

THE SPIRIT OF RUSSIA'S SCIENCE

by Lyndon H. LaRouche, Jr.

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The most awesome notion to be found among known cultures, is that associated with the best use of the word "spirit." In those cases that that word is spoken as a matter of the science of Kepler, Leibniz, Riemann, or by me, it signifies a unique quality of existence. It refers to a specific quality of existence which affects, and is affected by abiotic and living existences, but which is neither derived from, nor contained within either or both of those domains.[1]

In the history of the development of physical science in Russia and Ukraine, that scientific notion of the existence of spiritual identities, is to be recognized in the work of the geobiochemist Vladimir I. Vernadsky. Vernadsky defines the principle of existence expressed by what he named the *Noösphere* from the standpoint of a rigorous scientific method.[2] For this purpose, Vernadsky relied upon a rigorously scientific notion of such existence, using the same method of modern experimental physical science which was employed by a predecessor and teacher, Dmitri I. Mendeleev, in the latter's discovery of the so-called periodic table.

As I have explained repeatedly on past occasions, I did not derive my own definition of what Vernadsky termed the *Noösphere*, from his work. During the interval 1948-1953, I came to a notion of the human individual's unique place in the universe which turned out to be significantly congruent with his, but from a different starting-point, and with some significantly different conclusions included. Despite those divergences, my work included results which are congruent, in many essentials, with the notions of the practice of modern experimental physical science associated with Vernadsky's definition of that *Noösphere*.

One of the specific differences unique to my own approach, is that it provides a rigorous notion of what we ought to understand as that definition of "spirit," which must be adopted when that term is employed in the deliberations of physical science. Here, in defining a crucial feature of Russia's strategic role in the present world crisis-situation, I pivot my outline of a proposed policy, upon a summary of the bearing of my own

original contributions, as that more adequate appreciation of the work of Vernadsky, which is required to define the spirit needed for guiding the policy-shaping of Russia's and other governments today. I emphasize the strategic-economic importance for Russia itself, of viewing Vernadsky's development of the notion of a *Noösphere*, as a reflection of the deeper implications of the method typified by the leading discoveries of Mendeleev.

As I have argued in other, earlier locations, the present moment of world history, and the prospects of Russia in that history, are to be situated in the following terms. On this occasion, today, I examine these specific matters of the scientific spirit, in light of their strategic implications for the present world in crisis.

Some circles in Russia have recently stated, that the recent months have brought the world to the brink of a radical, systemic change in relations among states.[3] I agree with that estimate, which I reformulate, as follows, in my own terms.

HISTORY AS GEOMETRY

Whereas, the range of possible behavioral adaptations among the inferior living species, is bounded by the so-called "genetic" characteristics of specific breeds, mankind is distinguished as the only species which can invent and introduce the genetic-like cultural characteristics which distinguish one culture and its current stage of development from others. These distinctions remind us of the process of generation of the ostensibly abiotic periodic table, in the work of Mendeleev,[4] or the evolutionary emergence of classes and species of living types within the Biosphere. These willful changes in the relatively specific kinds of voluntary behavioral characteristics of persons or entire cultures, should be compared to the choice of a new, distinct set of "definitions, axioms, and postulates" of a synthetic physical geometry, such as that of Bernhard Riemann.

For reasons I have given in various locations, the notion of "geometry" which may be usefully applied to the study of such variations in cultural characteristics, is that which I have adapted from Bernhard Riemann's statement of the general principles of design of the differential geometries corresponding to sequences of multiply-connected physical-geometric manifolds. This report restates and applies those notions to the purpose of assessing the impact of the notion of a *Noösphere* introduced by Vernadsky.

Usually, the changes in axiomatic-like assumptions of populations, correspond to breaking-points of change of direction, in the history of a nation, nations, or some stratum within society. Unfortunately, because of the incompetence of virtually all officially certified education, in Europe and the Americas currently, for example, the teaching of history, or so-called "political science" and "social studies," has been treated apart from the recognition and study of the inseparable character of the axiomatic foundations of such essential features of historical development as the Classical forms of practice of physical science, artistic composition, and so on. As a result of this prevalent present custom, most among the recent generations of our populations, including the most educated classes, are functionally illiterate respecting those essential functional aspects of historical change which were either neglected topics, or fraudulently represented, in their education and most customary professional practice today.

Therefore, such of today's typically, highly educated such illiterates in the subject, who have not actually considered history as a lawful process, would tend to overlook the decisive role played by those historic changes of the following general types, the which have dominated the Twentieth Century and the beginning of the Twenty-First. To understand economic processes, and political notions of national or other special interest, one must, as I do now, consider the following series of changes as of the axiomatic quality I have just referenced.

Since the beginning of the Twentieth Century, Russia has passed from a Czarist, to a nominally Communist, to a so-called "liberal," "post-modernist" form of political-economy, and, is now entering some yet-to-be-determined choice of form of post-liberalism, post-post-modernist, economy. This specific experience of Russia, overlaps a succession of crucial, post-1945 changes in the world economy as a whole.

During the 1945-2001 interval, the world as a whole has been dominated, successively, by three phases. I situate the implications of Vernadsky's work within the present implications of that interval of modern history.

1. From 1945, until the events of 1989-1990, the post-war world was dominated by a certain system of relations among states, a system which blended the contradictory elements of nuclear-weapons conflict and détente.

2. That interval of history was succeeded, during 1989-1991, by the emergence of a post-Soviet world order, in which the English-speaking rentier-financier powers of the planet, worked to establish what was intended to become an uncontested, imperial form of world-rule consistent with that prescription for a world government in H.G. Wells' 1928 *The Open Conspiracy*, which has been the doctrine of Wells, Bertrand Russell, and their followers to the present day. That attempt at world-rule was modeled, speaking broadly, upon not only the ancient Roman Empire, but a virtual copy of the form of post-Rome imperial maritime power represented by Venice's rentier-financier oligarchy.

3. Approximately a decade after the collapse of Soviet power, the 1989-2001 world order is now in the process of disintegrating, under the impact of a self-induced, global breakdown crisis of the world's present, "globalized" form of post-1971 international monetary and financial system. The world is now writhing, in its struggles to disentangle itself from the death-agonies of a system based upon such deadly delusions of neo-Malthusian economic "liberalism," as the doctrine of "fiscal responsibility."

Although the outcome of that presently accelerating world financial collapse, is not yet predetermined, certain challenges posed by that crisis are clear. In a world of the near future, which had, hopefully, escaped from the worst possible outcome of the presently onrushing crisis. Russia must adopt a new kind of role in history for the period to come. If a successful choice of that national identity is made, the lessons of the successive experiences of Czarism, Communism, and a disastrous dalliance with radically positivist forms of liberalism, warn us, that no one should ignore the reality of Russia's experience from those pages of Twentieth-Century history.

In the case, that a successful choice of Russia's functional national identity is adopted, Russia's role in physical science will be a crucial feature of its economic and other relations, both within Eurasia, and the world at large. On this account, there must be a clarification of Russia's scientific mission, of Russia's place in the emerging scientific and related economic development of the world's economy at large. This understanding of Russia's new mission, must be shared among a leading group of nations world-wide.

The successive Eurasia initiatives of Russia's former Prime Minister Primakov and President Putin, toward Eurasia-wide cooperation for economic progress and mutual security, are the setting in which I situate the proposed sense of special science mission which history has now proffered to Russia during the decades ahead.

Looking toward the past, the succession of the most crucial among the shared features of the shared method expressed in leading discoveries of Mendeleev and Vernadsky, offers the conception of "Russian science" which best fits the role which Russia should play in world-wide scientific progress during the decades ahead. This is a crucial aspect of the role which Russia will play in any happy outcome of the historical maëlstrom which grips the planet as a whole at the present moment. I point here to what are, for me, the most crucial implications of the common thread of fundamental scientific progress; that contributed by those two great minds from the past. I speak, therefore, of "the spirit of Russia" for the decades presently ahead of us.

On this account, we must consider the global historical setting of today's Russia, not only from the standpoint of relevant axiomatic features of the discovery and application of universal physical principles, but in terms of certain, inseparable connections of ideas respecting physical science, to principled

notions of social and political interest.

The latter includes also the notions which govern the individual's sense of his or her mortally brief place within the continuity of those larger developments, which, respectively, have preceded his or her mortal

existence, and precede times to come. It is that sense of "world-historical identity," or the lack of that sense, which regulates the intention of the individual's role in life, as Kepler employs intention as the impulse expressed by discoverable universal physical laws.[5]

1. Science And The Nation-State

Let us understand the term "modern science" as the effort to master mankind's relationship, as a society, to the universe, and to do so in the terms provided by the discovery of experimentally validated universal physical principles. That pursuit has ancient roots, but the emergence of a more or less unified body of such knowledge, dates from the same period in which the modern sovereign nation-state first emerged, during Europe's Fifteenth Century. This is modern science, in that sense of the term which was begun by Nicholas of Cusa's *De Docta Ignorantia*, as this was developed after him by such among his notable, professed followers as Luca Pacioli, Leonardo da Vinci, and the founder of the first approximation of a modern comprehensive mathematical physics, Johannes Kepler.

Kepler's original discovery of a universal principle of gravitation, breaking free from the axiomatic ivory-tower assumptions which fatally crippled the efforts of Ptolemy, Copernicus, and Brahe, is documented in his 1609 *The New Astronomy*. This and related discoveries by Kepler, are to be recognized as the true predecessors of the experimental method of experimental demonstration of discovered universal physical principles, as expressed by that work of Mendeleev in defining the periodic table of elements, and the work of Vernadsky in defining, successively, both the Biosphere and *Noösphere*.

That is to say, that the same method of scientific thought used by Kepler, to define a principle of gravitation which is independent of mathematical explanations made at the blackboard, is echoed in the referenced discovery of principle by Mendeleev, and in the experimental method employed by Vernadsky to show that life and cognition (noësis) are ontologically independent, universal principles, which interact with the abiotic universe, but which each come into existence independently of abiotic principles as such.

At this point, I must take the preliminary step of clarifying what I recognize as the uniqueness of Vernadsky's work; I must also show how his discoveries both complement, and yet differ from my own.

The core of Vernadsky's net achievement, in defining the *Noösphere*, is that he defines the existence of what he calls noëtic processes of the mind, as reflecting respectively distinct kinds of universal physical principles, each distinct from the principle underlying the evidence both of other living processes and of a presumably abiotic universe.

