *the action which results in no action.*

Again, let us reference *In Defense of Common Sense*. Let us take any of the axiomatic systems of hereditary principles *A, B, C, D, E*, and so forth, respectively. To any among these, if we supply any action to be interpreted by, say, hereditary axiomatic system *A*, there will be no theorem generated by that action which is not consistent with the axiomatics of *A*, the hereditary principle of *A*. Similarly, for *B, C, D, E*, and *F*.

From the standpoint of *A*, that example, that an anomalous aspect of an event which differs from an acceptable axiom of *A*, or is inconsistent with *A*, will simply be disregarded as an erroneous, non-real occurrence.

In the practice of science, this treatment of anomalous reality appears all the time, or nearly so. People say, "Well,



After the October 1987 crash of the New York stock market, some of LaRouche's political collaborators set up this table on Wall Street. "If the common feature is disaster, then we can forecast disaster. But we cannot forecast in exactly which form the disaster will occur."

it didn't occur, it couldn't have occurred, because. . . ." It is only when one sees several times, that something anomalous did occur, and instead of rejecting the event because it is not consistent with the hereditary principle, one might, rather, realize that the hereditary principle is flawed, by virtue of the recurrence of the anomalous event.

One tests this, very simply, by proving that the alternative system, the alternative axiomatic system, generated by accepting the actuality of the anomalous event, generates a network of theorems which is consistent with the physical evidence, more consistent than the replaced or superseded axiomatic system A.

So, in the first instance, when we reject the aspect of the event which cannot be rendered consistent, we have *no-change*: We have no acknowledged result.

There is another aspect to this, a higher form of no-change, or *change that is no-change, but is also change*.

Take the same array, A, B, C, D, E: The event that causes the scientist to generate B as a successor to A, is of a very precise form. That is, even though there is no point of consistency between A and B, we can define the inconsistency. We can define this geometrically; we can provide a locus definition, which gives us an adumbrated algebraic definition, and so forth and so on. So, no event but one which is consistent with that difference will carry us from A to B, that is, will generate B out of A. Anything inconsistent with that inconsistency, would either lead not to B, or, if it is required to lead to B, will tend to be ignored. If the latter is not ignored, it will lead toward a completely different axiomatic system, which then comes under the same test.

Now, let us apply this principle to political and social processes and events.

We have this all the time; we have these kinds of envelopes all the time. Within limits, once something that can be represented as axiomatically determined in the course of events in process, any event, within certain bounds, introduced as a novel event to that system, will lead to the same general result as any other such event. It makes no difference what the choices are *within those bounds*. We will still end up with the same general outcome.

Now, for example, let us take simple economic forecasting. In the recent period, at every point we were forecasting, looking ahead, someone said to us, "When is this going to happen?" In response to that query, we could list an array of events which will be the probable, mutually exclusive alternatives.

Now, in each of these cases, the event is a crisis, which takes different forms; but all of the forms add up generally, within certain limits, to the same result, even though they

are different in detail.

It is one of the difficulties of forecasting, that it is more difficult to cause the layman, even the informed layman, to understand such a forecast and its significance, than it is to construct such a forecast (at least for me, an old hand at this sort of thing).

They rebuke me, "But that is no forecast. Which of those is it?"

I say, "It could be any number of them. But they all add up to the same thing." And whatever that is, when it happens, will cause another series of complementary events, which, whichever route is taken in detail, will add up to the same general thing in turn.

So, for the most part, we have systems which don't change. They change, but they don't change. And even the change may change, but without changing. *What we can forecast is that which does not change, the invariant, common feature of a variety of alternative sequelae*. That common feature is forecastable. If the common feature is disaster, then we can forecast disaster. But we cannot forecast in exactly which form the disaster will occur, because we don't know, in advance, which of the alternative routes will be taken, willfully. But once we forecast the disaster, we can examine the disaster, in all aspects, and find how the characteristic, which is disaster, will determine a characteristic sequel.

We can determine also something else, which takes us to *how to change the no-change*.

By looking at that which must be done to get us out of this kind of limitation, these kinds of boundaries, this trap, we select a course of action which takes us into new dimensions, which changes the characteristic of the event. Either we wish the disaster, in which case we don't try to change that sequence; or we don't wish that latter outcome, that characteristic; in which latter case, we must select only events available to us which will cause a different characteristic to emerge.

So, then we have the boundary conditions within which certain events lie. These events mean, effectively, *no-change* which is of one order or another. Any of these events are somewhat interchangeable; not entirely, but somewhat, at least in terms of that general thing which may be most significant to us in the result.

But there are also events which lie outside that narrow domain, outside these more restricted bounds, which can produce a different common characteristic of an alternative set of events, than the first case. That is the way we have to look at not only political processes, but, that is the way in which we have to look at physical processes.

Change and no-change

The subject is a further examination of the concept of “change/no-change.”

The question of change arises on, immediately, two levels.

First, there is simple change in experience. On this level, any event, or the lack of an event when it is to be expected, is a change. What we are looking at, at a higher level, is changes in the way we think.

This is most simply illustrated, from a deductive standpoint, by the fact that a logically consistent, deductive form of thinking, is always based upon a set of underlying axioms and postulates, both stated and conscious and implicit, as well as stated or conscious. Thus, the events which are of significance, as in the case of scientific discovery, are events which are not consistent with a theorem which might be derived from a given set of axioms and postulates.



French philosopher René Descartes, in a 17th century engraving “Descartes simply takes everything which is disagreeable to a radically reductionist standpoint, and relegates it to the mystical domain of deus ex machina.”



Brunelleschi's solution to the construction of the dome of Florence Cathedral (1420-36) was at the same time an astonishing engineering feat, a work of surpassing beauty, and a demonstration of the Western conception of the Trinity, which stressed the necessity of progress. It set into motion changes in society that increased the per capita power of mankind over nature, and the increasing security of the society.

So the practice of science and serious statecraft, i.e., something higher than the politics practiced in Washington, are ordered.

In both science and politics, the object is to increase the per capita power of society to exist and develop. This is the proper object of science. The essential difference between one set of underlying beliefs about science and another, from a practical standpoint, is which set of implicit axioms and postulates guide us to greater practical power over nature, per capita.

The same thing is true in politics: Which set of underlying political principles, notions of the nature of God, man, and nature in general, guide us to form some practice which corresponds to an increasing power of mankind over nature, and the increasing security of a society.

So, it is on the second level, of changes in axioms and postulates, at least implicitly, to the purpose of increasing the per capita power of man and society, that our attention ought to be primarily focused, rather than on the inferior level of the simple response to judging of simple experience. Hence, those aspects of experience, which do not challenge the existing set of axioms and postulates, belong to the area

of no-change, even though there may be change involved, of course.

This involves also, as we have already indicated, the case in which an event has occurred, which is anomalous, and which thereby would tend to require an overthrowing of existing sets of axioms and postulates, at least implicitly so. But, we refuse to recognize that event; or, we refuse to recognize the aspect of the event which represents this challenge. We do so in order to defend the system of axioms and postulates in use, against the threat which is represented by this anomalous event, or the anomalous aspect of an event (which is otherwise tolerated). *So, even though a change might seem to be required by the anomalous event, no-change occurs*, because the mind refuses to acknowledge the anomalous aspect of the occurrence, or, relegates it to some mystical realm, for which the conflict between the event and the axiomatic assumptions is reduced, as in the case of Descartes, who simply takes everything which is disagreeable to a radically reductionist standpoint, and relegates it to the mystical domain of *deus ex machina*. Thus, the problem is defined; and thus the importance of this subject of change/no-change in these discussions.

Self- consciousness again

We have outlined a schema, as we have in my *In Defense of Common Sense*. We have indicated some transfinite levels, *transfinites* in the sense of the term used by Georg Cantor, the famous mathematician of the nineteenth century, but also in a broader sense, although not inconsistent with Cantor's usage.

We have, first of all, the level of simple experience: Consciousness of simple experience is one level of transfinite: consciousness of events happening to one, not merely perceptual consciousness, but consciousness of a theorem-ordering, that something is happening. One thinks in terms of causalities, simple causalities respecting day-to-day experience, or assumed causalities. That is the simplest level of true consciousness, apart from mere awareness/perception.

Then, we have the second level, which we introduce forcefully by aid of a negative view of consistent deduction.



"God Separating the Land from the Waters," by Michelangelo, Sistine Chapel, Rome, ca. 1509. "On the higher level, man is locating himself or herself as a sacred individual, as in the image of the living God, as the embodiment of a sovereign quality of potential for creative reason, in which self-interest is associated with the discontinuous development of that potential."

That second level is the Kantian level: the fact that all mutually consistent theorems, i.e., perfectly consistent deductive mathematical physics, can be reduced to a set of underlying axioms and postulates, which axioms and postulates combine to represent what is called the hereditary principle. That is, that no theorem can be constructed in deduction, by deductive means, or otherwise, which is not simply an elaboration of something already asserted implicitly in the hereditary principle in the underlying set of axioms and postulates.

Thinking about the changes from one such set of axioms and postulates to another, is the second, or next higher order of consciousness. By thinking about that, we mean thinking about some notion of an ordering of change from one set of axioms and postulates to another set of axioms and postulates, and thinking at the same time of the changes in our notions of causality, on the simple level, simple causality, which are accomplished by these changes in choice of set of axioms and postulates. We also are thinking about the evidence in the empirical realm, which might be called *crucial experimental evidence*, which compels us to see a flaw in assumption within a set of axioms and postulates, and thus forces us to reform our axioms and postulates, to generate a new set of axioms and postulates. So that is the second level of consciousness, an awareness of this.

The second level of consciousness also includes the notion that there is an inherent ordering which ranks one set of axioms and postulates as higher in rank and order than another. This notion of rank is inseparable from the notion of power, which is why and whence my work in physical economy comes directly into play as reflecting the essence of philosophy in this matter.

The notion of *rank* and *power* is associated with an increase of the power per capita of the human species to survive successfully, which means to continue the development of that power.

This takes us to a *third level of self-consciousness, which is looking down on the level of succession of the sets of axioms and postulates.* On the third level, we are into the realm of true Socratic thinking, in which we are not merely negating the errors, obvious errors, or reducible errors in a set of axioms and postulates; we are now looking at the ordering principles, the choice of ordering principles, by means of which we might order progress among alternative sets of deductive axiom and postulate arrays.

So there is the third level of self-consciousness.

In each of these cases, what is involved is consciousness; that is, our actual human consciousness, as an individual, taking our consciousness on the relatively lower level, as a *subject* of consciousness, as an *object* of consciousness, and thinking about our thinking. That is, going to a higher level, to thinking about our thinking on a relatively lower level.

So we go from the level of thinking in terms of simple causalities, subsumed by only one set of axioms and postulates, to thinking about the differences in notions of simple

causality associated with an ordered change in choice among implicitly alternative sets of axioms and postulates. That is the second level.

On the third level, we take the activity on the second level as the object or subject of consciousness; and we might also think about, in the third level, our consciousness on the third level.

Thus, as long as we are able to do that, to achieve these three levels of consciousness as consciousness by no mysterious means, no mystical means, nothing more than precisely what I have described in essence, we have two results. We can master our fate to a large degree, as we are not compelled to follow blindly the current consensus of the Bush administration combination. We can choose sanity, we don't have to put butterfly nets around ourselves, as most of the Bush men should be doing. We can also conceptualize creative reason as a consciously comprehensible form of human thought and activity. We can do what Immanuel Kant, Descartes, and Aristotle, could never succeed in doing, and which they denied could be done; but, we can do it.

This latter is obviously what was done by all the greatest scientific discoverers and greatest artistic composers. Whether or not they were fully aware in the terms I have just referenced of what I have described, they practiced consciously what I have described.

This is related to something which can be called spiritual; that we all have, in a sense, two natures.

We have one nature, which is essentially below the belt, including treating the mouth, and sense of smell, in terms of aesthetic aspects of the mouth and sense of smell, as upward extensions of the gut. That is the lower level. That is the level on which man is closest to the nature of a beast. He is a little bit brutish, bestialized, shall we say; he is egotistical in the narrow sense; he is a *pragmatist*, which is a form of bestiality.

Or, man is on a higher level. On the higher level, man is simply thinking and locating his or her self-interest in terms already referenced. Man is locating himself or herself as a sacred individual, as in the image of the living God, as the embodiment of a sovereign quality of potential for creative reason, in which self-interest is associated with the discontinuous development of that potential. The development of that potential is associated, not merely with the progress which enables mankind to increase power for the survival of the human species, but is located, as we have indicated, in a conscience-strickenness respecting one's debt to past, present, and future humanity as a whole, and respecting man's role as a species: as a servant of the Creator in respect to Creation as a whole. That we are responsible to the Creator to assist in the process of continuing upward Creation.

Once we locate the meaning of our individual lives' soul, then we look at what we are thinking, as well as what we are doing. From that critical standpoint, that enables us to say, is our belief correct? or is our belief absurd, as opposed to

the person who says, "I was raised that way, and I'm going to believe that way until I die": which is not very intelligent, is it?

One says, "I believe that way, not merely because I was raised that way, which was an advantage to me; but I have come to understand why this choice of Christian civilization, for example, was the right one; why anything else would be a mistake; and why this is not merely our civilization; it is something, the best of which we hold in trust for all mankind."

That is the beginning of the *emotional*, intellectual ability: to rise above the relatively bestial level of thinking in terms of simple causalities. Then, when you think further, and become a philosopher, in the sense that Plato, and Plato's Socrates identifies this, a philosopher-king, a true statesman: Then one must think, and say, "What *is* creative reason?" And we think of what is creative reason in terms of what we must do, what we yearn to accomplish; the yearning for atonement, so to speak, with humanity as a whole, and with Creation as a whole.

We are sensible of the fact that we have short lives, mortal ones, in which all the sensual pleasures of modern life go into the grave with us; and so we sense our immortality, not in respect to the survival of our mortal flesh, but rather, in terms of the mission, which makes us useful to past generations, as well as present and future ones. Thus, we are able, in thinking in those terms, to reach out and see ourselves in respect to a necessary existence in the service of Creation as a whole.

We seek that quality; we seek to find that identity; and we find it within ourselves in creative reason. We yearn for it; we yearn to distance ourselves from that which denies us the development of that quality in ourselves. We have precious little time to do it; because we are going to die soon. It may be years, it may be decades; but we are going to die. That is a short time to get the job done, with limited opportunities available to us. So, we yearn for it.

People who are of that cast of mind, and who have achieved a certain amount of rigor (which takes time in

achieving that cast of mind), can go more or less readily to the second and third levels of transfinite as I have described. Thus, what I have talked about, as the problem of change and change/no-change, in the preceding, should be understandable; should be comprehensible, in practical terms of reference.

What do we care, in the long run, of these little things that most people care about? We care about them; they have to be taken care of. But we do not obsess ourselves with following the simple causalities, which are seemingly given to us, by an established way of looking at these things. What we have to do is to outflank the problem. We go to a higher level, the second transfinite level of consciousness. And look at ourselves engaged in this play; and we look at ourselves as Swift's Gulliver might look at the Lilliputians, and look down on them, and say, "There am I; I'm that little Lilliputian over there, I'm looking down on myself. What am I doing? What kind of silly fool am I, playing this game?" Or, as a playwright, putting a great tragedy on stage, in which he may put something of himself or something of somebody else; where you recognize yourself on that stage of that tragedy. You say to yourself, "That's me up there; what am I doing? What am I doing?"

That brings you to the second transfinite level. A choice of the set of axioms and postulates, so to speak, which govern causality, particularly one's own role in causality. But that is not enough. That is useful, it is necessary, but it is not enough. One is driven, thus, to find, "Well, what is truth? This is true, this is more true than that; that is false. We have proven that." "But what is true?" That requires going to the third level of transfiniteness, in which we understand the ordering principle, and understand a relative absoluteness. We recognize this as the Good. And when we reach that level, and when we think in those terms, we are good. When we think in lesser levels, we are not good.

Thus, those of us who would be good, must be, from the standpoint of outsiders, from the Lilliputians looking up at us, as Gullivers; we must be preoccupied with these three levels, and the problems of change, and change/no-change.

A self-conscious scientific method

In light of what we have just said about self-consciousness's role in this process, several points should be made respecting the nature of an adequate, i.e., rigorous, scientific knowledge.

First of all, it should be apparent that it is on the third of the three levels indicated, that creative reason is consciously located as both subject and object of consciousness.

The first level being the notions of causality associated with experience, as a causal notion of experience, as opposed to, simply, a perceptual one (which we deal with as somewhat below the dignity of the term consciousness). This includes the consciousness of the existence of *self*, as an actor in the causal sequence. All of that lies on the lowest level of self-consciousness.

