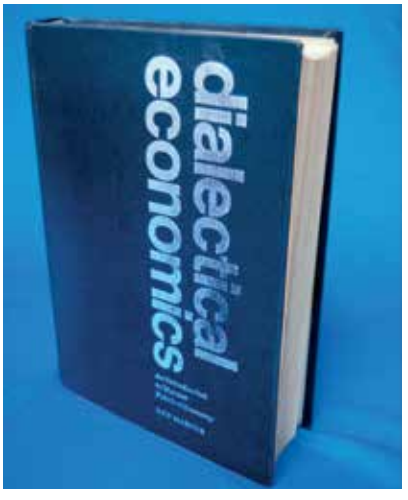
III. Economics

APRIL 12, 1985

For a Possible Second Edition of *Dialectical Economics*

by Lyndon H. LaRouche, Jr.
(1922-2019)

Mr. LaRouche wrote this preface for a projected second edition of his book, Dialectical Economics, An Introduction to Marxist Political Economy, *originally published under the pen name Lyn Marcus by D.C. Heath. That second edition was not produced. He released this preface to his associates to be used as an adjunct to instructional programs. We publish it here for the first time.*



LaRouche insisted that his method was still "dialectical," despite his contempt for the Hegelian and Marxist usages of the term.

EIRNS, 1973

This text [the 1975 D.C. Heath book] was written originally during 1971, and edited for publication in the Heath edition during 1973. It was part of the author's targetting of prospective adherents to his views among pro-Marxist strata. The text, like the 1966–1973 class-series upon which it is based, was composed in the mode of a critical appreciation of Marx's four-volume *Capital*. The attacks on the methodological fallacies of Marx, Engels, and Lenin, the which occupy a large portion of that text, are elaborated accordingly. The choice of audience, prohibited presenting certain among the most important observations in the manner I am free to employ today. Also, the 1974 Foreword to the Heath edition of that text, merely reports that the work of Riemann and Cantor plays a central role in principled features of the author's standpoint, but that the elaboration of this aspect of the matter is reserved to other locations.

The alert reader encountering this text today, will wish to have the author's report on three areas partially or almost entirely omitted from the 1971 and 1973 versions of the manuscript. First, the reader should know why the author, having shed the tactical encumbrances of the 1966–1973 period of the class-series on which the text is based, should still insist that his own method is still "dialectical," despite the author's contempt for both the Hegelian and Marxist usages of that term. Second, the reader might wish to know why, despite the author's opposition to "orthodox" Marxism, he considered strata associated with Marxism, during the

LaRouche's dialectical method is the Socratic method of dialogue practiced by Plato in the Academy he founded in Athens, c. 387 BC. Shown: a depiction of Plato's Academy in a 1st Century AD mosaic from Pompeii.

1966–1973 interval, as a viable population of potential adherents to his own views. Third, although the elements of the LaRouche-Riemann method are presented in a 1984 textbook, the reader would wish to know how the author developed that method.

Although the answers to the first two kinds of questions are implicitly answered beyond reasonable doubt, within the body of the 1973 text, it were better, presently mandatory, that that be made explicit. The third area needs to be summarized, in any case.

This preface summarily remedies those actual and apparent omissions, alike.

'Dialectical Method'

The term, "my dialectical method," is introduced to usage within Plato's dialogues, where it signifies nothing else than the Socratic method of dialogue. It means, essentially, a rigorous method for correcting fallacies of popular belief, by exposing the underlying, axiomatic fallacies of assumption, upon which those popular errors are implicitly premised. It means also, a method which is everywhere congruent with arguments in the form of what is called today "synthetic geometry."

The elaboration of this method, as within the dialogues of Plato themselves, leads to a notion of "substance" which is not based on the idea of self-evidently discrete "elementary particles" of matter. Finite objects exist, but they are not the primitive form of substance. The primitive form of substance is universal physical action. In modern language, this means: transformations in physical space-time, transformations rooted in self-reflexive forms of universal circular action. The geometrical singularities generated in a synthetic geometry based on self-reflexive circular action, such as lines, points, and plane and solid figures, are the prototype of definite physical objects.