From the standpoint of mathematical physics, the crucial

omission within Vernadsky's achievement on this account, is his lack of a developed statement of the fact, that a universe corresponding to the existence of the respectively distinct universal principles underlying life and cognition (noësis), respectively, as Vernadsky defines them, must be, conceptually, of the pro-mathematical form of a Riemannian, specifically anti-Euclidean differential physical geometry.

From a formal standpoint, both Vernadsky's discoveries and my own signify two conclusions. First, that the principle of life is not derived from a reductionist notion of an abiotic universe. Life expresses an original principle, whose existence as a principle is independent of any assumed dependence upon an axiomatically assumed quality of abiotic principle. Similarly, second, the universal physical principle of cognition, is as distinct from both life as such, and from abiotic principles, as life is distinct from the abiotic. Cognition is also as original to the universe as any notion of abiotic or living principle.[6]

Therefore, when Vernadsky's proofs are viewed both from the standpoint of a Riemannian differential physical geometry, and also my own view of the function of cognition, Vernadsky is to be appreciated as arguing, that what we call life or cognition, are phenomena which correspond to certain long-term effects of specific, universally principled forms of persisting action, by the universe, upon both its abiotic and living self. In other words, the implication of Vernadsky's discoveries, is not merely that the universe is hylozoic, as some ancient Greeks proposed. Vernadsky goes beyond the conventional reading of hylozoic; the universe is also cognitive (noëtic) in its essence. This echoes Plato's implicit insistence upon such a conclusion; that is to say, cognition (noësis) represents a universal physical principle which is distinct from either abiotic processes or life as such.

Vernadsky's discoveries respecting the Biosphere, have ancient and other precedents. That does not diminish his achievement, but, rather, illuminates it more brightly. The hylozoic view was already famously defined by Plato, as, notably, is implicit in his *Timaeus* dialogue.[7] The treatment of the proof of the uniqueness of the so-called Five Platonic Solids, as this topic is reflected in the last three books of Euclid's *Elements*, already implied a physical universe of a hylozoic geometry, in which the physical laws of the universe are bounded in their performance by a non-abiotic principle we call "life." However, as in the *Timaeus*, Plato also defines universal cognition (noësis) as a universal principle.

This feature of Plato's heritage was taken up, famously,

by Nicholas of Cusa, Luca Pacioli, and by Leonardo da Vinci, and emerges as the kernel of Kepler's principal discoveries in mathematical physics. The notion of the demonstration of the existence of universal physical principles, although a central feature of Plato's dialogues, for example, is a conception which arises as a functionally efficient idea only through reflection on the implications of modern experimental physical science, as the case of Kepler's discoveries, and those of Leibniz and Riemann after him, illustrates this point most aptly.

We should not have been surprised, therefore, that this working approach to a "general theory of what might be subsumed under the title of a general theory of Platonic and derived crystalline structures," should have led to the most celebrated discoveries of Mendeleev and Vernadsky. Contrary to some celebrated speculators, life did not begin in the universe as a germ infecting the abiotic, but was always an existing universal principle, which came to express itself in such modes as those forms of existence we recognize as living.

In other words, as is suggested by the evidence of universal anti-entropy in the universe, the principle which distinguishes living from presumably non-living processes, always existed as an efficiently present principle in the universe as a whole. From the standpoint of the differential physical geometry of Riemann, this conception poses no problem for the physical scientist. Consequently, the included effect of the action of that universal anti-entropic principle, generates a kind of Leibnizian monad we recognize as a living process per se, and therefore presents no conceptual problem. Similarly, a principle of universal cognition, also anti-entropic in essential character, may, at some point, adopt a developed, appropriate form of living creature as a cognitive individuality.

These conceptions pervade the work and argument of Plato, and of such modern scientific intellects as Cusa, Pacioli, Leonardo da Vinci, Kepler, and Leibniz. They are implied in the work of Riemann.

Similarly, for the same strong epistemological reasons, cognition is not to be defined axiomatically as a by-product of living processes in general, but is a superimposed principle which has organized the existence of cognitive beings, human beings, from within the domain of living processes.[8]

It is to be doubted that Vernadsky could have conceived of his specific notion of human noësis, had this not occurred to him through his reflections on the implications of the method he developed in the course of his definition of the Biosphere. Vernadsky was able to conceive of noësis, because of his viewing the paradoxes arising in the contrast of human to other living processes from the same standpoint he had defined the Biosphere.

That a principle, life, should exist, shown to be efficiently independent of the notions of universal principles of an abiotic universe, was the breakthrough which led Vernadsky to recognize the evidence of that experimentally demonstrable

distinction between human and non-human living processes, the distinction which sets mankind's cognitive processes apart from, and above life. The method which Vernadsky applied to this effect, parallels the geological and related evidence which showed life to be a universal principle independent of, and functionally superior to the modern reductionists' notion of an abiotic universe.

To conceptualize the idea of a discovery of universal physical principle, we must begin by understanding this as a challenge to our ability to conceptualize the generation of an experimentally verifiable hypothesis, that done within our own, sovereign cognitive processes. To restate the crucial argument:

The concept of noësis, as Vernadsky termed it, depends upon the ability to generalize the notion of efficient human noësis in a way which is comparable to proof of the efficiency of a universal principle of life, distinct from abiotic action, in shaping the geological history of our planetary Biosphere.

Vernadsky's approach to the subject of noësis, should be compared with my own application of Leibniz's anti-Kantian notion of cognition, to the way in which crucial experimental proof-of-principle, subsumes the definition of those technologies by means of which the productive powers of labor are increased, in terms of a physical process, per capita and per square kilometer. It is in treating the cognitive act of discovery of a universal principle as a subject of consciousness, in Vernadsky's case, as in my own, that the concept of the essential nature of the human individual, and therefore of the human species, is apprehended as a scientific conception of what should be named "human nature."

In Vernadsky's geology-based definition of the Biosphere, a relatively weak ("bioenergetic") force, the principle expressed as life, has been able to effect increasing power within, and over what is ostensibly the providence of a more powerful force, that of abiotic principles. Similarly, for him, as for me, a relatively weak force of cognition, is able to effect increasing power within the domain associated with what are, ostensibly, the relatively more powerful forces expressed as living and abiotic principles.

Here lies the key to the achievement of Vernadsky, relative to the earlier, more limited discoveries of Louis Pasteur, et al. It was the definition of the Biosphere as the outgrowth of a very long process of geological development, which provided the basis in experimental outlook, for recognizing, subsequently, that a principle which he termed noësis, distinguished cognitive processes from what were otherwise merely living ones.

To this, the theologian might respond: "You see: science shows that God always ruled the universe, and that cognitive man and woman have been made equally in the cognitive image of that God." Here lies the place of the notions of spirit, and related notion of universally efficient intention, within physical science, and within the attempt to comprehend human history in a truly scientific way.

NOËSIS AS A MATTER OF PRINCIPLE

To appreciate the implications of the discoveries of Mendeleev and Vernadsky on such counts, we must focus more sharply on my own, alternative choice of approach to the area of inquiry which Vernadsky defined as the Noösphere.

From the standpoint of my own view of the history of scientific knowledge, I must insist that science begins when blind faith in sense-certainty ends. The human sense-perceptual apparatus is not a more or less transparent window through which to see the actual objects existing beyond our skin. The sense-perceptual apparatus is, essentially, the experience of our biological interface with the universe in which we exist; it does not, in itself, represent explicitly a form of knowledge of any objects outside that "skin," so defined.

Knowledge is not a quality of sense-perceptual experience, but is, rather, the fruit of a cognitive criticism of our own sense-experience. Contrary to the modern logical positivists, as also to their reductionist predecessors the empiricists, the case of the discovery of existent monads, such as electrons, within the smallness of the domain of atomic and sub-atomic microphysics, illustrates that point most forcibly.

The significance of that distinction, is illustrated by the first successful modern discovery in microphysics as such, the proof of the Ampère angular force, by Carl Gauss's collaborator Wilhelm Weber. Weber's experimentally adduced constant, on the scale of the electron-orbit, was the first knowledgeable penetration of the interior of the atomic domain, the domain clearly beyond the powers of so-called sense-perception.

The chief root of modern European science, was, therefore, the collection of the dialogues of Plato. Experience confronts us with certain unevadable paradoxes, of which the most significant are those designated as *ontological paradoxes*. Kepler read his meticulously reexamined evidence of the observations of the orbit of Mars, to show, not only that the estimates of Claudius Ptolemy, Copernicus, and Brahe, were the errors caused by reliance on the substitution of ivory-tower ideas about mathematics, for physical science. Only some principle, some efficiently acting intention, external to the mere statistical portrayal of observed trajectories, could account for the experimentally anomalous evidence of the Solar orbits.

This notion of intention, as defined by Kepler for the discovery of universal gravitation, is the only rational definition of universal physical principle today. All notions of universal physical principle, and Riemann's related general notion of an extended magnitude, are of the same essential nature as the import of this discovery by Kepler.

Similarly, consider the paradoxical picture obtained by comparing reflection with refraction, which led Fermat to a notion of a universal principle of relativistic least time, rather than shortest distance.

Thus, from such critical experience with paradoxes presented to our senses, our powers of cognition, sometimes identified by theologians with "spiritual exercises," generate what we rightly called knowledge, especially knowledge of universal physical principles. That is to say, knowledge of the efficient intentions of the universe. Thus, what Riemann accomplished, as in his famous 1854 habilitation dissertation, was simply to throw out of science the polluted baggage, respecting matters of mathematical physics, left over from the accumulated ivory-tower ideologies of the sundry varieties of reductionists.

After Riemann's 1854 habilitation dissertation, self-respecting scientific practice was left with no morally acceptable choice, but to reject, and to exclude all presumably "self-evident," ivory-tower definitions, axioms, and postulates from science. Therefore we must delimit the use of the term knowledge, to denote experimentally validated discoveries of principle which had been prompted by relevant paradoxes of experience, especially those ontological paradoxes which lead, like Vernadsky's referenced discoveries, to an experimentally verified hypothesis.

Admittedly, we can trace the origins of such science to certain prehistoric and later astronomical calendars, and, within historic times, to the school of Pythagoras, the Ionians, and Plato's Academy at Athens. However, although modern civilization's debt to those sources is clear, the practice of modern experimental science is both novel, and a product of the special conditions under which the ancient and medieval systems of imperial rule began to be superseded by the notion of the modern sovereign form of nation-state.

By use of the very term "modern history," both Russia and western Europe reference the qualitative changes in social processes, which were unleashed during post-Fourteenth-Century Europe's emergence from that preceding dark age which had begun with the Second through Fourth Crusades, and which had extended through the Fourteenth-Century bankruptcy of the Lombard usurers. By modern European civilization, we signify the relationship of the Fifteenth-Century emergence of the modern nation-state within Europe to the world at large.

