
III. The Only and Urgent Solution

APRIL 16, 2005

HOW MOST OF TODAY'S ECONOMISTS BECAME ILLITERATES

Science: The Power To Prosper

by Lyndon H. LaRouche, Jr.

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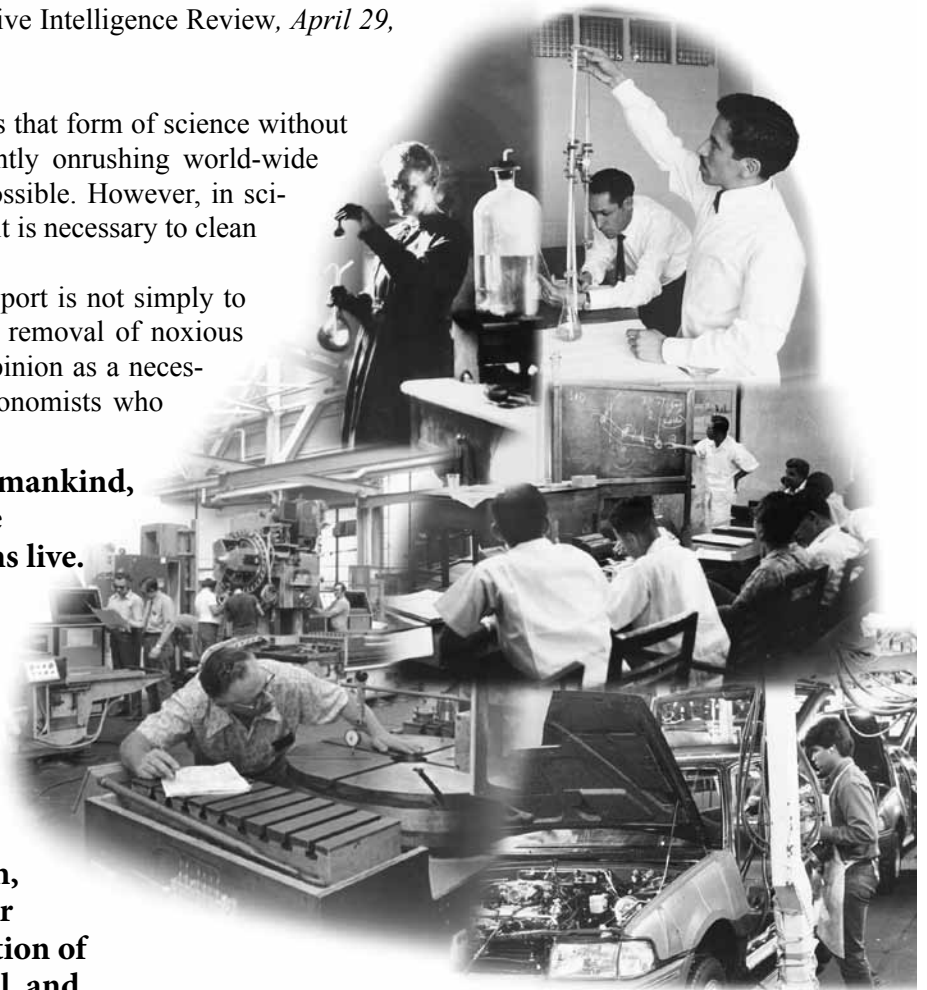
This report is about economics as that form of science without which no recovery from the presently onrushing world-wide monetary-financial collapse were possible. However, in science, as in preparing a decent meal, it is necessary to clean the kitchen of noxious debris.

However, the intention of this report is not simply to haul out the garbage. Consider that removal of noxious elements of currently widespread opinion as a necessary attack on certain groups of economists who

“To foster the development of mankind, we must look to improving the conditions under which nations live.

Work must be conceived as a true universal, as what society does to increase its power in and over the portion of the universe which society inhabits. It is that quality of transformation of the society's quality of work, which, in turn, supplies the criteria for defining the universal implication of both the work of the individual, and the individual's appropriate *moral* motivation for that work.

Such is the goal of happiness. . . .”



Scientific discovery transforms society, as it is transmitted to industrial production through the machine-tool process. Top to bottom: Institute of Applied Sciences, Mexico City; Marie Curie in her laboratory; engineering classroom, Bombay, India; installation of computerized machine-tools, Cincinnati Milacron; Ford assembly plant, Hermosillo, Mexico.

Credits: United Nations, YN/—b; AIP Niels Bohr Library; United Nations,—vmb; Cincinnati Milacron; EIRNS/Stuart Pettingel

continue to play the role of charlatans, at public expense. These predatory fellows need to be denounced for reason of the damage they would continue to do to the U.S.A. and other nations through the widespread influence of their deceits upon governments and others. I include this attack on them at the outset of this report, if only as a secondary feature of this report as a whole; I do so, because it would be virtually fatal negligence not to attack those dogmas for what will surely be their increasingly desperate frauds at this time. Unless they are denounced for their frauds, on exactly the issues I pose again here, the damage their erroneous opinions have already caused would not only continue, but worsen.

On this account, back in 1971, I accused many among those influential professors of economics of being “quackademics”; over the decades since then, that has been repeatedly proven to have been not only a correct, but necessary choice of language. In retrospect, it is now clear, that had more people heeded my warnings then, the U.S.A., and the world generally, would not be in the ugly mess it is today.

However, the principal topic which I address here, is the fact that, presently, even honest and otherwise intelligent people in government, business, and academia, simply do not have certain knowledge of a type which is absolutely crucial for choosing competent policies under the present crisis-circumstances confronting our government, businesses, and the general public. The principal topic of this report, is the presently urgent necessity of the study and practice of economics as a science, as essentially a branch of experimental physical science.

Under present circumstances, I am therefore obliged to supplement the memorandum which I have recently addressed to the members of the U.S. Senate and their staffs,* by providing professionals and relevant other persons this paper’s concise introduction to what are now certain urgently needed, but usually overlooked principles. In this present report, all matters addressed are subsumed under the need to remedy the general lack of that knowledge which must now guide our republic, and our world, out of the presently onrushing catastrophe.

Up to this present moment of my writing, even most among today’s visibly leading economists remain os-

tensibly ignorant of the most elementary of the systemic errors in their thinking. These are errors shown by their continuing complicity in the past three decades’ march down the wrong road, into the swamp of the presently onrushing economic chain-reaction collapse of the world’s present monetary-financial system. I present those needed principles of economics as a science which makes clear, that this present collapse would not have been possible, had these professionals and their followers not either ignored, or even defied, the previously well-known principles of that American System of political-economy which defined a durably successful design of modern economy, beginning more than two hundred years ago.

Therefore, given the immediate peril of the world’s economy today, the continued influence of the ideology of those misguided economists in the policy-shaping of governments including our own, must be considered the poisonous, habit-forming drug which lured the world monetary-financial system into a form of degeneration which should have been foreseen, or, at least recognized, decades ago, as being a recipe for the kind of state of a general catastrophe which we have actually experienced, more and more, in effects experienced during the recent quarter-century.

Therefore, to overcome the present crisis of our national and the world economy, we must do two things. First, rid ourselves of those specific kinds of diseased thinking about the subject of economics, which have dominated the U.S.A. and other governments’ policy-shaping, and caused the ruin of our economy during the recent three and a half decades. Second, circulate the missing, urgently needed true knowledge of how a successful modern economy works, not only among professionals and businessmen, but, to provide a competent grounding in this essential knowledge, through our secondary schools and universities. The latter, second purpose is the principal concern of this report.

To make those two points in this report, I have chosen the timely example of urgent need to diagnose and cure the present collapse of the auto industry. What was wrong? What should we now do instead? How must we think about economics if we are to succeed in overcoming this challenge? How must we think about a successful rebuilding of both the U.S. and world economy over the coming fifty years and more?

In earlier locations I have pointed out some of the

* “Emergency Action by the Senate,” April 13, 2005.

essential kinds of related causes, and cures, for the failure of General Motors and other managements today. Here, in this report, I focus on the scientific principles which should be applied, instead of those flawed policies which have caused the present collapse of that industry. On the latter account, I shall direct attention in the body of this report to some extremely relevant, essential principles of economics, principles which were generally unknown to leading economists in universities and elsewhere, up to the point of their study of this report. I supply selected examples of this general ignorance, examples which I choose because they are ones more readily understood among the audience I have selected for this occasion.