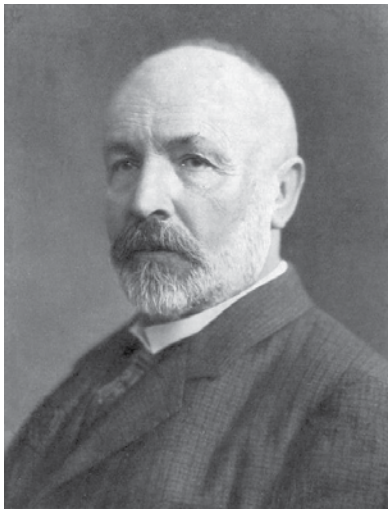
So, Plato's "my dialectical method," is not only a rigorous form of scientific treatment of axiomatical issues. It is not merely a formal mathematics. It is also implicitly a physics. The *Timaeus* dialogue is the writing of Plato's which has been most often referenced, over the past 2,400 years, as showing that Plato's "mathematics" is also implicitly a "physics."

The most important revival of Plato's "my dialectical method," at least as this bears upon modern physical science, was begun by Cardinal Nikolaus of Cusa (1401–1463 A.D.). On the subject of scientific method,

Master of the Life of the Virgin
Nicholas of Cusa

Marc-Michel Bousquet et Compagnie, 1745
Gottfried Wilhelm Leibniz

Cusa's *De Docta Ignorantia* is his major, and probably most influential writing. The continuation and further elaboration of this method within physical science among students of Cusa's work, runs through Leonardo da Vinci, Johannes Kepler, and Gottfried Leibniz. Re-



Left: Bernhard Riemann, 1863.
Above: Georg Cantor, early 1900s.

specting the development of modern physical science, the influence of this revival of Platonic method runs through Carl Gauss and his collaborators in nineteenth-century Germany, including Bernhard Riemann, and including implicitly the work of Karl Weierstrass and the 1871–1883 work of Georg Cantor.

Prior to Socrates and Plato, contributions leading in the direction of Plato's work include prominently Ionian figures and Parmenides.

The "dialectics" of Immanuel Kant, G.W.F. Hegel, and Karl Marx, are a different kettle of fish. Both of these versions of "dialectics" are implicitly derived from the work of Plato's famous adversary, Aristotle. Like much of Aristotle's writings, especially Aristotle's commentaries on the work of Plato, Kantian, Hegelian, and Marxian "dialectics," are best described as Aristotelean parodies of Plato's method.

For this reason, it is feasible to recreate Plato's dialectical method to a large degree, by critical treatment of the fallacies in Marx's method. Thus, in dealing with a pro-Marxist audience, it is feasible to win some among them to Plato's method and ontological standpoint, by couching the relevant criticisms within the framework of Marxian jargon. That is the characteristic feature of the text in this respect.

Viability Within Marxist Formations

All his adult life, Karl Marx was under the direct control of Giuseppe Mazzini's catch-all neo-Jacobin organization, "Young Europe." What distinguishes Marx's work favorably, relative to all other Mazzinian currents, is Marx's defense of scientific and technological progress, his insistence that economy must be based upon economic growth as an indispensably included feature of the development of the quality of the individual.

During the period following the 1815 Treaty of Vienna, excepting the influence of Friedrich List's policies in Germany, and the reforms of Russia under Czar Alexander II, all of Europe fell under the control of what are fairly described as the neo-feudalist forces represented by Britain's collaboration with the Holy Alliance. What became known as "capitalism" in Europe, became a hybrid of feudalistic rentier-finance and industrializing impulses, with the feudalistic interest ruling government and banking from the top.

The leading opposition to this feudalistic, hybrid form of capitalist political-economy, at the time of Marx's birth and young manhood, was centered in the United States, around Mathew Carey, Henry Carey, and Friedrich List. A perpetual state of warfare existed between the American System of political-economy, as defined by Alexander Hamilton, and the semi-feudalistic British system, of Adam Smith, Malthus, Ricardo, the Mills, et al.

