
Russia's science: a strategic assessment

Lyndon H. LaRouche, Jr. situates the crisis in Russian science within the context of the global economic collapse. Without sound economics, no sensible approach to science policy can be discovered.

July 20, 1997

Boris G. Saltykov, Director of the Russian House for International Scientific and Technological Cooperation in Moscow, has contributed a provocative commentary to the 3 July edition of the publication *Nature*. My best estimate is, that what he offers would be received by most among *Nature*'s readers as today's putative wisdom respecting the highlights of the recent trends presently shaping the fate of Russia's science. Except for his stress on the collapse of funding for Russia's science, since 1991, his account overlooks the most crucial issues: 1) Whether, under the present policy trends indicated by Saltykov and others, the precipitous, post-1991 collapse of Russia's former leading position in the ranks of scientific competence, will not be arrested until Russia's science has been collapsed to "Third World" levels; and, 2) Whether Russia's economy, and even its national existence, could survive the present trends toward that asymptotic collapse of Russia's science toward the "Third World" standards.

At the present moment, since the radical 1989-1991 developments within the former Comecon sector, the former thermonuclear-adversary blocs are both converging upon the brink of a rather different kind of Hell, than that prospect of thermonuclear Armageddon, which occupied the nightmares of the 1950s and early 1960s. Today, the accelerating drumbeat, of financial, monetary, and economic crises, around the planet, as punctuated by ominous events of the type of the present holocaust in Central Africa and current famine in North Korea, portends an old-fashioned kind of Hell: an echo of feudal Europe's Fourteenth-Century "New Dark Age," a new rampage by the legendary "Four Horsemen of the Apocalypse." This ongoing, threatened descent into a global "New Dark Age," must be seen by statesmen everywhere as the

fundamental strategic issue threatening each and all nations at the present time.

There is one point of crucial similarity between this and the earlier prospect of thermonuclear holocaust: the presently approaching hoofbeats of the "Four Horsemen," is also a man-made disaster, not a natural one, not a mischance bestowed upon mankind by some mad Olympian god casting dice. The thermonuclear holocaust was a product of the combined influence of the common circles of Bertrand Russell and Thomas Huxley's follower H.G. Wells, who saw the development of nuclear arsenals as supplying that terrifying weaponry which would impel nations to abandon national sovereignty for a new *Pax Romana* under world government. The immediate authorship of the past three decades' drift toward a New Dark Age, is also the work of perverted, influential circles of ideologues, including the networks of the same Bertrand Russell who, after the death of Wells, was left to play the leading initiating role in creating the age of nuclear-weapons terror.¹

1. Bertrand Russell, *The Bulletin of the Atomic Scientists*, September 1946. Despite the popularly received opinion, that Russell's use of Leo Szilard, Eugene Wigner, et al., to induce Albert Einstein to send his famous, relevant letter to President Franklin Roosevelt, was prompted by Niels Bohr's report of the 1938 work of Otto Hahn, Russell crony H.G. Wells' anticipation of nuclear-fission power and nuclear-fission weaponry antedated Hahn's experiments by as much as decades. Wells' scientific source was the writings of Frederick Soddy, a collaborator of Rutherford. The renewed, post-World War I collaboration between Wells and Russell was centered in Russell's public adoption of Wells' 1928 *The Open Conspiracy: Blueprints for a World Revolution* (London: Victor Gollanz, 1928). This was the document which launched the post-World War II project for launching a "New Age," a project in which Russell's own 1938 founding, at the University of Pennsylvania, of his and Robert Hutchins' Unification of the Sciences project played a central role inside the United States.



Cosmonaut Aleksandr I. Lazutkin, flight engineer aboard the Space Station Mir, May 20, 1997. The man-in-space program presents the best example of the kind of “science-driver” program needed to reverse Russia’s economic decline.

The present phase of the descent toward a New Dark Age, has been developed by aid of sundry agreements and ukases, including those of the International Monetary Fund (IMF), and that “sorcerer’s apprentice,” Professor Jeffrey Sachs, who never failed to ruin the economy of any nation which tolerated his advice. The present slide of Russia and other nations toward possible extinction during an emerging New Dark Age, is a horror designed by mankind, which will not be undone by any means but mankind’s reversing of those presently hegemonic, bad policies which have brought this strategic threat upon us: policies which still, at the moment, continue to dominate, and worsen the present global situation.

That economic situation, is the real-life cockpit in which the issues of Russia’s science are located; only by defining those issues in that location, could we pose the sane questions which might lead to useful answers. Under the presently apocalyptic, global economic circumstances, to discuss science policy without situating the subject so, smells of the unwashed virtual reality of the hesychast, not the spirit of scientific reason.

My own direct encounters with the situation of science inside post-1991 Russia developed during the years 1993-1994, through the rather wide circulation of both English copies and Russian translations from my 1984 introductory textbook in the science of physical economy,² and a series of

2. Lyndon H. LaRouche, Jr., *So, You Wish to Learn All About Economics?* (New York: New Benjamin Franklin House, 1984. Second edition: Washington, D.C.: EIR News Service, Inc., 1995).

meetings with some relevant key personalities and institutions in Moscow.

On both the side of Russian institutions, and my own side, these contacts were conditioned, at least in significant part, by my earlier contacts with certain institutions of the Soviet government. Notable earlier channels of contact with Soviet scientific institutions, from the mid-1970s and later, began in connection with the work of my associates and me around the development of inertial-confinement modes of thermonuclear fusion. The contacts involved the relatively highest political level, through my later efforts, as a private U.S. citizen, to secure new dimensions of scientific and economic cooperation between the U.S.A. and U.S.S.R. The latter contacts occurred through the medium of a back-channel discussion I held with a representative of the Soviet government, on behalf of President Reagan’s administration, during a twelve-month period beginning February 1982. On this latter account, I became the subject of prominent attention in the Soviet press and highest levels of other Soviet institutions, beginning Spring 1983, reaching extraordinary intensity, under General Secretary Gorbachev, during the Summer and Autumn of 1986.

Presently, although I oppose the eastward extension of NATO, I sympathize with President Clinton’s expressed view of Russia itself. I, like the President, am committed to Russia assuming its proper position as an integral part of continental Europe, as well as a state with an important special situation in Eurasia.

Also, for me and my immediate associates, Russia is an

Saltykov and the decline of Russian science

Boris G. Saltykov, a physicist, was Russia's minister of science and technology, from the formation of the first government of post-Soviet Russia, in 1991, until August 1996, when the Ministry of Science and Technology was temporarily (until its restoration in March 1997) downgraded to a state committee. Saltykov then moved to the Russian House for International Scientific and Technological Cooperation. His political affiliation is with the "Russia's Democratic Choice" (RDC) party of Yegor Gaidar, the Russian premier in 1991-93, whose imposition of "shock" price deregulation and other radical free-trade policies sent Russian industry, consumption, and science into a tailspin. A fellow member of the RDC is current First Deputy Premier Anatoli Chubais, designer of the privatization program under which Russian industry has been asset-stripped.

In his commentary, "The Reform of Russian Science," in the July 3, 1997 issue of *Nature*, and in a speech to last February's annual meeting of the American Association for the Advancement of Science (AAAS), in Seattle, Saltykov has outlined the drastic shrinkage of R&D spending, state subsidization of science, and scientific employment in Russia. He did not mention some of the more stunning events, such as the Oct. 30, 1996 suicide of Academician Vladimir Nechay, director of the elite Chelyabinsk-70 nuclear research lab, who shot himself after having had no

funds with which to pay his staff for five months.

From a peak level of 3.2 million scientists and science-related service workers, employed in the Russian part of the Soviet Union in the late 1980s, such employment has fallen to 1.3 million persons, Saltykov told the AAAS. This is a decline of science employment by nearly 60%. Almost 25,000 Russian scientists have emigrated or are otherwise working abroad. Inside the country, Saltykov wrote in *Nature*, the remainder of the drop took the form of an "internal brain drain," the "exodus of scientists and engineers towards new or modernized parts of the domestic economy such as commercial banks, financial and legal companies, and the telecommunications industry."

From 1991 to 1996, R&D spending fell by 70%. Last year, Saltykov wrote in *Nature*, state-funded science and technology programs received only 25-30% of the allocated funds.

In his February speech and July article, Saltykov expressed the hope that "funding from abroad" would help Russian science to survive. He himself is involved with foreign finance, as a board member of the Open Society Institute-Russia, one of international speculator George Soros's many projects in the former Soviet Union. When Soros is not fending off charges of bashing the currencies of nations, from Italy to Thailand and back, he flaunts his largesse as a Maecenas for ex-Soviet science, but the most visible part of Soros's activities in Russia is merely the promotion of Internet access. Since October 1996, Boris Saltykov has attended, in person or by video-conference, the launches of University Internet Centers in Vladivostok and in Rostov-on-Don, the third and fourth of 32 UICs planned by the Soros network.—*Rachel Douglas*

important selection of U.S.A. partner in joint efforts, together with other nations, in fostering the natural role of Eurasia as the center of initiatives which are essential to the recovery of the planet's economy. I mean durable recovery from those tornadoes of financial, monetary, and economic crises, the which are presently hitting financial centers around the world with a rising frequency and general intensity. For this work, the most prominent partners of the U.S.A. and Russia include the two giants of Asia, China and India.

Since 1993, my contacts, and those of my immediate collaborators, with Russia's scientific institutions, have been fruitful in respect to defining needed alternatives, even though needed support for these proposals, from relevant sections of the international community, unfortunately, has yet to materialize.

From this vantage-point, the prospect which Saltykov outlines for Russia's science, must be seen as unacceptable. His perspective for Russia's science, is directly contrary to any

policy which might allow a reversal of the present, horror-stricken process of economic collapse gripping that nation. The included object of any sane U.S. policy toward Russia, and also Eurasia as a whole, is to provide, largely from within Russia itself, the reassembly of the scientific support essential for Russia's urgent economic-recovery requirements. I summarize the most crucial issues, first, in a broad-brush, practical overview, and, thereafter from the stickier, but not the less indispensable epistemological vantage-point.