I have also pointed, below, to the nature of the still deeper, scientific principles which must govern the way in which we pass down education in the principles of economy from the university level, into the secondary school curriculum, and the public generally.

To speak bluntly, the virtual “brainwashing” of the upper echelons of business leaders and elected members of government on the subject of economy, has carried matters to the extreme, that a crash of enterprises as significant as an entire automobile industry reflects a quality of conditioning which hinders the business executive’s or political figure’s ability to think rationally about the decisive issues of the crisis of that industry. Typical, in recent years up to the present time, is the case in which the sense of a crisis in the physical economy, prompts the relevant individual’s flight from the physical-economic reality of the situation, a flight which is expressed in such forms as rebuking his informant, “But, tell me how the market is doing. . . .”

So, whereas, among relevant trade-union leaders from those industrial categories, the reaction to the presently onrushing collapse of an industry, tends to be rational, healthy, and realistic, the same information presented to the political figure who one might presume represents those trade-unionists’ political interests, is too often a change of the subject of discussion, to asking about “the market.” That “market” has been the same phenomenon which has continued to suggest that the relevant sector of the physical economy is on the road to prosperity, at the same time that the relevant industry has been preparing to crash. It is that latter kind of avoidance of physical reality rather typical of today’s so-called “white collar class,” which is expressed by their turning from reality to the subject of “the market”

whenever reality frightens them. That syndrome among them is the most likely influence which might set off the moral failure among politicians which virtually destroys our nation.

A study of the way in which the automobile industry, in particular, has been building up its over-ripeness for the presently onrushing collapse of its relevant corporate institutions, that over years to date, typifies the evidence of the need to shift discussion of the policy-making of our economy from the monetary-financial realm, back to viewing the actuality of the monetary-financial processes from the vantage-point of primary emphasis on the processes at work within the physical economy as such.

That said thus far, the first subject the thoughtful reader should wish to take up now, is the subject of the quality of my expertise. I now preface the body of this report, chiefly, with a few necessary remarks on the most relevant parts, for today, of my background in this field, and after that, turn, in the body of the document, to the crucial point of science to which this report is dedicated.

Some Relevant Personal Background

Often, the instances of either notable success, or ugly failures in the policy-shaping behavior of adult leaders in society, reflect some critical turning-point in development of that personality during childhood or adolescence,

Looking backward from today, it is fairly said that my present career as, in fact, a leading economist, reflects a process which began during my adolescence, in an incident which occurred my first day in attendance at the then standard first secondary school class in Plane Geometry. On that occasion, when the students were challenged by that teacher to suggest why we should study geometry, I volunteered a subject which had fascinated me since some earlier visits to the nearby Charlestown, Massachusetts Navy Yard. I replied to her challenge by posing the subject: *To study why leaving those holes in girders strengthens the structure of which they are a supporting part.* It is the kind of question a boy in my circumstances then would have asked his father. I did ask, but I was never satisfied with the answer he gave me, which was that I should learn the answer in school when the time for that came. School had come, and I had asked.

Despite some prompt, foolish, and also vociferous

ridicule from some classmates on that account, my reflections on what I recognized as their irrational reaction, showed me why I could never accept the idea of a geometry, or physics, premised upon allegedly self-evident definitions, axioms, and postulates of a so-called Euclidean or kindred doctrine in geometry. I never did.

Already, before that classroom incident, I had been prompted by similar questions, to begin a reading of representative writings of leading names in English, French, and German philosophy of the Sixteenth through Eighteenth Centuries. I remained fascinated by that study of philosophies as systems, rather than opinions, from that same standpoint, up through the present day. The pattern of that experience in studying philosophy, initially, during the remainder of my adolescence, showed the significance of that incident in the geometry class to have been, that I was then already on the road to becoming an adolescent admirer of Gottfried Leibniz, over all the other authors of my explorations in those modern European philosophies. These explorations among the history of ideas turned gradually to translations from, and disputed commentaries on the work of the pre-Aristotelean Greeks.

Within two years after that classroom incident, I had become, in effect, a convert to that science of physical geometry which I would come to recognize, more than a decade later, as a Riemannian anti-Euclidean geometry.¹

The relevance of that seminal classroom incident from my adolescence to this present, brief report, is not only that most professionally trained persons whom I have known from my own, and later generations, developed into adulthood along an intellectual pathway which was systemically contrary to my own. As a result

1. The term “anti-Euclidean,” rather than “non-Euclidean,” dates in fact from a time prior to the writings of Aristotle or Euclid. It dates in European culture, from the influence of the Egyptian astronomy known as *sphaerics* among the Pythagoreans and Plato. Although a return to “anti-Euclidean geometry” is implicit among Nicholas of Cusa and his principal followers, in physical science, the term “anti-Euclidean” originates with one of the principal teachers of Carl Gauss, Abraham Kästner. The concept is developed, although not under that name, in Gauss’s published work, beginning his 1799 doctoral dissertation against D’Alembert, Euler, and Lagrange; but appears, frankly stated, in its own right, with Riemann’s 1854 habilitation dissertation and his *Theory of Abelian Functions*. Riemann’s conceptions played a decisive role in shaping the development of my own anti-Euclidean notions in physical geometry. The term signifies the rejection of *all* notions of “self-evident” (e.g., *a priori*) principles in mathematics.

of my adopting the kind of views on geometry which I expressed in that classroom, I have developed what were to be proven to be my superior methods applied to the subject of economy.

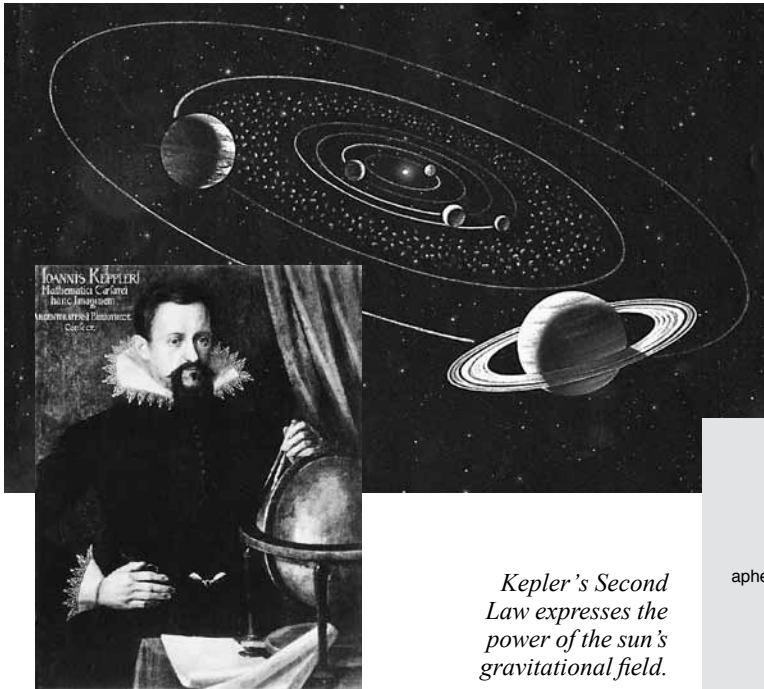
So, since my adolescence, my contentious view on the subject of physical geometry, which I had expressed in that geometry classroom, led me to follow the essentially Leibnizian, specifically American track in economics associated with the tradition which Treasury Secretary Alexander Hamilton had identified officially as that American System of political-economy; whereas, most of what passes for generally accepted doctrine, even in the U.S. universities today, is premised on that British East India Company’s Anglo-Dutch Liberal school of economy, the doctrine against which the American War of Independence had been fought.

My affinity for the American System, even during adolescence, expressed a non-accidental coincidence with those aspects of my childhood family legacy as a descendant of circles associated with the early Nineteenth-Century American Whigs and their Abraham Lincoln legacy. The outcome of the confluence of that part of family history with the evidence of science, was that I have remained personally comfortable with the agreement between the two influences to the present day.

