Why Tokyo Can Not Bail Out George Bush

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*[Published in **Executive Intelligence Review**, Volume 16, Number 6, February 3, 1989. View PDF of original at the LaRouche Library.]*

Once upon a time, in a mythical nation, the population was being decimated by a cholera epidemic. Curiously, none of the few physicians in the country was permitted to interfere with the progress of this epidemic. The population and government had great faith in their witch-doctors; the physicians were told not to interfere with local customs. Today, that nation is to be found nowhere on the map.

During 1988, and recently, Japan has acted massively to delay a new U.S. financial crisis. This was done for the included purpose of ensuring that George Bush was elected in November 1988. In Tokyo's view, Bush represented the prospect of institutional stability of the United States. Tokyo has continued to bail out the United States since the November elections, and is inclined presently to continue doing so for months to come.

Were Tokyo to cease supplying absolutely massive financial bailout for the United States, U.S. financial markets would go quickly into a tailspin as deep as that of October 1987, and probably deeper. Any margin the new administration has for continuing the Reagan administration's post-October 1982 monetary stalling-tactics, depends on massive financial bailout sums from Tokyo.

The question is: How long can Tokyo continue to bail out the United States? Some around Washington think: perhaps another twelve months, probably at least six. Both Tokyo and Mr. Bush's Washington are overconfident. I agree, that it is possible for Tokyo to postpone the next major U.S. financial crash for as long as six months, even slightly longer; however, that possibility depends upon certain factors outside the control of either Tokyo or the Bush administration.

There are two problems. Presently, Mr. Bush's Washington, and Tokyo, are considering only one of these problems: How long can the next U.S. financial crash be postponed, even by aid of the most drastic, Japan-funded bailout measures? The second is, of course: How can the problem be solved, rather than merely delayed?

The administration begins with the same tactic which has been used by the Reagan administration since the outbreak of the Mexico crisis of 1982: stall, stall, stall, and stall

some more. Apparently, Mr. Bush's circles include those who are aware this stalling-game can not be continued indefinitely. The indications we have concur with what we hear from relevant levels in Tokyo: The new administration is looking for a period of continued stalling of between six to twelve months, while it lines its financial-policy ducks up in a row.

The unfortunate facts are, first, that the new administration may not have six months' margin for stalling. Second, so far, what is being proposed as prospective solutions, around the incoming administration, is cures as bad as the disease: witch-doctor stuff.

Furthermore, the kind of stalling which the Reagan administration has done over six years, and which the Bush circles project for another six to twelve months, carries a penalty.

The method of stalling used, is to delay the inevitable day of reckoning by methods akin to proverbial Russians throwing babies out of the troika to the wolves: using up precious financial and economic resources, thus making the problem much worse, simply to buy delay. Reagan administration stalling has transformed the still-manageable international financial crisis of 1982 into a crisis which has become today absolutely insoluble within the terms of the existing monetary and financial system.

All of the necessary measures for solving the international financial (debt) crisis of 1982, were detailed in my August 1982 *Operation Juárez* report. Had the same resources used up since 1982, in the ultimately futile stalling-tactics, been used instead as means for solving the problem, the world today would have the entirety of this financial crisis behind us.

Operation Juárez is still today implicitly the model for the needed general monetary, financial, and economic reforms. The difference is, back then the measures of reform required of the United States were chiefly limited to matters of foreign policy; today, the measures proposed to Central and South American nations, must be taken internally by a United States whose financial and economic crisis is analogous to that of Mexico in 1982. Today, under present international monetary structures, the United States could never meet its combined domestic and foreign, public, and private debt-obligations.

We shall report, next, on the reasons Tokyo might be unable to delay a major U.S. financial crash at any price. Then, we turn our attention to the witch-doctors, the so-called economists.

Popping the Big Bubble

The underlying problem is, that the international monetary system as a whole is the biggest John Law-style financial bubble since the great financial crash of fourteenth-century Europe. The other leading problem is, that certain European-based financier powers intend to pop

the bubble, as a means for breaking the sovereignty of the United States, and for putting the United States itself under the same general kind of International Monetary Fund "conditionalities" now applied to debt-ridden Third World nations. The key additional problem is, that certain powerful elements of the U.S. establishment are prepared to serve as accomplices in this sort of operation.