Measuring economic performance

If we measure input and output of national economies in terms of *physical-economic* market-baskets of infrastructure, and of producer and consumption goods, no leading industrialized economy of the world has sustained net economic growth during any part of this century, except under three conditions: technological mobilization in preparation for anticipated major warfare, conduct of such warfare, or rebuild-

ing economies ruined by such warfare. The only significant qualification of this statement, is, that high-intensity space-exploration programs have been proven a substitute which is equal to, or superior to military science-driver programs as such, in fostering high rates of technology-driven gain in the productive powers of labor for the economy considered in its entirety.

The post-1989-1991 transition, from the Soviet Union to Russia, contains all the elements of this type of experimental-scientific fact. It is from this standpoint, that the economic reconstruction of Russia should be examined. It is from this standpoint, that Russia's priorities in science policy, and U.S. encouragement of those policies, ought to be defined.

The market-baskets employable for this measurement are defined per-capita of total labor-force, per household, and per square kilometer of the relevant area of the Earth's surface. The market-baskets are of three principal types: infrastructure, producers' goods, households' goods. The contents of the market-baskets are of two general types: hard (physical products as necessary to permit improvement in the productive powers of labor), and soft (education and related cultural, health care, and scientific services). Other costs may be treated, for convenience, as if they were actually or approximately "frictional" in their functional characteristics.

The functional constraints adopted in such functional analysis, are productive and demographic. The rate of productivity of labor, as measured in per-capita values of all three types of market-baskets, must improve for the labor-force as a whole. The potential relative population-density and demographic characteristics of households, must improve. To offset technological attrition, the power-density per capita and per square kilometer, must increase. The maintenance of a constant or improved ratio of output to input, under these constraints, is the definition of constant or better profitability of the economy, when that economy is considered in not less than its entirety.

The irony, that military end-products are chiefly destroyed, rather than inputs to the productive process, illustrates the principle which is relevant here. A summary description of the architecture of a modern science-driver program, for military or space exploration, is sufficient for our discussion.

The increase of mankind's per-capita mastery of nature, above the potential of several millions individuals attributable to "aboriginal" man, corresponds to a million or more years' accumulation of discoveries of validated principles of nature, including the invention of spoken language, of plastic arts, and of principles of human cognition itself. The reenactment of original such discoveries, as by students, transmits efficient knowledge of this inheritance as knowledge, rather than as mere learning. The mental experience of such reenacted discoveries, in approximation of the same modes of mental life we associate with crucial discoveries in experimental physics, as by students, is the means by which knowledge of past

discoveries of principle, is transmitted from the interior of one mind to another's, down through the ages.

This method of acquiring knowledge, through reenacting the mental processes of an original discovery, not only brings about the transmission of inherited discoveries accumulated from the past. This form of education, and related nurture, fosters the development of the individual's ability to control and direct those mental processes, by means of which additional validatable discoveries of principle may be generated by that individual to the advantage of present and future generations.

In the practice of modern experimental science, the design of experiments is crucial. A relatively perfected design of validated proof-of-principle experiment, thus serves as the model of reference for the development of corresponding new families of machine-tool and product designs. The rate at which such experimental progress is occurring, and transformed into improvement of product and productive process, determines the general rate of realized technological progress, and of rate of increase of the per-capita productive powers of labor.

This approach to science-driver military and related "crash programs" of economic development, was introduced to modern practice by France's celebrated "Organizer of Victory," Lazare Carnot, that in collaboration with his former teacher and friend Gaspard Monge. The further development of Carnot's approach to "science driver" programs was in the U.S.A., under President Abraham Lincoln, establishing the U.S. economy of the 1860s and 1870s as the most technologically advanced in the world. This was the model adopted by Germany after 1876, the model which the U.S. also provided its leading ally, Czar Alexander II's Russia, the Russia of D.I. Mendeleev and Count Sergei Witte. This was the model revived, in a limited way, by the U.S.A., for its part in World War I, and revived, in a more thorough way, for World War II. This is also the model implicit within the "crash program" work of the Soviet military-scientific industrial sector. This is the model of the science-driver space-program. Looking backward to the Renaissance, this was already the model implicit in the life's work of Leonardo da Vinci.

The functional character of this model is supplied a conceptual structure through application of the principles of a purely physical geometry, as outlined in Bernhard Riemann's 1854 habilitation dissertation.³ Each discovered principle corresponds to a physical dimension of such a geometry, a principle whose addition to knowledgeable practice, supersedes the previously established scientific hypothesis, of n dimensions, by a new hypothesis reflecting the characteristic of $n+1$ di-

3. Bernhard Riemann, *Über die Hypothesen, welche der Geometrie zu Grunde liegen*, *Bernhard Riemann's Gesammelte Mathematische Werke*, H. Weber, ed. (Vaduz, Liechtenstein: Sändig Reprint Verlag Hans R. Wohlend), reprint of Dover Publications' own reprint (New York: 1953) of the B.G. Teubner edition of 1892-1902, pp. 272-287.

mensions. Thus, the resulting increase in implied mathematical cardinality, if it yields an increase in the per-capita productive powers of labor, is a measure of the anti-entropy (physical-economic profitability) of the economic process so driven.

Thus, two distinguishable considerations apply to the productive process. First, the Riemannian knowledge-intensity of the technology being applied. Second, the rate of increase of that knowledge-intensity. For modern industrial society, this process should be viewed, especially for the science-driver cases, as a flow of knowledge-intensity from combined education and scientific discovery, both through the minds of educated persons entering the labor-force, and through the realization of validated designs of proof-of-principle experiments through the machine-tool-design sector. It is as the two flows converge upon the points of the productive process (and product design), that the identified Riemannian function is expressed as physical-economic anti-entropy.

Thus, in calculating the effects of a military sort of “science-driver” “crash program,” we must examine the balance between the loss to the economy on account of the economic waste represented by destruction and obsolescence of military goods, against the gains to the same economy represented by the “spill-over” of advanced technologies, through the machine-tool-design sector, into the products and productive processes of the economy as a whole. Thus, as this was measured during the middle of the 1970s, the costs of the U.S.’s 1960s space-program were a small fraction of the net increase in U.S. wealth caused by the “spill-over” of the “crash program’s” development of space technologies, into the U.S. economy generally.

With one qualifying reservation, the performance of Russia’s science-driven military-industrial sector was outstanding. This is dramatized by the relatively poor performance of the Soviet economy outside its military industrial sector. Anyone who has any grasp of the achievements of Soviet science in the military, aerospace, and related sectors, can more readily appreciate the fact, that the Soviet failure was not the fault of Soviet science, but rather the morbid, stubborn resistance to implementing high rates of technological progress on the side of the Soviet economy’s non-military sector.

Nor was the higher rate of “spill-over” into the civilian economy, which was realized in the U.S.A., or Germany, for example, the result of the “Adam Smith model.” Directly the contrary; the superior achievements in “spill-over,” in the U.S.A., most notably, or in the case of President Charles de Gaulle’s temporary revival of France’s economy from the Balzackian morbidity it had achieved under the Fourth Republic, were not the fruit of “free market” policies, but directly the contrary; the successes were the fruit of a Colbert-Carnot tradition of dirigism.

The method responsible for the Twentieth-Century successes of the U.S. economy’s military and space “crash programs,” was always to put “free trade” in a dirigistic cage for

the duration of the national-defense emergency. The method was to channel available capital and credit into scientific “crash programs,” including large infusions into the machine-tool sector, especially the machine-tool-design sector, to force massive infusions of capital into the public sector’s development of basic economic infrastructure, and to force high rates of capital-intensive, power-intensive modes of technological attrition, from the science and machine-tool sectors, down the throats of industry in general. Credit controls and other drastic measures of governmental direction were included as essential ways of preventing Wall Street from ruining the economy in Wall Street’s habituated ways.

The U.S.’s great economic depressions came when the period of emergency was ended. The economic collapse came naturally, as soon as Wall Street was freed from the shackles of dirigism, and permitted to go back to its old parasitical, monetarist ways.

The fault of the Soviet economy was not its lack of emphasis on “free trade.” Only an idiot, after studying closely the economic history of both Czarist Russia and the Soviet Union, from the aftermath of the British and French aggression in the so-called “Crimean War,” through to the 1962 missiles crisis, could sincerely deny that it was always the progress achieved during periods dominated by dirigism, which saved Russia and the Soviet republic, repeatedly, from either semi-colonial status, or outright obliteration. The relative economic inferiority of the Soviet system as a whole, lay in the social and political, and, above all else, the back-breaking cultural burden of tradition. These frictional forms of resistance to progress, fostered impediments to the non-military sector’s use of the spill-overs from the military and space sector’s science-driver forms of dirigism. “Free trade” ideology, more recently introduced, has already demonstrated, yet, once again, its seemingly exhaustible, magical, inherent powers, for making everything, anywhere, worse.

Modern national economy

The often overlooked central fact of modern economy, is that, since the establishment of the first approximation of a modern nation-state, in Louis XI’s France of 1461-1483, the growth of population, and improvement of demographic characteristics of households, not only in Europe, but globally, has progressed at rates unprecedented in all earlier history, and adducible pre-history. The immediate cause for this radical improvement was cultural: the replacement of the world’s domination by what Classical Greek culture knew as the “oligarchical,” or “Persian” model, by the persisting net influence, until the mid-1960s, of what is fairly named the “republican,” or “national-economy” model.

Prior to this change, which originated in western Europe out of the 1439-1440 sessions of the great ecumenical Council of Florence, the world was dominated by forms of culture in which government was run on behalf of financier or landed oligarchies (or, both); ninety-five percent of the population

was kept in the relatively bestialized state of actual or virtual cattle. The “Malthusian” Code of Diocletian, typifies those oligarchical traditions. In the republic, the nation-state is established for the benefit of each and all of the whole people, including its posterity. This latter policy, that of Gottfried Leibniz, is embedded prominently as the fundamental law of the U.S.A., within the Preamble of the U.S. Federal Constitution; that policy was a direct outgrowth of Platonic Christianity’s notion of the individual person as made in the image of the Creator.

