

Mathematics breakthrough to be released in September

The specifications of an important breakthrough in application of mathematics are now scheduled to be released publicly during the coming month of September, according to a New York City-based spokesman for an international scientific task-force.

The results to be announced represent a fundamental advancement in the ability to conduct computer-based analysis of certain classes of what are called "non-linear" features of economic and analogous processes. Despite that emphasis upon economic processes, the results contain the basis for useful improvements in a variety of fields, including crucial problems within experimental plasma physics.

The results to be announced are the outcome of a research and development project begun in New York City during December 1978, but subsequently involving scientists and research specialists of several nations. The international task-force has been co-sponsored by a prominent U.S. scientific association, the Fusion Energy Foundation, together with an international political-intelligence newsweekly, the *Executive Intelligence Review*.

History of the project

The project was born during a series of seminars held by the Fusion Energy Foundation in New York

City, during December 1978. The subject of the seminar was comparison of leading features of Soviet and U.S. progress in thermonuclear fusion and related matters of relativistic physics. The question was, how to focus U.S. research in such a way as to catalyze the highest rate of advancement, in light of known Soviet work in this field.

The seminar emphasized that the most crucial advances in 20th-century relativistic plasma physics had been prompted by the influence of an 1859 paper of the leading mathematical physicist, Bernhard Riemann. This 1859 paper, predicting the generation of phenomena now popularly associated with "sonic booms," is entitled, "On Propagation of Plane Waves of Finite Amplitude." This paper was crucial for the work of Erwin Schrödinger in accounting for the wave-particle dualism of electrons, and was crucial in Soviet successful development of a deployable H-bomb.

Although that Riemann paper dealt nominally with predicting the generation of "acoustical shock-waves," there is nothing properly surprising, the Fusion Energy Foundation reports, in its broader application to micro-physics and plasma physics. The Foundation points out that this 1859 paper was developed by Riemann as an example of the kind of experiment needed to prove experimentally certain kinds of laws of the universe.

Riemann outlined this method in an early, 1854 paper, "On the Hypotheses Which Underlie Geometry," in which he first specified what he named the method of "unique experiment." The Foundation's scientists emphasize that if the universe is Riemannian in its physical geometry, then the 1859 shock-wave paper is a model form of experiment to be applied to a wide range of what are termed "relativistic" phenomena.

Unfortunately, now as during 1978, one of the major problems in the U.S. physics community, according to the Foundation, is the influence of Riemann's factional opponents, the so-called Newton-Cauchy-Maxwell faction allied to the late Bertrand Russell's co-workers and followers. Although experimental results have forced scientists to employ some aspects of Riemann's work, and despite the influence of such Göttingen University refugees as Richard Courant, no general, serious attention is given to the broader implications of Riemann's successes in some many fields.

Prior to the December 1978 seminar, the Foundation reports, it had had extensive discussions of this problem with leading circles of the U.S. plasma-physics community, meeting a generally negative attitude against serious treatment of Riemann's more general approach to physics. Yet, as the 1978 seminar noted, known Soviet successes, matched with the results of U.S. work, showed that no general progress could be expected until a more thorough study of application of Riemannian physics informed research into certain key frontier questions.

The seminar therefore resolved, the Foundation reports, to develop a computer-assisted program of economic analysis, using Riemannian methods to overcome what are termed commonly "non-linear" problems of economic analysis. This course of action was recommended at that time by a sponsor of the Foundation, Lyndon H. LaRouche, Jr., who stipulated that Riemann's 1859 paper defined in principle a comprehensive solution to this problem of analysis of economic processes. LaRouche undertook to commit the *Executive Intelligence Review* to assist the Fusion Energy Foundation in the proposed project. The *Executive Intelligence Review* would benefit by having access to the best economic-forecasting method in existence. It was agreed that the Foundation would have proprietorship over the mathematical-physics products of the joint effort.

An informed approximation of the LaRouche-Riemann forecasting method was brought on line during 1979, producing, beginning the final quarter of 1979, the first of a series of quarterly forecasts for the U.S. economy which has been the only competent forecasting by any governmental or private econometric forecasting agency during the period to the present date. The methods employed for this purpose were published by

the journal, *Fusion*, and the *Executive Intelligence Review*, during 1979 and 1980.

However, the Foundation spokesman stressed, the 1979-82 version of the LaRouche-Riemann forecast represented only an informed approximation of the result proposed during the December 1978 seminars. A full-scale application had to be delayed until a suitable assembly of indispensable demographic and energy-consumption data had been collected and cross-checked. Trial tests of the data-base during July have now adequately demonstrated the characteristics of the required "model" as to specifications. The results fully confirm the projected expectations of December 1978, the Foundation spokesman reported.