This set of circumstances poses the question, whether the combined resources of a Bush administration and Tokyo were sufficient to resist a really determined effort by the relevant European financier forces? The plotters against the United States have the advantage of reversed financial leverage.

In brief, if the European financier-plotters behave themselves, Tokyo subsidies might enable the Bush administration to stumble through an additional six months or even slightly longer, without a catastrophic financial crash. However, if the European plotters proceed, with aid of critically placed accomplices inside key U.S. institutions, Tokyo lacks the resources to delay such a financial crash even during the short term.

The magnitude of the financial bubble is the key to this analysis. Measure the relevant developments in the U.S. economy, since the fourth quarter 1967, as follows.

Begin with standard per-capita content of market-baskets for the average of the years 1967–1970. Limit the content measured to physical content of producers' and households' market-baskets, respectively. Include as categories of content net quality of depreciated improvements in physical investment in plant, machinery, and equipment, and net quality of depreciated improvements in basic economic infrastructure.

Using these standard market-baskets as measuring-rods, define the changes in per-capita net physical product of the U.S. economy over the period 1970–1988. Measure this both per capita and per hectare: net physical output, both per capita and per hectare.

Determine the current prices of those market-basket contents during each of the years during this interval.

Define the combined public and private debt of the United States per capita and per hectare. Define the combined public and private debt-service per capita and per hectare.

Compare the gross price-value of physical output as measured in terms of 1967–1970 market-baskets (without the hoax of quality adjustments used by the Department of Labor), with the percentage of this output (income) allocable to debt-service.

Adduce the trend-lines so defined, to show rates of change, and rates of rate of change.

That defines the financial bubble in the simplest possible competent terms of reference. That defines the U.S. domestic economy as presently operating way below the breakeven point, and falling rapidly.

This also shows that all official reports of U.S. economic growth since October 1979 have been false. In physical terms, no net economic growth has occurred during the past ten years. If we take fully into account the depletion of basic economic infrastructure, the economic contraction has been continuous since approximately 1970.

What has been reported as growth is increase of Gross National Product (GNP). GNP is a very misleading yardstick, since it measures only the net money-difference between purchases and sales: so-called Value Added. (This does not include households, which, if taxed in the way businesses are, would have usually no income-tax liability.)

The fallacy of GNP measurements is illustrated by the following hypothetical case:

Imagine the case, that General Motors shut down all of its manufacturing and related capacities, but reemployed all of its production employees in sales and administration at the same wages they had received as factory employees. Presuming General Motors sold its administrative services to earn the same margin of net operating profit it had gained while still producing, the Value Added of General Motors would be approximately the same as before the change.

This result might satisfy General Motors' stockholders, but what would be the effect upon the U.S. economy as a whole?

Although the illustration is hypothetical, what it illustrates is not. This example illustrates the kinds of shifts in employment which have occurred within the U.S. economy as a whole since approximately 1970. The net result is that indicated by the outlined calculations, above.

From firm to firm, the GNP accounting causes the kind of result shown in the hypothetical General Motors case to be a contribution to GNP by that firm's nominal Value Added. The sum total of those individual results, for the economy as a whole, is, in reality, a disaster. Something is very wrong with the GNP method of national accounting.

Admittedly, each year, various relevant official and private agencies combine their efforts to refine the raw GNP estimates. Inflation-adjustments are most notable. The results of the outlined calculations, above, should be compared with the annual deflators used by official agencies. More than ten times $5,000 is needed today, to supply the same real level of income after deducting debt-service charges that $5,000 annual income of households

represented in net purchasing power in 1950. By the same standard, the net rate of inflation has risen under the Reagan administration, and has never fallen.

To the degree that inflation has appeared to level off under Reagan, this has been accomplished in ways which conceal apparent inflation-rates at the store, by reduction of payments against the actually incurred costs of production. Cutting down on needed repairs and other maintenance of capacities actually used in production, is one way of concealing inflation in the short term, to have the effect of concealed inflation erupt in full, accumulated force, at a later time. We explain, after a few more needed remarks on GNP accounting as such.