Prior to that time, in ancient Mesopotamia, for example, or in the emergence of what became the Roman Empire, since the aftermath of the Second Punic War, there was no efficient political conception of man as anything but another form of beast.

Ancient and feudal societies were ruled by oligarchies and their lackeys, and the remainder of humanity was treated as collections of either domesticated or wild beasts. Out of such bestial relations of the oligarchy and its lackeys toward the subject populations, those social systems adopted a notion of practice which treated man, including the oligarchical predators themselves, as but another beast. Although what is known as the humanist conception of man, struggled for expression in ancient

times, as the case of Classical Greece best typifies this ancient struggle, prior to the Fifteenth Century, the ruling social and political institutions usually succeeded in restoring the supreme authority of a contrary, bestial practice.

Today, speaking from the standpoint of scientific method, we would rightly equate the humanist conception of man, to that quality of the human individual which Vernadsky identified as the noëtic function. It is that universal physical principle, expressed functionally as the distinctive nature of the human individual, which sets mankind into a category apart from, and above the beasts.

Since then, despite the horror of those religious wars by aid of which rentier-financier Venice's influence continued to dominate 1511-1648 western Europe, there has been a trend of growth in population and improvements in the demographic conditions of life, a trend of a quality without precedent in the known earlier existence of our species. The key to this and related quality of increased progress in the human condition, is the interdependent relationship between the emergence of the modern form of sovereign nation-state and of state-fostered, modern, experimentally-based discovery and use of universal physical principles.

This includes those universal principles of Classical artistic composition, and study of history, which are discovered through the same *noëtic* processes of the mind which produce discoveries of the principles of physical science in general.

The initiative for this revolution called the modern sovereign nation-state republic, came chiefly from the followers of Dante Alighieri in Italy, but the first successful steps toward the modern sovereign nation-state, were taken in Louis XI's France and Henry VII's England. The crucial change in the form of the state, was from the imperial form in which an emperor ruled over a pantheon of ethnic cultures and religions, in the capacity of what the Romans named a *Pontifex Maximus*, to a new form of society, in which the moral authority to govern was limited to those governments which efficiently promoted the general welfare of the entire population and its posterity.

In the history of Russia, this new view of the role of scientific and technological progress dates, in terms of leading institutions, from approximately the beginning of the Eighteenth Century, as expressed by the establishment of academies dedicated to promoting such progress.

This change, from the oligarchical state as the ruler over human cattle, to a state responsible for the progress of the general welfare of the entire population, was the impetus for the growth of the practice of what became modern science. This way of looking at a national government's sovereign responsibility for the general welfare of the nation and its posterity as a whole, created a new notion of the functional meaning of the terms "nation," "nation-state," of government in general, the notion of a principle of progress, and of the essential, universal nature of the distinction between mankind and lower forms of life.

Nonetheless, despite such progress, the oligarchical legacy was never completely uprooted, up to the present date. The old feudalistic tradition of Habsburg imperial rule, is more or less in the past, excepting a scattering of the nostalgic pretenses of scattered groups of modern Don Quixotes, such as the mentally deranged Carlists of Spain. However, the tradition of the imperial maritime power of a Venetian financier oligarchy, has lived, and tended to dominate much of the world's affairs, from within centers such as the Netherlands, the British monarchy, and the lower Manhattan, Boston, and Washington financial-power centers, to the present time. The Fifteenth-Century revolution establishing the sovereign form of nation-state, was a great revolution, but it has remained, to date, an uncompleted revolution, with many set-backs in between.

Since approximately the middle of the 1960s, with the first Harold Wilson government of the United Kingdom, and the 1966-1968 U.S. Presidential-election-campaign of Richard Nixon, there has been a generally accelerating effort to turn back the clock, toward times before modern history, to times as horrible as Europe's mid-Fourteenth-Century "new dark age." As typified by the doctrine of "controlled disintegration of the economy," introduced to U.S. official policy and international practice by the Zbigniew Brzezinski-impelled U.S. Carter Administration, the changes which began to be introduced by the pro-racist Nixon election campaign of 1966-1968, sought, as Nixon did in March 1971, to reverse the physical-economic progress accomplished in most of the Americas and Europe during the 1945-1964 interval.[9]

As long as the Soviet Union remained a powerful strategic factor, the ability of that anti-humanist Anglo-American faction to turn back the clock of history in the direction of feudalism, was limited. With the collapse of Soviet power, over the 1989-1991 interval, the process of ending agro-industrial scientific progress in the general welfare of populations, was accelerated, as measures of so-called "globalization" were introduced; pro-Malthusian measures which had the stated intent of destroying that institution, the modern sovereign nation-state, on which the continuation of progress depends absolutely.

These changes of the 1966-2001 interval generated a long-term, systemic process of disintegration of the world economy. The planet-wide economic, as well as monetary and financial crisis, which has erupted with increasing force, since 1996, has led the planet to the point, that the disintegration of the present world monetary-financial system was immediately inevitable. We have now passed that point, when that existing political-economic system could be continued by mere internal reforms within the boundaries of the presently existing monetary and financial system. We are at the point, that either that 1966-2001 system is replaced, and the 1966-2001 policy-trends reversed, or the prospect of descent into a planet-wide dark age beckons.

This is not to suggest that the 1945-1963 Bretton Woods monetary-financial system did not contain some evils and other follies. It is to emphasize the contrast between that period and the follies of the 1966-2001 process. The latter process must be

contrasted to the net economic success of the economic recovery from world depression and war, under the 1945-1963 conditions. We can not, and should not simply repeat 1945-1963 history; we should learn and apply the lessons to be adduced from comparing the successful economic policies of 1945-1963, to the systemic self-destruction inhering in the post-1965 trends of accelerated reversal of the President Franklin Roosevelt reforms.

Looking backward, from the so-called “new dark age” of Europe’s mid-Fourteenth Century, to the present, there is no practical alternative available, but to affirm those kinds of systemic, institutional changes, which had been responsible for all notable progress during the recent six centuries. This requires restoring the supremacy of the principle of the sovereign nation-state, with its dedication to the general welfare, and with its emphasis on the essential role of scientific and technological progress applied to the effect of increasing the physical productive powers of labor, per capita and per square kilometer.

For Russia, the example of the work of the great Mendeleyev is a case in point. We must remember not only his fundamental discoveries of scientific principle, but the essential connection between his principal discoveries and his work to further the development of railways and industry.

THE NATION-STATE AS A PERSONALITY

The concept of the modern nation-state, as defended by Nicholas of Cusa in his *Concordantia Catholica*, implicitly defines the nation as an integrated, sovereign form of individual personality, within the body of humanity as a whole.

This is not a descriptive image of the nation-state, not a statistical concoction; it is a conception with the functional significance of a universal scientific principle. As I shall indicate, *the establishment of a modern nation-state republic, premised upon the self-governing principle of the general welfare, represented the establishment of a body of practice informed by a discovered universal physical principle.* This principle defines a species of society, whose distinction is the fact, that its entire functional existence is expressed as an underlying *humanist*, rather than a bestial quality of intention. This is an intention in the same sense as Kepler’s notions of a Solar System governed by a single set of universal physical principles.

The case of Russia’s character as a distinctively Eurasian nation, is a case in point. The role which Russia is potentially capable of playing in the currently unfolding history of mankind, is the role which should be adduced from the appropriate apprehension of the character of a Russia under the law of the general welfare, as a distinct personality of distinguishing characteristic intentions. Russia will be able to act effectively as a nation, to the degree it is able to direct and sustain its efforts under the governance of a properly selected intention consistent with its personality as a well-defined quality of sovereign nation-state. That definition of Russia’s role as a nation of science, is an

essential, integral feature of its nature and efficient historical role as a sovereign nation-state personality, at this juncture in world history.

Notice, but then put to one side, such exceptional cases from ancient society as Solon’s reforms at Athens, and the implicit specifications for a state supplied in Solon’s famous poem. Treat the more typical societies of Solon’s time, and earlier, as organized according to a bestial conception of man.

As the point is illustrated by the contrasting cases of ancient polymorphous idolatry, none of the established empires existing prior to the Fifteenth Century based the concept of a nationality, or state, on a definition which separated man from the beasts. The functional forms of relations, which were characteristic of those empires, and of the ultramontane currents of European feudalism, treated the relationship of the ruling oligarchy to the generality of mankind as a relationship between bestialized predators and their bestialized prey.

Typical of these points of distinction, is the case of Roman imperial law. It is the so-called Romantic tradition, including the bestial tradition of Roman law—which is to say the tradition of the cultural characteristics of pagan Rome—which continues to be the principal form of moral, intellectual pollution infecting the populations and leading educational institutions of globally extended European civilization today.

In Roman culture, as for such modern Romantics as Immanuel Kant and his existentialist followers later, there was no conception of truth. Rather, each people was distinguished from others by its own idiosyncratic, current form of “popular opinion” (*vox populi*). The sundry bodies of arbitrary popular opinion typical of the legacies of ancient society, were associated with the contrasted elements arrayed in a pantheon; the personality of the emperor, as in the form of the Roman Pontifex Maximus, provided the function of the arbiter of a perverted, so-called “rule of law” among the various religious and related cultural customs. Even empires whose imperial authority was physically weak, ruled by orchestrating some sections of the pantheon, or its equivalent, against others. Religious and kindred forms of warfare, such as the “Clash of Civilizations” and kindred geopolitical doctrines of the past century to date, are typical of that tradition of a pantheon-based notion of imperial law.

Thus, under the sundry imperial systems, the only law-giving authority of the universe, was the currently incumbent occupant of the position equivalent to that of a pagan emperor. Under ancient law and its modern echoes, the terms “emperor,” “imperial authority,” and “world rule of law” connote the arbitrary authority attributed to a pantheonic figure performing the function of Pontifex Maximus.

The emergence of the conception of the modern form of sovereign nation-state, was an axiomatic departure from those imperial forms. The conception of man upon which the notion of

the general welfare (or, common good) was premised, was now the newly instituted principle of law, rejecting and overturning all relics of the tradition of the law of pagan imperial Rome.

Typical of this change, was the increasing importance of trends toward universal education of all young members of society. These trends converged upon the methods of what is often identified as Classical humanist methods of education, as illustrated by the teaching practices associated with the influence of the Brothers of the Common Life over a period from the late Fourteenth Century. This, despite the effective suppression of that teaching order by the obscurantists of the Venice-orchestrated, anti-Renaissance reaction, during the middle of the Sixteenth Century. All of my own special discoveries in the field of economics, are premised upon my recognition of the crucial significance of those methods of education in developing a superior quality of cultured adult personality.

