Special Issue

THE NEW CITIZEN®

Official Publication of the Citizens Electoral Council of Australia
Web: http://www.cecaust.com.au Email:cec@cecaust.com.au

For More Information:
CONTACT
Citizens Electoral Council
1-800-636-432
PO Box 376
Coburg Vlc 3058

Vol 5 No 6 April 2006 $10.00 (inc GST) Print Post: 30601/00002

Facing the Depression:

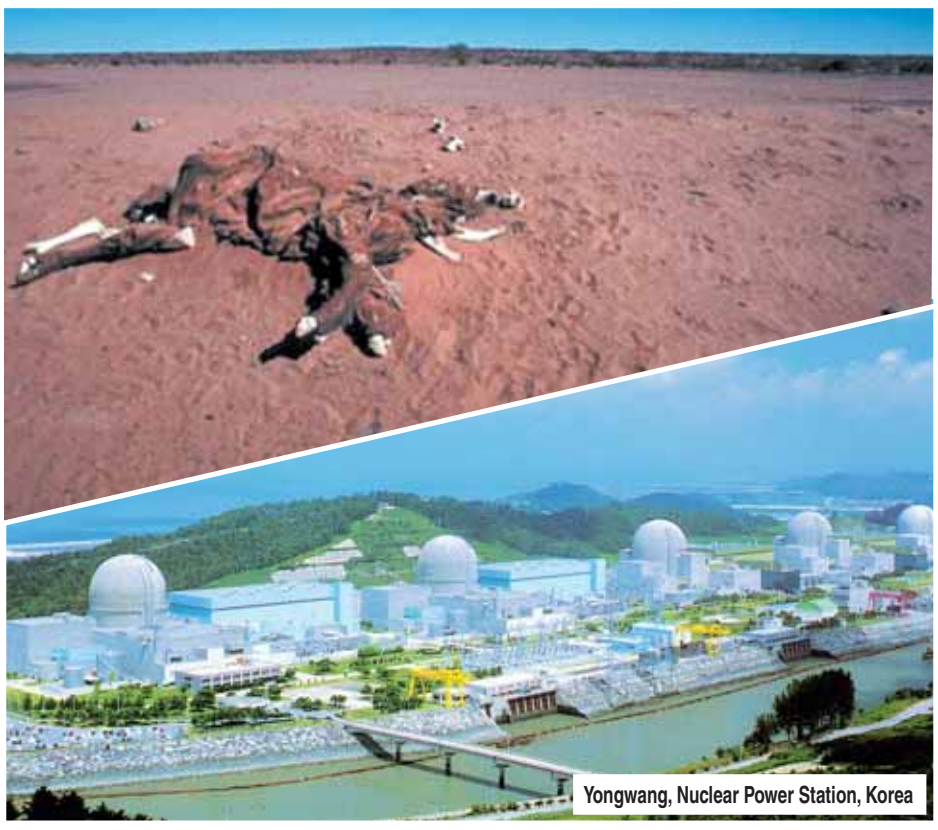
Australia's Blueprint for Economic Development

This special issue of the *New Citizen* is an expanded form of our February 2002 Special Report, *The Infrastructure Road to Recovery: Let's Build Our Way Out of the Depression!* Since then, the Synarchy (Sin´-ar-kee—the financial oligarchy) has continued to loot Australia, its citizens, and its infrastructure, and so to destroy any hope for a better future for ourselves, and for our children and grandchildren. Everything that we said then is even more right today, and more urgent.

Our health system has continued to disintegrate, not to mention the waiting time before you can even manage to get into the hospital. We are facing the worst water crisis in 100 years, because we never developed adequate water supplies. Our education is a joke: Leaving aside its poor quality, what young person without wealthy parents can afford a uni degree often costing $100,000 or more? And, with the exception of the Alice to Darwin line and a couple of smaller State projects, our railroad system has continued to disintegrate. Already in 1998, the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform of the Federal Parliament found that "Without urgent and substantial investment in this infrastructure, major sections of the national rail network are likely to become irretrievable within ten years." That was eight years ago, and little has been done. Our power supplies—now largely deregulated—are grossly inadequate for a modern nation, often subjecting us to blackouts, brown-outs, or power restrictions like a Third World nation.

The Way Out

This *New Citizen* proposes a well thought-out, inspiring vision of what our nation could be, and, indeed, must be, if it is to survive. What is the likelihood of that vision actually coming true, you might ask? There are two answers to that. First, if you just sit on your bum and don't organise with the Citizens Electoral Council to make it happen, then obviously it never will. But second, this vision can not be implemented within Australia alone. The Synarchy has fostered globalisation worldwide in order to loot and destroy nation states. Their power now is such that there is only one hope to defeat them, and that depends upon the titanic political battle now being fought in the United States, between the Synarchy and those forces in both the Democratic and Republican parties allied with economist and statesman Lyndon H. LaRouche, Jr. The globalists here, such as Howard, and Labor as typified by Beazley, are mere puppets for Tony Blair and Cheney/Bush. When the big boys in London and Washington go, their toadies here can be defeated as well. For historical reasons elaborated within, the U.S. is a unique nation on this planet by virtue of the way it was founded, as dedicated to the General Welfare of all its citizens—as specified in the Preamble to the U.S. Constitution—for which purpose the control of banking and credit was vested in the hands of the U.S. Congress, the elected representatives of the people. In Europe, in Australia and in most other nations, a private banking cabal controls the central bank and thus all credit. Private banker-controlled parliamentary governments like our own are mere puppets for such cabals. In his March 2, 2006 speech in Berlin, Germany and in his January 19, 2006 article, *Deficits As Capital Gains: How to Capitalise a Recovery*, LaRouche outlines the strategy for victory over the Synarchy. He also outlines an extraordinary vision for the future of this planet for the next fifty years. We either fight alongside LaRouche, or we face a planetary New Dark Age. The choice is indeed that stark, as you will see.



Australia can only solve its critical water and power shortages through the extensive use of nuclear energy.

LaRouche: A Vision for the Next Fifty Years

The following are excerpts from a speech by Lyndon H. LaRouche, Jr. in Berlin, Germany on March 2, 2006.

The present system, the present world monetary-financial system, as it took shape especially during the latter part of the 1960s, and especially in the course of the 1970s, is now doomed. Now, in economics, you can never predict an exact day of an event. You can't overlook the fact that we have *human beings* inside economies. And therefore, statisticians are always wrong when it comes to economics. Any statistician, anyone who believes in simple methods that are taught in accounting courses and in economics courses in universities today, is bound to be incompetent in any forecast they make: Because the human processes are not animal processes. You can not apply animal statistics to human behaviour, because human beings have will, they have the ability to change. …

Competent economics is based not on financial data. The idea that economies are run by financial data is like playing Monopoly, the board game Monopoly. And economies don't work that way. What happens to money, does not mean that the General Welfare is improved if the amount of money is increased—as you see now. The curve, [see graph, rt.] since the 1971-72 period, the curve has been a constant increase, a secular increase in the amount of money and financial aggregate in existence. But during the same period, especially over the late 1970s, radiating into the 1980s, has been a decline in the actual per-capita physical product production!

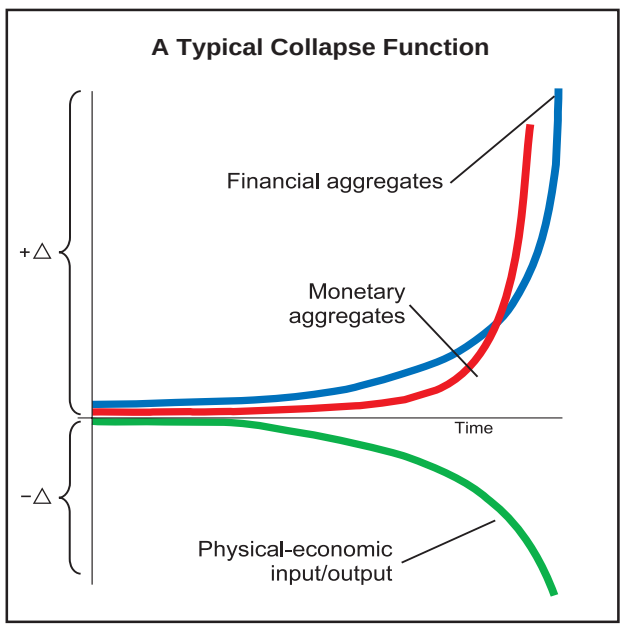
If you look at the figures in the United States, county by county, from 1977 on, you see a consistent decline in the economy. For example, take part of the state of New York, the western part, toward Lake Erie; take the western part of Pennsylvania, which used to be the steel area; take Michigan which used to be the great automobile centre; take Ohio, another big automobile centre; take Indiana, another centre: It's a disaster area! And you look at the areas that used to have physical productivity, now have none. People are living on make-work, cheap labor as make-work. Going from productive employment, into what's called "services," cheap unskilled services, working as restaurant workers and things of that sort—any kind of job to keep them occupied, and at very low wages. [See p.2 for map.]

Lyndon H. LaRouche, Jr.

So that, what's happened over this period, is, the shift into what has been praised as the post-industrial, or services economy, has been an economic disaster! …

The economy is collapsing, and the problems are, that people have tended to

Continued Page 2



LaRouche's "Triple Curve". It depicts how the financiers loot the real physical economy (bottom curve), in favour of Financial Aggregates (stocks, bonds, derivatives, etc.). Monetary Aggregates (money supply) must be issued so that ever-increasing Financial Aggregates can be turned over (bought and sold); when the former curve crosses the latter, a hyperinflationary blow-out is unleashed, as in Germany 1923, or at present.

From Page 1

believe in financial statistics, and government reports based on financial and related statistics. Which are in every case, fraudulent. Governments are trying to succeed in managing a population politically. Therefore, they want to project figures that help them control public opinion. And therefore, they manufacture their figures, by manipulation of financial statistics, as if an increase in the amount of money, or the increase in the amount of nominal wages, in terms of dollars or euro, these days, would say, "this is an improvement." When, actually, if you look at the content, you look at the rate of inflation as measured in physical goods, you find there's a constant deterioration. And in the United States, that's the case.

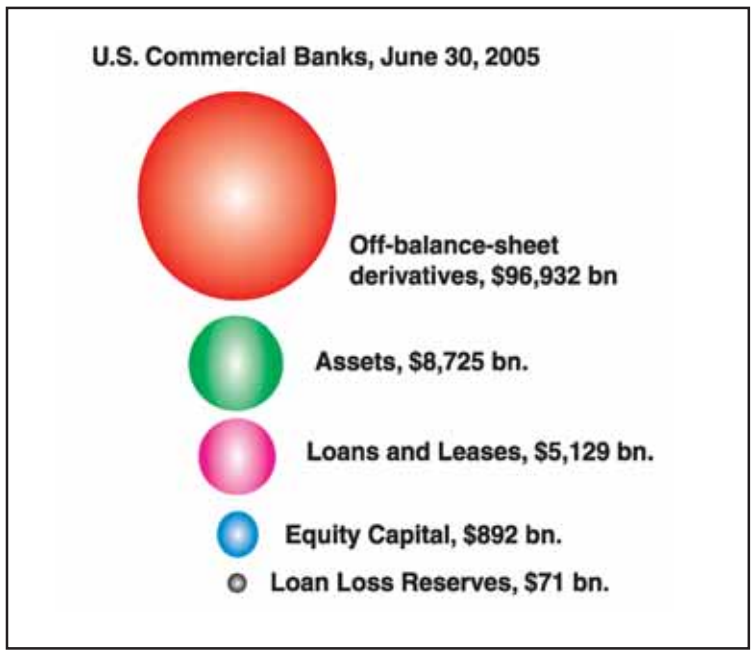
Now, the other problem, here, is that we had a great crash in Europe in the course of the 1920s and 1930s. It built up in various ways; it was a product of the Versailles Treaty arrangement [at the end of WWI], which was somewhat, sort of like a pioneer of the [globalist] Maastricht Treaty of today. And so, it was declining. And in this period, from 1929 to 1933, until Roosevelt was inaugurated as President, under Hoover, there was a 50% physical collapse in the U.S. economy—as there was something comparable here in Germany, in the same period.

The Roosevelt Miracle

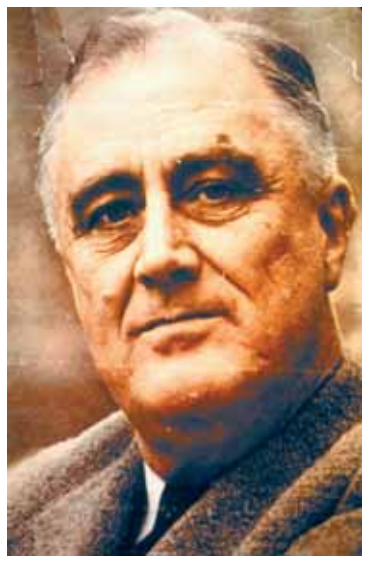
From that period on, Franklin Roosevelt, going back to the traditions of his ancestors—Isaac Roosevelt, for example, back from the time of Hamilton [America's first Treasury Secretary], and some other precedents—took a U.S. economy, which was shattered, in the depths of unemployment, with a 50% collapse of physical output, and he transformed this in a short period of time, into the most powerful economy the world had ever seen.

It was not the war, quite contrary to myth, that built up the power of the United States. The war was a big cost: We had 16 to 17 million people in military service, the largest military force ever fielded on the planet; we sustained that with tons of materiel per person, per soldier, around the world. This was an enormously costly venture. This was not a war-profiteering venture. In war, you lose money. If you fight a war for more than two years, you're crazy or you're ruined, because it will drain you—in more ways than one, as you see in the case in Iraq. A silly ruinous war, that went into asymmetric formation, and is now destroying that whole section of the world by its radiated effects.

Well, this was a miracle. We emerged from the war, as not only the leading nation, the most powerful economy the world had ever seen. But we also were able to save the world: Because, nobody's currency was worth anything, except the U.S. dollar. And Roosevelt introduced a system which was based—we had nothing to do with Keynes. People in Europe will say it was a Keynesian system: The Bretton Woods system was *not* a Keynesian system. European economies are based on *monetary* systems, in which, in general, the government is a subordinate of a central bank. The central bank is largely a creature controlled by the private financial interests. They control, in most times, unless government is very powerful and has a lot of support, *they* control the government, because they tell the government what they can do and what they can't do.



Highly-risky derivatives dwarf banks' other assets. Derivatives were illegal in both Australia and the U.S. until about a decade ago because they were not only gambling, but were *side-bets* on gambling.



Franklin Delano Roosevelt, U.S. President, 1933-1945

State Credit vs. Money

Now, the biggest problem that this represents, in times like *this*, in times of a great financial crisis, is the ability to create credit. If you try to create credit by private banking, you're going to fail. That's how fascism came easily to Europe, because the private banking system was orchestrated to fail on that. But it couldn't work anyway. In the United States, the advantage was, we have the American System, *not* the European system. The American System is based on *state credit*, not a monetary system. European systems are regulated by monetary systems, which means financier interests in the Venetian tradition, essentially more or less control governments—directly or indirectly. Private banking groups, as predators, often control governments, as you see in Germany today, and other parts of the world today. They're going in, gobbling up things, gobbling up industries, destroying assets, hedge-fund raids on all kinds of assets in this country and other countries.

In the United States, we have a different system: We don't have a monetary system, we have a *credit system*. Under our Constitution, the issue of money, and the control of money, is by the government, *not* the banks! We made a qualified exception to that in the formation of the Federal Reserve System. But in our system, it is the Federal government, under the Constitution, that controls the emission and regulation of money! So therefore, under our system, if the government creates state credit, with an Act of Congress authorising the government to form this credit, the Federal government, the Executive branch, through the Treasury, can issue this credit for investment.

Long-term Credit for Infrastructure

Now, the way it works, and the way it's going to have to work in the coming period, to get out of this great world depression which we're in now—we're just waiting for the shoe to drop for places like Japan, on the overnight lending rate, for the day when the hedge funds start to collapse—but, what we're going to have to do, is, we're going to have to create a great mass of long-term state credit, on long-term account, not annual account.

The leading edge of this investment of credit, now as under Roosevelt, will be in the state sector, the public sector, where the Federal government—I'll give you an example: I have one proposed piece of legislation, emergency legislation, which is kicking around among members of the Congress, members of the Senate: And that is, one large project, an integral project in itself, to take the question of the national public transportation and power systems, under one long-term credit arrangement. You're talking about essentially 30 years of credit, to rebuild—we don't have a rail system any more to speak of. It's been destroyed. We've got to put it back. We're going to have to go to a maglev-type system for trunk lines, on rails. [See p. 32 for mag-lev.] Our airline system is collapsing. You know, since power stations generally are 30-year investments, about that order of magnitude, you generally have to finance them on 25 to 30 years credit. So, you have to have credit for 25 to 30 years, issued by the government, in this case, to build a power station.

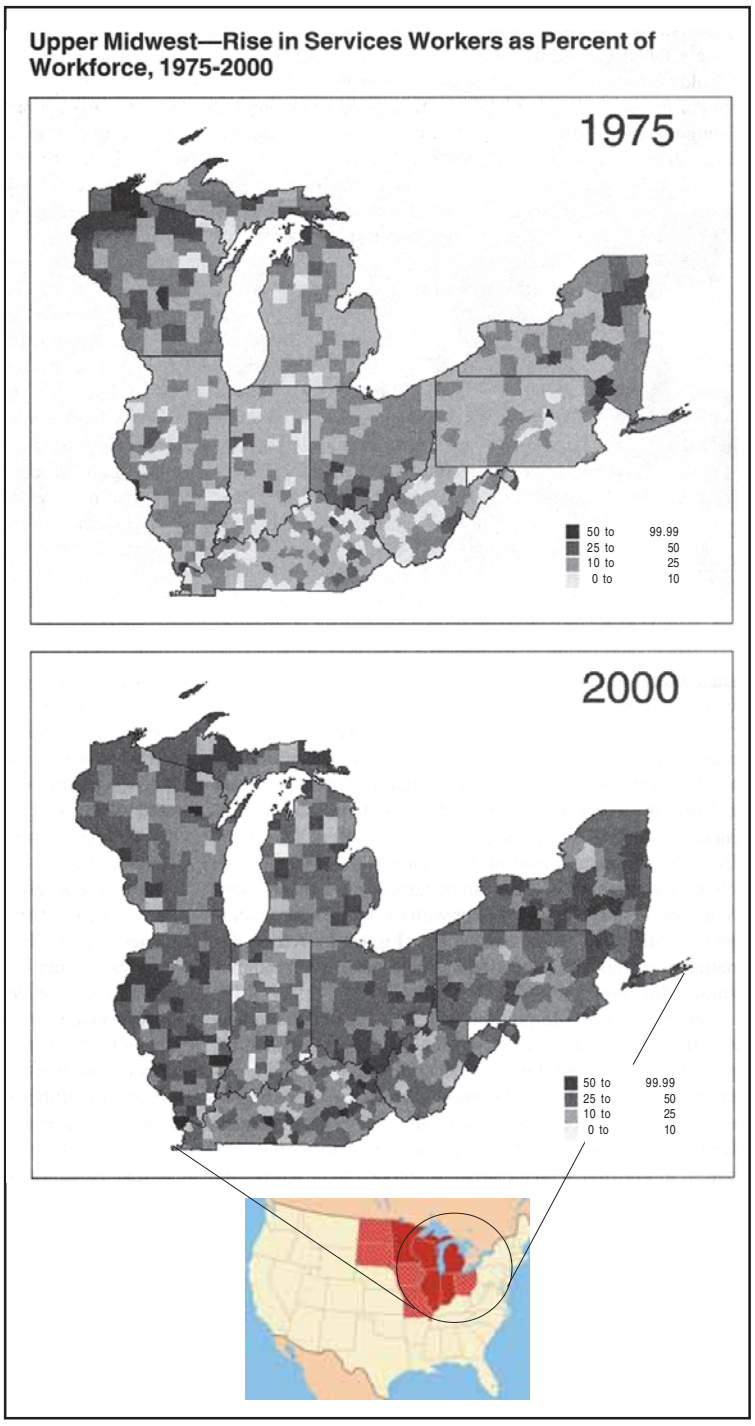
We're going to have to use a lot of nuclear power, which we backed off from, back in the 1970s. We'll probably be using things in the fission area of high-temperature gas-cooled reactors, somewhat modeled on the pioneering work done here on the Jülich model, which will probably be on the lower order of 120-200 MW for ordinary use, because they're small stations and they can be quickly put into place. But, we're also going to have to make another change in our energy policy, which will mean we'll be using hydrogen-based fuels, to replace our dependency upon imported petroleum products and so forth, in the future. We have to. We're going to hydrogen-based fuel automobiles. Japan is already doing that. There are plans in the United States to do the same thing. With an 800 MW reactor of this type, you can actually generate hydrogen-based fuels, locally. Which means that you have control of your supplies, within the territory.

So, you have a multiple-purpose reactor, which produces among its products, such things as fuels. We will convert automobiles largely to hybrids, which in one cycle, the chemical cycle, will depend upon hydrogen-based fuels. Aircraft, the same thing, they're hydrogen-based, because you might not want to use pure hydrogen, but you want some stabilizing element in it.

So, we have to do that. We have to change. The world is going to have to change—it's going to have to be done in Europe, too. The introduction of hydrogen-based fuels generated here is going to be crucial. It's a politically crucial problem here. It will be in other parts of Europe, as well.

So, this means that we can regenerate the economy, which is collapsing in the United States. The lower 80% of family-income brackets have experienced a disaster, since about 1976-77. And if you look, county by county, across the territory of the United States, you see the losses, the transformation from a productive economy, to a collapsing economy. And poverty. You see the collapse of health-care, the collapse of medical facilities in general; the collapse of schools. Filth, decay, all over the place, whole parts of the country that were once rich, prosperous, in the sense of the normal standard of living, are collapsing.

So, we're going to have to have, as Roosevelt did, but on a larger scale, long-term investment large-



The former industrial heartland of the U.S, home to the auto, steel and machine tool industries, among others. Globalisation and the drive for a "post-industrial society" have destroyed the area's high-wage, high-skilled jobs in favour of low-wage hamburger flipping or no jobs at all.

The Bank of England's longtime head, Montagu Norman, installed Hitler in power in the 1930s, and helped prepare a fascist coup for Australia, in case the ALP adopted Roosevelt-style economic policies.

The New Citizen

Published & printed by:
Citizens Media Group Pty Ltd
595 Sydney Rd Coburg Vic 3058
PO Box 376 Coburg Vic 3058
ACN: 010 904 757
Tel: 03 9354 0544 Fax: 03 9354 0166

Editor
Craig Isherwood

Staff Writers
Jeremy Beck, Robert Barwick
Noelene Isherwood, Rhys McGuckin

USA Bureau
Allen Douglas

The *New Citizen* newspaper is the official publication for Special & Feature reports for the federally registered political party, Citizens Electoral Council of Australia.
Copies of this and past editions can be purchased as single copies by telephoning 1-800-636-432, Mon - Fri 9.30 - 5.00 pm or by writing to Citizens Media Group Pty Ltd at the above postal address.

Website:

www.cecaust.com.au

The first headquarters of the Commonwealth Bank at Martin Place, Sydney. The Commonwealth Bank was intended to be the cornerstone of national sovereignty, and as Sir Denison Miller, its first governor said, "the greatest bank in the southern hemisphere."

ly in infrastructure investments, such as rail, power, improvement of our aircraft system, and things of that sort. …

So, we can do that. We can, with our system, simply by following it, by using our Constitution, and our credit system, we can mobilise our forces, to bring our nation out of the gutter.

The U.S. is the Key

Now, in Europe, you can't do it right now: Because, the political system is based on a *monetary* system, *not* a credit system. What happened at the end of the war, in the reconstruction of Europe, was, when the U.S. dollar was the only currency worthwhile, under Roosevelt's provision before he died, the creation of the Bretton Woods system enabled the United States to *facilitate* the building up of new currencies, or renewed currencies in Europe, and the creation of a credit system largely imitating what we'd done under Roosevelt in the United States, to build up in Germany, to build up in France, and build up elsewhere, in northern Italy.

Therefore, in the past, in the last crisis, the United States was able in the post-war crisis, to help *save* Europe, by the credit supplied, on the model of the United States. We didn't give a lot of money (we gave some money); but that wasn't it: We gave credit-backing, stability to European and other currencies. And it was that stability, and the ability for example with the Kreditanstalt fuer Wiederaufbau [*Bank for Reconstruction*] here in Germany, to do the job, to do the rebuilding. ...

The Myth of China and India

Now, if we *do* that, and the United States cooperates, say, with Europe on that, under those conditions, then we have a further perspective: We have people who have the myth, that somehow Asian economies are now the economies of the future. That's a myth. There has been great improvement in China, but it's not secure. There's been improvement in India, but it's not secure. *These are not the wave of the future*! Not on their own.

Because, in India you have 70% of the population is desperately poor. Why are they desperately poor? Because the product of India can not buy enough to sustain improvement of the population, of the 70%. In China, you have a somewhat different, but comparable situation, which is complicated by the fact that China is not really producing national product, not much. What it's doing, is, it's taking designs, of product of other countries, producing with cheap labor and some technology, on the basis of those designs; putting a product into the world market, which then is sold, and delivered to and polished, in other markets. What happens to China and India, in a somewhat differential way, if the U.S. and Europe go into a collapse—the primary markets for the China products? The primary sources of the credit for this business? What happens to India? You have a social crisis, immediately! As you can see in Asia.

So therefore, they're not independent. They are *not* the wave of the future, that's going to prosper if we collapse! If European civilisation collapses, there is nothing for the rest of the world. Except Hell.

Therefore, we have to resume a role which is bequeathed to us, since before the Peloponnesian War: The role bequeathed to us, implicitly, by the writings of Plato. European civilisation, which was reborn in that form, fully, with the Renaissance, the Italian Renaissance, the 15th Century—which is *modern* civilisation, modern technology, modern science, which we in the United States represent, too. Therefore, it is our obligation, to take this legacy we have, almost as a trust for humanity, and to make the benefit of this legacy available to people in Asia.

The Eurasian Continent

That means, that we're going to have to go to a *Eurasian* orientation for Europe, in terms of economy. We must not have globalisation. Globalisation is death. It's a form of imperialism, under which no one has any sovereignty over anything; and groups of bankers, like the Lazard Group in France, run the world—and eat the world, and eat the people in it. So therefore, it has to be sovereign nation-states.

But, our role, essentially, is to look at the Eurasian continent, as one big unit, the biggest unit on this planet; of the greatest amount of the world's population. You have, at one end, you have Europe, and Germany at the pivot in Europe, because it's the most advanced, potentially the most advanced centre for Eurasia, which then, reaches out, reaches eastward. [See map of the Eurasian Land-Bridge, p. 5.] It reaches into, reaches through Belarus, through Russia, through Kazakhstan, so forth, into Central Asia; reaches to China, goes down to India. One line, you can visit—most of this area is totally undeveloped. It needs development. It has vast resources hidden under the ground in this area, but in an undeveloped area. You don't have the population there to develop the territory, the vast resoures.

Now, at the same time, *if* we do a job of saving China, saving India, from the curse of what happens to the United States and Europe, what happens then? Well! The average Chinese is not going to be content with using the level of raw materials that they use now! The average Indian, is not going to be content with that: If they want a modern standard of living, their consumption of what we call raw materials is going to increase. With that, you can go into the areas like Asia, you can find large areas of deposits there, which are untapped and available, just as the Russians have their gas projects and so forth, out of there.

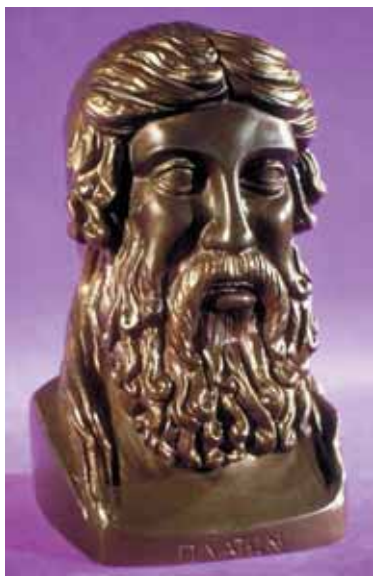
Creating Raw Materials

But that's not going to suffice. Because, these are marginal resources. Take one case: Take fossil water. [See p. 22.] Have you thought about how much of the fresh water, used in various parts of the planet is fossil water? That is, water left behind from the melting of the glaciers. For example, you've got some stuff that's been down there for 2 million years, under India—it's kind of salty, by now. But, you have Australia, depending upon fossil water. Most of the world, to one degree or another, depends upon fossil water. Fossil water means, it's not a renewable resource. You begin to get land subsidence, from drawing down fossil water.

Therefore, we're going to have to make water. Not chemically, but we're going to have to process water, to provide supplies. We cannot depend upon the present system.

The same thing applies to a lot of other fossil material, in the Biosphere, such as minerals, and things of that sort. As we draw down, more and more, we go to marginal resources. These resources are going to become more expensive, physically, in terms of current standards of production, by labor. What are we going to do about it? We're going to have to go to a *high-level, science-driver program*: We're going to have to do, what is implicitly in the work of Vernadsky. [See p. 6.] We're going to have to consider—instead of drawing down limited natural resources, we're going to reorganise the planet, to regenerate and produce the natural resources we require. First of all, so we supply the needs, the aspirations of a growing population, particularly the poor, who don't want to become poorer all the time. They want improvements; they want to look upward. In order to use marginal resources, more expensive resources, you've got to increase the productive powers of labor. Otherwise the cost of raw materials will be too high. It will just defeat your purpose, in trying to improve their lives.

The seeming competitiveness of the Chinese economy, in a globalised world, depends upon keeping about 70% of the population in poverty. Reversing this will require a huge increase in per-capita consumption of raw materials, among other things.



The revival of Plato's philosophical and scientific method unleashed the 15th Century Golden Renaissance.

Therefore, you've got to increase the productivity per capita. To increase the productivity, means changing the standard of living, upgrading it, increasing productivity through technology. It means *science-driver programs*: It means the end of the Greens. Because you can't survive under Greens, you can't live under them. ...

The Fallacy of "Money"

But, look at the typical situation: The idea that money is a measure of economy, a measure of performance in economy, is a piece of idiocy. Money is only useful as a means of exchange. The first time that money was used in the method prescribed by the U.S. Constitution, was in the 17th Century in the Massachusetts Bay Colony, where prior to 1688-89, when the British monarchy cracked down on them, they invented a scrip which was used as an internal currency inside the Massachusetts Bay Colony. Now, the Massachusetts Bay Colony, contrary to some myths in Europe, was actually much more advanced than in England. As a matter of fact, at the time of the American Revolution, the average standard of living and productivity of the typical American was twice that of the United Kingdom. England was a backward country. As a matter of fact, the Industrial Revolution was brought to England, by Benjamin Franklin!

So, it is not the money system, that generates growth. Money is not a measure of performance: Money is a means of exchange, it's a means of circulation. Performance is provided, not by investment of money; performance is by investment of people and skills, in creating infrastructure, in creating productive employment, in technological improvement, in scientific progress. This is where wealth comes from.

But you have idiots, you have systems, who have these monetary theories, they tell you how money is showing you how the economy is working. And you look at us today, and you say, "how is money working? What is the average condition of life? What's the level of employment? What's the standard of living? What's the health-care level?" All of these things—obviously, money is not a measure of performance. Money is a means of exchange, which is very useful and very necessary as a means of exchange, which enables you to let people function freely within an economy, and see how they perform, within an economy. That's the element of freedom of the individual in the economy. But progress is made by scientific and technological progress, or the equivalent in artistic progress, Classical artistic progress which develops the human mind, and develops the ability of people to understand other people and work with them.

But when we measure economy, we say, "What are the statistics showing us?" And you look at the economy, you say, "What does the economy tell us about the statisticians?" The economy tells us these statisticians are incompetent, or wasting their time, just to please somebody with some figures. It's not solving anything.

***Physical* Economy**

Economy is measured in *physical* terms, but not simply physical terms. You can approximate the effect by looking at physical effects, which are important. But the important thing is, you're always drawing down the richest resources. So, how do you maintain an economy, if you're drawing down the richest resources? If you're doing the same thing all the time, you couldn't possibly improve: It's only through scientific and technological progress, and its application to production, its application to the conditions of life, its application to public health—these are the ways, in which wealth has to be measured. It must be measured in the *physical* effects, and also in the rate of *improvement*, as measurable in physical effects.

Money must be measured by physical effects, not physical effects by money.

That's the issue here. So, what you have therefore, is accounting

Continued Page 10

Preliminary Design Report 1084, Met. Water Dist. of S. Calif., 1993.

Artist's depiction of a modern seawater desalination tower. Nuclear and thermonuclear-powered desalination could create literal rivers of fresh water.

DEFICITS AS CAPITAL GAINS

How To Capitalize A Recovery

by Lyndon H. LaRouche, Jr.
December 19, 2005

The following is excerpted from Executive Intelligence Review, *January 27, 2006.*

Consider the challenge facing the virtually financially bankrupt U.S. and European economies today… Focus upon the case of the U.S.A. itself. Ask, then: *What is a competent approach to establishing and maintaining a U.S. Federal Capital Budget—as distinct from a slop-jar package which lumps short-term and long-term balances together indifferently, in a single silly lump, as a common budget?* It must not be a budget like that of recent U.S. national practice, such as that of Bushes "41" and "43," one whose outcome suggests it might have been designed by unbalanced minds.

About half of the annual product of a healthy modern nation-state economy, should be tied up in capital and related expenditures for creation and maintenance of investments in long-term physical improvements of what should be viewed as the public sector of the total economy. [*Australia spends a miniscule 3-4% on infrastructure,* not counting health. See p. 6.] Under our republic's original, and continuing American System of political-economy, this investment in the public sector is expressed as a division of labor among Federal, State, County, and Local government. Although some of this public expenditure passes through, or into forms of private ownership, such as bond-holdings in a regulated public utility, the responsibility for public infrastructure considered as an integral whole, lies with our system of constitutional government, as this intention for the development of the economy as a whole was described by our first Treasury Secretary, Alexander Hamilton: most notably in his 1791 Report to the U.S. Congress *On the Subject of Manufactures*.

A Capital Budget

This aspect of the total economy can not be competently addressed in terms of a simply annual budget by governments. The most essential forms of investment in an economy are typified for today, by the idea of a quarter-century's lapse between the conception of a new individual and the age of maturity as a university graduate with specialist qualifications. A lapse of a quarter- to half-century of physical "life" (i.e., two such generations) of an investment in infrastructure, is typical of most major public investments of this indispensable, long-term type.

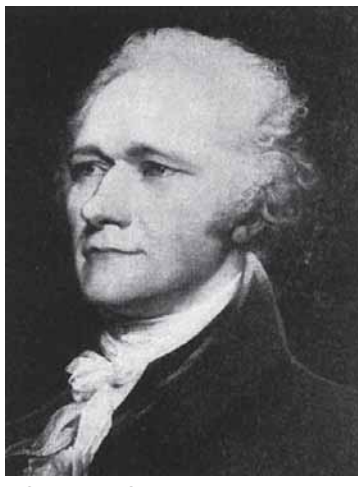
Thus, capital budgets of competent governments, like those of well-managed private entrepreneurships, are dominated by the crucial category of long-term expenditures for acquisition and maintenance of these essential physical investments.

Thus, our American System of political-economy, unlike those prevalent in Europe still today, is not lawfully based, constitutionally, on a so-called "independent central banking system," which is a mere monetary system; rather, our constitutional system requires a Federal monopoly over the utterance, and management of a system of national credit. When our constitutional system of national credit is effectively defended, the Federal government utters currency, as credit, for maintaining levels of useful employment, including the provision of essential capital, in the form of credit, for basic economic infrastructure. However, competent followers of our American System today, will also emphasise that a great part of the annual investment of Federal credit must be steered into useful development of long-term physical improvements in basic economic infrastructure and in promoting similar long-term investment among suitable private entrepreneurs.