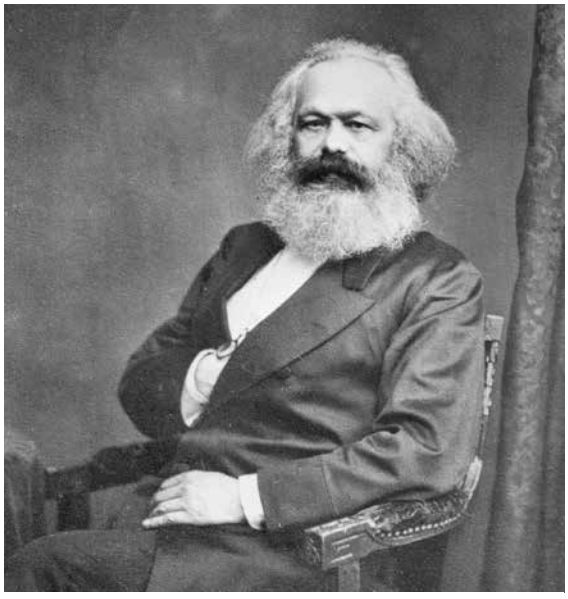
Marx defined himself as the adversary of both contending factions. He plagiarized bits and pieces from List and Carey, while defending the feudalistic element of Smith, Malthus, and Ricardo, the doctrine of "ground rent," against attacks by economists of the American System. By arguing that the British system was the only matured, scientific version of political-economy, he cited the manifest social evils of the British system, as sufficient cause for the impending destruction of all capitalism.

Therefore, Marxism acquired a special appeal among industrial labor, and also among other strata committed to scientific and technological progress. As knowledge of the American System vanished from the literature and classrooms available to all but a rare handful of the population, Marxism established itself as the defender of scientific and technological progress, in the eyes of those portions of the population

which rightly saw the lack of investment in technological progress as the kernel of their social grievances.

This specific social appeal of Marxism, was greatly increased by the developments in European colonialism which became ever more prominent during the late nineteenth century. So, the spread of "Marxism" erupted approximately a decade after Marx's death in 1883, during the 1890s.

So, over the course of this century, into the 1940s, depressions and wars impelled large portions of labor and the pro-science intelligentsia toward professedly Marxian movements. However, although so-called socialist organizations adapted to the resurgences in this "market" for recruitment and influence, those political formations never permitted the influence of the pro-science intelligentsia to modify the true character of the organizations; only the intelligentsia oriented to the positivist "new social sciences," of anthropology, sociology, and odd sorts of psychology, and so-called "political science," found the precincts more or less tolerable.



John Mayall

Left: Karl Marx, 1875. Above: Friedrich Engels, 1879.

In every known case of an organized socialist formation, the organization was controlled bureaucratically, top-down, by viciously small-minded careerists and tea-pot tyrants, who were in every way the enemies of serious intellectual life. So, the ranks of the organizations were characterized by waves of growth and ebb in size, with high rates of turnover. True, most who left these movements did so for purely opportunistic reasons, including sometimes savage pressures from police agencies, and so forth. What held the few members these groups represented in their hard times, was chiefly a desire not to degrade themselves, as by capitulating to immoral kinds of external, police-agency and employer, pressures.

The proper significance of these socialist formations, has been that among the new recruits to them which poured in freshly during every period of "radicalization," there have been significant, if small portions of such fresh recruits who were among the most viable potential recruits to the philosophical outlook typified by Benjamin Franklin and Hamilton's American System. Freshly entering socialist precincts, this portion of the recruits has accepted a commitment to seek in Marxism a rational method of solution to the leading problems of society. To that degree, and only to that degree, they are professed Marxists, who demand that issues be reviewed in the Marxist jargon. They have not yet accepted Marxism. They have merely committed themselves to work honestly within its ranks, while they settle with themselves whether or not this shall be a more durable commitment.

That was the definition which the author employed, in choosing to employ his critical treatment of Marxian economics, as the vehicle of his lecture-series and text of the 1966–1973 period.

By 1973, the degeneration of the socialist associations into countercultural cults, had drained those associations of viable strata, and repelled all those prospective new recruits of the sort who might have been temporarily attracted to an "orthodox Marxian" sort of association. Further efforts to recruit from the U.S.A.'s socialist milieu, would have been silly.

By 1974–1975, the same total degeneration which characterized the U.S.A. "radical milieu," had been more or less fully consolidated in Europe and Ibero-America.

By 1974–1975, it became silly to continue to couch the author's views in the language of a critical treatment of Marxian economics. Dropping that "cover," if you like that choice of terms, was also a great advan-

tage. The author no longer need be tactically cautious, in his formulation of criticisms of the follies of Marx. The sense of freedom which erupted once that tactical encumbrance was removed, was most exhilarating.

