EIR Feature

Can Australia beat the Anglo-American economic collapse?

by EIR's Economic Staff

Editor's Note: *This article was originally prepared upon request as part of a programmatic package for Australia. We are presenting a revised and expanded version here, since the approach adopted is of interest beyond the shores of Australia. It features elements of the physical economic method of Lyndon LaRouche, which we consider essential in thinking about how to reverse the deepening global economic crisis.*

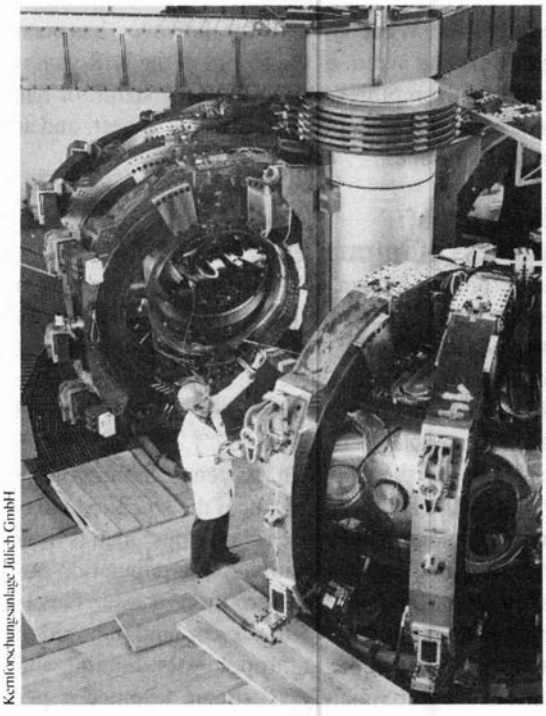
The approach elaborated below was recommended by LaRouche during discussions at the federal medical facility in Rochester, Minnesota, where he is being held as a political prisoner. His recommendations proceeded from the standpoint employed in his elaboration of the program for European integration and reconstruction known as the European Triangle. Different, in the specifics of the Australian setting, and unlikely to prosper, unless the Triangle program of high-speed railroad and infrastructure-based development is successful, the approach taken will, in our view, dispel some of the delusionary myths spread through U.S. advertising agencies about the paradise "Down Under," which is now, unfortunately, probably better known as the home of Crocodile Dundee than anything else. It will also provide food for thought about the economic problems that are going to have be dealt with as the worldwide economic and financial crisis proceeds.

The crisis facing Australia, and the world

What Australians have to know, first and foremost, is that the crisis which grips their nation is no mere local event. It is a part of a global crisis. Outside of contributing to the solution of the global crisis, there is not much, if anything, that Australia can do that will have durable effects.

There are three principal aspects to this global crisis.

The first is economic. The world has been sliding inexorably into a new depression, far worse than that of the 1930s, since the period 1963-67. That slide accelerated after U.S. President Richard Nixon took the dollar off the gold standard on Aug. 15, 1971, accelerated again, with Federal Reserve chairman Paul Volcker's



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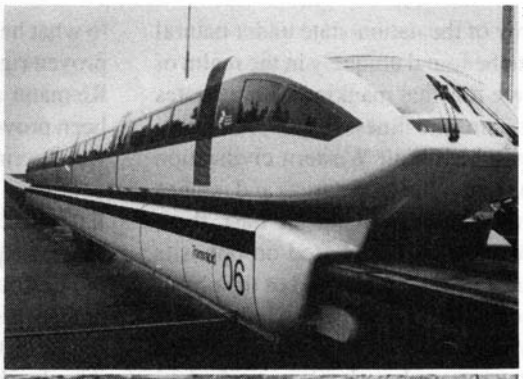
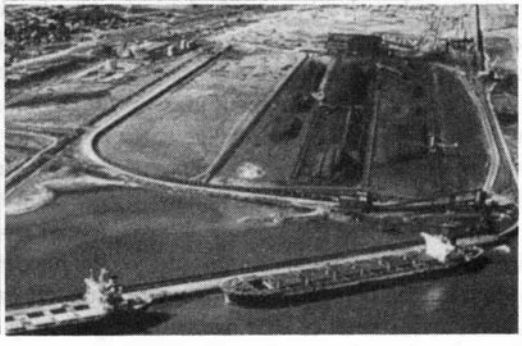




Transrapid

Australia's current mode of extensive development is heading for a breakdown crisis. The solution lies in a shift toward an intensive mode, developing the new technologies that can do the job. Chief among them is thermonuclear fusion power (a West German tokamak research reactor is shown on the left). Magnetically levitated (maglev) trains would allow high-speed intercity passenger transport (top right). Reopening Australia's shipyards would promote both domestic and international commerce. The photo on the bottom right shows Australia's Port Hedland Industrial Area.

high interest rate policy of 1979-81, and has been gathering new momentum since 1986-87. The slide into depression is powered by the willfully suicidal collapse of the United States as a world power.

Second, the dollar financial system is bankrupt. This is not a local matter for the United States. With the dollar's status as the world's reserve currency, even under the abomination of the post-1971 floating exchange rate system, the collapse of the dollar drags down everything with it.

Third, there is, governing the first two above, a world crisis of philosophy and morality.

Since both the first and the second crisis threaten the very existence of the human race, the question has to be posed, "What went wrong?" What failure in the method of the thinking of this human species produced the results that have brought the proverbial house tumbling around our ears?

That third crisis is reflected globally as well. The two systems that have dominated the world since 1947 are coming apart. Communist China stands on the edge of a cataclysm whose beginning was marked by the massacre in June 1989 in Tiananmen Square. The Russian Empire is not far behind the Chinese. Both have demonstrated their incapacity by their failure to feed their populations.

Things are not so different in the economies of so-called advanced sector countries, especially those of the English-speaking world, where the liberals' philosophical radicalism, in the form of either Thatcherite monetarism or fabianism, have produced nearly the same results as the collapsing communist collectivism of the Russian Empire.

Two parts of the world have escaped the worst follies of either disaster so far: Japan and the Federal Republic of Germany. If the world economy is to survive the gathering crisis, it will be because an alternative to the collapsing systems of the monetarists and fabians in the West, and the communist collectivists in the East, is forged from the capabilities of Germany and continental Europe, together with Japan.

There it is that Australia must orient itself, if Australia desires to survive the debacle that is upon us.

The potential solution to this crisis is to be found uniquely in the domain of economics, more precisely in the school of physical economy associated with the political philosophical tradition which created Western civilization. This tradition is associated with St. Augustine, with the giants of the fifteenth-century Renaissance, with Jean-Baptiste Colbert and Gottfried Wilhelm Leibniz, the founders of modern economics in the seventeenth century, and with the work of Alexander Hamilton, Mathew Carey, and Henry Carey in developing what became known in the nineteenth century as the American System of Political Economy and the National Economy of their German collaborator Friedrich List.

Any nation—lies from Britain's Royal Society aside—which took the path of industrialization in the 200 years since 1789, did so on the basis of the ideas and outlook of these figures. That includes Japan under the Meiji Restoration and the developed economies of Western Europe and North America.

Two ideas can be found at the core of this tradition: the sanctity of the life of the individual human being, as the embodiment of the potential for the divine in the living image

of God, and the sovereignty of the nation-state under natural law. The proof of both is to be found uniquely in the realm of physical economy, for there it is that mankind demonstrates conclusively whether he retains the fitness to survive or not.

Between this tradition which built Western civilization on the one side, and, on the other, the monetarists and fabians of the West together with the collectivists of the East, there is an irreconcilable divide. The two are based on opposite notions, both of what it means to be human and of the physical lawfulness which governs the universe as a whole.

Australians are not only called on to choose between respective platforms and measures, though they must do that. They are also called on—as are the rest of the world's nations today—to decide whether their nation is qualified to be part of the human race or not. For behind the platform, measures, and proposals for concrete action, Australia must decide to which culture it belongs: that of the human race, or its opponent, whether it be called by the name of monetarism, fabianism, or communist collectivism.

The question is put directly: Is there a higher purpose to the existence of the individual human being? One thing we all know for sure: We are born, and, sooner or later, we will die. And we know, equally surely, that whatever the material wealth we amassed during this life or the pleasures we chased after, we will depart this life as nakedly as we entered it, for we can take none of them with us.

Our life is short. Its duration with respect to the existence of humanity as a whole, less than that of the rose whose beauty graces a summer's day. Can that individual human life permanently affect the existence of the species as a whole, so that the individual life might enduringly contribute to the well-being of the species? The proof that such has to be the case is found in the science of physical economy.

The proof in its modern form was developed by the American physical economist and statesman Lyndon H. LaRouche, Jr., during the period between the end of World War II and 1957. He combined the work of the Leibnizian school of economy which led into the American System, with his conceptualization of the work of the school of physical sciences and mathematics which includes Leibniz, Karl Friedrich Gauss, Bernhard Riemann, and Georg Cantor. The result is known as the LaRouche-Riemann economic model. Forecasts produced under the governance of that approach have, since 1979, proven to be the most accurate of any available in the United States. LaRouche correctly forecast the Oct. 19, 1987, stock market crash on a New York radio show in May of the same year. In May 1989, he also forecast the October financial events of that year, and refined the forecast on Sept. 11, warning of new market crises to erupt around Oct. 10. No economist in the United States has anything like his record on these matters.

LaRouche now sits in jail, a political prisoner, framed up on spurious conspiracy charges by America's liberal Establishment and their Russian friends, out of their bitter enmity to what he stands for. What he stands for, however, has been proven right, time and again, as the record of the LaRouche-Riemann method exemplifies. And what they stand for has been proven, equally repeatedly, incompetent at best, and at worst, criminally insane.

