

The role of economic science in projecting pandemics

as a feature of advanced stages
of economic breakdown

by Lyndon H. LaRouche, Jr.

. . . and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.
—*Genesis*, Chapter 1, Verse 28

The eruption of potentially pandemic cholera epidemics, under conditions of worsening famine in black Africa, conforms to a general forecast presented by a research team, during a Dec. 28-29, 1974 conference of the National Caucus of Labor Committees (NCLC), held in New York City. (See charts published in *New Solidarity*, Vol. 6, No. 1, Jan. 23, 1975; reprinted in *EIR* of April 30, 1985.) This forecast was based on calculations which assumed that the International Monetary Fund (IMF) and World Bank policies then in force, might be extrapolated into the middle to late 1980s.

There is no coincidence in the fact, that the present eruption of pandemics has occurred in the place, during the time-period, and under the conditions forecast, as projected more than 10 years ago. The published details of that 1974 study, reviewed today, include an elaborated analytical argument, which eliminate any possibility of mere coincidence.

There is no coincidence in the choice of methods of analysis adopted by the task-force which produced that 1974 study.

That task-force, was among the outgrowths of a broader project designed by this reporter, as specified in an internal NCLC memorandum of March 1973. In that 1973 memorandum, this reporter summarized points of congruity and interaction of economic and biological processes.

The method presented is what is otherwise known today as "The LaRouche-Riemann Method." That "LaRouche-Riemann Method," treats economic processes as implicitly a special form of living organism, employing conceptions for defining living processes, conceptions developed through the nineteenth cen-



UNHCR/Leslie Jenkins

A biological holocaust is occurring now in Africa, as famine and pandemics strike a population weakened by the International Monetary Fund's austerity conditionalities. The LaRouche-Riemann Method of economic science forecast this catastrophe 11 years ago, and provides the means to reverse it. Here, Eritrean refugees in Sudan—where one million people will die by year's end if emergency measures are not taken.

ture on the basis of initial discoveries by Luca Pacioli and Leonardo da Vinci, at the close of the fifteenth century. The economist employing that method, if given a bare handful of the most crucial parameters on per-capita energy-throughput requirements, immunological requirements, and evidence from historical epidemiology, can readily elaborate reasonable estimates of the relevant effects of economic devolution.

This report summarizes the most relevant features of that indicated correlation.

Mathematically speaking, what is life?

The first known mathematical discovery, respecting the essential difference between living and non-living processes, was accomplished toward the close of the fifteenth century, by the collaborators Luca Pacioli and Leonardo da Vinci. They demonstrated, by extensive and careful observation, that the harmonic patterns of growth and morphology of function, of living processes, were congruent with harmonic series determined by the Golden Section, whereas non-living processes are not so characterized. If we exclude processes on the scale of astrophysics, and smaller than approximately one Angstrom Unit on the microphysical scale, this discovery by Pacioli and Leonardo remains valid to the present day.

There is nothing intrinsically mystical about the Golden Section. It appears in elementary geometry, as the central feature of constructing what are known as the Five Platonic Solids. These are the only five kinds of regular polyhedra which can be constructed within the limits of "Euclidean

space." Of these five, four are simply constructed from the starting-point of the fifth. That fifth, the dodecahedron whose sides are each regular pentagons, is constructed by constructing first the so-called Golden Section of the circle. The Golden Section is nothing more mysterious, than being the limiting condition for commensurable constructability in "Euclidean space."

Since the work of the great nineteenth-century scientist, Carl Gauss, and his immediate collaborators, we recognize that the harmonic relations determined by the Golden Section, are the infallible projection of conic self-similar-spiral action in what is properly termed "the Gaussian manifold." Physical processes (lying between the astrophysical and microphysical extremes) which are congruent with Golden Section harmonics, are either living processes themselves, or of a special class of non-living processes, such as skeletons of dead animals, organized by a living process.

These definitions just listed, supply the proper definition for the term "negentropy," as opposed to a different definition of that term in statistical mechanics.

Any society whose economy approximates an ideal model of economic growth, is negentropic in the same sense as a living organism. The ideal model, is a society undergoing an approximately constant rate of technological progress under conditions of relative increase of energy-intensity and capital-intensity.