Thus, the new form of nation-state, the republic premised upon principles of national economy, fostered the emergence of policies of universal humanist forms of education, as modelled, during the late Fourteenth into Sixteenth Centuries, upon the work of the Brothers of the Common Life. Similarly, the right of the person to employ those developed mental powers in ways consistent with the natural requirements of a being made in the image of the Creator, combined increase of popular education with state promotion of growth of technological progress in infrastructure, agriculture, and in industry. In short, the national economy was committed, from its beginnings, to a dirigistic approach, an approach which already contained the germ of the modern “crash program,” the science-driver model summarily identified above.

The failure of the League of Cambrai to decapitate the feudalist adversary of the modern nation-state, the adversary whose head was then Venice, enabled Venice to organize a repertoire of divide-and-conquer (e.g., “balance of power”) counter-offensives. This Aristotelean counter-offensive, resulted in the emergence of the neo-Aristotelean (Ockhamite), Paolo Sarpi’s, Anglo-Dutch, empiricist model of nation-state, in which two leading, mutually opposing forces, republican and financier-oligarchical, struggled for domination of the national, and international society which combined them both. This is the state as viewed, if only axiomatically, by Paolo Sarpi’s contemporary, the Malthusian Giovanni Botero.⁴ So, science-driven economic progress was condemned to a kind of Manichean self-degradation, in the bed of usury. This persistence of this morally unwholesome, degrading cohabitation of two hostile forces, republican and oligarchical, this mating of two opponents which had no principle in common, is known today as modern European “liberalism.” It is otherwise known, sometimes, as the American pragmatism of William James and John Dewey, or, simply, the principle-free ideology of Bernard Mandeville’s “Fable of the Bees,” the fable which, as today’s IMF-sponsored tyrants inform their looted victims, is called “democracy.”

The root-issue of the insoluble inconsistency of these respective republican and oligarchical factions, is an absolute

4. Giovanni Botero (1544-1617), an agent of the House of Savoy, accurately identified by Joseph Schumpeter’s *A History of Economic Analysis* (New York: Oxford University Press, 1955) as responsible for the introduction of Malthusian thinking into Seventeenth-Century England.

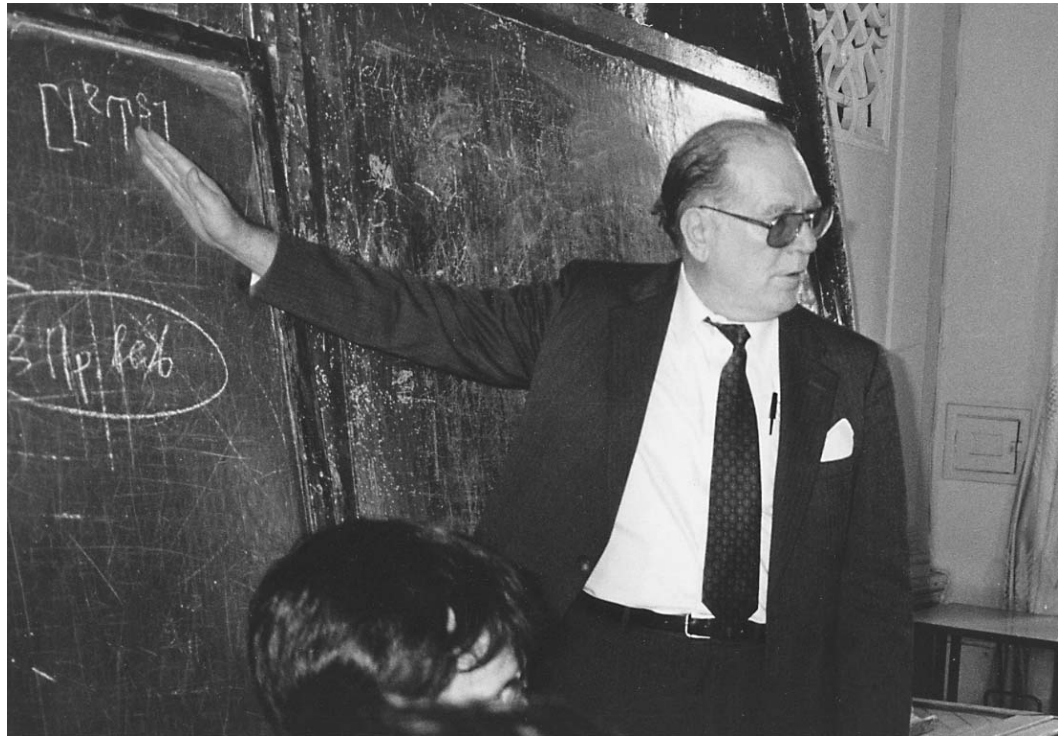
difference in the conception of both the human individual and of mankind. The one, the republican, conceives the individual as made in the image of the Creator, this by virtue of that gift of the developable potential for Reason, the which is the essential distinction of man from beast. The oligarchical standpoint, is typified by the empiricism of such English political assets of Venice’s Paolo Sarpi as Francis Bacon and Thomas Hobbes: man the beast, man “each in war against all.” For empiricism, that notion of “human nature” which depicts individual man as a beast, the mainspring of the individual’s personal character is deemed to be nothing but the legendary “Seven Deadly Sins.”

The oligarchical view of “human nature,” that of Hobbes, Locke, Mandeville, François Quesnay, Adam Smith, Jeremy Bentham, et al., coheres with a “two-tier society,” in which as much as ninety-five percent, or more, of the total population is subjected to conditions, as under the Code of Diocletian, approximating cattle, as in the Physiocratic schema of Quesnay and the tradition of those Seventeenth-Century feudal reactionaries, the *Fronde*, which Quesnay’s ideology echoed. This is the degraded view of “human nature,” typified in ancient Greece by Lycurgus’ Sparta. This is the proto-Malthusian, proto-Darwinian view of “human nature,” which is already presented in the Code of Diocletian, and in the notion of the nation-state proffered by Giovanni Botero.⁵

In summary: the difference between the patriots of the United States of America, and the British monarchy first established in 1714, is an irrepressible conflict between republicanism and oligarchism, a conflict rooted in that same fundamental difference, respecting the practical definition of a universal “human nature,” which has persisted in European civilization since the time of the conflicts between Solon and Plato, on the one side, and the oligarchical faction, of Babylon, Tyre, and Sparta’s slave-society, on the opposing side. This historic difference is, in principle, the same today, as it was during the U.S.’s wars against Britain, during 1776-1815, and during the fostering of the cause of the Confederate States of America by Queen Victoria’s ministers Lords Russell and Palmerston. It is a conflict which could be removed at such time as the British Commonwealth were to abandon its perverse, oligarchical misconception of “human nature.”

One of the most insightful views into the modern British empiricist’s oligarchical misconception of “human nature,” is provided by Jonathan Swift’s fictional account of the visit of his Lemuel Gulliver to early Georgian England, to the land of the Houyhnhnms, where lordly horses reigned over their bestialized, humanoid serfs, the Yahoos. In order to establish a durable form of society, where lordly oligarchs rule, it is indispensable to impose upon the culture of the subjugated classes of person, the self-image and cultural traits of the beast. Thus, when the Houyhnhnms discovered that human

5. See Botero’s appendix, *Delle cause della grandezza e magnificenza della città* to his *Della ragion di stato* (Venice: 1588; London: 1606).



Lyndon LaRouche lectures at the Russian Academy of Sciences, April 28, 1994, under the auspices of Pobisk G. Kuznetsov's "President" program.

Gulliver was capable of expressing ideas, they intended to castrate him, lest his presence might lead to a variety of Yahoo which could think, and thus imperil the local oligarchical rule. So, the racist Houyhnhnms, the eugenicists of today's Harvard University's Black Studies program, have played a leading role in promoting an argot called alternately "Black English," or "Ebonics," which they recommend as consistent with the alleged genetic predisposition of Africans for associative-emotional, rather than cognitive behavior.

From the outset, the new form of society emerging around the figure of France's Louis XI, was vastly superior to all society before it. This superiority was measurable in terms of the relationship between the society and nature, as measured both as expressed in per-capita of labor-force and per-square kilometer of the relevant surface-area of the Earth. Thus, even though the oligarchical forces were able to force degrees of cohabitation upon national economy, the per-capita power of the new form of national economy so far exceeded that of any other form of society, that western European civilization quickly emerged as the dominant influence for change throughout the planet as a whole. Thus, the two-fold struggle, between national economies and older cultural forms (the "modernization" issue), as it impacted Russia's history, in particular, on the one side, and the struggle between republican and oligarchical forces within the emergent modern European civilization itself.

With the ruin of France by the successive regimes of Robespierre, Paul Barras, and Napoleon Bonaparte, over the course of the 1789-1814 period, the mantle of world leader-

ship in national economy passed then, as if by default, to the young, then terribly isolated, Federal constitutional republic of the United States. This U.S.A. was a nation itself also besieged from within, by that building storm between republican and oligarchical factions, which was later, fatefully expressed by the great Civil War of 1861-1865. From the time of President Abraham Lincoln, the U.S.A. was the leading influence for modern economy and political institutions world-wide.

This tradition of Benjamin Franklin, George Washington, the Clay-Carey Whigs, and Abraham Lincoln, has been the continued, underlying tradition of the U.S.A., despite those "dark" periods during which the U.S. itself was dominated internally through the oligarchical faction's takeover of top-down control over U.S. political institutions. Such a dark period, was the case for three decades, beginning the 1901 assassination of patriotic U.S. President William McKinley, and accession of an oligarchic spawn of the defeated Confederacy, President Theodore Roosevelt,⁶ and, later, Teddy Roosevelt's choice, also a spawn of the Confederacy, President Woodrow Wilson, who launched the national revival of the Ku Klux Klan, in 1915, from the U.S. Executive Mansion.⁷

6. Theodore Roosevelt's maternal uncle, Cuba-filibusterer Captain James D. Bulloch, was the Civil War-period head of the Confederacy's secret service in Europe, and was, later, the mentor of Theodore Roosevelt's political thinking and career.

7. The occasion was the White House showing of the first Hollywood feature film, *The Clansman*, later retitled *The Birth of A Nation*. The production



Pobisk Kuznetsov (second from right) listens to LaRouche's presentation at the Russian Academy of Sciences. "Pobisk Kuznetsov's debating point with me," LaRouche writes, "was his argument, which I opposed, to the effect that the principles of physical economy might be demonstrated at the blackboard, in the language of contemporary mathematical physics."