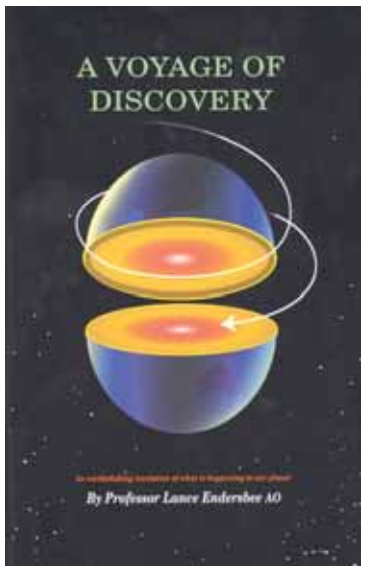
Therefore, the most crucial economic element of the American System, is the role of Federal credit in promoting the investment in development and maintenance of essential public elements of the nation's basic economic infrastructure, while promoting long-term investment in private entrepreneurial ventures of a type which are to be desired in the general interest. This action is premised on the crucial, constitutional principle of our system, that the creation and issue of legal currency, is a monopoly of the Federal government. This is also the case in practice when, as under Franklin Roosevelt's Presidency, devices such as the Reconstruction Finance Corporation (RFC), were used as a vehicle for accomplishing this result. The Franklin Roosevelt Administration, and the combination of the Eisenhower "post-Sputnik" and Kennedy manned Moon-landing science-driver programs, are exemplary.

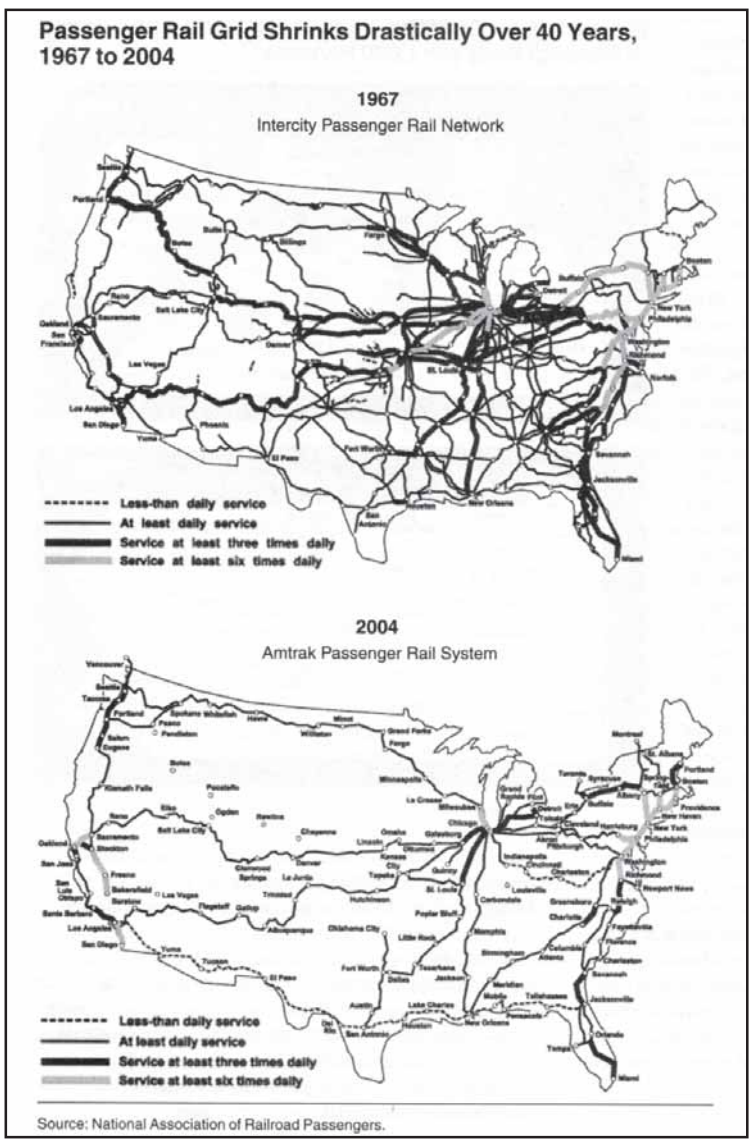
The greatest part of these various public and private forms of capital investment are long-term investments of up to a quarter-century, or longer. Thus, the creation of monetised national credit, represents a debt; much of this debt is, once again, long-term debt. As long as the financial debt itself is not postponed to a point beyond the useful physical life of the capital investment, that debt will probably continue to be useful and worthy. *Therefore, it would be, and is virtual idiocy, to treat long-term Federal credit created in this way as if it were the cause of an imbalance in current Federal accounts.* The current European monetary system presents us with a radical extreme of the foolish practice of treating long-term capital investment as if it were merely part of annual costs. Indeed, under conditions in which the level of nationally produced output is below the level of national requirements, treating long-term capital investments as short-term obligations, as we have tended to do under

Continued Page 21



U.S. Treasury Secretary Alexander Hamilton founded America's First National Bank. The CEC's book (r.) features a draft bill for a new national bank.





The collapse in infrastructure is exemplified by the dramatic shrinkage of railroad mileage in our two most industrialised states, between the years 1933 and 2000.

Source: "Australian Railway Routes 1854-2000", compiled by Howard Quinlan and John R. Newland, Australian Railway Historical Society.

Typical of the wholesale destruction of infrastructure in both the U.S. (above) and in Australia (rt.) is the collapse of the railroads.

"The American System"

LaRouche in his various writings and speeches often refers to the "American System" of economy. In the Nineteenth Century, two competing systems of political economy were locked in a titanic struggle worldwide; they were universally known as the "British System" (of free trade and looting), vs. the "American System of Political Economy". America's first Treasury Secretary, Alexander Hamilton, who was Gen. George Washington's aide de camp in the 1776-1781 Revolutionary War, established what he was the first to call the "American System of Political Economy" in three reports he delivered to the U.S. Congress in the early 1790s: *Report on the Subject of Manufactures; Report on Public Credit*; and *Report on a National Bank*. The U.S. Constitution, adopted in 1787-1789, had specified that Congress (and therefore the people) was to control the issuance of money, *not* private banks. To further develop the American System, Hamilton established the First National Bank of the United States, which was later destroyed by agents of the City of London, just as our own Commonwealth National Bank was destroyed by the same forces. Old Labor in Australia looked to this American System when they established the Commonwealth Bank in 1911.

A Sovereign Commonwealth

Nation states arose in the 15th century based upon the notion of the Common Good, or Commonwealth as it was also called, or, as it was called in the Preamble to the U.S. Constitution, the General Welfare, meaning that of *all* the people, both those now living and their posterity. This was also the principle upon which our Labor Party was originally founded, as expressed by our greatest trade union organiser and an ALP founder, W.G. Spence:

"The welfare of the people must be raised to the first place—must be the uppermost and foremost consideration. How to secure the good of all … the Common Good."

However, it is impossible to provide for the Common Good if the nation's money supply is privately controlled, as ours is today through the Reserve Bank board.

Thus, the framers of our Constitution who intended to break from the British Empire and establish an actually sovereign Australia, fought ruthlessly for the inclusion of what became Section 51 of that Constitution, modeled upon Section 8 of the U.S. Constitution, which gave the U.S. Congress the sole power: "To coin Money, regulate the Value thereof, and of foreign Coin…" Compare that to Section 51 of our Constitution, under *Part V. Powers of the Parliament*: "The Parliament shall, subject to this Constitution, have power to make laws for the peace, order, and good government of the Commonwealth with respect to: …

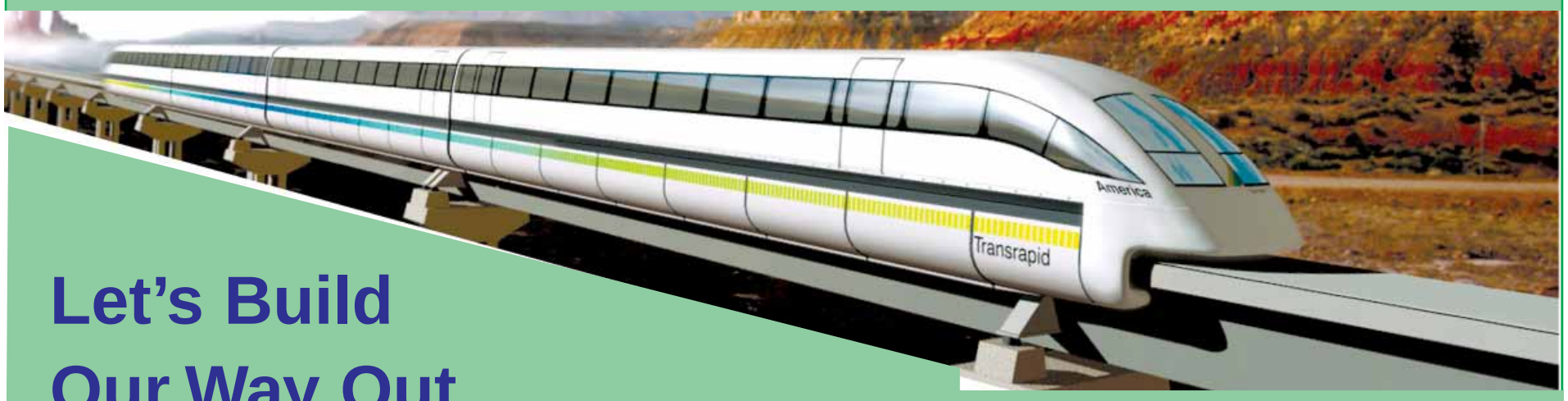
(xii.) Currency, coinage and legal tender;

(xiii.) Banking, other than State banking; also State banking extending beyond the limits of the State concerned, the incorporation of banks, and the issue of paper money…"

The privately-controlled ("independent") Reserve Bank has *unconstitutionally* usurped those powers over currency and banking from control of our elected representatives, except during the brief periods when the Commonwealth National Bank actually functioned for the Common Good, or during WWII.

Special Report

The Infrastructure Road to Recovery—



Let's Build Our Way Out of the Depression!

Contents

No matter how hysterically Australia's political and financial elites try to deny it, the world—and Australia along with it—are now hurtling into the worst depression in history. This special report provides an overview of the kind of great nation-building projects, along the lines of the legendary Snowy Scheme or the extraordinary work of Tasmania's Hydro-Electric Commission in decades past, which will enable us to build our way out of the depression. Before detailing the specific areas and projects which must be built, or rebuilt, the following overall points are essential to locate the "mission orientation" in which the specific projects are located.

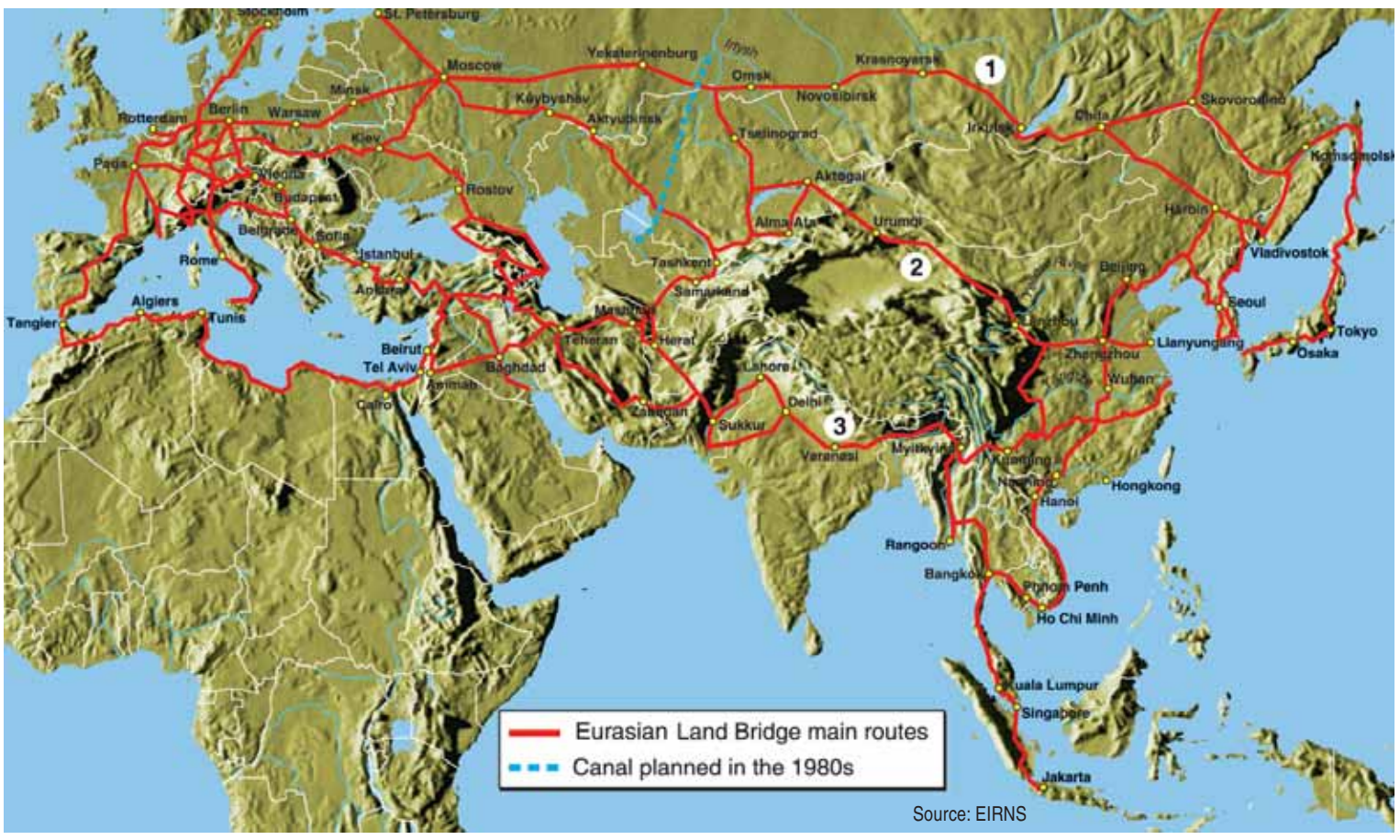
1. Build the Eurasian Land-Bridge!

An alternative to the deepening economic depression is taking shape, in the form of the building of the "Eurasian Land-Bridge." Actually a conception of several rail-corridor land-bridges across the Eurasian continent, this idea is giving rise to a large number of "Great Projects" of power, communications, and water management as well. Its guiding idea came ten years ago from American statesman and physical economist Lyndon LaRouche, when the fall of communism opened up the potential for an economic reconstruction drive "from the Atlantic to the Urals," and at the same time west from China, Southeast Asia, and India, uniting the high technology capabilities of Russia and Western Europe, with the world's greatest population centres, in Asia. It also includes the development of the vast, undeveloped and underpopulated, but resource-rich areas of central Eurasia, including the Siberian region of Russia—the "inner space of the planet"—as a driver of recovery from depression for the world as a whole.

The Eurasian Land-Bridge is not just a "nice idea"—it is rapidly being built, and is increasingly becoming the centrepiece of the foreign policy of Russia, China, the central Asian nations, and other countries. In order for the Land-Bridge program to really blossom, however, the world must dump the disastrous IMF/World Bank globalist system of looting, and replace it with a New Bretton Woods system built upon the best aspects of the original Bretton Woods, including national banking, exchange and capital controls, tariff protection, etc.[1]

Australia must make the Eurasian Land-Bridge the centrepiece of its own program for physical economic recovery. The ELB represents a true "Asia policy" for Australia, not the "beat them on the head with a stick" policy of John Howard, nor the phoney "engagement" policy of Paul Keating and the ALP, both of which are predicated upon free-trade looting, both of Australia and of Asia. The ELB provides us the vehicle to return to the postwar perspectives of Australia's greatest prime ministers, John Curtin and Ben Chifley. Curtin and Chifley, together with U.S. President Franklin Delano Roosevelt, envisioned Australia, because of its geographical position and because of the industrial transformation it had undergone during the war, as an agro-industrial engine for the postwar economic recovery of an Asia of sovereign nation-states freed, at long last, from British, French, Dutch, Portuguese colonialism, a colonialism continued today under the guise of the IMF and World Bank.

With the economic boom that such a perspective will unleash, our nation will suffer a huge labour shortage, and can joyfully open its arms to immigrants of many countries, who, in turn, will help build Australia. These "new Australians", along with the optimism unleashed by having our nation at last on the move once again, should return us to the fertility rates of the 1950s, and put us well on the path to having 50 million Australians by 2050.



Above: Lyndon LaRouche designed the Eurasian Land-Bridge concept as the engine of world economic recovery. Right: With high speed trains and high speed shipping, any part of Australia is only 1-4 days away from the world's largest population centres.

This Special Report was researched and written by Robert Barwick, Jeremy Beck, Allen Douglas, Craig Isherwood, Noelene Isherwood and Marsha Freeman.

The Infrastructure Road to Recovery

Introduction

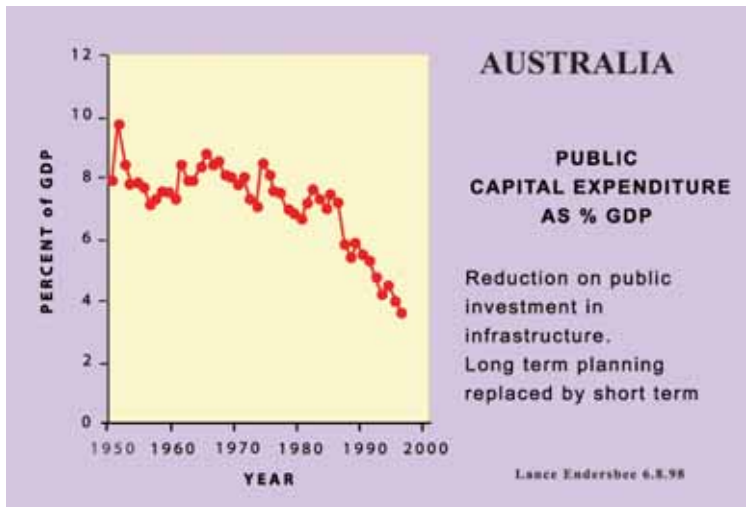
2. Revive the Nation-State and the Common Good

In the Golden Renaissance of Fifteenth Century Europe, an entirely new political institution was created—that of the sovereign nation-state. For the first time in history, government was premised on the Platonic/Christian conception, that all men are equal because they are all born *imago viva Dei* ("in the living image of God").[2] The unique purpose of the nation-state—and the sole basis of legitimacy of governments from then on—was to foster the "common good" of all of its citizens. This was a radical break with existing forms of oligarchical rule, whether of empires along the Babylonian/Roman model, of European feudalism, or of the slightly more disguised form of imperial rule of the financier oligarchy of Venice, which had been for centuries the world's leading banking centre and leading maritime power. Under all those systems, men and women were no different than cattle, to be herded, culled or slaughtered at will, as it pleased the reigning oligarchy.

After its first establishment in the France of Louis XI and in the England of Henry VII, the sovereign nation-state suffered many ups and downs in Europe, as the Venetian, Hapsburg and other oligarchies struggled mightily against it, including by unleashing the sort of brutal religious warfare of the 1509-1648 period. The republicans of Europe, particularly those later centred around the great statesman and scientist, Gottfried Leibniz, moved to outflank the still-powerful oligarchy of Europe, by establishing a republic in the new continent of America. After a bloody revolution against the British monarchy and the City of London ("the new Venice"), the Americans established a new sovereign nation-state, whose purpose as stated in the Preamble to the U.S. Constitution, was to foster the "general welfare" of all Americans, in the present, *as well as for generations to come.*

After the victory of President Abraham Lincoln over the British-backed, slave-owning Confederacy in the 1861-65 Civil War, the agro-industrial revolution unleashed by Lincoln's wartime mobilisation made the United States the most powerful industrial nation on earth. Its anti-British free trade "American System of political economy", as it was then universally known, was centred on universal education, protectionism, national banking, and great infrastructure projects (such as the transcontinental railroads). This "American System" was rapidly emulated in Japan, Germany, Russia, and elsewhere—and in Australia, where the American immigrant King O'Malley founded the Commonwealth Bank and oversaw the building of the transcontinental railroad, and where the founders of the Labor Party took the American, as opposed to British, spelling of "labour" to signify that system to which they aspired.[3]

The economic rationalism which has taken over Australia since the Hawke-Keating era, is specifically aimed at destroying the "common good", by putting private profits first, as most clearly reflected in the wholesale "privatisation" of our infrastructure which, by its very nature as necessary for the common good, must be state-owned, or at the very least state-regulated. Sponsored by the British Crown's Mont Pelerin Society, "economic rationalism" is aimed more fundamentally at destroying the very nation-state itself. [4]



Left: John Curtin and Ben Chifley dedicated their entire lives to fighting for the "common good", which was the central tenet of "old Labor." Right: Public capital expenditure as % GDP: This graph reflects the collapse in infrastructure under economic rationalism.

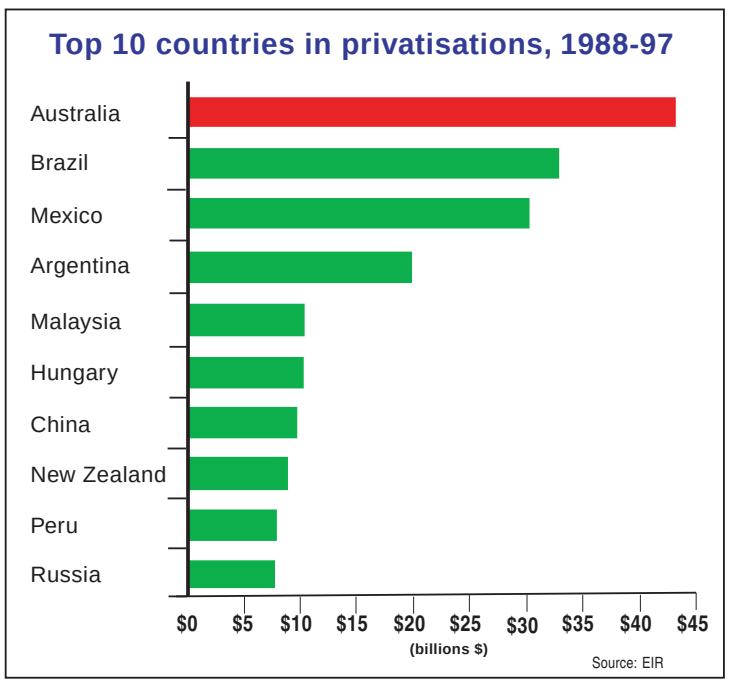
3. Rebuild Australia's Collapsed Infrastructure

Since at least the 1980s, our nation's infrastructure has been systematically run down and destroyed. This is perhaps most obvious in the "soft" infrastructure such as health care and education, but it is also true for such "hard" infrastructure as railroads, roads, shipping, energy and water. Since the 1980s Australia has built up an "infrastructure deficit" of over $100 billion. In fact, the size of the collapse has been masked by the fact that Australia's physical economy itself has shrunk drastically, from the sort of agro-industrial orientation seen in our once-proud manufacturing sector, toward "services", which require little or no infrastructure. A 1998 examination of our dilapidated rail infrastructure, for instance, by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform of the federal Parliament found that "Without urgent and substantial investment in this infrastructure, major sections of the national rail network are likely to become irretrievable within ten years." The Institution of Engineers, Australia, which compiles the annual Australian Infrastructure Report Card on behalf of the Australian Infrastructure Report Card Alliance comprising dozens of Australia's leading infrastructure bodies, and which is pro-privatisation itself—and therefore radically underestimates the country's actual needs by a large margin—has projected that over the next ten years, we need to spend $150 billion on infrastructure, including some $50 billion on water resources, $20 billion on electricity, $12 billion on rail and $5 billion on ports. Even by their own inadequate standards, the Report Card gives the following marks to key infrastructure sectors: Irrigation—D-; Stormwater—D; Local Roads—D; Rail—D-, with much of the rest of the nation's infrastructure graded as barely adequate.[5]

In addition to the financier looting known as "economic rationalism" and "privatisation", another justification for the looting of both hard and soft infrastructure has been the "balanced budget" lunacy followed, enthusiastically or not, by all of Australia's political parties except the CEC, as exemplified by the 1998 federal act, *The Charter of Budget Honesty*. As physical economist LaRouche—by far the world's greatest economic forecaster of the past four decades—has voluminously documented in his writings, the linear "statistical", "accounting" mentality at the root of the balanced budget madness, is a self-fulfilling prophecy which *causes* an economy to collapse.[6] And in fact, the Howard-Costello budget, like those of Hawke-Keating before them, are not balanced in the first place, because they are not replenishing the used-up infrastructure, and by so doing are simply looting the future to seemingly balance the books in the present. Because, as LaRouche specified in an address to a group of economists in Guatemala in mid-2001, "Over 50% of an investment in any effective economy, is in basic economic infrastructure, which is by the state…. A healthy economy, is *dominated* by the nation-state."

One can cheat on these costs for awhile, with seemingly little penalty, but the results over time are deadly. As LaRouche observed, "Generally, the minimum interval of time, during which the relationship between short-term aberrations and their large-scale long-term effects, becomes empirically clear, is in the order of not less than a quarter-century, approximately the span of development of a newborn child into a fully defined-as-functional adult…. Since infrastructural development, and long-term capital improvements, or the lack of either or both, define the net outcome of an entire generation of an economy's unfolding, we must never attempt to define the policies properly governing so-called microeconomical functions, except in an axiomatically well-defined macroeconomical setting."[7]

King O'Malley established the Commonwealth bank to provide credit for development.



From the Hawke-Keating era through 1998, Australia led the world in flogging off its precious infrastructure—the work of generations of Australians past.

Meanwhile, the same government which loudly protests that it "can't afford" infrastructure, spends over $5 billion on unemployment each year, which is a dead loss (not to mention the lost tax revenue from the army of unemployed), and was scheduled to spend an astonishing $16 billion through 2005-06 in National Competition Policy-related payments to *wreck* infrastructure.[8] Furthermore, instead of investing $500 billion in superannuation funds in crashing stock, bond and other speculative markets, $40 billion of which were lost in 2001 alone, much of that money should be invested in the physical building of Australia's future—what safer investment could you possibly have?

Foremost among the new institutions needed to facilitate an infrastructure-led, science-driver form of economy is a new national bank, which such titans of "old Labor" as King O'Malley, Frank Anstey, John Curtin and Ben Chifley always intended, will provide whatever credit is needed for national development. As LaRouche has specified regarding a national bank and its relationship to infrastructure, "The use of the power of the sovereign nation-state to create national credit, is the indispensable means for organizing a process of general recovery from a catastrophe such as that of 1929-33, or the worse situation erupting today. This course of action depends upon mobilising a passion in support of feasible programs which will not be self-sustaining in less than the medium to long term. On the basis of confidence in the prospect that such programs will become self-sustaining in their effects, government issues regulated credit to tide the nation and its people over, during the process of building up to a self-sustaining recovery."[9]

4. Develop the Biosphere, and the Noösphere

The CEC's bold proposals for an infrastructure-led agro-industrial recovery which are contained in this special report, will lead some to say, in a knee-jerk fashion, "You can't do that!" When asked why not, given that we *used* to do it, when the economy was actually functioning, they will either splutter some nonsense about "the budget", which is refuted above, or, perhaps more likely, they will emit a high-pitched whine, "What about the environment?!" They thus show themselves to be dupes of that same financier oligarchy, which both owns the major media, and which invented the scam of "environmentalism" in the first place, as another weapon to target nation-states.[10]

Because the real science of the biosphere begins with the man who formulated the concept in the first place, the great Russian scientist Vladimir I. Vernadsky (1863-1945). Vernadsky published his epoch-making book, *Biosphere*, in Russian in 1926.[11] And since he originated the concept of the biosphere, he can be presumed to know far more about it than any greenie ever could. Vernadsky, who also originated the discipline of biogeochemistry, showed that when you looked at the earth over hundreds of millions and even billions of years, that the geochemical energy of life (living matter)—which is a distinct physical principle from nonliving matter, and which is ostensibly weak in comparison with the mighty, ostensibly inanimate forces of oceans, volcanoes, storms, raging rivers, etc.—actually dominates and changes these inanimate forces to an ever-increasing degree. As Vernadsky put it in *Biosphere*, "Without life, the face of the Earth would be as motionless and inert as the face of the moon."

Moreover, Vernadsky proved that, just as living matter dominates and transforms nonliving matter, as when plants, for instance, absorb nonliving material such as water, minerals from the soil and gaseous molecules from the atmosphere and turn them into living tissue, the process of creative cognition—which is unique to man—increasingly dominates and transforms the biosphere itself, giving rise to a new geological epoch, that of the noösphere (after the Greek-derived word, "noesis", which means cognition, creative thought). Said Vernadsky of this new era, "We are living in a brand

The Infrastructure Road to Recovery

Introduction

new, bright geological epoch. Man, through his labor—and his conscious relationship to life—is transforming the envelope of the Earth—the geological region of life, the biosphere. Man is shifting it into a new geological state: Through his labor and his consciousness, the biosphere is in a process of transition to the noösphere…. The stage of the noösphere is being created. Within the Earth's biosphere, an intense blossoming is in process, the further history of which will be grandiose, it seems to us."[12]

LaRouche has further developed Vernadsky's concept of the noö–sphere, through his discoveries in the science of physical economy. From the standpoint of physical economy, LaRouche writes, "the functional relationship of the noösphere to the biosphere is expressed chiefly as what macroeconomics views as *basic economic infrastructure*. This means, chiefly, *the development of the land-area of a national physical economy as an indivisible unit of action, that over a relatively long-term period of not less than approximately a quarter-century or even much longer.*"[13]

Furthermore, says LaRouche, "From the standpoint of Vernadsky's outline, this development of basic economic infrastructure is expressed in two clearly distinguishable ways. In some actions, man's action simply improves the development of the biosphere as man finds it, as through the transformation of arid regions into biologically rich farmlands.

"In the second class of action, man improves the variety of content of the biosphere, qualitatively, by adding to it new kinds of what Vernadsky calls 'natural objects,'[14] adding to the repertoire of natural objects already produced by forms of life inferior to mankind. Such 'natural objects' introduced to the biosphere as products of cognition, include transportation and power systems. Water management systems represent the combined effect of human promotion of the kind of natural projects already produced by the biosphere as such, combined with added elements which are natural objects of a type unique to the products of cognition. Urban development is chiefly an example of natural objects of cognition.

"The development of educational systems, like the role of principles of Classical artistic composition is [also] a part of the essential infrastructure of the biosphere…."[15]

Thus, to do as Prince Philip and his greenies propose, to effectively stop all of man's major interventions into the biosphere, is, from a strictly scientific standpoint, *insane*, as well as economically suicidal. Rather, the opposite is needed: man must increase his interventions into the biosphere through great infrastructure projects, and through science driver projects such as nuclear power and space exploration, the latter of which, incidentally, extends the biosphere, the region in which life exists. The notion of a science driver is perhaps best exemplified by President John F. Kennedy's early 1960s call to put a man on the moon by 1970, in what seemed to be an almost impossibly bold task. As later studies showed, every $1 the United States spent on the space program returned $13 to the economy, by virtue of the continual waves of new technology it unleashed. Closer to home, one should remember the dictum regarding infrastructure of the great builder of the Sydney Harbour Bridge and Sydney's underground railway system, Dr. J.J.C. Bradfield: "You have to spend money to make money."

The great Russian scientist Vladimir I. Vernadsky, who originated the concept of the "biosphere" in 1926. His work demonstrates that "environmentalism", as the greenies propound it today, is an utter fraud.

Footnotes

1. For more on the Eurasian Land-Bridge, see the 1997 290-page special report by *Executive Intelligence Review* magazine, *The Eurasian Land-Bridge: The "New Silk Road"—locomotive for worldwide economic development.* The latest overview of the actual construction of the ELB is documented in the cover story of the *Executive Intelligence Review* of November 2, 2001. For more on LaRouche's conception of the New Bretton Woods, including an overview of the immense political support for that conception from around the world, see the CEC's book, *What Australia Must Do to Survive the Depression*, 2001, 332 pages.

2. This conception is also found in Islam, and in Mosaic Judaism. For the immense contributions of Islam to the building of modern Europe, see Muriel Mirak-Weissbach, "Andalusia, Gateway to the Golden Renaissance", *New Federalist* newspaper, Nov. 19, 2001. Regarding the contribution of Mosaic Judaism, as LaRouche's collaborators have demonstrated, the Orthodox Jew Moses Mendelssohn was the single most influential figure in creating the conditions for the great upsurge in Classical culture in late 18th Century and early 19th Century Europe, particularly in Germany. See "Moses Mendelssohn and the Bach Tradition", by Steven P. Meyer, "Philosophical Vignettes from the Political Life of Moses Mendelssohn" by David Shavin, and "What It Takes To Be A World Historical Leader Today", by Helga-Zepp LaRouche, all in *Fidelio* magazine, Summer 1999. Also see "A Personal Statement from Lyndon LaRouche on Music, Judaism, and Hitler", http://www.cecaust.com.au (Culture section, which also contains the Zepp-LaRouche and Shavin articles).

3. The key figures who created the "American System of political economy" were Alexander Hamilton, former aide-de-camp to Gen. George Washington in the Revolutionary War and America's first Treasury Secretary, under Washington, the first President of the United States; the Irish-American patriot Mathew Carey and his son Henry Carey, Lincoln's chief economics adviser; and the German/American Friedrich List, later the architect of Germany's Customs Union and railroad system. King O'Malley proudly called himself "the Alexander Hamilton of Australia". For more on the immense influence of the American System on Australia, see the CEC's 72-page pamphlet, "The Fight for an Australian Republic: From the First Fleet to the Year 2000".

4. For documentation of how the Crown's Mont Pelerin Society—which invented economic rationalism in its modern form—took over both the major Australian political parties, (see the CEC pamphlet, "Stop the British Crown Plot to Crush Australia's Unions", 1998, 96 pages.

5. 2001 Australian Infrastructure Report Card.
http://www.infrastructurereportcard.org.au/gl

6. "New Accounting Standards Are Imperative: The Becoming Death of Systems Analysis", by Lyndon LaRouche, *EIR*, March 31, 2000.

7. LaRouche, "The Science Driver Principle in Economics", which constitutes Part II of the CEC's book, *What Australia Must Do to Survive the Depression*.

8. The $16 billion figure in Competition Policy-related payments is cited in the National Competition Council's 1997-98 Annual Report. See http://www.ncc.gov.au/nationalcompet/annual%20reports/1997-98/sectiona.pdf. Although the policy is unchanged, payments for Competition Policy have since been reconfigured, due to the emergence of the GST.

9. LaRouche, "The Science Driver Principle in Economics." In consultation with LaRouche, in 1994 the CEC drafted a bill to establish the Commonwealth National Credit Bank, which is also included in *What Australia Must Do to Survive the Depression*.

10. For details on how Prince Philip, the old Nazi Party member Prince Bernhard and their multi-billionaire friends invented environmentalism, beginning with the World Wildlife Fund in the early 1960s (now known as the World Wide Fund for Nature), and later fronts such as the Australian Conservation Foundation (which Prince Philip personally founded), see the 1997 CEC pamphlet, "Aboriginal 'Land Rights': Prince Philip's racist plot to splinter Australia". Through its subsidiary, "The Primitive Peoples Fund", the WWF also gave rise to the "indigenist" movement worldwide, as another way of locking up huge areas of nations from development. For a thorough treatment of environmentalism and indigenism, see the 1997 *EIR* 218-page Special Report, *The True Story Behind the Fall of the House of Windsor*.

11. Vernadsky's *Biosphere* was translated into French in 1929, and an abbreviated version of that 1929 French edition was published in English in 1986 as *The Biosphere* by Synergistic Press, Arizona and London. The English translation is significantly inferior to the Russian original, but it does provide some sense of Vernadsky's ideas. A second key work by Vernadsky was translated in 2000 by two of LaRouche's associates for *21st Century Science & Technology* magazine. See footnote 14.

12. See Vernadsky, footnote 14.

13. LaRouche, "The Science Driver Principle in Economics".

14. "Natural objects" is employed here in the sense of Vernadsky's argument. As cited in Lyndon H. LaRouche, Jr., "A Philosophy for Victory: Can We Change the Universe?" *EIR*, March 2, 2001, see Vladimir I. Vernadsky, "On the Fundamental Material-energetic Difference Between Living and Non-Living Natural Bodies in the Biosphere" (1938), Jonathan Tennenbaum and Rachel Douglas, trans, *21st Century Science & Technology*, Winter 2000-2001.