That experience was the origin of what became my repeated successes as a long-range economic forecaster over decades, during a time when the schools of thought represented by my putative rivals in this field of forecasting have usually failed, often miserably.

Today, the most essential kind of principled significance for science generally, and economics emphatically, of that philosophical difference which I expressed in that classroom incident nearly seventy years ago, can be usefully restated as: *A mere mathematician, such as René Descartes, reports statistically, as did Copernicus, on the motion which has been observed; a physical scientist, by contrast, follows such precedents as Johannes Kepler. The latter not only discovers what has moved the observed object, but bases his presumption and proofs of professional competence on discovering the specific power²—the specific universal physical*

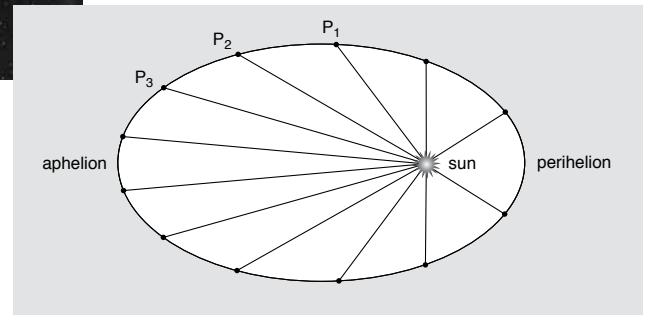
2. The term *power*, as I employ it here, as distinct from the reductionist’s mistaken notion of *energy* as elementary, is the customary English translation of Leibniz’s use for science of the German term *Kraft*. Those



Johannes Kepler

Kepler's Second Law expresses the power of the sun's gravitational field.

A mere mathematician reports statistically on the motion observed; a physical scientist, by contrast, not only discovers what has moved the observed object, but bases his presumption on discovering the specific 'power' which generates the kind of observable motion which could not have been predicted by the methods of the mere mathematician.



*principle—which generates the kind of observable motion which could not have been predicted by the methods of the mere mathematician.*³ We observe the movement of the planet. Galileo said that it moves; Kepler asked, and discovered that which moves it.⁴

So, from the beginning of what became my profes-

terms have the same significance as the use of the term *dynamis* by opponents—such as the Pythagoreans and Plato—of the reductionist schools. The modern form of this Classical Greek usage of the notion of *power*, is traced from such relevant writings as Cardinal Nicholas of Cusa's *De Docta Ignorantia*, which, with related later writings by him, launched modern experimental physical science along such main lines of development as the direct followers of Cusa, Luca Pacioli, Leonardo da Vinci, Johannes Kepler, and Leibniz. The reaffirmation of this notion of *powers*, against the empiricists' so-called Enlightenment and the followers of Descartes, occurred under the influence, in Germany, of the mathematician Abraham Kästner, Kästner's pupil Carl Gauss, the École Polytechnique of Lazare Carnot, Arago, et al., and the circles of Alexander von Humboldt, which gave us the work of Bernhard Riemann, and the defense of Kepler and Riemann made by Albert Einstein later in his own life.

3. Carl Gauss's discovery of the orbit of the asteroid Ceres, for example.

4. This qualitative difference between Descartes and Leibniz is expressed as systemic in Leibniz's refutation of Descartes on the subject of *vis viva*, where Leibniz's argument reflects the notion of *power (dynamis)* adopted, as a principle of what the Pythagoreans and Plato knew as *Sphaerics*.

sional successes as a working economist, I had been led to define competent economics, as Leibniz did, as a science of physical economy, whose most characteristic practice is long-range forecasting. The statistician, in his attempted role as forecaster, seeks to predict the movement so; the scientist working in the footsteps of Kepler, Leibniz, Gauss, and Riemann, asks what moves it, *even to produce a state of motion which had never been known to have existed before?* It is the latter sort of motion, forecasting successfully something which had never occurred before, which is inevitably excluded by reductionists' statistical methods, which is the motion which expresses all of those developments which correspond to the most important of all developments. These are the developments which the statistician must necessarily fail to foresee as likely.⁵ That discovery of a

5. As I have emphasized repeatedly in earlier locations, the typically irrational behavior of the individual and group can be described categorically as a case of a "fishbowl syndrome." The affected individual's reactions are conditioned by a mixture of individual axiom-like assumptions about the universe which limit his or her behavior to the confines of the kind of imagined universe to which those assumptions correspond. That individual therefore "can not see" the larger universe which exists beyond those axiomatic-like assumptions. Thus, the discovery of a universal physical, or kindred principle, frees the mind of the individual to see beyond the neurotic bounds of his own "fishbowl-like"

principle whose application generates a category of phenomenon never experienced before, is the experimentalist's definition of a universal physical principle. That is the true definition of scientific method; that is the *power* of progress. *This same notion of power, is the essential principle of any competent economic science.*⁶

The prompting of my first formal step from being a youthful admirer of the concept of physical geometry, toward becoming a professional economist, occurred at the beginning of 1948, when I had received a loan of a Paris pre-print of Professor Norbert Wiener's *Cybernetics*. Much of that book I found to be fun; but I could not swallow Wiener's frankly absurd, radically reductionist doctrine of "information theory." I was promptly determined, from that moment on, to elaborate my strict disproof of Wiener's cleverly seductive "ivory tower" intervention into economics.

At a later point, during my repeated, 1952-1953 re-reading of the opening paragraphs of Bernhard Riemann's 1854 habilitation dissertation with the subject of physical economy in mind, my earlier work in arriving at a thesis refuting Wiener (and, similarly, John von Neumann) for economics, came into focus. In the leisure imposed by a process of convalescence from a serious bout with hepatitis, I had my "Eureka" experience; I acquired a sure-footed sense of my special competence as an economist, a competence which was later demonstrated in my first general forecast on the economy, which I made several years later, in 1956.

The first working forecast actually made by me on the basis of those studies, which was made during 1956, took shape when I insisted to my rather astonished, and chiefly disbelieving colleagues of that occasion, that we, as consultants to business firms, must foresee a major U.S. recession to erupt approximately February of 1957.⁷ That forecast collapse into recession came on

syndrome.

6. This issue of *power* is addressed directly by Gauss's 1799 attack on the fraud by D'Alembert, Euler, Lagrange, et al., who used the nonsense-word "imaginary" to attempt to conceal the actual, physical existence of the complex domain. The concept of the complex domain, as developed from Gauss through Riemann, is the mathematical form of expression of that ontological principle of *power* as associated with the discovery of uniquely efficient universal physical principles. E.g., Riemann's conception of *Dirichlet's Principle*.

7. My related proposal was that the firm shift emphasis toward getting deeply into the ground-floor of what must be seen as an increasing importance of electronic data-processing in production, distribution, and administration.

time, and for the reasons I had forecast. The effects of my success as a forecaster were much disliked in those circles. Obviously, my doubts of the wisdom of the automobile industry had not caused that recession; but, it is not atypical of the perils of the successful forecaster, that for some associates and others, I must nonetheless be blamed, emotionally, for the effects which reality, not I, had created and delivered to their doorsteps. The typical poor fellow clung to his earlier delusion about the economy, by saying of me, "He talked us into a recession!"

The study which led to my crafting of this forecast had been prompted, initially, by my attention to economically pathological patterns in the marketing practices of leading automobile manufacturers. This observation had turned my attention to broader, correlated other, related factors of virtual fraud by lenders, then, as now, in the misuse of consumer credit by the U.S. economy at that time. Hence, the forecast.

All forecasts of that type which I crafted then, and later, have been premised on the discovery of a characteristically systemic feature of the economic process. Often, as in the case of my 1956 and later forecasts, this systemic feature corresponds to recognition of some influential, usually false, axiomatic-like assumption by some controlling interests in the current system. Like the 1954-1957 process leading into the February 1957 turn, most important forecasts are premised upon a discovered element of systematic delusion of that type, like the "Pyramid Club" frenzy of the late 1940s, or the consumer-financing frenzy leading into the 1957 recession, each of which, like the John Law "bubble" of the early Eighteenth Century, had been induced in relevant mass-behavior.