In view of the general scientific importance of the results, the characteristic features of the functions employed will be released during a projected September press conference, although the upgrading of quarterly forecasts to include these improvements is not projected to be completed before the final quarter of 1982.

The LaRouche-Riemann method of forecasting-analysis

The developments in economic science of LaRouche, the Foundation spokesman reported, are ultimately based on the principles of economic science defined by Gottfried Leibniz, beginning with Leibniz's 1671 *Society & Economy*. These are the same principles informing the work of Lazare Carnot's Ecole Polytechnique, and are most famous as U.S. Treasury Secretary Alexander Hamilton's American System of political-economy.

To this, the Foundation reports, LaRouche added one essential advancement in economic science, beginning 1952, with the discovery that economic processes are uniquely Riemannian.

"Leibniz created economic science proper," LaRouche insists, "by placing economics on what we would today best describe as a thermodynamical basis." According to LaRouche's writings on this subject, Leibniz started by focusing on the implications of the heat-powered machine, by means of which produced heat could replace human and animal muscle-power in the process of production. LaRouche emphasizes that Leibniz generalized this notion of the thermodynamics of production, to include a sense of the ordering of progress in productive technology prior to development of powered machines. From this basis, LaRouche reports, "Leibniz developed a rigorous conception of those notions we call work and power in both economic science and thermodynamics today."

LaRouche has argued that the first basic measurement of economy is a value he terms "potential relative population-density." This, he describes as the average number of persons who can be sustained on an average square mile of habitable land of relatively improved or

depleted quality, by means solely of the productive labor of the population inhabiting that land. His analysis centers on the fact, that the relatively finiteness of apparent natural resources for any fixed level of technology means that societies must either progress technologically or tend to collapse.

He insists that a second measurement must be made: the number of kilowatts of usable energy available per square mile of habitable land. The Foundation's spokesmen insist that mankind existing in a primitive food-gathering mode of existence could never have exceeded a world-wide population of about 10 million individuals, requiring an average of about 15 square kilometers of the earth's habitable surface to sustain an average individual. There is almost an exact correlation between increases in kilowatts of usable energy per square mile and rises in potential relative population-density per square mile.

Before proceeding to examine the function of technological progress in more detail, LaRouche insists, the broader thermodynamical characteristics of the economic function must be defined.

LaRouche, according to the Foundation spokesman, "begins with the usual procedure in ordinary thermodynamics. The total usable energy-throughput is first divided into two parts." The first part is the amount of energy the system must consume merely to prevent itself from "running down." This, the spokesman indicates, is usually referred to as the "energy of the system." The remaining part of the usable energy-throughput is usually referred to as the system's "free energy."

Generally, according to the spokesman, we think of the role of this "free energy" in one or a combination of two ways. Often, we consider the non-wasted part of the "free-energy" as the capacity to do work on something outside the system itself, as in the case of a power-generating system. In other cases, like an economy, we are interested in the application of the non-wasted part of the "free energy" in some way used to change the system which generates this "free energy."

We refer to the second kind of case as a closed system, the spokesman indicated. "We may describe the work done in the non-wasted free energy in this second, closed-system case, in various ways, all of which are really different ways of saying the same thing." Useful application of free energy can be viewed as raising the level of organization of the system, "which is the most useful way of looking at the process in some instances." There is a simpler, more commonplace, thermodynamical way of describing the result.

"We compare the ratio of free energy to energy of the system over successive periods of the operation of the system." If this ratio declines or turns negative, the closed-system process is described as *entropic*. If the

ratio rises over time, "we might say that the closed-system is exhibiting 'negative entropy.' It is more convenient to use a shortened term; we prefer to say 'negentropy.'

"There is more to be considered. If a closed system is consuming its own free energy in a negentropic way, the intensity of the energy of the system is rising. The best way to describe this kind of intensity is the term 'energy-flux-density.'" Energy-flux-density measures the rate at which useful work is passing through a standard cross-sectional area of the process, such as kilowatts per square meter. "Unless this rise in the energy of the system is accompanied by either a constant value for, or an increase of the ratio of free energy to energy of the system over successive periods, the system is not truly negentropic, but is running down, toward, at best, some equilibrium-point." LaRouche describes systems which sustain at least a constant ratio of free energy to energy of the system as "absolutely negentropic." He cites living processes and "societies which are not in the process of dying" as illustrations of closed-system processes which are "absolutely negentropic."

It is the increases in energy-flux-density, combined with maintaining a closed-system free-energy ratio, which, the spokesman stated, is key to the thermodynamic significance of what may be termed the increase in the level of organization of absolutely negentropic closed systems.

