VI

Reproduction of man

The most crucial among the *specifically economic* facts which set a Christian economic practice apart from any other, is the manner in which both Leibniz's *science of physical economy* and Christianity define the *sovereignty* of the individual personality. As we have stressed that fact thus far, this *individual sovereignty* is strictly defined, uniquely, by that *universal historical fact* which sets the human species perfectly, and absolutely, apart from any and all beasts: *the divine spark* of developable potential for *creative reason,* as this is defined in such recent locations as *In Defense of Common Sense*[1] and *Project A*.[2]

The crucial historical fact referenced by economic science, is the combined increase in per capita productive powers, and in potential productive fruitfulness of land-area, resulting from society's progress from lower to higher levels of culture. This progressive change, in both elements, is incorporated within, and subsumed by the notion of *a rate of increase of potential population-density*. In other words, this is a notion of *an implicitly continuous function,* expressed in terms of *a functionally variable such rate of increase*. That function expresses the effect of increase of the level of development of the *potential mental-creative powers of the individual* in the society.

At first inspection, these considerations may appear almost self-evident. After a more thoughtful, more rigorous second glance, we find that we are among the most troublesome axiomatic problems of any mathematical physical science. There are principally two such issues posed by any rigorous reflection upon the reproduction of the successive generations of a society.

First, we discover that although we do employ the ordinary counting-numbers to effect a raw measurement of actual population-densities, we may not employ simple arithmetic methods in defining the number of individuals represented by an increase (or decrease) of potential population-density.

Second, the sovereignty of the person's creative-mental processes defines the "economic individual" of per capita calculations as both *formally* and *ontologically* a member of the higher of the species of Gottfried Leibniz's *monads*.[3]

A student of mathematical physics who had considered only carelessly what we have summarized thus far, would probably fall into a blunder of the following description. Imagine a teacher-student exchange including these elements.

We have identified the precondition for durable survival of a social culture, as a continuing process of successive increases in the average *physical* productive powers of labor, effected through the generation, transmission, and *efficient* assimilation of valid, revolutionary scientific (and related) discoveries, transforming generally social practice. We have summed up the interdependent benefits of such continuing scientific and technological progress, respecting persons, society, and non-human nature, in terms of *rate of increase* of potential population-density.

How shall we measure *potential population-density?*

To come directly to the crucial point: Shall we, or shall we not, use simple counting-numbers to identify *actual* or *potential* population-density per unit area of land-use? Essentially, it would be a sophomoric blunder to use the simple counting-numbers to measure their respective population-densities for simple comparisons. The nub of the issue, stated most simply, is, as we noted in an earlier section, that the typical individual in one set is an individual of a different *quality* than that of another set.

Let us examine one aspect of this difference in *quality*. Let us view this first in the most rudimentary and one-sided way: in terms of social costs of producing a unit per capita value of a family household's basket of consumption requirements.[4]

As we raise the level of technology in productive and related practice, we increase the required quality of educational and correlated development of the *creative potential*[5] and moral character of the young. Therefore, we increase the per capita consumption and constructive-leisure requirements of the family household which produces these young. Nonetheless, we increase the per capita productivity potential of the society by a greater amount than the increased costs of the family household's basket of necessary consumption.[6]

Also, as society's condition is elaborated in these ways, the demographic characteristics of the society are altered.

Yet, important as these two kinds of changes are, they reflect something more profound, more spiritual, if you please.

In counting potential population density, we do not count the number of individuals as one; sometimes, we may make an approximation by counting the number of persons as individuals, in terms of countable numbers, for an estimation of *actual* population-density statistically, but that does not define *potential* population-density.

The obvious reason is that the use of the counting-numbers, particularly for the purposes of measuring density functions of any kind of counting magnitude, assumes that there is an equal magnitude usually, in some sense an equal magnitude, associated with each counting-number.

But that is not the case with human individuals. The quality in the human individual, relative to the density function, changes, as the density function of a *potential* population-density function increases. That is, both the activity, in the first approximation, and the consumption per person increases.

Furthermore, these functions are associated with a primary function, which is creativity: the higher order of creativity.

Thus, we have this nonlinear magnitude, the higher order of creativity, with its predicated features of required consumption levels, and potential productivity, in one sense or the other, occurring within a sovereign individual.