Sustainable economic (and population) growth, is measured as an (ideally) constant rate of increase of the potential relative population-density of that society. This is the mea-

sure of the average potential for growth of the society as a whole, and is also the absolute measure of per-capita productivity of labor in that society. Recognizing that “energy-intensity” and “capital-intensity,” include even the simplest kinds of useful improvement of land and maintenance of such improvements, and that increase of the productivity of average labor requires technological progress in some sense, we have the general picture. The most general facts from the history of mankind, are, first, that the upper limit of primitive mankind’s potential population is approximately 10 million individuals, second, that the population today is approaching 5 billion, and, third, that most of this increase has occurred since modern science was set into motion in Italy, during the fifteenth century. The rough “model” of increase of potential relative population-density, accounts for that process of increase of population, through technological progress.

“Ideal” economies, like healthy living organisms, are negentropic processes. The healthy economy has the same

congruence with the Golden Section, which Pacioli and Leonardo discovered to be the case for living organisms. The difference between living organisms and societies, is that the scientific and technological progress, which causes the increase of potential relative population-density, is itself a product of the developed creative-scientific potentials of the individual human mind; in this respect, the negentropy of the economic process is supplied in a different form than biological processes generally. Yet, at the same time, this negentropic mental activity, which is the proper name for “human intelligence,” is the activity of living organisms, persons, whose capacity to generate and employ the fruits of human intelligence is biologically delimited.

For reasons elaborated in published locations, the varieties of negentropic processes so indicated, can be comprehended mathematically, only along the lines of further, if uncompleted, development of Gaussian physics accomplished by Bernhard Riemann.

The geometry of life

Pictured are anatomical studies by Leonardo da Vinci (1452-1519), dating from the 1480s-90s, the time of his collaboration with the mathematician Luca Pacioli in creating a new scientific academy in the city of Milan. This collaboration produced the book *Divina Proportione*, which elaborated the conception that the harmonic patterns of growth and morphology of function of living processes are congruent with the Golden Section (called by Pacioli “divine proportion,” or proportion of self-similar growth). It is noteworthy that during this same period, Leonardo was designing new cities which would be “plague proof” because of advanced sanitation and fresh water-supply systems.

Leonardo da Vinci’s attitude toward his studies of anatomy is expressed in the statement inscribed on this drawing: “And you, O Man, who will discern in this work of mine the wonderful works of Nature, if you think it would be a criminal thing to destroy it, reflect how much more criminal it is to take the life of a man; and if this, his external form, appears to thee marvelously constructed, remember that is nothing as compared with the soul that dwells in that structure; for that indeed, be it way it may, is a thing divine. Leave it then to dwell in His work at His good will and pleasure, and let not your rage or malice destroy a life—for indeed, he who does not value it, does not himself deserve it.”

The model of the dodecahedron (inset), made up of 12 faces, each of which is a pentagon, was drawn by Leonardo da Vinci for Pacioli’s book. The pentagons can only be constructed by use of the “golden” self-similar ratio.



Economy and health

In both economies and living processes, analysis proceeds, by analyzing the total energy-throughput (or equivalent) of the process, between two broadly defined categories of consumption of that energy-throughput. The first of these two categories is roughly described as "the energy of the system": the portion of the energy-throughput which must be consumed or wasted by the process, merely to maintain the process at its existing level of state. If any portion of the energy-throughput remains, after deducting the "energy of the system" requirement, this remainder is roughly described as the "free energy" of the process.

On the condition, that the required consumption of "energy of the system" is satisfied, an increase of the ratio of "free energy" to "energy of the system" represents, potentially, negentropy. Whereas, a constant or decreasing value of this ratio, represents "entropy."

That is merely a crude, if broadly accurate, beginning.

It is the thermodynamic characteristic, of negentropic processes, that in a continuous negentropic function, the energy-flux-density increases with time. ("Energy-flux-density" signifies a measurement consistent with kilowatts per square meter, of throughput.) So, the "energy of the system" per square meter, increases. So, the margin of "free energy" required to maintain a constant ratio of "free energy" to "energy of the system," must increase accordingly.