The strategic conflict between the British "free trade" system, and the U.S. constitutional form, the "American System of political-economy," has been the ultimately determining issue of world politics, from the Congress of Vienna to the present day.

Any attempt to comprehend the internal policy-making of the U.S., which does not locate this in terms of the continuing affray between U.S. patriotic and oligarchic factions, the latter as typified by "Wall Street," is an utterly nonsensical (and usually "leftism"-rooted) grasp of both U.S.A. policy and internal politics, and of the decisive strategic issues of current world history. Inside, and outside the U.S.A., the only important, strategic issue of current history, continues to be the conflict between the "free trade" system, and the "American system." All other issues are, historically, merely "balance of power" or other forms of strategic diversions from the central questions of current history since 1814.

To understand Russia's position in world history, one must put one's finger on the twofoldness of the determining issues of both Russia's internal and strategic position: tradition versus modernization, and the pro-nationalist, versus the pro-"free trade" policy of the modern European financier-oligarchical model, these as typified by the tyrannical, current

and distribution of this pro-Ku Klux Klan propaganda-film involved the Goldwyn and Mayer of the later firm of Metro-Goldwyn-Mayer. Wilson's glowing review of the film was decisive in making possible the subsequent recruitment of an estimated five percent of the adult U.S. population to membership in the Klan which was revived from its inception by this rabidly racist propaganda-film.

looting policies of Adolf Hitler's intellectual clones at the IMF and World Bank. Here lie those ironies of world history, the which have confronted Russia's scientific community since the adult lifetimes of Czar Alexander II, D.I. Mendeleev, and Count Sergei Witte.

Science as politics

The Russia side of the issue of science as politics, was epitomized in a Spring 1994 Moscow seminar jointly addressed by the celebrated Pobisk Kuznetsov and myself. Kuznetsov had praised, publicly, the presentation of physical economy in my 1984 textbook. He had indicated, in his appreciation of this, that he had been part of a special, and highly secret Soviet task-force, established during the late 1970s, which had reached conclusions similar to my own. He elaborated on this latter point during his opening presentation at that seminar.

However, there was a significant point of difference between us, as expressed by his opening remarks, and also my own, during that evening's event. On this point of difference, we both were united, and divided on the matter, by a debt, which both of us shared, to Russia's V.I. Vernadsky.

Pobisk Kuznetsov's debating point with me, was his argument, which I opposed, to the effect that the principles of physical economy might be demonstrated at the blackboard, in the language of contemporary mathematical physics. With that proposition, one is confronted with the division of modern science, between the current of Leibniz, Carnot, Monge, Gauss, and Riemann, on the one side, and Hobbes, Newton,

Lagrange, Laplace, Cauchy, Grassmann, Clausius, Kelvin, Maxwell, and the modern logical positivists, on the opposing side. On this, I, like Riemann, stand in opposition to the relatively more popular position today, the formalist position defended by my friend Kuznetsov, in that debate.

Since Paolo Sarpi, the institutions of modern science have been corrupted, increasingly, by the dicta of Aristotle and William of Ockham, in which it is arbitrarily, falsely assumed, that science is defined by the standpoint of the “contemplative” observer. This, of course, is the form of Ockhamite neo-Aristotelean tradition introduced, as “materialism,” into Soviet ideology by way of Paolo Sarpi’s Enlightenment. Exemplary is the case of that follower of Thomas Huxley et al., Darwinist Frederick “Opposable Thumb” Engels, whose conception of human nature (and, of the “class struggle”), both biologically and cognitively, reflects no axiomatic difference with the notion of Sarpi follower Thomas Hobbes. In opposition to this, my conception of human nature, and of the cognitive processes which underlie scientific method, is that of Leibniz and Riemann.

This is not a specifically Russian problem. It appears as a commonplace difficulty of even outstanding experimental physicists, who are sometimes reduced almost to babbling when called upon to derive an already experimentally validated discovery, not in the domain of experimental physics, but, instead, only mathematically, “at the blackboard,” that “in the language of today’s generally accepted classroom mathematics.” Had any among these perplexed physicists understood the leading implications of Bernhard Riemann’s 1854 habilitation dissertation, or, even the program which subsumes Carl Gauss’s design of his *Disquisitiones arithmeticae*, the nature of the absurdity which they had been called to perform on the blackboard should have been transparent to them.

All of this has much to do with the absurdity of the assumption of “linearization in the infinitesimally small,” the hoax first perpetrated as an attack on Leibniz’s calculus, by Abbé Antonio Conti’s London agent Dr. Samuel Clarke, an attack restated as a tautological fraud presented as proof, by Leonhard Euler, and continued, after Euler, by his Berlin successor J.L. Lagrange, as in the latter’s influential, 1797 *Théorie des fonctions analytiques*, by Augustin Cauchy’s famous castration of the calculus, by Hermann Grassmann, et al. In the effort to defend that article of positivist blind faith in linearity, many frauds have been perpetrated in official science, including the arbitrary projection of the so-called “Coulomb force” into the very small.

It is notable that the latter piece of costly foolishness, which did much to impede work in the field of inertial-confinement fusion, was a result which must be attributed chiefly, and directly, to the myths built up around the deliberate suppression of the Ampère-Weber “angular force” of electrodynamics. A similar case is to be made for the dismal effects of

the relative political success of the followers of Ernst Mach, during the period of World War I, inside Germany and Austro-Hungary, and during the 1920s sessions of the Solvay Conference, in their efforts to defame and distort the work of Max Planck, as their predecessors, Clausius, Grassmann, Helmholtz, Maxwell, Rayleigh, and Bertrand Russell, had perpetrated frauds in science out of politically-motivated zeal, directed, in this case, against Carl Gauss, Wilhelm Weber, and Bernhard Riemann.

This fallacy of “linearization in the small,” has a complementary expression, in the Hobbesian definition of “human nature.” Indeed, the origin of this popularized error of most modern mathematics instruction, has a political root in Paolo Sarpi’s efforts to orchestrate the banning of the scientific method of Luca Pacioli, Leonardo da Vinci, Johannes Kepler, and William Gilbert, from the practice of science.

The issue here, as it was for Immanuel Kant’s *Critiques*, is that Kant et al. deny the possibility of transmission of knowledge of principles of nature (for example) through cognitive replication of the same mental action through which an original discoverer had first generated validatable knowledge of that then-revolutionary discovery of principle. The issue, as in the fictional case of the Houyhnhnms’ decision to castrate Lemuel Gulliver, is to prevent the elevation of the lower classes which must occur if we are allowed to evoke the creative power of reason which awaits development from within them. For, if one admits that all persons have the potential for acts of creative genius in science and Classical art-forms, then it is both morally, and practically obligatory, that all children and youth be educated accordingly, and that investment in productive processes be steered to the effect of providing the quality of places of employment which are most suitable to adult persons whose innate potential for scientific and Classical-artistic contributions bordering upon creative genius, is being fostered in educational and related cultural policies.

The eradication of this empiricist’s and Kant’s metaphysical imposition of intellectual castration upon the Gullivers of science, as by the empiricist myth of “linearization in the small,” is an issue prominently, if but implicitly addressed within Riemann’s 1854 habilitation dissertation. It is also at the center of my own original discoveries in economic science, and is the facet of Riemann’s discoveries which first attracted my intense interest in his work. It is also key to the most crucial issues of understanding the nature and causes of the present economic crisis now threatening to push civilization over the brink, and, is also key to understanding the included epistemological problems which Soviet practice has bequeathed to the shaping of the science policy of Russia today.

That said, let us go directly to the crucial issue.

Both the modern nation-state, and modern experimental physical science, date from the middle of the Fifteenth Century, in a series of developments centered around the 1439-

1440 sessions of the great Ecumenical Council of Florence. These are the developments of that century otherwise known as "The Golden Renaissance." Although the roots of the modern nation-state are to be traced to the Classical Ionian Greek city-states and the Athens of Solon, Aeschylus, and Plato, the immediate origins of both the modern national economy and experimental physical science, are located in the Platonic current of European Christianity leading into the developments, centered in Italy, during the middle of the Fifteenth Century.

The notable forerunners of the Fifteenth-Century founders of the first modern nation-state, Louis XI's France of 1461-1483, include Peter Abelard, so-called "of Paris," and Dante Alighieri. Within the context of a struggle to free people from the tyranny of those imperial forms passed down from Mesopotamia, through the empires of Rome and Byzantium, there was a more profound issue: to create a form of society fit for the human individual as a Christian view of Plato's argument, specifically the view of the Apostles John and Paul, and of Augustinus later. It were otherwise impossible to understand such works as Nicholas of Cusa's 1433 *Concordancia catholica*, the key Fifteenth-Century writing shaping the definitions of the embryonic modern nation-state, or Cusa's 1440 *De docta ignorantia*, the first among a series of his writings which established modern experimental physical science, and supplied the definitions of scientific method adopted, and acknowledged by Luca Pacioli, Leonardo da Vinci, Johannes Kepler, and others.

The central thrust of the notions of statecraft generally, of law, of scientific and technological progress, which defined the republican current in modern history, is thus centered upon the Platonic Christian view of both the nature of the human individual, and of mankind's relationship to the universe. In other words, the reading of *Genesis* 1:26-28 from that Platonic, Christian vantage-point. Any contrary view of modern European civilization, would be absurd by virtue of fallacy of composition, and would substitute purely imaginary, ahistorical presumptions, in place of the actual facts of history as shown by rigorous study of both physical data and primary sources from the vantage-point of modern experimental physical science. We proceed with the relevant issues accordingly.

Look at the Christian appreciation of *Genesis* 1:26-28. That is to say, read this as it was read from the Platonic standpoint in culture represented by the Apostles John and Paul. From the vantage of Plato's Socratic method of hypothesis, what empirical basis exists for reading the advice, that man and woman, alike, are made in the image of the Creator (i.e., the "Composer" of Plato's *Timaeus*), and that, through this quality of the human individual, mankind is awarded dominion within the universe? What is the existent empirical evidence which such statements must reference? To suggest that this must signify that the mortal individual's body is cast in the physical image of the Creator, were a travesty, suited for

the beliefs of none but very silly children. What is the essential difference between man and the beasts, which could correspond to such an utterance as *Genesis* 1:26-28?