So, when we're counting individuals, we're counting sovereign entities, whose internal magnitude is determined in the indicated, nonlinear way.

Thus, when we compare populations in two periods of time, assuming a process of development, we are comparing *non-comparable* magnitudes. What we're comparing, is simply the absolute number of equivalent of sovereign individuals who might satisfy that potential population-density function. We are not assuming that you are simply increasing the number of persons per se.

Suppose we increase our population-density over a significant interval between points A and B in historical time. The same society. The higher potential population-density at B does not mean a higher density of the *same* individuals as at A; but rather, a higher population of *transformed* individuals, or individuals of a transformed quality.

So, that's the point we're at in terms of reproduction. And it's on this point of the *quality* of the individual that the crux of the Christian aspect, that is, the *Filioque* Christian aspect of the science of Christian economy, pivots.

The ontological paradox of social production

If we attempt to represent rising population-density in an appropriate mathematical function, as an effect of a capital-intensive, energy-intensive mode of social investment in scientific and technological progress, we should recognize immediately why we cannot compare the individual persons undergoing such a transformation in this productive potential as simply-countable individuals. Over the duration of a continuing function, each person represents a changing magnitude from the standpoint of this function.

The same difficulty confronts the student in the case where a more generalized form of the same mathematical function is employed describing the condition of declining potential population-density.

In a third case, the apparent steady state, constant potential population-density must be determined as a representation by the same generalized function employed to represent both increased and decreased potential population-density.

However, the idea of a constant apparent potential value for potential population-density, that is, the notion of society maintaining such an apparent "steady state" over an extended period, presents the student with some provocative, and very relevant results.

Remember, that even the simply-continued existence of the society, at *a constant level of employed technology,* must determine a declining potential population-density. This fact is illustrated by the rise in marginal social costs, and lowered average productivity, caused by a marginal depletion of quality of resources. Only technological progress can offset that factor of marginal depletion. So, to achieve a net zero growth, "steady-state" condition for an economy (as measured in potential population-density), it is indispensable to maintain a corresponding level of capital-intensive, energy-intensive investment in scientific and technological progress.

Imagine a three-dimensional graph, in which the *x-axis* is *time,* the *y-axis technological progress,* and the *z-axis potential population-density*. So, for a constant value of potential population-density, in terms of a function of z, there must be an associated rate of increase in the function of y. This function of y is implicitly not a linear function.

This simplified imagery illustrates the point that, in order even simply to maintain a "steady state" of potential population-density, there must be constantly a significant increase in the level of capital-intensive, energy-intensive investment in scientific and technological progress. This defines a "world-line," as the locus of a steady value for potential population-density.

In this sort of function, the individual person corresponds to a *changing* function of activity. Thus, even in our hypothetical steady-state society, the average individuals in successive intervals are not equivalent individuals. Not only are they different magnitudes, but over the longer term, at least, the differences are reflections of a nonlinear function.

Although each person's biological individuality is simply countable, human and animal population functions are not comparable; we cannot count humans competently as merely biological individuals, as we are permitted to count animals with fair approximation. The functional significance of the differences in human individuality is not *merely* the biological individuality; rather, the biological individuality is, essentially, merely an indispensable *vehicle* for a different kind of individuality. That latter, different kind of individuality, is the sovereignty characteristic of the individual's developed mental creative powers.

In shorthand, even in a steady-state society, the average individual is a *nonlinearly* changing quality.

Land and people

We must never lose sight of the fact, that it is not sufficient to improve nonlinearly the quality of the average individual person. We must also transform the wilderness into a fertile place, a place where fertility is defined in terms of both the existing and emerging levels of productive and related technology.

In the earlier civilized, or quasi-civilized cultures, until modern times, more than nine-tenths of households were occupied in agricultural and related production of physical wealth. The introduction of steam-powered machinery along lines pioneered by Gottfried Leibniz, brought a drastic change over the course of the nineteenth century, a change which, when successful, has followed the outlines of cooperative relationship between township and countryside presented by U.S. Treasury Secretary Alexander Hamilton's 1790 Report to the U.S. Congress *On the Subject of Manufactures*.

From this modern vantage-point, we are able to offer certain securely proven generalizations respecting the mathematical forms of representation of physical-economic history up to this time.