These wide margins of error in official estimates for inflation, are caused partly by politically motivated faking of data. The more important factor is, as we have indicated, and for the reasons we have indicated, the intrinsic fallacy of measuring national growth in GNP.

Concentrate now on the ratio of the two functions we outlined above: increase of debt and debt-service rates, per capita and per hectare; change in physical output, measured in market-basket units, per capita and per hectare. Look more closely at the components of cost in the production of those market-baskets.

We have already indicated the immediate problem posed by the ratio of these two functions, to be the impact of debt-service margins on the money-value of actual market-basket content. How much can debt-service payments by farms, industries, and households be increased, without causing the physical economy to collapse?

During the recent 18 years, we have depleted basic economic infrastructure, by lack of repairs, so much so that today's repair-bill, for restoring quality of infrastructure, per capita and per hectare, to 1970 levels of functional quality, would be approximately $4 trillion. Farms and manufacturing have suffered a net contraction-collapse of a similar kind and degree. A very large part of what the U.S. economy has treated as annual income, over the past 18 years, has been spending used-up past capital investments for the current cost of living. We have been counting as current incomes the bills we have not been paying for repair and maintenance of those capital investments on which the continued operation of the economy depends.

This recalls the looting of the New Haven railroad, some decades back.

During and following World War II, interests including the Dumaine family had rebuilt the New Haven to financial and operating respectability. Then, came a group of corporate raiders, who baited the hook for New Haven stockholders with promises of larger dividends.

The procedure was simple. Maintenance is the big annual bill of any railway—or airline—which wishes to continue in sound operations. The corporate raiders, after taking over the New Haven, slashed maintenance. Rolling-stock which needed repairs, was simply abandoned on sidings; other "cost-cutting" measures were of a similar nature, done in a kindred spirit, and with a kindred ultimate effect.

The paid-out dividends increased; the price of New Haven stock rose accordingly. The raiders unloaded stock-holdings at fat profits, and then left a pile of wreckage behind them which has not been repaired since.

Such is, in net effect, the apparent growth of the U.S. economy as a whole during the past 18 years.

"Deregulation" is an example of the same thing done to the New Haven railroad. Declare a "free market." Force the prices of the industry down. Meet the resulting reduction of unit operating income, by looting depletion funds which should have been spent on maintenance and replacement of obsolete equipment. So, we have commercial aircraft operating beyond the extremes of their expected useful life, and more costly to maintain properly than the cost of acquisition of a new replacement.

The same was done to U.S. agriculture. Drive the price of agricultural product below the farmers' net cost of production, and keep this up until mass-foreclosures take over.

On paper, the zooming percentage of debt-service demands on income, per capita and per hectare, could be met by savage reductions in payments for costs other than debt-service. In reality, it is not so simple. The added debt-service margins must come from old-age pensions, wages and salaries, maintenance, and direct non-labor operating costs. When the ration of income after payments of taxes and debt-service falls below the level of real purchasing power needed to maintain operations, operations soon cease.

In a national economy, the economy as a whole can continue to function, on a reduced level of output, but only up to a point.

At a certain point, the closing down of firms goes beyond tearing off flesh, and digs into bone. Key categories of industry simply disappear entirely. When those bottlenecks develop, the economy as a whole ceases to function. For example, imagine the effect of a widespread collapse of the transport industry, or, as is already looming, the production of power drops to levels below the minimum required for industry and other functions in entire regions of the nation. These are only examples of the numerous bottlenecks now threatened with collapse.

When a few key such bottlenecks are collapsed, this sets off a chain-reaction collapse throughout the economy as a whole.

The U.S. economy is very near to the point such a chain reaction erupts in the physical economy as such.

We have reached the point, that the current rate of debt service can not be met without bringing the U.S. physical economy to, or perhaps even past the brink of chain-reaction collapse. That is the price of the stalling which the Reagan administration has done during the 1983–1988 interval.