The second level of consciousness is better called the simple Socratic consciousness, in the sense that we are aware



Benjamin Franklin's crucial experiment on the nature of electricity, with the Leiden jar. "What we do, properly, is to design experiments to bring forth, predictably, the anomalous kind of event, with respect to existing mathematical physics, to demonstrate that this predictability is accomplished, by allowing a different axiom or hypothesis, for example, than exists in the generally accepted mathematical physics."

that a deductive or formal reasoning (or linear reasoning, which is the same thing as deductive reasoning), is always governed by one of a possible set of axioms and postulates, such that these axioms and postulates taken as a set, anticipate every theorem which might be attached to a lattice based uniquely upon that set.

This relationship is called the *hereditary principle*, and no theorem respecting experience, that is, no notion of causality, including the relationship of self within the causal process of simple consciousness, can be reached except as in terms of expressions of theorems consistent with, in the simplest case, a specific set of axioms and postulates, or with a specific theorem of that set.

Thus, the second level: The notion of an array that we can go from one set of axioms and postulates, to another set of axioms and postulates, and that the theorems generated by, say, set *A*, are never consistent with any of *B*, and so forth. But, we are aware there is a connection between *A* and *B*; we are aware of a kind of mathematical discontinuity, separating one set absolutely from the other in terms of being mutually inconsistent.

This enabled us to see the third layer in the ascending rank of consciousness. In this, we are focused, not on a successive layer of mathematical sets; but, we are, rather, concentrated on the process by which possible such sets may be ordered to represent an ordered series: an enumerable series, in terms of a generating principle, such that the sets proceed from relatively lower or higher order, when the measurement of lower to higher is the increase of the per capita reproductive potential of the human species.

It is on that third level that we locate the action, which constitutes creative reason as an object and subject of conscious thought. In general, except as we imply a fourth level, which is the consciousness of this, such as the notion of universality, this is the nature of possible conscious human thought.

The question arises: To what degree is this subjective? That is, to what degree does the thinking, as in scientific knowledge, defined so, in terms of these three levels, by human beings, constitute a true science? An interesting proposition. *To what degree would a different species, presumably with a comparable intelligence, think quite differently?*

In general, we would have to say, with respect to the third level, not necessarily the first level: "They could think no differently: Otherwise, they would not be equal." The human species has an indefinite potential for increasing its equivalent of its reproductive power. That does not always mean that this increases the total number of persons; but it means that the equivalent of the power to increase the total number of persons is always there. It may be converted into some other expression; but it is there. So reproductive *power* refers, not to the reproduction of the *number* of persons of the human species, although that is implied; but, rather to the condition of the species as a whole, with respect to the

universe as a whole. Both productive power and reproductive power are subsumed notions of this *power*.

But in terms of the creative principle, if we can postulate, or hypothesize, different species, which have intelligence comparable to the human species, but might have all kinds of other differences; they might differ, in respect to the first level of consciousness, but they could not differ, essentially, with respect to what we have indicated as the third level of consciousness.

So much for that preliminary observation.

Now let us see what we are really saying.

First of all, the general condition we are referencing, as outlined in *In Defense of Common Sense*, indicates that simple empirical knowledge is not knowledge, nor is it scientific knowledge. That does not mean that simple empirical knowledge is irrelevant; it means it is not scientific knowledge; it is merely a device which plays a part in the development of scientific knowledge.

The interesting part, which goes back to the change/no-change proposition, is: The most important thing about empirical knowledge is the extent to which it is or is not, in Kant's terms, possibly anticipated as synthetic *a priori* knowledge.

For example, anything outside an accepted theorem-lattice which could be predicted by a mathematical physics without experiment, would be analogous to something synthetic *a priori* in a Kantian system. Then, what would be of interest to us in a such a mathematical physics, for example? In all cases, from a scientific standpoint, we would only be interested in determining, given any array of events, or individual events, which of these arrays or individual events, conformed, predictably, to synthetic *a priori* extrapolations from a given set of axioms and postulates; and which did not.

The only thing of very much interest to us, would be the situation in which some of the events did not correspond: were, in those terms, anomalous.

So, *the variable rate of occurrence of anomalous events, with respect to all events*, including the non-anomalous, is the kind of event in which the well-advised scientist is interested primarily.

So, in that respect, empirical experiment plays an essential part in scientific knowledge; but it is not the substance, directly the subject or substance of scientific knowledge.

What we do, properly, in design of experiments, is to design experiments to bring forth, predictably, the anomalous kind of event, with respect to existing mathematical physics, to demonstrate that this predictability is accomplished, by allowing a different axiom or hypothesis, for example, than exists in the generally accepted mathematical physics. The occurrence of that which is absolutely anomalous, with respect to currently accepted mathematical physics, but which is allowed by a different hypothesis, constitutes what we call, sometimes, a *crucial experiment*. And, thus, science is based, essentially, on a Socratic doctrine of

hypothesis, or at least that is the proper representation of scientific activity, whether some scientists recognize it or not.

This brings us directly into the main subject matter of *In Defense of Common Sense*. Science is concerned, in terms of reference modeled upon the idea of crucial experiments, to discover the discontinuities, which compel us to overturn axiom and theorem-lattice *A*, in favor of axiom and theorem-lattice *B*, and so forth and so on.

Thus, we are forced to level three in consciousness. Rather than just saying that we have to change from *A* to *B* in some undetermined fashion, we say what we are concerned about fundamentally is that which is crucial-experimentally right, which confirms an ordering principle which will enable us to say, with crucial experimental authority, that *B* is greater than *A*, and *C* is greater than *B*, and so forth and so on. The concept of that ordering principle, as itself the only axiomatic of mathematical physics, would be mathematical physics on level of consciousness three, the third level of consciousness. An awareness of that may be seen as analogous to a fourth level, which is the kind of thinking we are reflecting, or Cusa is reflecting, and so forth, in dealing with these kinds of matters that we are addressing now.

Thus, we come to the next point.

So, the human mind is incapable of scientific thought, or actually classical artistic creative thought, *except* in these terms of reference.

Our definition of an object, the ontological features of axiomatics of our knowledge, are all referenced to this level three of consciousness, as we have defined it, immediately here, or just loosely described it here. Therefore, first of all, this is the only apparatus by which we could have scientific knowledge of our universe. Only from this Socratic standpoint is a rigorous mathematical physics possible, for example.

The question is, then: "Is this merely a projection? a stereographic projection, so to speak, from one geometry into the geometry of the brain; the geometry of the other, to the geometry of the brain? If we have a different geometry of the brain, would a different perceiver, having that different kind of geometry of the brain, get a different stereographic projection of reality than we do?"

Not really. Not in terms of third level of consciousness; he couldn't. Because the crucial experimental approach associated with level of consciousness three, is crucial-experimental with respect to the real universe. So, in terms of the ordering principle, it is only on level three of consciousness, that the ordering principle of the mind, and the ordering principle of the physical universe, come into agreement. And there, the agreement is not merely the stereographic correspondence; there, the agreement is actually an essential identity, so that any other species of creature, which is intelligent, in the sense of the human species being intelligent, would, in terms of this third level of consciousness, have a mind

exactly like that of our best scientists, our best musicians, and so forth.

Furthermore, that being the case, that implies that our mind, in these terms of reference (not in terms of simple perception), is a representation of the lawful ordering of the universe. That the laws of the mind, when seen in this frame of reference, are essentially the laws of the universe. Not perfected laws of the universe, but imperfected laws of the universe. But the laws of the mind, insofar as they govern our mental processes, on the third level of consciousness, *are* the laws of the universe. Even though what happens on our third level of consciousness in terms of particulars, and its derivatives, may not be perfect, yet the principle which governs that progress in the mind, is a perfect principle.

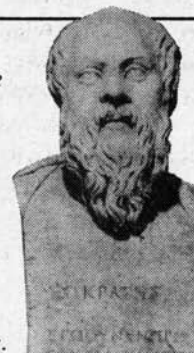
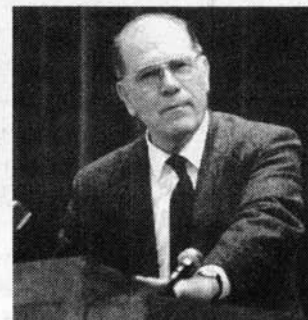
Similarly, in the universe. The principle which governs the development of the universe, the negentropic development of the universe, is a perfect principle. And these two perfect principles are in agreement. And that agreement pertains to the notion of *imago viva Dei*. That is the best of all possible worlds.

'From the prison in which the politician's career expires, the influence of the statesman is raised toward the summits of his life's providential course. Since Solon, the Socratic method has become the mark of the great Western statesman. Without the reemergence of that leadership, our imperiled civilization will not survive this century's waning years.'

—Lyndon H. LaRouche, Jr.

IN DEFENSE OF COMMON SENSE

by Lyndon H. LaRouche, Jr.



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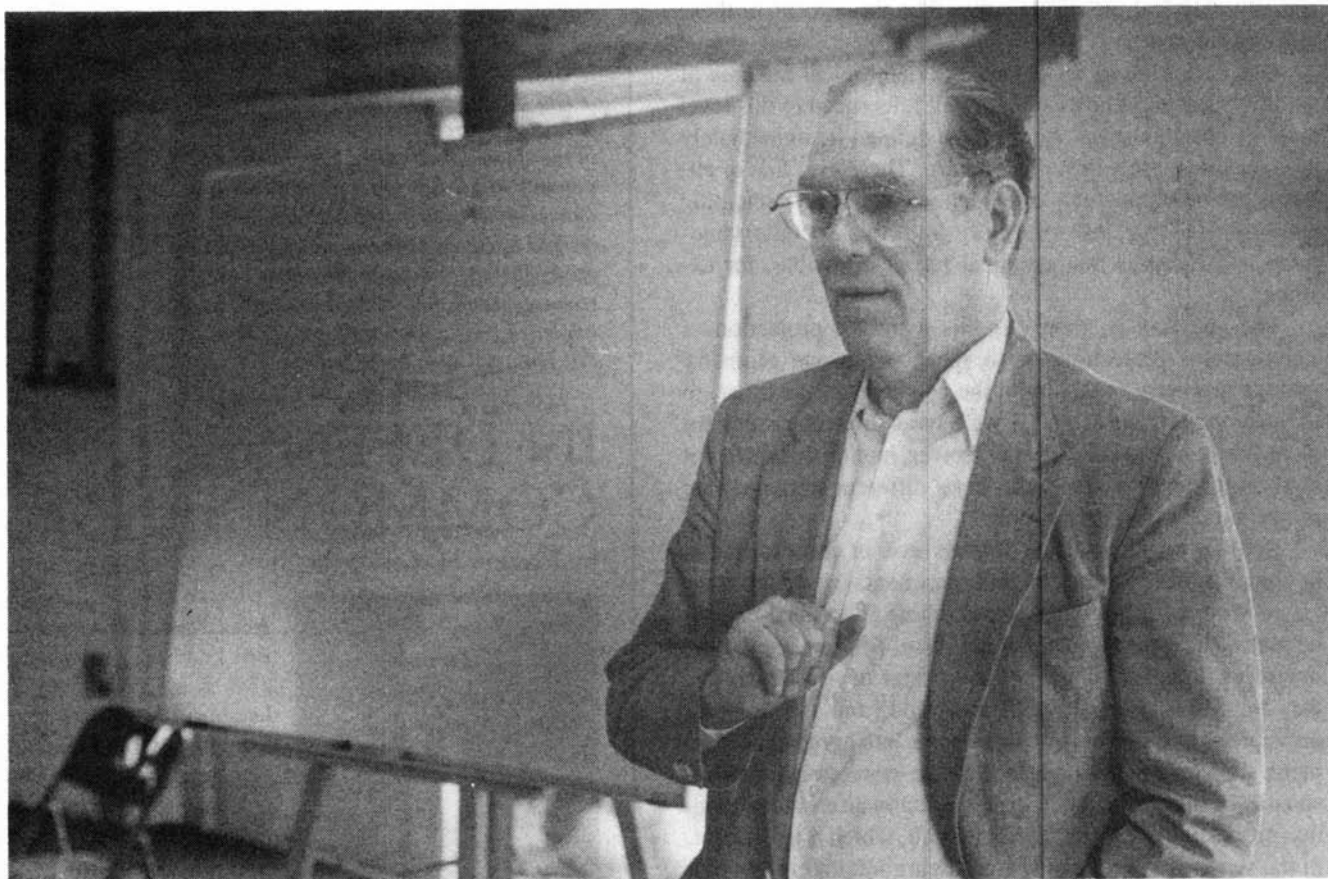
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The uses of deduction

Let us continue the line we have just been exploring. Let us compare what we have said in the previous section with our earlier references to the importance of the *Monadology* of Leibniz, and to the refutation of the attack on the *Monadology* by Leonhard Euler. We shall then see how what we have just said pertains to mathematical physics, for example, concretely.

We repeat: It is the generally accepted view, among educated mathematicians and mathematical physicists today, that the only acceptable argument in physics is that form of argument which is couched in the accepted terms of reference of a deductive/inductive form of commonly used classroom mathematics.

I object: "That commonly used classroom mathematics is faulty, and cannot possibly represent the real universe." This was first emphasized, as I referenced this problem in



Lyndon LaRouche teaching a class on scientific method in 1985, in Leesburg, Virginia.

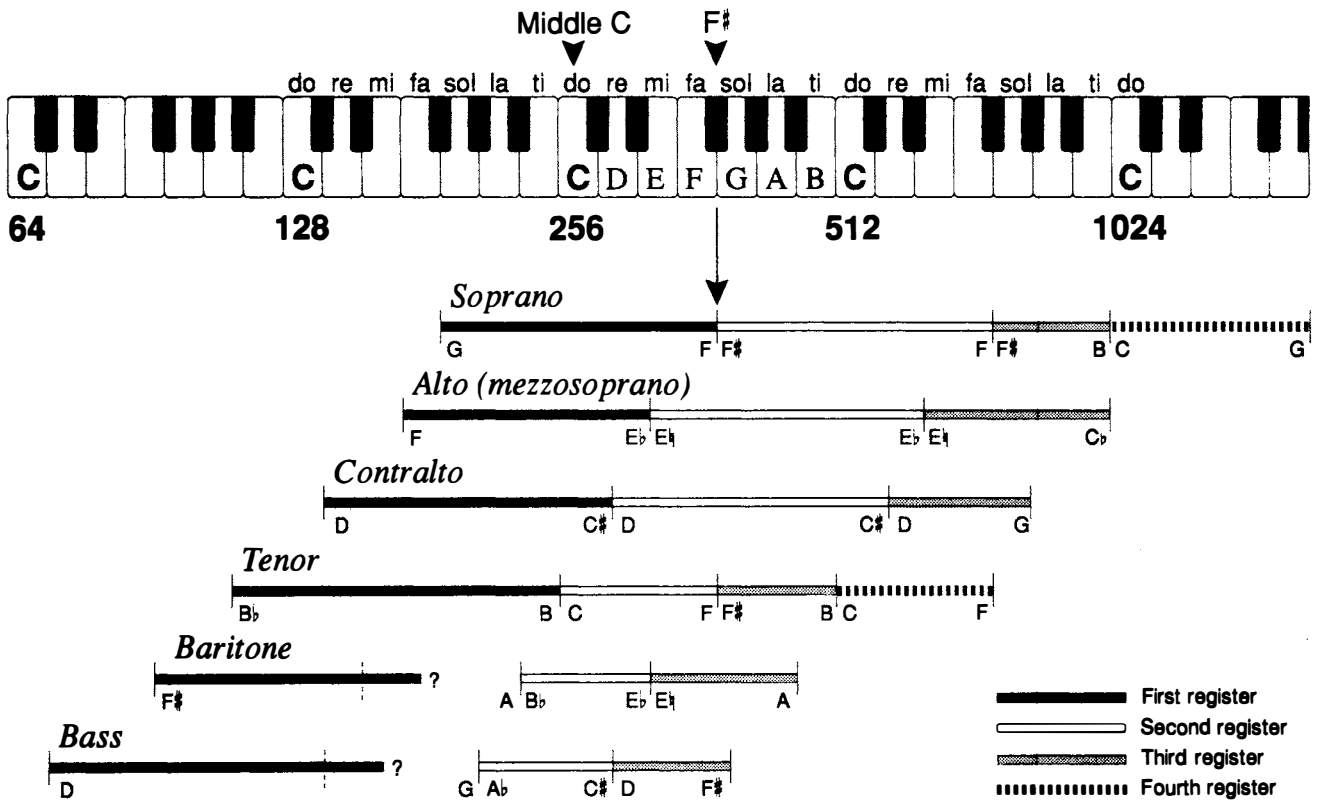


Chart of registers in trained singing voices.

the text of *In Defense of Common Sense*, in connection with Newton's *Principia*.