15. LaRouche, "The Science Driver Principle in Economics".

A Snowy Veteran Keeps Fighting

The following infrastructure package was inspired by the work of two key individuals: from an overall, conceptual standpoint by the world's leading physical economist, U.S. 2004 Presidential candidate Lyndon LaRouche, and for much of the detailed application to projects in Australia, by one of Australia's unsung heroes, Prof. Lance Endersbee. LaRouche's biography, his extraordinary record of economic forecasting over the past four decades, and his related work over the same period for a just new world economic order are chronicled in the CEC's new book, *What Australia Must Do To Survive the Depression.*

As for Prof. Endersbee, he is a civil engineer, with 27 years in engineering practice followed by 13 years at Monash University. He served with the Snowy Mountains Hydro-Electric Authority, the Hydro-Electric Commission of Tasmania, and with the United Nations in South-East Asia as an expert on dam design and hydro power development. Though now a private consultant, he has devoted the bulk of his time in "retirement" (together with a huge portion of his superannuation), to activities for the common good, in particular to designing great infrastructure projects for Australia, in the course of which he travels widely across the country and speaks to numerous groups.

Prof. Endersbee has specialised in the management of planning and design of major economic development projects, and energy and transport engineering. He has helped design and construct several large dams and underground power stations and other major works in civil engineering and mining in Australia, Canada, Asia and Africa. He has taken a special interest in the scientific field of rock mechanics, and was a Vice-President of the International Society for Rock Mechanics.

His professional awards include the Chapman Medal, the Warren Memorial Prize, and the Peter Nicol Russell Memorial Medal, the highest award of the Institution of Engineers, Australia, of which he is an Honorary Fellow, and was President in 1980-81.

Professor Lance Endersbee, patriot, and engineer *extraordinaire.*

In 1976 he was appointed by invitation as Dean of the Faculty of Engineering at Monash University. In 1988 he was Pro-Vice Chancellor of the University. He was Chairman of a major review of national energy issues conducted by the Institution of Engineers, Australia, the Task Force on Energy, and was a member of the Australian Government's National Energy Advisory Committee. He was also a member of the Energy Council in Tasmania.

He is an Officer of the Order of Australia and a Fellow of the Australian Academy of Technological Sciences and Engineering.

Prof. Lance Endersbee has proposed that a National Infrastructure Authority be established to oversee projects of national importance, which are otherwise ill-provided for by our Constitution. A crucial role in building these projects will be taken by the youth of Australia; instead of killing themselves at a world-leading pace, these youth should be mobilised through a Pioneer Corps, through which they can build their own future, as they build their country.

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Populate or Perish: Australia Needs 50 Million People!

by Craig Isherwood

Our nation today is in the throes of a great debate over population. The decisions we make now and in the coming few years will shape Australia for decades, and even centuries to come.

Therefore, one must examine this issue from the highest scientific standpoint, that of "potential relative population density", as specified by the greatest economic forecaster of the past several decades, the American physical economist Lyndon H. LaRouche, Jr. In the science of physical economy, *potential relative population density* is the fundamental measure of the economic health of any nation. In first approximation, to be elaborated below, it means the number of individuals who can be supported per square kilometre of any nation, solely by the efforts of the inhabitants of that nation.

LaRouche's concept is a radical shift from the prevailing measures of economic health, in that it puts *people* first, instead of the things they produce. The idiocy of "thing-based" measures, such as Gross Domestic Product, is self-evident: For Australia, look at the overwhelming evidence of the collapse of education and health care, of the collapse of the basic hard infrastructure of transport, water, etc., and of the growing poverty and unemployment of the general population. Compare that reality, to the crowing of our political and financial establishment (and of the OECD) about how "Australia's economy is leading the world."

More fundamentally, one can not speak about the population issue, without addressing the essential axiom which underlies that issue, regarding the nature of man. Are human beings merely another form of animal, as Prince Philip and his World Wide Fund for Nature gang contend? Or, are they fundamentally different, as the great religions of Judaism, Christianity and Islam teach, in which man is created *imago viva Dei*—in the living image of God the Creator. The reality is, that mankind (male and female) are different from animals because they possess God-like creative powers of mind, which enable them to change and develop the physical universe itself. Thus God's injunction to man in Genesis 1:28; "Be fruitful, and multiply, and replenish the earth and subdue it." This is not merely a religious statement, but a rigorous scientific one: it is by virtue of man's unique creative powers, that he has expanded his *potential relative population density* over the centuries and millennia, in a way that animals have never done by themselves, nor could ever do, because they lack the power which man has—creative cognition. The contentions of the greenies and economic rationalists, therefore, that "man is just another animal" operating according to "pleasure and pain" is unscientific quackery, or, perhaps, just plain paganism.

With those underlying axioms in mind, we can now begin to look at what sort of population Australia should have.

62 Million Australians by 2050?

In an article in *Rydge's Magazine* in October 1941, Dr. J.J.C. Bradfield, the architect of Sydney's underground railway and Sydney Harbour Bridge, and of the Bradfield Scheme, called for a population of 40 million by 1991, and an "eventual" population of 90 million:

"To populate and develop Australia we must spend money to make money. The money spent would all be for labour and materials of Australian origin. An expenditure of 5 shillings per day or 500 million pounds, in well thought out schemes throughout Australia during the next 40 years would greatly increase the value of our heritage, and add the population we need to hold what we have. To do this we should endeavour to have a population of 40 million say fifty years from hence. Australia eventually should easily accommodate 90 million people, 30 per square mile [12 per square kilometre]."

In 1941, Australia's population was seven million. To hit 40 million, as Bradfield called for, the population would have had to grow by 471%, a growth rate of 3.5% per year or 41% every decade. By 1991 however, even after the baby-boom of the 1950s and 1960s, Australia had a population of around 17 million people, and a population density of 2.2 people per square kilometre. Yet, Bradfield's dream is entirely feasible.

Today, another great infrastructure advocate, Prof. Lance Endersbee, has put the argument as follows: "We need an immediate increase of population of 25%…. Australia could quite reasonably embark on a planned increase of 25% within the decade. I would point out that, 50 years ago, in the fifties, there was a 25% increase in the Australian population with full-employment and a number of major works on hand around the nation. The top end of Australia could carry 50 million people alone."

A 25% increase would be nearly five million people, lifting Australia's population from 19.5 million to 24.4 million people. In 1949 Australia had 7,908,070 people. By 1959, we had grown by 2,148,410 people to 10,056,480, 27.1% within one decade! The Total Fertility Rate (TFR) for Australian women in that decade was close to 3.6 babies per woman, which peaked in 1961. This was well above the population replacement rate of 2.1, and far above the 1.7 rate we have sunk to in the year 2002. (The Total Fertility Rate is the average number of babies per woman according to the age-specific fertility rates each year. See Graph 1.)

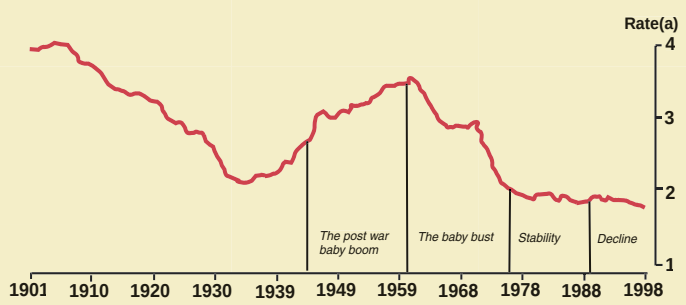
Whilst the TFR was initially high due to a catch up factor from the Depression and War, it was sustained by near-universal marriage, reduction in the ages at marriage, low unemployment, availability of housing, and reduced fertility problems, and increased cultural optimism. The population was further boosted by immigration, by the advent of immunisation against common disease, and by modern medical practices in general. The latter decreased the Infant Mortality Rate from a horrendous ratio of 103.6 per thousand live births in 1901, to just 5.3 in 1999. (See Graph 2.)

If we had continued the economic and population policies of the post-war period, from 1959, that 27.1% rate of increase would have meant an Australian population of over 28 million people today, and in the year 2049, over 89 million people, close to Bradfield's vision of 90 million! (See Graph 3.)

If we began in 2002 with a renewed population growth rate of 27.1%, then ten years from now we would have over 24 million people, and by 2050 be at 62 million people. How would we achieve this? We would need to enthusiastically promote and fund—once again—policies that support a rate of increase of *potential relative population density*. These are the policies and projects which are featured in this special report, which will inspire optimism and hope for the future.

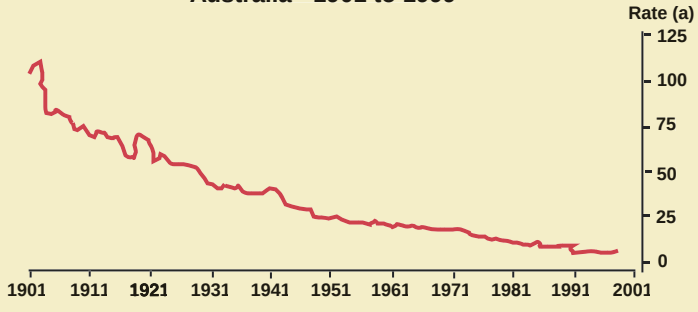
Although for both moral as well as nation-building reasons, we should dump Australia's present racist anti-immigration policy, generous immigration quotas alone are not sufficient to decisively expand our population. An intake of 100,000 immigrants, for instance, only represents 0.5% of Australia's current population. Of those 100,000, at least 50% are men, and of the women, a significant proportion are non-child bearing, so the proportion of women who would raise the Total Fertility Rate would be minimal.

Graph 1



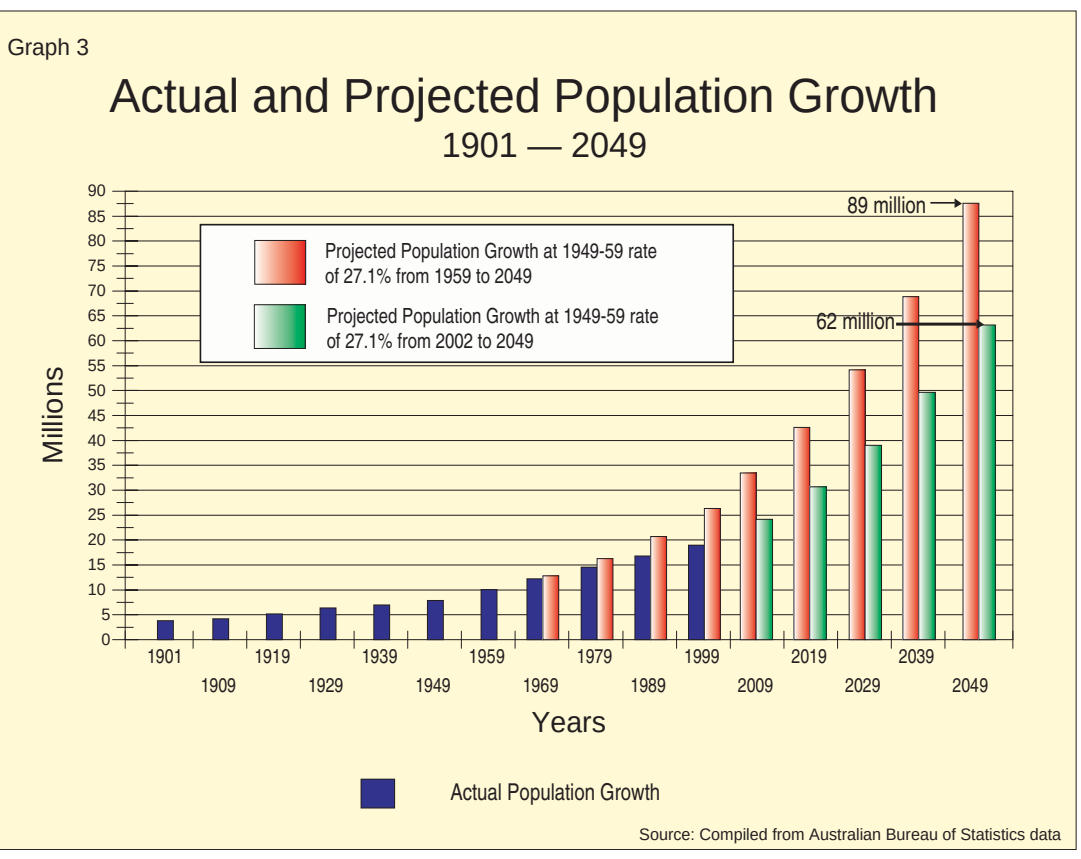
(a) Average number of babies per woman according to the age-specific fertility rates for each year.
Source: CBCS Demography Bulletins: ABS Births, Australia (3301.0), various Issues

Graph 2



(a) Rate per 1,000 live births
Source: CBCS 1508, ABS 1965, ABS Deaths, Australia (3302 0), various issues.

Graph 3



Source: Compiled from Australian Bureau of Statistics data

The Nation-State and Population Growth

The kind of rapid population growth which we are proposing is in fact normal by historical standards, particularly those of the last 500 years of extended European civilisation since the Fifteenth Century Golden Renaissance. At that time, Cardinal Nicholas of Cusa founded the concept of sovereign nation-states in his great work, *Concordantia Catholica*. He also founded modern science in his work *De Docta Ignorantia*, and counted among his disciples such universal geniuses as Leonardo DaVinci and Johannes Kepler, the founder of modern mathematical physics. These two innovations, the nation-state and experimental physical science, which were both dedicated to fostering the common good, caused the population explosion seen in Graph 4. And there were not only more people, but they had a much better quality of life, and lived much longer.

Periods of renaissance always result in rapid rates of population growth, as in the population growth spurred by the joint impact of the Islamic Renaissance and the neo-Confucian renaissance in China, which caused world population to double between 800 and 1300. Along with the rising numbers of population, come rising population-densities, as well as dramatically increased life-spans.

The Infrastructure Road to Recovery

Populate or Perish

Prince Philip and Other Great Apes

Forced to confront the evidence of population growth throughout history, the greenie might whine, "Yes, the evidence of all human history is of rising absolute population and rising population-density. But, we here in Australia are different because of our geography." One has only to open the newspapers any given day, to see where the greenie gets his ideas. For instance, *The Australian* of April 30, 1994 reported about the just-concluded conference of the Australian Academy of Science's Population 2040, "Biological evidence was presented that Australia had already far exceeded its biological limits, and ought to aim for as few as 6-7 million people in the very long term." On March 4, 1999, the Chair of the National Biodiversity Council, Dr. Harry Recher, told the *Canberra Times*, "The Australian environment is neither highly productive nor capable of withstanding the kinds of intense exploitation imposed on it over the past 200 years".

The quackademics are just mouthing what they are paid for. For the reality is that "population control" has always been a doctrine of the oligarchy, which desires dumber and far fewer people, because they are then much easier to control. This doctrine began in the modern era with attacks against the great Republican and American Independence leader Dr. Benjamin Franklin.

In 1751, Franklin published a pamphlet, *Observations Concerning the Increase in Mankind*, in which he argued for rapidly increasing the population of North America. Franklin's work was also published in Italy, where it was harshly attacked by the monk Giammaria Ortes, a leading spokesman for the powerful rentier-financier families of Venice.

Ortes' work was later plagiarised by an ambitious young graduate of Oxford University's divinity school, Thomas Malthus, who published Ortes' arguments as his own *Essay On the Principles of Population*. At that time, Malthus was in the service of the British Prime Minister, William Pitt the Younger, who sponsored the first, 1798 edition of Malthus' famous work. This work led to the 1800 reform of the British Poor Law where Britain ceased to give financial assistance to its own "useless eaters".

Malthus argued that the growth of population would always, sooner or later, outstrip the food supply, and therefore we should just kill off some of the population. As he wrote in his *An Essay on the Principle of Population*:

"We are bound in justice and honour formally to disdain the Right of the poor to support.

"The infant is, comparatively speaking, of little value to society, as another will immediately supply its place.

"All children who are born, beyond what would be required to keep up the population to the desired level, must necessarily perish, unless room be made for them by the death of grown persons.... Therefore … we should facilitate, instead of foolishly and vainly endeavouring to impede, the operations of nature in producing this mortality; and if we dread the too frequent visitation of the horrid form of famine, we should sedulously encourage other forms of destruction, which we compel nature to use.

"Instead of recommending cleanliness to the poor, we should encourage contrary habits. In our towns we should make the streets narrower, crowd more people into the houses, and court the return of the plague. In the country, we should build our villages near stagnant pools, and particularly encourage settlement in all marshy and unwholesome situations. But above all we should reprobate specific remedies for ravaging diseases; and restrain those benevolent, but much mistaken men, who have thought they are doing a service to mankind by protecting schemes for the total extirpation of particular disorders."

The Malthusian concept of "carrying capacity", which is interchangeable with the now-omnipresent buzz word, "sustainability", has been propagated by the oligarchy, through such fronts as Prince Philip's World Wide Fund for Nature, or through the Club of Rome, which was founded in 1967 by Italian businessman Aurelio Peccei and British intelligence operative Alexander King. As Prince Philip, founder of both the WWF and of the Australian Conservation Foundation, has said, "You cannot keep a bigger flock of sheep than you are capable of feeding. In other words conservation may involve culling in order to keep a balance between relative numbers in each species within any particular habit. I realize this is a very touchy subject, but the fact remains that mankind is part of the living world.... Every new acre brought into cultivation means another acre denied to wild species."

In 1991, in its publication *The First Global Revolution*, the Club of Rome openly identified its real enemy: "In searching for a new enemy to unite us, we came up with the idea that pollution, the threat of global warming, water shortages, famine and the like would fit the bill.... But in designating them as the enemy, we fall into the trap of mistaking symptoms for causes. All these dangers are caused by human intervention and it is only through changed attitudes and behavior that they can be overcome. The real enemy, then, is humanity itself." Or, as Prince Philip was reported as saying, by *Deutsche Presse Agentur* in August 1988, in his inimitable callous style, "In the event I am reborn, I would like to return as a deadly virus, in order to contribute something to solve overpopulation."

A second motive in population control, is so that the oligarchy can control the planet's raw materials, many of which are in lands inhabited by the "darker-skinned races", in the words of Club of Rome cofounder Alexander King. In the 1970s, then-U.S. National Security Adviser Henry Kissinger sponsored National Security Study Memorandum 200, which proclaimed that population growth in the developing world is a strategic threat to the United States, because it threatened to consume raw materials upon which the United States depended. The memo called for holding world population at eight billion instead of the 22 billion then projected for 2075, and specifically targeted 13 developing sector nations for "population reduction".

This notion of locking up raw materials has been applied in Australia as well, under the rubric of "land rights", "economic rationalism", and "environmentalism". The chief funder and organiser of all three is Her Majesty's minerals cartel, Rio Tinto. These policies are already depopulating huge sections of our continent, just as intended. (See map at right.)

Is there any danger in reality of "raw materials running out", or of "the earth becoming overpopulated", if the population keeps rising? Well, what does man have a brain for? It has been the history of mankind, that unlike kangaroos, man constantly develops new raw materials through scientific and technological advances. What was titanium (see "Great Water Projects" section) to the kangaroo, or even to most Australians, until recently? And, should mankind ever threaten to "run out of room", there are billions and billions of galaxies, each with billions of worlds in them, which we can colonise, beginning with "earth-forming" Mars over the decades ahead.

In fact, the danger today, after three decades of Malthusian policies, is not *over*population, but *under*population, both in terms of the work force required to support an aging population, as well as in the just plain radical shrinkage of the human race. As a January 28, 2002 article in *The Age* by Pamela Bone pointed out, if an average fertility rate of 1.5 births per woman (the actual rate in a number of advanced sector countries at present) is maintained over several generations, then the population declines by a quarter in each generation. "According to demographic projections," Ms. Bone points out, "if Japan's very low fertility rates persist for 200 years, there will be no Japanese left."

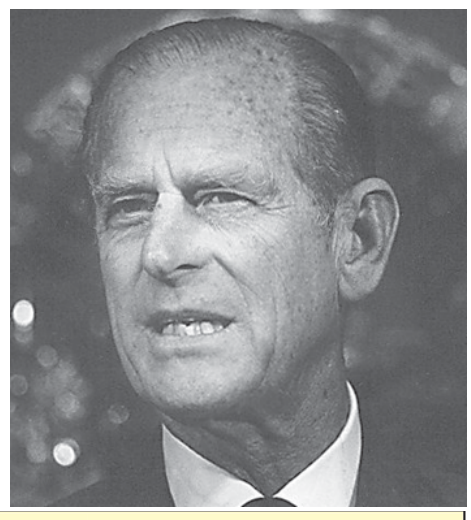
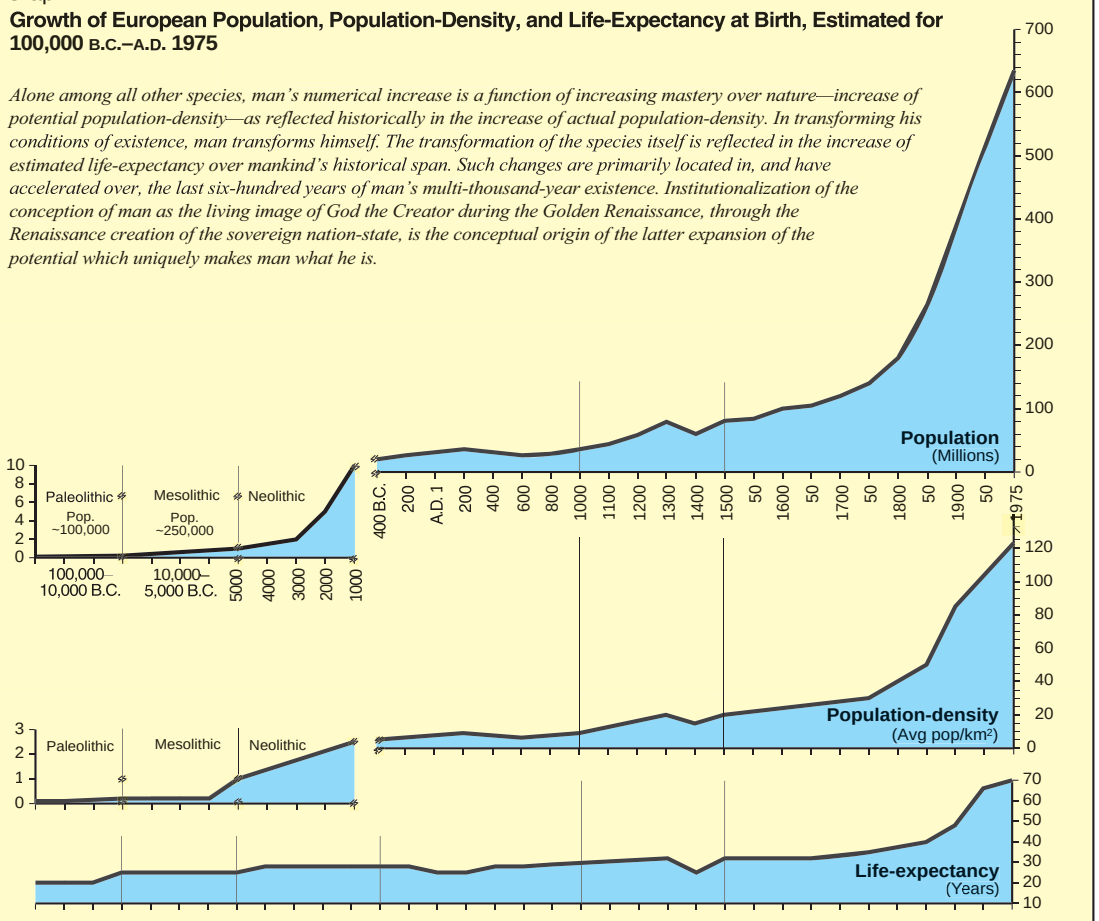


Photo Left: AP Photo/Gorilla Foundation via San Francisco Chronicle. Right: Gorilla Foundation Buckingham Palace

Graph 4

Growth of European Population, Population-Density, and Life-Expectancy at Birth, Estimated for 100,000 B.C.–A.D. 1975

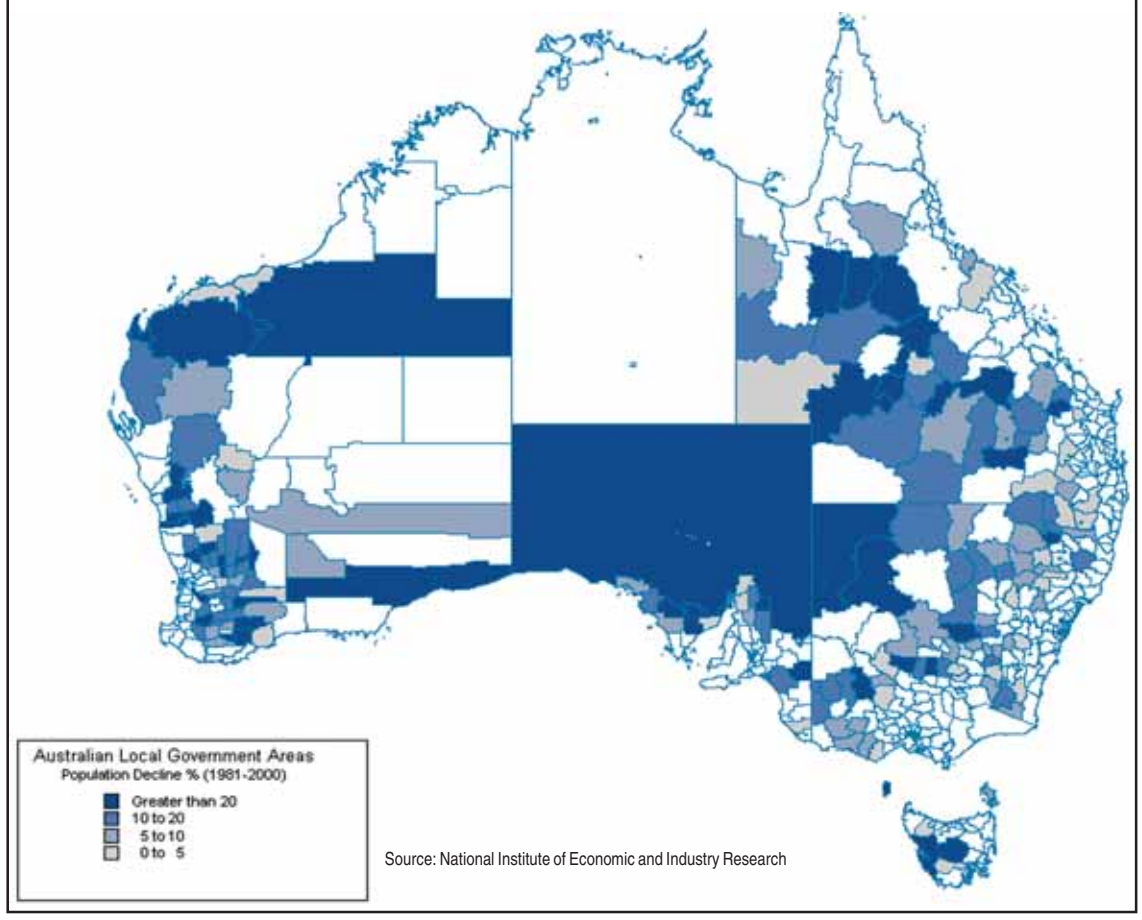
Alone among all other species, man's numerical increase is a function of increasing mastery over nature—increase of potential population-density—as reflected historically in the increase of actual population-density. In transforming his conditions of existence, man transforms himself. The transformation of the species itself is reflected in the increase of estimated life-expectancy over mankind's historical span. Such changes are primarily located in, and have accelerated over, the last six-hundred years of man's multi-thousand-year existence. Institutionalization of the conception of man as the living image of God the Creator during the Golden Renaissance, through the Renaissance creation of the sovereign nation-state, is the conceptual origin of the latter expansion of the potential which uniquely makes man what he is.



All charts are based on standard estimates compiled by existing schools of demography. None claim any more precision than the indicative; however, the scaling flattens out what might otherwise be locally, or even temporally, significant variation, reducing all thereby to the set of changes which is significant, independant of the quality of estimates and scaling of the graphs. Sources: For population and population-density, Colin McEvedy and Richard Jones, *Atlas of World Population History*; for life-expectancy, various studies in historical demography.

Note breaks and changes in scales.

Depopulation of Rural Australia



Source: National Institute of Economic and Industry Research

The Coalition/ALP policies of economic rationalism have systematically depopulated rural Australia.

The Infrastructure Road to Recovery

Populate or Perish

LaRouche's "Potential Relative Population Density"

Life on Earth is governed by the results of human cognition, as Vernadsky and LaRouche have understood. If society is truly human, and promotes cognition through scientific and technological advancement, then its *potential relative population density* will rise, and also its actual population, as we saw in Australia in the post-war years. Let us look a bit more closely at this concept, as promised above.

Man's unique ability to make discoveries of the physical principles which govern the universe, and to embody them in new technologies, gives him an ever greater power over nature. Thus, with less effort, man can accomplish more, which represents a real *economy of labor*.

As LaRouche explains in his 1995 economics textbook, *So You Wish To Learn About Economics*, this increasing power over nature, or economy of labor, is best measured in the amount of habitable land area required to sustain an average person, i.e. *population density*. In a hunting and gathering society, the population density is estimated to be one person per 10 square kilometres. Today, Japan, with negligible physical resources, has a population density of 335 people per square kilometre or 3350 people per 10 square kilometres, precisely because of the technologies employed by Japan in its industrial processes (at least until its anti-industrial turn beginning in the 1980s under Anglo-American pressure, which has ruined Japan and its *potential relative population density*.) See Table 1.

However, simple population-density requires certain adjustments.

First, land varies in quality for human habitation, so that one square kilometre in one country, cannot be directly compared to one square kilometre in another country. Land is subject to the relative technological level of the culture that inhabits it, and can be worsened by the effects of depletion, or improved by means of irrigation or fertilisation, for instance. A technological change within one country can make previously unusable land, fertile, so instead of measuring simple square kilometres, we actually have to consider relative square kilometres. We must therefore measure *relative population density.*

Second, there is usually a significant difference between the current size of the population, and the size of the population which could potentially be supported using existing levels of technology. For instance, if Australia were to employ all the technologies it had developed over the years, for the benefit of the nation, what would our population be? That is the *potential* population.

To compare one culture to another, therefore, we have to measure the *potential relative population density*, and, more specifically, its rate of increase. Thus, advancing potential relative population density is a moral question, because it is the use of this uniquely human quality of creativity, which enables progress to take place. Contrary to the howls of cultural relativists, one can rank societies as morally better, or worse, as more human, or less human. In fact, as LaRouche says, "Only societies whose cultures commit them to successful technological progress, as a policy of practice, are qualified to survive and to prosper. Indeed, only such societies are morally qualified to survive…."

Table 1

Population Densities

Persons per Square Kilometre

Country	1999	2050 (Projected)
Australia	2	3
Afghanistan	34	94
Argentina	13	20
Japan	335	278
Indonesia	110	164
Germany	230	205
Mexico	50	75
Nauru	539	1126
India	304	465
United States	29	37
United Kingdom	241	232

Source: United Nations

As mankind adopted the rock-drug-sex counterculture and the "post-industrial" society that went with it some 35 years ago, his potential relative population density collapsed, as we are now seeing globally. To reverse this madness, to prepare for this growing population (as well as to even sustain what we presently have), we will have to build railroads across our continent; dam rivers and create power stations; travel into space; solve salinity problems; educate our children; provide universal health care; harness safe nuclear processes for water desalination and energy production; build new cities in remote areas; develop and protect our agriculture and industry; and establish a perfectly sovereign nation state republic to secure our children's future.

If our Government chooses not to promote that which uniquely makes us human—*cognition*—then they will destroy this nation. It is your job to see that they adopt, instead, the *Infrastructure Road to Recovery*.

Chart 1

Development of human population

	Life expectancy at birth (years)	Population density (per km²)	Comments	World population (millions)
Primate Comparison				
Gorilla		1/km²		.07
Chimpanzee		3-4/km²		1+
Man				
Australopithecines B.C. 4,000,000 - 1,000,000	**14-15**	**1/10km²**	68% die by age 14	**.07-1**
Homo Erectus B.C. 900,000 - 400,000	**14-15**			**1.7**
Paleolithic (Hunter-gatherers) B.C. 100,000 - 15,000	**18-20+**	**1/10km²**	55% die by age 14; average age 23	
Mesolithic (proto-agricultural) B.C. 15,000 - 5,000	**20-27**			**4**
Neolithic, B.C. 900,000 - 400,000	**25**	**1/km²**	"Agricultural revolution"	**10**
Bronze Age B.C. 3,000 - 1,000	**28**	**10/km²**	50% die by age 14 Village dry-farming, Baluchistan, 5000 B.C.: 9.61/km² Development of cities: Sumer, 2000 B.C.: 19.16/km² Early Bronze Age: Aegean, 3000 B.C.: 7.5-13.8/km² Late Bronze Age: Aegean, 1,000 B.C.: 12.4-31.3/km² Shang Dynasty China, 1000 B.C.: 5/km²	**50**
Iron Age B.C. 1,000 -	**28**			**50**
Mediterranean Classical Period B.C. 500 - A.D. 500	**25-28**	**15+/km²**	Classical Greece, Peloponnese: 35/km² Roman Empire: Greece: 11/km² Italy: 24/km² Asia: 30/km² Egypt: 179/km² Han Dynasty China, B.C. 200- A.D. 200: 19.27/km² Shanxi: 28/km² Shaanxi: 24/km² Henan: 97/km² * Shandong: 118/km² *Irrigated river-valley intensive agriculture	**100-190**
European Medieval Period A.D. 800-1300	**30+**	**20+/km²**	40% die by age 14 Italy, 1200: 24/km² Italy, 1340: 34/km² Tuscany, 1340: 85/km² Brabant, 1374: 35/km²	**220-360**
Europe, 17th Century	**32-36**		Italy, 1650: 37/km² France, 1650: 38/km² Belguim, 1650: 50/km²	**545**
Europe, 18th Century	**34-38**	**30+/km²**	"Industrial Revolutiuon" Italy, 1750: 50/km² France, 1750: 44/km² Belgium, 1750: 108/km²	**720**
Massachusetts, 1840	**41**			
United Kingdom, 1861	**43**			
Guatemala, 1893	**24**			
European Russia, 1896	**32**			
Czechoslovakia, 1900	**40**			
Japan, 1899	**44**			
United States, 1900	**48**			
Sweden, 1903	**53**			
France, 1946	**62**			
India, 1950	**41**			
Sweden, 1960	**73**			
			Life expectancies: Industrialized," right; "Pre-industrialized," left	**1,200**
1970		**1975**		
United States	**71**	26/km²		**2,500**
West Germany	**70**	248/km²		
Japan	**73**	297/km²		
China	**59**	**180/km²**		
India	**48**	183/km²		
Belgium		**333/km²**		**3,900**

A growing "potential relative population density" means more human beings, with longer and healthier lives, and a greater potential for cognitive development. A stagnant or declining population is the sign of a sick society.

LaRouche: A Vision for the Next Fifty Years

From Page 3

systems and economic analysis systems, which do not correspond to reality. And right now, if you look at the ratio of monetary aggregate, financial aggregate, against physical aggregate, over the past period, since the 1970s, the rate of financial aggregate per capita and per square kilometre, has been going up, like that. The rate of financial emission, has been going up like that. [See the Triple Curve Function, p. 1.] Now, the rate of monetary emission, recently, or monetised emission, has gone up more rapidly than the financial, as a recent phase of crisis is entered.

In the meantime, in the same period, there's been an accelerating collapse, in physical output per capita.

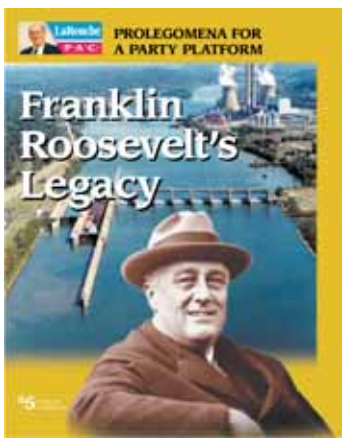
We have a doomed culture, a doomed civilisation, based on what happened since the middle of the 1960s, in the shift from the productive economy of the first two decades of the post-war economy, to this kind of orientation toward services and a globalised economy, which is destroying us.