The Central Flaw in Marxian Economics

The fraudulent aspect of Marx's "dialectics," is exhibited most simply and directly in Volumes II and III of his four-volume Capital, and in an equally definite, but more complex way, in what is usually described as his "historical materialism." On the one side, although Marx admits that increase of the productive powers of labor depends upon scientific and technological progress, he is never able to show how technological progress causes anything but expansion of the scale of the economy, is never able to show directly how technological progress generates economic growth.

This point is stressed forcefully throughout the text, together with necessary corrections of Marx's misdefinitions of such matters as Constant, Circulating, Fixed, Variable Capitals, of productive versus non-productive labor, and so forth. The general character of the solution for Marx's failure to comprehend "extended reproduction," is also presented explicitly, even though the more comprehensive, "Riemannian," solution to this problem is merely indicated and implied.

The central feature of the text which is insufficiently elaborated, is the deeper meaning of the term "negentropy." This is more adequately elaborated in the 1984 textbook, but the autobiographical aspect of the author's discovery, although stated in other published locations, is only implied in that 1984 textbook.

The formal error in Marx's doctrine of crises, is that Marx attempts to show that cyclical crises are caused by the increase of the rate of investment of capital goods in the average work-place. This increase of capital-intensity of production, Marx terms "the increase of the organic composition of capital." He argues that the increase of this "organic composition of capital" causes the rate of capitalists' profits to fall; he attributes the cause of the business-cycle to such periodic falls in the rate of profit.

The formal source of error in Marx's calculations, is that he employs the mathematical method of accounting called linear programming today. Marx does not solve the problems of linear programming mathematically, but his method is the same on which present-day mathematical programming is based. It does not occur to him, apparently, that economic processes are essentially "non-linear." This is not accidental; both Marx and Engels either ignore or defame every contemporary and earlier scientific thinker who contributed to comprehending the nature of "non-linear" processes; whereas both Marx and Engels praised many leading examples among those philosophers and mathematicians who contributed to incompetence in such matters.

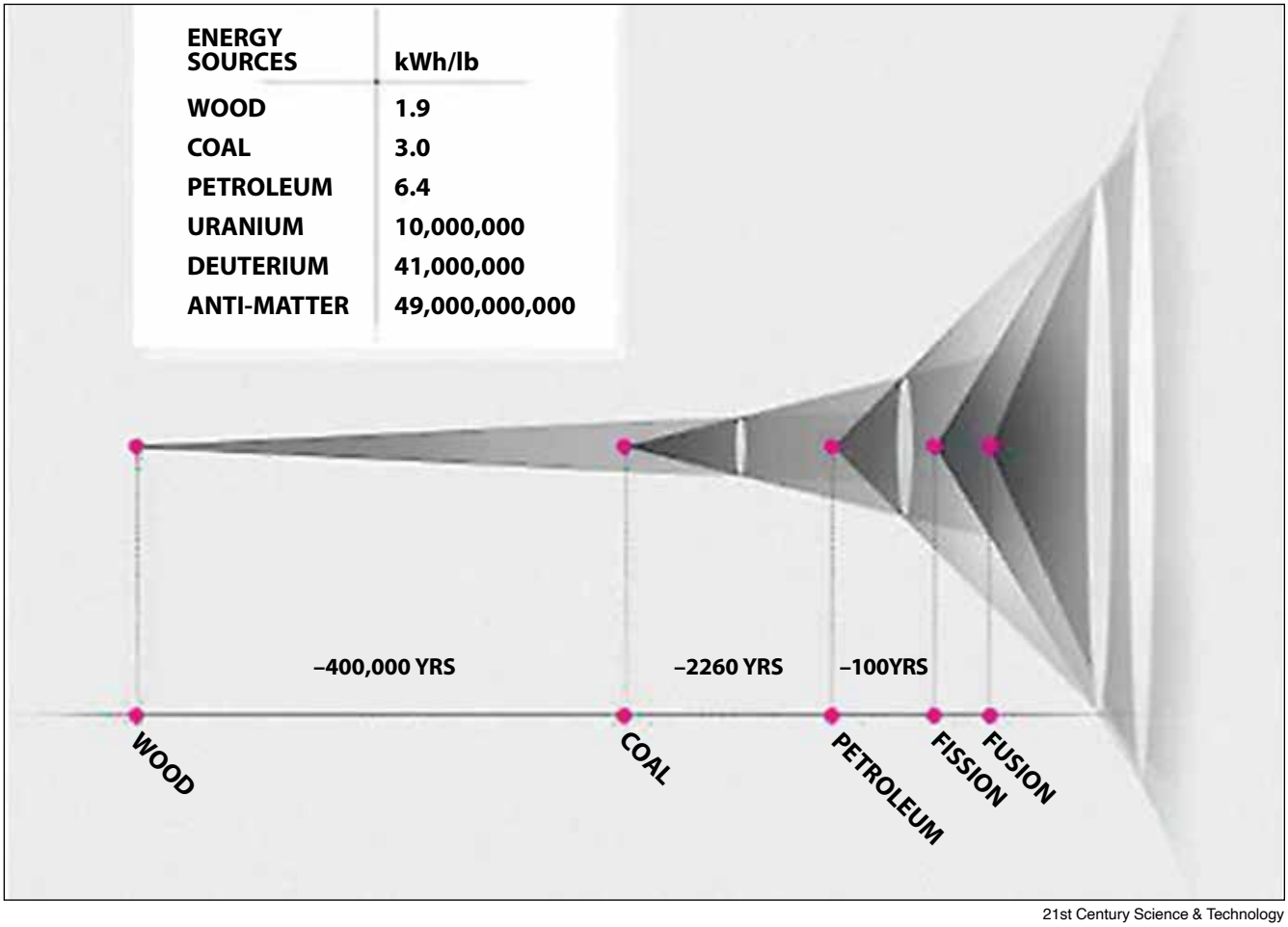
The author's own approach to this and other matters is rooted in adoption of the philosophical vantage-point of Gottfried Leibniz, at the onset of the author's adolescence, and a wrestling against the Critiques of Kant during later adolescence. The direct approach leading into the author's relevant contribution to economic science, began at the close of 1947 and beginning of 1948, in wrestling against a then-faddish treatment of "negentropy" by Lecomte du Noüy, and then reacting with highly motivating abhorrence, against the treatment of "negentropy" in Norbert Wiener's Cybernetics.