Newton was astute enough to recognize that what we call today the Second Law of Thermodynamics had made its ugly appearance, implicitly, in his text. He pointed that out to the reader, and said, in effect, "This is absurd. That is not the way the universe functions, and it is not my intent to convey that impression to you. However, I was compelled to show that, because of my choice of mathematics."

Now, what Newton was saying, effectively, is that the only mathematics which he considered acceptable at the time is a deductive/inductive form of mathematics, of the type which coheres, in most respects, with the doctrines and dogmas of Aristotle, Descartes, and Kant, the things we have refuted in *In Defense of Common Sense*, and in a number of earlier published titles, as well as here. That in any deductive mathematics or linear mathematics (the same thing), there is automatically introduced, to the physical evidence, superimposed upon the physical evidence, the appearance of a universal entropy. That is, a kind of averaging down of a statistical-gas-system process toward the point that there are no heat differences in the universe, and therefore no potential, in terms of the kinetic theory of gases or things of that sort, from which to generate, spontaneously, any work in the universe. So, the universe is seen to run down into heat death,

through this so-called ergodic process, or something analogous.

In point of fact, the universe is of quite a different order. The universe is a positively evolving universe, evolving to higher states. The universe is characteristically negentropic.

Therefore, we must reexamine this mathematics, this deductive notion of mathematical physics. It does not correspond to the physical universe, but mathematical physics based on that kind of mathematics does superimpose the appearance of things like a pseudo-law of physics, a Second Law of Thermodynamics, upon physics. It gives us a false physics.

Whereas we know from the standpoint just argued in the previous section, for example, and from earlier references to the Euler problem, relative to the *Monadology*, that a proper physics can be constructed free of this, if we are willing to forego the habit of deductive/inductive formalism.

What does that require?

We have to reject the deductive formalism, essentially, as we would depict it in a context we have been developing here, because we have shown that scientific progress, the essential feature of man's mastery of nature, is associated with a succession of scientific world outlooks. Usually, the successor, in this ordering, is superior to the predecessor. Crucial experiments, which overthrow or show the fallacy

inherent in the axiomatic structure of an implicit or explicit set of axioms and postulates, lead to the generation of a new set of axioms and postulates, such that there is an unbridgeable gulf between any two successive sets. That we can portray, at least if we use a deductive mathematics, the progress of science, in terms of this succession of sets of axioms and postulates—the deductive systems.

The deductive systems do not represent science; but they represent our attempts to *approximate* a consistently deductive representation of the possible theorems which might be advanced from the practice of physical science as we know it empirically at that point.

We have shown that creative reason cannot be encompassed by this; creative reason lies in what we have indicated to be the third level of self-consciousness. Therefore, we must have a mathematics which represents that. Obviously, a constructive geometry consistent with the third level of self-consciousness would be adequate for this purpose.

Let us just mention again the problem of geometry, to make sure we are absolutely clear.

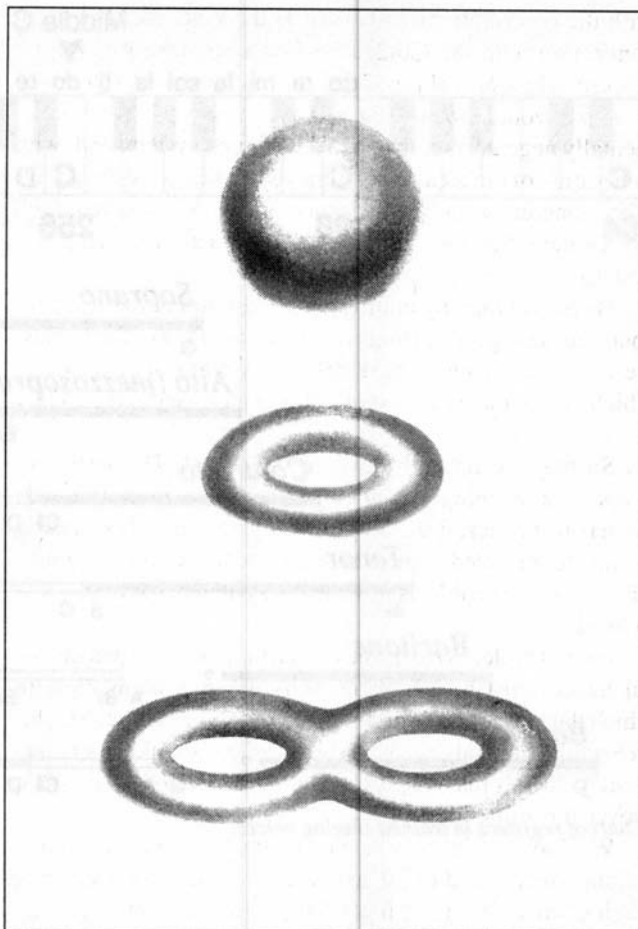
We cannot, obviously, use any form of arithmetic or deductive algebraic schema as an acceptable mathematics for representing a competent mathematical physics. We have to throw them all out. Obviously, for similar reasons, we would also throw out a deductive geometry, such as a formal Euclidean geometry. For the same reason, we would throw out most of the formalistic versions of so-called non-Euclidean geometries, because these are actually, simply, neo-Euclidean geometries, that is, Euclidean geometries, altered by tampering with some among the axioms and postulates of an existing formal system.

We require, therefore, a purely constructive geometry, which depends upon *no* axioms and postulates. Otherwise, we can't be rid of this deductive curse. The question is, what are the specifications of that constructive geometry, which are required for this purpose?

Obviously, it must be a constructive geometry which is based on the isoperimetric proof. It must be a projective geometry which is a multiply-connected form of action of this isoperimetric form. It must elaborate itself simultaneously as multiply-connected, in the sense of a double-conical geometry, for example. And, it must correlate that with a simultaneous expansion in another kind of ply, the simple Rouladen (non-algebraic curvatures, which are generated by rotations).

Our geometry must also satisfy another specification. It must be based ontologically on the notion of monads. That is, we must think of a continuum, in which the continuum, in an evolutionary way characteristic of the system, generates monads.

Without getting immediately into the question of the higher monads, which we are, just look at ordinary good monads, good singularities. Let us concentrate on those kinds of singularities, which correspond to negative curvatures denting, so to speak, a Riemannian surface. So, let us call



Riemann Surface Function modeled. Here we see a simply connected surface, a doubly connected surface, and a triply connected surface.

that, as I have proposed earlier, a *Riemann-Beltrami* surface.

So, those geometries which generate, in a lawful way, the characteristics of a Riemann-Beltrami surface function, are a minimal condition for a good mathematical physics.

This bears upon one of our big problems in physics today. Let us look at some of the implications. Let us take the case of Kepler versus Galileo, Descartes, and Newton, for example.

Kepler's physics is correct, at least as far as he makes any claims for it. That was proven during his time, and through the time of Gauss; Gauss's work on the implications of the asteroids proves in a crucial and unique way, that Kepler's astrophysics is correct, relative to every contrary claim of the incorrect Newton and Newton's supporters.

The negentropic curvature of space-time associated with the harmonic orderings of the Golden Section, is the basis for the construction of Kepler's system, to a large degree *a priori*, as Kant would say, synthetic *a priori*. But, in a sense, it is not, *a priori*, because Kepler shows two things.

First, on an empirical line of development, associated

with the contributions of Leonardo da Vinci and others, in connection with the Golden Section's significance, Kepler had crucial empirical proof that the universe was negentropic, as we would say, that is, relative to entropic: it is fundamentally negentropic, that is, a developing system; and, with a curvature of physical space-time, consonant, and congruent with, coherent with, the harmonic orderings consistent with the Golden Section. That is the instruction of Kepler's system.

He proves that, by finding that the empirical values correspond to, and give scaling to, such a geometry. And, thus, we have his system: the Keplerian system of harmonics, which he correlates with musical harmony, and quite rightly so.

So that we have the two intersections. The geometry gives us a seemingly *a priori*, synthetic *a priori* view of universal physics, i.e., Kepler's physics. But this physics cannot be perfected without reference to those crucial empirical data which enable us to scale the system. That is also true in music.

For example: We can show, in a similar way, that classical music must be based on well-tempered harmonics, in which the harmonics is ordered in congruence with the Golden Section; but that doesn't prove middle C should be approximately 256. It may suggest it, but it doesn't prove it. What proves it is something else.

We look at the human voice, the well-trained human singing voice—and of all species, as we identify species of singing voice. We find, first of all, the human singing voice follows harmonics that are consistent with the Golden Section harmonics.

So far, so good.

However, we find that the singing voices, so tuned, have register shifts within them. (See chart, page 47.) These register shifts are consistent with the species of singing voice. And, therefore, we must scale the musical system to fit this empirical datum of the register shifts, which is historically, pretty much how the well-tempered system developed, through Bach, Mozart, Beethoven, and the other classical composers, such as Chopin, Schumann, Brahms, as opposed

to the romantics, such as Liszt, Wagner, what-not, who all went, of course, for the higher, elevated tuning.

That is the general nature of the thing.

So, what we must do, always, is to guide the mind by such a constructive geometry. Use that guidance, relative to existing physical knowledge, to define new crucial experiments, which enable us to do two things: to demonstrate the appropriateness of our construction to physics, empirical physics, and to provide us a scaling of those functions, as we have indicated by the two examples, the scaling of the solar system by Kepler, relative to a geometrical construction or a method of geometrical construction, not a complete *a priori* one, but a method of construction; and the case of the well-tempered system.

Why do we get C approximately 256? Well, we get it from this evidence, in terms of the natural harmonics of the human singing voice. That is the essence of the matter.

Thus, from this discussion, we see into some of the ways in which the third level of self-consciousness, and the organization of thought on that level, defines a necessary form of, for example, physical science, the way we can comprehend consciously, empirically, the lawful ordering of the universe. All we must include in that, as we specified, beyond the correct geometry as such, is to recognize that the geometry must be a monadology—that no constructive geometry will allow us to assume the infinite divisibility of any portion of physical space-time, but requires a monad at every point of singularity.

Of course, again, these monads are not self-evident, discrete particles, not discrete bodies in any sense. Rather, they are the generated singularities, like the singularities of a Riemann-Beltrami surface function, which are lawfully generated, and *necessary* in the continued elaboration of a Riemann-Beltrami surface function.

The monads define the special features of the proper choice of constructive geometry. Hence we have a continuous constructive geometry, which also has discreteness, and yet on a higher order, is continuous, nonlinearly, so to speak, despite the appearances of these singularities, which are discreteness.

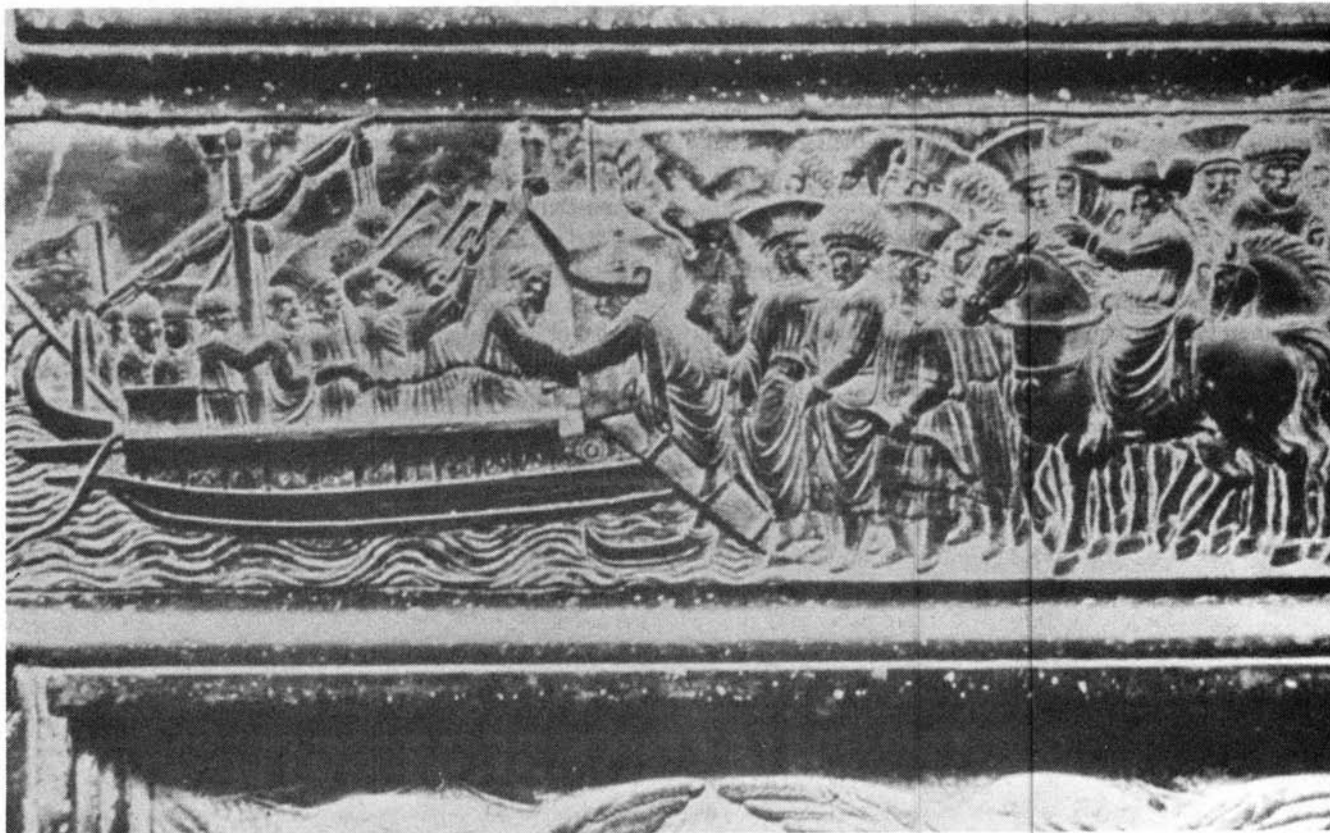
Religion and creative reason

Let us turn to the question of religion, and examine issues of religion from the standpoint which we have elaborated thus far.

To begin, let us take the case of the long-standing split between the Russian (Muscovite) Orthodox Church, and the Western Christian churches, over the issue called the *Filioque*.

For those who are not informed already, the *Filioque* signifies that in the Latin Credo, following St. Augustine's writings, the Latin term *Filioque* was introduced to say that the Holy Spirit flows from the Father and the Son. This was adopted by Isidor of Seville, and so incorporated into the Credo there in Spain. This editing of the Credo went by various routes into all parts of Christianity, and became formally a universal part of the Western Christians' Creed.

It was adopted by both the Eastern and Western churches



Greeks arriving in Italy for the Ecumenical Council of Florence, in 1438. There, the Eastern Orthodox Church recognized that the original intent of the Nicene Creed had been to incorporate the *Filioque* conception—the doctrinal corollary for the divine spark of reason in humanity. (Shown is a relief, by Filarete, from the bronze doors of St. Peter's Basilica in Rome, 1444.)

in the ecumenical unification which occurred in 1439-40, in the Council of Florence. There, the Eastern Orthodox Church recognized, on the basis of evidence from their own writings' original intent, as presented by the later-Cardinal Nicolaus of Cusa, that the original intent of the Nicene Creed had been to incorporate the conception, which is otherwise known as the *Filioque*. So, in the 1439 Council of Florence decisions, the Eastern Orthodox Church recognized that the *Filioque* of the Latin Church was a proper and essential part of the Christian Creed for all persons, and was not simply a Western innovation.

This Council decision was opposed by certain people at Mount Athos (Holy Mountain), including a fellow who became the "Quisling" of Greece, later known as the Patriarch Gennadios. (Gennadios helped in betraying Constantinople to the Ottoman conquest, and was rewarded for his treason, by appointment as Patriarch of all the Christians of the Ottoman Empire.)

Gennadios, who represented a faction at Mount Athos, was supported chiefly by a gnostic faction in Venice related to the Bogomils and Cathars and so forth; he was also supported, notably, by the princes of Muscovy, who practiced a heathen variety of Christian doctrine in the gnostic form. The Muscovite form was derived from what is called hesychasm, that is, the bellybutton contemplation of oriental pagan mystics.