LaRouche's proof: the uniqueness of human existence

LaRouche proves human existence to be unique from human history itself. There are now about 5 billion souls living in the world today. If the technology employed by the advanced sector countries were applied everywhere, the Earth could support an order of magnitude increase beyond that, to 50 billion people.

Compare this to the state of existence anthropology claims for mankind's aboriginal essence, the so-called hunting and gathering mode. Under such conditions, man is little different from a gifted baboon, with about a population potential worldwide in the range of 10 million or less. This is the maximum level permitted by the area of land required to support each individual in the anthropologists' hunting and gathering mode—approximately 10 square kilometers per person.

Yet now we have the developed potential to support a population of 50 billion. No other creature on the face of the planet has accomplished anything remotely similar. This three order-of-magnitude increase in potential population density is the foundation for LaRouche's proof of the uniqueness of human existence.

The increase in potential poses the question, "How was such an increase accomplished?" Return to the anthropologist for a moment. The anthropologist supposes a succession of human societies to have existed between the aboriginal hunting and gathering culture and modern industrial society. The conventional list includes: primitive agricultural society, developed agricultural society, early industrial society, and then mature industrial society.

Each of these modes of existence is characterized by its available technology and organization of labor so as to define a population potential relative to land use for human society in that mode. Each of these modes of existence is also characterized by a spectrum of raw materials made available by the technology, which augments human labor. So each of these modes of existence is functionally separated from any of those which came before or which come after.

But the continuity of human existence remains, reflected in the increase of *potential relative population density*. Therefore, the individuals that make up any of these modes of existence must all share some common quality which is not bounded by the particular mode of existence within which history and culture have situated them.

As the increase in potential relative population density implies, it is man's capacity to change his mode of existence which makes him unique. This capacity is typified by the

discovery of the individual scientist. That discovery, by overturning existing knowledge with respect to what can or cannot be done, permits the elaboration of new technologies which enable mankind to transform the modalities of his existence. Although the individual scientist makes the discovery, by assimilating the scientific breakthrough in the form of technology applied to increase the productive powers of labor, each individual in the rest of society partakes in the same process of innovation in thinking and activity as the scientist.

This creative capacity is what makes the human individual, as well as the species, unique. Each individual is of potential historic importance to the species as a whole, because each individual is endowed with the capacity to contribute to the advancement of the entire species, as the scientist does.

Thus, the continuity of human existence is defined as that succession of scientific breakthroughs which has permitted mankind's self-transformation out of the primordial mud. Man reduces the imperfection which separates him from the Creator by continually improving his own capacity to create.

From this standpoint, the concerns of personal morality, physical science, and government become one. They are unified in the science of physical economy by means of which the individual can face his death, knowing that his life is of permanent importance to all past as well as future generations. Thus he separates himself absolutely from the lower beasts.

Mankind is divided absolutely between those who seek to protect this divine spark of reason in the individual, and those who seek to destroy it, as stated by Germany's national poet Friedrich Schiller. Schiller traced the division between such irreconcilably contrary ideas of man and his universe to the conflict between Solon of Athens and Lycurgus of Sparta, identifying the characters of the systems of government associated with each, and the qualities of the individual citizens each called on and evoked.

The division is between two political tendencies, the republican and the oligarchic. The former orders the affairs of state to protect the creative potential of each individual. The latter reduces mankind to the level of the brute, insisting that man is not a creature of reason, but like the lower beasts, merely a dumb instrument of repetitive labor, who is best manipulated from behind the scenes.

Oligarchism may be expressed differently, between the liberalism and monetarism of the West, and the communist collectivism of the East, but the effect is essentially the same. The West's current obsessive insistence on the ostensible gratification of the individual's hedonistic impulses, may appear to be the opposite of the collectivist regimentation of the East. But both deny the efficacy of any higher purpose to which the individual may dedicate himself or herself, except that purpose which is imposed externally, by peer group manipulation and psychological warfare, or by police-state methods. Both bitterly oppose the reasoned independence of mind which is the heart of Western civilization's conception of the creative human individual. Without a positive conception of the purpose of human existence, neither the Eastern nor Western brands of oligarchism can tolerate the political assertion of truth. But, as the freedom revolutions currently sweeping the East show, neither can they permanently outlaw or suppress that quality which distinguishes man absolutely as human.

The science of political economy

The priorities of human economy follow from the republican world outlook. Leave money and credit aside for the moment, and focus on the fundamentals. Real economics takes as its starting point, exactly where the ignorant professionals and academics leave off. The subject is mankind's increasing power to reproduce itself, by transforming the conditions of its existence and thereby increasing potential relative population density.

Begin with the actual physical economy. The key elements for the analysis of an economy are:

- *the land,* and the degree of its cultivation or improvement for human habitation;
- *the population,* first, as the population which maintains and produces the labor which moves society forward, and second, how the labor force thus produced, is employed;
- *energy,* the volume and quality of its application to power human labor;
- *the quality of technology* employed to transform power available into useful work;
- *the volume and quality of production* required to sustain both the process of production, and the reproduction of the households that produce the labor force.

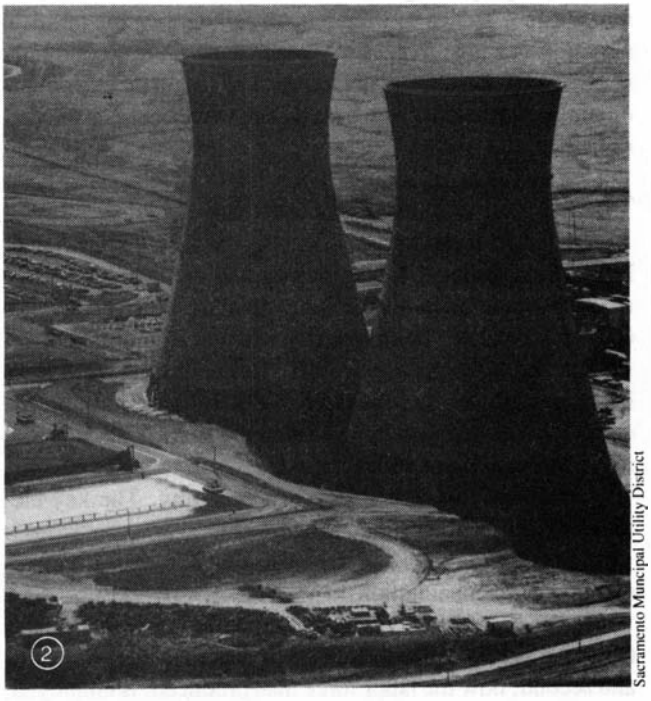
The increase of potential relative population density correlates with the increase of technology, as science improves the technical means with which man labors. Technological advance increases the productivity of labor; less labor is required to produce the same output.

This increasing power of labor is reflected in the increasing *energy intensity* of production. The amount and quality of energy which powers technology increases, while the energy required for each unit of output declines.

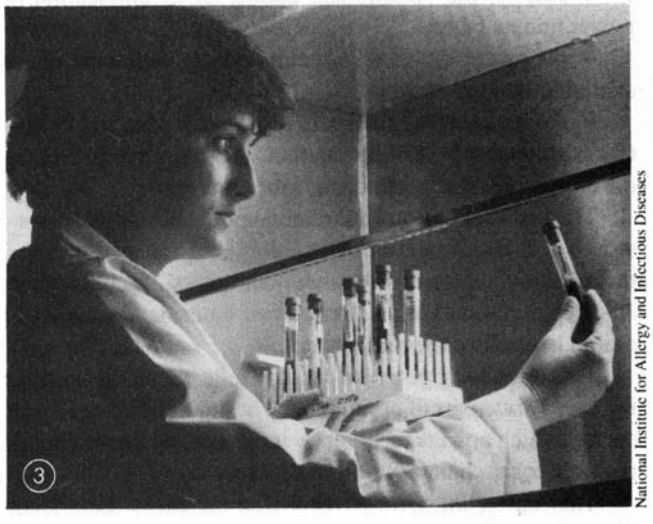
The *capital intensity* of labor also increases. Less labor is required to produce an increased volume of consumer goods, for example. Fewer farmers are required to produce more food than 25 years ago. For economic growth to occur, and thus for potential relative population density to increase, technology, energy intensity, and capital intensity must increase.

Reviewed from the standpoint of mankind's historical progress, LaRouche stated these elements of economic, as opposed to monetary analysis, in the form of constraints. In a successful economy, viewed from the standpoint of maintaining progress for mankind as a whole, the following condi-

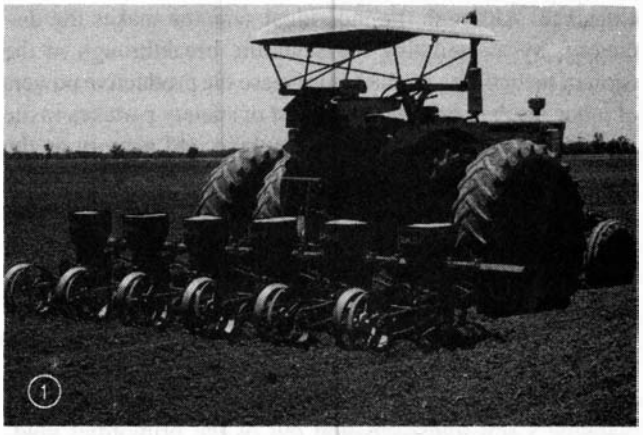
Why LaRouche is right about economics



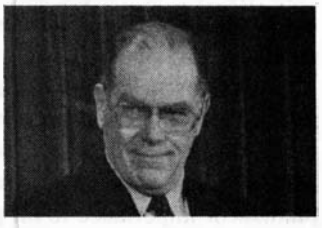
Sacramento Municipal Utility District



National Institute for Allergy and Infectious Diseases



LaRouche's method of economic analysis is unique in the world today—yet it comes from a philosophical tradition going back to St. Augustine. Taking the physical economy (not money) as fundamental, LaRouche emphasizes these constraints for a successful economy, which are applied to our analysis of Australia:



Physical economist Lyndon H. LaRouche, Jr.