Reshaping U.S. Politics

Now, therefore, what we're doing in the United States, we're dealing with the same thing: The Democratic Party which had been considered the party of Franklin Roosevelt, decayed. Both major parties decayed. About 80% of the population has, more and more, drifted away from the political parties. There used to be political parties which were mass political parties, in which a very significant amount of the general population participated in party organisations, especially in the Democratic Party after Roosevelt. Politics in the party were based on the people in the party, not on the big money. But on the people in the party. That changed, with the change in policies, under Nixon, especially.

Those changes in policy, meant the people became more and more estranged from their government, estranged from their political parties. The parties began to be controlled by a tinier and tinier minority, from the upper 20% of family-income brackets, leaving the majority outside.

We're going to have to change that. And we've begun the change: It happened in the summer of 2004, with the Convention in Boston, where *I had the only platform for the Democratic Party*. They didn't have a party! They didn't have a party platform. They got one, and we began to reorganise them. Gradually it's coming back. We find that we're way ahead of the party leadership, in going out and organising the local party organisations. They don't have a sense of a mass-based party. You want to talk about democracy? Well, where's your mass-based party? If the people don't control the parties, where's your democracy? What's it mean? It doesn't mean anything. It's when the people are *participating*, actively, in the question of government, where they're arguing and fighting about what concepts mean—not slogans—but, "what does this mean?" They're trying to understand what it means. And a real leader is not someone who tells people what they want to hear: A real leader tells them what *they need to know*, and gets out there, and does the job of convincing them that that's what we need to know.



The U.S. Democratic Party is being revived and mobilised around the platform written by LaRouche (above).

So that's what we're doing. And it has been a change. It's not perfect, it's a fight. Because I have some very notable enemies, internationally, including inside the United States, especially from the same gang that gave us Adolf Hitler in the last period—they're still around. They're bankers. They don't wear uniforms. They don't carry swastikas. But they have them in their head, and they do the same kind of thing that the Synarchist crowd did, that did things between 1922 and 1945 in Continental Europe. We've got them in the United States. Some of them helped put Hitler into power, here, from the United States. Firms like Harriman and so forth, who laundered the money to the Nazi Party at the end of 1932, so Hitler didn't go bankrupt, and was around to be appointed by the British as a Chancellor, here.

The *Real* United States

So, that's the fight we have. We can't guarantee any results in the United States, except we're doing the job. But, I can say, that you have to have a clear understanding of looking at the United States historically, not in terms of moods and gossip, as you get in Europe today. The United States is not a bad nation. It's as good as any on the planet, and better than most. The problem is, because we were good, and because we were powerful, those who wanted to do something to the world, knew you couldn't destroy the United States from the outside, by outside force—but you could destroy it by corruption. And there's a lot of corruption, a lot was applied.

But some of us are fighting. And we're having some success.

But, at the same time, you have to look at this, finally, this way: That what has to be done—and I think I know pretty well what has to be done, and know what could be done, politically and otherwise—what has to be done, can not be done on this planet without a leading role from the United States. We have to do that job. If we do the job, then we need forces in Europe, particularly, who will join with us, in making the job international. That's the only chance we have. If we in the United States do not do our job, in the advanced state of the world crisis today, I don't think civilisation will escape a Dark Age. If we do our job, and we have collaboration with people in Europe, I'm sure we can convince other parts of the world to join us. And we can win. We can bring back civilisation.

But that's the hard reality, which I see. And, being an older fellow, and more frisky than my enemies would like to have me, I enjoy the fight. [applause]

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Building a Nation: The Snowy Scheme

In 1967, before it was even finished, the American Society of Engineers rated the Snowy Mountains Scheme as "one of the seven engineering wonders" of the modern world.

The Snowy Scheme is the largest single infrastructure project in Australian history, and an appreciation of its magnitude, and the way in which it transformed postwar Australia, provides a model of how, once again, to think in terms of building our nation.

The scheme took one generation to build, from 1949 through 1974. It was finished on time, and under budget, for $820 million for a national asset which will last for hundreds of years. Over 100,000 people worked on the Snowy Scheme, two-thirds of them "new Australians", who were given hope and an opportunity to make a new life, and to contribute to building a young nation, Australia, after the death and destruction of World War II, particularly in Europe, where most of the new Australians came from.

The Scheme covers an area of 7,780 km^2, with sixteen dams, seven power stations (two of which are underground), 145 km of tunnels, and 80 km of aqueducts. It diverts the headwaters of the Snowy, Eucumbene and Murrumbidgee Rivers westward through the mountain range, releasing extra water without charge into the irrigation areas of the Murray and Murrumbidgee. The heart of the scheme is Lake Eucumbene, the Scheme's biggest reservoir, with a volume nine times that of Sydney Harbour. From there, huge underground tunnels carry water to and from the two major parts of the Scheme, the Tumut (and on to the Murrumbidgee) and the Murray.

The generators of the Scheme are large enough to produce up to 17% of southeastern Australia's energy requirements, but produce only 5% because of the limited amount of water available. However, the Scheme's large capacity enables it to produce a lot of power for short periods, which, among other things, means it can provide emergency support to the electricity systems of southeastern Australia in the case of a major blackout, and it could start up a whole electricity system if a total blackout occurred. In emergency situations, hydropower can provide energy within two minutes, compared to the hours or days it takes to crank up a coal or oil burning plant.

The Scheme transformed Australia in many ways. For the construction industry, for instance, according to Martin Albrecht, Managing Director of Thiess Contractors Pty. Ltd., one of the Australian firms which played a key role in building the Snowy,

"The experience gained by individual engineers participating in the Snowy Scheme had a profound influence on the culture of the construction industry beyond the life of the scheme. The early 1960s saw rapid growth of Australian heavy construction, including roads, railways, pipelines, dams, bridges, ports, coal-fired power-stations, power transmission, mineral processing, materials handling, mining, oil refining and industrial plant. The blossoming Australian contracting industry bolstered by the pool of talent available from the Snowy Scheme greatly facilitated this growth."[1]

Many of the engineers who had worked on the Snowy took up leading positions with engineering firms in Australia and internationally, while others took up senior positions in other governmental construction Authorities, like the Hydro-Electric Commission of Tasmania, the Electricity Commission of NSW, and the Sydney Water Board. The Snowy also had a profound impact on safety practices (it was the first project to mandate the wearing of seat belts, for instance), in technological processes, and in quality control.

But, perhaps more important, the Snowy transformed Australia's sense of what the nation itself was capable of.

Australia had never tackled anything so vast. Initially, most of the contracts and design work were let out to foreign firms. However, very quickly, Snowy Commissioner Sir William Hudson, the legendary figure with sole responsibility for driving the project forward for its first two decades, sent young Australian engineers off to America to study, to learn the techniques employed in the great Tennessee Valley Authority (TVA) project which covered seven states, and which the U.S. Bureau of Reclamation had used in building the great American dams, such as the gigantic Hoover and Grand Coulee dams in the American West. As Martin Albrecht recalled,

"William Hudson adopted the practice of talking to most of his engineers individually on their return home. His persistent questioning generally led to the observation by the returning engineer-trainee that 'we are individually just as competent and as well educated as the American engineers. If we work together and use management systems as they do, we can become world-class here, too.' To this William Hudson would sum up 'that is the main lesson I sent you to the USA to learn. We must get rid of our Australian technical and cultural inferiority complex'."

But perhaps the best way to appreciate the Scheme, is from two accounts of individuals deeply involved in it. The first is from one of the first group of twelve young engineers whom William Hudson sent to America to be trained, Prof. Lance Endersbee, and the second is about William Hudson himself, the driving spirit behind the mighty project.

Source: Snowy Mountains Hydro-electric Authority

The Snowy Scheme covers an area of 7,780 km^2, with 16 dams and seven power stations.

The Snowy Vision

by Emeritus Prof. Lance Endersbee AO, FTSE [2]

The concept of the Snowy Mountains Scheme captured the imagination of all those involved.

From the beginning, the challenges of the project attracted young and capable people. They were supported by wise leadership, and encouraged to accept tasks to the full limit of their capacity. They had access to the best world experience.

As the work proceeded, new challenges arose. Problems were being solved as they arose in practice, and innovations were being adopted without any delays to the overall progress. There was excellent co-operation within the Snowy team of engineers involved in investigation, design, and contract administration, geologists and laboratory scientists, and with the contractors. There was a united focus on achievement.

The scheme evolved in overall concept and was improved in detail. The project was finally completed not only on time and within the original estimate, but with much greater installed capacity and electricity output, and with much greater water storage. That ensured secure water releases for irrigation in long term drought.

Plan for the Nation

It is now 50 years since the *Snowy Mountains Hydro-electric Power Act of 1949* was passed by the Commonwealth Government. The time was right.

The nation had almost been invaded during the war. Darwin had been bombed. Ships had been sunk along the east coast. Enemy submarines had entered Sydney Harbour. During the war, almost all civil works had been deferred. The nation now had to rebuild. There was a need for greater electricity supplies for new industries, and there were blackouts as supplies failed to meet the demand. The international situation had become tense again. There was an Iron Curtain across Europe. It was the time of the Berlin Air Lift.

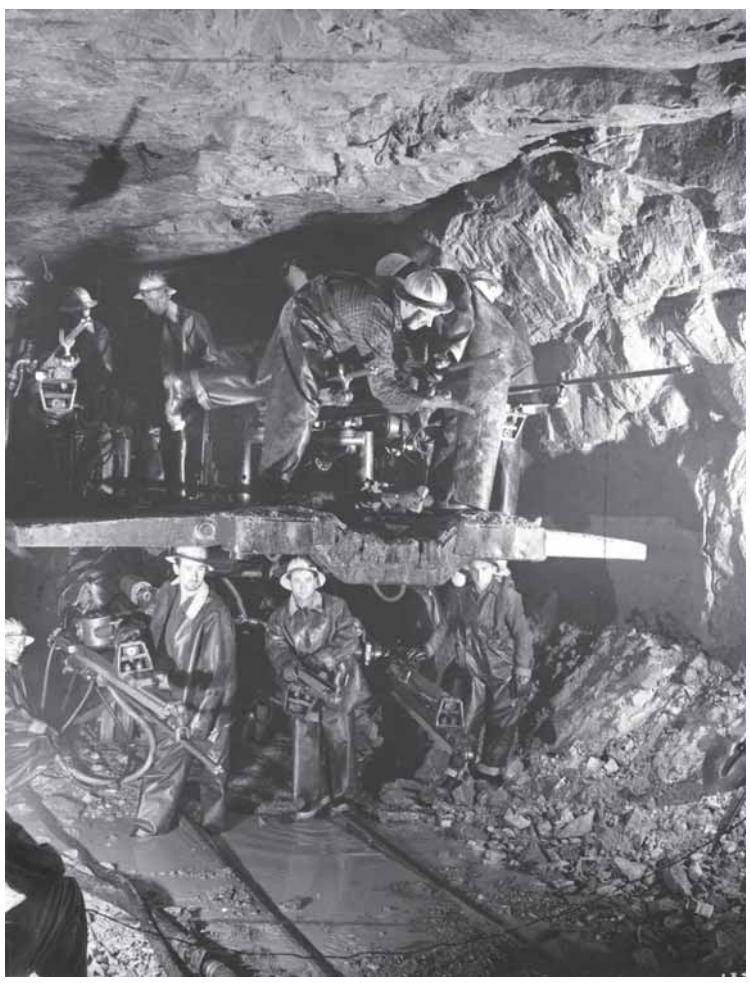
The Snowy Scheme was a plan for the nation, for national development. The prospect of diverting the Snowy waters inland had been considered for over 60 years, very seriously in times of drought, but always leading to argument between the colonies, and later the states, about the rights to the waters.

In 1941, Mr. L.R. East, Chairman of the State Rivers and Water Supply Commission of Victoria proposed that the Commonwealth and the two states of NSW and Victoria create a separate authority to undertake the work, on the lines of the River Murray Commission. However, the allocation of the diverted waters to the states of NSW, Victoria, and now also to SA, remained contentious.

In 1943 the conflicting proposals for the development of the Snowy waters led Mr. Arthur Calwell, MP, to ask in Parliament that "plans be formulated for the best use of the waters in the interests of the people of Australia as a whole."

In 1946, the Commonwealth and State Ministers from NSW and Victoria finally discussed the national aspect of the project. The engineering investigations for the project became the overall responsibility of the Commonwealth Department of Works and Housing, The Director General was Mr. L.F. Loder (later Sir Louis). The Director of Engineering was Ronald B. Lewis. The detailed work of investigations and evaluation of alternative proposals was the task of E. F. Rowntree, Engineer for Major Investigations.


Nelson Lemmon employed the *Defense Act* to ensure the great Snowy Scheme was built.


Drilling at the Tooma-Tumut Tunnel, 1959. These great Australians built "one of the seven engineering wonders" of the modern world.

Rowntree had been a courageous aerial observer in World War I, and had won the Distinguished Flying Cross for several missions at low altitude in the face of heavy machine gun fire. He was a member of a Quaker family in Hobart, but the pacifist Quakers disapproved of his war effort. After World War I he worked with the Hydro-Electric Department in Tasmania, where he designed entire hydro-electric projects virtually single-handedly. His professional background was ideal for the task of developing a plan for the Snowy Scheme.

He assessed many possible alternative layouts. Every variation involved site inspections, estimation of river flows, and calculation of reservoir capacity and regulation of storages, outline designs and costs of dams, tunnels and power stations. This task was the sole occupation of Ted Rowntree over about four years. He alone carried out the development of ideas, and studies of economic feasibility. It was a remarkable achievement by one man. Rowntree developed the concept of the diversion of Snowy water to the Tumut River for power and irrigation in the Murrumbidgee Irrigation Area, thereby gaining NSW support for the project.

Another remarkable contribution was by O.T. Olsen, an officer of the State Electricity Commission of Victoria, who had carried

The Infrastructure Road to Recovery

The Snowy Scheme

Top Left: Two of the six generators at Tumut 3 Power Station can provide enough electricity to power a city the size of Canberra. Photo: Snowy Mountains Hydro-Electric Authority Top Right: The six pipes of Tumut 3 are each 487 metres long, 5.6m in diameter, and collectively contain 10,260 tonnes of steel. Photo: Gabrielle Peut Right: Underground power station Tumut 1 in construction, 1958. Photo: Snowy Mountains Hydro-Electric Authority

out the investigations for the Kiewa hydro-electric project in Victoria, and had studied the potential of the Snowy River from the mountains in NSW to the sea in Victoria. It was Olsen who proposed the diversion of the Upper Snowy River to the Murray River for power production and irrigation along the Murray River. (The development of the significant hydro-electric potential of the Lower Snowy River still awaits its place in time.)

These two concepts came together in the detailed studies by Rowntree, leading to an overall concept that met the objectives of a plan for the nation as a whole. The final reports were presented to the Commonwealth and State Committee, and then to the Premiers' Conference. The next task was to build the project, in circumstances that would be alive with prospects for continued rivalry and procrastination by state governments.

Much of the credit for establishing the Snowy Authority should go to Nelson Lemmon. He was the Minister for Works and Housing in the Australian Government of Prime Minister Ben Chifley. A Western Australian, he was determined that the national interest would prevail, but understood that the Australian Constitution of 1900 did not assign any powers to the Commonwealth to build a project like the Snowy Scheme. The key objectives of the Snowy were to develop electricity and water resources, and these activities remained as residual powers of state governments.

Here is Lemmon's account of what, I believe, is one of the most decisive moments in Australian history:

I went to Chifley ... and I said, "There's only one way to handle this... Put the whole thing under the Defence Act ... and we'll be the boss." He said, "WHAT? Your name's Nelson Lemmon, not Ned Kelly—you can't do that?" So I said, "Why can't I?" "Well," he said, "you tell me how you can!" So I said, "Listen! You had subs in the Harbour. The way we're building everything now, all they want is a decent cruiser and they could sneak through the guard and they could blow all your power stations out without an effort! You've got Bunnerong built on the water, you've got the big one at Wollongong built on the water ... they could blow all your damned electricity out in one night's shooting! Where'll you produce the arms, where'll your production be with all the power of New South Wales buggered?" Chif says, "You might get away with it ... If you can get Evatt to agree with it—and if there's a case he'll have to fight it in the High Court—if you can get Evatt to agree, I'll go all the way with you!"

Lemmon went to see Evatt. He knew that Evatt did not like Dedman, who was the Minister for Defence and Minister for Post-War Reconstruction. They were rivals. Lemmon told Evatt that Dedman had said they could not use the *Defence Act*. Evatt's support of Lemmon was immediate. Lemmon had his constitutional defender. At the Premier's conference, Prime Minister Chifley advised the Premiers that the Commonwealth would proceed with the Scheme under the Defence powers. The Premiers were taken by surprise by this decision and simply noted the matter. They then proceeded to the next business.

It was an immense gamble, but there was no other way. Lemmon was aware that the Commonwealth did not even have the power to compulsorily acquire land for the project, as that was a state function. The Commonwealth did not have powers over diversion and use of water resources.

Chifley and Lemmon decided to move quickly towards construction to offset any possible legal challenges from the state governments, especially NSW. For this reason the Snowy Act of 1949 concentrated on the hydro-electric aspect of the Scheme, but not the diversion of water inland for irrigation. The costs of the project were to be recovered from power charges, with the additional water for irrigation being provided at no cost to the benefiting states of NSW, Victoria and SA.

These considerations of residual state rights for public works, under the Constitution, have meant that the Snowy Scheme remains the only national public infrastructure project in the history of our nation.

The project only became possible through the leadership of two groups of outstanding people. It was the engineering experts under Dr L.F. Loder who developed the vision of a national project. It was the political leaders, Prime Minister Chifley and Minister Lemmon, who believed that the merits of the grand design outweighed all objections on legal and constitutional grounds, and courageously began the Scheme.

The Leader of the Opposition in the Commonwealth Parliament was Robert Menzies. He formally opposed the proposals of the Government. But he privately congratulated Lemmon after the passage of the *Snowy Act*. Shortly thereafter there was a change of government, and Robert Menzies became Prime Minister. He accepted the decision of Parliament to proceed with the enterprise, supported the Snowy Authority, and ably dealt with the constitutional issues that continued to arise as the work proceeded. Menzies ensured the continued flow of funds to meet the needs of the project.

An Organisation for the Task: A Corporation Sole

The administrative form of the Snowy Authority was deliberately chosen to ensure that the construction of the project would proceed unimpeded by changes in the political environment. The construction of the Scheme was seen as an engineering task, and Cabinet preferred the appointment of a single outstanding engineer to manage the Project, unimpeded by any Board or group of experts, or any representatives from state governments. They deliberately chose rule by one man.

The Authority was formally constituted as a single commissioner. Thus the Snowy Mountains Hydro-Electric Authority was, in law, one person. That was a fundamental departure from a normal ministerial department, although the concept of corporation sole had been quite effective in other public enterprises.

In the case of the Snowy Scheme, it was outstandingly successful. There was no indication that the ultimate control of the project by a single commissioner was anything other than beneficial.

It was Nelson Lemmon who selected William Hudson as the Commissioner, and made a single recommendation to Cabinet. The record of the project shows that Hudson was an extraordinarily fine choice, and that the combination of capable leadership and unimpeded authority enabled the huge project to be built on time and within the estimate.

Hudson selected his two Associate Commissioners. Mr T. A. Lang, a young and distinguished civil engineer, and Commissioner of Irrigation and Water Supply in Queensland, and Mr E. L. Merigan, Electrical Engineer, State Electricity Commission of Victoria. Australia had a population of only 8 million in 1949, and there were wide-ranging and critical post-war shortages of men and equipment. It was the beginning of a great adventure.

Creating Competence

The critical challenge from the beginning of the Scheme was the enormous magnitude of the task ahead. There were very few engineers in Australia with experience in projects of that magnitude. The Authority had attracted an initial team of mostly young engineers, many with honors degrees and all with strong potential, but with no experience at all in hydro-electric engineering or major projects. In retrospect, it seems that only the Commissioner had any comprehension of what was involved.

The Authority decided to obtain overseas assistance in the preparation of designs and specifications for certain of the first major projects, and also to train the young engineers to a level whereby the Authority could complete the remainder of the Scheme from its own resources.

At that time many engineers around the world had been inspired by the achievements of the American civil engineers in the imaginative public works they built during the thirties. These projects were undertaken in a deliberate program of national economic recovery from the disastrous effects of the Great Depression. These great U.S. public works included the projects of the Tennessee Valley Authority, and many big projects by the U.S. Bureau of Reclamation such as Hoover Dam, and the Central Valley Project in California. This strong example in America undoubtedly aided the acceptance of the idea of the Snowy Scheme in Australia, and encouraged Lemmon and Chifley to provide similar direct and vigorous leadership.

The Snowy Authority decided to seek assistance in the United States for the initial group of major projects. This prospect was examined in America by Associate Commissioner T. A. Lang. He proposed an agreement between the Commonwealth of Australia and the United States of America whereby the Bureau of Reclamation would undertake the preparation of designs and specifications for certain tunnel projects and dams, and provide training and experience for a number of Snowy engineers.

At the beginning of 1952, twelve Snowy engineers began work with the Bureau, studying their practices in design and construction of dams and tunnels. Eventually, over 100 young engineers benefited from the program.

I was in the first group of 12 engineers. My own assignment from the Snowy was the study of the design of tunnels and underground structures. The Bureau of Reclamation promptly set me to work in the Denver offices on the actual designs for the Eucumbene-Tumut trans-mountain diversion tunnel, the associated regulating structures, and Junction Intake Shaft.

After 12 months I returned to Cooma with a big bundle of contract drawings and specifications for the Eucumbene-Tumut Tunnel and Associated Structures, Tumut Pond Dam and T1 Pressure Tunnel, hoping I would be able to answer any questions on the details of the projects.

The relationship between the experienced Bureau engineers and the young Australians was exceptionally cordial. We appreciated the way they openly shared their experience with us. They liked the way we were eager to learn, and asked questions.

The happy association with the Bureau of Reclamation was undoubtedly of tremendous benefit to the Authority, and to Australia. The concept of such detailed cooperation with an agency of another government, and the consequent inter-governmental agreement, was an act of much foresight and a credit to all concerned.

Within a few short years of the Authority being formed, the young engineers had matured into a capable, confident and united engineering team.

It is now of interest to reflect that it was all deliberately planned that way.

The
Citizens Electoral Council
is on the
WEB.

Updated daily

www.cecaust.com.au

The Infrastructure Road to Recovery

The Snowy Scheme

William Hudson:
Snowy Mountains Engineer

Reprinted from The New Zealand Edge[3]

William Hudson, an inspiring leader and civil engineer, headed the construction of the Snowy Mountains Scheme.

Born in Nelson, New Zealand, in 1896, Hudson was educated at Nelson College and studied civil engineering at London University. When Hudson told his father of his decision to study engineering, the response was, "Bill, that's all you're bloody well good for"—an ironic understatement for the man who was to forge one of the world's great engineering feats. When war was declared he enlisted in the British army. After the war he graduated with first class honours and completed post-graduate study in France before working for a large British engineering firm, Armstrong Whitworth.

The Chosen One

He returned to New Zealand in the 1920s to undertake supervision of the construction of some of New Zealand's first hydro-electric power schemes at Mangahao and Arapuni. After work in Australia and Scotland, Hudson became New South Wales Chief Civil Engineer and in 1948 was personally approved by Australian Prime Minister Ben Chifley to head the construction of the Snowy River scheme.

In the post-war 1940's Australia's acute needs for water, power, labour and capital were the most important challenges it faced. As demands for agricultural exports increased and the manufacturing sector boomed, irrigation and power became pressing concerns. Despite opposition to the project, these concerns, along with a perceived need to modernise industrially and defend against the communist threat, determined that the scheme must go ahead.

William Hudson took up duty on 1 August 1949, under the *Snowy Mountains Hydroelectric Power Act*, and on 17 October 1949 he fired the first explosive charge, starting a project that would launch Australian engineering and industry into a new era and usher in an enduring multi-cultural legacy.

United Nations of Snowy

From the beginning Hudson was urged to recruit mainly from overseas to avoid taking skilled personnel away from other post-war reconstruction work. Workers from "acceptable" countries proved difficult to garner so Hudson initiated a bold and innovative program which saw hundreds of thousands of immigrants drawn from Germany and the Mediterranean countries. Consequently a cosmopolitan staff and work-force was created, many expecting welcome release from the devastation, turmoil and unemployment of post-war Europe. Few of the workers appreciated the difficult and demanding living conditions that they would soon find themselves in. The varied composition of the workforce that came to Snowy also meant that it came from countries who had fought on opposite sides during World War II. As Brad Collis writes in *Snowy: The Making of Modern Australia*,

"In the primitive workcamps high in the Australian Alps Englishmen, Germans, Italians, Austrians, Poles, Greeks, Dutchmen, Portuguese, Spaniards, Hungarians, Swiss, Swedes, Finns, Czechs, Lebanese, Latvians, Russians, Danes, Cypriots, Ukrainians, Americans, Turks, Frenchmen, and Norweigians, more than thirty-three nationalities in all—shared hard work and laughter, ate from the same cooking pots, drank at the same bars and vowed to keep ethnic hatreds out of this young country which promised them a new life."

Rugged Conditions

For the pragmatic Hudson this melting pot was a management challenge, not just in terms of the cultural dynamic, but in terms of safety, of which he was acutely conscious. The living conditions were extremely rugged, even primitive, with some comparing temperatures to fighting on the Russian Front during the war. The working environment was equally as hazardous, with workers having to contend with difficult access across hastily made tracks, and tunneling and working round-the-clock on wet and snowy mountainsides.

"Generally you worked in teams so you could watch each others' backs. It was a harsh environment at the face. Newcomers needed mates to watch out for them until they became acclimatised to the conditions.

"With up to thirteen drilling machines working on a jumbo, visibility would be cut to just a couple of feet after fifteen minutes through fog from the water-cooled drills, dust and exhaust fumes—not a very pleasant breathing atmosphere either.

"It worsened what was already poor visibility, remembering the only illumination in the first place were lamps. Changing thirteen foot drill bits in two feet of visibility meant you needed to know what you were doing".

Safety and Innovation

Years before McLuhan coined the phrase, Hudson's Snowy community resembled a tangible global village. The diversity of the force developed quickly into a unifying strength socially, but in safety terms it was seen by Comissioner Hudson as an added risk. His solution for the many non English-speaking workers was to make English language classes a mandatory requirement for safety. As well, the wearing of seatbelts in Authority vehicles was compulsory

Tourists have the opportunity to experience the great legacy of nation building, viewing the grand Tumut 2 power station, which is 244 metres below the surface at the end of a kilometre-long-tunnel. Photo: Snowy Mountains Hydro-Electric Authority

at Snowy well before it was a requirement elsewhere, and drinking while in charge of an Authority vehicle was a dismissible offence.

Hudson was aware of opposition to the project by taxpayers (especially from those away from the southeast), and recognising that postwar Australians were now going on holiday in the family car, he developed escorted car convoys round the scheme to promote a sense of communal ownership. Bus tours were also accommodated. Tour operators convinced parents all over Australia that their children's education was incomplete without a school or family tour. This stroke of inspired public relations, selling the scheme to taxpayers, and the younger generation who soon would be, opened up the Australian alpine region for tourism, with the infrastructure that Snowy provided eventually paving the way for Australia's modern ski resorts.

Hudson was given substantial powers in the interests of speed and achievement, and he used these powers effectively, creating an organisation based on professional disciplines. His management style was hierarchical, but based on a respect for hard work and excellence.

Leader By Example

He could be a staunch boss, pushing engineers, administrators and workers alike to vigorously keep to budgets and timetables. Towards those he didn't consider were pulling their weight he was intolerant, and sackings for less than 100% commitment were commonplace, written into the standing orders of all supervising officers. Driven by a desire to quash criticism of the scheme, Hudson urged contractors onwards and tunneling crews repeatedly broke world records. Some viewed him as tyrannical, but he was also down-to-earth and only demanded of others what he expected of himself: "I like sudden problems. They're a challenge. I like building dams. They're a job to be done." Under his leadership the scheme was completed in 1974, under budget and before deadlines.

There were many design and construction innovations achieved in the scheme, in particular the technique of rockbolting. Previously concrete lining had been usual in protecting workers from unstable rock when tunneling, Under Hudson's charge researchers developed innovative rockbolts which were used to individually tie a rock face to the rock beneath it. When linked together in a pattern they provided a lateral force that obviated a need for concrete lining, a technique begun at Snowy and recently used in the construction of the Sydney Harbour Tunnel.

Above all, it grandly met its primary aims, harnessing snow melt from the Australian Alps, diverting it westwards under the mountains to irrigate the arid interior for food production, while generating hydro-electricity as the water falls to the level of the plains….

[H]aving recently celebrated its 50th anniversary Snowy remains an important asset and documents a massive human achievement—reflected in no one more so than William Hudson. As Sir James Gobbo, Governor of Victoria, stated in the 1999 Ian McLennan Oration,

"He [Hudson] enjoyed the respect of both staff and workers for he worked with prodigious energy and single mindedness and was very much directly in touch with the site and job difficulties. He believed in the project passionately and managed to ensure its survival through some difficult early years when its success remained to be proved and when doubters, especially amongst the politicians were numerous".

Hudson resigned grudgingly in 1967 aged 71 and died eleven years later in 1978, after receiving international acclaim.

Praise and Acclaim

He was knighted Sir William Hudson in 1955, awarded the Kermont Memorial Medal for Outstanding Engineering Achievement, made a fellow of University College, London, a fellow of the Royal Society, endowed with an honorary doctorate from the Australian National University and was honoured with an Australian stamp. The American Society of Civil Engineers twice rated the scheme as one of the great engineering achievements of the Twentieth Century, and as well as contributing pivotally to a panculturral society; it put a young, primarily agricultural country at the forefront of world construction technology. Australia's highest award for engineering excellence is named in his honour. In 1958, then Australian Prime Minister, Sir Robert Menzies, spoke of the triumph of the scheme: "In a period in which we in Australia are still, I think, handicapped by parochialism, by a slight distrust of big ideas and of big people or of big enterprises; this scheme is teaching us and everybody in Australia to think in a big way, to be thankful for big things, to be proud of big enterprises; to be thankful for big men."

William Hudson: big man for a big scheme.

Footnotes

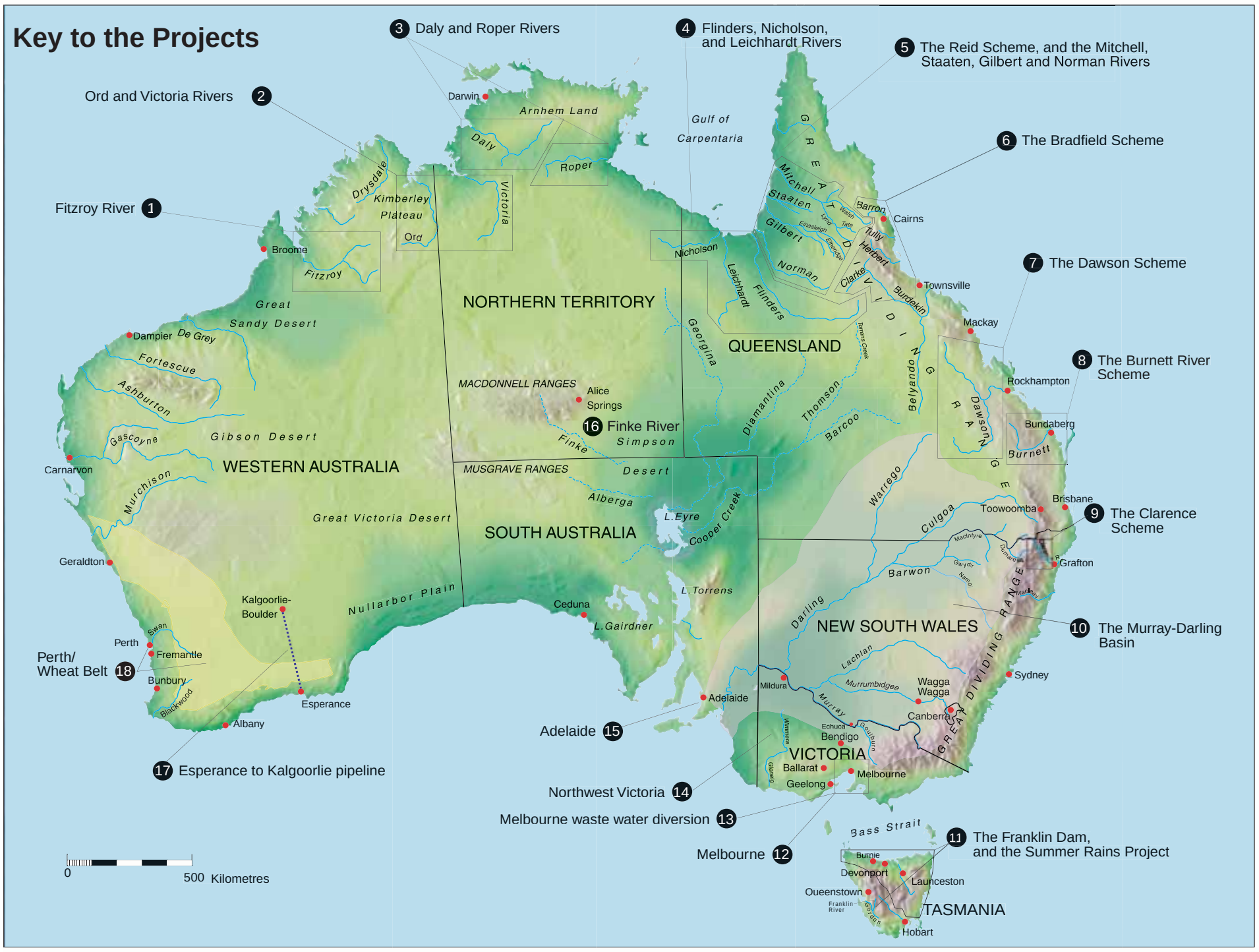
1. This quote and the following are from a paper Martin Albrecht delivered to the Australian Academy of Technological Sciences and Engineering, in November 1999, entitled "The Spirit of the Snowy—Fifty Years On". Albrecht's paper is entitled, "The Australian Construction Industry—the Snowy Legacy". (http://www.atse.org.au/publications/symposia/proc-1999p4.htm) Additional information for this introductory section was provided by the Snowy Mountain Hydroelectric Authority (http://www.snowyhydro.com.au)

2. Reprinted from On Line *Opinion* http://www.onlineopinion.com.au/April00endersbee.htm Prof. Endersbee also authored a paper refuting the lunatic proposal to corporatise the Snowy, preparatory to selling it off. The attack on the Snowy also involves the proposal approved in late 2001 by the Scheme's owners, Victoria, New South Wales and the Commonwealth, to restore 28% of the Snowy's original flow, on alleged "environmental" grounds.

3. Web address http://www.nzedge.com/heroes/hudson.html

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Great Water Projects



Water for Australia

Our national water needs, and how to provide for them, are illustrated in this sub-section (pp. 14-21) and in our special New Citizen *Lift-Out Feature. The Lift-Out maps, "Australia's Water Problems" and "New Great Water Projects", are between pages 22 and 23.*

The situation in much of rural and regional Australia was starkly portrayed by Ernie Bridge, upon his quitting the ALP in 1996. Bridge was a former Western Australian MP and Minister for Resources Development, and is presently the chairman of the Watering Australia Foundation.