Then, as in the case leading into the present General Motors crisis, the tendency of the relevant foolish folk is to see apparent short-term monetary-financial advantages in "the market," while putting aside concern for medium- to long-term physical-economic factors. The latter are the factors which will ultimately take their revenge, as now, upon the wishful monetary-financial thinking which has temporarily seduced prevalent opinion.

For example, the fact that the population of the U.S. has been transformed, as a whole, from a nation of savers, into wildly over-extended borrowers, seeing today's money to spend, rather than tomorrow's debt to be paid, is worse than typical of the way short-term de-

lusions of public opinion, lead into medium- to long-term catastrophes. Such are the cases of the 1990s “IT” bubble, the mortgage-based securities bubble, the automobile-sales-financing bubble, hedge funds generally, and the U.S. fiscal debt and current accounts deficit today. In all bubbles, and most boom-bust cycles, there is a systemic element of popular delusion operating axiomatically within induced mass-behavior.

Ironically, we witness the same kind of blunder as then, repeated on a grander scale today, as a key part of the onrushing crash of the automobile industry, and other key sectors. However, while forecasting disasters is not only important, but necessary, it is forecasting ways to bring about a recovery from a presently onrushing disaster, which touches the heart of a scientific quality of professional practice of physical economy. As an illustration of the latter point, take a key feature of my just-issued report on the prospects of a recovery, which I have just issued as a motion presented to the members of the U.S. Senate. This present report is crafted as a technical supplement to that report.

Not accidentally, the systemic error in mismanagement whose effects have exploded to the surface of the world’s automotive interest today, was the same type of error, but on a grander scale, speaking of types of systemic errors, which had attracted my attention in the automobile industry of 1956. General Motors’ financier management of today has obviously learned less than nothing from the industry’s mistakes of fifty years ago.

As I have noted above, my 1956 forecast of a deep 1957 recession had been crafted in a professional capacity as an executive of a firm by which I was employed at that time. However, the study and its specific success prompted a deeper, intense, and far-ranging private study of the trends which I later forecast, beginning 1959-60, as a current trend in our nation’s policy-shaping ideology of the mid-1950s. It was clear to me then, that if that ideology were continued in effect, this would set off a series of international monetary crises during the latter half of the 1960s, and, beyond that, presented the added danger of a breakdown of the presently ongoing world monetary system as a result. It actually happened as I had forecast this, over the course of the middle 1960s, through 1971 and beyond. That more widely circulated forecast is that for which I have become known around the world, since the middle to late 1960s. This forecast was realized as the 1967-68 pound sterling and U.S. dollar crises, and the subse-

quent, 1971-72 collapse of the original Bretton Woods monetary system.

My post-August 16, 1971 statements on this action of the Nixon Administration, which were issued during the remainder of that year, then defined the long-term basis for the series of subsumed, medium-term forecasts, which I later issued at various points during the decades up to that which I delivered through mass media shortly before the 2001 U.S. Presidential inauguration. None of those forecasts of that interval has ever been wrong.

It is the method associated with that general forecast which stands as completely vindicated in the international crises erupting today.

This is not to deny that there are many specialists in various aspects of the economy, who speak with the actual authority of experts in making valid, and sometimes also very valuable statements on the partial significance of current developments. There is often a notable coincidence of opinion between my work and theirs, and some consultation on such matters among us. Nonetheless, my forecasting has the indicated unique quality of significance, as providing the scientific basis for long-term policy-shaping which my success in long-range forecasting expresses. It is the scientific basis for my distinctive successes on that account which must, finally, be learned among those who will be qualified to lead the world into the future, especially those future leaders who emerge from the generation typified by the program of education in certain fundamentals of both science and Classical culture being conducted by my LaRouche Youth Movement.

I work to inform and educate the present leaders from older generations, but also seek to develop a new cadre of leaders of nations who will come to know what I already know far better than I do today. Also, they will still be here to lead in generations which have come to lead after mine has been long gone.

1. What Is Economics?

To discuss the ills and cures of our modern international and national economic systems as such, we must first define what economists and others ought to mean when we use the term “economics.” The problem has been, that among presently leading economists or textbooks, very few provide a valid definition for their use

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*Abandoned GM plant,
Danville, Illinois.*

EIRNS/Karon Concha-Zia

of the term “economics.” Most debates on the subject itself break down at the beginning, turning into a Babel of murky confusion over fundamentals. To avoid that confusion over definitions themselves, I begin my treatment of the technical problems raised by the present General Motors with the following corrected definition of the term economics itself.

The crucial historical fact from which to begin any competent study of economic practice today, is, that no science of economy, in any meaningful sense of the way that term is used today, existed prior to the birth of the modern nation-state in Europe’s Fifteenth-Century Renaissance. The first actual economies, otherwise known as *commonwealths*, were founded, successively, by France’s King Louis XI and his follower, England’s Henry VII, during the Fifteenth Century. Any discussion of the principles which must be recognized, if we are to deal competently with the causes and cure of the presently onrushing, global breakdown-crisis of the world’s present floating-exchange-rate monetary system, must begin with an understanding of the scientifically principled differences among the types of European society which existed prior to, during, and after the Fifteenth-Century Renaissance.

The cases of Louis XI’s France and Henry VII’s England are crucial for sorting out the historical evi-

dence needed to locate the causes and cure for the global crisis expressed by the General Motors and kindred cases today. It would be impossible to grasp what the term sovereign nation-state, or its synonym, the commonwealth, should mean to the competent economist, until the history of mankind, prior to Europe’s Fifteenth-Century Renaissance, is seen in a clear-headed way. Until that point is clear, no competent understanding of any the relevant principles of modern economy were possible.

I proceed accordingly.

First of all, although any meaningful definition of the idea of a constitutional republic is traced to the work of Solon of Athens, no actual republic, in that sense, existed in practice prior to crucial developments during the course of the Fifteenth-Century Renaissance. The relevant synonym for a true republic, as founded by France’s Louis XI and his follower Henry VII of England, is a *commonwealth*; *a nation-state whose constitutional law, based on the triple principle of perfect sovereignty, the defense of that sovereignty, and the obligation of society to promote the general welfare of all of the people and their posterity.* The examples are each equivalent, functionally, to the Preamble of the Federal Constitution of the U.S.A., and to the congruent, principled notion of natural law central to the 1776 U.S.

Declaration of Independence, a formulation copied from Leibniz's attack on John Locke's folly, "the pursuit of happiness."

No form of society meeting the standard of that definition existed in any known place prior to that European development of that Fifteenth-Century reform.⁸

This Fifteenth-Century development did not spring up spontaneously. It had developed as an outgrowth of a long process focussed within European civilization and adjoining areas over a period beginning, chiefly, within the geography of Europe and near Asia since approximately 10,000 B.C.

This is the period which began with a catastrophic event, a great flooding, which occurred as a continuation of an already ongoing great melt, which signalled the end of a long period of glaciation in the northern hemisphere. During the whole period of that melt, a process of post-glaciation which had begun more than six thousand years still earlier, there had been a rise in the levels of the world's oceans by approximately three hundred to four hundred feet. These levels, once approximately reached, have defined the general outlines of geography since that point.

This process of post-glacial change had unfolded to the accompaniment of profound successive changes in climate and other contextual factors over the period preceding the events associated with surviving historical accounts, a period of the history of the territory of Europe and Southwest Asia dating from about 4000 B.C.⁹

8. The founding of the modern nation-state by Louis XI and Henry VII was most immediately an outgrowth of the new juridical order in Europe established in the context of the Fifteenth Century's great ecumenical Council of Florence, in which, later, Cardinal Nicholas of Cusa performed an indispensable key role. Two works by Cusa, his *Concordantia Catholica* and his founding of modern experimental science with his *De Docta Ignorantia* and later scientific works, and his role in launching the policy of great transoceanic exploration and development typified by the actions of Christopher Columbus, were key features of the way in which the immediate conditions for founding of modern nation-states were crafted. The earlier, medieval history of the efforts to establish sovereign states as the replacement for both Roman and ultramontane imperial rule, has been documented from the standpoint of modern international law by Professor Friedrich A. von der Heydte in *Die Geburtsstunde des souveränen Staates (The Birth of the Sovereign State)* (Regensburg: Druck und Verlag Josef Habbel, 1952). Forerunners of this great Renaissance reform include, most notably, Solon of Athens, Plato, St. Augustine, Charlemagne's opposition to ultramontanism, Abélard, and Dante Alighieri.