That is one split.

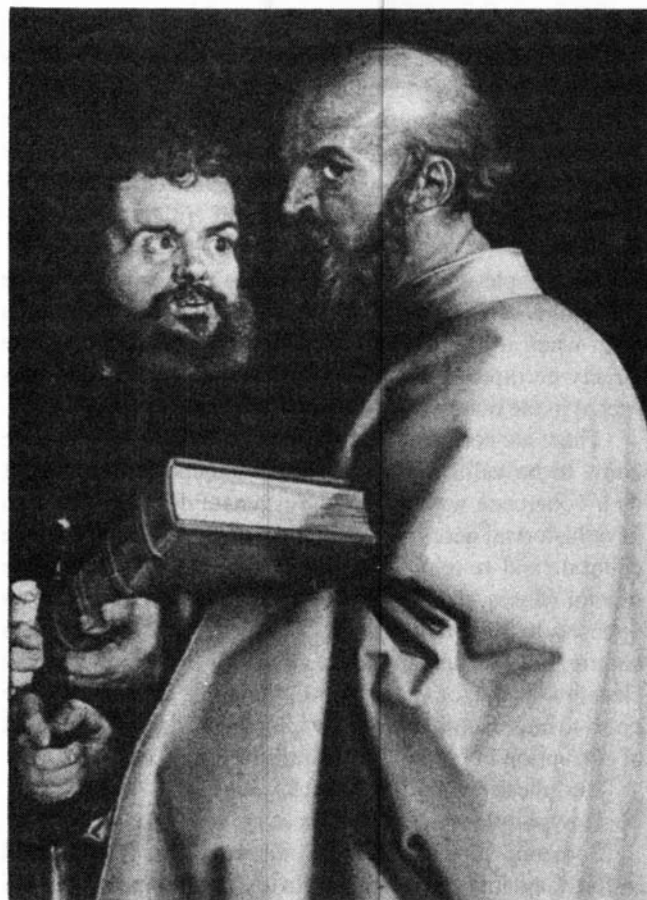
In Protestantism today, we have a split between Orthodox Western Christianity and certain among the Protestant cults, on the same substantive issue. For example, radical Calvinism is a form of gnosticism, *in effect*, which denies the *Filioque*, denies the divine spark of reason in humanity.

You have also those Lutheran radicals, who implicitly join with the Calvinists, on this, as do radical Pietists. For example, Immanuel Kant's Pietism was a significant factor in shaping his gnostic philosophical views. This connection was expressed in his famous *Critiques*, for example, as a follower of the gnostic, virtually satanic, David Hume and Adam Smith.

These issues come up more broadly today.

They are presented, ordinarily, as theological issues. In the United States today, at many divinity schools and theological seminaries, they would tend to be argued from the standpoint of William James's *Varieties of Religious Experience*. William James, the famous Harvard psychologist and pragmatist, who was virtually a Satanist, or, at least worst, a gnostic, certainly no Christian.

Around the world, people would argue, "These are merely doctrinaire matters; and it is merely a matter of opinion, of one sect against another." They would argue, "The only thing that is fundamental, is the religious experience as William James defined it;" "These are matters of revealed religion, revealed doctrine, or allegedly revealed doctrine as opposed to anything which can be settled by means of



St. Paul (with St. Mark in the background), by Albrecht Dürer (detail, "The Four Apostles," ca. 1425, Munich, Old Picture Gallery). What Paul stated in I Corinthians 13, the famous chapter on the primacy of sacred love, is provable, and would be so "even if he had never written it," says LaRouche.

reason."

Unfortunately, many advocates of these various positions in theology, will argue only from the standpoint of revealed doctrine. For example, many Protestants will say, "Well, 'such-and-such' is revealed doctrine in the Sacred Word of God from the Old Testament."

The Old Testament as a whole is not pure and this is provably the case. Some of the Jewish texts, for example, were known to have been corrupted by the Babylonians in the seventh century B.C. by the scribes. These scribes imposed upon the Jewish texts, the satanic, Chaldean cult of Ishtar. The latter was superimposed, in part, upon the Hebrew text, to bring them into conformity, by corruption, with the imperial pantheon of the Babylonian Chaldeans.

There was a second revision of the Jewish texts, in a similar way. The scribes under the Achaemenid occupation also created a pantheon, like the later Roman Pantheon; the Hebrew religion, in order to be tolerated, had to conform in letter and in practice to the terms of membership in this

polytheistic pantheon.

A good deal of the pseudo-Christianity, and pseudo-Judaism come from this particular corruption.

Christian gnosticism comes chiefly from the Mithra cult of Simon Magus. Similarly, Jewish cabbalism comes, in part, out of the same Mithra cult. The Mithra cult was explicitly the author of the Nietzschean Adolf Hitler, at least ultimately.

So, people will argue these issues, typically, from the standpoint of Scripture, revealed religion; they will do so even when it is provably the case that these scriptures are largely corrupted, as the Old Testament is extensively corrupted in the manner we have indicated above.

There are certain aspects of the Old Testament which we know to be valid from a Christian standpoint, because of their coherence with the New Testament doctrine. We also have historical access to proofs, based on knowledge of the cultural, and religious, beliefs of the relevant period, the time of Moses. We know what the Chaldean cults were, as opposed to Egyptian culture. The better part of Egyptian culture, not Mesopotamian, of course, is incorporated in the cleanliness code of Judaism. Anything that is paganism, we know to be corruption. For example, there is a certain amount of corruption in favor of the Canaanite Hiram of Tyre.

But, these are matters of background.

How should we deal with these issues?

Someone quotes his text, his interpretation of a text, and so forth, against somebody else's text, or interpretation of a text; this gets us nowhere. This fails, and leads Christianity, in particular, precisely into the trap of irrational formalism.

On the subject of the *Filioque*: We could know the truth if there were no text. If there were no Latin Creed with the *Filioque* in it, the *Filioque*, even without its incorporation in the Latin Creed, would still be true, and we would be able to prove that that were true.

Why?

For example: In the way we have indicated before, it is *provable*, by reason, that the human being, as a species, is distinguished, set apart from, and above, all other species, including all animal species, qualitatively, by virtue of the divine spark of reason: that potentiality. That separates the human species absolutely from an animal species. Man is not an animal; and animal behavioral experiments tell us almost nothing about man, except the lower part of man, below the belt, so to speak.

It is provable, that creative reason is a creative principle, as we have described it. *It is provable* that you cannot define Creation, or the Creator, except from this standpoint of the definition of creative reason. *It is provable*, that man, by virtue of his potential, is *imago viva Dei*. *It is provable*, that Christianity presents Jesus Christ as the mediation between the Creator and Man, or the aspect of the Creator which mediates between Creator and Man, which brings man out of a state of taking orders from God as a potentate, to man



"St. Augustine Preaching" (a scene from the "St. Augustine Altarpiece" by a late 15th-century Flemish artist, in New York's Cloisters Museum). It was following Augustine's teachings that the Latin term *Filioque* was edited into the Credo and formally became a universal part of Western Christians' creed.

who, out of love of God, a love based on *imago viva Dei*, acts out of the commandment of love, not the commandment of fear. That is all provable.

It is also provable, that this divine spark of reason is not a collective property of the species, in the sense that the Muscovite Russians would argue, but is, rather, a sovereign potentiality, a sovereign power, of the individual as an individual: a *monad*.

It is also provable, that this distinction we have just identified and outlined defines a different kind of ordering of society, as against barbarian or pagan society, and that this form of society is superior to, and natural, relative to all other forms of society. That Christian civilization, as defined from this standpoint, not an arbitrary standpoint, is the highest form of civilization which man could achieve, and every other form of civilization is inferior to it. That is provable.

It is also provable, that any contrary notion of religiosity is false. So, why do we get into doctrinal arguments about text and interpretation of text, where reason guides us to the

right answer?

The text is not to be despised by any means on this account. For example, the Gospel texts, the texts of the Epistles: These are historical statements of Christianity. They contain statements which are true, which may not have been known to be true by virtue of the action of reason in an ordinary sense—in the action of scholarship, or science—at that time. However, we can know them to be true. They are accessible to reason, and we are gratified to find that the truth has been told; but we can prove it.

This takes us to the verge of the matter. There are certain mysteries of Christianity, but they are very limited. Virtually everything people would normally argue about, except this one- or twofold mystery, is subject to reason. Be informed by texts, perhaps helped by texts, by Biblical texts, but not dependent upon them. *It is provable* by reason.

Let us take an example of this: Corinthians I:13, of Paul, the famous one.

What is stated there is provable, even if Paul had never written that; but he did write it. It is beautiful, in the center of a number of chapters of the same Epistle, which converge on the same point.

Paul instructed the Corinthians on this point, and instructed others. Does it detract from Paul's conveying that, that this argument he makes were provable? No, it is like a hypothesis. Paul has stated a theorem. It is up to us to prove the theorem. But Paul stating the theorem was the essential act—that this was said, even though it were scientifically provable, without the Epistle. Would it have been understood as widely, would it have been applied, if that had not been done, if that Epistle had not been written? The implication is fairly obvious.

The point I wanted to stress here, in this kind of intermezzo, is that as members of an ecumenical association, we must oppose arbitrary, doctrinal, textual argument in religion, and say, "These matters which are of importance can all be reduced to reason; and, whatever the text is assumed to say, or is interpreted to say, is irrelevant in that sense. Where is the proof? Where is the proof?" (Except in that which is identified as a mystery.)

Now, on the Russian part, what do you get? Then you get the holiness, the holiness as defined by oriental paganism, brought into pseudo-Christianity as gnosticism, beginning at least the time of Constantine, who promoted gnosticism with Arius and the Sinai Desert monks (St. Catherine's of Sinai),

as the latter hesychasts, or bellybutton worshipers, which were characteristic of the troglodytes of, say, Mount Athos's Holy Mountain later.

This is sickness; but, this is the essence which separates the so-called Russian holy man of the Muscovite model, from the Christian; which defines Russian culture as really barbarism, with a facade of Christian terminology. It is not Christianity. The fact that the Russians would like to call themselves Christians, may be commendable; it is not to be discouraged; but what they have got is not the true article.

Finally, to the Protestants.

We see that the Presbyterian Church, at least the Church of Scotland's leadership, is being destroyed from the top. It has gone outside Christianity, toward satanism, by way of paganism. That is what it is doing officially, with this motion set before it. This was done, in conjunction with the Muscovite Russian Church, with the ecumenical gestures which were taken during 1989, to promote precisely that. This has been the role of Archbishop Runcie, within the Church of England, who did the same kind of terrible thing. This is typical of the satanist, gnostic Cathedral of St. John the Divine, the Episcopal Cathedral in New York City, and its Lindisfarne attribute.

But, the essence of the matter here is the danger of the radical Calvinism, of Adam Smith's *Wealth of Nations*, which spreads widely throughout Protestant Christianity in the United States. The danger is, the separation of faith from works: faith without works, which is the characteristic of radical Calvinism, the characteristic of the worst part of radical Lutheranism. Those aspects of Protestantism are what must be fought and combatted.

It is not a theological matter, as such. It is a matter of reason. We are obliged—contrary to the Quaker, who says he must not participate in military affairs—to be accountable for the condition of mankind. We are obliged to that by determinable, knowable, moral standards respecting past, present, and future generations in entirety.

This, the radical Calvinist rejects; this, the gnostic rejects; this, the radical Lutheran rejects. This must be combatted. It is not a matter of interpretation of the Bible, even though the Lutheran version of argument on this is false, as Calvin's is, even from the standpoint of the Bible. But that is not the hard proof.

The hard proof is: This is insane; and, Christ and the Creator are not insane. That is the point to be made.

The bankruptcy of 'standard theory'

So far, we have outlined material which should make clear the general significance of the following statement.

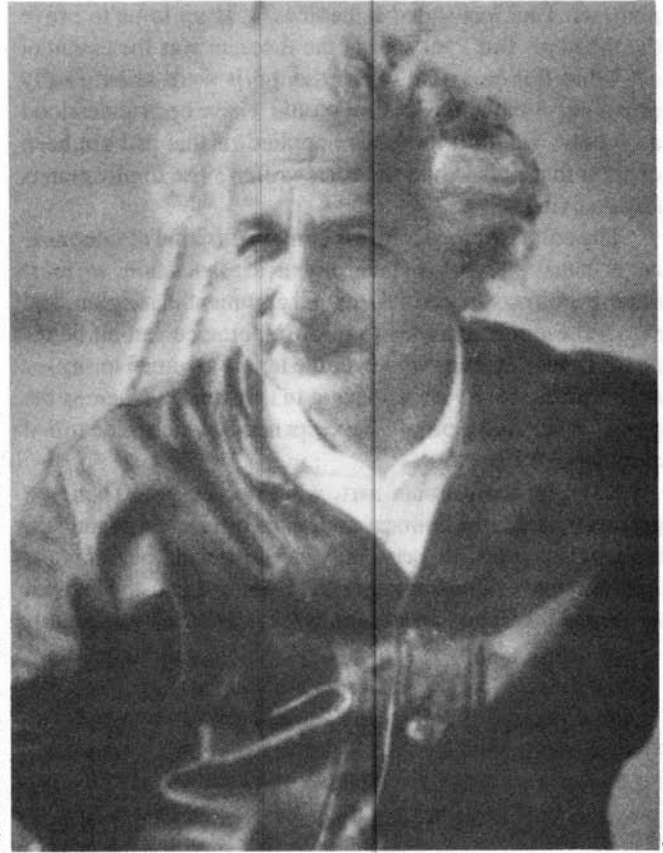
What is called, in conversation among physicists and in classrooms, "standard theory," is inherently fallacious, even in its treatment of so-called entities of so-called classical and quantum mechanics, including relativistic physics: to the degree that ontological entity's existence, and function, depends, in any significant degree, upon deductive consistency of a particular mathematical physics, employed to create the relevant array of cumulative experimental material.

Just to restate that in a few sentences, to make the point absolutely clear.

We have, for example, the definition of the quark. The quark has no experimental existence. The quark, and associated features of that kind of theory, arise from the attempt to explain actual experimental evidence from the standpoint of



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Max Planck (1858-1947) and Albert Einstein (1879-1955). "The original Planck, and his derivation of the concept [of quantum physics] is rich and exciting . . . as opposed to the dull and arbitrary assumptions . . . of an Einstein."

consistency with standard theory. Thus, quark theory represents the creation of assumed ontological existences, purely on the basis of the requirement of establishing consistency with experimental evidence for a standard theory.

The problem here is that the standard theory is, we know, absurd. That is, any physics which is based on a deductive mathematics, is absurd, to the extent that the physics is dominated by deductive mathematics.

Let us put this another way.

Given a valid experiment, one which is reproducible by almost any standard, irrespective of, say, a deductive design of experiments.

First take an observation, which is agreed to be an anomaly, in which the event is not structured (the observation may not be structured by any experimental design, in which the experimental design might be contaminated by deductive assumptions).

So, in this case, we may use the deductive system to describe the phenomenon. It will not correspond to the phenomenon; that is, the mathematics will not correspond, except as a matter of approximation, in a sense of, shall we say, linear curve-fitting, as the famous four Archimedean propositions deal with that sort of thing.

The improper mathematics has described, in terms of approximation, an experimental result. Fine. The experimental result pertains to something which has ontological significance.

However, suppose we stretch the theory, the mathematical theory, to such a degree, that we attempt to account for the margin of error in curve-fitting, between the curve-fitting construction, i. e., the linear construction, and the actual phenomenon whose description is approximated.

Now, let us suppose that we say, that we must account for the existence of the phenomenon described in respect to the margin of error between itself, and the curve-fitting involved. In that case, we would have created an entity, an apparent, but fictitious entity, which is the margin of error between the object and the approximation. This action, of course, would be subject to experimental verification. One could verify, repeatedly, under repeated experiments, that such a discrepancy exists. Therefore, one might leap, foolishly, to the assumption that the entity has an ontological existence, which it does not.

That is a very crude, simple, but I think effective, illustration of the point. It is the same point which Newton made (and probably he reasoned in a similar way in making it), in warning the reader, in his famous clock-winder treatment of the universe, that the universe was not running down (i. e., the Second Law of Thermodynamics does not exist), but that the appearance of this (that is, that the Second Law of Thermodynamics exists), is merely a product of the superimposition of a defective mathematics upon the process of description of the empirical evidence.

Now, how do we avoid this?

This takes us to the requirement of a different mathematical form of physics, something different than the standard classroom physics, or standard classroom theory, for example.