Look at the accumulated knowledge of principles of nature (including principles of cognition) which corresponds to mankind's increase of per-capita power in the universe. Look at this from the standpoint of Riemann's referenced dissertation. From that vantage-point, describe the preconditions for a student's reenacting, not at the blackboard, but within the sovereign precincts of that student's own, internal cognitive processes, the mental processes which must necessarily have occurred within the mind of the original discoverer.

In each such case, we begin with a devastating ontological paradox. On the one side, established scientific belief; counterposed to that belief, is undeniable evidence which should not be allowed to exist, if established scientific belief were not in error. Such a juxtaposition of belief and evidence, addressed from the standpoint of experimental physics, generates a true paradox, an ontological paradox of the same type presented by Plato's *Parmenides*. It is a paradox of the same type encountered as true metaphor in all important works of Classical plastic and non-plastic art. Behind every valid discovery of principle, in the entire corpus of science passed down to the present day, that principle was generated solely by

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means of a creative discovery, generated within the sovereign cognitive processes of an individual mind, a discovery produced as a solution to such an ontological paradox, a solution whose generation is replicated in other minds, such as the minds of students in a Classical humanist educational program, by the same means.

One of the well-known crucial experiments of this sort, is the estimate for the Earth's polar meridian, as defined by a correspondent of Archimedes who was trained by Plato's Academy at Athens, Eratosthenes. A true geodetic experiment was conducted by him to put to a crucial test the false assumption, that the underlying measure for the Earth's surface is a plane. The measurements demonstrated, in principle, that, at each point of tangency of such a plane of linear extension with a chosen place on the Earth's surface, within the smallest infinitesimal extension of that tangency, there existed an absolute mathematical discontinuity, reflected as an axiomatically non-linear "bending," requiring the Earth's surface to be viewed as a surface of a three-dimensional representation, not a two-dimensional one. This is, embryonically, a forerunner of Gauss's development of the application of biquadratic residues, to arrive at transparent comprehension of the physical significance of the complex domain, and a generalized notion of curved surfaces. These, in turn, provided the starting-point for Riemann's referenced 1854 dissertation.

This illustrates what should be understood as the import of Kepler's method in astrophysics, and Leibniz's development of a calculus intended to address the challenge of distinct types of even non-constant curvature, even such as the curvature which might underlie a specific type of ordering, defining a corresponding sequence (e.g., Leibniz's *Analysis Situs*) of families of mutually distinct catenaries, as would be implicitly detectable in the infinitesimally small.⁸ Such latter notions of hypergeometries, lead into more general considerations under Leibniz's rubric of monads. This is the standpoint, for physics, of Riemann's referenced dissertation.

Reconsider Pobisk's assertion from this vantage-point. Can science be rightly practiced from the vantage-point of persons contemplating the apparent behavior of the physical domain as such? It ought to have been clear, but for the heavy ideological indoctrination with which the Aristoteleans and empiricists have saturated the textbooks, classrooms, and minds of their victims, that such a contemplative view is axiomatically absurd. There is no science, short of a view of the

8. Hence the travesty of the limited mentality exhibited by inveterate plagiarist Augustin Cauchy, in his celebrated use of Ockham's Razor to castrate, and thus render infertile, the Leibniz calculus. As Kepler faced this problem of calculating orbits corresponding to relatively small intervals of observation, and as Gauss achieved celebrity in attacking the problem of adducing the asteroid orbits, Leibniz had defined the challenge of the calculus to be: to determine the curvature of a process within even an infinitesimal zone of tangency, not only non-linear curvatures, but also non-constant (e.g., hypergeometric) ones.

universe which includes the efficiently practiced, increasing domination of that universe by mankind. It is the proneness of the universe, as it were by design, to submit to certain willful potentialities of the creative powers of the individual human intellect, which shows us the actual nature of the laws of that universe. In that sense, the ideological myth of "objective science," must be replaced by a mastery of the principles of human cognitive subjectivity, a study conducted from the vantage-point of discovery of new physical principles through the work of experimental physics.

It is not the nature of man, to function in production, or in any other way, as a harnessed horse, ox, or Yahoo might obey commands from his overlords. Cattle may be of value, but they do not produce economic value: only the creative potentials of the individual's cognitive processes do. This production of economic value, which is to be measured as anti-entropy in the ratio of physical-economic outputs over increasing rates of per-capita inputs, is derived not from fixed modes of behavior, as the Code of Diocletian apotheosizes unchanging practices of crafts. Economic value is derived solely from anti-entropy, that is to say, from what we generalize as scientific and technological progress in the design of products and productive processes.

Man's only real knowledge of the universe, is knowledge of those principles of the individual's sovereign, anti-oligarchical, developable powers of cognition, on the which we may rely for mankind's increasing dominion within the universe. The development and expression of those powers, to the effect of that type of benefit for mankind, is the only true definition of human freedom, as distinct from the bestial alternative proffered to Russians (and others) by the U.S.-based International Republican Institute (IRI), and Britain's outgoing sewer-pipe of Thatcherism, its Mont Pelerin Society.

From this vantage-point, which may be fairly identified as a Riemannian vantage-point, any attempt to prove, or disprove a newly discovered principle of nature, by mathematical derivation at the blackboard, is a contradiction in terms. As Riemann makes this the underlying principle of physical geometry, in his habilitation dissertation, discoveries of principle, by their nature, lie outside, and defy presently established blackboard mathematics: "This crosses over into the domain of another science, into the domain of physics, which the nature of today's occasion [on the subject of mathematics—LHL] does not permit us to enter."⁹

The Renaissance foundations of modern experimental physical science are rescued from the pile of Aristotelean and empiricist debris later dumped upon them, once we recognize the fact, that the notion of "laws of the universe,"

9. *Es führt dies hinüber in das Gebiet einer andern Wissenschaft, in das Gebiet der Physik, welches wohl die Natur der heutigen Veranlassung nicht zu betreten erlaubt*, op. cit., p. 286.

is, in reality, a notion of that kind of internal ordering of the sovereign cognitive powers of the individual mind, which corresponds to mankind's increased power over the universe, as distinct from those orderings of cognition which do not. Thus, we are obliged to turn from mathematics as ordinarily conceived in today's textbook and classroom, to a meta-mathematical domain which Leibniz sometimes named "Analysis Situs." In this domain, we are concerned with the notion of distinct types of ordering of the individual mind's cognitive processes, and of the relative ranking of those types in respect of their relative efficiency, the latter in terms of human potential relative population-density and improvement of demographic characteristics of households in general.

This notion of ordering, appears in the mathematical shadows of physical scientific progress, in the form provided by Riemann's referenced dissertation. To grasp this, we must focus attention, first, on validated, revolutionary discoveries of physical principle. That ordering of successive physical geometries, each separated from all others by an absolute mathematical discontinuity, reflects the type of ordering of the human subjective processes which corresponds to mankind's increasing power in commanding the universe.

Although the results of such progress are measurable, the process itself can not be predetermined in the formalist's mathematical way. Rather, as any successful teacher should know, this progress is achieved through the student's successive replication of the mental processes which occurred within the mind of an original discoverer in effecting a validated, revolutionary discovery of new principle of nature. The function of effective education, is not to learn the mathematical derivation of textbook formulas, as by drill and grill. The function is, to oblige the student to learn every inherited knowledge of principle, from millennia and centuries earlier, by replicating the relevant cognitive processes, as they occurred within the mind of the original discoverer, within the student's own mind.

This is the location, within the domain of social relations, of that issue of discontinuities which separates the two factions, which we may rightly distinguish as Renaissance (e.g., Cusa, Leonardo da Vinci, Johannes Kepler, Leibniz, Carnot, Monge, Gauss, Riemann, et al.) versus Enlightenment (Sarni, et al.) in modern science. Riemann's habilitation dissertation makes the connections clear.

Each validated new, revolutionary discovery of principle in experimental physics (or, analogous cases), assumes the form of a new dimension of a n-dimensional manifold; moreover, such manifolds form new hypotheses not merely in terms of the component dimensions, but also the colligating relations among them. The interaction of each new such dimension, adds a new discontinuity, relative to each arbitrarily defined interval of action within the domain of the superseded physical geometry. In Leibniz's view, the essential task of

a calculus, is to address the existence of even non-constant curvatures existing within an infinitesimally small such interval of action. Leibniz's view is opposed to the Enlightenment's *political* requirement, that, in the very small, relations must be reducible to linear approximations.

This, Leibniz's type of non-linearity in the very small, is key to his understanding of the significance of non-linear types in the infinitesimally small, as monads. Hence, the virulence with which the Eighteenth-Century myrmidons of Abbé Antonio Conte, who created the mythical apotheosis of Isaac Newton, myrmidons including Berlin's Newton-fanatic Leonhard Euler, focussed such hatred against Leibniz's notion of the *monad*.

Thus, Euler resorted to a desperate tautological hoax, in his effort to present a supposed proof refuting Leibniz on the issue of the perfect continuity of Euclidean extension in space and time. This was the same issue which, later, unleashed one of the most shameful political witch-hunts in the history of mathematics, against a Georg Cantor driven virtually insane by the intensity of this persecution. The same issue arose in the hatred focussed, by Bertrand Russell acolytes such as the dismayed John von Neumann, against the amiable Kurt Gödel's independently constructed, but related refutation of Russell's leading mathematical work, a hatred which followed Gödel to his grave.

The key to understanding the connections between the formal and social issues, which we are bringing to the surface here, is that that singularity of Riemannian physical geometry which revolutionizes a pre-existing mathematical physics, is the mathematical expression of an act of revolutionary discovery of a valid new principle, an action occurring within the sovereign precincts of the relevant individual's cognitive processes. These revolutionary transformations of reigning hypothesis, occurring in the practiced domain of physical geometry, are the reflections upon mathematics, of the act of discovery of a valid principle, in the mind. Here, exactly, lies the connection between the ostensibly formal issue of mathematics, and that issue of social relations which separates the Platonic scientific heritage of the Fifteenth-Century Renaissance, from the reductionist empiricism of the Seventeenth- and Eighteenth-Century Enlightenment.