1) The capital intensity of production must increase. *That means a declining proportion of the labor force required for food production. Shown above: A dual-wheel tractor sows soybeans in Australia.*

2) Energy intensity must increase. *Australia was a leader in nuclear energy research during the 1960s, but then turned her back on the program. Today, development of nuclear energy and transportation links would make it possible to expand industrial production.*

3) The level of technology must increase. *The coming breakthroughs in fusion power, plasma physics, and optical biophysics will generate the greatest revolutions in human history. This is where funding and manpower for scientific research should be directed. The photo shows a U.S. AIDS researcher.*

tions must be satisified, both as to what is produced, and how it is produced:

1) *The quantity and quality of what the economy is capable of producing, from its own means, must increase in per capita and per hectare terms.*

2) *Capital intensity of production must increase.* Capital intensity is measured in two ways. First, the proportion of the total labor force required for food production must decrease, while, at the same time, the production of food, per capita and per hectare, increases. Second, the proportion of labor employed in production of durable goods, such as machinery and metals, relative to the proportion employed in production of non-durable goods, like processed foods, clothing, and textiles, must increase, while the per capita and per hectare availability and quality of consumer goods increases.

3) *Energy intensity must increase.* Like capital intensity, energy intensity is measured in two ways. First, the volume of available energy, per capita and per hectare, must in-

crease. Second, the flux density of application of energy must also increase. Increasing volume of energy supplies is relatively straightforward in conception; the *flux density* of energy applied refers to the volume of energy that crosses the work surface of a machine or process. The idea is simply represented: Try cutting a block of butter with a metal bar, then with a knife. Increasing flux density of application increases the coherence of the energy applied in such a way that more can be accomplished than if the volume of energy throughput is simply increased.

4) *The level of technology must increase.*

These constraints are interrelated causally, such that advancing technology increases the energy intensity and capital intensity of the economy, to the effect that more people can be supported per unit area of cultivated and inhabited land, at higher standards of living. The advances thus defined correlate both with the increasing productivity of the economy, and with the increase of potential relative population density, the effects of which are seen in the relative improvement of land for habitation and use, and in the increase of population density.

The growth of the economy, relative to the progress of mankind in history, is the growth of a special kind of living organism, and is subject to the same harmonic, geometrical ordering as that of any living creature, as self-reflexive, self-similar action. Mankind, through the application of science and technology, acts on the universe to change the conditions of his own existence, and also to change himself. The simplest geometrical form of such self-similar, self-reflexive action is circular action. If the circular action is growing, then a conical spiral is generated.

The growth of the constraints is governed by a special kind of spiral action. Suppose, for example, an economy is increasing in capital intensity, the proportion of agricultural labor is declining, and food production, per capita and per hectare, is increasing. Assuming a constant technological level, the spread of existing technology, and day-by-day improvements in its application will, sooner or later, create the circumstances in which the proportion of labor required tends toward a limit, and the per capita and per hectare availability of food tends toward a limit. In the extreme case, zero percent of the labor force would be required to produce an infinite amount of food per capita. The variable rates at which the combined constraints converge asymptotically on such limits define conditions, called *singularities,* in the language of the mathematical physics employed by LaRouche. The constraints, combined hierarchically, under the governing technological mode for the economy as a whole, thus define threshold conditions for possible action, relative to the requirement for human survival, to maintain advancing rates of increase in potential relative population density.

This can be illustrated historically. For example, the anthropologists' hunting and gathering society is separated from its supposed successor, settled agriculture, by such a discontinuity, or singularity, just as modern industrial society, characterized by the use of the heat-powered machine, is separated from the predominantly agricultural ordering of the eighteenth century. Yet, human history continued, on what might be thought of as "the other side" of the singularity, and did not come to an end. Transforming the technological mode of organization of labor is uniquely the means by which the constraints that satisfy the conditions for continued human progress are met.

Australia's extensive development

It is useful to compare such criteria, as they can be developed for Australia, with other countries. Such comparisons are useful in two respects. First, the language of economics has for so long been dominated by the vocabulary of monetarism, where money values and money prices are substituted for physical economic conceptions of cost and productivity, such that the adopted mental reflex is to think of prices and money, and then cost in money terms, and productivity in terms of pricing of output in relation to pricing of predominantly labor inputs. But the arrangements associated with such methods of thinking are collapsing, as the dollar credit system, swamped in more than $20 trillion of debt and speculation, collapses. The vocabulary of prices and money is going to have to be replaced with another, reflecting the opposing economic method. And second, it is always useful to step outside one's own circumstances, to see how things might be otherwise.

First we take *land use, population and employment,* and *energy throughput,* and then turn our attention to the matter of the constraints discussed above.

The maintenance of Australia's population requires the cultivation and use of an area which is bigger than the cultivated and improved area of all of continental Europe. But Australia's population is 15.5 million—the same as that of East Germany or Czechoslovakia. Three hundred million people live and work in the equivalent area of continental Europe. Looking at 1960 to 1984 in terms of population density in the world's cultivated and inhabited areas, Australia presents quite an anomaly. Whereas other regions increased their population density by 20-30% over that one generation, Australia alone is *less* densely cultivated and inhabited than it was in 1960.

Yet, Australia had one of the highest population growth rates of all the considered countries. To maintain a slightly declining level of population density, relative to her increased population, Australia had to bring land under cultivation and habitation at a rate 25% faster than her population growth. It is well known that Australia's land area—desert and arid zones in the main—is one of the most inhospitable and infertile of any land area on the face of the Earth. Whereas the costs of maintaining and improving cultivated and inhabited land have generally declined, in Australia the re-

verse is the case. The more land that is needed to sustain the population, the lower the quality of the soil, the greater the distance that must be traversed, the higher the cost of improvement.

The faster growth in area used and area cultivated than population, is the tip-off to the kind of crisis with which Australia has to deal. Human history as a whole establishes that progress occurs as economic activity becomes more concentrated, more dense, in terms of area utilized by man. That the land area employed has grown faster than the population, signals that growth has taken an *extensive* pathway, rather than an *intensive* one. The increase is primarily in the area of land cropped, not in the area employed for grazing and pasture. While the area of cropland increased by nearly 25% from the early 1960s, the area employed for pasture declined by about 1.5%.

The extensive pathway adopted defines limits beyond which the society cannot go, unless the pathway is changed to an intensive mode, in which improved technologies increase the productivity of human labor, relative to the cultivation and use of land, and thereby also increase the intensivity with which land is cultivated and employed. *The extensive pathway is the tip-off that the potential relative population density of Australia is declining.*

Population density and transportation

Table 1 compares the usage to which the land is put in Australia, with other industrialized nations; here, pasture and grazing land has been added to the total of used and inhabited land area. The first part of the table shows the number of square kilometers per person, and the percentage of that area which is used for agricultural or urban purposes, along with the portion devoted to the transportation system and the railroad system. The second part of the table expresses the Australian value as a ratio of the other three countries.

So population density, in terms of used and inhabited area per person, is more than 500 times greater in Japan, and 160 times greater in the Federal Republic of Germany (F.R.G.). The corresponding point is made by considering the area devoted to transportation, by road and rail, in the four countries. In absolute terms, Australia's transportation grid is about 70% larger than that of either West Germany or Japan; Australia devotes about 19,000 square kilometers to its road and rail system, against the 11,000 or so that are so employed in Germany and Japan.

But consider transportation usage relative to used land as a whole (**Table 2**). This comparison ought to help clarify the significance of the question of population density, for clearly transportation costs will be significantly lower in a country where there is 1 square kilometer of land used for transportation for every 7 or 12 square kilometers of used land, than they are in a country where there is 1 square kilometer used in transportation out of every 262 square kilometers of total land in use. Minimally, an average load will have to be moved less far, during the turnaround time of an average trip. Furthermore, the costs of constructing the highways and the railways will be less, for fewer roads and rails have to be built to achieve the same level of per ton distribution capability. The construction materials have to be moved less far, from where they are produced to where they are to be employed.

Land was converted to transportation uses, over the period from 1960, almost as rapidly as the total area inhabited and cultivated increased, thus maintaining the drag of extensive exploitation. Extensivity in cultivation and habitation must reflect the relative looting and depletion of both natural and human resources, against the improvements in land use and cultivation which would define progress. It may appear, for some length of time, that the extensive method functions. But sooner rather than later, that appearance will prove to be a vicious illusion.