Let us take the case of the alternative, which I have proposed: a *Riemann-Beltrami surface function* as a general mode of describing all of these anomalous (otherwise called nonlinear), phenomena, which do not precisely fit neat standard physics. Also, looking at some of the things in so-called standard physics, which might appear subtle to some, which are not subtle, but fallacious, because they involve the assumption of entities, where none exist: that is, pseudo-entities like the epicycles of Ptolemy, in order to make the system seem to work.

For example, when I indicated the discrepancy between the attempted curve-fitting approximation, and the actual curvature. That margin of error, and the epicycles, of course, come out very similarly. The existence of the epicycles is based on the margin of error introduced by a bad theory: a bad attempt at description.

In order to escape such bad attempts at description, let us take all the cases, which are really wildly anomalous, obviously nonlinear; and, let us take those which we should be looking at as anomalous, in which the entity, like the quark, comes into existence in our mind, solely as an attempt to reconcile a margin of error, between the events actually observed, and the error of approximation inherent in the method of description employed to represent that event.

So, the Riemann-Beltrami surface function is a very useful way of subsuming the relationship among, and of, weak and strong nuclear forces.

In this case, when we bring that into play, and deal with the relationship of electromagnetic and gravitational phenomena, for example, in these terms of reference, particularly on the nuclear scale, we get a completely different kind of result than we do with, say, the quark theory.

For example, there is a problem which arises in the published version of Wells's model for the solar system, in the sense that he is using a standard classroom theory-approach for describing something which was actually developed from a different standpoint. So, there is a discrepancy. I think that in that case, in Wells's construction, we'd have to go back, away from the standard theory which he is using for the IEEE publications, and so forth, and go back to the source to eliminate the "curve-smoothing errors" which arise from the use of linearity of standard theory, to represent the approximation of the process discussed.

Another part of this, which has to be emphasized, is that among Anglo-Americans, most emphatically (I keep away from the special problem of neo-Cartesianism among the French), there is absolutely lacking, in virtually every case, any understanding of what a strong rigor is. Not only do they show a lack of strong rigor in their work; but, in general, they do not even know what it is that they lack. They do

not know what a strong rigor should be. None of them, for example, are trained profoundly in the Socratic method, which virtually all of the great classical discoverers in physics were, including Leibniz, or including all of the leaders of the work in developing the theories of elliptic functions and so forth, during the nineteenth century.

The greats approach these ontological and other questions, and questions of axiomatics, with an understanding of the Socratic method. The average Anglo-American, with terminal degrees of the highest qualifications, is educated *to avoid* any consideration of that sort of material, to avoid any conception of geometry which is inconsistent with that approach.

Thus, the typical American today (I'm talking about the Anglo-American scientist), by a margin of 99.9999%, is incapable of understanding the kind of rigor which is employed by the best scientists, the best continental scientists in particular, of the nineteenth century. This makes it doubly important to shift the emphasis away from standard theory, and to compel some of these scientists, ones who are more viable, and perhaps a bit younger in some cases (if they can rebuild themselves), to take this Platonic approach. Because only on that basis can they become acquainted with a strong rigor. There is no sense in trying to educate people merely in constructive geometry *per se*. I suppose there is some sense in it, but you are not going to get the student to the kind of desired result from that. You must accomplish what must be done from the Platonic kind of approach, of which I have represented a reflection here.

For example, I would give examples of cases which are relevant, apart from Gauss, Riemann, Beltrami, and so forth. Look at the less profoundly rigorous figures, such as Felix Klein, Max Planck, and so forth. These people were much less rigorous about the turn of the century than their leading predecessors in the same institutions a half-century earlier. They'd gone down in terms of rigor. But still, the rigor of people such as this is overwhelming, astonishing, awesome, compared to the loose, almost gossipy character of standard theory today.

Max Planck, from this standpoint

There are two Max Plancks. One is the Max Planck who derives the concept with which his name is associated; and there is the other Max Planck, the mythical Max Planck, who was created by Albert Einstein in 1917 approximately, with

that terrible abomination that Einstein produced at that point on the subject, or as reified through the radical positivist version, which, coming out of Niels Bohr and company and others, seems to be hegemonic, more or less, today. So, we have this multichotomy among the so-called classical version (which is not classical at all) and the positivist version of quantum mechanics, and the positivist version of relativity; these three kinds of things bobbing around, none of them really good physics. Everything has been misunderstood from the attempt to reconcile the irreconcilable among these three things, none of which should exist.

The original Planck, and his derivation of the concept, is rich and exciting; at least it was for me, as opposed to the dull and arbitrary assumptions, not only of an Einstein who was probably one of the better cases among the bunglers later on in this positivist tendency.

You will observe, going to Planck's own published account of his derivation of the concept,¹ that there is a precise affinity between my attack on Euler's attack on the *Monadology* (see above, Chapter 6, and the Appendix) and Planck's method. That is, rather than taking smallest of smallest of smallest, or arbitrary division of line lengths, linearity, one must reduce the thing to action in the form of isoperimetric action, and the question of division of rotation, as the division of an angle, and then the division of that angle. And that is exactly the way the Planck Constant actually develops. So, looking at it in those terms, keep to Planck's original terms, in using the quantum relationships—that is, in this notion of rotation, this isoperimetric motion—and a lot of the nonsense which commonly arises, is averted. Then, put that back into the approach I have outlined to a Riemann-Beltrami surface function, and Planck's concept, as he describes his derivation of it, in his autobiographical note on this, applies beautifully. It lends itself to comprehension, and avoids this terrible, positivist, statistical mysticism, and convolutions which come along commonly in this connection.

Planck made a wonderful, great discovery, and, he made it in an extremely rigorous way. People seem to be deprived of the beauty of that rigorous discovery, and prefer the after-the-fact reification of that from a positivist standpoint; but the discussion of Planck should be situated, as I have recommended it be situated.

1. Max Planck, *A Survey of Physical Theory* (formerly titled *A Survey of Physics*), translated by R. Jones and D.H. Williams, Dover Publications: New York, 1961.

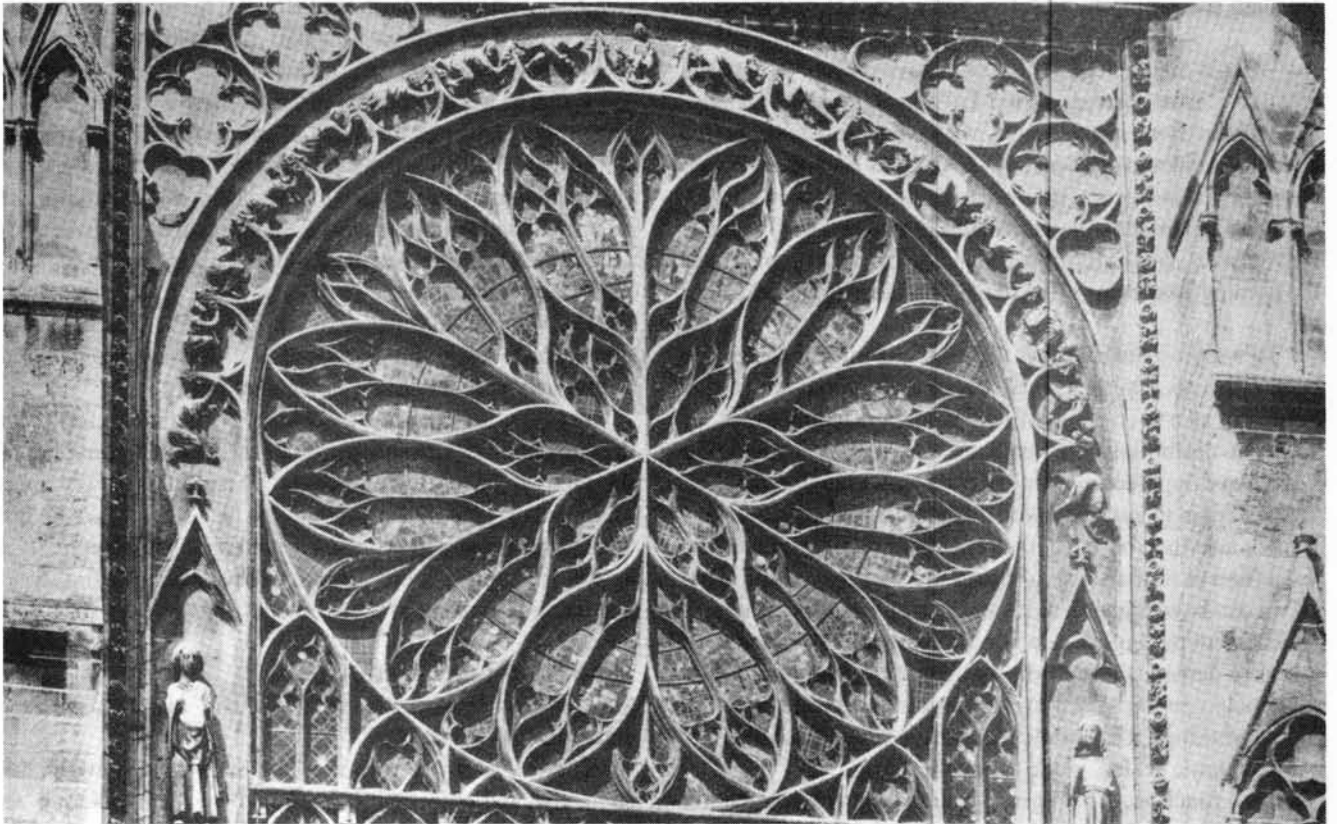
On the subject of unity

We have written and discussed earlier the subject of substance. Let us look at the same matter from a slightly different vantage point. Let us take the issue of unity, the issue which I addressed glancingly in commenting on the *Thaetetus*, the Waterford translation, earlier.¹

Let us take this maximum-minimum relationship. *One* is the individual. Why one? Well, because the individual is sovereign, and that within the individual which is sovereign, that is, creative reason, is potentiality. It is not divided, in any way, beyond the individual. So, it is one.

Let us take the universe as a whole. It is sovereign. Its existence is not divisible. Therefore, its existence is also an indivisible one.

1. Lyndon LaRouche, Jr., *In Defense of Common Sense*, Schiller Institute: Washington, D.C., 1989, pp. iii-v.



The great Rose Window of the western facade of the Cathedral of Amiens (14th century), France. These multicolored yet perfectly circular stained-glass roses expressed the idea of the relationship between the universe as a whole, as a unity, and the individual creative reason, as a unity, which is the essence of scientific knowledge.

In both cases, the *One*² refers to substantiality, or, to the quality of existence we associate with substantiality: efficient existence. (I'll make an observation on this efficient existence and problematic feature of literal interpretation later on.)

So, both are one. They're equal in that sense. Equal, why?

Equal because the ordering of the universe, for reasons we have given earlier, is coherent, consistent with creative reason as a potentiality, as the potentiality of the individual. And, the future order of the universe, in the sense of past, present, and future, is also equal to the present, in respect to the fact, that if we measure the *present* substantiality of the universe as *One*, with emphasis on the word *present*, as *potentiality*, it contains past and future, as well as present.

We can speak of the unity of the individual in respect to the potentiality of creative reason, in a somewhat similar vein, with certain qualifications. The individual is not really self-subsisting, the individual person, in this respect, *except* as the individual is in an efficient, unmediated relationship to the universe as a whole. But, in respect to the universe as a whole, the individual, in that relationship, does, in the present, reflect as potentiality, past and future, in the way we have indicated earlier.

Now, the interesting thing is the content of this *One*. And we shall see promptly why I'm doing what I'm doing right now.

What is the content of *One*? Creative reason. What does creative reason correspond to? Let us reference *In Defense of Common Sense*. In this case, we have the successive deductive theorem-lattices, *A, B, C, D, E*, and so forth. Creative reason occurs, or is reflected in, the *efficient* character of the apparent mathematical discontinuities both separating *A* from *B*, and so forth, and also provoking, or prompting, the coming into being of *B* out of the catastrophe affecting *A*.

This representation, just identified, is not adequate. We have to go to a higher level, because we have to see this not really as a succession of independent discontinuities, or apparent discontinuities; we must see this as a *recurring function* of apparent discontinuity. And it is in that *function* that we begin to approximate creative reason.

We also then observe, that this function may be more or less efficient in the sense of being more or less dense. That is, we can have higher and lower rates of scientific progress, which, with the higher rate, would be measured in terms of a higher density of such discontinuities of the type we're referencing per lapse of time, or per unit of universal action (the same thing). This would mean that we would have different isochronic scales, in the following sense.

Let a function, which gives us a certain rate of scientific progress, or scientific revolutions, as *A, B, C, D, E*, and so

forth, represent a pathway of scientific revolution; let that be represented by an isochronic scaling. No problem.

Now, let us have a higher rate of scientific progress. That would be a slightly different isochronic scaling.

Just a note to bear in mind, as we think about these things, to make sure we're thinking rigorously about where we are at all times when we do these kinds of excursions; otherwise, we drift off into detours which become wild fantasies.

So, therefore, the notion of a variability in the rate of scientific progress, comes as close to the elaboration of creative reason as we can conceptualize it, from this approach. And the highest notion we can approach, is the notion of a unity of that kind of variability of function, or functional variability.

So, that highest notion is that which corresponds, as an articulate notion, to the notion of efficient, existent, substantiality. This is true for the mind of the individual monad, the person; it is also true for the substantiality of the universe as a whole.

So, the number *One*, as a cardinal number, stands for that function.

To restate what we have just said: It is the accepted standard of classroom practice of mathematical physics, to start with the number *One* as a cardinal number (once we have defined it as a cardinal number), and to associate cardinal numbers with elementarities of physics: the smallest possible parts. And, then to show how pair-wise relations and multiples of pair-wise relations, or multipliers of pair-wise relations, can be left to account for the universe as a whole. And, thus, the search amid the flurry of quarks for colorful stories.

Obviously, that approach is absurd, because elementarity, in the terms of unity as we have just defined unity for the individual and the universe and the relationship between the two, is the most complex of all number notations, or geometrical number notations.

So, we start with the most complex of all number notations, which defines the significance of simple counting numbers associated with things in the long run.

The idea of equality of one to one, and so forth, all depends upon the determination of the *One* by a function of the type we have just referenced. Therein lies a very great secret, so to speak, which should not be a secret. (We do not wish to spread any gnosticism around here.) It is not really a secret; it is only a secret from those who blind themselves. But that is the nature of the problem.

A point of clarification

There is one particular point, which I wish to make very clear, and has two aspects.

The first is my reference to the distinction between the subjective and objective. It is clear, I think, that there is no strictly necessary distinction between subjective and objective knowledge, as in, for example, science. There is not an objective worldview which might be seen by some other

2. See Plato, *Parmenides*, *passim*.

being, as distinct from the scientific worldview of the physical universe which we are able to construct by virtue of the special features, including limitations, of our mental perceptual apparatus. Rather, on the level of creative reasoning, the representation of the laws of the universe in the language of creative reasoning, and the actual laws of the physical universe are one and the same—both in fact, and as to form.

Now, essentially, this bears directly upon the role of the monad: the fact that in the mental image of scientific knowledge of the universe, the monad is crucial. That is, the relationship between the universe as a whole, as a unity, and the individual creative reason as a unity, in direct, unmediated relationship to the universe as a whole, is the essence of scientific knowledge, is the essence of an *efficient* relationship between creative reason and the universe as a whole. For that reason, there could be no discrepancy as to form between the laws of the universe, and a correctly devised representation in terms of creative reason's construction of a picture, shall we say, of the laws of the universe.

There can be a discrepancy only to the degree that there is imperfection in the application of reason.

So, the subjective element arises as a discrepancy *only* to the degree that this imperfection exists. There is no *inherent* discrepancy, but only the discrepancy of relative imperfection.

That is the essential point to be stressed. This bears upon the fact, which is the crucial fact of all physical geometry, or all economic science (the two terms being really the same), that the increase in technology, which is the increase of the per capita power of existence of the human species or of a society, is caused by the generation of scientific progress by a purely subjective agency (apparently): creative reason.

Thus, the spiritual action, a creative-reason action of discovery, is the efficient cause of a physical result, the increase in productivity, for example, as one aspect of that physical result.

These two things permeate the entirety of Project A: the complementarity between this ostensibly anomalous relationship between the spiritual, i.e., creative reason, and the physical result of creative reason as the cause, and the (in principle) exact correspondence between what we might think is the subjective view of science, and objective reality, which we're representing by science.

The only time that we can speak of, significantly, a principled discrepancy between reason's picture of the universe and the actual universe, is in, for example, a deductive method, or inductive method.