In economic processes, the "energy of the system" is represented by the interdependency among three "market-baskets" of consumption. Each of these "market-baskets," corresponds to a minimum value, required to maintain the economic process at a constant level of negentropic potential. These three are:

- 1) The "market-basket" of households' consumption, per-capita;
- 2) The "market-basket" of producers' goods;
- 3) The "market-basket" of "basic economic infrastructure: energy production and distribution, water management, transportation, etc.: improvements in the quality of inhabited area, necessary to maintain at least a constant level of potential relative population-density.

The latter two, combined, represent the basis for measuring the increase of the per-capita "capital-intensity":

$(2 + 3)/1$ reflects "capital-intensity."

In general, increases in capital-intensity do not increase productivity, unless the amount of usable energy per-capita is increased sufficiently.

The increases in the indicated "energy of the system" "market-baskets," must be supplied by increases in per-capita output of the components of these "market-baskets." It is, broadly speaking, in this fashion, that "free energy" margins of output are converted into increase of "energy of the system."

If the level of technology were constant, then, the per-

capita output of society would proceed to the point that no further increase in output per-capita would result from increases in capital-intensity. At that point, further increases in capital-intensity, would merely increase the per-capita "energy of the system," without increasing the total energy-equivalent throughput: the ratio of "free energy" to "energy of the system" would fall; the economy would become "entropic." Only technological progress can sustain negentropy, can permit the durable survival of an economy, a society.

Such "entropy," signifies a fall in the potential relative population-density. The "ideal" case, at which economies are to be examined for economically-determined eruption of pandemics, is the case for which the potential relative population-density falls below the level of the existing population.

The conditions for economically-determined pandemics, may be either the instance in which the average consumption is determined by a fall of potential relative population-density, below the level of requirements for the existing population, and the special case, that the differential rates of distribution of the households' goods "market-basket" falls below the level of "energy of the system" for a large part of the population. We are most concerned with the effects on health, as the nutritional throughput per-capita falls below some relative biological minimum, and also the effect of collapse of sanitation and other relevant aspects of basic economic infrastructure upon the conditions of an undernourished population.

The first assumption, that the death-rates would be increased by malnutrition, requires no special inquiry in the language of economic science as such. It is the second alternative, that the undernourished population might become a breeding-culture for eruption of epidemic and pandemic disease, which requires special attention.

Descent to lower forms of life

The notion, that a collapse of potential relative population-density, should transform populations into breeding cultures for eruption of pandemics, is a possibility implicit in the proper choice of mathematics for living processes.

Geometry provides an elementary basis for examining the latter alternative.

The unique axiom of a proper form of elementary synthetic geometry, is that the only form of action which exists self-evidently in physical space-time, is the discovery, first by Cardinal Nicolaus of Cusa, that only circular action is self-evidently existent as a form in physical space-time: the so-called isoperimetric principle. For reasons elaborated in other locations, this can not be merely simply circular action. It must be triply-self-reflexive circular action, as symbolized by three moments of concurrent circular action, each at right angles to the other two in Euclidean space: that is the indivisible, unique axiom of elementary, indivisible action in physical space-time.

In elementary synthetic geometry, of the constructability of forms in Euclidean space, such triply-self-reflexive circular action, produces what are called "singularities": points, lines, surfaces, and solids. However, this, while correct as far as it goes, is not adequate for the construction of a physics.

Human perception is such, that we can not experience the perception of an instantaneous object. Perception is possible only as the experiencing of some change (transformation) during a finite displacement of physical space-time; a finite amount of time has elapsed between the beginning and conclusion of the smallest possible act of perception. Therefore, if circular action is uniquely axiomatic, we can never perceive circular action in physical space-time, except as spiral action.

If this spiral action is generated at a constant rate, what we perceive is a cylindrical helix. If the action is generated at either a constantly increasing, or constantly decreasing rate, we perceive a conical self-similar-spiral action. The latter, conical self-similar-spiral action, is the correct choice for a generalized physics; this defines the rudimentary form of a Gaussian (constructive) geometry, a Gaussian manifold, or Gaussian continuum.

However, in extending circular action in time, as a spiral action, we must not forget that our circular action, so extended, is triply-self-reflexive circular action. Even a doubly-self-reflexive conic-spiral action, generates a special kind of singularities, ultimately somewhat analogous to, but qualitatively different than, such elementary singularities as points, lines, surfaces, and solids.