9. The reports on ancient astronomical calendars, as this was emphasized by India's Bal Gangadhar Tilak and others, show a highly devel-

The way in which European civilization generated the functionally precise conception of the sovereign nation-state, requires us to look at the way in which monotheism shaped that evolving conception of mankind and society out of which the sovereign nation-state emerged in the Fifteenth Century.

The known development of human cultures within the area of Southwest Asia, Africa, and Europe during the approximately four thousand years preceding the birth of Jesus Christ, was the cauldron of conflict, out of which a specific development constituting European civilization emerged, a process of development which came to be centered within what is known today as Classical Greek civilization.

The central factor of that process is birth of mankind's conscious knowledge of a universe and a willful universal deity. The notion of a monotheistic God as a personality conceived as in the image of the mind of man, is a notion buried somewhere deep within the prehistory of the world known to the Egypt of Moses's monotheism. However, the obscurity of the origins of knowledge of the monotheistic principle is not only a feasible challenge; a more rigorous, precise notion of the concept itself, is scientifically necessary. It is essential to focus attention on those creative powers, unique to the human mind among known species, by means of which we are able to sort out clues pointing to the way the human mind, as we know it, could know of the provable existence of such a God. This notion of God, as argued by Plato's *Timaeus* dialogue, is the emergent foundation on which the development of European civilization has depended from its beginning.

Typical, for example, is the argument for an actively

oped astronomy existing in Central Asia more than 6,000 years ago. Related evidence points to the outstanding importance of maritime cultures based on sophisticated astrogation during times preceding historical times. The evidence indicates that the development of civilization proceeded from the oceans and seas into settlements along principal rivers, rather than the reverse. Traces of settlements along present coastlines, at up to several hundred feet below today's ocean surface, especially where great ancient rivers intersected likely regions, are now submerged, on or near the coastal regions of those ancient times. Therefore, study of relevant, presently submerged off-shore locations, especially off the coasts of India, whose maritime culture of the early historic period played a known important role in the history of adjoining regions, have great importance for our knowledge of the prehistoric conditions of mankind. Such studies would help us greatly to understand the prehistoric development of relatively advanced forms of culture which probably left a crucially significant imprint on the relevant cultures of historic times, such as those of lower Mesopotamia.

creative God by Philo of Alexandria and the Christians, who argued with the same form and degree of exactness we might rightly associate with scientific certainty, rather than some anecdotal blending of legend and chronicles. Plato's *Timaeus*, when situated in the context of the work of the Pythagoreans, and his own dialogues in general, points toward such a scientifically precise knowledge of God and the associated principled notion of society.

Curiously, but not merely coincidentally, Riemann's insight into the implications of Dirichlet's Principle, shows the way in which the human mind can actually know of, and define the notion of an ontological quality of existence of such a monotheistic God with a systematic sense of scientific certainty. As I shall emphasize in the next chapter of this report, all rational notions of science and of modern economy depend upon the ability to conceptualize the notion of a universal principle as a definite, and efficiently ontological object of human consciousness. Riemann's rigorous redefinition of such universals, as stated first in his revolutionary 1854 habilitation dissertation, and as this notion was elaborated in the form of Dirichlet's Principle in his *Theory of Abelian Functions*, enables us, today, to look back with insight to the preceding development of physical science, back to the Classical Greeks, and also, still further, not only to Egyptian astronomy, but notions of astrophysics implicit in Bal Gangadhar Tilak's report on pre-4000 B.C. astronomy in Central Asia.

This elaboration, as by Riemann, of the notion of Dirichlet's Principle, is a crucial quality of modern improvement in our ability to conceptualize those universals which the relevant ancient Egyptians, and the Pythagoreans and Plato, defined as *powers* (i.e., *dynamis*), or what modern Classical science and art know as *universal physical principles*, as absolutely distinct from the merely descriptive quality of mathematical formulas. A clear understanding of this notion, seen in that way, is crucial for defining a notion of economic science, for a *science of physical economy*. This conception is indispensable for achieving a definite, ontological notion of creativity and of the personality of a Creator. This conception is indispensable for understanding more adequately the qualitative specificity of the modern European civilization which first appeared within the context of the Fifteenth-Century European Renaissance.

What we know of the relevant roots of European

civilization, is the central role of this idea of a Creator in defining that current which has adopted those special aspects of European civilization as a whole which are relevant for understanding the long struggle, through ancient and medieval times, for the modern birth of the sovereign nation-state republic. Plato's *Timaeus* is the key example of the relevant connections. The conception of man and woman as made in the image of the Creator, all within a continuing process of universal Creation, is the notion which separates Christianity, for example, from the depraved forms of Venetian-Norman-ruled, medieval society from which the revolutionary Fifteenth-Century founding of the modern sovereign nation-state republic largely freed mankind at that time.¹⁰

That theological conception of man, as typified by such seminal works as Cardinal Nicholas of Cusa's *Concordantia Catholica* and *De Docta Ignorantia*, is the basis for the generalization of both the kind of physical science later typified by Riemann's work, and the notion of man in society, on which the principled organization of the relations among the citizens of a modern European republic is premised. It is the same Cusa, proceeding from the same basis, who led in organizing what became the great explorations across the Atlantic, and from the Atlantic into the Indian Ocean, out of which a modern notion of developing a truly universal civilization emerged.¹¹

10. Philo is notable for his attack on the fallacy of the Gnostic's syllogism, that if God were Perfect, then his Creation had been Perfect, such that even He could not interfere with a predetermined dramatic script once the Creation had occurred, as the mechanistic, dispensational dogmas of the modern Gnostic Darbyites teach. That Gnostic dogma is also characteristic of the sordid paganism of the cult of the Olympian Zeus of Aeschylus' *Prometheus Bound*, which forbids man's knowledgeable use of the discovery of universal physical principles. Philo's argument on that account, typifies the general method also expressed by competent forms of modern physical science. Creation was not an event, nor a closed drama, but a process of endlessly continuing Creation, in the sense of Heraclitus' famous aphorism as adopted by Plato. The "history" of the evolution of the Solar system out of a fast-spinning, solitary Sun, is an illustration of the point. V.I. Vernadsky's concept of the Noosphere is both an essential conception of physical science, and a theological statement about mankind's role in the organization of our universe.

11. Some of Cusa's writings proposing these explorations fell into the hands of Christopher Columbus. Columbus followed up his study of those documents by Cusa by a correspondence with the scientist and Cusa collaborator Paolo dal Pozzo Toscanelli, who provided Columbus, in 1480, the map which Columbus used in designing the policy for his later voyage into the Caribbean.

Contrary to the doctrines of the empiricists and kindred reductionists, these issues of the history of monotheism are not only theological. They pertain, unavoidably, to those conceptions of man in the universe, man as in the image of the Creator, which also have distinctly secular implications, implications which have to do with the categorical distinction of human beings from beasts. Without understanding the roots of modern European civilization in the notion of man as in the image of the Creator, nothing essential, nothing practical of human existence and modern society could be understood.

The Crucial Conception of Man

This conception of man as a creator in the likeness of the personality of God the Creator, is the essential foundation of both competent physical science and any systemic conception of the modern sovereign state and economy. The most important additional contribution to the development of an integrated view of economy and man as a creator in the likeness of the Creator, was the Twentieth-Century development of the concept of the *Noösphere*, by Russia's V.I. Vernadsky.

Vernadsky, the Russian nuclear scientist and founder of the branch of science known as biogeochemistry, presented to the world his Riemannian conception of the physical organization of the universe, as composed of three multiply-interconnected universal phase-spaces, the abiotic, the Biosphere, and the *Noösphere*.¹² This was premised on crucial experimental evidence showing that the living processes expressed by the production of the relevant fossil aggregations of our planet, were the product of a universal principle not encountered in defining non-living processes, and that the fossil aggregations produced by mankind's discovery of universal principles (the *Noösphere*) were the result of a power not otherwise found among living processes. This latter notion of the term *power* is identical with the original Greek designation as used by the Pythagoreans and Plato, and by Leibniz later.