The most efficient way in which to clarify this point, is to compare the coincidence and differences between my own and Vernadsky's conceptions of noësis on this point.

The general form of the act of cognition, or what Vernadsky terms noësis, is that exemplified by the reenactment of the Socratic dialogues of Plato. I have elaborated the relevant argument at varying length within numerous among my published writings.

The discovery of those ideas which distinguish the human individual from the beasts, begins with an experimentally-defined ontological paradox. Such paradoxes, which overturn preexisting axiomatic forms of belief, can not be solved by deduction, but only by a spirit of insight, which Vernadsky termed noësis, a spirit which is functionally unique to the sovereign cognitive powers of the human individual. The solutions to such paradoxes, so generated, is what is termed an hypothesis. The discovery of a crucial form of experimental proof of that hypothesis, then produces knowledge of a newly discovered universal physical principle.[10]

The only source of the ability of the human species to willfully increase its species' potential relative population-density, is the discovery of such principles in that Socratic way. What we may regard as the valid aspects of any culture, is an accumulation of such reenacted experiences of discovery, as transmitted over successive generations.

Although the principles contained in one culture, may be essentially the same verified principles known to another, it is often, even usually the case, that the same solution appearing in one culture is generated along a different pathway of experience than has occurred in a different culture. Peoples with different historical experiences may come to knowledge of identical principles through a different specific set of cognitive experiences, experiences which leave their trace in the way in which the principle has become known and is used.

On this point, I emphasize, that to know a principle discovered earlier, one must replicate the experience of the original discoverer. Such a replication is usually made in terms of the culture in which the replication is undertaken, but the result bridges the difference between that culture and the culture of the original discoverer. Thus, the person who comes to know such a replicated conception knows it in terms of the cultural setting in which that person is situated. Hence, national cultures, properly so defined, have that significance, a distinction which defines the characteristic thought specific to some sovereign nation, as the thought with the color and other characteristics of a sovereign personality.

WHY 'RIEMANNIAN'?

A society organized under the rule of promotion of the general welfare, can only be a society which is organized around the notion of a growing accumulation of experimentally verified hypotheses, experimentally verified discoveries of universal physical principles. It is only through the general application of such discoveries, that an improvement in the potential relative population-density of the human species, or of a specific culture, can occur.

This means that we must focus attention upon the process by which the experience of such original acts of discovery is replicated, again and again, through succeeding generations. It is not to be allowed, to substitute textbook learning, or mathematical deductions at the blackboard, as a proposed substitute for actually replicating the mental action of cognitive insight (noësis) performed by Archimedes, for example.

The method of education through the student's re-experiencing the mental experience of discovery and verification of a principle, is what is rightly named a Classical humanist form of education. This includes not only those ideas narrowly associated with the name of physical science. It includes knowledge of political, social, and artistic history. Although each must experience the act of discovery in his or her own frame of social-cultural reference, he or she must also experience a reconstruction of the society-culture in which the original experience occurred. Such is the properly defined historical method, in which all knowledge is assimilated from either the past or other contemporary cultures. The transmission of ideas in this same mode, defines Classical artistic composition, as distinct from such Romantic, modernist, or post-modernist artistic work.

To the extent that the education of a present generation approximates the requirements of a Classical humanist method of re-creating the discoveries of principle from the past, the mind of the individual is a living accumulation of the living experience of the acts of discovery from predecessors even long deceased. This provides not only a specifically, uniquely human connection of presently living generations to those of both past and future, but defines the basis for innovative cooperation in

use of principles within present society. No animal knows such an experience; only the human species. This is where I have placed the emphasis, respecting the practical implications of the differences between my own approach and argument, and that of Vernadsky.

The view of the human mind seen in the terms I have just described, can be represented only in a way which is congruent with Riemann's notion of the manifold defined by a differential (physical) geometry.

Accordingly, in the language of a Riemannian differential geometry, man's special power in and over the universe, constitutes a kind of physical phase-space. This phase-space has the form of a multiply-connected Riemannian domain, in which only experimentally validated universal physical principles, have relevant functional significance in determining the increase or decrease of the potential relative population-density of a society. The progressive development of such a manifold, corresponds exactly to what Vernadsky identifies as the expression of the power of noësis's actions on the combined domains of the abiotic phase-space and Biosphere combined.

Thus, only educational methods which emphasize reenactment of original Socratic acts of discovery of experimentally verified universal physical principles, are consistent with the essential quality of human relations. Teaching students to learn, in the manner one teaches a dog to do tricks, does not produce knowledge, but only students who know almost nothing, even if they have learned much about retrieving approved answers, as information, to questions thrown to them on a multiple-choice academic examination.

Against the background of those summary definitions, the "common good," or "general welfare" can refer only to those improvements in the potential relative population-density, which occur in a manner consistent with that Socratic notion of knowledge, as opposed to the popular delusion called learning. The notion that a government is obliged to promote the general welfare of all of its present population and their posterity, implies a corresponding functional relationship between the government and the population in the law-making process. It also implies the government's congruent accountability to the future population as much, or even more than the present one, and a certain special kind of accountability to the previous generations, too.

This relationship between the processes of government

and the combined past, present, and future population of that nation, defines the institution of the sovereign nation-state republic and its proper law-making processes. This cognitive relationship among the past, present, and future participants in that nation, defines the sovereign nation-state republic as a personality in the strictest meaning of that term: a sharing of a unifying state of mental outlook on the general business of that society. This distinction is not a quality inhering in the raw nationality as such, but depends upon the development of the quality of cognitive relationship to ideas within that population which is typified by a Classical humanist mode of education.

For purposes of comparison, we should consider the cases in which a nation is mobilized to accomplish relative miracles under conditions it sees its existence threatened, or is inspired by some celebrated achievement. Admittedly, sometimes this excitement of the national will serves the wrong purpose; but, even those cases do provide an important illustration of a point. The issue is: How is a people to be mobilized for a sound choice of purpose, rather than what proves to be an ultimately destructive one. The solution to that element of risk, is to be found in the quality of the deliberation within the population; the solution is to work to establish the relatively highest standard of communication we associate with a Classical humanist standard for universal education.

What, then, of the relations among sovereign nation-states? Shall we treat the world as a kind of pagan pantheon of national cultures, each based upon some essential irrational choice of a body of arbitrary mere opinion; or, is there not some available process by means of which nation-personalities may remain distinct as personalities, yet have relations among themselves which are as cognitively rational as the relations among members of a national society should be? Simply said, nations must act in concert on behalf of the general welfare, just as a good national government acts on behalf of the general welfare of past, present, and future generations alike.

This change in the axiomatic basis of the social relationships constituting a society, represents a new, cognitive quality of the form of social organization of human existence. This change rests upon the discovery of a universal physical principle: the need to accept the fact that mankind as a species, is distinct from the existence of all animal species, and, that human relations within nations, and between nations must be constructed on the basis of that discovered principle, a principle which defines the functional notion of a nation-state personality.

2. A Global Community Of Principle

Contrary to the wishful myths of the inventors of general nuclear warfare, H.G. Wells and Bertrand Russell, nuclear weapons are not absolute weapons.[11] Nonetheless, absolute or not, the sense of horror they evoke, serves to illustrate a very important point. The progress of science and technology has

brought the world into a time at which the power expressed by technological progress must prompt us to reexamine, and reject, the Hobbesian assumption that war is a naturally permanent hazard of the existence of nations or religions. The time has come, when military capabilities are to continue to be perfected

to ensure the capability of avoiding unnecessary wars, rather than hoping to fight one. Indeed, as recent events have shown, the most efficient promoters of peace are often the best-trained, traditionalist military leaders, who warn against the foolish wars which defective statesmen are all too willing to unleash.

Within historic times, justified and other wars have occurred chiefly as a reflection of the continuation of sundry forms of oligarchical society, or, in the struggle of sovereign nation-states to resist the malice which all oligarchical society has toward their existence. Therefore, there are two preconditions for overcoming the risk of general warfare. First, this presumes that oligarchies have either vanished, or persist only as zoo-like relics. Second, that we have established some relationship among sovereign nation-states which amounts to a generally accepted community of principle among all, or, at least, most of them.

The present economic situation in Eurasia, typifies the problems which must be addressed and overcome, if we are to realize a cooperative community of principle, a principle which may tend to arise naturally from the juxtaposition of the complementary self-interests of those autonomous societies.

Now, that rentier-financier form of oligarchical society, which has dominated the world in the form experienced during the recent three-and-a-half decades, has brought itself into the presently terminal phase of a general economic breakdown crisis. The present world economy, as a physical economy, could be revived; but, the present design of monetary and financial system could not. Any attempt to perpetuate that monetary-financial system, or, as the foolish Felix Rohatyn et al. have proposed, to merely "reform" it, must either simply fail of its own logic, or, in the alternative, plunge the world as a whole into a generations-long new dark age.

The required types of reforms of the monetary-financial order, are relatively obvious from study of relevant earlier revivals of economies in the aftermath of great wars and general economic depressions. These types of general reforms will succeed, only on the condition that they are applied appropriately to the physical problems to be overcome. Without overlooking the importance of the Americas and Africa in a general economic revival of the planet, the case of physical-economic cooperation in Eurasia points the way to global solutions.

The physical-economic challenge in Eurasia, is chiefly twofold. First, providing for the needed rates of increase of the per-capita productive powers of labor of the densely-populated regions of Asia. Second, the development of the area and natural resources of Central and North Asia, as a bridge between the contributions to be made from Europe and the great population-centers of East, South, and Southeast Asia.

The immediate form of our general tasks, is to: a.) increase the rate of supply of modern technology, from regions which have the potential to fill that need, to regions in which external sources

must supply a crucial margin of the technology which must be supplied to increase the net productivity of the population as a whole, per capita and per square kilometer; and b.) meet the vast amount of infrastructure development this cooperation requires. For Japan and Western and Central Europe, this means that the markets in Asia are the principal opportunity for economic recovery in those European economies themselves. For Asia, this means the increased inflows of technology on which those nations depend for meeting the future needs of their growing populations.

Here, especially in Central and North Asia, we face great scientific and engineering challenges which lend a sense of urgency to the pioneering work of Vernadsky on the subjects of the Biosphere and Noösphere. We see similar challenges in the continents of Africa and South America. Here, the implications of the work of Vernadsky find their leading place in the policy-shaping of both Russia, most emphatically, and the world at large.