Thus, the issue of discontinuity, of non-linearity in the very small, is the reflection of the issue of social relations, the issue of the nature of the human individual, reflected upon the shadow-domain of mathematical formalism. This issue divides man from both beast and Thomas Hobbes, Renaissance from Enlightenment. This is the fundamental issue of economy.

That approach reduces mathematics' status, from science, to that of the chief handmaiden of science—to, as Gauss emphasized this point, the "Queen of the sciences." To find science, we must proceed as Gauss's practice and Riemann's words point the way, out from the domain of mathematics,

into the domain of physics. Do we lose comprehension by delimiting mathematics in this way? By no means; we make mathematics better, more powerful, by showing it its own limitations, by warning it against its common failings.

If we know how to educate, we know how to create new knowledge, and, thus, we know how to increase man's relative power to command the universe. That can not be put on the blackboard; it can only be taught through repeated reliving of the history of scientific progress, from the more rudimentary, to the more recent among the revolutionary discoveries of principle. In science so practiced, each among us relives many times, a newly replicated moment of the finest thinking from among those greatest minds among persons deceased long before each among us was born. Thus, in that way, all fruitful, truth-seeking minds, are contemporaries, comrades, within the simultaneity of eternity.

This, the foregoing, Platonic, Renaissance ordering of social relations among thinkers, in the mind, is key to the politics of science, and to the politics of republicanism, in opposition to the political characteristics of social relations within any oligarchical form of society. The distinction of man from beast, lies in the fact, that the characteristic feature of the continued existence of the human species, is the accumulation, for practice, of those original discoveries, by means of which mankind's per-capita power to exist in the universe, is increased. Thus, the essential feature of social relations, is the ability of one mind to replicate the generation of a valid, original discovery of principle by another mind; this relationship among minds, is the essential form of normal social relations among members of the human species. Thus, the central feature of a civilized nation, is a universal program of Classical humanist education for all its young persons.

If we restrict the use of the term "idea," as Plato's method does, to the replicatable notions which first appear as validatable original discoveries of principle, we must say that the universal characteristic of the human species is social relations defined in terms of ideas for practice.

On that account, the essential feature of social relations, can be only the process, within the sovereign cognitive processes of one mind, by means of which valid discoveries of principle are replicated in that mind. Thus, the mode of education by means of which one person employs the method of ontological paradox, to create a riddle, a metaphor, within the mind of another, as a means for prompting that other person to replicate, within his own mind, a solution which is a discovery of principle, is the essential form and mode of relations among persons. There is no means, by which a deductive mathematics, or any similar formalism, could represent the essential feature which defines such social relations. It is a transformation, called cognition, which can not be performed by a blackboard, a piece of paper, a slug of text, or an algebraic expression; it can be performed only within the individual human mind.

However, when Paolo Sarpi et al., sought to define a form of nation-state agreeable to the service of a financier-oligarchical class, such as the financier nobility of Venice, it was their concern to secure to the financier-oligarchical class, the ability to adapt to the military and related strategic advantages peculiar to the nation-state form of political-economy, but without allowing emphasis upon scientific and technological progress to undermine the two-tier — master-cattle, Houyhnhnm-Yahoo — relations which are the "family jewels" of all oligarchical societies.

The effort to delimit the public expression of knowledge to a deductive mode, whether by the Averroëist Pietro Pomponazzi, or the more radical, Ockhamite tactic of Sarpi, Galileo, et al., corresponds to the effort to eradicate the use of metaphor and the properly defined subjunctive mood, by Galileo's mathematics pupil Thomas Hobbes. Hobbes' coupling of the banning of that method of paradox (i.e., metaphor) which is the universal characteristic of natural human social relations, to supersede the principle of metaphor with a beastly, reductionist misdefinition of "human nature," as by John Locke, Bernard Mandeville, François Quesnay, Adam Smith, and Jeremy Bentham, after him, echoes the intent of the proto-Malthusian Code of Diocletian: the intent to establish within the financier-oligarchical form of political-economy, the perpetuation of the feudal tradition of division of society into a small ruling stratum of lordly Houyhnhnms and their motley lackeys, and a relatively more numerous collection of subjugated, Yahoo-like, human cattle.

By pretending to eliminate from science, the pedagogical relationship we have identified here, the reductionist formalism promoted by Sarpi's Enlightenment, banned the general use of that form of social relations from the general experience of the populace. Thus, the Enlightenment, and the use of the empiricist and positivist modes of degradation of the education of the overwhelming majority among university and other students, to the status which Friedrich Schiller identified by the term of derision, *Brotgelehrte*.¹⁰ The deductive mode of empiricism and positivism prevails in science today, despite its intrinsically anti-science character, solely because it is perceived to be "politically correct" among those seeking employment in the relevant professions.¹¹ It is the form of

10. Best translated into English as "those who sing to earn their suppers, rather than for the benefit of music."

11. It is readily, and conclusively demonstrable, from the internal characteristics of their method of work, that both Carl Gauss and Bernhard Riemann, for example, were not only followers of Gottfried Leibniz, but abhorred the methods of both Isaac Newton and Immanuel Kant. Indeed, even the opening paragraphs of Riemann's habilitation dissertation are already pure Leibniz, and a devastating refutation of everything distinctively characteristic of the methods of Descartes and Newton; yet, for reasons of "political correctness," a genuflection to Newton, the household god of the British (and Hannover) monarchy, and of Prussia's Frederick II, is included, however reluctantly, in Riemann's published work. Yet, with rare exceptions, neither Gauss nor

reductionism employed in “politically correct” modes of discourse about science matters, between Houyhnhnm and Yahoo.

Hence, the popularization of the hoax, that principles of science are validated by being derived from existing deductive mathematics at the blackboard. This misleads popular opinion about science matters to the degraded form of appearance, of symbolic incantations by a gnostic priesthood of official science. Hence, the political fight within science, between the heritage of the Golden Renaissance, and Sarpi’s gnostic Enlightenment. This fallacy of the “blackboard,” has played cruel tricks on modern civilization, as in post-1991 Russia today. Hence, the importance we have placed upon that issue here.

How to rebuild an economy

The ostensibly exceptional performance of modern industrial economy under the impact of dirigist methods of science-driver development, is, in fact, not the exceptional, but, rather, the normal form of a healthy modern national economy. It is deviations from this normal form, which are the exceptions to the principle, the pathological states leading to the ills, such as financial and monetary crises, and brutal increases in poverty, which modern nation-states have suffered so much, so often, as presently.

The modern European model of national economy, since the developments of the Seventeenth Century, has been a hybrid established through the accommodation, within the same national economy, of two absolutely opposite social systems, the republican and the financier-oligarchic. Thus, insofar as a nation-state faces the prospect of losing its sovereignty in warfare, the anti-progress faction, the financier oligarchy and its lackeys, reluctantly submits to the requirements of a technologically progressive form of national economy. Under circumstances that that same oligarchy imagines the danger of such warfare to be remote, the oligarchy works to suppress the influence of those who represent the technologically progressive impulses within that society. Thus, the perception of durable peace, has been the apparent cause of the worst economic disasters of modern European civilization.

The significance of Sarpi’s strategy, of creating financier-oligarchical forms of nation-state, as clones of Venice, within the maritime bases of the Netherlands and England, was not to further the cause of the modern nation-state, but to compete with it, hopefully, ultimately, to destroy it, in what Sarpi perceived as the only way possible. Essentially, the problem

confronting Venice’s financier nobility was, that the strategic potential of the modern nation-state, as Leonardo da Vinci had demonstrated the principle, and Niccolò Machiavelli had described its effect, was inherently superior, per capita of population, to either the forms of feudalism premised chiefly upon landed aristocracy, or financier nobility. Sarpi’s point was to capture that strategic potential, but at the same time to castrate it as early and often as expediency would permit; hence Sarpi’s launching of his efforts to exterminate the influence of Johannes Kepler and England’s William Gilbert. Sarpi’s Enlightenment wished to make use of a tamed science and technology, one which would be housed, and supervised, in the academic and related slave-pens of the ruling financier oligarchy.

Thus, it should not be surprising that we observe the best performance of economies under conditions of perceived strategic threat to the existence of a nation. What we perceive, in such ostensibly exceptional cases, is a reflection of the normal functioning of a modern national economy, were that economy freed from the grip of an oligarchical accommodation. With that insight, republican strategic economic policy appears in its proper perspective.

Turn to the history of the modern, science-driven, machine-tool-design centered, “crash programs” of high-intensity economic development, since Filippo Brunelleschi’s use of the catenary principle to achieve the otherwise unfeasible construction of the cupola for the Florence cathedral of Santa Maria del Fiore, and to the virtual one-man “crash program” represented by the output of Leonardo da Vinci.