Amusingly, and usefully, Newton points this out in stating that the imposition of his mathematics (in this case, a linear, i.e., deductive mathematics) upon the physical evidence, leads apparently necessarily to an image of the universe which is in part false to fact, the running-down-clock image of the universe, the Second Law of Thermodynamics universe. In that case, there is a principal discrepancy between science and reality, such that we call science in this case the *subjective*, and the reality which it fails to represent, the *objective*.

In contrast, from the standpoint of creative reason, when that is employed rather than the deductive/inductive mode, then that discrepancy-in-principle vanishes, though a discrepancy may exist in terms of the margin of error. That is the point which permeates the Project A undertaking.

I thought I would restate it in this form, in case I do not make the point clear. Or, at least by contrasting what I say here with what is said in the text as delivered, so far, perhaps the comparison of the two will force to the reader's attention the nature of the issues involved. If the reader finds the thing a bit confusing at first glance, that is not exactly the reader's fault; this is a profound matter, and the correct answer to the implicit questions goes far afield from what is generally considered, although wrongly, the accepted classroom view of the subject.

On the subject of ontology, again

As we have indicated so far, in reflections upon the material I have covered in this series and in other writings published earlier, the crucial issue of science, of knowledge in general, and of policy-shaping, therefore, is the issue of the notion of *ontology*, of being in the sense of substance: What is substantial?

In general, I have cautioned people that causality is the key to being. That which efficiently causes something to occur, and which is the subject of causation in a reciprocal manner, is essentially what we should mean by *being*. As to how being elaborates itself, that is something for us to discover. But in starting out, we must reject simple perception, sense perception, as a definition of being, and must have a more general notion of being which covers all cases, that is, which is of universal applicability.

I shall indicate some of that now, and go through an



Old man in contemplation; experiments in varying the velocity of water—two pen and ink studies on a single sheet, by Leonardo da Vinci (1452-1519). All being is associated with motion, or more generally, with becoming, with change. And change has two aspects: that which is representable in a linear way, and that which is a qualitative change.

exercise, essentially Socratic in its character, though not necessarily always Socratic in its form. I tend, in summation of the argument, more to the didactic, and leave the Socratic to the pedagogy of the classroom, or similar circumstances.

Let us start with being.

All being is associated with *motion*. This motion occurs in two primary ways: Either we perceive the being, the entity in question, to move with respect to the physical space-time in which it is situated, or, we see it not to move, but, that is, relatively to move with respect to the motion occurring about it. So in both cases, the notion of being is associated with motion.

It is associated more generally with *becoming*, with *change*. And change has two aspects: the linear aspect of change, or that which is representable in a linear way; and that which is not representable in a linear way, i.e., a *qualitative* change, we tend to say.

In this vein, on the simplest level, the preconditions for defining simple existence are, in order, first of all, motion, which signifies, generally, matter-motion, as a most common reading of that. And secondly, the motion of change of quality of motion, accompanying a simple matter-motion. This relationship of the two, as qualified in the second observation, is very important to bear in mind.

There is another consideration of universality which comes in in a different way here, negatively. Suppose we were to reject either of these two conditions, or to qualify them. Then we would have a real problem. Because our definition of substance, of being, implicitly, is that it is substantial in respect to all possible conditions of the universe.

Now how would we observe all possible conditions? What would we mean by "all possible conditions"? Or, reciprocally, what would we mean by failing to meet the standard of all possible conditions? In other words, all we would have to do, according to this line of argument, is to prove that in one case the entity responded to the universe in a manner as if the universe did not exist.

For example, if you imagine a great explosion, a couple of kilotons or megatons of dynamite goes off next to a fellow, who is walking. Everything around him is blasted, tattered, ruined, except he continues to walk through blithely, as if nothing had happened. We would say, well, this fellow cannot possibly exist. This must be a phantasm. It cannot be a real person.

Therefore, something that fails to respond appropriately to action of the universe more generally, even in one case, puts upon itself a question mark as to its existence.

This may involve, in some exceptional cases, all kinds of subtleties, which might be explained away, as in the kind of case I just used for illustration. But, nonetheless, if we cannot explain it away in a consistent manner, then it does not meet the criteria of being.

Therefore, that is our crucial, negative test: It must be efficient in its action upon the universe, and the universe

must be efficient in its action upon it. And that must be universal. A single exception tends to call that being into question. Therefore, universality of substance implies universality of response, as well as universality of its causal efficiency as an existence. It must respond as an efficient existence, in all possible motions and states, i.e., qualities of motion, in the universe. There may be, according to the rules, reasons why it should not appear to react in certain cases, though it actually must react in all cases, whether it appears to or not.

This sort of notion leads us to the question of *transfinite being*. Transfinite being, as a notion, starts out as a very simple kind of Socratic idea.

Let us take, for example, numbers. We have all kinds of numbers. Let us take the numbers in the proper fashion, not arbitrarily. Let us take them without fooling anybody; let us take them geometrically. Well, the number *one* has a very simple significance. And so does *zero*. *One* and *zero* have a very simple significance in geometry. Well, we make constructions. And as we make constructions, the simplest plane figure we can make is the triangle and so forth. We can make quadrilaterals and so forth, and so on, plane figures. Out of this we get notions of construction, which are generating plane areas and their roots by products of linear magnitudes. A very simple kind of case. One can try to generate the field of integers, so far, in that way, and other numbers that fill in between integers. We find out that we have rational numbers, which can be constructed that way. Then we have a number of irrational numbers. Then we have various orders above the irrational. We have the transcendental numbers, and we have much higher orders than simple transcendental numbers, which can be generated in the manner which Gauss has indicated, and as Cantor has indicated this problem.

We get into larger geometric numbers, as Gauss does. We get into the so-called imaginary and complex numbers, which are not really imaginary, and which are quite clearly classes of geometric numbers. They tend to fill up the gaps in between, leftover in-betweennesses not filled in by all inferior sorts of numbers.

So, a general notion of number arises, not from particular experience, but by trying to approach universality by the method of successive transfinite orderings. So, hard proofs and strong proofs all involve universality. They involve universality positively, and they involve it negatively. We have referred to the negative above. We have referred to the single crucial experiment, which is a negative demonstration, tending to jeopardize the claims to being of something. And we have the more profound sort of negative inquiry, which may cause us either to abandon the definition of being for something, or to redefine it in a qualitatively new way.

In this process, as we have done in the foregoing sections, with intermezzi and affirmation, we have defined that the change of quality of motion comes close to the proper definition of substance, that is, it covers universality. This must



The "Virgin of the Grotto" by Leonardo da Vinci (1483; Paris, Louvre Museum) shows the Virgin Mary, the Christ Child, and an angel as the infant St. John the Baptist approaches them, in an unusual grotto-like landscape. "The idea of beauty, as we associate it with great classical art, emphasizes an aspect of the creative processes of mind, which is otherwise essential to creative scientific work."

be the case, because any simple motion cannot be universal. There will be cases in which this particular motion does not exist, or in which the universe is expressing itself in a different quality of motion, in which the universe is changing the quality of motion. So we cannot have a response, unless we fill up the gap of change of quality of motion. That leads us to a further consideration: the rate of change of change of quality of motion, or rate of change of rate of change of quality of motion. That begins to bring us to a kind of universality, in which the higher ordering of the functional notion of rate of change of rate of change, does pretty much on the third level of change of quality of motion everything we need

to do in an ordinary way in representation.

Very simply, having come that far, let us look at our mathematics.

Simple, discrete matter does not exist, as in the sense of a perceptual discreteness, as an object of touch, as an object divorced from motion. That kind of substance does not exist. It cannot exist in our universe. Secondly, even simple motion cannot exist as something primary in our universe. It does not meet the qualifications of substance in any aspects of substantiality. It is not being, it is not substance. Nor is a rate of change in quality of motion adequate. We have to generalize the notion of a rate of change of rate of change of quality of motion, and then we have, at least verbally, encompassed in a general way the kind of definition of being we require.

That being the case, let us do a very simple thing. Let us look at the domain of physics. Let us not be totally naive. Let us take into account the notion of curvature of physical space-time which has been explored and pretty well refined, and which we have dealt with in various ways, in qualifying the implications of Kepler from a more advanced standpoint, say that of Gauss, Riemann, and Beltrami, and so forth. Into that space-time, let us introduce this notion of rate of change of rate of change of quality of motion, of matter-motion. And let us put that into any relativistic physics whose relativism is defined from the constructive geometric basis in terms of a curvature of physical space-time.

If that is the most primitive substance, look at what we have said earlier about the relationship between the individual monad and the universal. Let us suppose the monad is somewhere in the order of a Planck distance. Suppose we squeeze it down in there someplace. We do not simply have a little black hole there; we have something that is very busy, with more lights than the thousand points of light that George Bush has been looking for lately. Very complicated, very active substance in there, nonlinear also. But from our standpoint, the substance in there, since it is cognate with the universal in particular, the substance of universality and the substance in that monad is of this nature: It is of the nature of a function describing a rate of change of a rate of change of the quality of motion. It is not only that: The function implies the ability, a method, for increasing that function; an increase which we can measure, in the first approximation, with a notion borrowed from Georg Cantor of an increase of the enumerable density of apparent mathematical discontinuities for interval of action. The interval of action being, say, this Planck distance. There is an arbitrary choice, consistent with Cantor's definition of an arbitrary choice, for that kind of comparison.

That becomes, then, simple matter. It is simple matter, of course, in the case of an individual human being endowed with sovereign, creative reason.

But we also referred earlier to the other kinds of little monads kicking around the universe that do not have any

intelligence, that do not have any creativity—little pieces of dirt, for example. We said that these things have to *react* to the universe, which is *characterized* by the relationship between that higher monad and the universe as a whole. Therefore, the lawfulness governing that little piece of dirt there, in its motion, is determined in reference to the higher degree of motion, that is, the motion of the mind of man, of reason, with respect to the universe as a whole. Thus the laws that we adduce concerning the nature of substance, from the primary relationship, that of the individual human being to the universe as a whole, define the laws of the universe in which that little piece of dirt is functioning and having its relationships.

Thus, the simplest rigor of reason requires us to turn, so to speak, the entirety of physics on its head, in the sense that physics and simplistic physics, or accepted classroom versions of physics, attempt to reduce everything to derivation of the articulated from the simple, where in point of fact, the simple is determined by the increasingly self-articulated substance, in the sense we have defined. So, this defines another way of looking at the problem we have been discussing so far. A way which, of course, must be included in an all-sided treatment of the problem.

Finally, let us return our attention to the subject of creative reason as experienced by the human mind, as the map of physics and as the proper reflection, within itself, of the laws of the universe as a whole.

Let us look at this from a different standpoint, the standpoint of method, historically, and recognize that this is precisely the secret of what is called the Socratic dialectical method.

By recognizing that the individual creative reason, as a

sovereign capacity of the person, was essentially in unmediated relationship to the universal, that is, directly, Socrates struck upon—whatever sources he used for this discovery—the essence of all science and all knowledge. We seek universality by eliminating those underlying assumptions which fail to be universal, and whose failure is demonstrated to us, or can be demonstrated to us by the means internal to the sovereign faculty of creative reason within each person.

The limitations placed upon this are, of course, empirical. That is, the mind cannot know more than it knows as an interpretation, in a sense, of the falseness of perception. In order to understand the falseness of the misleading character of perception, we must have perception, empirical, or we must have the absence of a perception where that perception is to be expected according to some prevailing, accepted set of assumptions. That is really all there is to it.

The Socratic method rests, in fact as it does implicitly, by the very use of it, upon the evidence that the sovereign creative reason, intrinsic to the individual human mind as potential, is in an unmediated direct relationship with the universal. And that, by exploring that, we have, in a sense, the perfect mathematical physics, given to us, as it were, *a priori*, but not in Kant's sense; not a specific physics, but we have the map of mathematical physics, which enables us to exclude all formulations which we attempt to force upon that map, which do not fit the map. Otherwise, it is as I have said, that the relationship between the monad, as a monad, which we are, and the universality, particularly the unmediated aspect of that relationship, which enables us to know, and to prove, that the Socratic method is a true one, and a uniquely true one.

That completes Project A.

Euler's fallacies on the subjects of infinite divisibility and Leibniz's monads

Leonhard Euler (1707-83), renowned Swiss mathematician, astronomer, and natural scientist, studied mathematics for 11 years under Jean Bernoulli. Bernoulli had collaborated with Gottfried Leibniz, the German philosopher, statesman, and universal genius who invented the calculus, on various problems of mathematics and physics. But, in his 1761 Letters to a German Princess, Euler attacks the followers of Leibniz, who had died 45 years earlier, in a manner revealing his own lack of understanding of Leibniz's notions of space, time, and substance.

He was an opponent of the Newtonian reductionist method in mathematical physics. In an attempt to refute Newton's bowdlerization of Kepler's great discoveries, Euler tried to show that Newton's theory did not correctly account for perturbations of the Moon. While Euler was absolutely correct philosophically in his criticism of Newton's axiomatic barbarism, this could not be demonstrated for the case of the Moon's orbit.

LaRouche, in a three-part essay dictated by telephone from prison in the third week of January 1990, demonstrates the fallacies in Euler's argument and revives the standpoint of Leibniz's Monadology. Following LaRouche's critique, we publish two of Euler's letters, which present the essentials of his argument.

A critique by LaRouche

Let me deal first with the core argument by which means Euler introduces the subject (I'll deal later with the second part of his argument, which is more specific, on the subject of monads).

Euler obviously starts with a very simple proposition, winds up to it, then gets into monads, and premises the entire discussion which ensues on a certain fallacy. I shall now just summarily address that fallacy, specifically because it is very interesting to do so, as well as profitable.

He argues simply for the case of infinite divisibility, and I need not replicate his argument; it is clear enough. Simply by asserting infinite divisibility, he comes up against a problem which he ignores, a problem which was recognized implicitly as early as Leonardo da Vinci, in respect to physics *qua* physics.

All through the discussion of this subject, there's been the question: If we divide all observation into three categories, can we attribute the same sensory properties of phenomena to all three categories in the same fashion, without some qualification as we move from one to another?

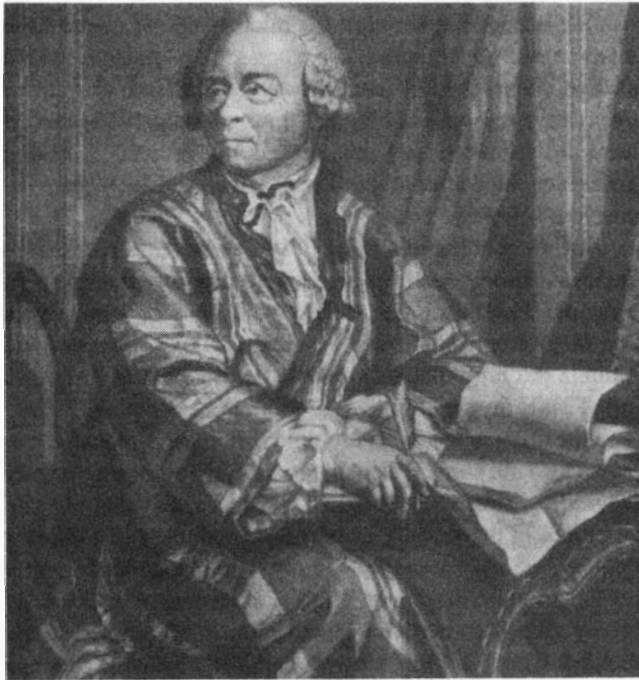
The three categories are the following:

First is the level of simple visual observation, simple sensory observation, a physical space-time as it appears to our senses by virtue of the limitations of our senses. The second is astrophysics, the macro-scale, that which is accessible in a sense to our senses, but which involves things which are far beyond our senses' immediacy. The third, of course, is microphysics, that which is so small, that it is beyond the capacity of direct observation by means of the senses.

Now, from early times up through Riemann, those of my persuasion have insisted that when we come to the extremes of astrophysics and microphysics, we can no longer make the simple projections which might be suggested by observation or successful observation within the realm of visible and kindred phenomena, on that scale.

This begs a third question: What is the nature of the boundary separating each of the extremes, i.e., the large, astrophysics, and the very small, microphysics, from the ordinary scale of observation.