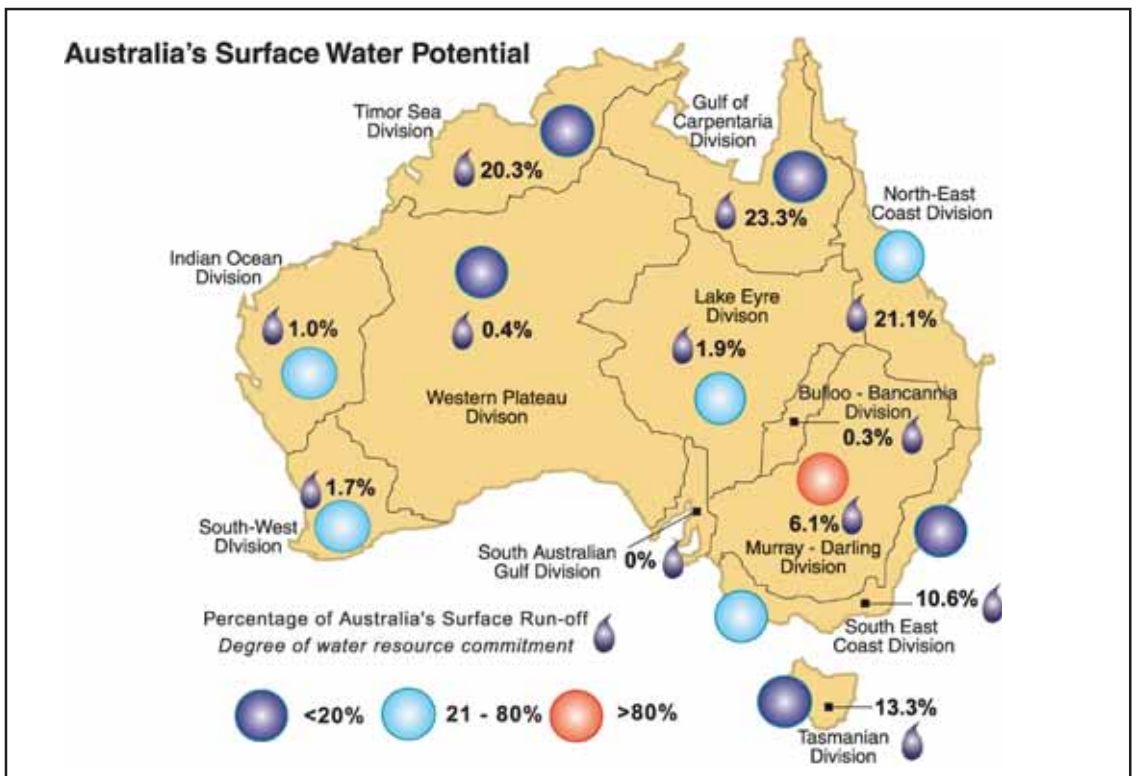
"Governments nowadays are simply mauling inland Australia. The practice of so-called micro-economic reform or economic rationalism, call it what you like, has brought about the most destructive dismantling of basic infrastructure in this nation's history and it is apparent the major parties are not prepared to recognise this and alter their economic policies.… When one sees population reductions of over 50% in some areas of our nation, it emerges as a frightening situation. I cannot stand back and see good battling Aussies simply handing over the keys to banks at such regular intervals as is happening. When you talk and look into the eyes of many people of the outback, you see signs of fatigue and a loss of hope."

By contrast, the great water projects depicted on the maps, and described in more detail below, are exemplary of the scale upon which Australians must think, if we are to conquer our dry, largely empty continent, as well as the deepening depression. The precise details of each project (some bits and pieces of which have been completed), are much less important, than the general approach, which is to think big, i.e. to think of the continent as a whole, and to think longterm, of what will be required over the next 25-50 years, at minimum, with much higher rates of growth than the negative real growth rates of the post-industrial (and, increasingly, "post-agricultural") nonsense of the past three decades. As the 1996 *Australian Encyclopedia* was forced to acknowledge, in describing such projects as the Clarence, Bradfield and Reid Schemes, in particular, "Modern investigation methods have ensured that most of the proposals are feasible in technical and engineering terms," though it protests that "the same can not be said for their economic feasibility."

However, such well-chosen, well-engineered projects, provided that they are integrated with other vital aspects of infrastructure, such as a high-speed rail system to get products to market, are always cost-effective, because they unleash far more revenue-generating economic activity than they cost, provided one calculates on a real, physical basis, and not on the lunatic "user-pays", "full cost recovery" method of economic rationalism, which is expressly designed to ensure that little or nothing will ever be built. For a refreshing example of something in the direction of such real, physical accounting versus the bean-counting "it costs too much" nonsense, see the Queensland Government's Office of Northern Development figures on the economic activity to be unleashed by the revised Bradfield Scheme, versus the cost of that scheme, which proves, hands-down, that the scheme will more than pay for itself—in fact, it almost pays for itself in a single year! (available from the office of MP Bob Katter, who has spearheaded the effort to finally build the Bradfield Scheme, or from the CEC).

And remember, by the standards prevailing in 1939, we "couldn't afford" to fight World War II. Yet, as Ben Chifley used to emphasise, we spent 350 million pounds per year during the war versus 60 million per year pre-war, and, notwithstanding the great losses of men and material (and the fact that war production itself, as opposed to its technological spin-offs, is usually a dead loss) we came out a far richer nation than we went in. The present depression must be tackled with similar methods, and similar determination.

Australia's growing water shortages, will only be overcome through the kind of bold projects outlined on the Lift-Out map, "New Great Water Projects". The projects elaborated in the pages that follow, provide the vision around which we must mobilise our nation.



The Murray-Darling Drainage Basin, which has only 6.1% of Australia's surface water (>80% of which is already committed) is Australia's agricultural heartland, producing over $16 billion in agricultural products. Imagine what more could be done with the huge, virtually uncommitted resources of the Timor Sea Drainage Division (20.3% of the total), The Gulf of Carpentaria (23.3%), the North-East Coast (21.1%), the South-East Coast (10.6%, but largely uncommitted), and Tasmania (13.3%, largely uncommitted.) Source: The Australian Academy of Technological Sciences and Engineering

The Infrastructure Road to Recovery

Great Water Projects

1. The Fitzroy River

In flood, the Fitzroy's water volume is second only to the Amazon. It has an annual runoff of 8 million megalitres; metropolitan Sydney uses one-half million megalitres a year, by comparison. (A megalitre is 1 million litres, the volume of an Olympic-sized swimming pool 1 metre deep.)

An evaluation by Prof. Endersbee: "The Fitzroy in flood is by far the largest river in Australia, and at the height of the monsoon season it is really quite an enormous river. And it floods over the lower flood plains below the Fitzroy crossing. There it rushes through gorges upstream of these plains, and there are really narrow, excellent sites for dam building. And dam building is rather easy because the river virtually dries out in the winter. And so I have been proposing and talking to the Western Australian government about this, and I have been suggesting to them that above the Great Sandy Desert, that I think I could develop at least a half a million acres of irrigation, and this is probably one of the best sites in the world for major, highly mechanised, intensive horticulture. You can design it as a massive project. Anything smaller is uneconomical, really. The Fitzroy could easily support two or three or even five million people."

Estimating the project on a smaller scale in 1997, WA Senator Alan Eggleston said the Fitzroy Scheme would take 10-15 years to develop, and it would provide direct employment to 3,000 people and 7,500 indirect jobs. While in Opposition, ALP WA Premier Geoff Gallop opposed the scheme (and probably still does), as did Kim Beazley and the federal ALP.

2. The Ord and Victoria Rivers

From Prof. Endersbee's testimony to the House of Representatives Standing Committee on Primary Industries and Regional Services, April 1999:

I was recently in Kununurra as guest of local governments in that region, and had the opportunity for aerial and ground inspections of the Ord and Victoria River regions. After my inspection I suggested to the Councils that they should plan on the basis of the integrated development of both the Ord and Victoria River irrigation areas, and should also consider the possible inclusion of the Daly River irrigation areas. The combined developments would greatly enhance the growth opportunities in the entire region…. At the present time the Ord Project is operating well at Stage 1. The continuing development of horticulture is leading to higher returns. The next major stage is Stage 2, and detailed planning is now in hand. With completion of Stage 2 and increased emphasis on horticulture, the overall potential of the Ord is possibly five to eight times greater than the present level of output. On the other hand, nothing has been done whatsoever to investigate the potential of the nearby Victoria River. The potential for irrigation is probably equal in magnitude to the Ord….The combined potential of the Ord and the Victoria could be 10 to 16 times the present output of the Ord, which would make it one of the great irrigation regions of the world. The new port of Darwin and the new rail to southern markets enhance this potential. The combined projects would fully justify the construction of a new rail connection from Katherine to Kununurra, and also the improvement of roads for road-trains to the east via Mt. Isa. I have also proposed the consideration of a new ferry terminal at the mouth of the Victoria River, which would be in easy trucking distance for all farms in the region. I think the new railway from Katherine to Kununurra should be put in hand immediately, with completion at the same time as the Alice-Darwin railway. The Ord irrigators could readily plan to substantially increase sales to southern markets via that railway. The new railway service will create a new demand, and the resulting freight volume could readily rise to one train each day for a large part of the year. This would be of major benefit to the Alice-Darwin railway.

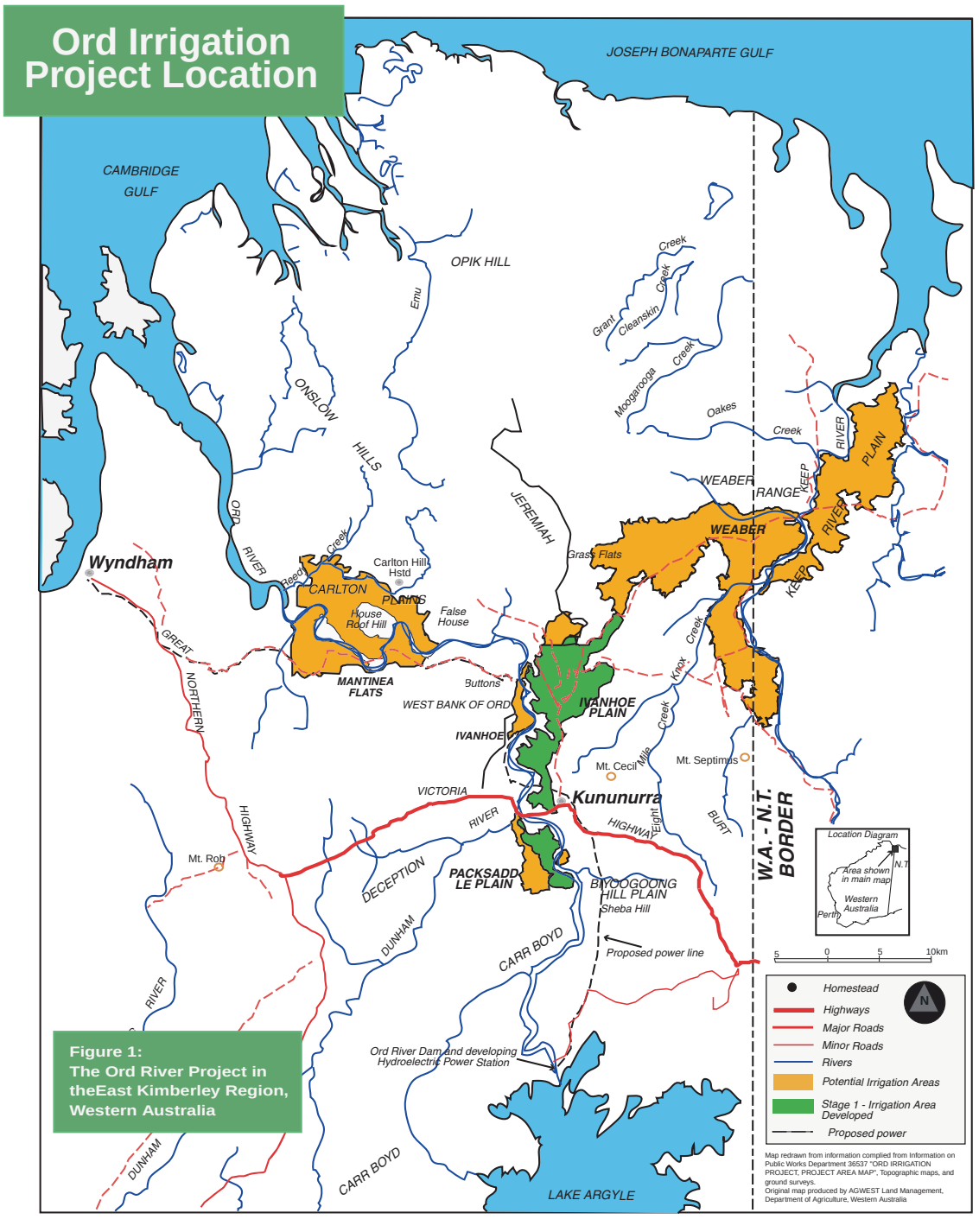


Figure 1: The Ord River Project in theEast Kimberley Region, Western Australia

Water expert Prof. Lance Endersbee has recommended that the Ord and Victoria Rivers be developed in combination, on a vast scale; the Daly River has significant potential, as well. This could be one of the greatest irrigation projects of the world, right on the doorstep of Asia's huge and rapidly growing population centres.

3, 4. The Daly, the Roper, and the Gulf of Carpentaria Rivers

Prof. Endersbee: "Going further east [from the Ord/Victoria scheme] there is the Daly and the Roper Rivers, they also have potential. I've recently been in the Gulf country, there is a huge runoff into the Gulf of Carpentaria, in this monsoon season. And on the range, between the Gulf and the eastern coast of Queensland near there is the Atherton tablelands, and the rivers that flow towards the gulf from the Atherton tablelands, flow through fairly deep gorges, on their way to the plains and the Gulf [the Mitchell, Staaten, Gilbert, and Norman rivers]. There are a number of sites there where it would be possible to have major dam sites and reservoir storage. The Flinders River, is one of the largest rivers and there are good dam sites there, we can store water to about 500 metres. Now the level of the land over a good contour, in most of Western Queensland, and Central Queensland is about 200 metres. So if we can store water at 500 metres, in the Upper Flinders, we've got 300 metres to play with. The level of the water is 500 metres. So that gives us a fairly significant head, that is available to help pumping. And you go south from the Flinders River, south from Hughenden in Queensland. There are absolutely vast areas, where there is irrigation potential, good soils and there could be a fantastic variety of crops. Now the potential of the Flinders River, could easily support several million people, the volumes of water are just so great. And we've got these irrigation areas. Once again the problem is access to markets. If you join up all of those projects together, if we have an interconnecting railroad, virtually going from Broome right across the top, and towards Mount Isa, and then South, and across to Hughenden, we would pick up all of those irrigation areas, and it would be possible to ship food, and food products out via Broome, or out of Darwin. The potential is absolutely enormous, its fantastic in investment terms. The problem is, that the magnitude of monies involved is so great, that everybody takes fright and it is not possible for them to look at it as an investment, on a cost-benefit basis. But that's not how you should look at it. It is a national project, like the Snowy."

Construction Plywood Sales Pty Ltd

"Right advice and the best price and service"

- Plywood
- Marine Ply
- Concrete Form Ply
- Wall Panelling
- Structural Plywood
- Melamine Boards

www.constructionplywoods.com.au

Full Range, Prompt Delivery. 37 Parer Rd, Airport West

03 9338 1933

The Infrastructure Road to Recovery

Great Water Projects

5. The Reid Scheme

The Reid Scheme is an inspiring proposal, on the scale of the Snowy Mountains Scheme. As designed by Brisbane engineer L.B.S. Reid in the 1940s, the flood waters of the Walsh, Tate, Lynd, Einasleigh, Etheridge and Gilbert Rivers, which flow west from the Great Dividing Range, would be diverted into the headwaters of the Flinders, and eventually into the Diamantina. To do this, Reid proposed to build a dam at the headwaters of the Walsh River, a tributary of the Mitchell, and to link this storage dam with nine other dams on the headwaters of the other westwardly flowing rivers, and thence into the Flinders and Diamantina.

As envisioned by Reid, the scheme was to include 275 km of canal 84 metres wide by 11 metres deep, 17 km of tunnels, and 216 km of 1.5 metre pipeline. A total of 7.5 million megalitres of water would be stored in reservoirs, most of which would be bound by the Gregory Range. Dams were to be constructed wherever the canal crosses a river, with three large dam walls of note: The Einasleigh River Dam would be over 6 km long and 76 m high; the Etheridge River Dam would be about 5 km long and 60 m high; and the dam creating the reservoir bordering the Gregory Range would be 19 km long with a height sufficient to create a head of 80 m. The volume of water under this scheme could be considerably increased by bringing in the headwaters of the Mitchell, Palmer, Normanby and Laura rivers, but this would mean increasing the size of all canals and tunnels to handle monsoon rains.

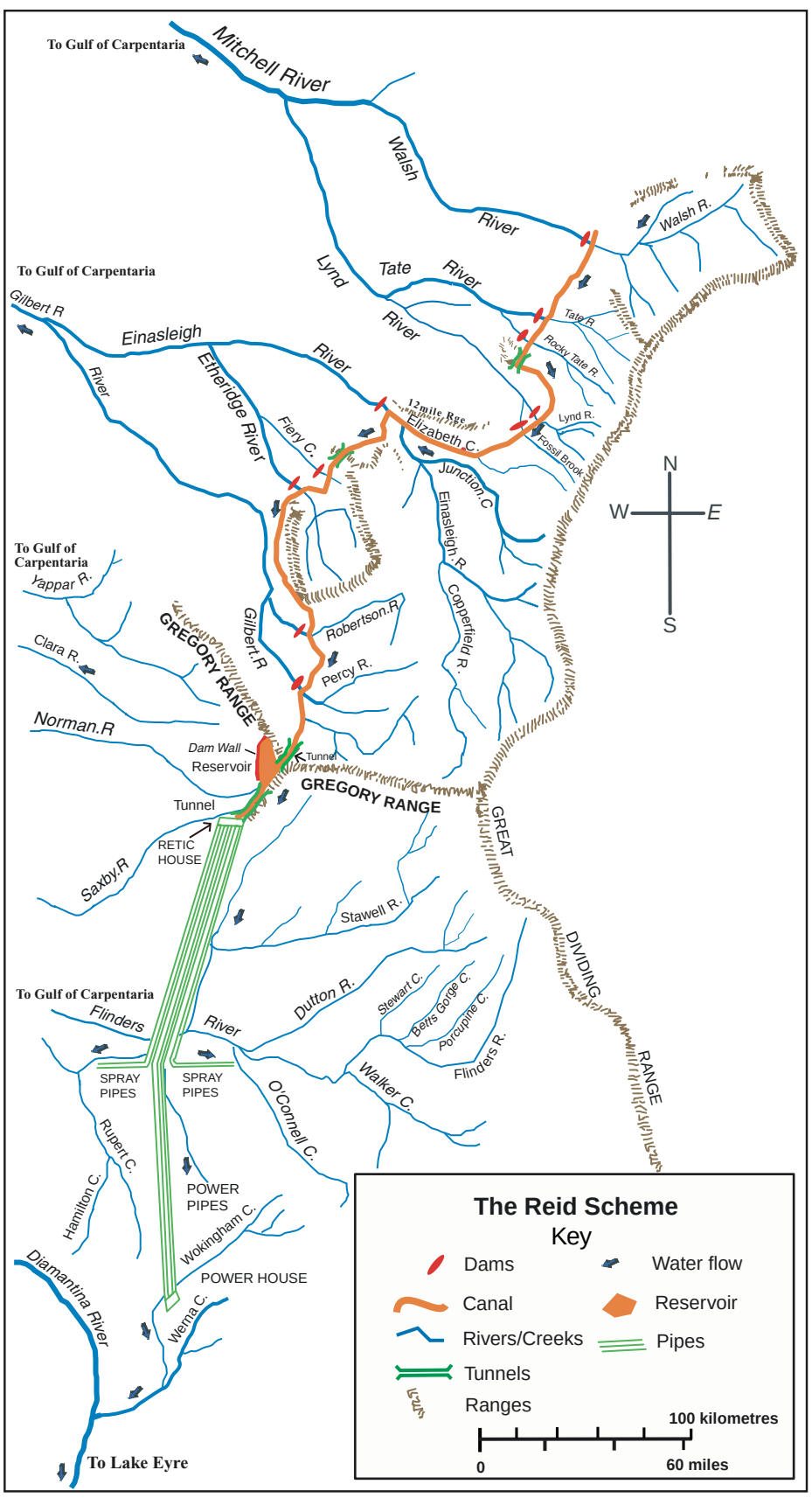
Reid also reviewed and elaborated the plans of Dr. J.J.C. Bradfield, proposing to bring the flood waters of the Herbert, Burdekin, Clark, Basalt and Cape Rivers across the Great Dividing Range into the Thomson River.

6. The Bradfield Scheme

At the direction of the Queensland state government, in 1984 four of Australia's best-known hydraulic engineering firms combined to form the Bradfield Study Consortium. Their Bradfield Study Consortium Report, together with an optimistic assessment by the Department of Northern Development, was never officially released due to a change of government in Queensland. But in July 1993, all of the relevant Shire Councils of North and Central Queensland joined together to form the Northern Australian Water Development Council, to fight to make Bradfield's dream a reality. The estimated cost of the revised Bradfield Scheme (which called for pumping water over the Great Dividing Range instead of the tunnel originally foreseen by Bradfield, among other changes), was at that time $2.49 billion. The state of Queensland's Office of Northern Development projected that the scheme would create $2.02 billion *annually* in direct output from the cattle industry, agriculture, etc., not to mention the billions saved in drought losses. Vast numbers of jobs would be created, both in the construction and in the follow-on development of this area.

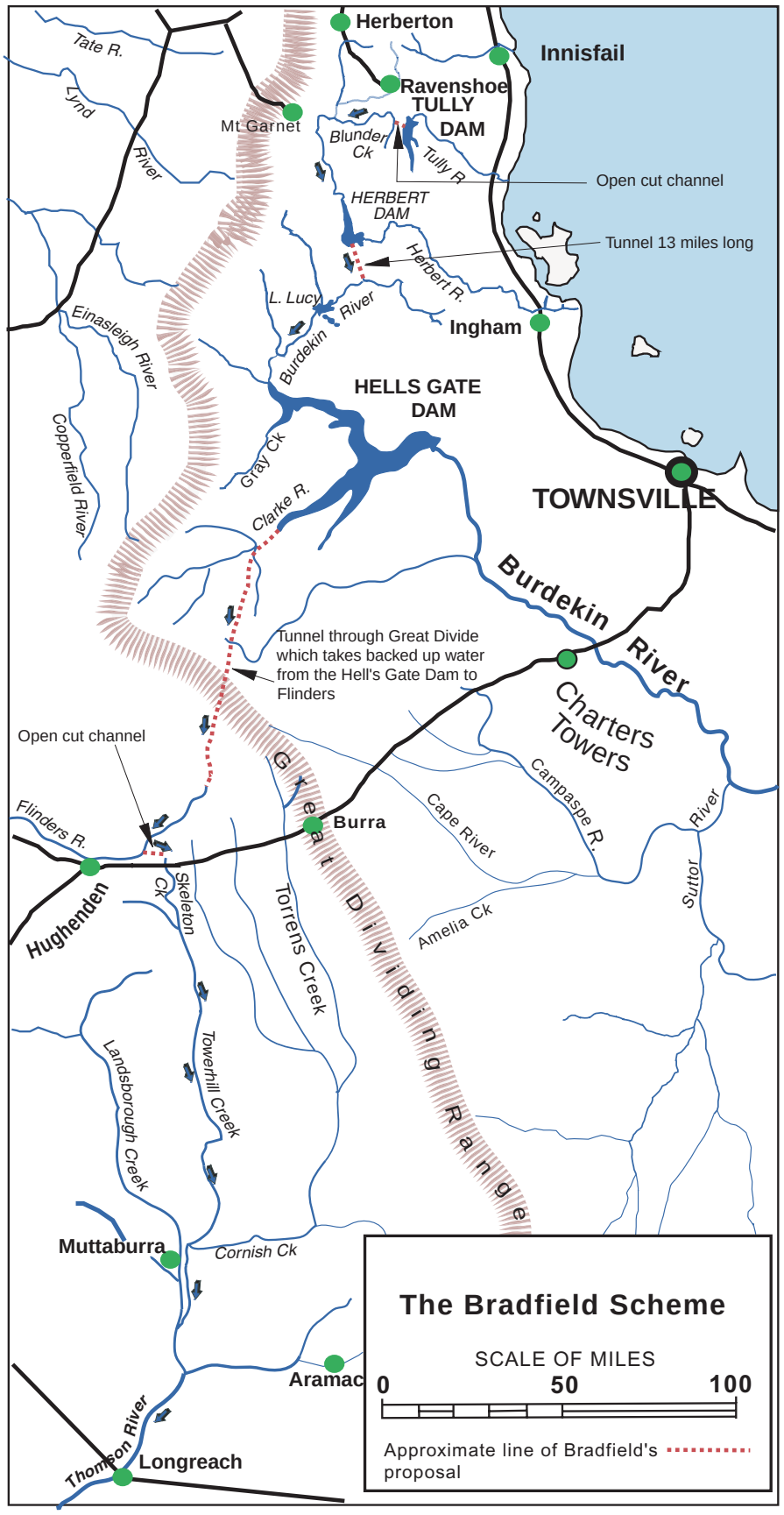
Since the time Bradfield proposed his scheme, the Burdekin Falls Dam on the Burdekin River was completed in 1987, in the middle catchment of the Burdekin, with a storage of around 1.85 million megalitres. Whether or not the Burdekin is utilised in the revised Bradfield Scheme, Stage 2 of the development of that dam should go ahead, under which the dam wall would be raised (it was built to allow for such expansion), which would allow the storage to increase to 8.5 million megalitres above its current capacity.

The Reid Scheme



First proposed in the 1940s, the Reid Scheme is a bold nation-building project on the scale of the Snowy Scheme.

The Bradfield Scheme



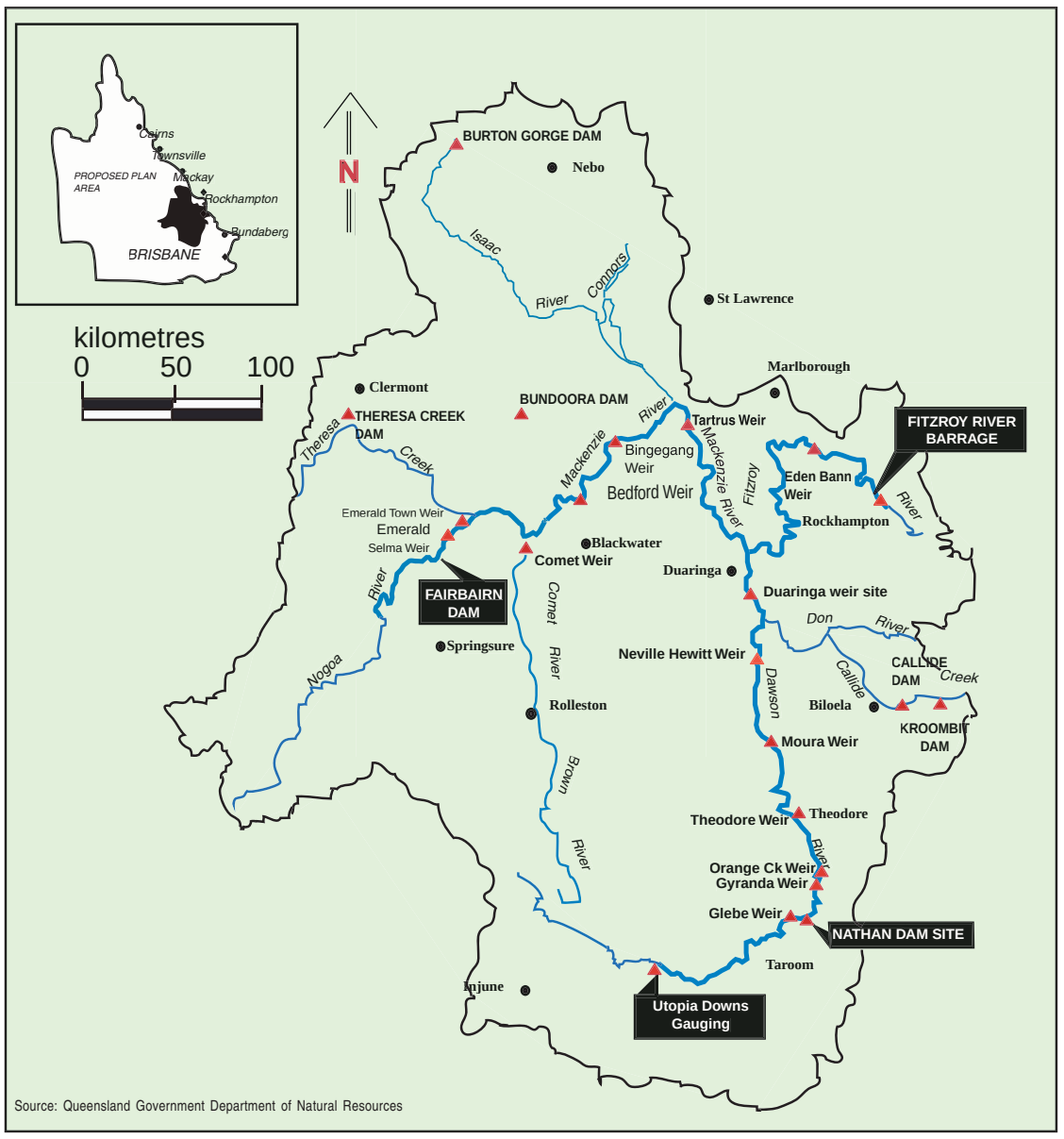
During World War II and for some years later, the Bradfield Scheme was regarded as the logical next step in building and securing our nation, after the Snowy. Beginning in the early1980s, Queensland MP Bob Katter revived the scheme, in a revised form.

The Infrastructure Road to Recovery

Great Water Projects

7. The Dawson Scheme

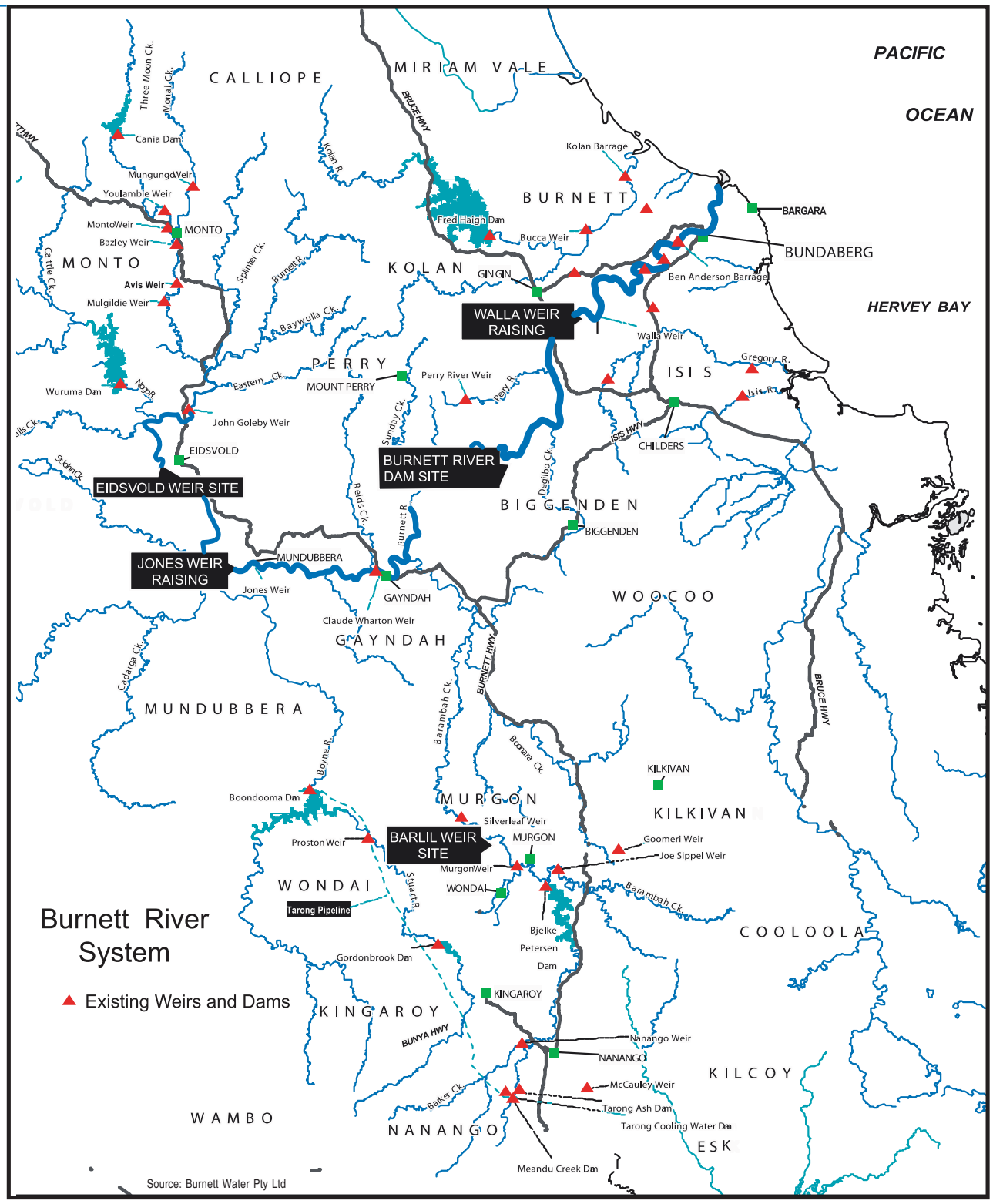
Originally planned as a $3 billion scheme to include a power station and rail lines, the Dawson Scheme has now been cut back to only the Nathan dam, which is to be a much smaller dam at that. Even this may never be built, since the state of Queensland insists it be built by "private enterprise." But the potential of the project was expressed in a January 10, 1998 article in the *Courier Mail*, "The storage of up to one million megalitres of water is expected to be a catalyst for development along hundreds of kilometres of Australia's biggest eastern-flowing river catchment. With little more than 10% of its capacity harnessed by a series of weirs, the Dawson is seen by proponents as one of the last great opportunities for inland water development."



First proposed in the 1920s, the Nathan Dam on the Dawson could be the centrepiece for a $3 billion development project.

8. The Burnett River

On 31 January 2002, Federal Environment Minister David Kemp signed off on a $168 million deal to build the 300,000 Ml Burnett River Dam near the old mining town of Paradise, as per feasibility studies of Burnett Water Pty. Ltd., a company established by the Queensland Government to develop water infrastructure in the Burnett Catchment. Scaled down from a much larger $240.7m, 750,000 megalitre proposal, the dam will still have the capacity of over half that of Sydney Harbour, and will be Queensland's first major dam proposal since the Teemburra Dam in 1990. Burnett Water Pty Ltd has additionally recommended building Eidsvold Weir on the Burnett River, Barlil Weir on Barambah Creek, and raising Jones Weir by 1.5m and Walla Weir by 2m. These projects will increase the available water supply in the region by 70%, with near-term net benefits estimated at between $1.7 billion and $2.9 billion, and 1,200 jobs created during the construction phase and 9,000 jobs as a spin-off. Bundaberg City Council Mayor Kay McDuff called the projects "the greatest news in decades." Federal and State approval is still required for the Walla Weir raising that is expected to yield around 10,000Ml per annum.



The Burnett River Dam, together with a series of proposed weirs, would alleviate the chronic water shortages in the Bundaberg/Hervey Bay region.

The Infrastructure Road to Recovery

Great Water Projects

9. The Clarence Scheme

The Clarence Scheme was summarised in the *News Weekly*, July 12, 1997: "Several factors are now combining to make it feasible and economic to divert the seaward flowing waters of the upper Clarence, Nimboida and Macleay Rivers into the Murray Darling basin. The annual flow of water available is comparable to that of the Snowy Mountain diversions.

"The Clarence Project would enable the development of further irrigation along the Dumaresq and MacIntyre Rivers that form the border between NSW and Qld. The Macleay project would involve the transmountain diversion into the Gwydir River in NSW."

The Clarence Scheme was elaborated by its designer, Prof. Lance Endersbee, in a speech to the CEC on November 23, 1997:

"There is the catchment of the Clarence River and it is a wonderful little cup in there and very steep country, high rainfall and one of the highest rainfall areas in Australia, and they get the summer rains from the monsoons coming down and they get the winter rains as well. So there is a lot of rainfall there and it all flows out into the sea, and if you have been to Grafton, you know how wide the Clarence River is in Grafton. It's a big river. So I have worked out, designed a scheme for the diversion of the Clarence into the Darling.

"Now, as you know, there is a lot of algae in the Darling…. This would flush all the algae out of the Darling. I have designed this as a pump storage scheme. There is a surplus of thermal energy, coal fired thermal energy from the Hunter and LaTrobe Valley and there is a surplus of thermal energy on the national grid and the national grid just goes right through there—past the project.… So I knew that there was a surplus of thermal energy overnight and at weekends and so with this Clarence diversion, rather than tunneling through the mountains, I could pump it up the hill and so I have devised a scheme whereby we pump overnight and at weekends, and we generate at peak times, on the way down the hill, and the project is economic!"