Thus, we have a situation in which the need for cooperation defines the true self-interest of each and all of the nations of Eurasia, and beyond. Yet, these needs can not be met except by defending the most immediate interest of each of the nations involved: its vital interest in being a truly sovereign national personality, a truly sovereign nation-state economy.

It is sufficient for the subject at hand, that I merely summarize what I have addressed in earlier locations: the indispensable function of the nation-state, in creating the economic preconditions for large-scale, long-term physical-economic growth. The point is, that without an economically sovereign nation-state republic, as U.S. Treasury Secretary Alexander Hamilton defined this, it is impossible to sustain the supply of long-term, low-price credit needed for a general recovery of the type projected for Eurasia today.

The most useful precedent for such a notion of new relations among sovereign nation-states, is that given by U.S. Secretary of State John Quincy Adams, in prescribing the doctrine of "community of principle" underlying the U.S. adoption of the 1823 Monroe Doctrine.[12]

Today, the only available route of escape from a presently threatened, planet-wide new dark age, is the establishment of a form of "community of principle" among perfectly sovereign nation-states which is consistent with the urgent needs of each and all of those nations. Presuming that the financially bankrupt world of today, is superseded by general bankruptcy-reorganization, it will be necessary to establish a new global monetary and financial system, more or less totally replacing, top-down and sideways, all of the characteristic features of the combined IMF and World Bank system of the present instant. Any rational approach to that sweeping reform, will model itself upon the most essential of the successful features of the 1945-1963 Bretton Woods monetary system, this time including all nations which volunteer to participate as sovereign equals in

such a form of partnership.

With the presently onrushing collapse of the existing, 1971-2001 world monetary-financial system, we have entered a state of affairs in which the level of current production is insufficient to meet the needs of even simply maintaining the present levels of human existence in general. Under this condition, all efforts at balancing accounts by fiscal-austerity measures are willful mass-murder, and nothing different than that. Only a wiping the slate clean of dubious financial claims, combined with the creation of new sources of long-term, low-cost credit within a fixed-exchange-rate system, would permit the world to avoid a presently threatened plunge into a planet-wide, new dark age. Any contrary opinion is a homicidally foolish one.

This presently required new arrangement can not be a purely legalistic, utopian, or otherwise formal construct. It must be rooted axiomatically in certain highly practical, specific intentions. This requires a fixed-exchange-rate system, akin in its functioning to the protectionist, gold-reserve system of 1945-1963. The similarities to that precedent, include the necessary role of those economies which are suppliers of high-technology capital goods of production and infrastructure, to sectors of the world economy which have an important deficit in their ability to produce such goods. On that account, the new monetary and financial system must be designed to provide a stable flow of long-term credit, at rates not in excess of between 1% and 2% annual simple interest, for long-term investments in development and maintenance of basic economic infrastructure, agriculture, manufacturing, and development of science-driver capabilities.

Such a system of long-term fixed exchange-rates will succeed only to the degree that two conditions are satisfied. First, the arrangements must be strictly enforced; that is the precondition for bringing currencies into agreement with assigned long-term relative exchange-values. Second, there must be high rates of investment in global improvements in basic economic infrastructure, and in physical progress in the productive powers of labor per capita and per square kilometer.

The goal is to accomplish, through such forms of cooperation, an indispensable result which can not be accomplished otherwise. Thus, nations which are jealously sovereign, and yet know that they need one another's assistance, will cooperate in service of that common interest expressed by the intended common benefit.

A WORLD WITHOUT HOBBS

In modern history, the notion of a community of principle has been presented in two opposing ways. First, falsely, by approximation, as Immanuel Kant argued for perpetual peace. Kant outlined a practical basis for simply negating the Hobbesian argument of such as former Secretary of State Henry

A. Kissinger, that universal conflict, rather than cooperation, is the basis for relations among states.[13] Second, as I do here, by identifying cooperation as a matter of a universal physical principle, as in experimental proof of any universal physical principle. I limit myself here to the latter argument. I summarize that argument in terms of four listed principles, as follows.

First, mankind's relationship, as a species, to the universe, is expressed as a function of the application of an increasing accumulation of experimentally validated discoveries of universal physical principles to that universe. These principles each and all express efficient intentions, as Kepler defines intention: as equivalent to experimentally verifiable universal physical principles, which do not exist as willful knowledgeable action by any species other than mankind.

Second, the development of shared such discoveries and their application among societies, is of related forms of benefit to all societies participating in such exchanges.

Third, for specifically related reasons, it is required, in the interest of each and all, that the foregoing relations be cognitive, rather than deductive-reductionist in their most characteristic features.

Fourth and last, more profoundly, the realization of the meaning of individual life of any human individual, is, on principle, in proportion to the efficient accumulation of discoveries and use of valid discoveries of principle which he or she represents to humanity generally. This defines a unity of true self-interest, first, within a specific nation, and, second, among nations.

The first three conditions require little explanation. It is the clarification of the fourth which occupies us at this point.

The importance of this fourth consideration, is best illustrated by considering its bearing upon the often crucial leading role performed in history by the exceptional individual personality. The principle of Classical tragedy, from the ancient Greek Classical tragedies, through Shakespeare, Schiller, and other most notable examples, centers upon the relationship between the tragic principle, and that issue of the principle of the sublime role of the exceptional individual in history, the role which is so famously addressed by Friedrich Schiller.

That notion, of the sublime, points to a characteristic feature of the human species, a feature which corresponds directly to the same, essential difference between mankind and beasts associated with Vernadsky's notion of the Noösphere. That notion of the sublime expresses a universal physical principle, which is located by a process which begins with a relevant ontological paradox of the following type.

The experimental proof, that the relationship of the human species to the Biosphere, is not that of another animal, depends upon the class of experimental evidence associated with what

I have defined as potential relative population-density. Given the physical costs of producing and maintaining a typical human individual of certain demographic characteristics, what determines the relative physical productivity per capita and per square kilometer of that population as a whole? This standard of proof coincides with what I have pointed out as the quality of crucial scientific method employed by Kepler, Leibniz, Gauss, Riemann, Mendeleev, and Vernadsky.

In respect to the increase of the potential relative population-density of society, the function of individual noësis is not statistically biogenetic. Productivity is not a quality of the genetically determined potentialities of the biological individual human being; it is a reflection both of the quality of cognitive development of the individual, and also of the development of functional forms of associated social-cognitive relations in society.

Restated: the relatively greater noëtic efficiency of one individual, relative to others, is not a function of an imputable genetic heritage, but, rather, a function of the cognitive development of that individual, and of the relations within the society with which he or she is associated. The significance of this fact becomes clear when we consider the matter from the axiomatic standpoint of cognition (noësis) as such.

The problem-solving power of the individual, and of the society, relative to pre-existing physical conditions, is a function of the accumulation of memory of the original, or replicated spiritual exercise of generating verifiable discoveries of universal physical principle. This accumulation of memory of successful cognitive experiences, is not a mere aggregation of isolable individual discoveries; the entirety is a multiply-connected manifold of such principles, each with a definable cognitive-functional relationship to the others. This manifold supersedes genetic determination, in ordering the evolutionary moral and intellectual superiority of certain cultures, as species, over others which they surpass. Herein lies the science of the idea of progress.

The memory of the cognitive experience of generating each and all of those principles known by the individual in that way, has a physical consequence for man's relationship to nature, a quality of memory of a spiritual exercise which parallels the work of living processes in the transformation of the abiotic domain within the Biosphere. In that sense, these cognitive memories accumulated within the individual personality, have the apparent significance for human behavior, that genetic determination has for the behavioral potential of the inferior living species.

The paradox is, that although this genetic-analogous function of cognitive ideas occurs, as the form of action of a cognitive spiritual exercise, within the biological medium of the human individual, the bio-physical nature of that interaction per se is not known, but only the crucial-experimental certainty that it can be known to exist, and that it is a fully efficient quality of

knowledge.

As an example of this: thinking back to Kepler's discovery of gravitation, we have conclusive empirical knowledge, that cognitive action exists as a universal physical principle, one outside the domain of other living processes; this existence is expressed as a manifestly efficient intention of the process considered. However, as of this present date, we have yet to lay hands on the correlated physical transformations within the biological mental processes of the human individual.

We can not expect to discover the biological psychophysical substrate of cognition as if it were, epistemologically, an evolutionary derivative of the lower forms of living processes. We can expect, however, to identify physical processes of the living human mental processes which occur only as, uniquely, products which are correlatives of the act of cognition. We have certain hints from the specific realm of "non-linear" processes of optical biophysics, which might help us progress toward such discoveries.

Once we have said that much on the matter of the biophysical substrate of cognitive processes, we may resume our focus upon the implications of the role and nature of the sublime in the shaping of history. Turn back to the relationship between the tragic principle and the sublime in the composition and performance of Classical forms of tragedy, such as the Classical Greek, Shakespeare, and Schiller. These are not to be considered as mere fiction, but as scientific studies of the principles of history.

Contrary to the specifically Romantic misrepresentation of such Classical tragedy, the fault in the society presented by the tragedy, is not the fault usually associated with some central figures; the force of tragedy is the pervasive folly of the entire society, its typical leaders included. A society so corrupted dooms itself, as did the Europe of the 1618-1648 Thirty Years War, by its selection of leaders who reflect the corruption pervading the population and institutions generally. That is the essence of the tragic principle, not only of the Classical stage, but of the real-life history which the dramatist presents in a distilled form to the audience, by means of the stage.

The sublime enters upon the Classical stage of real-life history, when some exceptional individual, such as Schiller's presentation of the essential case of Jeanne d'Arc, acts to move the course of history along a pathway of escape from the doom, the tragedy, the society and its leading institutions are otherwise bringing upon themselves. The mode of action which brings about that escape from the grip of the customary tragic principle, is typified by the collection of Plato's dialogues. This is made clearer, when those dialogues are recognized as dramatic presentations of the principle of cognition, not fiction.

In each and all of the latter dialogues, the tragic element is represented by the follies of belief attacked by the figure who exemplifies the sublime, Socrates. Follies are exposed to be follies,

through the mechanisms of ironical juxtaposition of the elements of ontological paradoxes, as is done in all Classical metaphor. This is the Platonic method on which modern experimental physical science was premised, the method of Nicholas of Cusa's *De Docta Ignorantia*. In each Socratic dialogue of Plato, a crucial ontological paradox is presented, and a sublime solution achieved. This is the crucial point of difference between the explicit intention of most of the pre-Socratic Classical Greek tragedies, and the method of the sublime expressed by Plato and by the noblest works of Shakespeare, Lessing, and Schiller, for example.