Generally I think we accept the notion, or those of us do who ponder this matter, that we speak of microphysics as that which lies in the vicinity of such a boundary, as in microphysics, the very small. You might say an Angstrom unit, or two or three Angstrom units, might not be that boundary or might be that boundary, but that when you get down into micron and similar kinds of areas of measure, you are in a troublesome area, relative to projections simply of the ordinary rules of visible observation and visible phenomena. Similarly, when we deal with matters on an astro-scale or astrophysical scale, for various reasons, having to do largely with time and so forth, we can no longer trust the simple rules of observation, of visible related phenomena. So, we are not concerned, generally, when we speak of astrophysics or microphysics, with knowing, at least for preliminary purposes, the exact boundary which separates the classes of phenomena. But we say, "When we get in the vicinity of those, a certain area, a certain scale, we have to be alert for



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The Swiss mathematician Leonhard Euler (1707-83), revealed his lack of understanding of Leibniz's notions of space, time, and substance in the letters cited here.

sudden changes, abrupt changes hitting us.”

We would say the boundary, of course from the standpoint of physics, is not a wall, but is rather a singularity. An example of that would be satisfying, since this was already addressed by Leonardo da Vinci in respect to sound, for example, and light. When we project a body under power to a supersonic speed, velocity, that it is not in this case impossible to have supersonic velocities, but certain changes occur within the realm in which this occurs, the transonic, supersonic phenomena occur, changes associated with phenomena which are not otherwise evident on the scale of observation of events at the lower speeds. So that the speed of sound is a singularity. A transonic area is a singularity, such that we cannot generalize what appears to be adequate interpretation of phenomena at lesser speeds as we move through the transonic to the higher speeds.

So that's what we mean, generally, when we say a change in the rules for observation of physical space-time as we encounter a boundary condition in the form of a singularity, as we continue to venture into the ever-smaller and the ever-larger scale.

The way we generally would approach this, particularly in the present century, is in respect to the limiting factor of the speed of light. As we approach the speed of light, we speak of a boundary area, which we call relativistic conditions. Generally, this is applied to the scale of astrophysics. But, ingenious minds will promptly attempt to reflect what is true of astrophysics, even as a consideration, back onto

microphysics. That is, it is the common tendency in mathematical physics to treat the infinitesimal as an inverse of the infinite. Thus, if the speed of light is a boundary condition in the one scale, we must expect that there is a complementary boundary condition, i.e., a singularity in the microphysical scale. That is essentially the way this should be approached.

What this would mean, of course, is that there is no infinite divisibility, in the sense I just implied. That is, we are not talking about an impossibility of some kind of divisibility on the microphysical scale below the scale of this boundary, this singularity, but we are implying the singularity as such.

This whole business, in both instances, is associated with the issue of the proper definition of physical space-time itself. Is physical space-time, in respect to physical cause and effect, a matter of simple linear extension, or is it not?

Kepler's astrophysics says it is not a matter of simple linear extension: that the available planetary orbits are not only limited in number, in the sense of being enumerable, but that this enumerability is defined by a very definite, intelligible principle, a principle susceptible of intelligible representation, which is the harmonic ordering; and that in the values of a special kind of Diophantine equations, if you like, in the values which lie between these harmonically ordered, enumerable values, there are no states of a similar nature, or precisely similar nature, at least, to be found.

Now, this introduces a kind of discreteness into physical space-time per se. That physical discreteness is the first aspect of a monad in the microscale.

Let me skip a bit, and go ahead to another consideration respecting both astrophysics and microphysics. What about the large monads? The very large monads belong, not necessarily, immediately, to the microphysical scale, but rather to the astrophysical scale. Ahaaa! Right? Now there is a second consideration.

This goes to what I treated under the title of the Parmenides paradox: the immediate relationship between the infinitesimal and infinite, say in the case of a human being. In this case you will see that it leads to the second point, on the monad.

We in a sense are, in the scale of astrophysics, an infinitesimal. Our mortality makes us all the more so. Nonetheless, we can affect the universe as a whole, at least implicitly so. We do so by an agency; that agency is creative reasoning.

We are capable of discovering, less imperfectly, the laws of the universe, and doing this by creative reason. By activating and acting upon those discoveries by means of the agency of creative reasoning, that is, by acting on them by means of creative reasoning as well as discovering them by that means, we are able to influence the course of behavior of society as a whole, and society as a whole is able to act on the universe, on an ever-larger, implicit scale of chains of cause and effect. By that agency, in terms of discovering universal principles, less imperfectly, and by discovering more powerful and more

efficient means of acting upon the universe in the large by these means, we show that the human individual, this mortal ephemeral creature, we, the individual, actually have an implicitly direct relationship to the universe at large.

Similarly, we come to the second principle. Not only is the monad, so-called, something which is defined in respect to scale, but it is defined in respect to an active principle. Now here we come to the crucial matter, as treated by Leonardo da Vinci, and treated explicitly by Kepler, as in the small paper *On the Six-Cornered Snowflake*.

On the ordinary macroscale of observation, it appears to us that we have two harmonic orderings: one characteristic of living processes, and the other characteristic of non-living processes, as Kepler treats this matter in *The Snowflake*. Thus, is the universe bifurcated in this way, or do we find some reflection of this question in the microphysical and macrophysical, or astrophysical, scale which removes the apparent paradox, or which makes comprehensible the apparent anomaly of the division of visible space-time and physical phenomena of observation into these two, living and non-living parts?

We find it just so. We find it implicitly required, for example, that the monads, in the scale of the small, in the microphysical scale, be implicitly negentropic, rather than entropic. That is, since negentropy, as a phenomenon, is characteristic of living processes, and entropy of non-living processes, then we must find, what might be considered by some, the simplest aspect of the non-living, the simple physical monad, to be implicitly negentropic—that is capable of showing negentropy or entropy, but being primarily negentropic. This again bears upon our relationship to the universe as a whole through creative reason, that is, our individual relationship to the universe as a whole as creative reason.

This goes to the simple *Parmenides* paper, to that little, beautiful irony, which is the center of that artistic composition, rightly called artistic. Amid all of these antinomies, this elaborate, quasi-deductive array of antinomies, Plato inserts a touch of irony: that after all, the problem here is that the transition between these qualities which seem paradoxical, is defined by change, and if we introduce, implicitly—Plato says, not explicitly, but implicitly—if we introduce change as having the primary ontological actuality, in this case, then the mystery of the antinomies dissolves and vanishes.

The problem here, is that when we say that this divisibility of physical space-time in its linear aspect is elementary, we get into precisely the problem which Euler creates here. So, by assuming that simple extension in that sense is the property of matter, we create all the chimera which haunt Euler's dream in this instance.

We recognize the implications of the speed of light as a singularity of the astrophysical scale, and recognize that the speed of light has a reflection in terms of a singularity in the microphysical scale, then we see where the fallacy of Euler's argument lies respecting physical geometry. If we recognize

that the connection between the micro- and the macro-, the maxima and the minima, is expressed by change, where change is the quality of negentropy generalized, as typified by creative reason—as I have, I think adequately, defined at least in the preliminary degree, in *In Defense of Common Sense* and locations to the same effect, earlier—then the problem vanishes.

So, the problem for Euler lies in his definition of extension, and in the use of a linear definition of extension. In principle, Euler excludes, thereby, the realm of astrophysics and of microphysics from physical reality. This is where Leibniz did *not* fail, and where Euler, at least in this case, did. That is my preliminary observation.

One thing added, as a footnote: Microphysics and astrophysics do not simply stand independently of the universe of the scale of simple observation; but, there is a point of scale at which, in the vicinity of whatever boundary condition is defined, we must *change*. We must recognize that we can no longer rely simply on simpler elementary methods of observation, but must change our view to accommodate the fact that we are approaching a singularity. Thus, in practice and in fact, as we get into the very small, divisibility of the ordinary sense *vanishes*, as it does as we get into the astrophysical scale, where the relativistic considerations remind us, or should remind us, that we are approaching a boundary condition in that respect.

Thus, as we get to certain areas of scale, in practice we no longer trust infinite divisibility. What that exact boundary condition might be, as, say, from the standpoint of the eighteenth century, we might not know. But we must know that one does exist, as Leibniz recognized. We must also recognize, as Leibniz recognized and Euler *does not*, that there is a qualitative change in the immediate implications of phenomena, of existence, as we get into the microphysical scale, i.e., that that which seems to be entropic non-living processes, on the scale of simple observations, can no longer be treated as simply entropic, but as a negentropic existence susceptible of generating ostensibly entropic phase spaces.

Not only is Euler wrong—and it is important to find Euler wrong, because of how otherwise useful he is—but, I think he has made what we might call a *strong* error, which has tremendous pedagogical value.

Letter 12, on the subject of monads

I address the content, in part, of Letter 12 of Euler's letters on the same subject of monads.

Euler introduces a fallacious argument of some significance, an argument whose foundation is a simplistic reading of the *Monadology* by some critics of Leibniz's work. This pertains to the magnitude of monads. Are they greater or lesser? Since they cannot be greater or lesser by the method which Euler imputes, then the whole thing is absurd. He also, therefore, says that relative to magnitude, they are absolute nothings.

It is interesting to look at this from the standpoint of the method we associate with the early work on integration by Roberval, L'Hôpital's accounts, and so forth: the primitive view of infinitesimals, as Roberval et al. define them, which is the result of the conventional reductionist view, or quasi-reductionist view, prevailing in mathematics and mathematical physics today.¹ Nonetheless, it is not the point of view of the *Monadology*.

For example, the simple demonstration of the fallacy of Euler's argument here, from the standpoint of geometry, to

1. The subject is axiomatics of nonlinearity. I decided to attack some of the problems of conceptual nonlinearity, as against the linear, methods in mathematical physics, from the most elementary, i.e., axiomatic, critical axiomatic standpoint possible. In that respect, some of the sources available through David E. Smith's *A Source Book in Mathematics* (New York: Dover, 1959) and editor Dirk J. Struik's *Source Book in Mathematics: 1200-1800* (Cambridge: Harvard University Press, 1969) are quite useful, as well as some of the other few collateral sources such as Hilbert (see D. Hilbert and S. Cohn-Vossen, *Geometry and the Imagination* [New York: Chelsea, 1952]). I am looking at these, my dear friend Huygens, a few Leibniz things, the Smith and Struik sources, to take some of the most obvious, simple, elementary cases, where the complexities have the greatest relative dependency on the immediate point at issue.

Let's take, just as a point of illustration of what I am doing and what I am thinking about, pages 312 through 316 of Struik, on the L'Hôpital, excerpts.

On pages 312, 313, and 314, we find a development-elaboration of the ground, the basis for two propositions there, and in the following pages, further excerpts from the same source, which give us propositions 163 and 164.

Now if we take that little diagram, as described on pages 313 and 314, pertinent to proposition 1 (Figure 1), we have there a simple closed curve, which leads to the proposition that the infinitesimal assumption can be added to make, shall we say, the APM equivalent to A small p , small m , in terms of all the functions associated with that.

It's very simple to show the fallacy of that. If the curve is not a simple closed, a simple positive curve, but a hyperbola, then we take in the vicinity of the rapidly ascending slope of the hyperbola, we try to make the same construction and that assumption is no longer even approximately true: that, roughly speaking, an apparently infinitesimal difference, even a relatively small difference, is sufficient to throw the whole thing out of whack, and therefore the infinitesimal assumptions cannot be made.

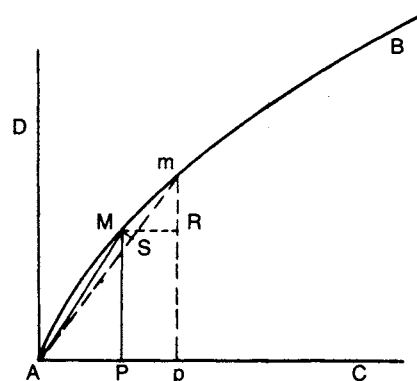
The same thing applies to postulate 2, which begins on the same page, and the same approach applies obviously hereditarily to postulate 163, 164 in the second selection, which Struik cites from that source.

So, although I think, while this is very simple, what we must do for pedagogical purposes, is look back at the axiomatic assumptions, which we have with Roberval. These axiomatic assumptions in Roberval, the same kind of mathematical assumptions, turn up hereditarily in the case of the L'Hôpital reflection on the work of the Bernoullis. This shows up in the problems of Euler.

So that if we look at this problem of infinitesimals, as defined in these two ways, and we find the fallacy of the notion of the infinitesimal, wherever discontinuities are generated, as in a Weierstrass function, or this much simpler case of the simple single hyperbolic application to this first proposition I cited of L'Hôpital.

It's a lot of fun, it's immediately accessible by people. I just throw that in for a suggestion of how we might approach some of these things, from a pedagogical standpoint, and actually get at the deepest, the most elementary, the most simple axiomatic assumptions which cause propositions in physics and as well as mathematics to go awry.

FIGURE 1



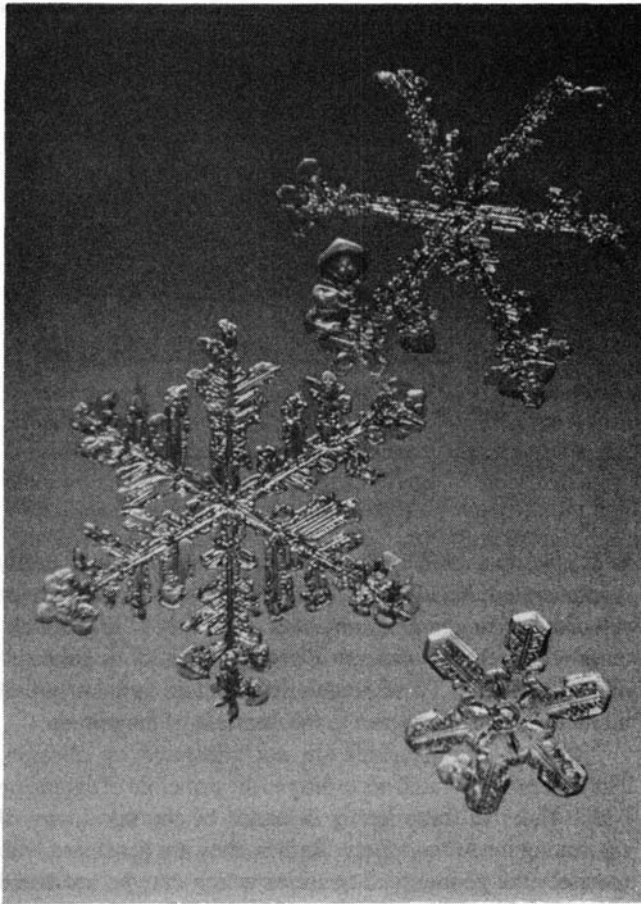
which we can hold Euler accountable, is that it is easily demonstrated, beginning with nothing but the circular action of constructive geometry and hence multiply-connected circular action, that we generate discontinuities, or singularities *out of continuity*. These singularities pertain to the nature of monads, at least in respect to the question of magnitude.

Now, the singularities are not generated by division. They are not generated according to the principle of extension which Euler in these letters demands be the standpoint of examining the *Monadology*. Rather, they are generated with precisely the geometrical qualities which may be attributed to monads by a continuous geometry, which takes no regard of infinitesimals generated by division.

Let us take the case of the simple fallacies which arise from the calculus by the simple method associated with L'Hôpital. If we use L'Hôpital's approach, we cannot equate an infinitesimal to virtually anything; but, in the case where we are trying to get the slope of a discontinuity, this infinitesimal becomes wildly indeterminate in a ponderable degree. That is, the indeterminacy is not infinitesimal, is not marginally infinitesimal, but the indeterminacy is of a very large order of magnitude relative to the function itself. Thus, there is no problem of the type which Euler attributes.

Thus, this is another way of looking at the boundaries of geometrical division, that is, in respect to scale, micro-scale and astrophysical-scale versus the ordinary scale of observation. What we call the micro-scale, the microphysical-scale, or the astrophysical-scale, is associated with the boundary conditions, which are associated in turn with the generation of singularities. What all of this involves, more specifically, is something which is made clearer successively by the work of Leonardo da Vinci, Kepler, Huygens, Leibniz, et al. in the seventeenth century into the eighteenth century.

Huygens, for example, in his treatment of the pendulum clock, shows the role of the cycloid, and of course this extends throughout the entire period, the tautochrone, the isochronic, the brachistochronic, functions, this shows that uni-



"On the ordinary macroscale of observation, it appears to us that we have two harmonic orderings: one characteristic of living processes, and the other characteristic of non-living processes, as Kepler treats this matter in his essay on The Six-Cornered Snowflake."

versal lawfulness and determination of time with respect to universal lawfulness is determined in respect to these non-algebraic functions. The implication of that is that the Cartesian notion of extension, of space, time, and matter, does not exist. Rather, that physical space-time, which has a definite curvature, is what *does exist*, and thus the significance of astrophysics and of microphysics and of the boundary conditions which ostensibly or, putatively, or what not, separate the three domains from one another (or, each of the two extreme domains from the domain of simple observation), and involve the generation of singularities.