Over the 1948–1952 period, the author was occupied to the point of obsession, with researches aimed at locating a correct approach to defining "negentropy" in terms of mathematical physics. This led to a 1952 occupied largely with the contributions of Georg Cantor, and from Cantor back to the work of Bernhard Riemann. Viewing Riemann's work as posing the problem upon which Cantor's work was focussed, supplied the needed conception of "negentropy."

The author's approach to this 1947–1952 activity, was governed by two interdependent assumptions. The first assumption is, that the existence of creative intelligence in living processes (mankind), demonstrates that the universe as a whole is negentropic in the sense that the distinction between living and non-living processes implies. The second assumption is, that the viewpoint reflected in Leibniz, is implicitly such a comprehension of the universe as a whole.

The bearing of this upon the author's contribution to economic science, beginning 1952, is generally elaborated in the 1984 textbook. Only a summary of the point need be supplied here.

Nikolaus of Cusa, was the first to prove, that the only axiomatic form of existence in the universe, is circular action. This meant, for geometry, that all of the axioms and postulates, and deductive methods, of Euclid's geometry, are to be thrown away; everything in geometry must be proven solely by rigorous methods of construction, beginning with nothing but circular action. This meant, for physics, that substance is not built up from indivisible elementary particles; finite



21st Century Science & Technology

The nested cones depict the introduction of increasingly energy-dense fuel sources and the approximate time each became dominant in society. The time between discoveries of new fuel sources shrinks exponentially, and the energy densities increase exponentially. Fusion fuels produce orders of magnitude more energy per unit of mass than the chemical combustion of fossil fuels or fission.

particles are generated (created) in the way in which circular action performed repeatedly upon circular action produces straight lines, points, surfaces, and solids, in elementary synthetic geometry. This meant, for physics, that the most primitive form of existence of matter in the universe, is circular action. It meant, that a mathematics based upon such a synthetic geometry, and a physics, are the same subject-matter.

Later, Leibniz elaborated Cusa's discovery, that only circular action is primitive, as what is called the Principle of Least Action. This discovery of Leibniz's positively unified mathematics and physics: since no synthetic-geometric construction can exist which is not a form of physical action; and no physical action can exist which is not governed by proper principles of synthetic geometry.