In the simplest "ideal" case for a growing economy, the notion of merely doubly-self-reflexive conic-spiral action, presents us with this classic problem.

Given, a growing economy, developing at a constant rate of technological progress, in an energy-intensive, capital-intensive mode. In such an "ideal" case, the growth of the economy is not described merely by an ordinary sort of conic self-similar-spiral action. Conic-spiral action upon conic-spiral action, is typified in effect, by the case in which the ratio of arithmetic to geometric mean-values of spiral-action is increased harmonically over successive cycles. Instead of a simple cone, the locus of the action is a horn with a bell-shaped mouth. In one such case, a side-view of the horn describes an hyperbolic curve, seeming to shoot off into "infinity" in a Cartesian plotting. This apparent "shooting off

Fact Sheet

What experts say on the current breakdown

The following fact sheet was prepared by EIR for use at press conferences in Washington and other cities throughout the United States on April 24, announcing the release of the Special Report on the ecological holocaust (EIR, Vol. 12, No. 17, April 30, 1985).

The Pasteur Institute, Paris

Dr. André Dodin, a leading epidemiologist, stated: "Cholera is all over Africa, malaria too; yellow fever is in a belt going from Senegal to the Central African Republic. Africa has been invaded by these diseases. Diarrhea kills enormous numbers in Africa, especially in the cities, where there is not enough clean water. . . ." He stated that cholera had been spreading since 1971-72 in almost all of Africa, and especially Ivory Coast, Senegal, Mali, Somalia, and Zaire. It is spreading fast because people travel so much today. The other major disease killer in Africa,

he said, is malaria. He commented, "Unfortunately, health is following the economy. If the economy flourishes, health improves. If it deteriorates, so does health."

World Health Organization, Geneva

An official said on April 15, 1985: "One-third of all children's deaths in Africa are due to or associated with diarrhea. The highest diarrheal mortality rates are being recorded in Africa, even higher than Asia. . . . Out of 100 African children born, at least 10 will die before the age of one. One-quarter will die before the age of five. These rates are ten times the rates of Germany or Switzerland. One-third of those children—or 8% of all children in Africa—die of diarrhea."

Center for Disease Control, Atlanta

An infectious disease monitoring expert said on April 16, 1985 that the CDC estimates that there are 200 million cases of malaria worldwide. The subsaharan total population of 350 million people has 74 million official cases of malaria. Furthermore, the majority of people with the disease never get counted in the statistics because they live in remote areas. His colleague at CDC commented further: "We've felt for a while that areas like South America are wide open for cholera, *all* of South America. For example, some parts of Brazil are ripe for outbreaks. It's hard to believe it hasn't been introduced yet, that's the only ele-

into infinity," is a singularity, or, in other words, a mathematical "discontinuity" in the continuous development of the economic process.

However, the economic process does not come to a stop, while the hyperbolic arc seems to "shoot off into infinity." Let the central axis of the horn represent the time-scale. The economy as a physical process continues quite efficiently through the interval at which the mouth of the horn appears to zoom off "in search of Cartesian infinity." What happens, as Riemann supplies preliminary indication of this, in his 1854 "On the Hypotheses Which Underlie Geometry," is that as a physical process generates a singularity of this kind, the metrical characteristics of action in the affected region of physical space-time are altered. As the horn appears to zoom off in search of infinity, the process continues, operating now on a modified metrical basis.

A new hyperbolic, or kindred, curve, is described, with the same general result; and, after that, a third; and, so on. On the time-scale (for the indicated "ideal" case), the intervals between the singularities become shorter, and these successively shorter intervals describe a harmonic series.

This indicates, that another way of measuring negentro-

py, is to measure it in terms of the increasing density of Gaussian-topological discontinuities (singularities) per arbitrarily small interval of time. The point to be stressed now, is that a decreasing density of singularities, is a measure of the relative entropy of a process.

This is a useful vantage-point from which to ask, "What happens, when a biological system, such as a society, falls entropically, to a lower level of existence?"