10. The Murray-Darling Basin

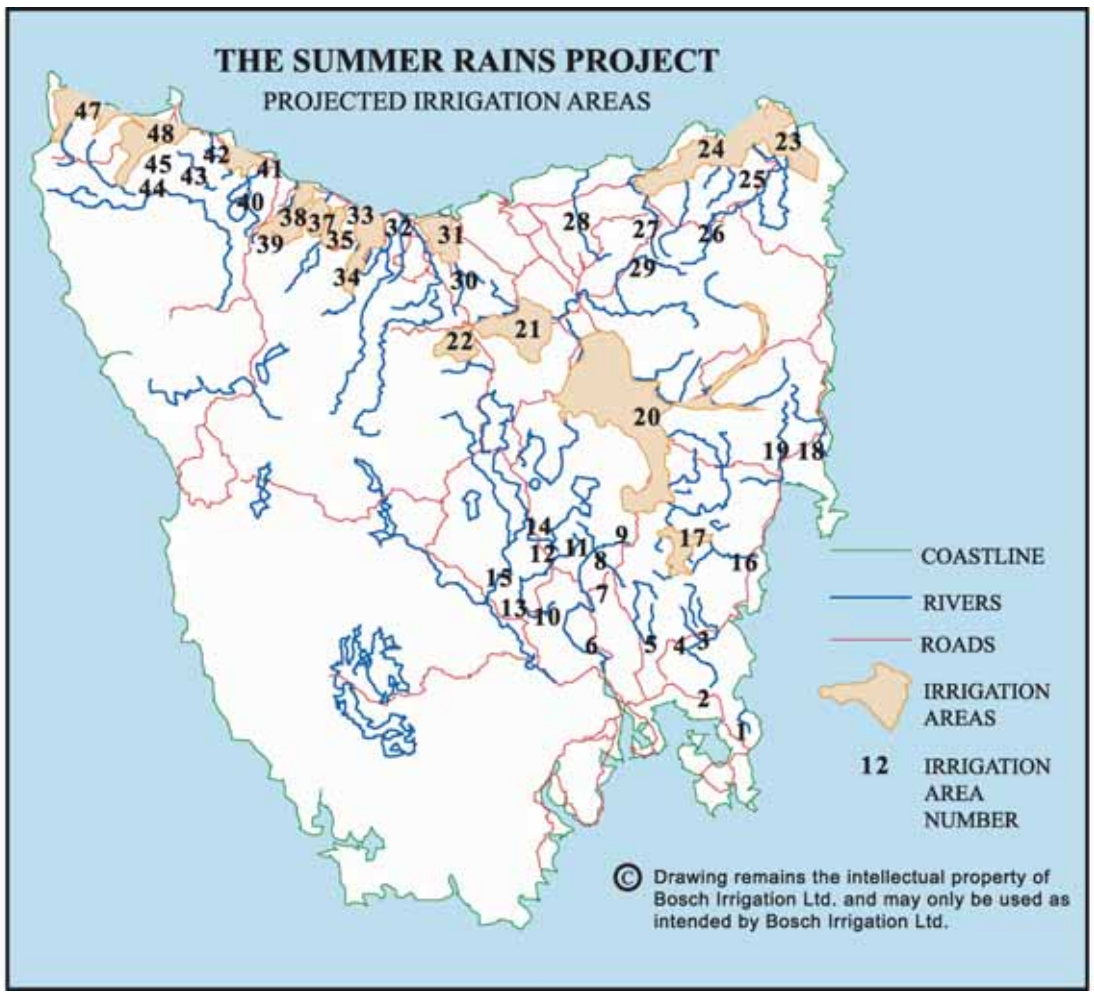
Prof. Endersbee: "There is an opportunity to greatly develop the existing Murray-Darling Basin, where they really only use effectively, something like 10% of the water that is applied to the land, deplorably low. So I've been saying, it is readily possible, to double the efficiency, which means we could double the area of land, with the same volume of water or even go further. I've just been in touch with the Chairman of the Commonwealth Scientific and Industrial Research Organisation. He's told me that the new chief of that organisation is looking at the same possibility of doubling the output of food for the same volume of water in the basin. Now, once again, that is a project that initially might cost $5 billion. The point is that the volume of output, at the present moment in the Murray-Darling basin, is about $20 billion a year, if you add crops plus all the manufacturing based on food, and food products and things like that. The agriculture in the Murray-Darling basin, plus the processing is something about $20 billion. [Prof. Endersbee has updated earlier estimates of $16 billion.] Now we could go pretty close to doing that again. In other words, we could easily add another $20 billion dollars, of output, for the same volume of water. So, if that is the potential value per annum, that means we could easily justify a capital cost, of $5 billion to start, then we go, and get on with it…. However, the private sector is unlikely to embark on the complete design and construction of entirely new irrigation systems. This would involve new diversion weirs, pumping plants, new lined channels totaling hundreds of kilometres, pipe distribution systems, and the opening up of vast new lands for irrigated agriculture…."

11. Tasmania

Like much of rural Australia, Tasmania is being rapidly depopulated, with an Australian Bureau of Statistics projection showing the state will have only half of its present population of 470,000 by mid-century. A huge 10% of people in the key age group of 18-38 have left the state for the mainland in the past decade, because Tasmania offers little or no future. Tasmania must revive the proud state-building tradition of the Hydro-Electric Commission, which, by the time "the Hydro" was gutted in the 1980s on the altar of environmentalism and economic rationalism, had built far more installed capacity in the state than the entire Snowy Mountains Scheme. In the 1970s, the Hydro projected that a planned huge hydroelectric scheme on the Gordon River, including the Franklin Dam, would provide sufficient electricity for the state until the year 2000. Due to meddling by the Hawke government, that dam was never built, and the state is indeed running short of power today.

In other uses of water, the state government released its "Water Development Plan for Tasmania" in August 2001, which includes the following projects, some of which have been long-planned: new irrigation in the Meander region by building the Meander Dam; increased irrigation in the South East; irrigation in the Clyde, Derwent and Jordan catchments by transporting water from the Great Lake/Arthurs Lake area; increased irrigation in the Circular Head Region in the North West; the Waterhouse project in the North East; the Long Marsh Dam project in the northern Midlands; increased irrigation supplies for the South Esk basin; increased urban and irrigation supplies on the East Coast; and water for irrigation from the Wesley Vale pipeline.

On a more inspiring scale, Bosch Engineering Pty. Ltd. in 1998 drafted the Summer Rains Project, which identified the possibility of storing 300,000 megalitres of water to irrigate some 60,000 hectares in 50 different projects, which would increase the state's presently irrigated 45,400 hectares of 132%! By 2001, Summer Rains Project proponents had identified over 1,000,000 megalitres of water storage, including the large-scale Waterhouse proposal in the North East with a capacity of 113,000 megalitres, which is now subject to state and federal feasibility studies, but which has no guarantee of proceeding, given the "privatised" assumptions under which it is being reviewed.



The Summer Rains Project has identified a million megalitres to irrigate major sections of Tasmania.

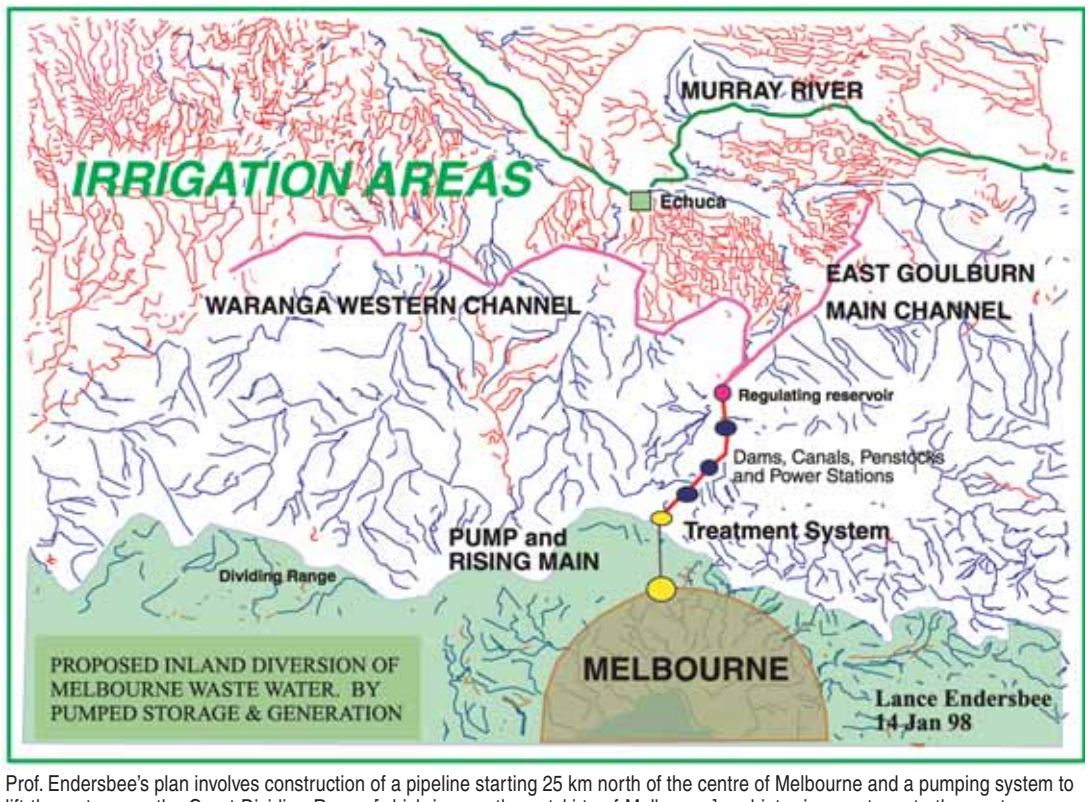
12, 13. Melbourne

Nuclear-desalinated seawater would solve Melbourne's water shortages for the indefinite future.

Some of Melbourne's treated waste and stormwater could be used either in Melbourne itself, or in Prof. Endersbee's plan to use it, as summarised in the *Sunday Herald Sun* of August 9, 1998: "A bold plan to send Melbourne's waste water inland could help prevent drought in large parts of southern Australia and pay for itself by generating power and by selling water to farmers, says a leading Australian engineer. The massive infrastructure project would make use of some of the hundreds of billions of litres of Melbourne waste water and stormwater which empties into Port Philip Bay and Bass Strait every day. A plan by emeritus professor Lance Endersbee involves construction of a pipeline starting 25 km north of the centre of Melbourne and a pumping system to lift the water over the Great Dividing Range [which is near the outskirts of Melbourne] and into river systems to the west. It would be one of the nation's largest infrastructure projects, involving the construction of massive pumping stations and hydro-electricity generating plants and could cost $2 billion."

The project is similar in concept to the proposed Clarence diversion, and uses overnight pumped storage and peak generation to keep power charges to a minimum.

Recently, Melbourne Water has proposed to pipe and re-use some of Melbourne's vast waste-water run-off to irrigate large areas west of Melbourne, from Werribee to the Yan Yean mountains.



Prof. Endersbee's plan involves construction of a pipeline starting 25 km north of the centre of Melbourne and a pumping system to lift the water over the Great Dividing Range [which is near the outskirts of Melbourne] and into river systems to the west.

The Infrastructure Road to Recovery

Great Water Projects

14. Northwest Victoria

Two crucial projects for north west Victoria were summarised in *The Age*:

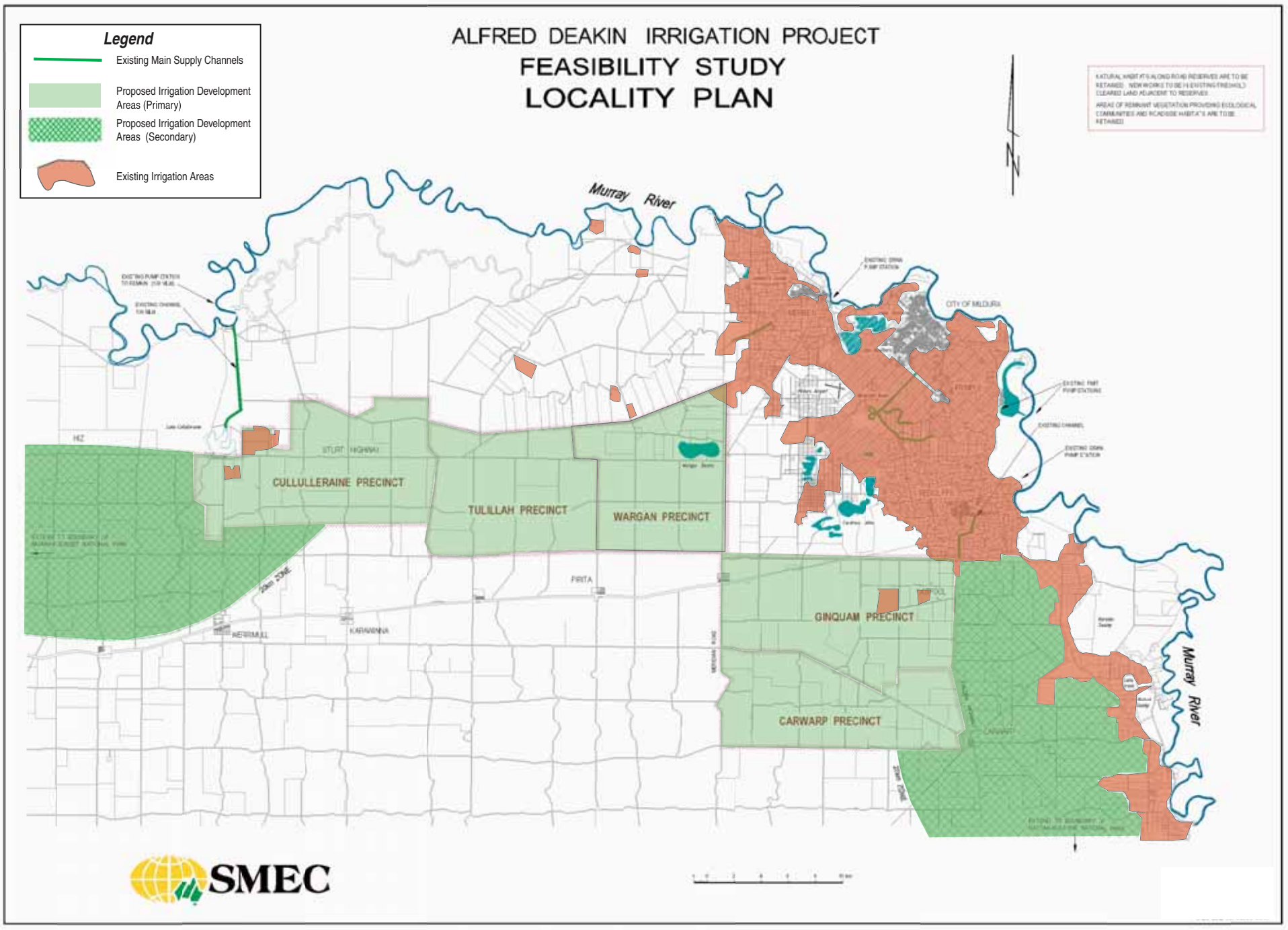
The Mallee region

22 April 1998, "Irrigation to boost exports": "A Victorian Government proposal to boost agricultural exports by doubling the size of the irrigation system in the state's north-west has received the backing of a key national water body. The chief executive of the Murray Darling Basin Commission, Mr. Don Blackmore, praised the scheme which would add up to 44,000 hectares to the Sunraysia irrigation area and increase exports by $300 million. The plan has already been enthusiastically greeted by Mildura Rural City Council…. The proposal to double the Sunraysia irrigation area was outlined by the deputy premier and Minister for Agriculture, Mr. Pat McNamara, at the National Party state conference in Stawell earlier this month. McNamara commissioned a detailed feasibility study by consultants Sinclair Knight Mertz, which showed it would be possible to expand irrigation around Mildura and Robinvale by up to 44,000 hectares…. Mildura Mayor Eddie Warhurst said the project would fulfill the dream of the pioneers of the Mildura area, and gave the local community the opportunity to plan 50 years ahead."

Subsequent feasibility studies in 2001 recommended a much smaller project, to be incrementally increased over the years—an utterly inadequate concept based upon a privatised approach to the whole scheme.

The Wimmera region

23 July 2001, "Push for state to back water plan": "The Victorian Government is under pressure to commit to a multi-million dollar plan to convert 16,000 km of the Wimmera-Mallee's open channel irrigation system to pipes to prevent water wastage. The State Opposition, the National Party, independent MPs, the Victorian Farmers Federation and green groups have called on the government to endorse Wimmera Mallee Water's plan, which would save 83,000 megalitres a year. Wimmera Mallee Water executives briefed Environment Minister Sherryl Garbutt on the $300 million project last week. Opposition leader Dennis Napthine said the government should back the project, which he said was one of the most important in Australia…. National Party deputy leader Barry Steggall said the project was first class. He called on the government to conduct a feasibility study with a view to financing works on the Wimmera-Mallee's channels. Mr. Steggall said the project would be one of the biggest infrastructure works in Australia, taking between five and 10 years. 'This would deliver absolutely huge gains to our society'….VFF water resources chairman Doug Chant said piping Wimmera-Mallee's 100 year old channels was of vital importance to the state's farmers."



With the Alfred Deakin irrigation project, huge new irrigated areas (light and dark green) could be opened up around Mildura. Existing irrigators in the area (as opposed to big agribusiness) should be given the first options on acreage in the Deakin project, together with the necessary low-interest credit for expansion.

15. Adelaide

Like those of Melbourne and Perth, Adelaide's chronic water problems could be easily solved through nuclear desalination.

16. Finke River

In addition to his "Bradfield Scheme", Dr. J.J.C. Bradfield also proposed a Central Australia scheme, based upon a series of dams at gaps in the McDonnell-Musgrave Ranges, to store the flood waters of the Finke and its tributaries, the channels of which flow towards Lake Eyre. He envisaged an irrigation project of 500 square miles, just south of Alice Springs.

17. Esperance-Kalgoorlie Pipeline

United Utilities Australia has proposed to desalinate seawater off Esperance and pipe it to Kalgoorlie-Boulder, to solve the region's water shortage, a proposal most effectively done by nuclear desalination. Additionally, in May 2000 Anaconda Nickel announced the discovery of huge groundwater reserves in the Officer Basin 400 km north of Kalgoorlie. Covering around 260,000 square kilometres, Western Australia's Waters and Rivers Commission estimated the basin's storage to be over seven million gigalitres of groundwater of variable quality, with only 14 gigalitres estimated as "renewable". Other experts estimate that none of the basin's water is renewable, so that, even with judicious use, nuclear desalination will be needed at some point.

18. Perth/Wheat Belt

In the short term, if water were drawn for Kalgoorlie-Boulder from the Officer Basin, supplemented by desalinated water pumped from Esperance, this would enable the water now pumped to Kalgoorlie through the Mundaring-Kalgoorlie pipeline to stay in the Perth area. Ultimately, Perth, like Kalgoorlie, will have to rely on nuclear desalination.

Subscribe to the Citizens Electoral Council's

Australian Alert Service

A weekly newsletter to inform you of up to the minute breaking international and Australian strategic issues, campaigning and political organising, cultural ideas and much more.

50 editions $275.00

25 editions $165.00

12 editions $85.00 (GST included)

Phone: 1-800-636-432

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Conquering Our Salinity Problem

The great water projects proposed above, will inevitably raise the question, "What about the salinity?" If one were to listen to the greenies, or to much of the mass media, one would think that the problem were mainly caused by farmers out there drowning every field in sight. However, of the two kinds of salinity, 1) dryland and 2) wetland or irrigation salinity, the latter comprises only 152,000 hectares, versus 2,180,000 hectares for dryland salinity, according to even government sources.[1] Dryland salinity results from excess water draining into an underlying water table with the resultant rise of the water table bringing salt with it, while irrigation salinity is caused by over-irrigation of farmland (as in flood irrigation), inefficient water use, poor drainage, seepage from irrigation channels, etc., all of which also raise the water table. According to one CSIRO estimate, rising salinity levels are estimated to cost Australia over $600 million per year in lost production levels alone, not to mention the hundreds of millions of dollars in damage to roads, buildings, and other infrastructure.[2] Putting the greenie/media hype to one side, it is clear that Australia does have a significant salinity problem, which it must seriously address.

There are two approaches one could take to this problem. The first, preferred by Prince Philip's greenies at the Australian Conservation Foundation, its allies in the National Farmers Federation, and elements of Federal and State governments, including some so-called "scientists" at CSIRO (though not others), is to use the salinity problem as an excuse to do what they want to do anyway: shut down or radically cut back Australia's rural sector.[3] The second approach—to actually solve the problem—befits the dignity and creativity of human beings, and is coherent with LaRouche's discoveries in physical economy and with Vernadsky's discovery of the concept of the "biosphere". In the second approach, the salinity problem is recognised for what it is: a large-scale land-management problem, which can be solved by re-design, re-building, and changed land-managemnt practices, together with the application of new technologies. This must be tackled on a national level, with the appropriation mobilisation of manpower and resources.

Typical of the latter outlook is Prof. Lance Endersbee's proposal to solve the salinity problem in Australia's agricultural heartland, the Murray-Darling Basin, which produces over $16 billion in agricultural products per annum. As he recently put it:

"The other problem is wetland salinity in the lower parts of the irrigation areas.

"The Murray-Darling Basin comprises a deep basin of saltwater sediments. The salt is already there and has been for millennia—the salt is a geological condition. We get salinity in the surface soils if we irrigate in such a way that we flood the groundwater. The saline waters then rise. Some of those areas of low-lying land should never have been irrigated anyway, and may now have to be taken out of irrigation. The present irrigation systems were designed virtually without regard to groundwater. As a consequence, the use of irrigation water is quite inefficient. The overall efficiency of application of water in irrigation areas is no more than 10%.

"When the settlers first went into the Murray-Darling Basin, the groundwater was much lower and all the surface waters were nice fresh waters. By bringing in irrigation and raising the groundwater, salt water has been brought to the surface and destroyed these fertile soils, particularly the low-lying parts in the Murray-Darling Basin. Now my approach to all of this, is that it is far better to think about redesigning the entire system. If we redesign the entire system, we can double the area of irrigation—easily double the area under irrigation for the same volume of water. The overall system would be much better. We could irrigate some of the higher lands, design new irrigation systems and canals and so on. The present system of irrigation uses open channels and open ditches in the farms—all of that is simply feeding water into the groundwater. In parts like the Mallee, in the porous red soils, the irrigation channels and ditches just virtually pour all the water into the ground. Overall, there is such a colossal loss of water, that we have no alternative other than to plan and redesign and redevelop the entire irrigation system."

Such a new irrigation system as Prof. Endersbee calls for, would feature drip-irrigation or similar systems which provide only as much water as the crops can actually use. Such concepts would be built into all the great projects the CEC has proposed above, right from the outset.

To tackle the task of Murray-Darling salinity, Prof. Endersbee has proposed to assemble a national team of top level engineers and scientists to evaluate the Basin as a whole, from a national and not merely a state standpoint, and to develop a strategic, top-down approach. With the appropriate funding level (at a "ball park" estimate of $5 billion for the project as a whole), such an approach would generate a flow of research and scientific studies which could rapidly lead to an explosion of wealth-creation in addition to solving the salinity problem. And, given that an initial investment of $5 billion would double the Murray-Darling agricultural output to over $30 billion per annum, while largely solving the salinity question, it is obviously "cost-effective". In fact, it is far more so than the "market-oriented" proposals of the states and Federal government involving $1.4 billion over seven years; or the multi-tens of billions of dollars proposal by the Federal parliament's environment and heritage committee under National Party MP Ian Causley, to tax every Australian at least 1% of their annual income; or the ACF-NFF plan to spend $65 billion over ten years for who-knows-what.

Another exciting, complementary approach to that of Prof. Endersbee, is the proposal by scientists in CSIRO's Minerals Division, as reported in a recent CSIRO release:

Australia's salinity crisis can be turned to advantage, helping to create regional industries, jobs and an improved environment, a new study by the national science agency, CSIRO, says.

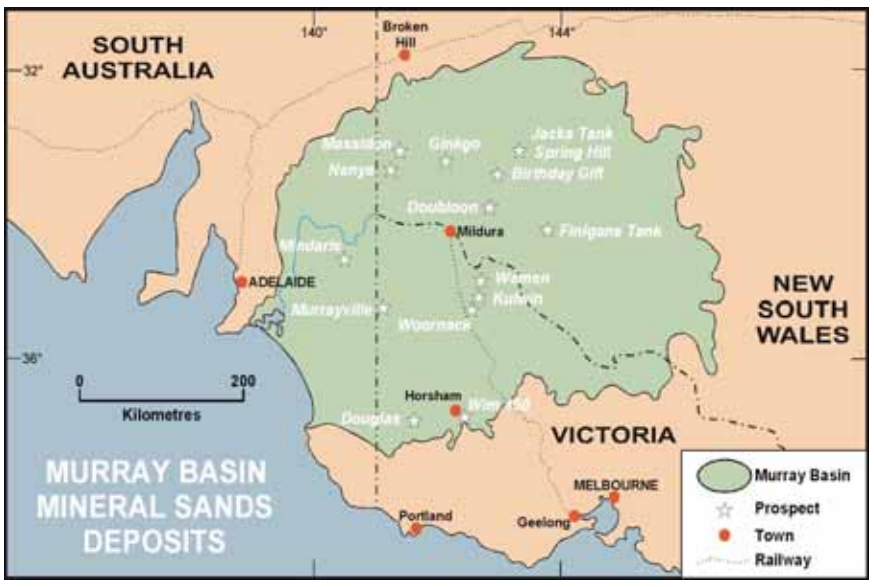
An opportunity exists to tackle salinity by extracting valuable minerals and chemicals for industry from saline groundwaters and so reduce their impact on the landscape and on agriculture, according to Dr. Hal Aral of CSIRO Minerals.

"Substances dissolved in our salty groundwaters can be used in the making of fertilisers, light metals, plastics, industrial chemicals, oil refining, pesticides, glass, fibre glass, ceramics, bleach, soaps, detergents, dyes, inks, sewage treatment, sugar refining, alcohol brewing—the list is almost endless," says Dr. Aral.

Dr. Aral and colleague Dr. Graham Sparrow, propose the creation of new industries to extract valuable raw materials from the groundwater, using natural evaporation and solar energy.

For instance, ordinary salt can be crystallised out of groundwater by evaporation, then used to make chlorine, hydrochloric acid, sodium hydroxide, sodium metal, soda ash, sodium bicarbonate and table salt. Among these are substances which can be used in the processing of titanium and zirconia.

Once the salt is removed the water, known as "bittern", still contains magnesium, potassium, sulphates, boron, strontium, bromine, iodine and other useful compounds. These range from epsom salts, worth $400-800 a tonne, to fertiliser ingredients, cement ingredients and many other chemicals more valuable still. Bittern can be directly used in the mining industry as a dust suppressant.



CSIRO scientists have proposed to extract salt and other valuable raw materials from groundwater, creating whole new industries while tackling the salinity question. Mining and processing the mineral sands of the lower Murray Basin, for instance, which are worth billions, could also make major inroads into the salinity problem. Source: CSIRO

The Aral plan envisions the widespread recovery of salts from saline evaporation ponds. A network of solar-powered desalination plants and energy-storage ponds across the Murray-Darling Basin can then convert highly saline waters to fresh water for local communities and value-added chemicals for industry.…

The plan also links into the development of major titanium and mineral sands industries in the Basin, based on the existing $13 billion resource and using value-added salts in the processing. Titanium, in turn, can be used to make corrosion-resistant parts for desalination plants.

The core of the plan envisages the production of a host of new industrial products and so lowering the environmental threat posed by salt.

"CSIRO considers salinity can been seen as a resource and an asset, as well as a liability. We have a lot of information about the richness and extent of this resource. We feel it is time to have this vision widely discussed and debated," says Dr. Aral.

"The Murray Darling Basin could, potentially, become the centre of an Australian sustainable chemical industry—drawing on a vast natural resource, and integrating production so that one industry uses the waste products of another.

"We also believe the large-scale removal of salt from the Basin will have a beneficial impact on salinity, as well as generating wealth needed to combat landscape salinity, making it less of a drain on the national coffers.

"Investment in these new industries will bring new businesses and skills to inland Australia, nurture local communities, increase access to better services for residents, and generate more secure long-term employment."

Dr. Sparrow estimates that an early stage industry adding value to Murray-Darling salt could be worth $200 million a year, as well as helping to lower the threat to the heartland's water quality and farming industries.

As noted elsewhere in this report, the use of the HTGR reactor for large-scale desalination would be inherently much more efficient than the solar-energy proposal of the CSIRO scientists, but their overall approach is enormously exciting. And the prospect of creating a world-leading titanium industry in the process, was elaborated by Dr. Rod Hill, chief of CSIRO's Minerals Division, in an article, "Dawn of the Titanium Age", in the *Australian Financial Review* of October 2, 2001. Dr. Hill is confident that Australia can halve the current world cost of producing titanium from the mineral sands in the Basin, while simultaneously solving much of the salinity problem:

Australia's heartland, the lower Murray basin, may become the site of literally a titanic mineral development. The Basin's ancient sediments are yielding mineral sands already worth $13 billion, and the value is rising steadily.

The story begins with the Moravian Gulf, a huge marine intrusion the size of France which inundated the lower Murray-Darling Basin from Adelaide to Cobram and the Grampians to Broken Hill, six million years ago. Here wave action sorted and deposited the mineral-laden sands in serried rows along ancient beach-lines. The receding waters left a series of fossil strands, laden with ilmenite, rutile, monazite and xenotime eroded from the bedrock. Among these deposits, on the lower slopes of the Grampians south of Horsham, are some of the richest mineral sands on earth.

Collectively, these deposits equate with finding a world-class orebody in raw material value. But, to Hill, the true opportunity lies in Australia being first to develop the low-cost process that will make titanium a 'household' metal, like aluminium or steel.

"The mineral sands of the Murray Basin are a treasure as they are—but if we can take them down the whole processing chain to titanium, they could be worth seventy times as much," he says.

For over a generation the Mallee, Wimmera and Riverland regions and surrounding pastoral and irrigation country have staggered under the boom-bust cycles of agriculture, and stared down the barrel at the looming menace of salinity and landscape decline. In Rod Hill's vision, mineral sands offer an antidote not just to economic and community woes, but to environmental ones as well. The new industry can be used, not just to pay for but actually to repair, the damaged landscape….

Hill's view is that Australia is perfectly placed to develop a global-scale industry in industrial-grade titanium, using new metal production and fabrication processes that can deliver metal mill products at around $US5 a pound, compared with the present figure of $US10 a pound. If that still sounds dear compared with steel, it's because it overlooks the essential qualities of titanium. It's 43 per cent lighter than steel, stronger, more flexible, more corrosion-resistant. What really counts is the volume of metal you use for a given task—not its weight.

The big market opportunities for industrial-grade titanium, Hill says, are in major global industries

Salt harvesting at Port Hedland in Western Australia. With the development of precious-mineral extraction technologies for the saline ground water of the Murray-Darling Basin, these salt harvesting operations could yield more minerals than just Sodium Chloride. (AAP/Muchenberg)

The Infrastructure Road to Recovery

Conquering Salinity

such as transport, where it can provide superior structural components for cars and trucks, construction, where it can furnish girders, frames, supports and even cladding of greater durability, beauty and toughness, chemical processing and desalination, where its corrosion-resistance is a major plus, and marine construction.

One of the advantages of mineral sands production is that those environmental blues of the 70s and 80s have made it one of the cleanest, greenest, resource industries in business today. The art of extracting the small proportion of valuable minerals from these sands and then restoring entire living landscapes of farmland, forest or native vegetation is so mature it is fast becoming one of Australia's proudest exports in its own right.

Environmental issues particular to the Murray basin that may arise are that the mineral sand containing formation is also an aquifer for the saline waters, and that radioactive thorium is associated with some of the deposits. Solutions will need to be developed for both.

But there is a breathtaking possibility: mining and processing the mineral sands of the lower Murray Basin could make inroads into the salinity problem which now threatens vast areas of the catchment, making money and creating jobs into the bargain.

The salty groundwaters used in mineral extraction can themselves be "mined" for everything from common salt to low-, medium- and high-value minerals and chemicals —most of which Australia currently imports at high cost.

The salt extracted from saline water can be treated to produce byproducts used to extract minerals. One is sodium hydroxide, which is used in the production of zirconia, zirconium metal and partially stabilised zirconia (PSZ), the super-hard ceramic now used in everything from false teeth to engine parts. A second is hydrogen chloride, used in the production of titanium dioxide, on the pathway to making titanium metal.

The salt which is poisoning Australia's landscape may thus become a key condiment in the recipe for a new advanced materials industry, Hill argues. That's not all. Salty groundwaters also contain a host of other useful dissolved minerals and chemicals, the so-called "Bittern fraction". These can be extracted by evaporation for making cements, fertilisers, dust-suppressants and simple or sophisticated industrial chemicals.

This way, a mineral sands industry could help in the fight against salinity not only by creating the economic wherewithal—but also by actively exploiting the enemy itself, Hill asserts….

The benefits are not confined to southeastern Australia. Opportunities also exist in southwest WA, along some parts of the eastern seaboard and in central Australia in the Musgrave ranges on the WA/NT border where major new ilmenite and nickel deposits have been found.

The combination of these products and processes can establish Australia as world light metals leader, adding a third leg to the remarkable developments in aluminium and magnesium, Rod Hill believes.[4]

In addition to Prof. Endersbee's proposal for the Murray-Darling Basin and the CSIRO proposal just cited, there is an interesting range of other research underway on salinity, including the use of crops specially adapted to salinity, and the strategic use of perennial plants to counter salinity and waterlogging. These and other research projects underway may well prove complementary to such larger, top-down approaches as the Endersbee/CSIRO proposals.

Footnotes

1. National Airborne Geophysics Project National Report as seen at the National Dryland Salinity Program webpage at: http://www.ndsp.gov.au/NAGP/nreport/nrchap1.pdf

2. The $600 million estimate is from a CSIRO media release, July 3, 2000. http://www.pi.csiro.au/Media/MediaReleases/2000/MR03-07-00.htm

3. On the Prince Philip-founded Australian Conservation Foundation, see footnote 10 of the Introduction to this feature. Prince Philip's personal hatred of great water projects was exemplified in his flying to Tasmania in the early 1980s in an attempt to stop the construction of the Franklin Dam, as well as in ACF honcho Tim Fischer's threat that ACF activists were prepared to "die in a ditch" to stop a dam on the Fitzroy River in the Kimberleys.

Rio Tinto, whose dominant shareholder is Queen Elizabeth II, played a key role in both National Competition Policy and in founding the ACF, the latter through RTZ's longtime chairman Sir Maurice Mawby, a founder of the ACF and one of its chief early fundraisers. For instance, the 1992 Hilmer Commission, which initiated the whole "national competition" scam had three members, two of which, chairman Fred Hilmer and Mark Rayner, had been longtime top figures at Rio Tinto. The company is also a major funder of such hotbeds of Mont Pelerin economic rationalism as the CIS, IPA, Tasman Institute, etc. Together with "Aboriginal land rights"—another Crown/Rio Tinto project—the purpose of such ideological fronts is to splinter Australia, to stop its further development as a sovereign nation-state.

So, it is no surprise that the ACF, with its Rio Tinto heritage, has repeatedly endorsed National Competition Policy as a way to stop any significant water projects. Nor, given their common oligarchical sponsorship, that the "leftwing" ACF and the "rightwing" NFF would prepare a joint report, "Repairing the Country," which calls for spending $65 billion over ten years to "repair environmental damage", which would be more of a huge tax on the economy, than anything else. (On the Crown's role in setting up "land rights", see "Aboriginal 'land rights': Prince Philip's racist plot to splinter Australia", CEC, 1997, 48 pp.)

Whereas some CSIRO scientists have proposed exciting, and even highly profitable plans to solve the salinity crisis (see text), CSIRO Land and Water Division head John Williams has proposed to solve the problem by simply wiping out most of Australia's farmers. For example, on ABC's *7:30 Report* on June 14, 1999, presenter Justin Murphy, who claimed that 15 billion trees had been wiped out since settlement, asked Williams: "Does this mean that we're growing the wrong things in the wrong place, in the wrong way?" Williams replied, "There has to be a radical change. We're talking about afforestation of large elements of the landscape." Murphy: "With the farmers either leaving or being helped to do something else?" Williams: "Leaving or helped to do something else, or the forestry enterprise itself. That has enormous social implications."