It is not only transportation costs which are thus affected, for the higher population densities function in regard to the lower, in the same way as the knife versus the metal bar in cutting butter. The economic concentration achieved from higher population densities, if ordered according to the con-

TABLE 1
Australia's land-use compared to other nations

	Used km² per person	Agro	Built-up	Transport	Rails
U.S.	0.019	93.7%	6.3%	3.1%	0.01%
F.R.G.	0.002	81.8%	18.2%	8 %	0.06%
Japan	0.0006	68 %	32.0%	14 %	0.09%
Australia	0.32	99.6%	0.1%	0.3%	0.02%
Australia as a ratio of					
U.S.	17	10.7	0.0158	0.096	2.0
F.R.G.	160.0	12.2	0.005	0.038	0.33
Japan	533.0	14.7	0.003	0.021	0.22

TABLE 2
Transport area relative to used area
(square km)

	Total transport	Rail
U.S.	1: 30	1: 563
F.R.G.	1: 12	1: 159
Japan	1: 6.9	1: 104
Australia	1:262	1:3,250
Australia as a ratio of		
U.S.	1: 8.7	1: 8.5
F.R.G.	1: 21.8	1:20.7
Japan	1: 37.9	1:37.6

TABLE 3
Transportation tons and ton-kilometers

	Avg haul (km)	Million tons/ hour	Ton-km/ hour	Mn ton-km/hr per transport operative	Transport operatives (% labor force)	Ton-km/hr per capita (mn)
U.S.	1,017.0	0.287	292	64.9	3.9	1.23
F.R.G.	82.3	0.353	27.4	21.3	4.3	0.4
Japan	74.2	0.648	48.2	26.5	2.9	0.44
Australia	376.0	0.162	17.7	53.2	4.9	1.14
Australia as a ratio of						
U.S.	0.36	0.564	0.06	0.82	1.26	0.92
F.R.G.	4.6	0.458	0.645	2.49	1.14	2.85
Japan	5.1	0.25	0.367	2.0	1.68	2.59

straints under which economic growth must occur, imparts a coherence to the process as a whole, different than that which pertains at the lower level, such that the same quality of effort in the form of work, achieves a vastly different result in the economy organized in a land intensive mode, against that following a land extensive pathway. The one can advance, while the other will prove to be devolutionary.

Transportation can again exemplify the point. The functioning of the system of transportation can be stated in terms of the throughput of freight in tons, and ton kilometers per hour; clearly this will represent some function in relation to distance, and thus also to population density (**Table 3**). It will also correspond with a level of action required to maintain the economy in its functioning.

There would be two diametrically opposite ways of looking at this.

One way, would be to take the transportation system, in and of itself, and to argue, on the basis of such figures, that Australia's transportation system is actually much more productive than the other three, for with a 14% greater deployment of the labor force than in Germany, for example, each operative is accomplishing two and a half times the work per hour, moving goods four and a half times further. But only half the goods are moved per hour, for 2.85 the per capita ton-kilometers per hour.

The other way would be to look at the transportation system in relation to the rest of the economy, to establish that Australia's workers are overworked and undercapitalized for the job they have to do, and not just in the transportation system. The greater volume of apparent work required, as in transportation, is a function of the lower population density—*not* of higher productivity. This is reflected in the higher labor costs, and the greater number of ton-kilometers per hour per capita of the population. It furthermore increases the economic costs of what might look like the same kind of economic activity, in some proportion to the difference in population density between the economies.

The coming crisis in agriculture

Let's take the case of agriculture, in relation to the transportation system. The first of the constraints which LaRouche specified had to be satisfied, if economic growth were to occur, was that agricultural employment as a percentage of the labor force as a whole, had to decline, while food production had to increase, per capita and per hectare (**Figures 1-3**).

The values shown in the graphs are scaled to the United States in 1967—the last year the U.S. economy benefited

FIGURE 1
Agricultural employment as proportion of total employment
(as percentage of U.S. 1967 level)

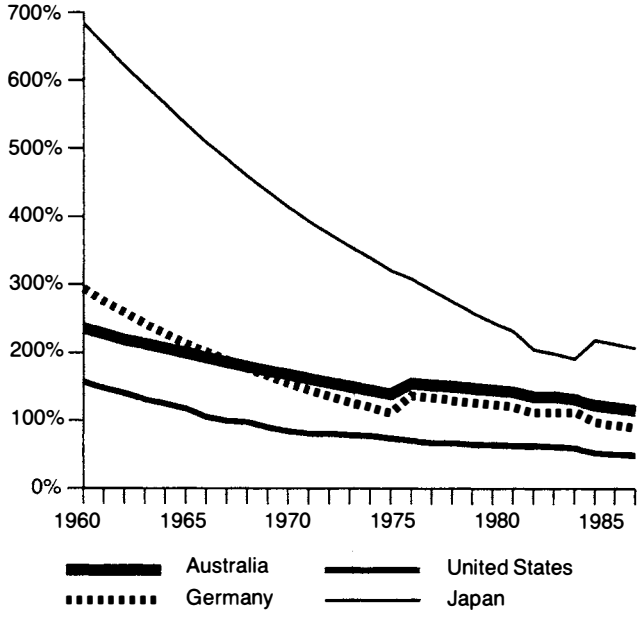


FIGURE 2
Food production per capita
(as percentage of U.S. 1967 level)

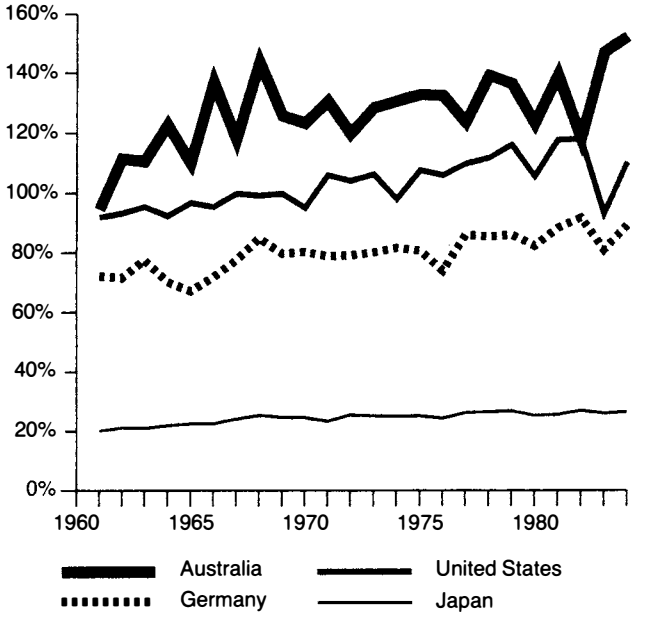
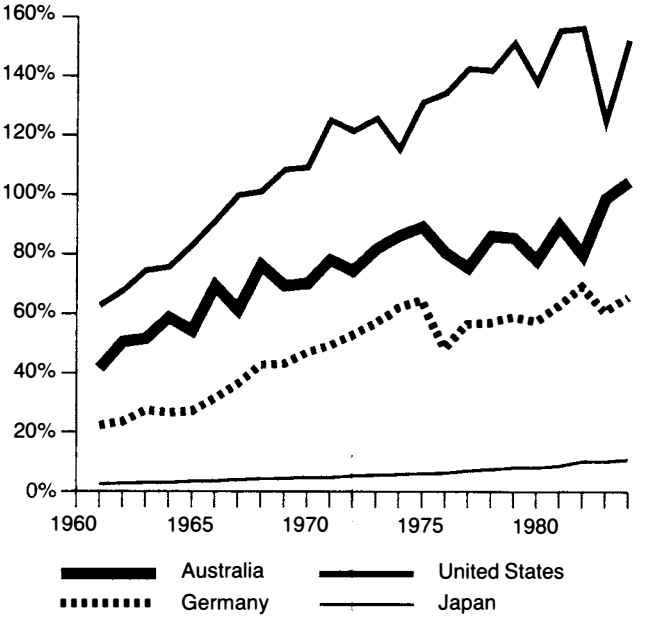


FIGURE 3
Food production per farmer
(as percentage of U.S. 1967 level)



from the Apollo Moon-shot program, and from the investment tax credit policies implemented under President John F. Kennedy.

Since 1975, the reduction in direct labor cost of food slows, at differing rates in the four countries (Figure 1). Maintaining the kind of increase in per farmer productivity which would continue to reduce the overall labor cost of supplying food to internal consumption, and export markets, would require an upgrading of the inputs available to agriculture from manufacturing.

Look, then, behind the numbers of the time series, at the level of the inputs to agriculture which sustained the improvements until the mid-1970s (**Table 4**). Such ratios have remained relatively paradigmatic over the entire period from 1960.

The numbers are calculated on the basis of total crop area, as reported by the U.N. Food and Agriculture Organization (FAO). It can be that as much as half of Australia's cropland

TABLE 4
Australia's agricultural inputs as a ratio of the U.S.A., F.R.G., and Japan
(1984 figures)

	Land per farmer	Tractors per hectare	Combines/ hectare	Fertilizer/ hectare	Food produced/ hectare
U.S.	2	0.29	0.25	0.25	0.35
F.R.G.	24.6	0.034	0.043	0.062	0.065
Japan	152.7	0.018	0.042	0.06	0.065
	Agro employment as a proportion of labor force	**Tractors per farmer**	**Combines per farmer**	**Fertilizer per farmer**	**Food produced per farmer**
U.S.	2.38	0.56	0.66	0.44	0.68
F.R.G.	1.32	0.82	0.79	1.34	1.5
Japan	0.54	2.85	0.77	8.2	9.8

is kept fallow in any one year, in order to allow the soil to recover from the planting the year before. In that case, the column of "land per farmer" could be divided by two, to indicate the amount cropped per farmer each year, thereby discounting the fallow. Then, the Australian farmer is cultivating the same area as the American, in any one year. The other "per hectare" ratios would then have to be multiplied by two, to calculate effective application of the indicated types of machinery and fertilizer, such that "tractors per hectare" would be at 58% of the U.S. level, and fertilizer per hectare at 50%. On the other hand, fallow land, given other inequalities, is also part of the system. If the land is not fallowed, it is less productive next time it is cropped.