However, although circular action is the primitive form of matter, circular action occurs only in finite intervals of physical space-time. There is a time-displacement of the circular action, such that any choice of beginning of the action lies at a different point in time than the rest of the action. Circular action occurs in physical space-time in the form of spiral action. Therefore, physics could have only two choices of alternate forms. One form is cylindric spiral-action (Fourier Analysis). The alternative form, is conic spiral-action (Gaussian physics). Gaussian physics, the physics of a continuous manifold based primitively upon conic self-similar-spiral action, conic functions of a complex variable, is the only physics which corresponds to the scope of real occurrences in the universe.

The minimum geometric condition for negentropy in an economic process, requires a very elementary modification of conic self-similar-spiral action.

Let the ratio of the arithmetic to geometric mean value of spiral-action increase harmonically. In the

simplest case of this modification, instead of having a true cone, we have something which might remind us of the mouth of a trumpet; we have a hyperbolic horn, a horn whose side-view describes an hyperbola.

This image shows that as the economy is growing, under the influence of continuous technological progress, the rate of growth appears to increase hyperbolically. Let the central axis of the conical horn measure clock-time at constant rate. So, in a section of time, the side of the spiral seems to shoot off toward "infinity." There is an illusion involved in all such ideas of "infinity"; overlook that problem for a moment. At first glance, some students might imagine, that economic progress must stop until the hyperbola has "reached infinity." Obviously not; the clock continues ticking at a constant rate. The economy must move right ahead, not waiting for infinity.

Lejeune Dirichlet

The problem is this. We know that the process of economic growth is continuing, past the arm of the hyperbola. How is it possible to represent this continuity mathematically?

The point at which the arm of the hyperbola might appear to zoom off into infinity, is called either a "discontinuity," or a "singularity."

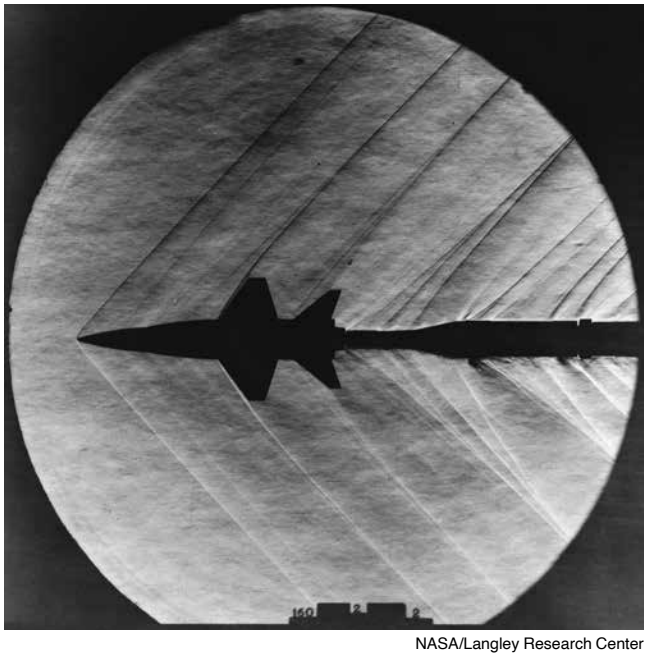
Imagine two sides of a square. If we move around the perimeter of the whole square, we must suddenly change direction, as our movement along one side brings us to the point of intersection with the adjoining side. The point of intersection, in that case, is a mathematical singularity. Imagine traversing the surface of a cube; the line separating one of the surfaces from another, is also a singularity. So, if one constructed the mathematical formulation which described the movement along one side, or surface, the mathematical formulation would collapse at its encounter with a point, or line, at a singularity.

The point at which the hyperbola's arm appears to zoom off into infinity, is a discontinuity in the physical function which appeared to account for the process of economic growth, up to that interval of time. There the similarity to the simple kinds of examples from plane and solid geometry ends. The discontinuity (singularity) in this economic function is usefully termed a "true singularity," to distinguish it from the simpler cases in geometry.

Actually, the arm of the hyperbola does not fly off to infinity. If we project the side-view of the economic function onto a sphere, as Riemannian projection specifies, the hyperbola's arm ends at the vanishing-point of the surface of that sphere.

This problem of discontinuities within Gaussian physics, was attacked and solved by Lejeune Dirichlet, Riemann, and Karl Weierstrass. Dirichlet showed, in principle, how a continuous process could remain continuous, despite successive generation of discontinuities (singularities). Dirichlet's solution was made a central feature of physics, by Riemann: the so-called Riemann Surface. To understand a Riemann Surface adequately for physics, one must look at this Surface from the vantage-point of the work of Karl Weierstrass, on the characteristics of functions which are continuous, but which also are discontinuous at many points.