Williams' enthusiasm for replacing farmers with billions of trees, would seem to be shared by Australia's largest wine producer, Southcorp, which in July 2000 announced it was financing ACF activities on salinity. Southcorp managing director and CEO Graham Kraehe called for planting "40 billion trees" to solve the problem. Southcorp has also allied itself with the economic rationalist fanatics, the NFF.

Besides wiping out most farmers, planting billions of trees to deal with salinity is a dubious business in the first place, particularly when one considers the overwhelming evidence that Australia at the time of European settlement was characterised by vast plains of rich grassland with minimal tree cover, and that the trees were only planted later. See the historical accounts cited by Dr. Christine Jones (as well as her own thought-provoking contributions to the salinity debate, which run directly contrary to the prevailing dogma on the matter), in her articles in the 5-part series "The Great Salinity Debate" at http://landholderstripod.com/index.htm.

4. For the full text, see http://www.csiro.au/html/featureArticle/TitaniumAge.htm

How To Capitalize A Recovery

From Page 4

the misguided President George W. Bush, Jr., for example, would be rightly considered as recklessness verging on insanity. …

Presently, every economy in North America and Europe is operating at physical-economic levels far below breakeven. Our private banking systems are generally deeply bankrupt. Nothing but the generation of appropriately applied long-term public *credit, could enable us to avert a great and global financial-economic catastrophe.* Otherwise, the conditions created since the October 1987 U.S. stock-market crash, through the accelerated escalation in various uses of the "John Law" tradition of sheer gambling debts known as so-called financial derivatives, when combined with the effects of increasing trends into globalisation, have created a condition of ripeness for a global chain-reaction collapse comparable in effects to Europe's mid-Fourteenth-Century New Dark Age.

Thus, we must treat current notions of a "balanced Federal Budget" as either the work of unbalanced minds, or as a calculated measure taken by enemies who would wish to induce us to destroy ourselves by such means.

It is time to discontinue monetarist dogmas such as the cult-belief in so-called "free trade" and "globalisation." …

Principles vs. "Things"

We must propose specific choices for actions; but, we must also recognise that the problems of this nation will not be fixed by "things"; what is needed are things which express deep-going changes in principles of policy-shaping. It is those changes in principles, essentially changes from a "post-industrial, services economy"-orientation, back to an infrastructure-based, agro-industrial economy, changes which get the labor-force out of low-paid services employment, in skilled, productive and related employment in capital-intensive modes of agricultural and industrial output, or in development and maintenance of the basic economic infrastructure which should represent about half of the typical total annual output of the economy for generations yet to come.

It must be emphasised, that the principle of investment in production and infrastructure, should not be as much investment in things, as investment in the margins of gains in productivity achieved through science-driven approaches to both production and product-design. Essentially, investment should be directed to introduction and application of principles, rather than merely the production of things….

For Example: Retooling the Auto Industry

The problem to be considered in reorganising that industry to avoid this loss of machine-tool-design capability [see pp. 42-43], is the fact that de facto national policy has created a greatly excessive dependency on automobile manufacturing as such, relative to urgent other needs in national transportation capability such as the railway system. In the meantime, the nation has great needs for the manufacture of other things, such as mass-transport systems, power-generation capacity, and repair of inland waterways, for many of which the capacity represented by today's auto industry would provide the obvious remedy. Much of these options for new streams of manufactured output lies within the domain of public infrastructure of either the Federal, State, or Local government. Contracts issued in support of the production of these elements of public infrastructure, would be the most efficient way of using long-term capital investment generated chiefly by the Federal government, to stimulate the recovery and modernisation of presently imperilled sectors of the privately operated sectors of the economy. …

We must reverse these trends of the recent thirty-odd years' shift from a global fixed-exchange-rate system based on capital-intensive productive investment, to a floating-exchange-rate system of emphasis on cheap labor modes available in regions of the world which have the relatively most intense poverty-rates, and the lowest level of development per capita and per square kilometre.

Certain ABCs of successful modern economy must be stressed at this point in the report.

True Profit – And Immortality

The ultimate source of an actually net profit from investment, is scientific, technological progress, as complemented by progress in the influence of Classical modes of artistic composition. …

The advantage of the Classical, pre-Peloponnesian War Greek culture associated with Athens and the Pythagoreans, was based on conceptions of science and artistic composition associated with the ancient Greek use of the term *dynamis*, the modern Leibnizian notion of *power*, as the expression of discoveries of universal physical principle which increased mankind's power, per capita, and per square kilometre over raw nature. Since both forms of expression, physical science and Classical artistic principles, are expressions of the same principle applied to a different composition of media, it is this principle, most famously associated in ancient times with the Pythagoreans and Plato, which has paradigmatic significance as the conceptual form of the impulse for human progress.

It is this connection among successive generations, which unites those generations, as if in immortality, in the transmission of the contributions to progress from earlier to subsequent generations. This characteristic of societies committed to progress is the most typical practical intimation of immortality of the human personality. …

Machine tool operator at a GM plant in Ohio.

In reality, no one has shown the possibility for a state of affairs in which human beings might become immortal in their incarnate form. Rather, unlike the beasts, we can become spiritually immortal, at least conditionally, as no individual member of a species of animal could. The difference between man and beast on this account, is located in the domain of those qualities of ideas which are typified by the individual mind's generation of the discovery of a universal physical principle, or of a work of strictly Classical artistic composition which perpetuates the existence of the identity of the composer as a living force within society for centuries, even millennia to follow. Indeed, as the efficiency of discovered and employed universal physical principles attests, that aspect of us which is immortal, as the uniquely human discovery of universal physical principles attests to this, is within the Creator's universe, not in some place outside, or "underneath."…

Among rather ordinary, sane people, we have the case of the grandfather who points to some physical work, while saying to the child, "I was part of the team which built that." It is in a sense of the continued, historical existence of living and deceased human beings, that we have a more or less ready access to what has been labelled "an intimation of immortality." By looking backward, thus, and then looking forward to the future where we shall be interred, an appropriately efficient prescience of human individual immortality becomes accessible to our knowledge.

Hence, it is such great scientific discoverers and great Classical artists, who typify the larger category of persons who not only have an intimation of human individual immortality, but an efficient one, one which is of immediate relevance to the knowing individual's practice today….

It is that specific kind of sense of personal immortality, beyond the reach of death of the animal body we inhabit, which is the foundation of all true human morality. It is that sense of one's self, of one's own efficient existence in the universe beyond the limits of our individual life and death, which is the only foundation of true morality, the only foundation of that true sense of citizenship which we must now awaken in our people, if we are to overcome the terrible threats which recent folly has bestowed upon our own and other nations today.

It is only as we grasp our personal responsibility for what happens to mankind in generations to come after us, that we will have located our higher sense of personal identity. Here lies what Gottfried Leibniz defined as "the pursuit of happiness," the notion of the general welfare of present and future generations, and the realisation of the good contributed by those who came before us, which is the central conception of our 1776 Declaration of Independence.

Our hope as a people today, lies in the commitment to those great and mighty works, which make not only this nation, not merely this planet, but the immediately surrounding universe, a better place for generations yet to come.

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Fossil Water: *A Voyage of Discovery*

This page through to page 25 are excerpted from Professor Lance Endersbee's explosive new book (pictured right) on the exhaustion of the world's finite reserves of fossil water.

It is appropriate for me to explain how I came to write this book.

In 1999 I attended a meeting of the Federal Inland Development Organisation in Charleville, in Western Queensland, in Australia.

I presented a paper on my proposals for new national infrastructure for Australia, and related prospects for national development. A paper which followed mine was about the Great Artesian Basin of Australia. This Basin is the largest artesian basin in the world.

We were told that when the artesian waters were discovered in the 1880's, water gushed from the early bores as great fountains, often rising to 30 metres or more above the ground. In a few years, many water bores were drilled throughout the Basin, some to depths greater than 1000 metres.

The total yield of all waters from the basin reached a maximum in 1917. The total yield has declined ever since. Many bores have run dry, and many more new bores have been drilled. Most bores today are running free into open drains to provide water for cattle. Well over 98 percent of the water is lost to seepage and evaporation.

The presentation at the meeting included some diagrams of the Basin which had been prepared by the Queensland Government to show how the artesian basin works, and how, they believed, the underground waters are recharged from surface rainfall. The charts included a cross-section of the strata in the Basin, and a plan showing the direction of flow of water through the strata from the presumed intake areas of exposed sediments on the eastern edge of the Basin.

I could see that this official explanation of the operation of the Basin showed conditions which were, in fact, physically impossible. But what I found most disturbing was the fact that the professionals involved believed it all. It was an act of faith on their part, and they defended their position by reference to world practice and world authority.

I subsequently found that the same pattern of decline of groundwater yields was occurring in many countries around the world. All of the world's wells are running dry. Well over one half of the peoples of the world depend on groundwater for part or all of their water supply, in India, China, Bangladesh, Pakistan, the Middle East, North Africa, Europe, America and Mexico.

Sadly, all of the world's groundwater specialists share the same convictions as their Queensland colleagues regarding recharge of deep groundwater from surface rainfall. All of the textbooks on groundwater hydrology are based on this common assumption. Similarly, all of the many recent books on the environment do not make any distinction at all between surface waters and groundwater, despite the serious problems of decline of groundwater supplies.

In reviewing many recent and historical books and papers on groundwater, I concluded that there had been more than a century of error. But this led to some serious and profound questions. How was it possible for so many professional geologists and engineers around the world to remain in error for so long, and in circumstances where much of the evidence over the years had contradicted their assumptions? Furthermore, why was it that there had been no debate whatever on the subject? A major factor must have been the separation and increasing specialisation of the disciplines, which limits exposure and debate. But a significant cause was simply the enormous power of the fashionable view, and most disturbingly, the power of the leaders of the scientific fashion to suppress debate. It is called peer review.

I embarked on my own voyage of discovery. It soon became evident that the same misconceptions about the origin of artesian waters and thermal springs applied to the origin of petroleum and natural gas. And furthermore, there was equally strong suppression of ideas and learned debate about that subject. And then I noted that the same errors of understanding seemed to apply to the matter of climate change.

This book is a report of my enquiries, written for the general reader and the professions involved, and also to help young scientists and engineers appreciate the exciting history of ideas in science. It has been written as a scientific detective story, where each clue is part of the mystery. All the clues combine to reveal a new picture of our wonderful world.

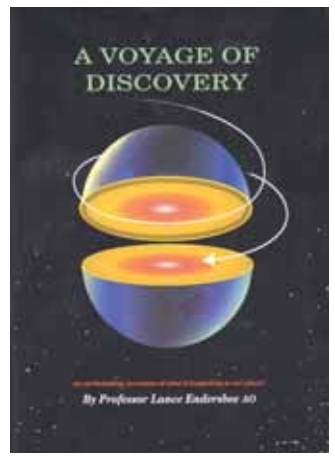
During my voyage I discovered some outstanding scholars of the past. Their scientific curiosity was inspirational. I came to admire the breadth and intellectual rigor of their work. But on certain critical issues they did not inspire their own colleagues, because their theories were ahead of their time. Some of their most important ideas were criticized, even ridiculed, and subsequently ignored. I think these ideas are still valid, and I describe them in the book.

In all science, the pressures to conform can be overwhelming to the dissident, while remaining quite unnoticed by all those in the mainstream of science and professional practice.

I believe the scholars I discuss in this book were intellectual giants. They followed their scientific enquiries wherever they led, and resisted intellectual intimidation. Incredibly, they are still showing the way.

I leave it to my readers to make their own assessment.

—Lance Endersbee



Professor Lance Endersbee's fascinating book is available from the Monash University Bookshop. Tel. 03 9905 3111 or http://www.bookshop.monash.edu.au

The world's water wells are drying up

Around the world, groundwater from deep wells is the main source of drinking water for over three billion people. In addition, a large proportion of the food supply in many poor countries is based on irrigation from wells. However, almost all of the world's wells have falling water levels, and declining yield, and already, many have run dry.

These deep water wells cannot be replenished from rainfall. In the book it is shown that the source of the groundwater that supports these three billion people lies in the interior of the earth. There is a continuing release of water from the interior towards the surface of the earth, and we see that in the steam of volcanoes, and the water gushing from deep ocean vents. Over geological time, some of the rising water was trapped in the path towards the surface of the earth, and accumulated as underground reservoirs of water.

There are resources of groundwater underlying most of the flat lands of the world. From early times, men dug wells by hand, and lifted water in buckets for their needs. Many civilisations were established where groundwater was available at oases or in shallow wells. The ancient Romans built aqueducts to bring springs of groundwater to their many cities around the shores of the Mediterranean. Vitruvius, a Roman engineer and architect, describes in his book, written in the first century BC, the methods the Romans used to find and test underground sources of water. He tells of the adverse properties of some spring waters. There are cautionary tales about a little well at Susa, the capital of Persia, where those who drink of the water lose their teeth, and a well in the Alps where those who drink the water immediately fall lifeless. There are also wells with healing properties, such as the acid springs in Campania that have the power to break up stones in the bladder. Vitruvius advises on the tests for good water: the first test is to look at the physique of the people who dwell in the vicinity!

Today, in the United States, groundwater provides drinking water for over one half of the population. The same applies in much of Europe, India, China, and many other countries.

The pattern of dependence on groundwater that had continued for centuries began to change from about 1950. The population of the world was continuing to increase, there was growth of cities and expansion of city water supplies based on the use of groundwater, and in rural areas there was the introduction of mechanical pumps and commercial agriculture based on groundwater. As a consequence there was a simultaneous and rapid growth in the use of groundwater all around the world. In countries like India and China, in North Africa and the Middle East, the use of shallow hand-dug wells, and hand lifting of water, was replaced by drilled bores and mechanical pumps. The use of fertilisers enabled a very great increase in yield, but that required much more water. There was a vast increase in the areas under irrigation from groundwater.

There was a rush to exploit the limited groundwater resources.

The groundwater was freely available at the cost of a bore and a pump. There was competition to use more and more ground water. Water tables dropped, and farmers drilled deeper bores, and installed more powerful pumps. Almost simultaneously, all around the world, the wells began to run dry, and governments were quite unable to control the extraction of groundwater, or protect the resources.

Most governments did not know where the wells were, or the depth of the wells. Governments did not record water levels, but were certainly informed when farmers complained when their wells ran dry. Farmers, governments, and their professional advisors, had all believed that the wells would flow forever.

The groundwater rush was like a gold rush; it was a great uncontrolled bonanza. The International Water Management Institute has estimated that the total global withdrawal of groundwater is now about 1000 cubic kilometres each year, but it is quite unsustainable. This great global rush to exploit available groundwater resources in our time is a one-off extraction of a limited natural resource.

Groundwater has been, and in many areas still continues to be, the best and only readily available source of clean drinking water. This is because the groundwater may be just directly below the place of use, for agriculture, cities, factories and mines. In most cases the groundwater is available at no cost, except for the cost of the well, and the pump.

The groundwater in these underground reservoirs has accumulated in geological time. The resource can be considered as a great reservoir of water that has been captured in open joints and fissures in the rock, and in pores in porous rocks. In the natural state, prior to intervention to exploit the resource, the underground reservoir was filled to the brim, and overflowed naturally at springs, and into lakes and streams.

Prior to 1950, most of the world's groundwater basins were in a condition close to a state where the rate of use of the groundwater was compatible with the sustainability of the resource. After over half a century of massive exploitation, far greater than any possible rate of recovery, most of the groundwater basins of the world are now close to the limits of the resource.

The consequences are now evident in many countries. In essence, the world has been exploiting the reserve bank of groundwater at a rate far greater than the rate of natural replacement, and the water bank is becoming insolvent. This excess use of water is a deficit that can never be repaid in our time.

The deficit in the groundwater bank is also being matched by a deficit in the food it provided. Thus the present prosperity in much of the world is based on borrowing from the bank of water, which is also, in essence, the borrowing of food from the food bank, neither of which can be repaid. As a consequence there has been an artificial stimulus of food production in many countries where groundwater enabled food production to be raised well above sustainable levels.

The UN Food and Agriculture Organisation even suggested that the rapid exploitation of groundwater has saved the world from a food crisis. But if countries have been borrowing water on credit, and effectively, borrowing food on credit, it means that the world is facing the prospect of an even more serious food crisis. This prospect is already highly evident in some countries as they try to rapidly expand food production from resources of surface waters, especially in China, and India.

China's water crisis

China is heavily dependent on groundwater. Most of the flat areas of China overlay groundwater basins, and the groundwater is being extracted for water supply for cities, industries and agriculture. The northern agricultural areas of China are virtually drying out: the major rivers have ceased to flow in the dry season. The water table under the North China Plain, which produces half of China's wheat, and a third of the corn, is falling at an alarming rate. Under Hebei Province, in the heart of the North China Plain, the water level in the deep aquifer is falling at a rate of 3m. each year.

The decline of the water table has led to wells drying up, and to deeper wells being drilled. The consequent increase in pumping costs has forced some farmers off their land, while the demand for groundwater for cities and industries has continued to grow. In Beijing, the new wells for the city water supply now have to reach 1000m to tap fresh water.

The pumping of groundwater in the North China Plain has resulted in the entire area subsiding, with many funnels and sinks appearing on the ground surface. Cities are reporting substantial subsidence, complicated by the consolidation of the ground under the new high-rise buildings.

Shanghai started pumping groundwater for the city water supply in 1860. The old city of Shanghai sank almost 2 metres in the period 1921-65. Subsidence is continuing, and the authorities are now trying to correct it by injecting water into the aquifers.

Such ground subsidence in densely populated cities has caused great economic losses, as well as presenting a hazard to buildings and people. It is reported that Shanghai has suffered economic losses estimated at US$35 billion in the past 40 years due to destructive flooding and tidal effects due to subsidence, probably mostly caused by groundwater extraction.

In the Pudong New Area of Shanghai there are a large number of new skyscrapers. Settlement of the new urban area is being recorded at about 3 cm a year. The foundation of the tallest building, at 420 metres high, sank by 6.3 centimetres in 2002. Most of that settlement is probably due to the great weight of the building, but extraction of groundwater would have contributed. It may be unfair of me to mention that during construction of a tower in Pisa in Italy, from the year 1173, it began to tilt in 1178, due to extraction of groundwater nearby. Construction continued intermittently in the tilted position until 1350. It became famous as the Leaning Tower of Pisa. I am pleased to note that the buildings in Shanghai appear to be subsiding without tilting.

The urgency of the need to control the use of groundwater, and to provide other sources of water and food, has been recognised by the Chinese Government. They are planning to build several new water projects, including two very large projects, one in China, and one in South East Asia to provide a food bowl for China.

In November, 2002, the Chinese Government authorised the construction of a hugely ambitious water diversion plan to take waters from the Yangtze River system to the Yellow River.

The aim of the project is to divert water from the south of the country, where the rivers flow from

The Infrastructure Road to Recovery

Fossil Water

the Tibetan plateau, to the areas of water shortage in the North China Plain, and to Beijing and other industrial cities in the north. There are three separate diversion systems. Construction of the first diversion system began in 2002, and is estimated to cost US$19 billion, and will divert 13.4 billion cubic meters per year to north China. There are two more similar diversions in the total project.

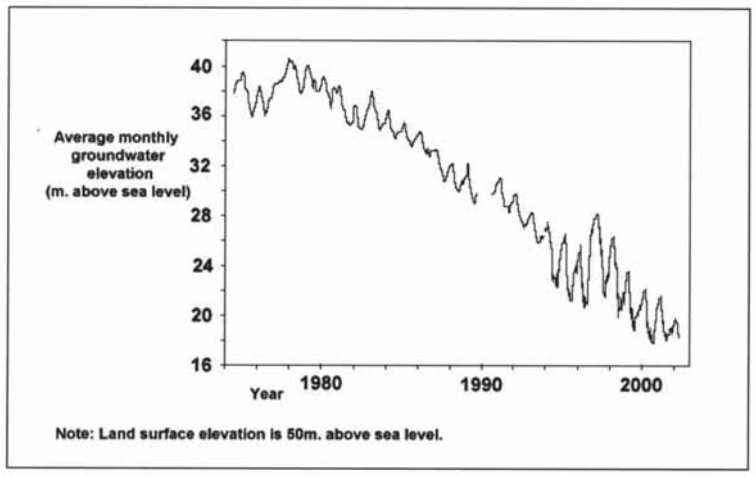
The population of China is about 1.3 billion, and still growing at about 0.8% each year. That means an increasing demand for food. Even with the proposed water projects in China, there will still be a need to import food.

One prospective source of food for export to China is the Mekong Basin in South East Asia. The Basin begins where the Mekong River leaves the mountains at the Thailand-Myanmar border, and comprises the flood plain of the Mekong River in parts of Thailand, Laos, Cambodia and Vietnam.

In 1956, a Mekong Committee, comprising representatives of the four riparian countries, was established with a secretariat provided by the U.N. Economic Commission for Asia and the Far East (ECAFE), in Bangkok. They studied conceptual plans that had been developed by the riparian countries with significant input from expert engineers from U.S. Government agencies (Corps of Engineers, Bureau of Reclamation, and Tennessee Valley Authority).

The conceptual plan was a vast scheme involving a cascade of seven dams on the Mekong River, associated hydro power, river navigation for 1,000 km. inland from the sea, the diversion of waters for extensive irrigation development throughout the Basin, the construction of many dams on tributary rivers, and water supply to cities and towns, and flood control.

In 1964 I became interested and involved in the Mekong Project when I went to Thailand as a U.N. adviser on dam design and hydropower. At the time there was great enthusiasm to get on with the Mekong project, and wonderful international co-operation. Some excellent and extensive investigatory studies had been made on many aspects of the project by experts from friendly nations, all under the umbrella of the United Nations—for example: U.S.A, Japan, Israel, Australia, France and other countries were active in programmes of assistance in planning and evaluation. In addition, there were offers of support from many countries for participation in the construction of the project. Overall, it was a wonderful example of international co-operation in action. For my part, I was delighted to share in the work with my Thai colleagues, and to collaborate with experts from so many countries.



The decline of water table level at the Luancheng Agro-Ecological Research Station, Hebei Province, in the North China Plain. As the water table falls, springs have dried up, and streams have ceased to flow. Lakes have disappeared. Hebei Province once had 1052 lakes, now only 83 remain. Note that the level of the water table in 2002 was less than 20 metres above mean sea level. Sea water is now intruding into the lower aquifers.

View of Pudong New Area of Shanghai from across the river. The load of the new buildings on the saturated sediments, together with groundwater pumping, is leading to subsidence of the area by about 3 cm. each year. It has been reported that 46 cities in China are sinking, due to settlement under load and excessive pumping of groundwater.

At the beginning of 1965 it all seemed to stop. The war in Vietnam halted any prospect of the project continuing, even on site investigations on the main river damsites. Shots were sometimes fired at the operators of drill rigs in the middle of the river, lessening enthusiasm for international cooperation. The World Bank was quite firm in refusing to fund any part of the project while hostilities continued.

Later, the terrible civil hostilities in Cambodia, especially the genocide, and the laying of a vast number of land mines, did not encourage any construction activity in that country for the foreseeable future. The effect was to stop all work on the key parts of the project, —for forty years.

Recently, the Chinese Government announced an interest in funding and building the entire project, and sought the cooperation of the riparian countries. The Chinese were quite clear that they wanted to create a new food bowl for the world, and especially for China.

The Chinese Government indicated that there would be no need for funding from international sources such as the World Bank, or the Asian Development Bank. The Chinese were prepared to fund the project and to undertake the design and supervision of construction of all the major dams and hydro power plants. The total cost of all those parts of the Mekong Project in the four riparian countries will probably be much more than one hundred billion dollars. The offer of such large funds is a strong incentive to the riparian countries to accept the Chinese proposals. Of course the World Bank and the Asian Development Bank would also welcome the Chinese proposal, as it frees bank funds for other purposes.

Far upstream on the Mekong River, in China, near Tibet, the Chinese government is now constructing a 290m. high concrete arch dam project, which includes a large hydro- electric power plant. It will be the highest dam in the world. The project is likely to be followed by a cascade of hydropower dams down the river towards the Mekong Basin.

These two great projects to be funded by the Chinese Government, the south-north river diversions in China, and the Mekong Project, illustrate the urgent concern about future food supplies for China, and the magnitude of the extra-ordinary problems that have been created by the exploitation of the Chinese groundwater resources towards extinction.

Topography of China, India, and South East Asia, showing the extensive mountainous regions, and the limited flat plains for agriculture. On The North China Plain there are very large cities, industries, and intensive agriculture, all largely dependent on groundwater. It is a major source of food for China. The groundwater extraction exceeds 40 billion cubic metres per year, and the water table is falling rapidly. China has now proposed to fund and build water diversion and irrigation projects in other countries as a new source of food for China and the world, for example the Mekong Basin. In India, the wells are also running out of water, and India is also interested to encourage irrigation development in the Mekong Basin as a world source of food. (Topographic map from Earth Observatory, of National Aeronautics and Space Administration)

United States of America—Groundwater and market forces

The United States of America is a federation of states, and it is the state governments which retain residual responsibilities for such matters as land and water. All states maintain their own legislation on water.

In the case of groundwater, the property owner has an absolute right of capture of the groundwater under his property. This means the land owner may pump as much water as he wishes, without incurring any responsibility if his actions are found to be detrimental to his neighbours or the community as a whole.

Under state environmental laws, a state may establish controls to maintain groundwater quality, and that may influence well spacing, and disposal of waste into the groundwater.

But overall, throughout the United States, the state legislatures treat groundwater as a basic property right, and there is no control over groundwater withdrawal. Because of problems of depletion of groundwater in some basins, many states have established local district conservancy boards, which are self-governing bodies of users of groundwater. The boards are charged with responsibility to deal with all property owners in the management of the water resources. It is hoped that the problems will be solved by mutual agreement. Nevertheless, in any dispute, the legislatures and the courts continue to treat groundwater as a basic property right.

Even with the conservancy boards, the consequence has been a disastrous emptying of the nation's groundwater basins. In cases of dispute, the right of unlimited private use of groundwater is defended by the law!

Groundwater is the source of drinking water for about one-half of the population of the USA, including nearly all of the rural population. The pumps deliver in total about 50 billion US gallons per day, or about 70 cubic kilometres per year. The problem is made worse by a continued quaint view in the groundwater profession that the aquifers are being recharged from surface rainfall. They use dubious mathematical models of groundwater flow to show farmers and cities where to drill more and deeper wells, but inevitably the new wells cause the water table to drop, while the wells decline in flow.

The reality is that the U.S. is coming to the end of the cowboy era of groundwater exploitation, and it is to be expected that the flow in all basins will gradually decline towards extinction. The evidence is clear.

There are reduced flows of water to springs, lakes and streams. In the natural state, the small residual flow of groundwater came to the surface as springs, and as flow to streams, lakes and wetlands. With the lowering of groundwater levels, the associated springs and streams cease to flow.

There is serious subsidence of land in many parts of the US due to pumping of groundwater. In the area of Houston in Texas, groundwater pumping has led to subsidence at the surface of about 3 m, together with a lowering of the groundwater level by about 120 m. In the desert state of Arizona, there have been water level declines of between 100 and 200 m. over much of the area, and associated subsidence of the ground of 5m and more. Unequal subsidence and deep land fissures are a serious problem.

(The following internet reference is informative, http://cals.arizona.edu/AZWATER/arroyo/062land.html).

In 1952 I became familiar with problems being caused by land subsidence in the San Joachim valley in California. I was with the Bureau of Reclamation in Denver, and the engineers in the Bureau were designing a canal system for the area to distribute surface water for irrigation. They had a problem with land subsidence that was being caused by extraction of groundwater. The land was subsiding at the rate of about one metre in three years, presenting major difficulties in the design of irrigation canals which follow very flat grades. The subsidence continued for decades after. [See photos (rt).]

In Kansas, groundwater accounts for 90 per cent of the total water supply. It is the principal source for 600 public water supply systems, and most rural-domestic supply. Most of the groundwater is used for irrigation. Groundwater levels have dropped substantially, in some areas by over 200 feet. There are many similar examples in other states.

Virtually all of the drinking water in Florida is supplied from groundwater. The Florida aquifer system extends across the entire state of Florida, southern Georgia, and adjoining parts of Alabama and South Carolina. A major concern is the increasing contamination of the aquifer system as the water levels decline. There is intrusion of sea water into the aquifers along the

Subsidence related earth fissure due to groundwater extraction in Arizona. Fissures are causing very serious damage in several irrigation areas in the state. The Arizona Geological Survey maintains a Centre for Land Subsidence and Earth Fissure Information. Information papers are available on the internet. (Source: Govt Arizona)

Subsidence of the land in the San Joachim valley in California due to the extraction of groundwater. The markings on the pole show the level of the land in 1925, 1955. and 1977. Such subsidence arises from closure of fracture openings and pore spaces in the rock, and is essentially irreversible. (Source: Govt. California)

The Infrastructure Road to Recovery

Fossil Water

east coast, and on the south coast along the Gulf of Mexico.

In Texas and Arizona there are proposals to privatise the groundwater aquifers. This would absolve governments from the responsibilities for management of groundwater, and leave the matter to the private sector and the people to sort out. This seems a dangerous proposal in a country where citizens may own guns.

Subsidence of lands due to groundwater extraction is a serious problem in several states of the US. Differential settlement, sometimes with cracking of the ground surface, and sinkholes, can cause serious damage in built-up areas.

Throughout the United States, the common law right of capture of groundwater is firmly entrenched in the minds of the people, and in legislation. Landowners protect their claim to capture by pumping the water. Consequently, there has been a race to the pumphouse. The race is now ending.

From now on, water supply will become a far more important issue for farms, cities, and states. Water supply for cities will become more expensive, and there will be pressures for transfer of water across state boundaries.

The rapid decline of groundwater resources in China and India has led to the governments of those countries moving to construct huge projects for the transfer of water to their cities and farms. Similar actions may be needed in the United States.

Map of Africa and Asia composed from satellite photographs of the earth in true colour. Note the vast extent of the dry regions, extending from the northwest coast of Africa to north China. At present, groundwater is the only source of water for survival in most of these dry regions, and over much of India, and in north China, and the wells are running dry.

The discovery and exploitation of the Great Artesian Basin

Great waterspouts from bores, and water for stock in the desert

In seasons of good rainfall there is plenty of grass in eastern Australia. These wide waving fields of grass attracted the early settlers into inland Australia, and by the mid-1800's grazing leases were established over most of eastern Australia. The early settlers in the more remote areas of western Queensland and western New South Wales took up very large holdings of land. One enormous land holding, "Wellshot", was nearly half a million hectares in extent, and ran up to 400,000 sheep. There was no fencing, and the sheep were run in mobs of up to 2000 by a shepherd. However, such huge stock numbers could not be sustained in long periods of drought.

Pastoral activities were focused on the perennial and occasional rivers. During good seasons the animals would walk away from the rivers and graze on the plains, but as the rains stopped the animals moved to the river frontages.

The sheep and the cattle grazing on the plains quickly found the mound springs, eating the lush grasses and reeds around the springs, and creating a boggy mess. The aborigines were alarmed. The settlers were also alarmed when the aborigines killed some of the stock, and sometimes the shepherd. The terrible consequences were some dreadful massacres that still concern many Australians.

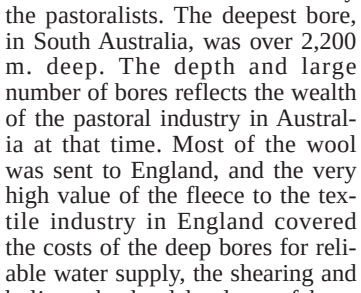
The early pastoralists needed labour to care for the stock. But the gold rush had caused a shortage of labour, and some pastoralists persuaded the government to arrange to bring in Chinese labour. Not surprisingly, many of the Chinese also caught gold fever.

The Chinese brought an approach to water management that was new to the Europeans. They introduced small overshot weirs across water courses to improve water storage. They also dug wells by hand, some apparently to a depth of 100m. It may be noted that the hand excavation of a well of such a depth, without artificial ventilation, could be a quite dangerous undertaking. On one property 28 wells were dug by hand.

There was a continued need for more water for stock. The grasses of the western plains were mostly drought resistant, but the stock needed water, and the mound springs were few.

The evidence of the mound springs, and the hand dug wells, indicated that water could be found by drilling. In 1878, a shallow bore at Bourke in NSW yielded flowing water at the surface. Many shallow bores were drilled near the margins of what we now know as the Great Artesian Basin.

In 1886, a pastoralist company in Queensland contracted a Canadian well-borer to bore for water on their drought-stricken property. Water was struck at 330 m., and deepening to 660 m. increased the flow substantially. Other bores followed. Thirteen years later, in



An early drilling rig driven by steam power.

1899, 524 bores had been sunk, and 505 were productive. Many of the bores reached 1300 m. in depth.

The drilling of bores to depths of 1300 m., and more, represented a most substantial investment by the pastoralists. The deepest bore, in South Australia, was over 2,200 m. deep. The depth and large number of bores reflects the wealth of the pastoral industry in Australia at that time. Most of the wool was sent to England, and the very high value of the fleece to the textile industry in England covered the costs of the deep bores for reliable water supply, the shearing and baling, the land haulage of hundreds of kilometres, and shipment halfway around the world. One pound weight of fine wool fetched one pound sterling.

But the pastoral industry faced great risks, and the prospects of profits in good times led to stocking rates far higher than could possibly be sustained in times of drought. Extraordinarily large stock numbers were built up in the late 1800's, only to collapse in the drought at the turn of the century. In NSW, stock numbers peaked at 19 million in the 1890's and crashed to 3.5 million in the drought of 1901-2. Land degradation was extensive.

The discovery of artesian water, and the prospect of a permanent water supply to offset the impact of drought, led to a dramatic increase in well drilling, and a great waste of water as the wells were allowed to flow freely and spill on the ground.

The desperate search for water at a time of drought is described in a poem by A. B. Paterson, published in *The Bulletin*, 12 December, 1896. The poem is of particular scientific interest in its description of the bore continuing to a depth of 4,000 feet through strata without any sign of water, to when the drill is,

"bumping on the solid rock four thousand feet below":

And then the bore suddenly strikes huge quantities of water,

"And it's rushing up the tubing from four thousand feet below, Till it spouts above the casing in a million-gallon flow."

A flow of a million gallons a day can be visualized as 10 imperial gallons per second, or 45 litres per second. Today, after over 100 years of exploitation of this underground water resource, such a flow is still available at some bores.

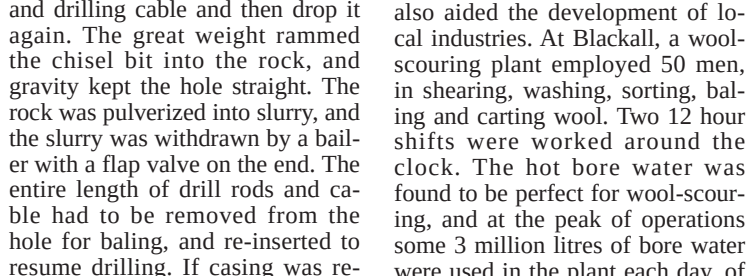
At the time, a very strong flow of water was available from many artesian bores. Sometimes the jet of water from an open bore would spout over 100 m. into the air. One small town in western Queensland used the pressure of water in a bore to generate hydro-electricity. It was Australia's first hydro-electric power station. It had a Pelton wheel turbine made by the local blacksmith.

The boreholes were drilled by the percussion method. A weighted chisel bit was used to impact the rock repeatedly, with the bit being partly rotated with each blow. A steam engine was used to lift the entire length of drilling rods and drilling cable and then drop it again. The great weight rammed the chisel bit into the rock, and gravity kept the hole straight. The rock was pulverized into slurry, and the slurry was withdrawn by a bailer with a flap valve on the end. The entire length of drill rods and cable had to be removed from the hole for baling, and re-inserted to resume drilling. If casing was required it was hammered into place until refusal, and then the size of the hole would be reduced to extend the casing further. The maximum depth of hole drilled by this method was over 2,200 m., a most remarkable technical achievement at the time.

From the beginning of the discovery of artesian water, most bores were allowed to flow freely onto the ground and the water was directed into long shallow gutters to provide places for stock watering.