To this effect, we define the required improvement of land-area and waters in terms of physical-economic categories of *land-usage*. To this effect, we associate each among the family households of which the total population is comprised, with the primary physical-economic (e.g., household-income related) activity of the adult labor force members of that household.

In the statistical practice of physical economy, the functional relationship between per capita potential for *physical productivity,* and fecundity of improved or other land (and water), area, is treated in first approximation in terms of *categories of land use*. Seven such rough categories are employed: 1) basic economic infrastructure; 2) agriculture and related; 3) mining and closely related; 4) manufacturing; 5) residential; 6) commercial and administration; 7) other (including unused reserve land, wasteland, etc.).

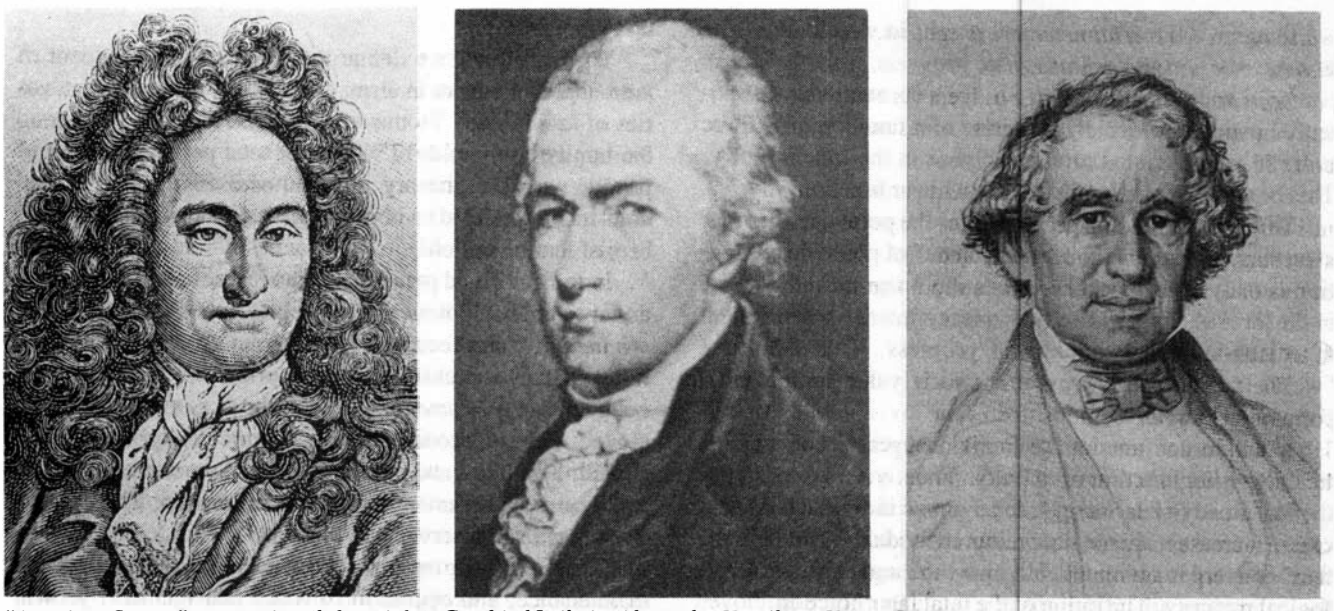
Basic economic infrastructure includes the development, maintenance, and operation of water management, general transportation, generation and distribution of power, general sanitation, and general communications. It also includes general education and related cultural support for the population as a whole, and general medical and related health-care delivery. These represent the categories of essential capital improvements in the society's total environment, required to sustain a population in its production at a given level of range of both technology in use, and of range of potential population-density.

In sane, civilized nations, the development and maintenance of basic economic infrastructure is the economic responsibility and customary function of government. In successful modern economies such as the pre-1964 U.S.A. (prior to the mid-1960s "post-industrial," "neo-malthusian," "rock-drug-sex counterculture" "cultural paradigm-shift"), basic economic infrastructure was supplied either as an economic activity of government, or as the function of a government-regulated, if privately owned public utility. If the state does not adopt and maintain efficiently its moral and economic obligation to provide adequate basic economic infrastructure, private enterprise generally will fail, and misery abound.