When the point is reached, that the national economy depends upon increasing its per-capita debt-service as a precondition for monetary stability, and yet in which increases in debt-service ratios threaten to set off a chain-reaction collapse in the physical economy, the expansion of the financial bubble has reached a critical threshold. We are at, or very near to such a critical threshold now.

This brings us to the operations planned by certain wicked financier gentlemen in Europe. The short-term factors to be considered, include the price of the U.S. dollar, the prices of U.S. public and private bonds, and other financial assets which are among leading negotiables in world markets. Another short-term factor, is fluctuations in interest-rates.

The U.S. currently requires an annual inflow of over $100 billion in foreign borrowing. A shaky U.S. dollar means that those inflows will tend to be denominated in foreign currencies, not U.S. dollars. We borrow from such sources as fiduciary accounts in Swiss banks, and incur liabilities denominated in Swiss francs, deutschemarks, yen, and so on. What, then, is the effect of a drop in the price of the U.S. dollar? What is the effect upon, not only the more than $100 billion a year of new such borrowing needed, but the current and principal obligations of the carried forward debt of the same kind from preceding years?

What if the U.S. dollar takes a nosedive, at the same time that U.S. public and private bonds drop similarly, and some major troubles occur in the highly volatile sector of leveraged buyouts (LBOs)? A run against the U.S. financial markets, under those conditions, is something which would overwhelm the combined resources of the Bush administration and Tokyo. On that account, we are already looking down the barrel of a financier's gun.

The intent of the relevant European financiers, is not to go all the way with a run on the U.S. dollar. Rather, the moment that begins to occur, both the United States and the relevant European financier-sharks go into "crisis management" negotiations. The foreign interests will agree to take the worst immediate pressures off the U.S. financial system, on conditions.

Those conditions signify putting the U.S. government under IMF "conditionalities," in the manner already experienced by nations such as Mexico. The federal, state, and local budgets will be set by foreigners. A foreign-dictated "incomes policy" will be imposed upon the U.S. private sector. And, so forth and so on. In short, the U.S. government will cease to be a sovereign government, and the United States will cease to be a sovereign nation. The U.S. government will be a partner in the international monetary system, but the power of the U.S. government will be transferred to that partnership.

Under those imposed "conditionalities," the rate of U.S. debt-service payments per capita will be greatly increased, even though this means a breakdown in the physical economy of the United States. That sort of dictated "recovery program" is an imitation of what Nazi Finance Minister Hjalmar Schacht did in pre-World War II Germany. This is the same Schachtian policy which caused Nazi Germany to adopt a murderous system of slave-labor concentration camps. Joseph Goebbels' diaries contain ample explicit recording of Adolf Hitler's remarks to precisely that effect.

That occurrence, is the beginning of the end of civilization on this planet.

The Two Schools of Political-Economy

If there is to be a cure for the terrible dangers now facing the U.S. and other economies, we must be assured that the shaping of economic policy is taken out of the hands of the relevant local witch-doctors, the so-called professional economists and kindred experts of similar habits and opinions. For this to occur, relevant government circles and others, must come to recognize that these putative experts are indeed no better than witch-doctors.

The simplest, most direct, and conclusive manner in which to demonstrate this fact, is a summary of the history of political-economy. The use of this sort of proof is made mandatory by the nature of the claims put forth by the putative economists themselves. For example, they claim that their opinions served as the basis for the successful periods of development of the U.S. economy, from the beginning. That is flatly not true. To similar effect, they claim, as Karl Marx did, that economic science begins with Adam Smith; that assertion is absolutely false, and known to be false to anyone who knows even the barest facts about the history of the subject.

The beginnings of a systematic notion of economy in Western Europe were the famous census of Charlemagne. Matters did not progress above that general level until the beginning of the fifteenth century, in and around Florence, Italy.

The first modern economist was a Greek celebrity attached to the retinue of Florence's Cosimo the Great, Georgios Gemistos Plethon. Around the A.D. 1439 Council of Florence, a new quality of statecraft emerged, leading into the rise of a branch of study of statecraft called cameralism, during the seventeenth and eighteenth centuries, most notably. Cameralism is the generic name of the period for the successful practices which the Massachusetts Bay Colony built up during the decades preceding the governorship of Edmund Andros. The policies of the young U.S. republic respecting money and credit, for example, were reaffirmations of the principles of practice from the pre-Andros Massachusetts Bay Colony.