The implication of that notion of powers is that the universe, like Vernadsky's *Noösphere*, is a *system*. That means a system in the sense that the way in which the universe works is determined by a set of discoverable universal physical principles provided by the Creator.

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

Thus, to the degree that we discover those universal principles (*powers*) we have gained a partial amount of the total power which the Creator's universe represents.¹³

So, in that way, what we know—or, what we believe that we know of such principles—is also a system, not exactly the Creator's system, but including some part of that. That, of course, leaves us with some errors we have produced, or adopted, and, insofar as what we actually know, leaves much that we have yet to discover.

As the case of Kepler's discovery of gravitation shows, or Leibniz's discovery of what he termed *vis viva* (i.e., powers) which he presented to refute Descartes's blunder, the universe in which we actually live is not a world of our naive sense-perceptions, but a universe of universal physical, and related kinds of principles, which can not be sensed directly, but which we can not only know through experimental methods, but which we can prove, experimentally, are an image of the real universe, where the universe we tend to infer by mere sense-certainty, is only a shadow which the real universe casts upon our senses. The concept of the complex domain, as elaborated by Gauss, Riemann, et al., is typical of the way competent modern physical science represents both the difference and connection between the real universe and the shadow-world of sense-perception.

The characteristic physical-scientific distinction of man from the beasts is this *power* which we associate with discovered universal physical principles, as expressed by the transmission of such discoveries from the sovereign mind of a single individual discoverer to his, or her society, and to future generations.¹⁴ This power of the individual mind, so expressed, is the immortal aspect of the human biological individual, the expression of his, or her participation in the same creative principle which resides in the monotheist's Creator.

It is the notion that we live in a universe ordered by the will of that single Creator, which is the foundation for competent modern science, and is also the moral principle upon which the crafting and existence of the modern sovereign nation-state and its economy depend.

13. This is Riemann's then-revolutionary argument in the opening of his 1854 habilitation dissertation.

14. *Ibid.*

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Thomas Alva Edison and Charles Proteus Steinmetz, 1922.



EIRNS/Karon Concha-Zia

However, the process of establishment of the modern commonwealth, even up to its present, imperfect form, has been a long struggle, a struggle between the notion of man as made in the image of the Creator, and the contrary view of man expressed by a phenomenon called the oligarchical model of society. Typical of the oligarchical model are the systems associated with ancient Babylon, with Sparta, with the image of the Olympian Zeus, with the Roman Empire, and the medieval ultramontane system under the alliance of the Venetian financier oligarchy with the Norman chivalry. The modern sovereign nation-state, the commonwealth, is a conditional realization of the goal of establishing a form of society consistent with the notion of the human individual as made in the monotheistic image of the Creator. The chief adversary of that conception of man, still today, has been the oligarchical models of society which exist still as outgrowths of the medieval ultramontane tyranny under the Venetian financier oligarchy.

The characteristic of the commonwealth is the transmission of those discoveries of universal physical and congruent principle, from one generation to the next, which is the essential functional, and spiritual distinction of the human individual and species from the beasts. It is the conscious participation in the universal

process so defined, which is the unique expression of specifically human *happiness* to which Leibniz and the U.S. Declaration of Independence refer, in opposition to the specific bestiality of John Locke and Locke's pro-slavery followers in the doctrine of "property."

The issue between the republican and oligarchical system is posed, still for today, in the elementary form presented famously by the Classical Greek tragedian Aeschylus' *Prometheus Bound*. Prometheus is presented there as the advocate of mankind as a species capable of receiving and employing the discovery of those universal physical principles through which man distinguishes his society from that of apes. For that Olympian Zeus, Prometheus' crime was giving usable knowledge of the principle of fire to mankind.¹⁵ It is the denial of the right of human beings generally to have access to knowledge of those universal physical principles typified by *Prometheus Bound's* notion of the power of fire, which is typical of the way the oligarchical principle of usury operates as the enemy within a modern commonwealth such as the U.S.A. today.

15. The same contempt for the people was expressed in the time following the outlawing of slavery in the U.S.A., by those who insisted that the children of former slaves not be educated above their intended station in life, a doctrine expressed today in such forms as the "no child left behind" doctrine.

The conflict between the interests of the people of the U.S.A. and the financier interests which had savaged the auto industry, is an expression of the conflict between the common good and the principle of financier oligarchy carried over into modern European society as a legacy of the ultramontanist of the awfully ungodly medieval Venetian financier-oligarchy.

The Purpose of Man's Work

The oligarchical concept of man as a subject of the government acting as an instrument of financier-oligarchical power, is that the assigned purpose of man's existence is *work*, a notion of work which is often applied with a vague distinction between the work of the man and of the ox. Work to produce financial and related profit and pleasure for the members of society, especially the owners, and work done to secure the income on which the sustenance and pleasures of individual and family life largely depend.

Those who live on a higher moral plane than that, echo the *New Testament* parable of the talent. This is the notion that work must somehow produce some improvement in the condition of life within the society of those who will be living after the doer of that good has passed on, ending life with something equivalent to a smile on his or her face. The principle is that we must make the universe which has "employed" us better for our having lived. Those of us dedicated to that kind of outcome of our mortal existence, spend the entire span of our lives, working to, as it is said, "improve ourselves" as people with an enhanced potential to be useful, that for no other motive than that the opportunity to do so already exists, or could be discovered.

The sublime notion of the purpose of work pertains to a specific distinction of man from beast, the available option of cognitive immortality of the mortal human individual. We are, in that sense, the "fire-bringers" of our society, or, the tool-maker of the automotive plant.

Look at the miserable condition still imposed upon most of the living people of this planet! Is it the meaning of our lives that they and their descendants should live so, or perhaps even worse, over successive generations yet to come? We see more immediately, the wretchedness of the conditions of life by which they are circumscribed. That is the lowest, almost contemptible level of compassion we might experience. Look at the inner misery their circumstances promote. Shall they

live, from generation to generations yet to come in that or a comparable condition? Is not the worst betrayal of mankind, and of the Creator, the willingness to leave our fellow-creature in that internally impoverished condition of knowledge and of spirit?

It is the development of mankind, as in the likeness of the Creator, the commitment to do that kind of good, which is the essential form of the work which should motivate us.

Yet, to foster the development of mankind, we must look to the conditions under which nations live. We must improve the planet, and also the Solar system, on that account.

To contribute to those ends, we require relevant conditions of life, for ourselves, as for others. We must therefore produce the improved conditions in our society which make possible that enhancement of the conditions of family life and work itself.

This definition of the notion of work has a reciprocal implication in the uniqueness of modern European civilization, as qualitatively distinct from all known forms of society before it. It is the way in which the notion of work is situated as a systemic characteristic of that new form of society, which supplies us the crucial distinction of modern European society from all known earlier forms of society. It is in this context, this definition of modern civilization as emergent from the Fifteenth-Century Renaissance, that we are rendered capable, as a society, in conquering the immediate challenge which cases such as the crisis of General Motors poses today.

Work must be conceived as a true universal. Work is defined as what society does to increase its power in and over the portion of the universe which society inhabits. It is that universal quality of transformation of the society's quality of work, which, in turn, supplies the criteria for defining the universal implication of both the work of the individual, and the individual's appropriate *moral* motivation for that work, the motivation associated with the individual's *relative satisfaction* with his or her choice of profession, and the society's practical satisfaction with the benefit of that individual's profession.

Such is the goal of happiness, which Leibniz specified in his objection to the inherent bestiality of that notion of "property" (e.g., "shareholder value") admired by Associate Justice Antonin Scalia and others.

That notion, rooted in the concept of true universals,

is the difference which defines the Fifteenth-Century birth of the sovereign nation-state. Instead of society conceived as in congruence with the Olympian Zeus of Aeschylus' *Prometheus Bound*, as the reign of a ruling oligarchy and its appendages, over a mass of human cattle, the emergence of the new form of society, the commonwealth, from the Fifteenth-Century Renaissance, changed the relationship of the individual to society, and, therefore, the notion of work, that in a fundamental way. It is that conception of man, as reflected in the U.S. Declaration of Independence and the Preamble of our Federal Constitution, which is the essential feature of the necessary intention of modern European civilization. It is consciousness of that difference by the institutions of society, and by the individual citizen, *that attitude*, which is the key to the cure of the awful crisis descending upon world civilization at this moment.