Riemann provides us the first step toward a solution of the problem of getting past our hyperbolic disconti-



NASA/Langley Research Center

Supersonic flight is different than flying slower than sound-waves: The metrics of physical space-time change when that singularity—the speed of sound—is surpassed. Shown: An X-15 aircraft model in a supersonic wind tunnel.

nuity, in his famous 1854 "On the Hypotheses Which Underlie Geometry." Summarily, as a continuous physical process generates such a singularity, the way in which we must measure action in physical space-time changes; the metrical characteristics of physical space-time are changed. Riemann provided the simplest kind of example of this, in his 1859 analysis of the generation of an acoustical shock-wave, as a projectile reaches supersonic velocity, "On the Propagation of Plane Air Waves of Finite Magnitude." The rules for flying an aircraft at supersonic velocities are slightly different than flying below the velocity of a sound-wave; the metrical characteristics of physical space-time have been altered, by passing the singularity which is the velocity of sound-waves.

An ordinary observer, or a mathematician who does not understand Gaussian physics, might imagine that only the initial shock-wave generated by a supersonic aircraft is of interest. Quite the contrary.

The process of economic growth continues through the apparent discontinuity; but the metrical characteristics of economic space-time after the discontinuity are different than before the discontinuity. If the economic process is shaped by continuous technological progress, a new hyperbolic curve appears to be generated, and after that, another, and so on.

After each discontinuity, the metrical characteristics of economic space-time are altered. There is a further, very important point, to be noticed in studying these successive discontinuities: they occur closer to one another in time, as the economy develops. In an economic process conforming to the Principle of Least Action, the increasing closeness forms an harmonic series. For each successive, constant interval of time, in such an harmonic series, the number of discontinuities occurring within that interval increases. The increase of the density of discontinuities within a constant amount of an arbitrarily small interval of physical space-time, is a measure of the relative negentropy of any process generating such discontinuities, and the decrease of such density, a measure of the entropy of the process.

A Riemann spherical projection of such a continuous function, permits us to directly restate this as an harmonic trigonometric function. This approach, based on the principle of a Riemann-Weierstrass Surface, permits us to construct a continuous mathematical function consistent with the continuation of the indicated process of economic growth, beyond each encountered singularity.

All mathematical functions for physical processes, of a type termed "non-linear" are functions of types related to this example.

This "Riemannian" approach to the study of economic processes, enables us both to measure technology in terms consistent with Leibniz's definition of technology, and to correlate the injection of measurable rates of technological progress with forecastable rates of economic growth. Essentially, we measure the potential negentropy of technological progress, and measure this against the negentropy of the economic process driven by technological progress.

The usefulness of this approach is not limited to the case [in which] we have actually completed both such measurements. Even without actually measuring the technology itself, knowing how we might be able to measure technology, is sufficient to show us what kinds of scientific and technological advances should be given priority of emphasis, to obtain the optimal rate of growth of the economy.

The proper measure of economic value, and of growth, in an economic process, is a non-discrete magnitude best named "rate of increase of potential relative population-density, relative to an existing level of potential relative population-density." This correlates with rate of increase of the per-capita and per-hectare amounts of energy and energy-flux density, relative to an existing level of energy and energy-flux density. This correlation is simplified, by reducing the measure of energy-throughput to terms of energy-flux density. Those scientific and technological advances, which can be assimilated into an economy, to the effect of increasing these energy-values, are thereby indicated to be the rough measuring-sticks for choosing priorities of emphasis in scientific and technological progress.

This means also, that we discard as false, the popular definitions of "negentropy" and "entropy" employed widely in statistical mechanics, the definitions supplied on the basis of Boltzmann's treatment of statistical fluctuations. We proceed from the definitions of distinction between living and non-living processes first elaborated by Luca Pacioli and Leonardo da Vinci, and restate those rawer discoveries in the more refined terms of the Gauss-Riemann synthetic geometry, of a continuous manifold primitively rooted in conic self-similar-spiral action. This is the refutation of Norbert Wiener's "information theory" dogma, which the author set out to refute beginning 1948.

In the text, that point of view is reflected, although not specifically elaborated. This is the point of view, of negentropy, which informs the criticism of Marx's fundamental errors respecting "extended reproduction."