Meanwhile, during the last quarter of the seventeenth century, there was a revolutionary advance in political-economy, Leibniz's elaboration of a science of physical economy. The influence of this was embodied in U.S. Treasury Secretary Alexander Hamilton's December 1791 *Report to the Congress, On the Subject of Manufactures*. It was then that the name American System of political-economy was minted.

Adam Smith appeared very late in the history of political-economy. He had been an obscure Scottish professor of David Hume's empiricism, until he was picked up, in 1763, by the Second Earl of Shelburne, and assigned to travel to the circles of Hume's and Voltaire's Geneva and Physiocrat cronies, to pick up some rudiments of their brands of political-economy. Shelburne, perhaps the most evil man in England, second to his protégé Jeremy Bentham, during the late eighteenth century, was a chief political representative for the interests of the East India Company, who managed British politics by buying up the relevant figures, with funds channeled chiefly through Barings bank. The purpose of the project to which Shelburne assigned Adam Smith, was to elaborate a scheme for ruining the economies of both the North American British colonies and France.

The approved project was presented in 1776, as the East India Company propaganda-tract against the Americans, Adam Smith's *Wealth of Nations*. Thus, the chief proximate cause for the U.S. War of Independence was the set of East India Company policies for which Smith's *Wealth of Nations* was an apology.

The tack taken by Smith became the starting-point for the East India Company's training-center for its agents, the Haileybury school. Followers of Smith and Jeremy Bentham at this school included Thomas Malthus, David Ricardo, James Mill, and John Stuart Mill. In practice, it also includes the Karl Marx who hated the American System, and praised Smith *et al.* as "the only scientific" economists before himself.

By approximately 1825–1830, all of the contributions of leading French and German economists up to that time, had been formally consolidated under the single roof of

American System of political-economy. The cameralists generally, Leibniz in particular, were incorporated in the combined contributions of Benjamin Franklin, Hamilton, the two Careys, and Friedrich List.

Adam Smith was introduced to the United States during the late 1790s, by the circles of the leading Barings bank representative in the United States, Aaron Burr. These circles included the East India Company's partners in the China opium trade, the Perkins syndicate of Massachusetts, the Russell syndicate of Connecticut, and the Astors of New York. The leading advocate of Smith's dogma in these circles was the Albert Gallatin who became the power behind the throne in the Jefferson and Madison administrations. However, the economic disaster which Jefferson's and Madison's support for "free trade" left behind, prompted the United States to return to the American System under Monroe and Quincy Adams. The American System was the policy of Henry Clay's Whig Party, and of Abraham Lincoln.

The influence of the American System waned rapidly after the late 1870s implementation of the U.S. Specie Resumption Act, as monetary and financial control over U.S. internal affairs came increasing under the foreign domination of Anglo-Dutch and Swiss bankers, with the Anglo-Dutch predominating. The control of the political power represented by great fortunes fell into the hands of those closely tied to the East India Company's successors abroad.

Around the turn of the present century, the leading universities of the United States veered away from their earlier close ties to France and Germany, especially away from German ties, and modeled themselves as virtual extensions of Oxford and Cambridge.

Under these circumstances, the institutions of finance, the great concentrations of family wealth, and the principal banking centers, represented the Haileybury tradition in dogmas of economic practice. This transformation was felt also in the Washington governmental bureaucracy. As new forms of U.S. central banking emerged, consolidated as the Federal Reserve under President Wilson, U.S. financial and monetary policy was thoroughly dominated by the tradition of Haileybury.

In addition to these influences on cultivated economic thought in universities, government, finance, and so on, the 1890s saw the beginning of a powerful direct influence of British Fabian socialism, including such influential figures as John Dewey, Charles A. Beard, and Walter Lippmann. For these socialists, the defaming of the U.S. Founding Fathers was a favorite sport.