Trace this through the first national-economic, science-driver “crash program,” that of France’s Minister Jean-Baptiste Colbert, and, then, to the model for all subsequent Nineteenth- and Twentieth-Century “crash programs,” that of Lazare Carnot and Gaspard Monge’s 1794-1814 École Polytechnique—prior to the wrecking of that École, and French science generally, by the vandals Marquis Laplace, Augustin Cauchy, Henri Saint-Simon, and Auguste Comte.¹²

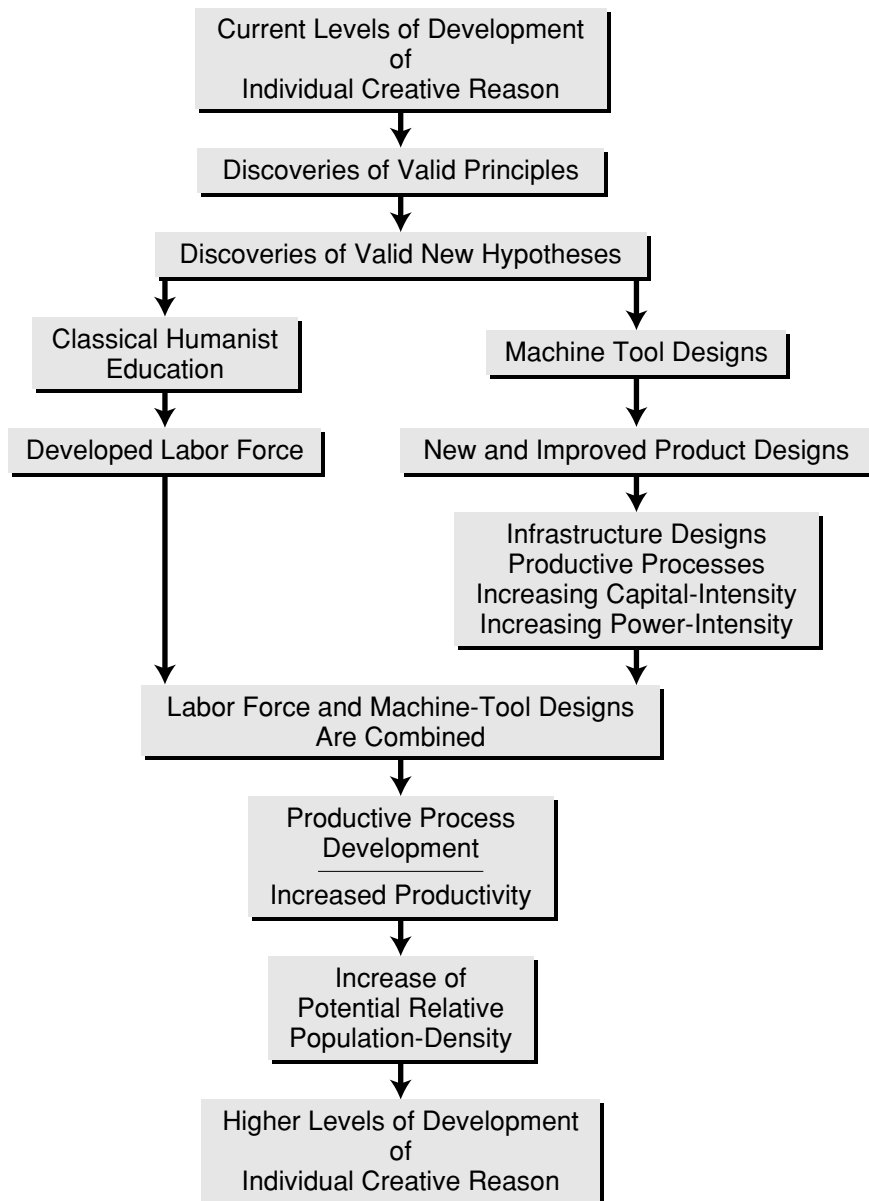
Thereafter, the most notable models are: that begun under President Abraham Lincoln, which became the model of reference for Germany’s post-1876 emergence as the leading science-driven machine-tool economy of Europe, and the spread of this influence from both the U.S.A. and Germany, into the Russia of Czar Alexander II, D.I. Mendeleyev, and Count Sergei Witte. Locate the World War II programs under President Franklin Roosevelt, and the post-World War II, German-American space program, as among the best further expressions of this same principle.

Riemann defended Leibniz, or attacked publicly, by name, the Newton they despised, in their published writings, during their lifetimes. Hence, Gauss’s refusal to publish his own notions of a non-Euclidean geometry, as this issue came to the surface most clearly in his correspondence on that subject, with G.L. Gerling, and Farkas and Janos Bolyai.

12. Granting the occasional exception, such as “out of the positivist mainstream” Louis Pasteur, with the 1826 appearance of “Crelle’s Journal” (*Journal für die reine und angewandte Mathematik*), the position of world leader in science passed, definitively, from France, to the Germany of Carl Gauss and Alexander von Humboldt.

FIGURE 1

Summary representation of a national economy operating in a science-driver, ‘crash program’ mode



With that background in view, turn attention to **Figure 1:** “Successive Levels of Development of Creative Reason.” If that Figure is viewed as a summary representation of the points made here up to this point, it represents the distinguishing feature of a national economy operating in a science-driver, “crash program” mode. From that point of view, consider the potentials for an economic renaissance of Russia. Consider the strategic importance of such a renaissance in Russia for the development of Eurasia and of contiguous

regions of the planet.

From this vantage-point, the world’s economy has three interests at stake in the prospect for reactivating the scientific potentials which Russia (like Ukraine) has inherited from the Soviet Union: 1) One of the largest, and best developed scientific cadres of the planet; 2) The specific orientation of that cadre to the frontiers of experimental science in general, as the Soviet space program typifies this frontier capability; 3) The grievous shortage, globally, of that quality of science cadres associated with the former Soviet Union, as this acute shortage should be measured, per-capita of labor-force, throughout most of the world, notably Eurasia and Africa. In summary, without a virtually full-scale reactivation of the scientific cadre associated with Russia, the world at large lacks the quantity and quality of total scientific cadre-force required to reverse the recent thirty years’ contraction of means to satisfy the urgent requirements of mankind as a whole.

At this juncture, no one who is moderately well-informed, and also sane, doubts that the world economy in general, is a decrepit shanty-town, facing modern history’s fiercest, onrushing epidemic of financial and monetary tornadoes. Since the so-called “New Dark Age” of the mid-Fourteenth Century, European civilization has experienced nothing comparable to that which will devastate this planet during the several years between now and the close of the present century. Many of the outcomes of these next few years are undecided; but one result is assured. It is presently a certainty, that whatever else the outcome of the onrushing storms might be, before these storms have subsided, the

leading financial and monetary institutions of the present moment will have become no more than unpleasant memories.

Nonetheless, although the world is presently trapped within the worst financial crisis in more than six centuries, this, like the crisis of the mid-Fourteenth Century, or the so-called “Dark Age” which characterized the collapse of the Roman Empire in western Europe, is no mere economic crisis, and certainly no mere cyclical crisis. This is a threatened, general disintegration of global civilization itself, which, un-

less prevented by extraordinary measures, will become rapidly comparable to the most celebrated cases of collapses of vast empires during past history, or, of the Biblical "Cities of the Plain." It is the collapse of a global civilization, which, during the recent thirty-odd years, has lost the moral fitness to survive.

The central feature of this thirty-odd-year process of worsening decadence, has been the increasing hegemony of the financier-oligarchic interest, achieved through a systematic drift into the irrationality of "post-industrial" utopianism, bringing with it, the intentional process of destruction of the indispensable trappings of modern agro-industrial national economy. As, in most nations of the world, the generation of university students from the second half of the 1960s, has moved into the topmost executive and related posts in government, business, education, religious bodies, and so on, this generation has brought to the policy-shaping of those institutions, the habits acquired under the campus conditions of the middle to late 1960s. The trend toward increasing irrationality, which has characterized this generation's growing influence, during the quarter century of its "march through the institutions," is now hegemonic. If those trends persist during this crisis, civilization as we have known it during recent centuries, is about to go over the proverbial lemmings' cliff.

The proverbial glimmer of hope in this situation, is the fact, that the institutions of financier-oligarchic power, themselves, will suffer devastating blows during the months ahead. The momentary popular discredit, even hatred, which must be inevitably directed against monetarist institutions and policies, under such circumstances, creates the mass-psychological preconditions for a sudden return to republican policies of national economy, echoing, in that respect, the sudden decapitation, in July 1794, of what had seemed to be the unshakable grip of the Robespierre-St. Just regime of Terror in France. If that turn does not occur, then civilization as a whole will collapse into the worst, deepest "New Dark Age" yet known to historians.

Therefore, there are no sane policies, no sane strategies, except those which, first, are designed to bring about that dramatic policy-shift, and, second, focus on the measures to be taken in launching a general re-industrialization of this planet. This global shift to re-industrialization, is Russia's only chance for survival; all other alternatives are pathetically counterproductive, perhaps hesychastic fantasies. It is the necessary, essential role which the former Soviet Union's potentials must play in such a global re-industrialization process, especially the Eurasian part of this, which represents Russia's only true strategic self-interest, and the world's strategic self-interest in Russia's successful adoption of such a role.

The only way in which Russia could fulfill such a role, is through a reorganization of the shards of the pre-1991 society in a configuration corresponding to Figure 1 here. The economy of Russia must be rebuilt around a core of the type de-

icted by this Figure. Borrowing a usage from Japan, from a decade or so ago, we might call this the "knowledge-intensive export sector" of Russia's economy, overall.

To achieve this, the national educational policies, programs, and institutions of Russia must be associated with the science-driver institutions, and those mission-oriented, science-driver institutions must be oriented to a rapidly expanded machine-tool-design sector. For the sake of honing the cutting edge of scientific progress, Russia's space program must be refurbished and greatly expanded. Otherwise, the economic revival of Russia, and other nations formerly associated with the Soviet Union, will be centered around knowledge-intensive forms of capital-goods and related exports into Eurasia, and, hopefully, also Africa. In this way, Russia will earn its required imports. The concentration of national and international credit resources into the international and national projects in which Russia either participates, or interfaces, will provide the mechanisms of money, credit, and fostering of trade.

Apart from the urgency of such mobilization, the most important thing is the way in which Russia, among other nations, comes to think about economy. There must be a radical change in mentality, away from a primary emphasis upon a money orientation, to a primary emphasis upon a physical-economic orientation. There must also be a shift from primary emphasis upon things, to primary emphasis upon change, upon technological advance in products and processes, and constant increases, through realized science and technology, in the physical-economic productive powers of labor. The essential thing, is to effect a shift in the character of consciously practiced social relations, away from the Hobbesian bestiality which dominates the falsely labelled "social sciences" today, to relations based upon ideas, as we have discussed these distinctions above.

Science policy as such

Although U.S. Lt.-Gen. Daniel P. Graham is recently deceased, the lunacy for which he was a leading public spokesman, since no later than a time he was head of the U.S. Defense Intelligence Agency (DIA), back during the middle 1970s, lives on. The issues associated with Graham's perverted advocacies, during the 1975-1986 interval, are more alive than ever, in both the U.S.A., and western Europe, today.