In real history, as on the Classical stage, the society is imperilled by its own prevailing popular opinion, and therefore by the role of leaders who express the qualities which popular opinion seeks in them. Typical is the real-life Spain of Philip II, as presented by Schiller's *Don Carlos*. Each and all of the figures, excepting the knowing Queen—who, unfortunately, had no authority within that society—is a fool of one sort or another, just as the insightful, great tragedian Miguel Cervantes addresses the self-doomed Hapsburg-ruled Spain of the two fools unfit to rule, *Don Quixote* and the glutton *Sancho Panza*. Sixteenth-Century Hapsburg Spain is doomed, because it is tragically rotten, morally and culturally throughout, both on the stage and in real history, a legacy of folly from whose effects the real Spain has not recovered fully to the present day.

In the case of *Jeanne d'Arc*, both in real life, and on Schiller's stage, we have the sublime expressed. She is the inspired peasant girl who transforms a fool, the nominal king, into a real king, against his foolish will, and thus makes possible the France of Jacques Coeur's Louis XI and the England of Henry VII and Sir Thomas More. *Jeanne* is not a tragic, but a sublime figure; the manner of her death is horrible, but her life is not wasted by the consequences of that choice of her actions which led to her death at the hands of the gnostic, inquisitorial evil of the Plantagenets.

Hide-bound Romantics will disagree with that. Romantics reveal their moral decadence by their insistence upon arguments such as the proposal that *Jeanne* made a tragic mistake, a mistake which cost her her life. So, Romantic fools, still today, see the assassination of *Wallenstein* (in both real history and Schiller's *Trilogy*) as the result of his personal folly in dealing with his foolish Hapsburg monarch. Fools see tragedy in the apparent lack of personal success achieved on behalf of narrowly defined personal self-interest, by the central character. Fools substitute the issue of personal success in individual mortal and related goals of so-called "self-interest," for the successful historical outcome, for society, of the central figure's having lived. So, some Romantics insist that it must have been a tragic error which led *Jesus Christ* to the Crucifixion; cowardly fools argue as if to say, "If you are right, why aren't you successful?" Wise men and women heed the warning: "You have but one mortal life to spend, which, in the end you must spend, in any case. If you are wise, it is in your most fundamental self-interest to spend it well, for both humanity past and yet to come." The greatest of all lives is that expended, like the brief mortal life of *Christ*, in

fighting for the future victory of truth over the moral degeneracy of currently prevalent existing institutions and popular opinion.

Tragedy is the silly Kaiser Wilhelm of 1914 committing the world to World War I, by his infantile impulse of affection for the cause of the even sillier Hapsburg monarchy of that time. Kaiser Wilhelm was not the cause of the tragedy; the institutions of Germany were foolish enough to be controlled by a Kaiser's regime which led them into the trap prepared for them by the associates of England's Edward VII. Such, also, were the fools among Germany's military leadership of late January 1933, who allowed President Paul Hindenburg to oust Chancellor von Schleicher, and bring Adolf Hitler to power.

In each case in real life, or on the Classical stage, a sublime intervention leads a nation from the doom its prevailing institutions and popular opinion had chosen for it, the role of the exceptional personality is crucial. It is, in that way, the lack of the suitable exceptional individual in place at the relevant moment, which is rightly seen as the crucial factor in all real-life and Classical tragedy.

This means, that the most deadly danger to society comes from the lack of such exceptional personalities in place at the time their role is indispensable. Either they have not been developed, or the foolish society dooms itself by preventing them from assuming the part they must play were the society to outlive the folly it had brought upon itself.

These cases, from the repertoire of Classical tragedy and from the actual history from which Classical tragedy has been distilled, point to a deeper and broader problem: What is wrong with the quality of development of the populations and institutions of nations, up to the present moment? Why is the need for absolutely exceptional leading personalities so desperate as it is today? How did we allow this to happen to our nations?

The answer to that question is, summarily, twofold. The answer is, on the one side, technical, and, on the other side, moral. However, in the end, the two sides converge to become as one, as follows.

THE SUBLIME VERSUS THE NEUROTIC

There are, as I have emphasized in the immediately foregoing discussion, two opposing notions of individual self-interest, the one popular, the opposite sublime. On that account, the tragic outcomes in history show that the better name for "popular," were "neurotic," or even "psychotic." The issue so posed, is the contrast of the notion of self-interest expressed by cognition, to the bestial notion of self-interest which mislocates the essential within the confines of sense-certainty.

The mature sane individual, and society, locate their

essential self-interests as sovereign personalities in the cognitive experience, in a Riemannian manifold of accumulated memories of experimentally verifiable hypotheses, experimentally verified experiences of discovery of universal physical principles. The essential feature of this location of sovereign self-interest, is not what might be regarded as an accumulation of academic knowledge; the essential self-interest lies in locating one's identity in the unfolding historical process of a continuing unfolding of such a manifold of cognitive action.

The sane individual, which has been the exceptional personality so far in known human existence, locates his or her self-interest in the process of becoming, expressed by the action of cognitive discovery. He or she responds to each important challenge in life, with a resolution to react in a way consistent with the cognitive principle, rather than a learned sense of naive sense-certainty. The former reacts as a human being; the latter reacts as a learned beast, a neurotic; even, like the Wall Street speculators and their admirers of today, as a functionally dangerous psychotic. The exceptional, sane, individual responds to life's experience as intrinsically a process of overcoming ontological paradoxes, and therefore seeks out that sort of paradox in each potentially tragic situation of personal mortal life and of society. The exceptional person has an exceptional ability to die decently, because he or she knows that mortal life must be spent, and should therefore be spent wisely, with the inevitability of death more or less clearly in view.

By the very nature of valid discoveries of universal physical principles, there is no limit to the discoveries ever to be made. It will always be the case, therefore, that the role of the individual in effecting and applying such discoveries to the general human condition will always be exceptional, and personally so. That could never change.

The change to be desired so urgently today, is in the limit of the number of needed exceptional individual personalities to such tiny handfuls, while the rest of humanity, including its leaders, remain essentially pathetic neurotics or worse. The change to be made, for the sake of all future humanity, is to bring humanity at last out of the condition of childishness, even pathetic infantilism, which abounds in high places, and popular opinion today.

This means, that securing the future of humanity requires

a certain institutionalized habit of universal education, the habit of universal Classical-humanist methods of education, both in educational institutions, but also in all aspects of family and public life. The prophets upon which the survival of society has so often depended so critically, were always too few, too vulnerable; the shortage, and vulnerability of such talent has been the greatest single source of peril to civilization. The danger has been, that the power to decide has been left usually in the hands of the infantile minds seized by a pathetic commitment to bestialized notions of sense-certainty.

On this account, the function of endless scientific and related progress, is not merely to produce the explicit benefits which can be obtained in no other way. The more essential interest is the urgency of promoting the primacy of cognitive experience as the prevalent way of life. The celebration of the achievements of scientific progress, more than those achievements as such, is thus the highest good in the practice of statecraft. It is the celebration of that unending, continuing progress of cognition, of noësis, which is the highest true self-interest of all mankind.

The individual whose closest friends include the living memory of acts of valid cognitive discoveries by persons often even centuries deceased, and who sees his or her relationship to the future unborn in a similar way, locates his or her personal identity in a different way than those who locate social relations primarily in the sensations and passions of current sense-certainty. That difference is the only true meaning of morality, the meaning of knowable truth. Any contrary opinion is pathetic, neurotic, or even much worse, as the existentialists express the principle of evil practiced for its own sake.

It is the unity sought in service of that notion of the true self-interest of each and all nations, which is the only true and faithful servant of the common self-interest of all nations, in the benefits contributed by one another.

Exceptional individuals must lead mankind out of the terrible morass which present world history has become. Let us learn the lesson of the perilous situation in which we find the nations today; let us recognize the urgency of lifting mankind out of the pathetic infantilism typified by generally accepted popular belief today.

3. Managing The Noösphere

As emphasized at the outset here, the characteristic features of so-called liberal economy, are essentially of Venetian origins. Venice, in imitation of ancient Phoenician Tyre, defined itself in practice as an imperial form of rentier-financier maritime power. Later, during the course of modern Europe's Seventeenth and Eighteenth centuries, Venice transmitted the characteristic features of a rentier-financier form of imperial maritime power, to the Netherlands and England of the tyrant William of Orange;

this characteristic was expressed by the India companies of those two nations, especially Lord Shelburne's British East India Company. It was also expressed by that Company's Haileybury School, whence the economics and related dogmas of Adam Smith, Jeremy Bentham, Thomas Malthus, David Ricardo, and the like were inflicted upon the haplessly credulous of the world at large, to the present day.

In effect, from the accession of George I to the throne of the newly created British monarchy, the British monarchy has been what is fairly described as an hereditary form of parody of the post held by the Doge of Venice.

To understand that long-wave degeneration of the modern English monarchy, which began during the reign of the ostensibly sex-crazed Henry VIII, a number of factors must be taken into account. The best features of modern English society and its influence are typified, still today, by such forerunners of Percy Shelley and John Keats as Henry VII, Sir Thomas More, More's obvious intellectual heir William Shakespeare, and the scientist William Gilbert. The initial phases of that descent into degeneracy are marked by such figures of English influence as a pack of Venetian advisors, including putative Plantagenet heir Cardinal Pole, Thomas Cromwell, and Henry VIII's Venetian marriage councillor "Giorgi" of the family of Zorzi. The influence of the "moralist" doctrinaire Pietro Pomponazzi, from Padua, is also notable among the Venetian influences causing the moral and intellectual degeneration of that monarchy, as of most of the culture of Sixteenth-Century Europe.

The later mis-shaping of Seventeenth-Century England was provided by the influence of the de facto Lord of Venice, Paolo Sarpi, and by Sarpi's household lackey Galileo Galilei. Important pro-Venetian influences included the English translation of Giovanni Botero's model for the later Malthusianism of Giammaria Ortes, and of the plagiarist of the then-current English translation of Ortes' book, Thomas Malthus. To the present day, the essential principle of moral and intellectual corruption polluting England to the present day, since the influence of Sarpi and Galileo on English assets such as Sir Francis Bacon and Thomas Hobbes, is empiricism and its French complement, Cartesianism.