Although the heritage of the American System was progressively undermined during the past hundred years, its traditions did not begin to die out within U.S. agriculture and industry until the beginning of the great radical "cultural paradigm-shift" of 1963–70. The popularity of President Kennedy's space-program and investment tax-credit measures represents, to the present date, the last gasp of the American System tradition of commitment to capital-intensive modes of scientific and technological progress. As the barbarian hordes from institutions such as Harvard Business School replaced engineering-minded industrial management in major manufacturing firms, and as the influence of both "post-industrial" utopianism and the radical counterculture moved in, then, and only then, was the last significant vestige of the American System removed as a factor in national policy-shaping.

Exemplary of the conflict between the economists and the industrialists, was the justifiedly contemptuous rejection which the new-fangled art of Operations Research found so quickly among its industrialist clientele. The conflict between "Wall Street" and American industrial management, put most U.S. patriots on the side of the industrial managers. As an industrialist, one "had to learn to get along with Wall Street," but the arrival of the bankers' team, and the presence of the bankers' special, designated personality on the roster of leading corporate officers, brought the underlying policy conflicts to the surface often enough. To the industrialists, the professional economists were as visitors from an alien world; the Operations Research funny types were what the industrialists distrusted in the professional economists, expressed in a concentrated way.

The successful engineering-minded industrial manager of the 1940s, 1950s, and 1960s had an innate professional grasp of the ABCs of economic science, of which the professional economists of then and today are incapable. In those days, despite the rule of Wall Street over corporate finance, the day-to-day job of producing a salable product was a matter of applying the principle which Henry C. Carey elaborated as "economy of labor": the use of fostering of scientific and technological progress, to produce a product of equal or better quality at a lower real cost.

They understood that increasing the capital-intensity of investments in productive capacity, and employing labor with greater cultural potential for assimilating rapid technological advances efficiently, were the essence of successful production in general.

In real terms, increased capital-intensity signifies, on the scale of the economy as a whole, increasing the percentage of the labor-force employed in producing producers' goods, relative to employment in production of households' goods. Since producers' goods, the machine-tool sector most emphatically, is the transmission-belt by which technological progress is introduced to the productive process generally, the manufacturer's cost of possession of a

usable improved, higher-priced machine tool means, in general, a net saving on combined costs of capital and labor for a unit of physical output.

That example illustrates what ought to be recognized as the manner in which the American System's tradition was maintained in the practice of good industrial management even during the two decades following World War II. It was not until the Johnson and Nixon administrations, that the professional economists began to take over the shaping of national economic policy in depth. The result of their increased influence has been cumulatively a national catastrophe.

In summary of this point, an economist typifies those who study how to make money, without the least interest in discovering how to earn it.

Thus, in modem history, there are two mutually exclusive currents of thought on the subject of political-economy. The current which expresses those views responsible for the rise of productivity during the past 600 years, is that associated with Leibniz and the conceptions incorporated within the American System of political-economy. The opposing view is rooted in the tradition of Chaldean usury, as reflected in the Haileybury tradition of Adam Smith, *et al.* The latter view, when influential, has invariably produced disasters.

What Is Economics?

The two views outlined, represent opposite starting-points for the very definition of "economics." The American System developed out of the kind of emphasis on physical productivity associated with Leibniz's science of physical economy. The views of Adam Smith and the utilitarians, start from the assumed preexistence of money.

Unfortunately, cultish money-theories are not the exclusive province of the professional economists. Whoever confesses himself a defender of the gold-reserve system of central banking, will soon find himself besieged by querulous packs of gold-exchange fanatics, bimetallists, and the like. To similar effect, the lunatic belief that money can earn wealth by virtue of some potency intrinsic to money as such, is widespread. The folly of belief in "magic of the marketplace," is very widespread, which is why disastrous policies premised upon that blind faith were so widely tolerated.

So, the myth of money must be addressed, head-on, if we are to free this nation of the ruinous pack of policies leading us to perdition.

Contrary to Karl Marx and his Haileybury predecessors, no form of currency, including coin of precious metals, ever functioned as money within an economy, except in the implicit

mode of a negotiable bill of exchange. The difference between coin and paper currency is their relative values when they cease to be used as money.