In the matter of determining the upper bounds attainable by production in general, three aspects of basic economic infrastructure are most conspicuous: water, power, and transportation. Examine each briefly.

Water. In the history of physical economy, the emergence of civilization is the history of oceans, shores, rivers, lakes, and of water-supplies as food for the hunger of the land. Water is the source of food from the sea, lakes, and streams, chiefly animal protein. Water is transportation, historically the superhighway along which every civilization has advanced.

Look to the development of Europe from the time of Charlemagne. The history of the development of Europe's



"American System" economists (left to right): Gottfried Leibniz, Alexander Hamilton, Henry Carey.

nations, cities, and population-densities, is the history of Europe's seas, coastlines, navigable rivers, and canals. Even today, water-borne freight has inherently the lowest cost per ton-mile, and, as cheaper, bulk cargo, also the lowest cost per ton-mile-hour or ton-kilometer-hour, better than the next-best competitor, rail. Coasts and rivers are the oldest arteries of civilized life.

The productivity of land, for agriculture, mining and refining, manufacturing, and reside[illegible]ssed in correlation with cubic liters of water.

Similarly for *power*. For purposes of first approximation, we may measure power in linear quantities per square kilometer, and also in the simplest qualitative terms, *energy-flux density*, e.g., watts per square centimeter of a cross-section area of direct application.

Transportation. In order of increasing cost per ton-kilometer, we have transport of freight by navigable water, rail, highway, and air.

If cost per ton-kilometer were the only factor of cost in determining the per capita physical-economic productivity, then water would predominate such that long-haul highways and air freight transport would virtually not exist. Two considerations require heavy emphasis on rails, upon relatively short-haul highway freightways, and air freight.

First, there is the matter of *density*. The possibility for economical development of navigable waterways is limited, such that rails and highways are indispensable additions to our freight-transport repertoire. Otherwise, much of the world's land area could not be significantly productive.

Second, there is the cost factor of *time*. We are required to supplement measurement of costs in terms of ton-kilometers, by cost in terms of ton-kilometer-hours. *Spoilage* is an obvious consideration, a point which should require no further elaboration in this location. Here, we emphasize the great increase required in a nation's work-in-progress inventory, if the average time to move goods from production point A to production or distribution point B is significantly increased. This consideration is taken into account in fair degree or first approximation, by replacing ton-kilometers with ton-dollars or ton-ECUs per kilometer-hour.[7]

Among the cost variables to be considered in such computational systems of linear inequalities approximations, are the capital and maintenance energy-costs of the respective modes of freight transport.

The physical costs of these cited, various forms of basic economic infrastructure vary significantly in two degrees. They vary in correlation with the normal level of productivity expressing, in turn, a degree of development of employed technology. They vary also according to category of land-use.

For example: At any level of quality of existence, the average member of a family household requires a minimum to maximum range of daily potable water consumption. This is reflected chiefly in the statistician's *residential* category of land-use. If we apportion the per hectare output of the *agricultural* land-use by average per capita requirements, we must associate these per hectare and per capita rations of output with a corresponding fresh water requirement. We have a similar case for *mining*, *manufacturing*, and so forth land-usages.

So, in this vein, the rising physical, plus absolute educational and medical costs, per capita consumption market-basket, required by a rising level of applied technology, is associated with infrastructural requirements expressed in such *combined* per capita and per hectare terms as *liters of potable* (and other qualities) *water*, *watts per hectare*, and

watts per square-centimeter cross-section, ton-dollars per kilometer-hour, and so forth.

So, our physical-economic universe is examined statistically in such units of infrastructure measurement per capita unit of land-use.

As to other categories of land-use, other than physical infrastructure, it is not necessary to elaborate these in any significant degree in a paper dedicated to the specific purpose of this one. A few further remarks should be sufficient.

Capital-intensity

The technological progress of society is reflected in the form of a changing composition of the division of (physical) labor within and among the family households of which a healthy society is composed predominantly.

As longevity is increased, as physical productivity per capita increases, the possible required modal "school-leaving age" converges asymptotically upon the mid-20s age of biological maturity. The ration of the total labor force employed in agriculture and other rural occupations declines toward what is apparently an asymptotic lower limit of perhaps approximately 1%. Within urban centers, the ration employed in production of producers' goods increases relatively to the shrinking urban ration employed in production of household goods—although the absolute physical content of the per capita household ration of consumption increases.