The other aspect of this which I stated before and must emphasize again: The characteristic of a monad, in Leibniz's setting, and as I have situated it in the previous little oral memorandum on this subject, is that it is a universality; it is the minimum in which is embedded implicitly the maximum, or the minimum in which the maximum is implicitly embedded. This relationship of minimum to maximum is demonstrated immediately from the standpoint of the *Parmenides*

dialogue, by the demonstration of the negentropic character of the monad. This we know, from the standpoint of human reason, from examining the nature of human reason itself, or its efficient and therefore existent nature. The fact that we are able to change the potential population density of mankind through scientific and technological progress, i.e., through negentropic processes, nonlinear processes of creative discovery, demonstrates that this process of efficiently expressed discovery is existent and is thus *reason*.

Thus, when we look at man as a monad, as embodying *reason* in this efficient existence sense, we thus define a relationship between the mortal individual, a monad, and the universe as a whole and with the Creator—the reflection of the Creator, the *imago viva Dei*. This negentropic monad, us, the creative reason, individual creative reason, becomes the standpoint from which we understand the monads in general. That is Leibniz's point of view.

Letters 13-15

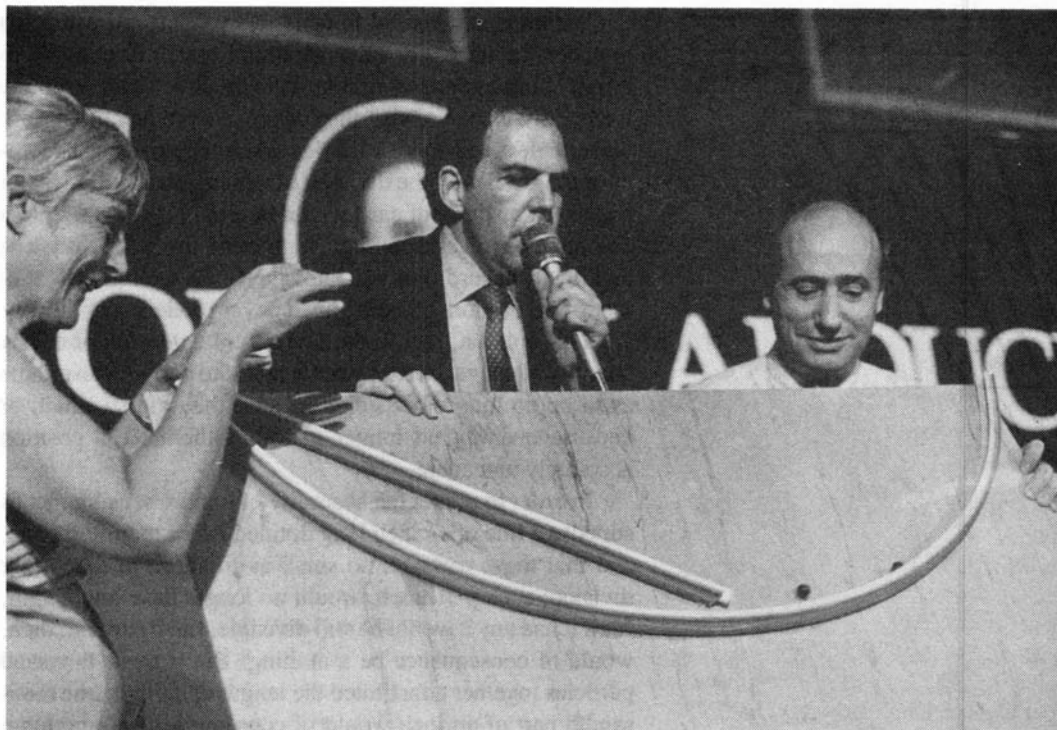
Here we are dealing with Euler's attack on the principle of sufficient reason.

Now, the first thing to look at in Euler's criticism as a whole, particularly when, most to be emphasized when we come to this issue of sufficient reason, is the question of ontology: It is not accidental that Euler starts this entire discussion on extension with the issue of ontology, and affirms infinite divisibility as a corollary of extension to be a quality of substance, a necessary condition, a universal requirement, a universal property, of ontological actuality.

The best vantage point from which to view this, critically, is to recognize the point made by Plato in the *Parmenides* dialogue. Plato anticipates, in effect, this entire argument of Euler's, and of others, by showing through antinomies the inexhaustible absurdity of the idea of simple extension—and does so by showing that simple deductive methods, which are linear methods and hence the method of simple extension, cannot define substance. He does this in the beautiful, ironical method indicated by referencing *change* as the key to the whole business. Thus, not extension, but rather *change in the process of extension*, is the location of efficient ontological actuality.

What Euler does, is to deny the efficiency of monads, except as *deus ex machina*—the Cartesian argument. He says, for example, in this English translation, the Brewster: "In this philosophy everything is spirit, phantom, and illusion; when we cannot comprehend these mysteries, it is our stupidity that keeps up an attachment to the gross notions of the vulgar." And then again, (this as in 14), and in 15, he extends this to include the powers of the soul: that ideational properties are the mechanism which the monadologists profess to be efficient ideas, efficient principles. But, we know precisely that, in respect to change, ideas insofar as they are limited to images of linear space, are not efficient.

So, therefore, by agreeing with Euler on this point, which



A model of the isochronic curvature of the cycloid, demonstrated by Carol White, Mel Klenetsky, and Dino de Paoli at a conference of LaRouche's philosophical associates in September 1990.

he asserts, we thus demolish his argument, because that is not the issue. It is the creative processes through which valid scientific principles are discovered, and changes in human behavior resulting from these ideas, that the monad expresses its efficiency. Therefore, it is not simply an abstract idea of movement, that the idea in this case, that is the creative idea, as distinct from the simple mental image of an object, which is at issue. This, therefore, he assents to, by saying it would be to descend into obscurity to see efficiency in a mere image idea; he avoids the fact that it is not the image idea that is the question here, but as Plato says in the *Parmenides*, it is *change*. The change, in this case, is the change effected by overthrowing an entire set of assumptions controlling human behavior, through discovery of a valid, crucial principle of natural law, and thus changing human behavior to the effect of increasing the per capita power of the human species over the universe.

The sufficient reason in this case applies to the discovery and the elaboration of the discovery of this negentropic characteristic of individual human mortal existence. The fact that human beings have this capability, is sufficient evidence of the existence of this capability within an individual existence within the universe. The fact that this capability within an individual existence expresses a coherence of the maximum and the minimum—that is the maximum in the minimum and the minimum in the maximum—is sufficient to demonstrate, against Euler, that this nature of existence is a general, i.e., maximum, within the universe. General, not in the sense that all existence is immediately manifested, but that it is general

in the universe and defines existence.

The *Parmenides* dialogue comes back into play here, by showing the absurdity of any notion of efficient existence from a linear standpoint, the absurdity of the notion of efficient existence from any other standpoint but change.

Selections from Euler's letters

From Letters of Euler on Different Subjects in Natural Philosophy, Addressed to a German Princess, David Brewster, ed., New York: Harper & Brothers, 1840.

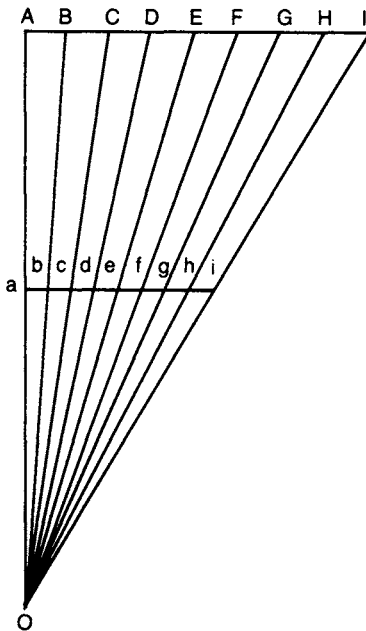
Letter 8: Divisibility of extension *in infinitum*

The controversy between modern philosophers and geometers, to which I have alluded, turns on the divisibility of body. This property is undoubtedly founded on extension; and it is only in so far as bodies are extended that they are divisible, and capable of being reduced to parts.

You will recollect that in geometry it is always possible to divide a line, however small, into two equal parts. We are likewise by that science instructed in the method of dividing a small line, as *a i*, **Figure 2**, into any number of equal parts at pleasure: and the construction of this division is there demonstrated beyond the possibility of doubting its accuracy.

You have only to draw a line *A I* parallel to *a i* of any length, and at any distance you please, and to divide it into

FIGURE 2



as many equal parts AB, BC, CD, DE, etc. as the small line given is to have divisions, say eight. Draw afterward, through the extremities A a, and I i, the straight lines A a O, I i O, till they meet in the point O; and from O draw towards the points of divisions B, C, D, E, etc. the straight lines OB, OC, OD, OE, etc., which shall likewise divide the small line a i into eight equal parts.

This operation may be performed, however small the given line a i, and however great the number of parts into which you propose to divide it. It is true that in execution we are not permitted to go too far; the lines which we draw have always some breadth, whereby they are at length confounded, as may be seen in the figure near the point O; but the question is, not what may be possible for us to execute, but what is possible in itself. Now, in geometry lines have no breadth, and consequently can never be confounded. Hence it follows that such division is illimitable.

If it is once admitted that a line may be divided into a thousand parts, by dividing each part into two it will be divisible into two thousand parts, and for the same reason into four thousand, and into eight thousand, without ever arriving at parts indivisible. However small a line may be supposed, it is still divisible into halves, and each half again into two, and each of these again in like manner, and so on to infinity.

What I have said of a line is easily applicable to a surface, and, with greater strength of reasoning, to a solid endowed with three dimensions,—length, breadth, and thickness. Hence it is affirmed that all extension is divisible to infinity; and this property is denominated *divisibility in infinitum*.

Whoever is disposed to deny this property of extension is under the necessity of maintaining that it is possible to arrive at last at parts so minute as to be unsusceptible of any further division, because they cease to have any extension. Nevertheless, all these particles taken together must reproduce the whole, by the division of which you acquired them; and as the quantity of each would be a *nothing* or *cipher* 0, a combination of ciphers would produce quantity, which is manifestly absurd. For you know perfectly well that in arithmetic two or more ciphers joined never produce any thing.

This opinion, that in the division of extension or of any quantity whatever, we may come at last to particles so minute as to be no longer divisible, because they are so small, or because quantity no longer exists, is therefore a position absolutely untenable.

In order to render the absurdity of it more sensible, let us suppose a line of an inch long divided into a thousand parts, and that these parts are so small as to admit of no further division; each part, then, would no longer have any length, for if it had any it would be still divisible. Each particle, then, would of consequence be a nothing. But if these thousand particles together constituted the length of an inch, the thousandth part of an inch would of consequence be a nothing; which is equally absurd with maintaining that the half of any quantity whatever is nothing. And if it be absurd to affirm that the half of any quantity is nothing, it is equally so to affirm that the half of a half, or that the fourth part of the same quantity is nothing; and what must be granted as to the fourth must likewise be granted with respect to the thousandth and the millionth part. Finally, however far you may have already carried in imagination the division of an inch, it is always possible to carry it still further; and never will you be able to carry on your subdivision so far as that the last parts shall be absolutely indivisible. These parts will undoubtedly always become smaller, and their magnitude will approach nearer and nearer to 0, but can never reach it.

The geometrician, therefore, is warranted in affirming that every magnitude is divisible to infinity; and that you cannot proceed so far in your division as that all further division shall be impossible. But it is always necessary to distinguish between what is possible in itself and what we are in a condition to perform. Our execution is indeed extremely limited. After having, for example, divided an inch into a thousand parts, these parts are so small as to escape our sense; and a further division would to us no doubt be impossible.

But you have only to look at this thousandth part of an inch through a good microscope, which magnifies, for example, a thousand times, and each particle will appear as large as an inch to the naked eye; and you will be convinced of the possibility of dividing each of these particles again into a thousand parts: the same reasoning may always be carried forward without limit and without end.

It is therefore an indubitable truth that all magnitude is divisible *in infinitum*; and that this takes place not only with

respect to extension, which is the object of geometry, but likewise with respect to every other species of quantity, such as time and number.

28th April, 1761

Letter 10: Of Monads

When we talk in company on philosophical subjects, the conversation usually turns on such articles as have excited violent disputes among philosophers.

The divisibility of body is one of them, respecting which the sentiments of the learned are greatly divided. Some maintain that this divisibility goes on to infinity, without the possibility of ever arriving at particles so small as to be susceptible of no further division. But others insist that this division extends only to a certain point, and that you may come at length to particles so minute that, having no magnitude, they are no longer divisible. These ultimate particles, which enter into the composition of bodies, they denominate *simple beings* and *monads*.

There was a time when the dispute respecting monads employed such general attention, and was conducted with so much warmth, that it forced its way into company of every description, that of the guard-room not excepted. There was scarcely a lady at court who did not take a decided part in favor of monads or against them. In a word, all conversation was engrossed by monads—no other subject could find admission.

The Royal Academy of Berlin took up the controversy, and being accustomed annually to propose a question for discussion, and to bestow a gold medal, of the value of fifty ducats, on the person who, in the judgment of the Academy, has given the most ingenious solution, the question respecting monads was selected for the year 1748. A great variety of essays on the subject were accordingly produced. The president, *Mr. de Maupertuis*, named a committee to examine them, under the direction of the late *Count Dohna*, great chamberlain to the queen; who, being an impartial judge, examined with all imaginable attention the arguments adduced both for and against the existence of monads. Upon the whole, it was found that those which went to the establishment of their existence were so feeble and so chimerical, that they tended to the subversion of all the principles of human knowledge. The question was therefore determined in favor of the opposite opinion, and the prize adjudged to *Mr. Justi*, whose piece was deemed the most complete refutation of the monadists.

You may easily imagine how violently this decision of the Academy must have irritated the partisans of monads, at the head of whom stood the celebrated *Mr. Wolff*. His followers, who were then much more numerous and more formidable than at present, exclaimed in high terms against the partiality and injustice of the Academy; and their chief had well-nigh proceeded to launch the thunder of a philosophical anathema against it. I do not now recollect to whom

we are indebted for the care of averting this disaster.

As this controversy has made a great deal of noise, you will not be displeased, undoubtedly, if I dwell a little upon it. The whole is reduced to this simple question, Is a body divisible to infinity? or, in other words, Has the divisibility of bodies any bound, or has it not? I have already remarked as to this, that extension, geometrically considered, is on all hands allowed to be divisible in infinitum; because however small a magnitude may be, it is possible to conceive the half of it, and again the half of that half, and so on to infinity.

This notion of extension is very abstract, as are those of all genera, such as that of man, of horse, of tree, etc., as far as they are not applied to an individual and determinate being. Again, it is the most certain principle of all our knowledge, that whatever can be truly affirmed of the genus must be true of all the individuals comprehended under it. If therefore all bodies are extended, all the properties belonging to extension must belong to each body in particular. Now all bodies are extended, and extension is divisible to infinity; therefore every body must be so likewise. This is a syllogism of the best form; and as the first proposition is indubitable, all that remains is to be assured that the second is true, that is, whether it be true or not that bodies are extended.

The partisans of monads, in maintaining their opinion, are obliged to affirm that bodies are not extended, but have only an appearance of extension. They imagine that by this they have subverted the argument adduced in support of the divisibility *in infinitum*. But if body is not extended, I should be glad to know from whence we derived the idea of extension; for if body is not extended, nothing in the world is, as spirits are still less so. Our idea of extension, therefore, would be altogether imaginary and chimerical.

Geometry would accordingly be a speculation entirely useless and illusory, and never could admit of any application to things really existing. In effect, if no one thing is extended, to what purpose investigate the properties of extension? But as geometry is beyond contradiction one of the most useful of the sciences, its object cannot possibly be a mere chimera.

There is a necessity then of admitting, that the object of geometry is at least the same apparent extension which those philosophers allow to body; but this very object is divisible to infinity: therefore existing beings endowed with this apparent extension must necessarily be extended.

Finally, let those philosophers turn themselves which way soever they will in support of their monads, or those ultimate and minute particles divested of all magnitude, of which, according to them, all bodies are composed, they still plunge into difficulties, out of which they cannot extricate themselves. They are right in saying that it is a proof of dullness to be incapable of relishing their sublime doctrine; it may however be remarked, that here the greatest stupidity is the most successful.

5th May, 1761.

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