Our earliest detailed knowledge of the history of money dates from approximately the fourteenth century B.C. The evidence is heaps of baked-clay cuneiform tablets and their corresponding envelopes, unearthed from what were ostensibly the merchants' quarters of sites of old Hittite cities.

That was not the very beginning of what became modern financial systems; but, records dating from earlier times are either lost parchment documents of the Canaanites (Phoenicians), or are mislaid among unsorted heaps of tablets which poorly trained Biblical archeologists unearthed in Mesopotamia.

However, we know enough about the usurious practices in early Mesopotamian cultures, beginning with the Chaldeans, to assess the implications of the collection of cuneiform bills of exchange from the Hittite site.

The origin of paper money, is nothing more than as a form of negotiable bill of exchange. Coin is no exception to this rule; to the degree that coin functions within an economic process, it functions only in the form of a negotiable bill of exchange. The fact that coins made of precious or valuable metals might have an economic use other than as money, has something to do with the use of such coins as a form of negotiable bill of exchange, but that is the only bearing of the minting of coins from precious or valuable metals. The variants of the populist idea, that paper money ought to be limited in issue to a total denomination not exceeding the price of a hoard of coin or bullion, are nonsense.

A negotiable bill of exchange has no rational function within an economy, except to facilitate the purchase and sale of physical goods. Although services may be purchased, one purchases services by tendering the means by which the seller of services may secure physical goods. This latter observation might be contested by those unfamiliar with rudiments of economic science; the principle involved is an important one, seldom known, and of general relevance here.

Many contemporary textbooks attempt to define "first principles" of economics in terms of exchanges among two or more persons. As implicit in the outlined calculations earlier, and in several illustrations supplied, it has been illustrated that the study of economic processes must proceed from treatment of the whole of the economic process as primary, and the function of the individual person and transaction defined always in immediate reference to the whole economic process taken as a functionally indivisible whole.

For example, it has been calculated by one among the author's associates, that if we might assume that hypothetical "simple hunting and gathering societies" existed during some primeval Cenozoic period, the average amount of such Cenozoic wilderness's land-area required to sustain an average individual in a most marginal and precarious existence, would have been approximately ten square kilometers. That would put a ceiling upon the living human population, at approximately 10 million individuals.

The implications of that observation are summed up, by noting, that in terms of state-of-the-art technology available for general employment at the beginning of the 1970s, this planet could support a population of between 15 and 25 billion persons, at a standard of life comparable to that in the advanced industrialized nations of that time. Respecting more recent millennia, especially the last 1,000 years of Western Europe, parish records and kindred sources afford us an increasingly precise estimate of population-levels and their demographic characteristics.

Using modern language, the growth of actual populations is associated with the increase (and occasional calamitous decrease) of a magnitude best described as potential population-density. The overriding determinant of potential population-density, is scientific and technological progress. So, since the hypothetical early-Cenozoic condition of society, mankind's potential population-density had increased by more than three decimal orders of magnitude by 1970, with the prospect of a possible increase of more than an additional order of magnitude within the term of less than a hundred years following that.

It happens, that the generation of a single idea, by an individual, which idea has the character of a scientific discovery, implicitly increases the potential population-density of the entire society. For that and related reasons, economic science begins with the notion of the causal correlation between potential population-density and scientific and technological progress.

On this account, studies of animal populations are irrelevant to study of society, or of individual human behavior. It is the self-developing characteristics of society which are elementary to the definition of society itself. It is the relationship between the creative powers of the individual mind, and changes in potential population-density, which is the essential function within economic science.

We define an economy properly by regard for two possible definitions. As economy in general, as distinct from a national economy, an economy is an approximately self-contained process. Today, when the functional interdependency among national economies is so much developed, no national economy is large enough to be a self-contained economy. National economy is defined by the sovereign, or relatively sovereign authority of the state over all economic processes contained within it. The role of national currency, is exemplary. In

practice, economic science takes both notions as interactive: the economy as defined by minimal extent of an approximately self-contained process; the economy as a national economy. In the typical case today, the bounds of national economy define a special domain, with distinctive characteristics of functioning, within a larger scale of economy defined as an approximately self-contained process.