These shifts correlate with an increase in the power employed by society per capita. This is a *humanizing* of production, away from muscular, to mental means of controlling willfully the minutiae and end results of the productive process. This is expressed in great part, in a rise of capital-intensity, a capital-intensity reflected in the ratio of productive employment, between producers' and households' goods, of the urban labor force.

Private entrepreneurs

There is no reasonable doubt, but that David Hume and his follower, Adam Smith, were dedicated adversaries of both Christianity and Western civilization. It ought to be clear also, that to the degree that private entrepreneurship in high-technology family farms and manufacturing is essential to the superiority of modern European forms of economy, the superiority owes nothing to Smith's famous "invisible hand" dogma, but rather to the Christian fostering of the value of the human individual as *imago viva Dei*.

Adam Smith briefly

Smith is associated with a single conception so crucial to all his work, that everything else he asserts, or that which is asserted by his modern devotees, stands or falls absolutely upon that one point. It appears as the centerpiece of argument in Smith's two principal published pieces, his 1759 *Theory of the Moral Sentiments,* and as the "invisible hand" dogma, in his more famous, plagiaristic physiocratic piece, the 1776 *Wealth of Nations*.

Smith, following in the proto-positivist school of British philosophical irrationalism of such predecessors as Franc(i/e)s Bacon, Thomas Hobbes, John Locke, and David Hume, asserts in the 1759 book, that man is incapable of foreknowledge of the larger consequences of his actions, and is advised therefore to be indifferent to the ultimate effects of his acts of commission and omission. In the *Wealth of Nations,* Smith's advocacy of pagan (epicurean) immoralism assumes the form of the dogma of the "invisible hand."

In fact, the net result of every generalized application of the British model of liberal political-economy, has been the contraction, or even collapse, of the region of the world subject to the rule of that so-called "free trade" system. In the case of the U.S.A., whose federal constitutional government was founded successfully upon rejection of Smith's British liberalism, we see that each time the "free trade" dogma was introduced to the government, as under Jefferson, Madison, or Jackson, for example, the direct result was national economic catastrophe. The accelerating of the collapse of the home physical economies of Britain and the U.S.A., during the past 25 years, is a fresh example of this.

London's prosperity during the nineteenth century is no exception to this rule. It was Britain's looting of the population and natural resources of its empire, the looting of much of the rest of the world through the London market's dominant part in the bloodsucking practices of international usury, which were the source of Britain's economic power during that century.

Similarly, today, it is the Anglo-Americans' looting of most of the planet through aid of the mass murderously bloodsucking practices of the International Monetary Fund's "conditionalities," which produce hundreds of billions of dollars of loot annually into the collapsing U.S. economy of the mid-1980s.

Nonetheless, throwing Adam Smith and his dupes to one side, there is something of great practical importance to be said in behalf of private entrepreneurship. The history of England even prior to Adam Smith provides an important clue.

The efforts to promote scientific and technological progress during the fifteenth century, for example, met powerful resistance in the form of craft guilds' stubborn enmity against technologies offering economy of labor. Against this backwardness, stands out such notable cases as Brunelleschi's solution to the challenge of constructing the cupola of the Cathedral of Florence. One of the practical solutions found for the backwardness of the guilds was the use of the power of government to create limited corporate monopolies, of fixed duration, to promote the production and sales of useful inventions.

In the emergence of such patents in sixteenth-century England, for example, must be seen reflected the work of such as Nicolaus of Cusa and others, during the fifteenth century, in stipulating from the vantage-point of natural law, the right of nations to the benefits of scientific and technologi-

cal progress.

Those and related aspects of modern economic history serve here to illuminate a deeper principle. It is only through the direction of human society's behavior by means of the faculty of creative reason, that the human species exists, is able to survive as human, is in *imago viva Dei*. This is the connection to the true basis for promoting private entrepreneurship.

Scientific and technological progress is a characteristic reflection of that divine spark of potential for creative reason which defines man as *imago viva Dei*. As we have illustrated by reference to *classical forms of art*, and to the function of *agapē* more broadly, scientific and technological progress as narrowly defined is not the exclusive expression of the divine spark, but is the only form in which that spark is reflected as an approximate form of physical-economic practice of entire societies. Most simply, any contrary policy of practice for economy would negate man as *imago viva Dei*.