It is this form of empiricism, reenforced through such channels as William of Orange's Netherlands, which has defined what is generally liberally accepted, still today, as the perverted British definition of "human nature" associated with Hobbes, Locke, Mandeville, Hume, Adam Smith, and Jeremy Bentham. British liberalism, and its U.S.A. and continental European parodies, are typical expressions of this. So, the Mont Pelerin Society and its influence on both the U.S.A. and the circles of the late Yuri Andropov in Russia, define the contemporary meaning of "liberalism" still today.

Today, the prevalent form of perversion in globally extended European culture, can be traced liberally to such leading sources of the contemporary neo-Malthusian cults, as followers of the satanic confederates H.G. Wells, Aleister Crowley, and Bertrand Russell. The Harvard University Professor William Yandell Elliott, who created such official personalities as Zbigniew Brzezinski and Henry A. Kissinger, is typical of that collection of pro-racist Nashville Agrarians who followed Wells. Similarly, Josef Korbel, and his daughter, recent U.S. Secretary of State Madeleine Albright, have been explicitly protégés of H.G. Wells' following in the U.S.A., with

policies of practice, like those of their confederate Brzezinski, to match. These are conspirators in the literal meaning of the term; not by mere "guilt-by-association" sorts of family and other connections, but by their adoption of common, axiomatic kinds of beliefs regulating the convergent tendencies inhering in their acquired behavioral traits.

These axiomatically pro-Malthusian degenerates, and their like, typify a current of traditionally oligarchical interest, an interest which relies upon two fraudulent assumptions of underlying belief. First, these types argue that there is no universal physical principle which is not a mere, axiomatically abiotic description of sense-certainty. Second, the contemporary logical positivists and existentialists also insist that there is no axiomatic difference between merely living processes and cognitive ones. The arguments, that human intelligence could be organized in a non-living system, or that there is no axiomatic difference between man and the apes, are examples of this.

Typical of the spread of the influence of the Wells-Russell cult, is the Unification of the Sciences conspiracy, which was backed by Robert Hutchins, but founded by Bertrand Russell, Karl Korsch, Rudolf Carnap, Margaret Mead, Gregory Bateson, and others, at the University of Pennsylvania, in 1938. Typical is that offshoot of the still continuing Unification of the Sciences cult, the Cybernetics Project led by Mead, Bateson, and others, through the Josiah Macy, Jr. Foundation, during the 1940s and beyond. Typical is the influence of both the Unification of the Sciences and cybernetics/systems analysis cult at the U.S.A.'s Massachusetts Institute of Technology (MIT). Typical are the LSD-centered operations of Aldous Huxley, Bateson, and others, including the Lindisfarne role in fostering the so-called "ecologist" movement. Typical are the radically logical-positivist extremes reached by such personal acolytes of Bertrand Russell as Norbert Wiener and John von Neumann.

The influence of these circles upon world scientific and other intellectual currents of academic thinking today, typifies the extent of the moral-intellectual degeneracy of the pro-Malthusian current as a whole. This form of the pro-Malthusian current, is the kernel of the prevalent form of fascism spread internationally today, the form which Kissinger-associated Michael Ledeen described as "universal fascism."

Notably, the degree of success of the efforts of precisely these pro-Malthusian circles to penetrate the Soviet Union, is key to understanding the way in which the economies of both the Soviet Union and of post-1989-1991 Russia were ruined, up to a recent time. It is key to the self-induced destruction of U.S. society, and of that of western and central Europe as well.

The impact of these empiricist, logical positivist, and existentialist pathologies, often turns up in curious ways, even among professed admirers of Vernadsky. Although there are circles which have attempted, fraudulently, to integrate the work of Vernadsky into the current form of universal fascist ideology, the pivotal feature of that effort is a neo-Physiocratic

caricature of the work of Vernadsky, a morbid parody proffered, fraudulently, as an anti-humanist, cultural pessimist's defense of the Biosphere from the intrusions of the Noösphere!

Typical of such trends, during the Nineteenth Century and beyond, to the present day, the leading feature of ideological warfare against modern society by pro-Malthusian oligarchical interests centered in the British monarchy, was to attack the Idea of Progress. This was expressed in many ways, including the promotion of novel, often Bogomil-like religious cults, which attacked Apostolic Christianity as hatefully "Promethean." [14] The focus of this attack by such pro-Bogomil cults, was against Prometheus' defense of mankind against the oligarchical pagan gods of Olympus; this was turned into an attack on the Mosaic doctrine of Genesis 1, an attack on the notion of man and woman as made equally in the image of the Creator of the universe, and assigned to rule in that universe.

For such religious perverts as those, Vernadsky's scientific definition of the Noösphere was and is an anathema, and the efforts of some to claim to invoke Vernadsky against scientific progress, is clearly a fraud, if also an anti-scientific delusion.

VERNADSKY AND PROGRESS

The significance of Vernadsky's work for Russia, in particular, today, has two leading, axiomatic facets. First, it represents the necessary guide to defining urgently needed forms of general economic progress. Second, it is a policy of practice which must be pursued for its own sake, without needing to consider further any immediate practical benefits it provides. On the first account, it provides indispensable material benefits. Nonetheless, on the second account, it fosters that specific, sublime quality of moral and intellectual development, on which the continued production of such material benefits depends absolutely.

The appropriate practical applications of the notions of Biosphere and Noösphere, include the notion of "terra-forming" of planetary bodies, to the purpose of generating from both the abiotic and living domains found there, the conditions of life needed to sustain human existence. This includes transforming the so-called "ecology" of our own planet, to cause that planet to generate an increased amount of those qualities of the Biosphere needed to sustain an increase in the potential relative population-density of our own species. All such measures are to be assessed as typical expressions of continuing the successive work of Mendeleev and Vernadsky. The realization of the potential benefits of central and northern Asia, depends upon scientific work in service of what I have defined as the presently updated notion of a science of physical economy.

That is not sufficient. The fact that we can measure the benefits of physical-economic progress in terms corresponding to increase of potential relative population-density, does not

solve the most crucial of the problems of policy-shaping. Those facts show how progress has occurred, but does not show us how it should continue to occur. That confronts economists with a problem analogous to that faced by the Kepler contemplating the evidence of the non-uniform motion defining the orbit of Mars. How and why should economic progress happen?

Kepler observed that the planetary orbit, considered as a totality, was regular and predictable as a totality. However, it was seemingly impossible to determine the future position and velocity of the planet from statistical study of preceding short intervals of motion. This became the problem first solved by Leibniz's uniquely original discovery of the calculus.

On that account, Kepler asked, in effect: "What is the intention of the Creator, which governs the changes in non-uniform motion out of which the regularity of the closed orbit appears?" Kepler's study of the manifest such intentions of the Solar System, and other matters, are known to us today by the name of experimentally verified discoveries of universal physical principles.

What is the nature of the physical principles which determine the necessity and possibility of continued progress in man's mastery of the universe? Restate this as: What is the intention which mankind must adopt, to ensure the continued universality of human physical-economic progress? The answer to that question is: the practice of a universal policy of Classical humanist education, in which the discovery of previously discovered, and of unknown universal physical principles, ensures the self-developing state of mind out of which future progress is made inevitable. Shall we continue the presently prevalent practice, of running our educational institutions as zoos; or, shall we adopt cultural policies consistent with nothing but a Classical-humanist mode of universal education?

For clarity, we must emphasize here once again, that a Classical-humanist mode of scientific education, makes no fundamental distinction in method between education in physical science, and education in Classical art-forms. By Classical art-forms, I mean both the Classical types of plastic and non-plastic art, and also the study of history, language, and the human mind itself, from the same standpoint in scientific method required for a Classical-humanist teaching of what is generally recognized as physical science, to the present day.

What Vernadsky terms the noëtic characteristic of the human species, the capacity for cognition unique to our species, is the only means by which our species obtains its power, to exist within, and over the universe. The three-fold characteristic of cognitive discovery of true principles, is expressed, as I have described this, by the three-step process of ontological paradox, hypothesis, and experimental verification of the hypothesis. That is, as I have stressed, essentially an activity of the sovereign individual discoverer. However, the benefits of such discoveries for society depend upon a cooperative sharing of the cognitive experiences associated with such discoveries of principle. The

methods appropriate for fostering cooperation in use of such principles among the members of society, all have the same essential form as Classical humanist forms of education and of Classical humanist forms of artistic culture.

For example, all Classical artistic composition, and its expression as performing art, are pivoted upon the role of irony, and of the form of irony known as Classical metaphor, in facilitating and standardizing the communication of the cognitive act of discovery. The application of the study of those artistic forms of communication to the subject-matters of statecraft and religious belief, produces the ongoing development of the arts of statecraft and theology. These studies, including the study of the development of the proper methods of Classical artistic composition and performance, are themselves subject-matters of the same cognitive method required for an individual discovery of a universal physical principle.

In addition, the universal principles which cognition adduces from the subject-matters of Classical art and statecraft, combine with universal physical principles as such, to define the boundaries within which a society, and humanity as a whole, acts upon the conditions of life in general. Since Classical art and statecraft define the axiomatic characteristics of decision-making in and by a society, these axiomatics have corresponding physical effects, just as the application of discovered universal principles of the abiotic and living domains produce what Vernadsky identifies as “natural products” of the Biosphere. Moreover, these physical effects, whose causes lie within the domains of Classical art and statecraft, are themselves subject to studies of their physical effects, just as abiotic and biological principles present such residues of the natural products of their actions as—as Vernadsky emphasizes—the atmosphere, the oceans, and the soils.

It is the combined development of the individual’s knowledge of true principles of Classical art and statecraft, with addition of what are conventionally considered universal physical principles, which shows us the way in which to change, improve the progress of society and of humanity as a whole.

Thus, a Classical approach to the subject-matter of cognition, treating so-called physical science, Classical artistic composition, and Classical forms of statecraft as one body of knowledge, fosters the continuation and generation of those new discoveries, and those corrections of errors, on which progress depends. In other words, this Classical approach to the view of mankind, expresses the motivating intention upon which reasonable assurance of continuing progress of society depends, into even the distant future.

A SCIENCE-DRIVER ECONOMY

In the domain of what has been considered conventionally as science and technology, it should be readily recognized, that

the principled source of all gains in net physical productivity of society, is derived from the discovery and developed application of universal physical principles. It is also known to all competent university instruction in so-called physical science, that the benefits of discovery of universal physical principles, are transmitted through a specific kind of by-product of a proof-of-principle experiment, a by-product conventionally termed a technology.

A technology, so defined functionally, points to those features of an experimental design which have crucial bearing on a successful proof of principle. This implies that such experimental approaches are required for each of several or more relevant media, and for any new combination of applied technologies. No competent firm would rely upon the use of what is currently called “benchmarking” as a substitute for the traditional function of crucial experimental designs in design engineering.