The negentropic ranking of relative higher and relatively lower orders of living species, may be estimated in terms of the relative density of singularities of the living processes examined. From this vantage-point, it is not necessarily the case, that the human population simply dies of effects of malnutrition.

Society is an integral part of the biosphere, both the biosphere as a whole, and regionally. Rather than measuring the level of relative negentropy of society as such, let us consider the effect of society's development upon the average level of the biosphere which contains that society. This was the crucial feature of the March 1973 memorandum referenced. Rather than viewing a deep fall of the potential relative population-density, as merely a fall in the relative value for

ment lacking. We all thought that after 1975-76, and the revolution in Angola, there would be large cholera moves into Brazil, because cholera was widespread in Angola. Why it hasn't happened yet in Brazil and other parts of South America, I just don't know."

The privately expressed opinion of another CDC expert was: "Cholera is not even being monitored in China and Southeast Asia. In Africa only 20% of the Africans who have cholera are symptomatic, so that the reported figures for cholera should actually be minimally multiplied fivefold."

World cholera expert

"Somebody may be consciously deciding not to treat cholera victims in Somalia. I can't figure out why *anybody* need die of cholera. It makes no sense. The oral rehydration treatment is incredibly cheap, costing the equivalent of 10 cents to at most one dollar per person treated, and it is universally known. There's no way possible anybody could not have heard of it."

Fusion Energy Foundation, Washington

Dr. John Grauerholz declared: "Cholera is now endemic in 96 countries worldwide, and has the potential to rapidly expand, under collapse conditions, into Europe and the United States. Approximately 75 regional subdivisions of African countries have serious cholera prob-

lems, according to recent data from the Center for Disease Control in Atlanta and the regional World Health Organization office in Washington, D.C. The affected countries include: Benin, Burundi, Cameroon, Equatorial Guinea, Ghana, Ivory Coast, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Rwanda, Senegal, Somalia, South Africa, Swaziland, Tanzania, Upper Volta, and Zaire. Two other countries known to have endemic cholera problems, but which have not made official reports to the World Health Organization, are Ethiopia and Sudan.

"The African crisis is a direct result of the International Monetary Fund's austerity conditionalities, designed to effect the depopulation policies of the Carter administration's *Global 2000* report. Under these policies, African agriculture, which once produced exportable food surpluses, has been ravaged and the populations herded into refugee camps, which serve to concentrate large numbers of sick and starving people in an environment suitable to the rapid spread of disease and lacking any means of prevention or treatment. These camps serve as giant cultures for growing viruses, bacteria, and parasites, and propagating them in a susceptible population. The IMF response to this breakdown has been to demand even greater austerity and to place increasing pressure on these countries to pay their debt. The only possible result of this policy is to ensure the most rapid possible extermination of the population of black Africa."



Children in New York's South Bronx. Conditions are now ripe for the spread of epidemics, even in the United States.

the society as such; let us examine this as a fall in the relative level of the biosphere including that society.

For convenience, let us say that a collapse of society obviously requires the affected portion of the biosphere to function at a reduced level of relative negentropy. In other words, this must tend to be adjusted, by increasing the role of relatively lower forms of life. That was the proposition subsumed by the cited March 1973 memorandum. Lower forms of life "consume" human and other higher-level forms of life as "fuel" for their own proliferation. The attempted thermodynamic analysis of cancerous development, by Chicago's Dr. Nicholas Rashevsky, was referenced as a model for such a transformation within the biosphere.

Instead of simply assuming, that man collapses within a constant level of the surrounding biosphere, assume that it is the biosphere which is directly affected by a collapse of the human population-potential, and that it is the biosphere which must adjust to the impact of the drop in its own potential caused by the collapse of the included human potential. In that variant, human and animal pandemics, and sylvatics, must tend to resurge, and evolve, under certain kinds of "shock" to the biosphere caused by extreme concentration of fall of population-potential. Instead of simply dying of effects of malnutrition, the population generates a pandemic which becomes the biosphere's adaptation to its own reduced state, and this pandemic then attacks the concentration of fall

of potential which has caused the lowering of the potential for the biosphere generally.

During 1974, this was the hypothesis examined against the available array of evidence respecting historic eruptions of pandemics. The evidence correlated significantly with the hypothesis. On the basis of this correlation, the published estimates were projected.