Graham became a spokesman for a kookish cult, known as the "L-5 Society," a cult with some influence around institutions of the Joint Chiefs of Staff and Defense Department. Prior to President Ronald Reagan's March 23, 1983 public offer of cooperation, on a Strategic Defense Initiative (SDI), with the Soviet Union, Graham had been the leading opponent of SDI, when it had been proposed, first, by me, and then by Dr. Edward Teller. Graham's campaign of attacks upon me, on this issue, from August 1982, and upon Dr. Teller, beginning October 1982, are crucial for understanding the problems of science policy in the U.S.A. today.

Within a week, after March 23, 1983, my enemies inside the State Department and other nooks and crannies of the U.S. Government, began to push Graham forward as the “quasi-official interpreter” of SDI. As a result of this push from behind the scenes, Graham became prominent as the leading spokesman for the proposed alternative, called “High Frontier,” to Reagan’s original SDI proposal. “High Frontier” was a concoction produced by the L-5 Society.

The leading features of Graham’s opposition to the original SDI proposal, represent a kind of mental disease widespread, then and today, among radical right-wingers of the sort associated with the British Mont Pelerin Society’s leading propaganda-agency in the U.S.A., the British intelligence-directed Heritage Foundation. It is that mental disease which must be identified, and countered, to overcome today’s most influential opposition to a revival of science in Russia.

Graham’s most significant base of support came from those U.S. defense contractors who perceived their self-interest to lie in selling the U.S. Government “off-the-shelf technologies” left over from previous research into what Graham et al. identified as “kinetic energy systems.” That was consistent with the underlying characteristics of the “High Frontier” proposal itself; it was, in all essential technological characteristics, a revival of an aborted missile-defense design dating from the early 1960s. This smell of lucre in Graham’s 1975, 1982, and later attacks on the development of “new physical principles,” provided the platform for a more thorough-going attack on basic scientific research itself. It is that latter feature of Graham’s Heritage Foundation-backed campaign of the 1980s, which has crucial bearing on Russia’s science policy today.

The broader policy-context in which Graham’s tantrum-like, 1982-1983, public attacks upon me and Dr. Edward Teller are to be situated, is the Mont Pelerin Society’s campaign against government-sponsored fundamental scientific research. Graham served as a cat’s-paw for two interests. First, the Pugwash Conference circles which Henry A. Kissinger had represented in U.S. policy since his cooptation, under McGeorge Bundy’s patronage, to serve as a British Foreign Service asset seconded to the New York Council on Foreign Relations’ promotion of the Pugwash policies which featured in the 1958, Quebec, “Dr. Strangelove” proposal of Dr. Leo Szilard. Essentially, in this respect, Graham was a Kissinger asset, his “High Frontier” proposal simply a piece of silliness, from the vantage of both military strategy and science.

It is the Mont Pelerin Society side, Graham’s attacks upon science itself, which is of immediate relevance here. Both the intentional destruction of Russia’s science, set into motion under the Thatcher-Bush-Mitterrand policies of the IMF et al., and the present recommendations for a pathetic niche-orientation for the future science of Russia, are reflections of the exact same mentality which Graham and his backers expressed in the SDI debates of the early 1980s. The alternative to the wretched perspectives reported by Saltykov,

emerges from the roots of modern science.

The roots of modern science, lie chiefly within the work of a “Golden Age” of approximately two centuries, the period from the emergence and influence of Plato’s Academy at Athens, a period whose conclusion is most prominently marked by the murder of Archimedes and the death of his great contemporary Eratosthenes. The principal point of departure for Greek science was, as Plato stressed, Egypt’s pioneering in improvement of astrophysical determination of solar calendars. The difference, which places Greek science qualitatively above that of the Egypt which sponsored the revival of a literate Greek culture from a centuries-long, preceding “dark age,” is marked by Plato’s emphasis upon the manner in which the notion of incommensurability had been developed by the school of Pythagoras, both for geometry, and for musical tuning. The key is Plato’s development of that same method of hypothesis which sets the science of Bernhard Riemann apart from, and qualitatively above that of Grassmann, Clausius, Kelvin, Helmholtz, Maxwell, et al.

The Platonic Academy’s pioneering of a qualitative advance over Egypt’s contributions to science, may be termed, conveniently, the “transfinite” view of the development of human knowledge. In this way, the term “transfinite” is used to reference an attribute adumbrated by Plato’s method of hypothesis. The relevance of this connection is made especially clear, when that method is seen from the standpoint of the way in which Plato’s scientific method explicitly underlies Riemann’s habilitation dissertation, and permeates the mid-1880s *Grundlagen* and *Mitteilungen* of Karl Weierstrass’s protégé, Georg Cantor.¹³

The reason that a centralized, state-backed science-driver “crash program” outperforms all other forms of economy, not only relatively, but absolutely, is found in closer examination of those implications of Riemann’s work viewed from the vantage-point just identified. This provides the relevant alternative to the mendacious quackery permeating the views of the late General Graham and his L-5 Society and Heritage Foundation cronies.

In the ordering of scientific progress made intelligible by Riemann’s discovery of physical geometry, the general development of society flows from the sweeping changes in Platonic form of scientific hypothesis, which are imposed

13. *Grundlagen einer allgemeinen Mannichfaltigkeitslehre* (Leipzig: 1883). For the original version of this work, see *Georg Cantor: Gesammelte Abhandlungen mathematischen und philosophischen Inhalts*, Ernst Zermelo, ed. (Berlin: Julius Springer, 1932) [reprint (Berlin: Springer-Verlag, 1990)]; pp. 139-246. On the *Mitteilungen*, see pp. 378-439, in the same *Gesammelte Abhandlungen*. In light of the disorientation of Cantor by British agent and theosophist Rudolf Steiner, especially in Cantor’s tormented efforts to prepare his *Beiträge zur Begründung der transfiniten Mengenlehre*, one should view Cantor’s contributions from the vantage-point defined by Riemann’s habilitation dissertation [*Abhandlungen*, pp. 282-356]. *Contribution to the Founding of the Theory of Transfinite Numbers*, Philip Jourdain, trans. [New York: Dover Publications (reprint), 1955].

by a single, validated discovery of a universal principle of knowledge. Such a discovery, by changing not only the set of definitions, axioms, and postulates underlying all of scientific knowledge up to that time, but also changing the metrical relations defined by the interrelationship among those axioms, unleashes a flood of secondary discoveries. This result occurs in a fashion analogous to the way in which the set of definitions, axioms, and postulates of a schoolbook Euclidean geometry, implicitly generates each and all of the valid theorems of that geometry.

In brief, it is indispensable to make a clear distinction between fundamental discoveries of principle, and secondary discoveries derived from a discovery of principle. It is necessary to put to one side all niche-science; it is essential to see the whole sweep of existing, and possible future scientific knowledge, in all facets of knowledge, as if in a single conception.

This latter view I have represented in terms of the permutations of orderings among the cells of that nine-cell array defined by three mutually distinct types of ordering and three categories of evidence. The functional types are: 1) ostensibly non-living particular processes; 2) living, but ostensibly non-cognitive particular processes; and, 3) cognitive processes. The three categories are astrophysical, microphysical, and macrophysical, mutually distinguished by the position of the evidence of relations with respect to the human sense-percep-

tual apparatus. It is the ordering which subsumes all orderings among all permutations of orderings among the cells, in the sense of Leibniz's term "Analysis Situs," which defines the scope, and, thus, the content of both science itself, and a well-defined science policy.

The characteristic of a science-driver "crash program," is that the program as a whole addresses the relations among all nine cells, in respect to some unifying task-orientation, some unifying mission, or group of missions.

Perhaps nothing satisfies that requirement as well as a man-in-space mission. This combines astrophysics with microphysics and macrophysics. It combines ostensibly non-living, living, and cognitive processes. It takes man into the kinds of places man has never visited before, by means which had not been developed in this way earlier. It is therefore, this kind of mission-orientation, which generates the broadest range, and prolific assortment of "spill-overs," from the domain of experimental physical science, into the tool-design potential for improved products and productive processes.

The broadest (national, continental, intercontinental) scale of production of transport-spined, modern developmental corridors, using the impetus of technological progress supplied by a "crash" manned space-exploration program, is the feasible approach to an economic renaissance of planet Earth, which, by its principled nature, offers the highest rate of per-capita gain for mankind.

Second LaRouche book published in Russia

Fizicheskaya Ekonomika, the second book by Lyndon H. LaRouche, Jr. to be published in Russian, came off the press in July. It is a translation of LaRouche's essay, "The Science of Physical Economy as the Platonic Epistemological Basis for All Branches of Human Knowledge," which was serialized in *EIR* in 1994 (Feb. 25, March 4, and March 11).

The first long article LaRouche wrote after he was paroled, five years into the 15-year Federal prison sentence received in his notorious frame-up case, "The Science of Physical Economy" contains a rigorous definition of LaRouche's "market-basket" parameters for measuring economic progress in real terms. In this essay, he establishes physical economy, developed by human beings, as the domain in which essential change in the universe can be precisely measured. That is why physical economy is the "epistemological basis"—epistemology being study of what may be known, and how—for other branches of knowledge.

The market baskets are presented in Chapter 1, "Rudimentary comparative studies of physical-economic time-series," and contrasted with the monetarist excesses of "asset-stripping," and "the myth of 'cheap labor.'" Chapter 2 is "Smith, Ricardo, and Marx: British imperialism's zero-growth economists." Chapter 3 is titled, "Not-entropic processes," and Chapter 4, "Economics as the only science," concludes with a section on "Economics and higher hypothesis."

In an introduction to the Russian book version, Prof. Taras Muranivsky reviews the growing attention to Lyndon LaRouche's ideas, in Russian academic and political circles, since the publication of his *So, You Wish to Learn All About Economics?* in Russian translation in 1993. He welcomes LaRouche's demolition of zero-growth notions, as well as the author's attention to "social and moral problems," as especially useful for Russia.

Fizicheskaya Ekonomika, published by the Schiller Institute for Science and Culture, is a 128-page paperback, with tables, graphs, and an index of names. It was printed at Nauchnaya Kniga publishing house, which assures its availability to major libraries in Russia. The text will soon be available, as well, in the Russian-language section of *EIR*'s Internet site at: <http://www.larouchepub.com>