Whether the land is counted the one way or the other, the volume of fertilizer applied, and the level of mechanization, would each have to be either doubled, if the fallow were to be excluded, or quadrupled, if the land were counted as is, if the Australian farmer were capitalized with the same level of industrial inputs as have been applied in the United States up to recently. That is not to say that the United States should be taken as a model for Australian agriculture; a different point is being made.

The question then would be posed, what effect would this have on the transportation system, not only in terms of the delivery of the finished products to the farmer, but also in terms of the shipments of the crude materials and semi-manufactured goods, from extraction sites and plants to final assembly and processing shops? It would require establishing a level of functioning based on doubling or tripling the 1984 tractor inventory of about 330,000, and doubling or tripling the 1984 fertilizer consumption of around 1.25 million tons. The discrepancy is an indication of the enforced looting of agriculture. Suppose the looting were reversed: Could the transportation system function so as to sustain the expansion that would be required to increase the inputs to the farmer, including supporting the transport of the materials required to produce those inputs, and then, to support the transport of the expanded produce of agriculture to the consumer, or the port of shipment for export?

Against such considerations, it might be argued that since Australia is basically self-sufficient in foodstuffs, and can continue to export wheat and wool, without increasing the quantity and quality of the inputs available to the farmer, therefore this is all idle speculation, since it is not necessary to do any of it. But the discrepancy in mechanization and fertilizer supplies, per farmer and per hectare, between Australia and the other countries, is also an indicator that the land is being looted, and that potential productivity is being destroyed.

To reverse the looting which is the consequence of the extensive mode of production, at least in the case of agriculture, would require both an increase in the quantity and quality of inputs to the farmer from the manufacturing sector, and a transportation system which could deliver such inputs quickly and cheaply. It is no different, in principle, for any other sector of the economy. No right-minded person would disagree. The question would then have to be posed, should such be attempted by maintaining the extensive pathway of development, or adopting the intensive methods proven successful from mankind's historical evolution?

Improve inputs from industry

Suppose one were to start by attempting to upgrade the quantity and quality of inputs made available by industry, without addressing the question of the dangers in maintaining extensive forms of cultivation and use of land.

Take tractor production. Take the lower variant, where we considered doubling the present tractor inventory of about 330,000 units. At production levels achieved in 1986, when about 7,700 tractors were produced, this would take some 42 years to accomplish, without taking account of obsolescence of existing equipment. The industry has been destroyed since its hey-day of the mid-1960s, when more than 13,000 units were produced each year. Imports have grown to the range of 10-12,000 tractors per year. If the level of imports were doubled, it would still take about 20 years to double the size of the tractor inventory, without regard to the physical obsolescence of the equipment.

The same considerations apply in modified form to fertilizer supplies, for about one-third of Australia's fertilizer consumption is also imported. If the increases were to come from imports, how would they be paid for? If they were to be

TABLE 5
Australia manufacturing as a ratio of U.S.A., F.R.G., and Japan
(1984 figures)

	Durable goods operatives	Durables/ Non-durables	Overhead	Per operative			Per capita	
				Appliances	Tractors	Auto	Appliances	Auto
U.S.	1.07	1.07	0.92	0.34	0.75	0.54	0.3	0.6
F.R.G.	0.627	0.723	1.05	0.40	0.53	0.25	0.26	0.3 55
Japan	0.879	1.10	0.98	0.11	0.35	0.12	0.14	0.3 73

FIGURE 4

Operatives in durable good industry as proportion of total employment

(as percentage of U.S. 1967 level)

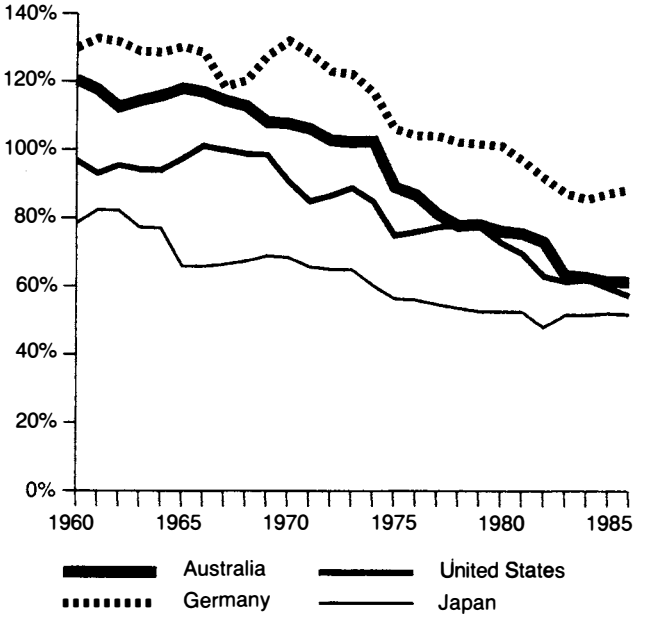
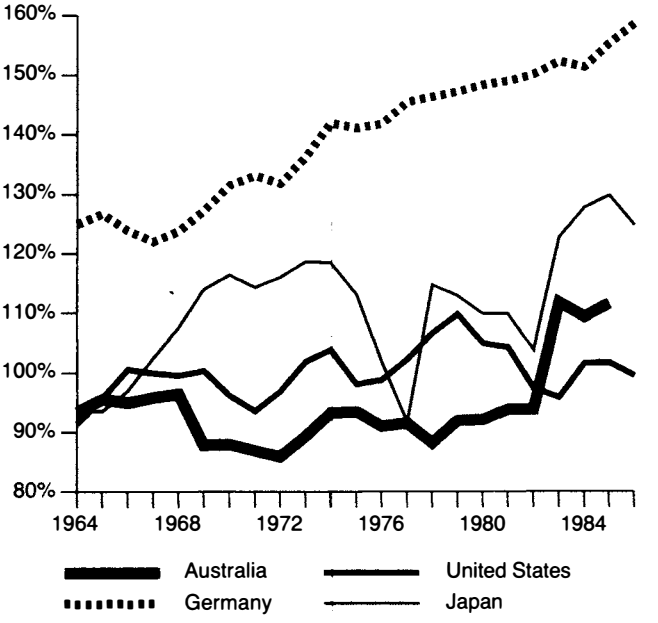


FIGURE 5

Durable goods operatives as proportion of non-durable goods operatives

(as percentage of U.S. 1967 level)



produced internally, what kind of changes would be required to reverse decades of looting against man and nature?

Clearly, without respect to the feasibility of building up the tractor park in the indicated way, the capability of industry is key to upgrading agricultural productivity. The second of the constraints that have to be satisfied if growth is to occur, we saw, is that the proportion of the labor force employed in production of durable goods must increase, and the quality and quantity of manufactured goods for the consumer sector must increase too.

Contrary to the employment and output ratios which we saw prevailed in agriculture, when we consider the application of LaRouche's constraints to the manufacturing sector, none of the four countries considered satisifies the requirement that *employment in durable goods should increase relative to the labor force* (**Figures 4-5**). Japan and West Germany did produce increases in per capita availability of automobiles and household appliances. The United States and Australia have both declined from the highs reached, in the U.S. case in 1966 for autos and 1972 for household appliances, and in the Australian case in 1970 for automobile production and 1974 for the production of household appliances. In the U.S. alone, the per capita production level is back below that of 1960, in the case of automobiles, and at roughly the same level in the case of household appliance production (**Table 5** and **Figures 6-9**).

This second measure of capital intensity—employment in durable goods relative to the labor force as a whole—helps substantiate the assertion made at the beginning of this report, that Australia's crisis is not national, but part of a global crisis, and that it cannot therefore be resolved at the national level, but only as part of the process of transforming the way the world is organized. Over 80% of world industrial production is accounted for by about 18 countries of North America, Western Europe, and Japan. Japan, the United States, and West Germany account for the lion's share of the 80%. When it comes to the capital goods class of equipment, not simply industrial semi-manufactured goods, then Japan and Germany dominate absolutely, with the United States falling further behind each year.

On one level, the problem is financial: The dollar-based credit system is in the midst of a deflationary bankruptcy collapse. On a second level, the kind of economic problem the world confronts is that epitomized by the failure to invest in durable goods or capital goods. Where the United States, West Germany, and Japan have not done so, but have at best held the line, or slowed the rate of attrition, it can be assumed that no other industrially developed economy has done so either. And where those who have the capability to do so have not, what can others do?