2. Work and Its Organization As Power

Mere financial accounting, or the related practice of cost accounting, employs the term *productivity* to refer to a very poorly understood, but perceived effect. Contrary to the accountants and their like, economic science, like related functions of government, must define an increase in productivity as the outcome of the discovery and appropriate application of a universal physical principle, or what we term, in memory of the ancient Pythagoreans and Plato, as *powers*.

The best way to introduce the relevant conception into the modern layman's experience with the increase of the productive powers of labor in society, is to focus on the way in which technological progress, as embodied within the development of basic economic infrastructure, determines the levels of productivity which can be achieved and maintained within both agriculture and industrial and related manufacturing. This connection may be restated, and most simply illustrated, as the interaction with the universal physical principles embodied in basic economic infrastructure, with the universal physical principles expressed in production of physical goods.

The role of *powers* so expressed, is then defined as the distribution of *potential* as Gottfried Leibniz de-

fining *potential*. The principal expressions of this distribution of potential are as basic economic infrastructure and as the application of powers in the manner of technology applied to production, or expressed by a product which has been produced for consumption or other use.

This view of *potential*, as the term is associated with Leibniz, brings into immediate view the way in which Carl Gauss and Riemann dealt, respectively, with what I have already identified here earlier in this report as Dirichlet's Principle.

Take Dirichlet's Principle as addressed implicitly by Gauss in two locations which are most notable examples for our subject-matter here. First, his general treatment of Earth magnetism, and, second, his related collaboration with Wilhelm Weber in defining the experimental principle known as the Ampère-Weber principle of electrodynamics. Contrast these accomplishments in Nineteenth-Century physical science to the reductionists' blunders of the Clausius-Kelvin-Grassmann-Helmholtz-Maxwell circle. See that principle at a higher level of conception, in Riemann's treatment of Abelian functions.

The only discovered manner in which we can deal rationally with the efficient relationship with a universal physical principle, is to express the relevant experimental expression of cause-effect connections in terms of the notion of a *field*. The simplest first approximation of such a representation, is to treat, as Gauss does, the relatively simpler pedagogical problem of defining the distribution of the potential within the interior of an hypothetically circular area, by measuring the potential along the perimeter of that circle.¹⁶ Then, extend that first-approximation illustration of that notion to a multiply-connected Riemannian surface, as Riemann's development of the notion of Abelian functions applies to such cases.

To trace the development of the notion of a *field* in modern European science, revisit Kepler's development of the conception of universal gravitation, as from his *The New Astronomy* through the implications of his *World Harmony*, this time viewing the subject-area treated, in a pioneering fashion, by Kepler, from the standpoint of the work of such as Gauss and Riemann.

16. Note that the challenge of mapping a system of higher order relations into the perimeter and interior of a circular area is the first step of pedagogical approach to clarifying the general implications of the notion of Dirichlet's Principle as defined by Riemann.

Look at the miserable condition still imposed upon most of the living people of this planet! Is it the meaning of our lives that they and their descendants should live so, or perhaps even worse, over successive generations yet to come? Is not the worst betrayal of mankind, and of the Creator, the willingness to leave our fellow-creature in that internally impoverished condition of knowledge and of spirit?

Washing from an open ditch, Mexico City.



Then, apply the same approach to the notion of a physical-economic process encompassing a nation, such as the U.S.A., or our planet as a whole.

All discovered, valid notions of any universal physical principle, implicitly define a *field*, a field which is the functional notion of the extension of the efficacy of that principle throughout the universe as a whole. It is the action expressed by the impact of the potential expressed by a field upon the setting in which production occurs, which is the focus of our concern in this report as a whole.

For example, the application of Dirichlet's Principle to any field of action, elevates the experimental viewpoint from a collection of calculations to a single act of conceptual thought, a conception which, like Kepler's notion of universal gravitation, efficiently subsumes, implicitly, all of the relevant, detailed calculations. It is impossible to develop any competent insight into the way a modern economy functions, physically, except by employing the way of looking at a field in the way Riemann's treatment of what he terms Dirichlet's Principle applies.

The understanding of this point which I am developing here, enables us to understand why *the transfer of the production of a product, even when the same technology of design and production is employed, from a developed economy, to a less developed economy, has*

usually resulted, during the recent quarter century, in a net collapse of the level of the rate of generation of per-capita productivity in the world as a whole! The transfer of production from a nation with advanced development of its infrastructure, to a nation of relatively poor people with a poor development of general infrastructure, tends to produce a collapse of the physical economy of the planet as a whole. The role of the field represented by basic economic infrastructure, has been ignored, with what tend to become ultimately fatal economic results for all concerned.

By choosing a field of application which itself represents a zone of lower potential, the effective productivity of labor, per capita and per square kilometer, is relatively reduced. By "globalization," for example, the act of production is shifted away from a zone of higher potential, such as the U.S. economy, into a national economy with a much lower potential. Even though the exported technology may be competitive, in and of itself, the effect is usually a lowering of the potential and productivity of the world as a whole, as a result of transferring production from a zone of higher potential to a zone of significantly lower potential.

There is an additional factor to be considered, the order in which advanced technology is applied at various points in the sequence of the productive cycle of the society as a whole. This includes consideration, once

again, of the effect of a relatively lowered, or merely unimproved technology of basic economic infrastructure, upon the effective productivity (per capita and per square kilometer) of the relevant economy as a whole. In general, rapid advances in technology in basic economic infrastructure and the machine-tool sector of production, have the optimal outcome for the economy as a whole.

The argument will be made in attempted rebuttal of what I have just written here, that since most people in management and the employed labor-force do not understand what I just said, what I have just written could not, even possibly, be of any relevance to the way production actually works. I reply: "Ignorance is no excuse for the awful results of ignorant management which are expressed in the undeniably actual collapse of General Motors and kindred enterprises today." The field in which production occurs, a field in the sense implicit in Riemann's references to Dirichlet's Principle, is the principal determining consideration in shaping the productivity and growth, or collapse of productivity in a modern economy as a whole.

The rule is, do not put relatively scientifically illiterate persons, such as the typical corporate managements of today, into controlling positions in the economy, including banking, as we have done, increasingly, over the course of the recent several decades of corporate Europe and the Americas.

I treat this matter here in two distinct, but interacting contexts: the way in which basic economic infrastructure defines the variability of potential productivity of the economy (e.g., national physical economy) as a whole, and the way in which the field of application of principle determines productivity in agriculture and manufacturing more directly.

But, also look at the matter of potential in broader terms of reference.

An Example: Leibniz and Bach

Knowing what I know of such matters as that, I prescribed the crafting of the common educational program of the LaRouche Youth Movement on the benchmarks of Gauss's 1799 exposure of the frauds of the empiricist fanatics D'Alembert, Euler, and Lagrange, and, also, the implications of the same type central to J.S. Bach's founding of the principles of Classical musical composition and its performance. The first pole, the implications of Gauss's exposure of the hoax of

Euler et al., pertains to the relationship of the individual human mind to the universe around that individual. The second, Classical musical composition, pertains to the field of the social process, as in Classical modes of choral works, through which the individual acts to effect the cooperation on which the realization of discoveries of physical principles depends.

For example, in the case of Classical composition and its performance, the well-trained, brain-dead musician thinks in terms of chords laid out like a sequences of corpses. The actual follower of Bach's system of well-tempered counterpoint defines the relevant composition as a field in which development of a unity of conceptual effect of the performance of the individual composition as a whole, is located primarily in the more complex modalities of the cross-voice relations of the counterpoint, through which an appropriate unity of effect is achieved.¹⁷ The object is the same as in Riemann's approach to the notion of Dirichlet's Principle, the notion of detail as subsumed by a single, universal conception, a conception, in the case of a relevant Beethoven performance, such as of the Opus 131 or 132 quartet, as a single, essentially individual idea of a principle of composition. The role of the same Lydian progress of cross-voice development met in Mozart's *Ave Verum* as compared with Beethoven's Opus 132, is an example of the unity of a field expressed through a unified process of development according to a principle.