For such reasons, the best rule-of-thumb way to examine notions of political-economy, is to treat a national economy or a choice of economic process (larger than a national economy), as it were a consolidated agro-industrial enterprise. Since nearly all of the exchanges and other economic matters are contained within that "consolidated enterprise," approximating a closed economic process, matters such as the sale of services and other intangibles are canceled out of isolated exchanges. Instead, services, for example, appear in the accounts as the total amount of services employed by the society.

For example, referring to the outlined calculation above, the rate of inflation in a society is a function of total employment, its composition as a whole, and the productivity and ration of the operatives' component of the total labor-force.

There are two approaches to determining the effect of individual transactions upon the state of the economic process as a whole. One approach is that typified by the fallacious method of GNP accounting. This approach attempts to adduce the total as the sum of parts estimated individually. The approach of economic science is opposite; the significance of the particular is determined by its immediate connection to the functioning of the economic process as a whole.

For example, we do not add up employment of operatives; rather, we examine the effect of the increase or decrease of the operatives' component of the total labor-force on the economy as a whole. We examine this in more detail, in terms of the division of labor within the operatives' component: for example, the difference between adding an operative to employment in the machine-tool sector, as opposed to garment manufacturing.

By this approach, we are enabled to construct estimates of economic value which are independent of any information respecting price. The outlined calculations presented earlier here, imply such a calculation.

The term economic science is strictly equatable with what Leibniz defined as a science of physical economy. That science measures output in terms of the contents of a market-basket sufficient to sustain the household of the individual operative at a level of health, longevity, and culture, consistent with the level of technology being practiced. The cost of production of such unit-value market-baskets in quantities adequate to the needs of the whole

population, and to the needs of production itself, is measured in terms of a percentage of the total labor of the operatives' component of the total labor-force.

We measure the costs of production in terms of average per-capita values of combined producers' and households' goods, and anticipate a gain in such goods, over these requirements, as output of the productive process.

In those terms of primary reference, we examine the effect of powered machinery upon productivity of operatives, both per capita and per hectare. The inclusion of per-hectare is required to correlate results with potential population-density. How does increase of the power supplied to machinery, per capita, affect the increase of productivity of operatives?

The definition of technology is introduced so. In the hypothetical case, two powered machines, with the same per-capita power-consumption-rates, employed for the same production, if used alternately by the same operative, might result in a higher rate of output using the one, than the other. The difference in internal organization of machinery, which accounts for that difference in performance, is the raw empirical definition of technology.

Inevitably, Leibniz correlated this notion of organization with the geometrical definition of physical least-action. That correct definition of technology, leads toward a better, more intelligible representation of measurable technology in terms of the constructive geometry of the Gauss-Riemann complex domain. It is sufficient to identify that fact here; further elaboration of the point is not relevant here.

These considerations define a primary economic function, which may be represented approximately in terms of constraints expressed in the form of a system of inequalities:

1) The per-capita market-basket of requirements must tend to increase, in correlation with technological progress.

2) The power-density, per capita and per hectare, must tend to increase in correlation with technological progress. This includes a secular tendency for increase of the power density per unit cross-sectional area of work.

3) There are changes in the composition of employment of the labor-force which correlate with combined advances in technology and increase of power-density. On condition that the percentage of the labor-force employed in occupations other than those of operatives is not allowed to become excessive, the following set of constraints applies:

   a) The ratio of urban to rural employment increases toward an asymptotic limit.

b) The ratio of employment of operatives employed in production of producers' goods increases relative to the number employed in production of households' goods.

c) Within the ration of employment in production of producers' goods, the sub-ration employed within subsectors including or proximate to machine-tool production increases.

4) The level of technology increases secularly.

The function of monetary and related policies, is to shape the flows of money and credit in such a way as to promote the results implicit in such a set of physical-economic constraints. Instead of the misguided, but prevailing practice, of measuring the performance of physical economy in terms of money, the exact reverse must be the rule. The performance of monetary and related policies of taxation, banking, credit, and regulatory actions, must be measured in terms of the requirements which these constraints specify for fostering the development of both the individual standard of living and physical economy generally.