Volume of production, per capita (**Table 6**) or per operative, does not provide, on its own, an indication of what

FIGURE 6
Automobiles produced per operative
(as percentage of U.S. 1967 level)

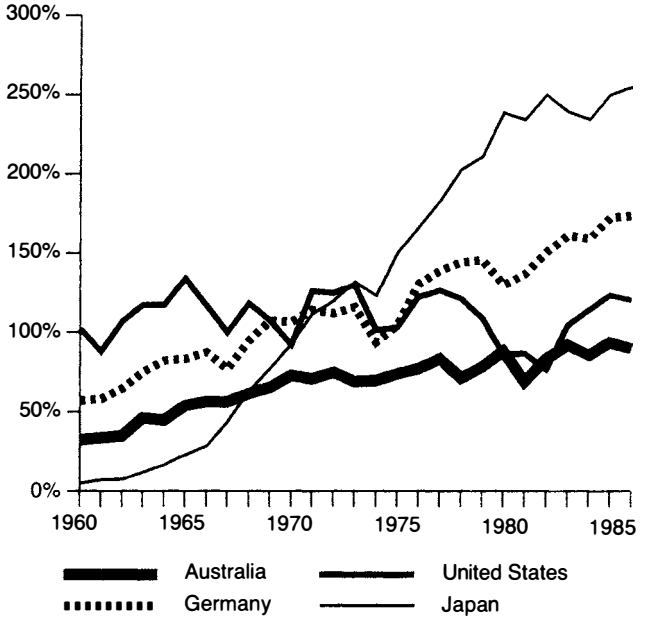
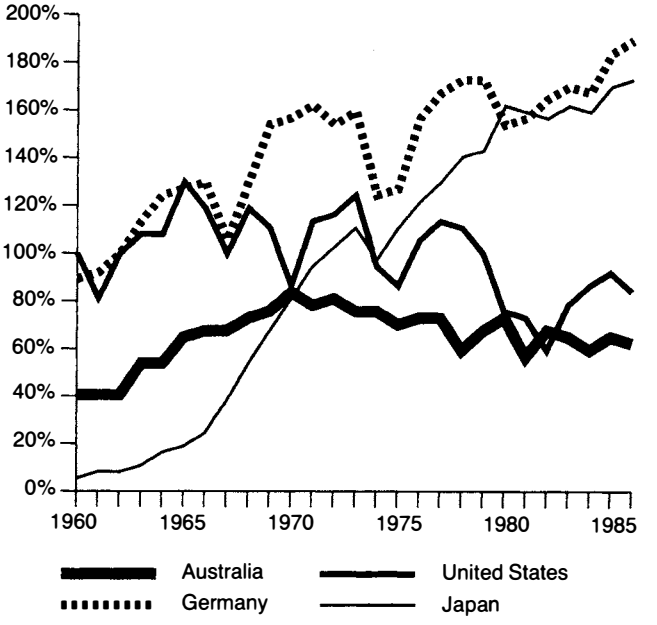


FIGURE 7
Automobiles produced per capita
(as percentage of U.S. 1967 level)



ought to be produced. This can be approximated in two ways. One, by comparing production with apparent consumption. And, second, by comparing the apparent consumption of what is produced, with the total inventory of the product in use, and its estimated physical life. Employment data can then be recalculated to indicate the level of employment necessary to maintain the turnover of the indicated classes of product, on the basis of self-sufficiency. The recalculated employment data then provide estimates of the labor cost of meeting certain requirements for the economy to function. Those estimated costs can then be compared with the employment ratios which indicated the first and second capital-intensity constraints, and with the transportation profile we indicated above, as well as with the profile of land use and population density (**Table 7**).

In the table, the inventory of tractors is as reported by the FAO. The inventory of automobiles and trucks and buses is the figure of registrations reported in Australia's annual vehicle census. The life expectancy of the vehicles is the standard which used to obtain in the United States in the mid-1960s. Such standards have changed in the meanwhile, but not because better, longer lasting, equipment is made now, but because equipment is not replaced as often as it should be. The line "divided by 1984 production" indicates the increase over 1984 that would have to be produced if Australia were to be self-sufficient in those areas as defined. In other words, in 1984, Australia was producing about 17% of the tractors it needed, 28% of the automobiles, 40% of the trucks and buses, and about one-third of the fertilizer.

If the line "divided by 1984 production" is then divided by the difference between Australian labor and that of Germany and Japan in per manufacturing operative output in tractor and automobile production, as reported above, the result provides an approximation of the difference in productivity of labor cost in producing for the requirements of self-sufficiency. The United States is not included here, for the U.S. is not self-sufficient, whereas Japan and Germany are. It can then be seen that the labor cost of producing for the requirements of self-sufficiency, as indicated for Australia in

TABLE 6
Per capita production
(1984 figures)

	Tractors	Appliances	Automobiles
U.S.	0.0032	0.18	0.031
F.R.G.	0.0013	0.26	0.072
Japan	0.0018	0.39	0.064
Australia	0.0002	0.06	0.023
Australia as a ratio of			
U.S.	0.0625	0.33	0.741
F.R.G.	0.15	0.23	0.319
Japan	0.11	0.15	0.359

FIGURE 8
Household appliances produced per capita
(as percentage of U.S. 1967 level)

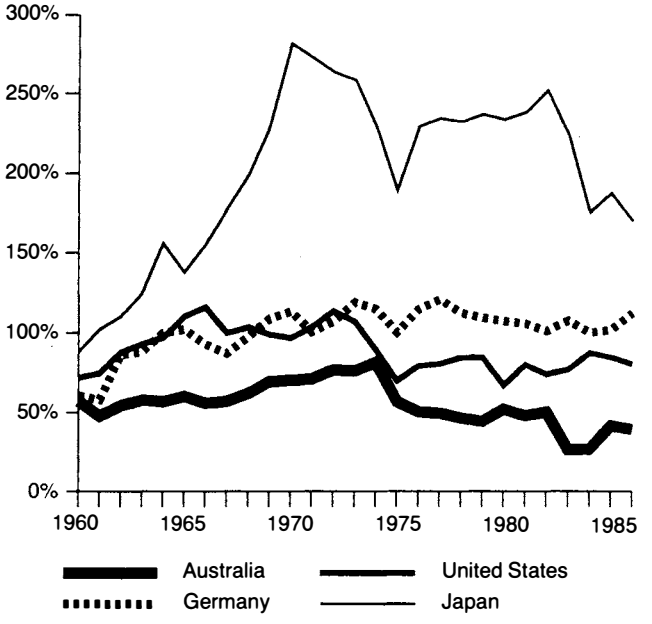
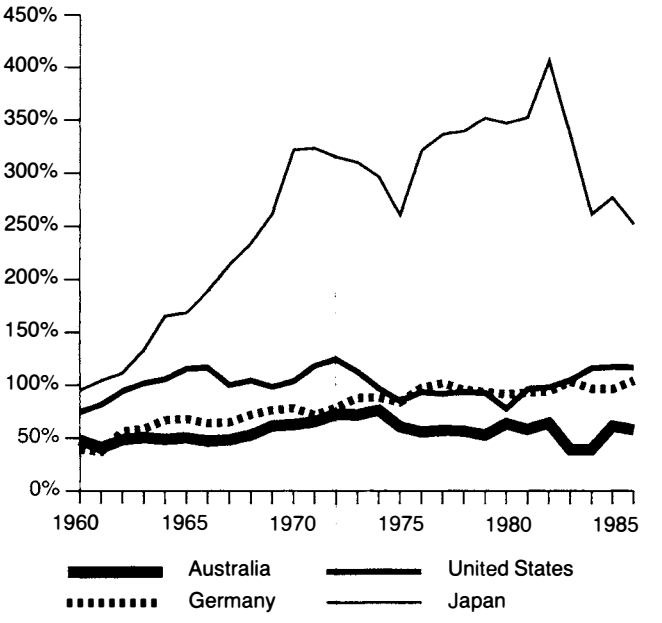


FIGURE 9
Household appliances produced per operative
(as percentage of U.S. 1967 level)



the cases of tractors and automobiles, would be, respectively, 48 and 23 times greater than it is in Japan, and 10 and 6.6 times greater than it is in the Federal Republic of Germany. This is arrived at, for example, relative to Japan: Australia's per operative output of tractors is 12% that of Japan's, and of automobiles, 35%, but Australia's output is 17% of requirements in the first case, and 28% in the second (17% of 12% is just over 2%, and 28% of 35% is 9.8%).

The difference reflects the same kind of looting which has been applied to agriculture in the extensive mode. The looting takes the form of underemployment in manufacturing, and underinvestment in the technology and power which permit the manufacturing operative to work. To reverse the looting would require gearing up production, or imports, or a combination of both, to reach the inventory replacement levels for each of the commodities cited, and others that are not.

Raising the productivity of labor

Australia's underemployment is easily demonstrated. Its labor force in 1984 was counted at 6.815 million. Nearly 11% of the total, 746,000, were then employed as operatives

TABLE 7
Production and employment requirements for self-sufficiency
(1984 figures)

	Tractors	Automobiles	Trucks and buses	Fertilizer (tons)
Inventory	332,000	7,757,200	677,400	
Production	7,000	367,749	35,354	1,014,000
Consumption	19,000	444,286	118,288	1,372,178
Years of use	8	6	7.7	
Needed/year	41,250	1,292,866	87,974	2,744,356 (×2) 5,488,712 (×4)
Divided by 1984 production	5.8	3.5	2.5	2 or 4
Mfg operatives needed at 1984 per operative output (thousands)	4,327.9	2,611.7	1,865	2,238.6

in manufacturing, out of an estimated total productive work force of 1.926 million, when agriculture, mining, transportation, and construction are taken into account.

LaRouche's standard for a healthy employment profile for an economy requires that 50% of total employment be in productive activity, 10% in scientific research, and the balance, divided between administrative and institutional functions, such as sales, after adequate levels for education and health services are provided. In this view, Australia's productive work force ought to be in the range of 3.4 million people, rather than the 1.9 million who are so presently employed. The 3.4 million can be compared with the line in Table 7, "Manufacturing operatives needed at 1984 per operative output" levels.

Assuming that the level of technology applied remains the same, it can also be assumed that the division of labor of the productive work force would remain the same. Thus, for the sake of assumption, 38% of the total potentially productive work force of 3.4 million would be employed in manufacturing. This would come to 1.2 million, and can be compared with the 4.3 million manufacturing operatives who would be needed to produce tractors, the 2.6 million who would be needed to produce automobiles, and the 1.8 million who would be needed to produce trucks, if requirements for self-sufficiency were met at 1984 per operative output levels. Obviously, there would not be too many workers available to run the transportation sector, construction, mining, or anything else.

The difference between the number of operatives required to produce for self-sufficiency at 1984 output per operative levels, and the total for potential manufacturing operatives, indicates the level of improvement in productive powers of labor which would have to be provided, through investment in increasing the technological content of labor, within the demographic constraint imposed by the size of Australia's potentially productively employable work force. If the indicators utilized here are again employed, the required increase in the productivity of labor will be in the range of from 1.5 to 3.5 times. Here, the requirement for tractor production is the basis for the larger estimate, and the requirement for truck and bus production, the lower.