The qualification implicit in the foregoing paragraph taken into account, the object of society is to produce individuals who are *imago viva Dei*, individuals expressing a lessening of the imperfection, the realization of their true nature as in the living image of the Creator. Society and its individual members must thus live and work in a manner consistent with the purpose of human existence.

Insofar as entrepreneurship in physical-economy is a means for placing economic processes under the *lawful domination* of the creative principle reflected as fundamental scientific progress, either entrepreneurship or something equivalent to this specific effect, ought to be considered in principles of economic science.

This point is directly relevant to the causes and failure of the now-collapsing Soviet economy; but, it is equally cause for opposing, and despising those "free trade" dogmas which have brought about the presently ongoing collapse of the Anglo-American economies. In particular, what is called "Thatcherism" by some—notably the policy of "deregulation" and "privatization" which former Prime Minister Margaret Thatcher adopted as her principal stock of professed political wisdom—deserves to be put into the bottom of the rubbish bin of history as quickly, and as permanently, as possible.

We must demand, on the one side, that the hierarchy of governments' parts—national, regional, and local—each assumes, in a mutually coherent way, appropriate respective responsibilities for maintaining effective monopolies of regulatory power to supply an adequate development and maintenance of basic economic infrastructure. Yet, we must also insist upon preference for quasi-sovereign entrepreneurship as the form of ownership and direction in agriculture and industrial production and distribution of physical goods. That is no contradiction in our policy; rather, the differences in our political treatment of basic economic infrastructure and private owner-management of production, flows coherently from a single principle.

Our principle is the nonlinear process of increase of society's potential population-density through the direction of society's physical-economy in a capital-intensive, energy-intensive mode of investment and production, under the rule of a form of scientific and technological progress consistent with the creative principle of *imago viva Dei*.

Wherever possible, we rely on social-economic forms which are consistent with the sovereignty of the relevant creative processes: hence, the principle of entrepreneurship. Yet, wherever the continued advancement of scientific and technological progress demands it, the government must be responsible for establishing and maintaining the necessary preconditions, both as basic economic infrastructure, and as regulation of the market.

For example, it is insane, and immoral in the extreme, to foster a market in which the prices paid to farmers are below the average cost of production of an adequate supply of food. Today, when governments intervene to prevent those usurers called food-cartel monopolies from drawing down the farmer's price so, the "free traders" howl insane moral indignation against "subsidies," and demand a practice of "free trade," which, in fact, will be globally more mass-murderous in effect than Hitler's Schachtian slave-labor system.

Similarly, society's political economy must provide, through government, an adequate development of basic economic infrastructure. That governmental provision is not an *exception* to private entrepreneurship in agriculture and industry; it is, rather, an indispensable precondition for a successful form of entrepreneurial economy.

The moral object of production is the reproduction of mankind according to the individual person in the living image of the Creator. On that account, we are each morally responsible for all mankind, past as much as present and future. We are responsible to our forebears, to fulfill in the richest degree possible, the potential of good they've contributed in their time. We are each responsible to the limit of what we may develop our creative powers to become.

Notes

1. See Appendix A.

2. Lyndon H. LaRouche, Jr., *Project A*, Appendix, pp. 64-71, in *EIR*, Vol. 17, No. 41, Oct. 26, 1990.

3. G.W. Leibniz, *Monadology*, trans. by George Montgomery (Peru, Ill.: Open Court Publishing Company, 1989), pp. 251-272.

4. Lyndon H. LaRouche, Jr., *In Defense of Common Sense*, pp. 5-9.

5. cf. Lyndon H. LaRouche, Jr., *Project A*.

6. Henry C. Carey, *Principles of Political Economy*, Reprints of Economic Classics, (New York: Augustus M. Kelley, 1965); and *The Harmony of Interests: Agricultural Manufactures and Commercial*, (Philadelphia: J.S. Skinner, 1851, reprinted by A.M. Kelley, 1967).

7. For example, a simple indifference curve can be constructed, comparing the net cost to the economy of moving coal by ship, or inland-canal barge, leafy vegetables by rail or truck, and transistors by air freight over long distances.