In fact, even limiting our attention, for the moment, to the popular notion of physical science, the accumulation of valid universal principles and their associated technologies, must be viewed, in the imagination, as a Riemannian multiply-connected manifold, rather than as a mere collection of principles aggregated in parallel to one another. It is the sense of such efficient, and also often problematic connections, within the developed individual mind of the scientist or design engineer, which that individual brings to bear, as expressed professional competence in addressing a relevant problem of experiment.

Thus, in general, the normal flow of scientific and economic progress would be from the well-developed university, through the combination of pedagogical and research experiment conducted as a leading component of that university’s activities, to special design laboratories, into design of products and processes for production, and, thus, into the general process of improved production.

Such, in summary, is the lesson of experience of the successful forms of practice of modern economy. That lesson should point our attention to a relatively obvious next step: to the notion of a science-driver economy. The example of the commitment to “indicative planning” for France’s Fifth Republic, by President Charles de Gaulle, is a relevant illustration of the point.

If we agree, to reorient our nations’ educational systems, according to Classical humanist methods and perspectives, and to foster the selection of primary and secondary national and global missions as the leading edge of the intentions expressed by both the educational system and the flow of public credit into new directions in large-scale, long-term investments in infrastructure, product-designs, and production, we would then have assembled the lessons from previous science-driver programs, such as the space program, into the form of national and international policy required to transform modern economy into a realized form of mission-oriented, science-driver economy.

If we take that step, then the importance of integrating such mission-orientations with the approach to the universe implicit in Vernadsky's definitions of Biosphere and Noösphere, defines a fresh way of thinking about economy. By assigning a mission-orientation to the safe and sound revolutionizing of both the Biosphere and Noösphere, we will have made the next great leap forward in the efforts to perfect the functioning of both the modern sovereign form of nation-state, and new forms of mission-oriented cooperation among such states.

The most important thing, is to elevate the individual's self-estimation of himself or herself, from a being reacting to a confined chronological and geographical setting, into a being whose witting, efficient, primarily cognitive connection to the deep past and distant future, has become his or her sense of personal identity. Persons so elevated in their moral character, leave themselves no choices of goals which are not far-reaching; the pervasive character of such personal goals, is an intention of commitment to the principle of endless human progress, for its own sake.

When we have transformed more and more of our young into the perspective of such a cognitive outlook respecting the meaning of their personal lives, we shall have, at long last, entered the moral adulthood of the human species.

Such is the importance shared, for Russia's future, by the combined legacy of Mendeleev and Vernadsky.

[1] In other words, we are speaking of a multiply-connected, three-phase-space Riemannian differential geometry, in which the terms abiotic, life, and cognition ("spirit") are respectively distinct, but multiply-connected sets of experimentally definable universal physical principles. This is a Riemannian definition of what Vladimir I. Vernadsky identifies as a Noösphere. In theology, the act of cognition is termed "a spiritual exercise."

[2] Cf. Lyndon H. LaRouche, Jr. *The Economics of the Noösphere* (Washington, D.C.: EIR News Service, 2001).

[3] For example, the statement issued in preparation for a recent Berlin conference, by Dr. Yuri Gromyko:

"It is now clear that the world put together after the Second World War, at Dumbarton Oaks, Yalta, and Potsdam, has disintegrated. Therefore, the whole array of international institutions constructed during the past 50 years—financial, economic, and political institutions—are no longer adequate. These institutions were not intended to support or to promote the development of the world as a whole. They were deliberately introduced for the purpose of suppressing some nations, to the profit and gain of others. Their main purpose had to do with preserving the political and financial status quo that had

been achieved. They were connected with the doctrine of neo-colonialism, in the period of Cold War rivalry between the Soviet Union and the U.S.A.

"It was very important for the superpowers to locate bridgeheads and staging grounds, in various geopolitical niches. This does not mean that these international institutions and their possibilities should be neglected. They can be very important in stopping a war, for example, but when it comes to proposing new perspectives, they are useless.

"It is also rather important to see that the rivalry of the three main political projects of the 19th and 20th Centuries has come to an end: the conservative-traditionalist (anti-progressive), the liberal, and the communist projects, which dominated the whole 20th Century. Of course, all of these mass political projects served as means to implement a well-defined policy. But, it is interesting to see that the liberal project, which involved the orchestration of palliatives and represented compromises between the communist and traditionalist projects (as Wallerstein has also emphasized), having achieved victory, is actually situated in a vacuum, and is decaying and self-destructing through its own impulses to continue expanding." (See EIR, Nov. 30, 2001, for the full text of Dr. Gromyko's presentation.)

[4] As emphasized in passing, later in this report, the universe is composed of three known, distinct, but multiply-connected phase-spaces: the ostensibly abiotic, living processes, and cognitive processes. None of the three ever existed or acted in isolation from the existence of the other. One should be reminded, as I note below, of the Classical Greek notion of an axiomatically hylozoic universe.

[5] *New Astronomy*. For more on this subject, see below.

[6] Vernadsky makes significant reference to Riemannian geometry in his crucial "On the Fundamental Material-Energetic Distinction Between Living and Non-Living Natural Bodies of the Biosphere" (in Lyndon H. LaRouche, Jr., *The Economics of the Noösphere* [Washington, D.C.: EIR News Service, 2001], pp. 275-318). Note, especially, the section "III. Supplementary Explanations," pp. 312-318. "Anti-Euclidean," rather than "non-Euclidean." An "anti-Euclidean" geometry, as Gauss's teacher Abraham Kästner defined this, challenges each and all of the assumptions of a Euclidean, quasi-Euclidean, or so-called "non-Euclidean" geometry, as Riemann does in the opening of his 1854 habilitation dissertation. As noted, in his later writings, Vernadsky indicates his peripheral awareness of Riemann's work as a relevant topic, but the relevance of Riemann's method is not found in any of Vernadsky's writings known by me, or reported to me. On this account, some of Vernadsky's advocates have been misled to suppose that Vernadsky's definition of "energy" can be brought into coincidence with the pathetically reductionist notions of Clausius, Grassmann, Kelvin, Boltzmann, et al.

[7] My own discoveries were rooted in the legacy of Plato

as transmitted to me through the work of Gottfried Leibniz, and my defense of Leibniz's notion of a monadology against the dogma of Immanuel Kant's Critiques.

[8] The epistemologically unavoidable conclusion, that the principle of life existed prior to any living organism known to have lived at some time past, must be invoked here. The same must be argued as a conclusion implicit in Mendeleev's notion of a process of generation of the existence of the Leibnizian monads of the periodic table. The problematic, popular variety of classroom or textbook error to be avoided, is to be recognized as the presumption that material existence is originally of the form which naive sense-certainty expresses as an aprioristic form of geometry or algebra. What we recognize as life, empirically, is living organisms and the processes associated with them. However, crucial experiments adducing an underlying universal principle of life, show a principle of generation of a type which we rightly identify as universal anti-entropy, in contrast to the entropy which the empiricists attribute to abiotic processes. The principles which underlie life and cognition, are, respectively, anti-entropic principles of ordering. In a Riemannian differential physical geometry, generation in an abiotic phase-space, such as a periodic table, could not have occurred without "external" intervention from anti-entropic principles of the type associated with life and cognition.

[9] It was the combination of Nixon's 1971 launching of the so-called "floating-exchange-rate" world monetary system of 1971-2001, and the Carter Administration's launching of the radically monetarist intent of U.S. Federal Reserve Chairmen Paul Volcker and Alan Greenspan, to bring about "controlled disintegration" of the present U.S. and world economies, which have been the leading factors in monetary and financial policy responsible for the presently onrushing terminal phase of systemic collapse of the present IMF and World Bank system.

[10] More precise than the commonly used "crucial experiment," is Riemann's notion of a unique, or universal experiment. Mendeleev's principle of generation expressed by the periodic table, and Vernadsky's experimental approach to the universality of the distinctions of life and cognition, are examples of a unique, or universal experiment: a principle proven experimentally to be a universally valid hypothesis.

[11] See author's foreword, in H.G. Wells, *The World Set Free* (Omaha: University of Nebraska Press, 2001; reprint of 1914 edition). Wells, working from the lectures of Rutherford's collaborator Frederick Soddy, proposed the use of radium-based nuclear weapons as a means for compelling the world to accept a world-government utopia. The theme is repeated in many locations, including Wells' principal political treatise, *The Open Conspiracy* (London: Victor Gollanz, 1928), and Russell's various proposals for use of "preventive" nuclear warfare as a way to bring the world's powers to abandon their national sovereignty, in favor of the notion of world government set forth in Wells' *The Open Conspiracy*.

[12] The Monroe Doctrine is often misdefined in Russia, and elsewhere, where the circumstances of its adoption, and Adams' argument are ignored, in favor of ignorant prejudices on the matter. With the Duke of Wellington's successful placing of the British puppet, France's Bourbon Restoration monarchy, in power in France, Europe was dominated by a growing rivalry between the two principal predatory powers of Europe and the Atlantic Ocean, the British monarchy and Metternich's Holy Alliance. Adams warned his President not to accept an alliance with Britain, warning that British minister Canning's proposal ensured that the U.S.A. would degenerate into a mere "cock boat in the wake of a British man of war" in Britain's looting of the former Iberian colonies of Central and South America. Adams insisted that U.S. policy must be a long-range commitment to expelling both the British and Habsburg predators from the Americas, as soon as the U.S. had gained the military power to liberate those emerging nations from all colonial-imperial overlordship. The U.S. must commit itself to ensure the perfect sovereignty of each and all of these new republics, under a doctrine of "community of principle."

[13] Typical of Kissinger's argument to this effect, is his May 10, 1982 public address to London's Chatham House, in which he avows himself a foe of what he terms the "American intellectual tradition," and places himself on the side of former British Prime Minister Winston Churchill, an opponent of President Franklin Roosevelt, in insisting that the relations among people in general, and states in particular, are intrinsically Hobbesian. Kant's notion of "universal peace," is of the purely negative quality which Kant himself defines, in the dialectic of his *Critique of Practical Reason*, as the method of treating the negation of a negation as positive.

[14] The relevant impact of the Bogomil cult upon modern Europe, is traced from the regions of France around the Pyrenees, the Tarn, and the Rhône, where the Bogomils' Gnostic, neo-Manichean doctrine of the elect surfaced as a feature of sundry pseudo-Christian cults, and in both Dr. François Quesnay's doctrine of *laissez-faire* and Adam Smith's plagiarism of *laissez-faire* as the dogma of "free trade." ■