The levels at which falls in the essential components of the "market-basket" of nutrition correspond to preconditions for eruptions of pandemics in widespread concentrations of population, are broadly supplied by medical specialists. It was merely necessary to estimate the rate of fall of population potential toward such threshold-levels, and to take into account the duration of such conditions historically indicated as consistent with brewing of a new upsurge of pandemics, to foresee when, how, and where a continuation of 1974 trends in monetary and economic policy would probably generate such eruptions.

Supplementary observations

One of the hideous, classic cases considered broadly, in conducting these forecast-studies, was the manner in which the Nazis caused the mass-deaths in the war-time concentration-camps. Contrary to popularized legend, the core of the method of mass-murder, was not the gas chambers. If I supply slave-labor with, for example, 1,000 calories of nourishment a day, and exact 2,000 to 3,000 calories of output, within an estimable number of weeks of hard labor under these constraints, a healthy slave is transformed into a near-corpse. The cheapest method for "cost-reduction," in the camps to which the worn-out slaves are returned, is to place these worn-out slaves in a crowded, filthy barracks, with assorted other "unusables," and to allow the spread of disease among the sickened starvelings to decimate their ranks, and then, to use other "useless" slaves to assist in disposing of the dead. This was the essence of the Nazi death-camp system; contrary versions are, to a very large degree, merely legends, at least insofar as the majority of deaths is concerned.

The legend, that it was the Nazis' gas chambers, rather than the logic of slave-labor economy, which decimated the Nazis' concentration-camp captives, serves today as a convenient way of overlooking the fact, that the same methods actually used to cause the deaths of the majority among those victims, are the methods imposed upon entire, increasingly numerous regions of the world today, by the Schachtian policies of the International Monetary Fund's "surveillance."

As for those who console themselves, that the death of as many as 300 million black Africans, through chain-reaction effects of IMF "conditionalities," over the coming period, is a far-away catastrophe, not to intrude upon an evening's escapism into TV soap-opera, we have inside the United States already, no fewer than 30 million Americans in a ripe

condition for assimilation and spread of pandemic infection, should such infection leak across our borders; otherwise, the fall in animal-protein consumption within spreading portions of the general population, represents a population increasingly weakened in its potential resistance to pandemics.

Unless IMF "surveillance" is nullified and reversed, the entire world, including Western Europe and North America, is becoming increasingly ripe for effects like those which decimated the population of Europe during the middle decades of the fourteenth century. When we continue to tolerate IMF policies already unleashing genocide against black Africa, and other "third world" regions, we exhibit in ourselves a lack of the moral fitness to survive. If we do not reverse this toleration we have exhibited to date, the unleashing of pandemics from Africa and elsewhere, will sweep into the depression-weakened portions of our own population, and our lack of moral fitness to survive may become indeed the cause of our own destruction.

By continuing to tolerate IMF "conditionalities," we are close to unleashing upon this planet such a combination of revived and new pandemics, that general thermonuclear war would be preferable to the biological holocaust, which IMF policies will have unleashed upon this planet.

If the indicated economic causes for pandemics are as our

hypothesis suggests new pandemics to be generated, it must be the case, that diseases are created not by chance mutation of pathogenic organisms, but are rather created within weakened cell-tissue of the infected bodies. The disease, penetrating and interacting otherwise with cell-tissue's processes, becomes a part of that cell's functioning, such that more than the pathogen's feeding upon the cell's material must be considered to define the true character of the disease. If that is so, as much suggests this to be the case, then the collapse of the reproductive function of the cell, to a lowered state of relative negentropy, must directly affect the reproduction of the pathogen, such that the pathogen's reproduction adapts to the pathological condition of the cell's own reproductive processes. In other words, something much more than a mere lowering of the victim's resistance to the pathogen, must be taken into account.

If this is the case, as the indicated line of mathematical argument strongly implies might be true, then, the effect of a rapid collapse of levels of global population, as proposed by the Club of Rome and President Jimmy Carter's "Global 2000," and as implemented by worsening IMF "conditionalities," is breeding a new dimension of biological holocaust of such horror that we would welcome general thermonuclear warfare as a more merciful alternative.