As the famous aphorism of Heraclitus emphasizes, as Plato after him: in the real universe, nothing really exists except constant change. It is the changes in a field, as I have indicated the implications of the term "field" so far here, which are the *efficiently determining* primary reality, rather than, as is often mistakenly assumed, a derived experience.

17. For example, what conductor Wilhelm Furtwängler sometimes identified as performing between the notes. In a Classical polyphonic work of many performers, unlike the case of the accomplished string quartet, the individual performing voice does not hear the functional interaction of his or her own voice within the array of voices as a whole. What is heard is the impact of the polyphony upon the volume of the region in which the work is performed and heard. This is heard not as a collection of voices, but as a *field*, as I have identified the notion of a field in reference to the case of Kepler's principal discoveries and Dirichlet's Principle. The exceptionally able conductor, such as Furtwängler, hears the whole in a way which the performers do not, thus seeing and shaping those subtleties which craft the effect of the field of the performed composition, in that acoustical setting, as a sensed indivisible whole.

The same which is to be said of the composition and performance of Classical musical works after J.S. Bach's revolution, is true of all Classical artistic composition, including poetry and drama. In place of Furtwängler's apt use of the expression "performing between the notes," we encounter the often wildly misunderstood terms, poetic, or dramatic *irony*.

The dullard, idiot, or pedant, which are usually only different costumes for the same kind of fool at heart, wishes a net, dictionary meaning, or the equivalent, for every term in the vocabulary used. Not a single competent artist, as composer or performer, would ever do such a disgusting thing as reducing everything to attempted literal meanings, as the unfortunate Associate Justice Antonin Scalia does with his implicitly Satanic dogma of "text." The proper use of words by literate, actually thinking people, is to employ known terms and other images to convey a meaning which the words used have never conveyed on any occasion before that. This reality of Classical irony, too painful to be discussed at a grammarian's funeral, is the typification of the way in which the creative powers of the human mind are expressed in communication.

Only a half-brain-dead pedant could have dreamed of the invention and use of a pseudo-language such as Esperanto as a proposed replacement for living languages of actual peoples living in actual cultures. This was the problem of Latin which Dante Alighieri exposed and remedied by design in the course of defining the pathway to development of the cultures of a sovereign nation-state republic. The same idea, when expressed in one language, can be replicated by appropriate modes applied to a different language; but this translation of actual ideas can not be competently effected by a mechanical process of translation according to standard dictionaries and grammars. The meaning lies not in the words as such, but in the reality to which the words are intended to allude. The music of any use of language lies, as Furtwängler emphasized, "between the notes." In other words, in the ironies of the *field*, as Riemann's reference to Dirichlet's Principle implies.

Take 'Energy,' for Example

Energy, as defined by the reductionist circles of Clausius, Grassmann, and Kelvin, does not actually exist. It is a footprint, not the foot, *power*, which produces the imprint. One important effort to clarify this distinction, was the suggestion that we employ the

term "energy-flux density" as a replacement for the crudely scalar notion of "energy" of the usual suspects of reductionism. We used this, for example, in the work of the international scientific association known as the Fusion Energy Foundation. We have used it in our professional practice of economics, to impart a sense of the way in which relatively higher and lower orders of sources of heat-equivalent are ordered as we go up, or down the scale of the ordering of relatively more effective technologies. Thus, we have the ordering of burning of wood, charcoal, coal, petroleum and natural gas, nuclear fission, nuclear fusion, and matter-antimatter reactions as successively higher, relatively more effective, and more efficient orders of technology. These rules of thumb have distinct meanings for practice within the generalities of chemistry and nuclear and sub-nuclear domains of physics. They are in rough, but meaningful correspondence with the notion of a relatively higher, or lower ordering of technologies.

So, in the effort to understand the principled nature of the processes which govern the universe, and its admissible technologies, in the large, we are obliged to plumb into the domain of that which is ever-tinier. To understand the tiniest, we must conceptualize the process in its largest astronomical aspects imaginable, as the paradoxes of the Crab Nebula tease us so. Kepler already thought like that.

The relative weight of power and related potential is greatest in the development of basic economic infrastructure, which should represent about half of the total capital investment by a modern economy such as the U.S.A. Most of this development must occur within the public sector of the economy, rather than private entrepreneurship, just as the achievements of rural electrification show the way in which increased potential over wide areas will have a relatively most powerful multiplier effect on net productivity and quality of product. Improved quality of investment in public education, is among the most powerful multiplier effects, with smaller class sizes (generally not in excess of 15-25 pupils), upgraded goals in technology and Classical culture, and higher ratios of preparation to teaching time for teachers in the system. The advantages of mass transit over individually operated motor vehicles are to be featured, and the organization of territory to minimize travel time, with emphasize on shortening the cost, time, and effort associated with the most fre-

quently required functions of economy and personal life within the territory.

The U.S.A., for example, would benefit greatly, especially over periods spanning a generation or more, from a more dense development of land-areas, such that food supplies are produced locally, as much as possible, and other measures which decentralize as much as possible of the production and services required by each local area and region of the nation, as distinct from the narrowed concentration and process of globalization today.

Virtual “clever idiots” of contemporary corporate management have sought to eliminate actual toolmaking by resort to the brain-dead effects of linearization of design and testing of product through emphasis on computer-synthesis of technologies, with a resulting sharp contraction in the rate of development of power and distribution of potential per capita and per square kilometer in both production and the economy as a whole.

Generally, the higher the rate of turnover effected through technological progress, and the accompanying greater emphasis on science-driven research-and-development as a percentile in the composition of the employment of the labor-force, will provide a relatively optimal effect on productivity in generating and realizing technological progress. The highest rates of benefit come usually from concentrating on the front-end of the process-sheet cycle, in basic economic infrastructure and product and process design, always moving up-scale in what is, in effect, higher energy-flux-densities.

Once we begin to apply the notion of powers and potential to the structure of the national economic process-sheet, it becomes obvious that the U.S.A. today is virtually bankrupt in many respects. The included causes for this effect include the following features of employment and investment patterns.

The composition of employment is way off whack. Much too little employment (and education) in science, engineering, and machine-tool specialties at the front-end of the national production process-sheet. Much too high a ration of so-called “white collar” services employment, relative to so-called “blue collar” employment. Far too low a ration of employment in basic economic infrastructure, especially in the higher technology categories of investment.

The ration of the total labor-force employed in the

physical development of basic economic infrastructure is far too low. We must bring investment back up to about half of total employment for combined public and private investment and employment of the labor-force in basic economic infrastructure as a whole. We must get out of emphasis on so-called “soft” technologies, into capital-intensive technologies at the high end of energy-flux densities.

The same general objective stated in another way, is the following.

The general objective of our national reconstruction program must be priority on raising the potential expressed as powers concentrated in the “front-end” of the national process-sheet cycle. The point is to build up the base-line of our national productive potential in the long-term investment cycles associated with the front-end of the cycle represented by the process-sheet of our national economy as a whole. It is the rate of advance of technology (as power, as potential) in this base-line category of the economy, which must have the relatively highest priority, since this affects the base-line of the economy as a whole over the longest period and the broadest base. This is the category in which long-term investment-cycles of basic economic infrastructure are dominant. The complementary area of high priority is the machine-tool sector, as that bridges both basic economic infrastructure and the so-called private sector.

This, which I have just summarized, is sufficient indication of what we must do in the way of changes in investment and budgetary policies otherwise. As recent experience should have shown us, that change is necessary, but is not sufficient by itself. We must rid ourselves of the mental state based on those false but axiomatic assumptions associated with the empiricist premises of modern Anglo-Dutch Liberalism. We must think of a universe which is essentially a system of universal physical principles, a universe in which more and more among us recognize that only those principles associated with the potential of powers are reality in the functional sense of potential, a universe in which we must replace the mechanical way of thinking about economic and related reality, by putting the highest priority on increasing our command of that potential as Riemann’s notion of Dirichlet’s Principle implies. We must change our ways, to thinking of potential in ways consistent with man as made in his potential as in the likeness of the Creator of our universe.

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