Technologies which are now on the horizon will permit increases in the power of labor applied by a factor of 10. Such technologies will flow from current work in controlled thermonuclear fusion, from developments in high-energy physics associated with coherent plasma and related phenomena, and from developments in biophysics. Developments in these areas, supplemented by foreseeable ancillary increases in the power of computers, obtainable through parallel-processing, will produce the tenfold increase in labor power over present levels, as they are assimilated into the economy. Coming breakthroughs in these areas will generate the greatest revolutions in the organization of mankind's existence in the totality of human history, for they will permit the coherent processes which govern the physical universe to be brought under man's willful control. The combination of the three therefore defines the general area into which funding and manpower for scientific research ought to be directed, and a different vantage point from which to address the indicated, needed increases in the power of labor.

Energy throughput

LaRouche's paired energy constraints can be reviewed from the standpoint of what has been identified above. The level of energy throughput, or availability of power, represents the totality of the inputs available to the economy and, therefore, also represents an approximation of the level of improvement in density of land usage. Ordinarily, energy, or power supplies, are taken either as a simple magnitude, or as a per capita indicator. **Table 8** compares energy use per hectare, per capita, and per unit population density for 1984, and shows the cumulative change in the measure LaRouche calls per unit of population density.

Energy or power supplies are employed by people working, or living in a given area. Thus the density of energy throughput ought to be looked at, not as a simple magnitude, but in both per capita as well as per hectare or square kilometer terms. However, there is an inverse relationship between the per capita throughput, and the throughput per unit area. This means that the greater the population density, the lower the energy throughput per capita, and the higher the energy throughput per unit area. As we saw above, in the case of transportation and land use, greater population densities make possible cheapening of economic costs. Energy throughput, as representative of the sum of the inputs required for all areas of economic activity, thus exemplifies what was shown by the case of transportation, but in more general form (**Table 9**).

Since there is an inverse relationship between the throughput taken as a per capita value, and throughput taken as a per hectare value, relative to population density, both

TABLE 8
Energy throughput in 1984

	Per km² bn kcals	Per person mn kcals	Per unit population density	Change 1960-84
English speakers	9.86	77.848	27.7	38%
Western Europe	13.46	34.621	21.58	113%
Continental Europe	15.94	33.655	23.16	91%
Soviet bloc	0.74	54.504	6.3	165%
Eastern Europe	11.07	42.588	21.7	90%
United States	9.49	83.826	28.2	58%
West Germany	26.50	44.514	34.3	55%
Japan	70.80	39.560	52.9	1,106%
Australia	1.68	52.510	9.39	66%

TABLE 9
Energy applications in 1984 figures
(% of total final consumption)

	Australia	Germany	Japan	United States
Electric generation	16.1	15.2	19.6	14.6
Industrial uses	38.1	35.4	47.8	31.3
Transportation	38.0	22.0	22.0	34.2
Rail	1.4	0.7	0.9	0.8
Road	31.0	19.2	18.8	34.2
Agriculture	2.5	1.2	1.5	1.0
Households	12.8	24.6	11.8	18.2

have to be taken as a combined measure. The custom is to compare energy throughput per capita: Here, the United States is way ahead of the rest of the world, and Australia is 30% higher than Japan. But Japan's throughput per square kilometer is more than 40 times greater than Australia's, comparable to the difference in labor productivity we identified above in the case of tractor requirements.

The measure, *per unit population density*, is intended to combine the per capita and per square kilometer values in such a way as to make comparison between countries more adequate. The measure is calculated by taking the square root of the product of the per capita and per square kilometer value, to produce the geometric means between the two. Take the comparison between Japan and Australia again. The result is that energy throughput in Japan, per unit population density, is about 5.6 times higher than it is in Australia.

The difference ought to highlight again what has been proven from human historical development itself. Increasing population density is not optional, but necessary, if mankind is to continue to progress. The difference indicates the direction Australia must move in if it is to turn around the extensive production-based looting mode which is the motor of the worsening present crisis.

Review what has been presented in light of official projections of Australia's population growth. The United Nations projects an increase in the population of Australia between now and the year 2010 of about 30%, with another 14% between then and 2025. Assume that the current looting mode can be continued, and that land continues to be brought into cultivation some 25% faster than the population is growing. Then, the cultivated land area, excluding pasture, would have to increase by 37% to keep pace. If current policies are continued, at least another 10 million hectares will have to be brought into cultivation. Who will do that, and with what will they do it? And if it isn't done, or cannot be done, what then? The new land area required is the equivalent of Portugal or Hungary. There has to be a better way to sustain Australia's population than gobbling up the land area of whole nations every 20 years.

This will not happen—but what will? In the case of agriculture, if land cultivated is not to grow as fast as it has over the past 30 years, how will output levels be maintained on the land which is cultivated, if the inputs from industry are not increased? How can the inputs from industry be increased without the kind of expansion of productive employment identified above, without increasing the technological content of labor, and without increasing the energy throughput at least in proportion to the required expansion in employment? Doing each of the above requires breaking with the extensive mode imposed by looting and underinvestment.

Energy throughput per unit population density is a good indicator of the relative costs of improving and maintaining land under cultivation and habitation. Australia's 66% increase of energy throughput from 1960 to 1984 kept pace with the 62% increase in land used over the same period. Without changing the mode of use of land, increases in energy consumption over the next 20 years will be eaten up in the same way.

To continue in the current extensive mode of land use over the next 20-25 years will require bringing a minimum of 10 million hectares into use. To maintain per farmer productivities, this will require increasing the number of farmers by about 25%, just to maintain yields that are low compared to those prevalent in the rest of the advanced sector. Not increasing the number of farmers, but increasing the cultivated land, would require a similar productivity increase from the farmer.

Breakdown crisis looms

There would come a point in this process at which the quality of existing cultivated land and new land brought into production is insufficient to maintain the low yields achieved, and too extensive to be served by the transportation sector. At that point, Australia's urban population would run into real difficulties. No doubt, the Fabian Society's social engineers will be advocating the return of some part of the urban population to the land, to scratch out the subsistence the collapsed economy can no longer provide for them.

That point of total breakdown crisis will be reached as:

- the growth in availability of energy throughput becomes insufficient to continue to bring in land at the required rate;
- agricultural productivities collapse under the impact of declining qualities of land and lack of necessary inputs;
- the transportation sector breaks down, as ever smaller loads have to be carried over ever longer distances.

It would take far less than 25 years for these parameters to intersect. Elements of such a crisis are already here, now. Within 10 years or less, it will become apparent that, as presently organized, Australia cannot even support 15-20 million people, at existing densities of 30 people per square kilometer, if pasture and grazing land is excluded. At that point, the reverse slide back down the anthropolo-

gists' markers for the advance of human society will accelerate.

An intensive land use program

Continued extensive cultivation is not feasible. But what will replace it? The alternative is to change the mode of cultivation and habitation. Adopt the *intensive* use of land instead of its extensive use.

Under the constraints imposed by current densities, it would be impossible to achieve the intensive management of the millions of hectares in use. It would be impossible to achieve the rates of growth required in application of technology, energy throughput, and productivity of labor, including in the transport sector. Calculate, for example, the volume of energy, or the transport construction, that would be required to improve Australia's inhabited and cultivated area to the level indicated by West Germany.

The best results would be achieved if the effort at transforming the mode of activity into an intensive rather than extensive direction were focused, not throughout the whole area, but where the population centers are. Such an approach coincides with the necessary increase in non-agricultural productive employment.

For example, West Germany is self-sufficient in food production. Sixty-one million West Germans are fed from an area of 7.465 million hectares. Only 0.122 of a hectare is required to keep each person in foodstuffs for a year. Unlike the United States, where cultivation proceeds on the basis of regional specialization, German agriculture is highly diversified. The diversity permits the urban population to be fed from the hinterland surrounding the city, without requiring the great transport distances needed in the United States.

Expansion of technologically driven manufacturing employment in the urban centers would be most effectively sustained if food production, for domestic requirements, were concentrated in the hinterland of the cities, where the urban work force is located. If German agricultural productivity is taken as a model, and if such levels were obtainable in Australia, given appropriate investment to provide the inputs, and supporting infrastructure in the form of transportation, water, and power, Australia's urban population could be fed from an area of about 2 million hectares. If half the land still had to be kept fallow each year, then 4 million hectares would be required.

The idea would not be to shut down everything else, and force the relocation of the entire population into the area slated for investment. Nor would the idea be to eliminate the production of wool and wheat, among other crops for export. That would be absurd. The idea would be to cheapen the cost of producing food for internal consumption, through capital improvements, so as to cheapen the cost of sustaining the kind of increase in manufacturing capability which is required, and cheapen the cost of providing the capital improvements to agriculture. It would be the necessary corollary to the upgrading and expansion that is necessary to modernize Australia's industry on a full-employment basis.

The approach would be to build up the focal points for intensive development of agriculture and infrastructure in the hinterland of urban concentrations, as markets for part of the production of expanded industry. Then, to define a checkerboard-type grid which would interlink the foci of development as growth proceeds. The Melbourne-Sydney axis would take priority, followed by Brisbane, and so on.

The level of inputs required for such a focusing of effort can be estimated in comparison with the other economies we have seen. For example, the U.S. energy throughput per square kilometer is about 10 billion kilocalories. If this level of energy throughput were applied to areas selected for their proximity to existing urban centers, total throughput over 40,000 square kilometers would approximate 400 trillion kcals. Divided by Australia's present population of 15.474 million, this total, while increased per cultivated and inhabited kilometer, would represent a cut of about 50% from present per capita standards.