According to LaRouche, a negentropic development of society correlates with a twofold increase in the organization of the economy. First, he states, the division of labor in production and movement of goods becomes more complex. Second, he points to the fact that design of machinery may combine two or more labor-operations into a single machine-operation. He argues that this is merely transferring some of the complexity of the social division of labor into increased complexity of the machine. He argues that this has the general effect of increasing the complexity of production in the most advanced, tool-creating part of production, while reducing the portion of the labor-force required for consumer-goods production.

This, LaRouche pinpoints as the location of the problem of accounting for the role of technology as such. Up to a point, LaRouche and the Foundation insist, simply input-output modeling is unavoidable. However, they emphasize, in the case of either technological progress or contraction of the economy, any effort to interpret an economy in terms of systems of linear inequalities breaks down. "The rows and columns of the matrix are changed, as well as the coefficients," LaRouche stresses; "It is these changes in the proper input-output matrices, combined with the energy-flux-density-function changes, which cause the usual econo-

metrician to howl his cry of injured protest, 'non-linear.'" LaRouche ridicules as childish, the efforts of Ilya Prigogine and Prigogine's group to solve such problems either for economies or power-distribution networks. "For anyone familiar with Riemannian physics, the approach to the solution is properly quite obvious."

The basic solution, according to the spokesman, is to perform Riemannian integration upon a potential function of order N , to generate a potential function of order $N+1$.

So, the spokesman reports, potential relative population-density for the entire population of a society must be the measure of the required function. The only work actually accomplished by an economy is an increase in that potential for the society's population as a whole. This increase in potential relative population-density is viewed as congruent with an increase in the negentropy of the economy as a closed system.

It is this increase in potential which correlates with the required increase in energy-flux-density of the usable energy-throughput of the society. It is implicit that increase in the per-square-mile energy-throughput correlates with the per-capita energy-throughput values, in terms of the population-density per square mile. It is also implicit that the energy-flux-density of point-sources of usable energy must be increased to sustain the desired overall per-square-mile increase in energy-throughput.

'Energy pay-back'

It is clear, the spokesman noted, where the Foundation stands on such issues as "soft-energy technologies" and so-called energy conservation. One does not need to go so far as Riemannian analysis to show that society must measure the amount of energy invested in creating and operating an energy-producing system. How long must an energy-producing system operate, before it pays back to society the amount of energy used up in producing that energy-generating system?

With present solar-energy technology, the answer is "Never." Present solar-energy techniques use more energy than they produce in their entire lifetimes. The same is true for so-called bio-mass energy-programs. The effect of energy conservation-programs of the kind the Carter administration pushed, is that the United States will lose more energy as a result of those conservation measures than will be saved by the conservation itself. "Scientifically, the spokesman stated, "the so-called alternative energy programs and soft-technologies programs are all a gigantic fraud. They will accomplish exactly the opposite effect to that advertised."

In the LaRouche-Riemann analysis, what is measured, according to the spokesman, is the rate at which society's energy-flux-density is increased by the invest-

ment of energy in production. "Energy pay-back" is a built-in feature of the analysis.

The analysis shows immediately, according to Foundation spokesmen, that the only tolerable energy-generating policies for society today must be a combination of technologically-improved fossil-fuel combustion, such as MHD, combined with high-head hydroelectric power, and fission and fusion forms of nuclear-energy generation. "Our objective must be to generate fusion-energy in the form of a stream of charged-particle plasma, not neutrons. Using neutrons to produce steam, to run turbines, is like using a jet-engine to operate a mechanical horse pulling an old-fashioned buggy," the spokesman stated. "If the fusion-output is a stream of charged particles, conversions such as MHD-type production of electricity are obvious."

The spokesman also stressed that such forms of fusion-energy technology mean the most fundamental revolution in chemistry and production technology in the history of mankind. "Controlled, ultra-high energy-flux-density heat-sources mean a fundamental change in every one of our conceptions of production and natural resources."

The deeper issue

The spokesman emphasized that the successful elaboration of Riemannian functions for economic processes will not completely settle the issue between the two factions among scientists. He emphasized that there are deeper issues, which he illustrated by Gottfried Leibniz's attacks on the dangerous implications of the arguments of René Descartes.

"Since the time of Plato," he stated, "the definition of scientific method has been fought out between the followers of Plato and the followers of such Phoenician, pagan cults as the Temple of Apollo at Delphi and the Temple of Isis at Thebes. The fight is not going to die out easily or quickly. The fight of Leibniz against Descartes was essentially nothing but a continuation of the fight of the followers of Plato against the Cult of Apollo. The same history is true of the delphic cults of Newton, Cauchy, Helmholtz, Maxwell, and so forth, against Riemann."