Taking Germany's energy throughput per cultivated and inhabited square kilometer as a reference instead, 26.5 billion kcals per square kilometer, the total requirement, based on the assumed 40,000 square kilometers, would be 1,060 trillion kcals, with a per capita energy consumption of 68.5 million kcals per person. Taking Japan as a reference point, the total energy throughput required would increase to about 2,300 trillion kcals, or 183 million per person (**Table 10**).

Such parameters, combined with identified expansion in productive employment, and upgrading of the powers of la-

TABLE 10
Intensification of habitation compared

	Land area used (km^2)	Energy per km^2 (bn kcals)	Energy per person (mn kcals)	Per unit population density	Energy throughput (trn kcals)
U.S.	40,000	10	25.86	16.08	400
West Germany	40,000	26.5	68.5	42.6	1,060
Japan	40,000	70.8	183.0	113.8	2,382

bor, would identify a pathway along which Australia's potential relative population density could be increased. In such a program, intensive usage of land, expansion of productive employment, and expansion of energy throughput, under conditions of technological advance, would combine to reverse the deadly threat posed by the continuation of extensive cultivation and destruction of industrial activity. Energy throughput per unit population density and technological capability would be increased to compensate for the absence of actual population density.

How can it be done?

The discrepancy between Australia and the other advanced sector economies, in intensity of cultivation and habitation, is not only an indicator of what would define progress; it is also an indicator of the vastly greater costs incurred in pursuing such efforts in the underpopulated southern continent.

This puts a premium on the adoption of technological advances to compensate for shortages of available labor.

To reverse the degradation of its inhabited area, Australia will have to place a premium on the development of the new technologies that can do the job. Chief among them is thermonuclear fusion power, which, apart from making available relatively unlimited supplies of energy, will also eventually make feasible power generation stations in the terawatt range.

Until fusion comes on line, Australia should concentrate on nuclear fission. Here the high-temperature reactor which Australia helped pioneer in the 1960s would be useful. But Australia had better not make again the mistake she made back then, when from a position of world leadership, she turned her back on nuclear power.

It would be insane to build the required volume of capacity out of coal, gas, or oil-fired generating plants. Reliance on coal would reduce the transportation system to a parody of that of the United States or East Germany, where coal shipments for electrical generating stations constitute the bulk of freight carried on railroads. Gas or oil-fired plants would require a huge expansion in the exploitation of existing resouces, where they are known to exist, and also strain transportation capacity.

The nuclear route is better in either case.

Improved transportation links are the key to increasing the intensity of cultivation and use of the existing area used by human beings. The extensive use of land results in far greater added costs in transport, since goods have to be moved from one place to another, from port cities, inland to the point of final destination and use, between cities and countryside. The less the density, the greater the distance, the greater the cost.

The greater costs are reflected in the higher energy bill for transportation incurred by Australia than West Germany, Japan, or perhaps even the United States, which has been deprived of transportation investment for over 20 years. The energy bill for Australia's transportation system, at 38% of total final energy consumption, is 70% greater than in West Germany or Japan, in proportion to energy consumption as a whole, and even in excess of that incurred in what used to be the petroleum-profligate U.S.A.

The difficulties are compounded by the fact that in Australia, highway transport, economically the most expensive form of transportation, accounts for more than 80% of the total energy bill for transport. Concentrating intensified development in the rural hinterlands of Australia's cities will help to cut the costs of transportation, while providing a significant boost to overall productivity.

Trucking has been pushed into predominance because of its claimed cheapness. The argument is that the capital investment required for highways, assuming the existence of a highway grid, is far less than the capital investment required to maintain and operate a railway network.

In reality, highway transport is more expensive than rail or shipping. In the United States, trucks carry upwards of 15 tons; railroad freight wagons carry 60-120; barges are about 900 tons. A freight train will be made up of 30-40 cars; it takes 120-160 trucks to handle the same volume of merchandise as a freight train. There are advantages to trucking in final delivery, between break bulk point and end-user of the merchandise, and trucks do move faster than trains. But still, it is an order of magnitude cheaper to move freight by rail, over long distances, than by truck, and another order of magnitude separates rail from barge-drawn water traffic.

Link to the European Triangle

Developments in Europe right now, in the context of the political unification of Germany, will mark the beginning of a new Golden Age for rail transport, and can set off potentially the biggest economic boom in human history. West Germany, reunified with the culturally developed, but undercapitalized and looted population of the East, rebuilding economic ties with free Czechoslovakia, is set to become the economic driving force for a new integrated market of more than 400 million people. Central Europe, over the next five to 10 years, has the potential to become the equivalent of a new Japan in terms of its economic weight in the world. Between them, the two could provide the technological and economic muscle to pull the rest of the world out of the depression it is sliding into.

Rail will come back, by way of the economic integration of Central and Eastern Europe, because there is no other way to move the required volume of goods. Highway infrastructure in East Germany, as elsewhere in Eastern Europe, is not even up to advanced sector standards of the 1950s. Rail is the cheapest way to do the job. It is the centerpiece of a proposal put together by LaRouche, the "European Triangle." The idea

is to take the area bounded by Paris, Berlin, and Vienna, which contains some of the most densely developed industry and infrastructure on the face of the Earth, and make that area the driving force for the reconstruction of the East.

Rail will make its comeback in Europe in the form of high-speed freight transport—running freight at 150-180 kilometers per hour. This will permit rail to regain the advantage of timely delivery from trucking, and will permit, over the area swept by any radius of 500-700 kilometers, delivery of goods within 4 to 7 hours, or overnight. Under this arrangement, rail will recapture the intercity traffic in finished and semi-finished manufactures moved, and bulk goods moved by rail, like ores and fuels, will move on to the waterways.

The same type of approach would also represent perhaps one of the immediately most advantageous means for Australia to reverse the crippling problem posed by her underdevelopment and lack of population, thereby reducing dramatically the costs of making other necessary improvements. The most densely developed area of Australia is the hinterland bounding and connecting Sydney and Melbourne. Seventy percent of the entire population is to be found living within range of those two cities, and the country's principal croplands are on the hinterland's edge.

The optimal plan would be to build a high-speed railway connecting Melbourne and Sydney. Drive a high-speed line northeast from Melbourne through Wagga-Wagga and Dubba to Parkes, and send a spur from Parkes over to Sydney. This railroad connection will become the means by which development is proliferated along the corridor, and will promote significant improvement in agricultural productivity, by bringing inputs to the farmer, as well as increasing the intensity of use. High-speed rail movement of freight will pull traffic off the highways, and will dramatically lower the costs of moving goods. It will help lay the basis for the order of magnitude increase in density of human settlement which Australia urgently requires.

The Melbourne-Sydney high-speed line will define a corridor for rapid, intensive development; sites for power stations will be identified along the natural intersection points defined by the railroad's progress across the infrastructure that already exists. Passenger transit can be handled similarly. France's high-speed train, the TGV, has demonstrated the capacity to function at speeds of around 500 kilometers per hour, speeds at which rail travel for passengers becomes competitive with air traffic.

The Melbourne-Sydney line through Parkes can, at a later point, be extended farther, through, for example, Gooniwindi, to Brisbane, as the hinterland of Brisbane is developed, thereby marking out a second area and corridor for intensive development like the first. The 40,000 square kilometers of improvable farmland could easily be found within reach of the proposed high-speed rail line.

Development of nuclear energy and transportation links would provide the infrastructure to support the revival and expansion of industry. Agricultural machinery and equipment would have to come near the top of anybody's list. How will productivity in agriculture be increased without the machinery and equipment to do it? Why pay a premium for the imported product when idled domestic production capacity and workers are to be found at hand?

The railroad corridor would be supplemented by the reopening of Australia's shipyards. There may not be much of an inland water system that can sustain water-borne commerce, but coastal shipping of bulk goods won't be beaten for a long time, especially given Australia's harbor cities and predominantly coastal population. Reopening the shipyards would serve two purposes: promotion of internal commerce, and international commerce. With a shipping fleet, exports, whether of industrial materials or foods, can be carried in Australian vessels. Freight back, including imports of capital goods, can be handled the same way.

Shipbuilding and nuclear power plant construction would fit together hand-in-glove. Twenty years ago, nuclear-powered merchant vessels were coming on line. But, with the depression, world trade slumped, merchant ships were mothballed, and world shipbuilding capacity, with the exception of South Korea, was shut down. No more has been heard of nuclear-powered merchant ships. However, the navies of the great powers have been operating nuclear-powered submarines for over 30 years. They have proven reliable and efficient. Nuclear power is still a natural to take to the sea.

Furthermore, a newly integrated European economy will provide a vast outlet for industrial raw materials. Even at present levels, reduced by half since the late 1970s, Eastern Europe imports about 60 million assorted tons of raw materials and fuels from the decrepit Soviet market. That market, and more, will open up as the integration effort proceeds. Additionally, capital goods will be exported out of the European center.

Suddenly, in the not-too-distant future, the world will wake up to the reality that there is a shortage of shipping capacity and that the capacity which does exist is, by and large, obsolete. If Australia does not repeat the kind of mistakes that were made in the 1960s, when it opted out of nuclear power, it could be among the pacesetters in the development of shipping.

This type of approach could easily be adopted if the world were organized in a rational way. But it isn't. Australia, with the present depleted resources of her own industry and agriculture, would not be capable on her own of undertaking such an effort, or of making it succeed. Therefore, Australia's only option to escape from the consequences of economic and financial looting, is to join the effort to transform the world.