The underlying issue has been, the spokesman stated, the implication of what are called the "five Platonic solids." He stated, "During Plato's lifetime, a collaborator of his at the Cyrenaic Temple of Amon proved that within Euclidean space, only five kinds of regular polyhedrons can be constructed. Kepler later proved that Plato's argument is correct. Kepler proved that this limitation of the five solids demonstrates that the physical space we see is not reality as such, but a special sort of distorted reflection of reality. We say, that the visual physical space we see is a geometrically bounded discrete manifold. By proving that the orbits

of the solar bodies are bounded as to orbit and orbital relative orbital velocities, by the harmonic principles adduced from the five Platonic solids, Kepler proved that Plato was correct, and Plato's adversaries completely in error. That, however, did not stop the adversaries from continuing to be adversaries.

"That was the issue between Leibniz and Descartes, between Leibniz and Newton, between Louis Lagrange and the neo-Cartesian Augustin Cauchy, and between Riemann, Weierstrass and Cantor, on the one side, and such as Kronecker, Dedekind, Helmholtz, Maxwell, Rayleigh, and Russell on the other side. It is the same old issue of scientific method, between the followers of Plato and the delphic followers of the ancient Phoenician cults, simply dressed up in fresh disguises.

"Riemann's special achievement was to complete what Kepler started. Kepler proved that the discrete manifold of visible space was a harmonically-ordered mirror of a higher reality. Riemann, standing upon the accomplishments of all of Kepler's followers, completed the work of defining in principle what the nature of that unseen, higher-order reality must be. What we see in our images of the discrete manifold is a harmonically-ordered reflection of real action occurring in a negentropic form of continuous manifold. That is, the continuous manifold is characterized by the principle of Riemannian integration of potential functions from any given order N , to an order of potential function, $N+1$. We can make statements which are true concerning the continuous manifold only by means of observations and experiments which meet the specifications of the unique experiment.

"The reasons for objections to Riemannian physics are not scientific. They are psychological. To put the point in the simplest terms, many people, even trained scientists, are fanatically attached to believing that the reflection of reality in the mirror of visible space is an adequate substitute for the reality which is reflected. Riemann's validity, like Kepler's, has been proven over and over again, to the point no scientific defense of Riemann's opponents really exists in the experimental evidence. The issue is not scientific. It is a psychological problem invading the practice of science. That is the reason that not even the hydrogen bomb could shake the delphic faction to its senses on this issue.

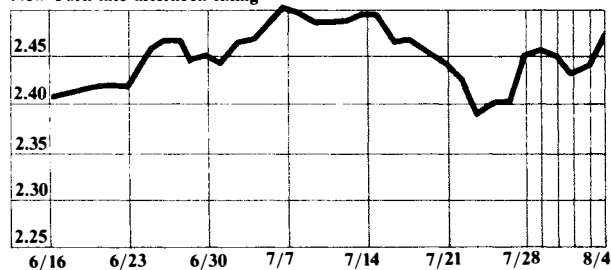
"The successful completion of the project will not necessarily convert pagan Phoenicians into Christians or Cartesians into scientists. We hope it will be useful to those scientists and others who wish to have the advantage of looking at Riemannian functions from a different vantage-point of comparative reference.

"Considering the kind of progress Riemannian physics can contribute to crucial areas of research today, one hopes there are not too many Phoenician fanatics among our scientific professionals."

Currency Rates

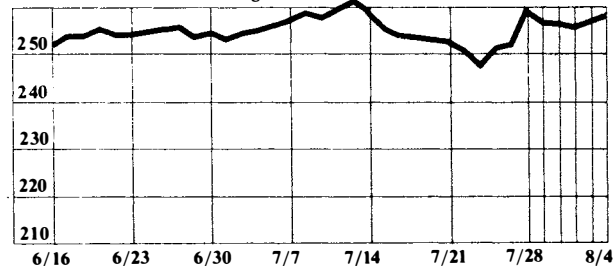
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New York late afternoon fixing



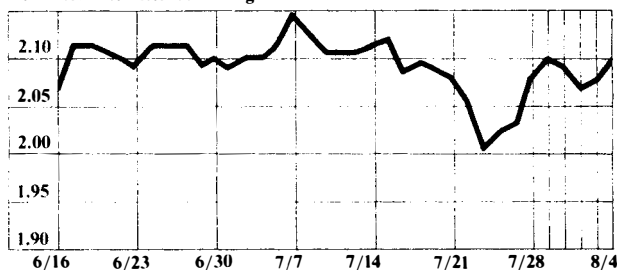
The dollar in yen

New York late afternoon fixing



The dollar in Swiss francs

New York late afternoon fixing



The British pound in dollars

New York late afternoon fixing