The discovery of artesian water also aided the development of local industries. At Blackall, a wool-scouring plant employed 50 men, in shearing, washing, sorting, baling and carting wool. Two 12 hour shifts were worked around the clock. The hot bore water was found to be perfect for wool-scouring, and at the peak of operations some 3 million litres of bore water were used in the plant each day, of which 1 million litres was required for the scour.

The artesian bore water was very precious in times of severe drought. Periods of drought were desperate times. Any proposals to limit the free flow of artesian bores met strong resistance from land owners, with the emphatic assertion that the bore waters were being replenished from surface rainfall. That view has continued to the



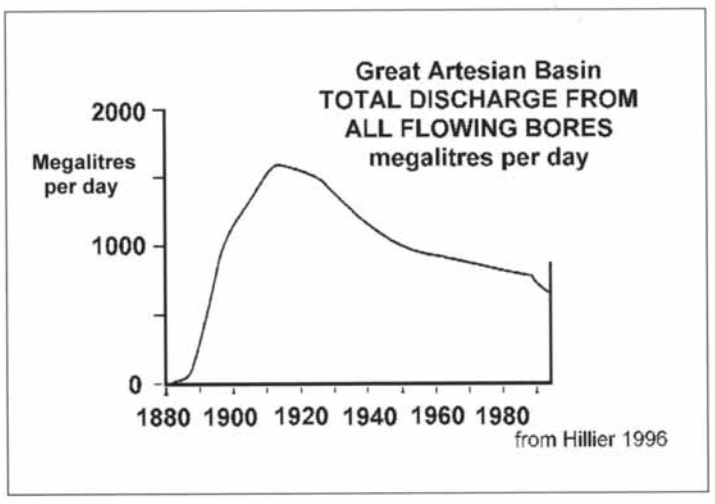
The Great Artesian Basin covers approximately one fifth of Australia, and underlies parts of the states of Queensland, New South Wales, South Australia, and the Northern Territory. Water resources are a state responsibility, and each state is responsible for its part of the Basin.

Freely discharging bore in South Australia near Lake Eyre, discharging as steam. The steam is mineralized and sulphurous. The question to be considered is the source of the steam at the base of the borehole. Is it, as is popularly believed, to be water percolating through porous sandstones, sourced from rainfall on exposed sediments in Queensland some 1400 km away, or is it from steam gushing through open joints in the granite below the sediments, and originating in the deep plutonic processes of the earth? (Photo: Clive Minton)

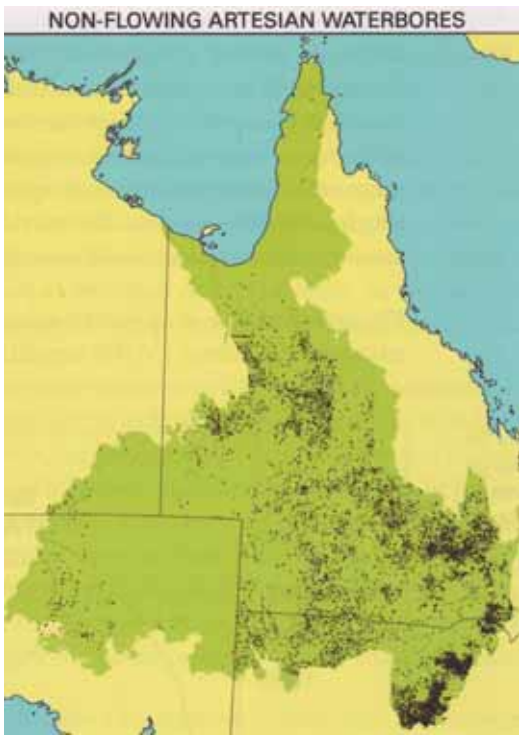
John Seccombe, Chairman of the former Great Artesian Basin Consultative Council, demonstrating the volume of flow that is available at one bore at his grazing property near Longreach in Queensland. In this case the bore supplies hundreds of kilometres of distribution pipes. It is popularly accepted that the source of such flows is water seeping through porous sandstone at the base of the cased boreholes. That is evidently physically impossible. The author believes that the source must be high pressure steam in the jointed granite below the sediments, and that the steam flowing to the base of the bores has eroded the sediments to form a deep steam cavity down to the jointed granite which now supplies the borehole. (Newspix/David Sproule)

The Infrastructure Road to Recovery

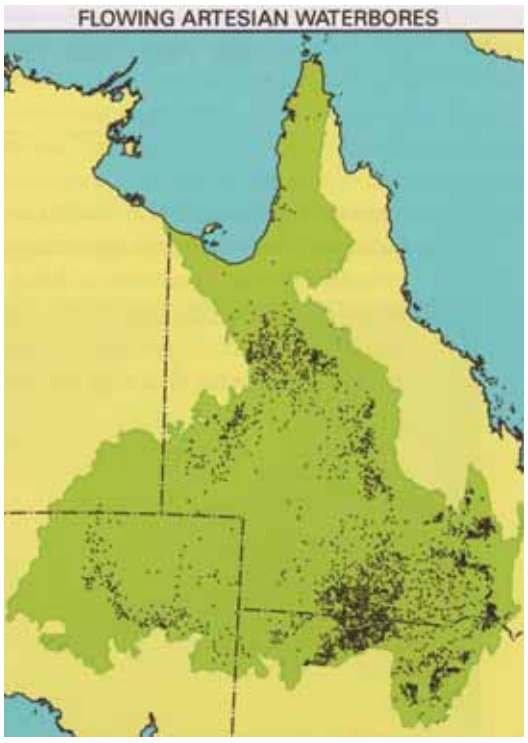
Fossil Water



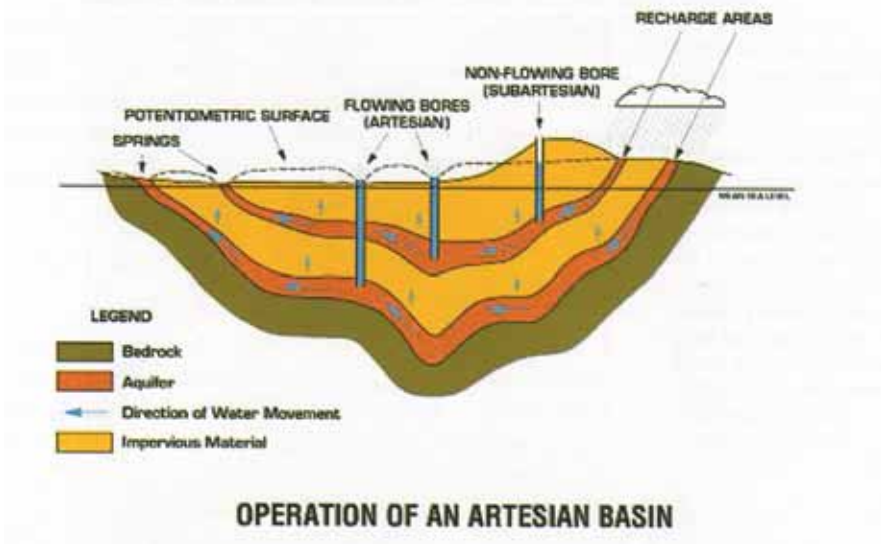
History of total discharge from all flowing bores in the Great Artesian Basin. The total flow reached a maximum in 1917, and has been declining ever since.



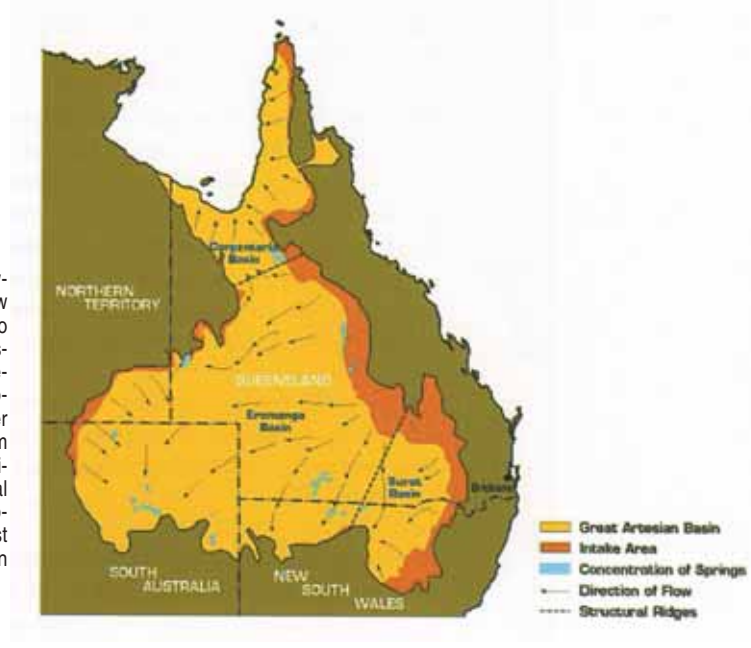
Map showing non-flowing bores of the Great Artesian Basin, that is, bores that have been drilled in the past and no longer flow. (Source: Australian Government)



Map showing the flowing bores of the Great Artesian Basin. Most of these flowing bores discharge into open earth drains, with great loss of water due to evaporation and seepage. (Source: Australian Government)



Concept of the operation of the Great Artesian Basin as shown on the web pages of the Queensland Government. Note that the assumed source of water is rainfall on the exposed sediments at the edge of the basin, and that the water is assumed to percolate through the sediments for long distances, rising to the surface through the artesian bores. It is important to note the distorted scale in this diagram. The lateral distance overall is about 1500 km, and the maximum depth of the sediments is about 3 km, a ratio of 500 to 1. If this chart was redrawn to a natural scale, it would be almost a single line across the page.



Plan of the Great Artesian Basin showing recharge areas and direction of flow through the sediments. This plan is also taken from the web pages of the Queensland Government. This illustration of recharge areas and flow directions is supposition. There is no evidence whatever to support the concept of recharge from surface rainfall, or of the flow along sedimentary strata for distances of several hundred kilometers. Similar misconceptions are found in the reports on most groundwater basins in the world, even though the wells are running dry.

present day.

By 1890 there was serious concern about the gradual decline in the flow from the bores. In 1891, legislation to control the waste of water was twice proposed in the Queensland Parliament, each time being carried through the lower house of state government, and each time being rejected by the upper house. The grounds for rejection were that the water was being recharged from surface rainfall, somewhere, and that there was no cause for concern. There was speculation that the source of the water was in rainfall in New Guinea, or even further away such as the Andes or the Himalaya. In the state of New South Wales a similar Bill was proposed in 1894, and similarly failed to pass.

The early settlement of Australia was concentrated at a few ports accessible by sailing vessels. Separate colonies formed around these ports, but because of the remoteness from London, the colonies quickly became politically and economically independent. But even though they managed their own economies, and had their own tiny defense forces to protect against other maritime colonizers, they recognized their collective vulnerability. This led to the governments of the Australian States, and the people by referendum, agreeing to create the Commonwealth of Australia, as a Federation of the States.

In the new Constitution, in 1900, the Commonwealth Government was granted only limited powers, primarily dealing with external affairs and defense. Thus the states retained most of their internal responsibilities, including those for water resources, and land. The constitution for Australia was based in part on the earlier US constitution, where state governments also retained most of their internal responsibilities. As a consequence, there are now very serious national problems in both the USA and Australia in the matter of development and protection of national water resources, including groundwater, with continuing disputes between national and state governments, and between state governments.

From the time of the earliest bores into the Great Artesian Basin in the 1880's, the number of bores steadily increased. Many were taken down to great depth, to bedrock or near bedrock. By 1915, over 1500 flowing bores had been drilled throughout the Basin. Thousands of kilometres of bore drains were excavated to distribute water around properties. Bore drains are small open channels that may extend for lengths of 100km or more. The bore drains are the cause of very high losses by evaporation and soakage in these hot dry parts of Australia.

The total discharge of all bores reached a maximum around 1915, estimated to be about 750,000 megalitres per year.

Since the beginning of bore drilling in the 1880's the flow from most individual bores has gradually diminished. When ground water pressure becomes insufficient to bring water to the surface pumps may be installed. Often the dry bores are abandoned. Each year a number of new bores are drilled. Thus the total number of bores is still increasing, while the total flow continues to decline.

The official concept of the operation of the Great Artesian Basin, which led to the rejection of legislation to control waste of water over 100 years ago, and which is still the official position today, is shown in the accompanying illustrations.

When the artesian waters were first discovered, the gushing water brought with it large quantities of natural gas, which was wasted and regarded as a nuisance. At one stage, about 1910, the Chief Geologist in Queensland noted that there was no consideration of the possibility that the artesian water and the natural gas may have come from the same source, and noted that nobody was looking for a surface intake for natural gas. He was disregarded as a cynic. The belief in rainfall recharge of the artesian waters held firm.

As I write this it is still assumed that rainfall on exposed strata at the edge of the sedimentary basin enters the strata and percolates through porous strata for hundreds of kilometers, emerging from flowing bores under high pressure.

In the year 2000 the Queensland Government passed administrative orders to proclaim the intake areas where the rainwater is expected to enter the sedimentary strata. The orders also limit the use of surface waters by the farmers.

Also in 2000, the Australian Government published a substantial report, *Hydrochemistry and implied hydro-dynamics of the Cadna-owie-Hooray Aquifer, Great Artesian Basin*. It is a most comprehensive study and it is of interest to note that the title of the report refers to implied hydrodynamics. The cautionary implied quickly became proof.

At the beginning of the report there is an Authors' Note. I have selected the following extract, which I think illustrates the intellectual dilemma of the authors:

"Our findings confirm the origin of the groundwater from recharged rainfall and that the groundwater evolves hydrochemically as it slowly migrates into and across the Basin. Groundwater in the latter stages of its migration towards discharge margins is in excess of 800 thousand years old and possibly as old as 2 million years. In some of the deeper regions of the component hydrogeological basins, flow is so slow that the groundwater appears relatively stagnant."

In these terms the national government thereby endorsed the views of the Queensland government on recharge of the groundwater from surface rainfall. Note that the authors confirmed the official concept of recharge from rainfall, whilst also reporting ages of the groundwater of 800,000 to 2 million years, without question.

A key feature of the report is the use of radioactive isotope ratios to indicate age of the groundwater. The assessment of age of groundwater is based on the knowledge of these isotope ratios in rainfall and surface waters, and the change of these ratios, over time, when the water is no longer exposed to the atmosphere. It is a technique that is used worldwide.

The logical steps in this method of assessment of age of groundwater are as follows:

(a) the isotope ratios in rainwater are known.

(b) It is assumed that the groundwater was originally derived from rainfall; and that the groundwater once had the isotope ratios of rainwater.

(c) the decay times of the two marker isotopes are known, and thus the change in these ratios over time provides an estimate of age since the groundwater was originally rainwater.

(d) the age of the groundwater is estimated from the difference of the isotope ratios of the groundwater and rainwater. In the case of the Great Artesian Basin, the estimate of age may be up to 2 million years.

Note the circular argument. The procedure is directed towards proving the assumption that the groundwater was originally rainfall, but that fact is not recognized. The procedure specifically excludes the possibility that the groundwater was never rainfall. Unfortunately, it is normal for groundwater hydrologists to be quite unaware of the assumptions involved. From their perspective, a date determined by nuclear physics must be right, and they thereby manage to prove that all groundwater is derived from surface rainfall.

As is shown in the first chapter, this lack of understanding of the sources of water, over a long time, has created serious problems for the world. The answer is to try to understand how water is released from the interior of the earth. That is examined later the book.

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Australia Must Go Nuclear!

by Robert Barwick and Jonathan Tennenbaum

Moving the bill to authorise the construction of the Snowy Mountains Scheme in 1949, the federal Chifley Labor Government's Minister for Works and Housing, Nelson Lemmon, declared to the Parliament: "Now … the Australian Government desires to proceed with the great Snowy Mountains Scheme, in an endeavour to ensure that Australia does not lag in the race to develop *atomic power*…. Today we are living in the atomic age. It would allow great inland cities … and decentralised industries to be built."

Today, it is vital for Australia's future that Chifley's and Lemmon's vision for an Australian nuclear power industry be revived. For Australia to achieve the goal of 50 million people, our energy and water requirements would be most efficiently met through the widespread application of modern, clean and safe nuclear power. One kilogram of nuclear fuel in an atomic reactor generates about as much energy as the combustion of more than 50 tons of petroleum! In that fact, we begin to grasp the vastly higher economic potential of nuclear energy, compared to fossil fuel technology.

This amazing potential was part of the Chifley Government's vision. The way that vision was virtually snuffed out within 30 years of Lemmon's declaration is a tragedy of Australian history. With it went many of the other grand plans for Australia Post War Reconstruction (resurrected in this publication), as well as the cultural optimism that allowed our war-time nation builders to expect a future in which Australia would enjoy a prosperous population of nearly 50 million people by the end of the 20th century.

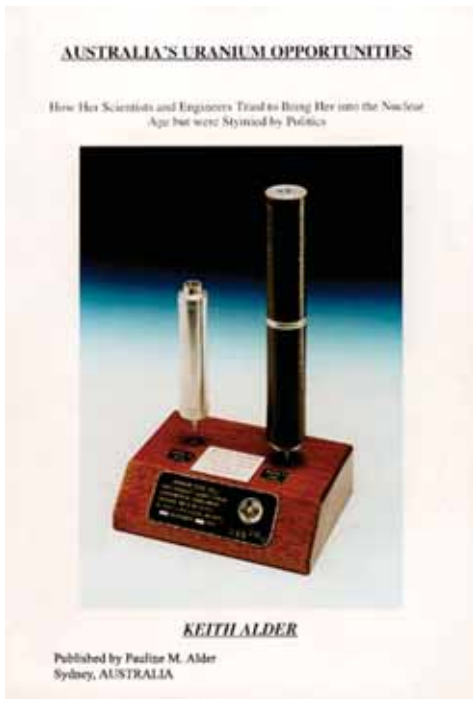
Australia's Nuclear History

From the mid-1950s until the mid-1970s, Australia boasted a world class nuclear research capability, coordinated by the Australian Atomic Energy Commission (AAEC) based at Lucas Heights in Sydney, the site of our only nuclear reactor. Australia's world-class scientists who participated in the AAEC research program in those days insist that, contrary to the anti-nuclear propaganda they have been subjected to, the focus of Australia's research was the peaceful application of nuclear power. The history of the AAEC has been very concisely recorded by its long-time director Keith Alder in a 1996 book, tellingly titled, *Australia's Uranium Opportunities: How Her Scientists and Engineers Tried to bring Her into the Nuclear Age but were Stymied by Politics*.

In its lifetime, the AAEC constructed the Lucas Heights nuclear research facility, and among its many research projects conducted notable research into reactor models, and the uranium enrichment process. In its research into reactor models, the AAEC particularly focussed on high temperature reactors (HTRs), and conducted a significant amount of the very early research into pebble bed reactors. This research was discontinued by the AAEC in the late 1960s, and was seen as unsuccessful, but today pebble bed HTRs are seen as the fourth generation, super-safe reactors whose widespread application is the future of nuclear power generation (see pp. 33 and 34).

In 1971, Australia's nuclear power program was ended when the pro-nuclear Prime Minister John Gorton was replaced by William McMahon, who stopped the construction of Australia's first commercial nuclear power plant at Jervis Bay on the NSW south coast. The Jervis Bay nuclear reactor was a significant project, both nationally *and* internationally: it would have been the first realisation of a longstanding dream of nuclear power generation in Australia that, for instance, had inspired the Nuclear Research Foundation at the University of Sydney in 1955 to foreshadow a line of nuclear power plants "from Alice Springs to the Arafura Sea"; and it was the world's first genuine competitive tender for a nuclear power station, which triggered advances in enrichment technology worldwide. The decision to build Jervis Bay had been made explicitly "in the national interest". The decision by McMahon to scrap the project, after tenders had closed, the design decided and some foundations laid, was justified purely on financial grounds, and dubious ones at that. In his book, Keith Alder reports PM McMahon said to him, "How can I possibly approve a nuclear power station when I'm faced with the need to cut pre-school education in Canberra?" However, Alder maintains, "In retrospect, the Jervis Bay Nuclear Power Station would have been a tremendous bargain if it had gone ahead…. I believe that the station would have produced the cheapest electricity in Australia during its operating lifetime." Suspiciously, when the 1971 Cabinet documents were released on January 1, 2002 under the 30-year secrecy rule, documents relating to the Jervis Bay saga were held back as still being "too sensitive" to release, even after 30 years.

Another major wasted opportunity arose from the AAEC's significant research into uranium enrichment, particularly the centrifuge enrichment process, which is necessary to enrich the raw, "yellow cake" form of uranium that is mined from the ground up to the 3-4% purity necessary for most nuclear reactors. (Again, contrary to anti-nuclear propagandists, this is not the process that enriches uranium fuel for nuclear weapons, which requires above 90% purity). This project was given particular encouragement by Labor Prime Minister Gough Whitlam's Minerals and Energy Minister, R.F.X. (Rex) Connor, who had a grand vision of an Australian uranium industry. The potential was enormous: Australia contains 30% of the world's known uranium reserves—more than any other country—and immediately upon beginning research in the field in the 1970s, the AAEC was inundated with expressions of interest from countries keen to develop Australia as an alternative source of enriched uranium.



This book is an excellent personal account of Australia's little known history in nuclear science. Tragically, the author, and many of his contemporaries, are watching their lives' work go to waste.

Tragically, with the sacking of the Whitlam Government in 1975, directly because of Connor's vision for an Australian-owned resource industry, so effectively ended the AAEC's uranium enrichment work, and a major export industry opportunity was lost.

With the advent of the Hawke Labor government in 1983, any remaining serious nuclear aspirations in Australia were effectively killed off, and a strongly irrational, anti-science "environmental" position took over. Practically, this saw the implementation of the "three uranium mines" policy, which effectively leaves Australia's huge uranium reserves barely touched, while competitor nations like Canada enjoy booming export industries. It also saw the AAEC wound up in 1985, and replaced by the Australian Nuclear Science and Technology Organisation (ANSTO). Thus officially Australia's 30-year commitment to nuclear science.

Australia and the Current Global Reality

Australia's present anti-nuclear policy has serious ramifications. Firstly, we are denying ourselves the most efficient power source in the world, thus thwarting our own development. Secondly, we are potentially placing ourselves at risk from desperate neighbours in our region seeking an energy source which we possess in abundance, but are just sitting on. For instance, in Western Europe and the United States, the once-mighty nuclear industrial sector is threatened with extinction, thanks to the media-driven anti-nuclear hysteria in the population and institutions. But in Asia, nuclear energy is in the beginning phases of a vast upsurge.

Characteristic of this development is the fact, that nuclear power plants have become an "export champion" of an otherwise depressed Russian machining industry. At present, Russia is building six large nuclear power reactors abroad: two nuclear reactors in China (Tianwan 1 and 2 at Lianyungang, Jiangsu Province); two nuclear units in India, at Kudal; and two reactors in Iran, at Bushehr.

A whole series of further projects is under discussion. Nuclear power is making a comeback in Russia itself: The nuclear energy plant Rostov 1 went on line in 2001; three additional nuclear units are now under construction, and nine others are planned by 2010. Beyond this, the Russian Ministry of Atomic Energy has drawn up a comprehensive plan for the development of nuclear power, according to which the relative share of this energy source in the total energy generation of the nation will increase dramatically over the coming 20 years.

China is also opting for a large-scale expansion of nuclear power. Although that nation possesses enormous reserves of coal, the annual mining, distribution, and burning of over a billion tons of coal per year creates an enormous burden on the transport system and the environment, and drags down the physical productivity of the Chinese economy. For that reason alone, a broad utilisation of nuclear energy is inevitable. There are now eight large nuclear power reactors under construction: Qinshan 2, 3, 4 and 5; Lingao 1 and 2; and Tianwan 1 and 2.

These projects will all be completed by 2005. Additionally planned are two 1,000 megawatt (MW) reactors at Haiyang, while four additional units for Hui An, Fujian, Sanmen, and Zhejiang are under study.

In South Korea, two nuclear power plants are under construction, and the construction of an additional 12 units is planned by 2015. Japan projects the construction of an additional 20 large nuclear reactors.

India plans 12 additional nuclear energy plants. Even Vietnam is planning the construction of a first nuclear power plant by 2020, in its long-term government program. Indonesia, while a major petroleum-exporting nation, has also been studying the possible domestic applications of nuclear power.

In *Australia's Uranium Opportunities*, Keith Alder spells out the awkward position Australia's current policy is put in by these nuclear developments in Asia. "Looking ahead, all of the Asian countries expanding their nuclear programmes that I outlined earlier will need increasing supplies of uranium. They all know we have it, in large quantities. If we continue to say 'no' to exploration and mining and the world supply becomes scarce or expensive, what do you think their attitude will be. I am not pointing the finger at anyone in particular, just pointing out that if we don't take advantage of our resources someone else may come and do it for us. And who will stop them? None of the administrators of heritage areas, parks and wildlife areas, or aboriginal reserves."

In a discussion with the *New Citizen* on January 4, 2002, former Newcastle Associate Professor of Physics Dr. Colin Keay, the author of two books on nuclear matters, *Nuclear Energy Fallacies*, and *Nuclear Radiation Exposed*, spelled out a solution to this situation.

"What Australia could do, and this would be, in my view a highly moral approach, is to participate in the full fuel cycle. We mine the uranium, and we make the fuel rods for reactors to the specifications of whatever reactor they are needed for. And to replace those fuel rods when the energy has been extracted, we supply more upon return of the old ones, which we then reprocess. For the intractable waste, we've got the world's best opportunity for burying and disposing of it. We reprocess it, we salvage material to put into the new fuel rods, and we keep the cycle going. That way Australia maintains tight control over the whole cycle, because if any material gets out of that cycle, it is subject to the provisions of the Nuclear Non-Proliferation Treaty. And so we are really upholding an international treaty, and we are behaving in a highly ethical way. We could do that."

Further to that commonsense initial step, there is a wealth of exciting potential developments that would open up for Australia, if Australia ditches its current irrational, anti-science, anti-nuclear policy and develops a modern, clean, safe nuclear power industry.

Exposing the Myths

Australia nuclear energy development was thwarted by policies based not on scientific fact, but on anti-nuclear scare stories that are nothing more than superstitions. In two self-published booklets, Dr. Colin Keay, PhD, DSc, a former Associate Professor of Physics for 24 years at the University of Newcastle, who has no past or present connection with the nuclear industry, has emphatically exposed these superstitions, "in the interests of a better future for Australians…" "Nuclear Energy Fallacies: Forty Reasons to Stop and Think", and "Nuclear Radiation Exposed: A Guide to Better Understanding" are mandatory reading for any open-minded Australians who want a scientific understanding of nuclear matters, as opposed to the mass media-propagated superstitions. These concisely-written, 36-page booklets are available from the author for just $7.00 each, by writing to:

The Enlightenment Press
PO Box 166
Waratah NSW 2298

http://www.enlightenmentpress.com

Email: bolide@hunterlink.net.au

The Infrastructure Road to Recovery

Go Nuclear!

The High-Temperature Reactor is Coming

by Jonathan Tennenbaum

At the beginning of 2001, in the vicinity of China's capital, Beijing, a unique nuclear reactor was put into operation, which is destined to play a key role in the development of the Eurasian infrastructure corridors. This is the "pebble-bed" high-temperature reactor (HTR), first developed in Germany. After decades-long, highly successful operation of the first HTR test reactor AVR in Jülich, and the construction and operation of a 500MW HTR power plant at Hamm-Uentrop, this revolutionary technology became the victim of the politically manipulated hysteria against nuclear energy in Germany. The pebble-bed reactor subsequently emigrated—exactly like the German-developed Transrapid—to China, and also to South Africa.

In the Institute for Nuclear Energy Technology (INET) of the Chinese Tsinghua University, the HTR was realised in an especially promising form for worldwide application. The 10MW Chinese HTR-10 is the prototype of a standardised modular reactor of approximately 200MW-thermal capacity, which can be mass-produced at low cost in the future. On account of its simple construction and operation, inherent safety, small unit-size, flexibility, and ease of maintenance, this reactor is eminently suited for use in developing nations.

Apart from China, these advantages of the HTR have moved the large South African electric power company, ESKOM, to launch an ambitious program for the development and assembly-line production of HTR modules. ESCOM plans, after the success of a first, prototype project, to produce 30 modules every year: 10 for internal consumption and 20 for export (illustrated in Fig. 1). The Chinese HTR-10, already in operation, is supplying important advance data and practical experience for the South African program. In the area of HTR development, a comprehensive international cooperation has emerged in recent years, with the participation of China, South Africa, Germany, France, Russia, and the United States.

The core of the HTR-10 consists of a graphite-lined cylindrical chamber of 1.8 meters diameter, filled with 27,000 spherical fuel elements ("pebbles"), each the size of a tennis ball. Each fuel "pebble" contains about 8,300 tiny particles of enriched uranium, about the size of a grain of sand, embedded in a graphite matrix. Each particle is encased in concentric layers of a high-temperature ceramic (silicon carbide) and carbon material.

The idea of such "coated particles" is that the radioactive substances which are generated by nuclear fission reactions, are permanently trapped within the particles themselves, and cannot escape to the environment. The fuel elements are so constituted, that they withstand even extreme temperatures—up to 1,000°C in normal operation, and even peak temperatures of 1,600°C in the event of a failure of the cooling system—without any considerable quantities of radioactivity escaping to the outside. In addition to this, the fuel pebbles permit a continuous fueling of the reactor. This eliminates the need to interrupt power operation for several weeks for fuel reloading, as is the case with conventional reactors. In the HTR, fuel pebbles are continuously fed in from the top of the reactor, while old ones are gradually removed from the core via its funnel-shaped bottom.

Through the use of ceramic, "sealed" fuel pebbles, it is possible to greatly simplify the entire construction of the reactor, making it inherently safe under all conditions. An accident leading to dangerous escape of radioactivity to the environment is precluded in this reactor, because of its special physical characteristics—above all, the "trapping" of radioactive products in the fuel elements up to high temperatures and the strong "negative temperature co-efficient," which prevents a "runaway" power increase in the reactor. The HTR does not need the intricate, expensive safety systems that are required for conventional nuclear power plants. Yet, this is only one of its many advantages.

A decisive breakthrough over conventional nuclear technology lies in the fact, that the HTR has a much higher operating temperature—900°C, or more. Therefore, the HTR can not only reach a higher thermodynamic efficiency in the generation of electric power, but can also serve as an economical source of *process* heat for various chemical and other industrial processes. Among these are the environmentally friendly generation of fuels such as hydrogen and methanol from natural gas; coal gassification; process steam generation, metallurgical processes, and so forth.

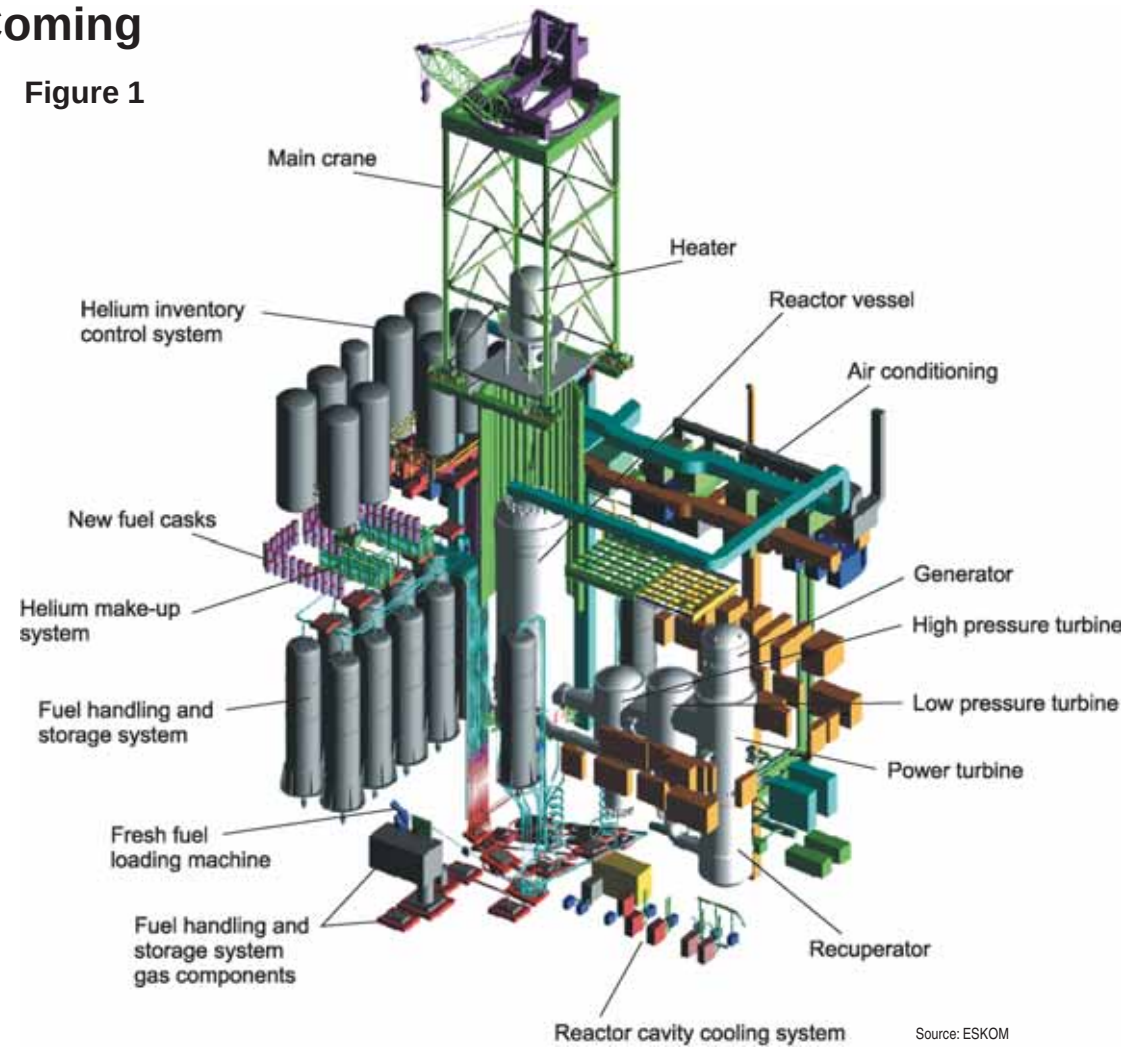
Where conventional nuclear plants are only suited to, and designed for, delivering *electrical* power, the HTR can be employed in many more sectors of the energy economy, where energy is needed directly in the form *of* heat. HTR process heat can replace a part of the costly and environmentally damaging burning of coal, oil, and natural gas.

Chinese experts have in mind, among other things, to use HTRs for generating high-temperature steam, whose injection underground can make it possible to exploit major heavy oil deposits in the country.

In a first period, the heat generated from the Chinese prototype HTR-10 will only be utilised, with the help of a conventional steam generator and a turbine, to generate electrical power. INET plans later to install a compact helium turbine in the primary cooling cycle, in order to explore the possibilities for a very much simpler, and at the same time more efficient conversion of reactor heat into electricity. There are also various possibilities for tapping the HTR's waste heat. The helium turbine plays a large role in the plans of the South Africans, who hope to be able to produce electricity at the extremely advantageous cost of about 1.6 U.S. cents per kilowatt-hour.

The majority of the components of the HTR-10 were produced in China itself, including the reactor vessel, steam generator, and the helium cycle cooling system. Exceptions are the graphite structures for neutron moderation in the nuclear reactor. The special graphite was imported from Japan; the precision machining of the material was done, however, in China.

Figure 1



The elements of a pebble-bed modular reactor—the future in safe, efficient power production.

Solve the Water Crisis With Nuclear Desalination

Nuclear desalination, researched since the 1960s, is a technology ready for take-off as a clean, economical source for supplying safe drinking water from seawater. As Lance Endersbee makes clear, there is no time to waste in planning and building desalination plants that can meet the looming deficits of fresh water for the world's population.

Conventional desalination plants powered by the steam or electricity that is produced by gas or oil, have been operating for 50 years, and in 2001, there were 12,451 desalination plants worldwide. In the Gulf region and North Africa, desalination supplies about one million cubic meters per day of water, while Saudi Arabia, which is even more dependent on desalination, has a capacity of four million cubic meters per day. The Mideast and Gulf regions are the largest users, with more than 50% of the world's desalination capacity.

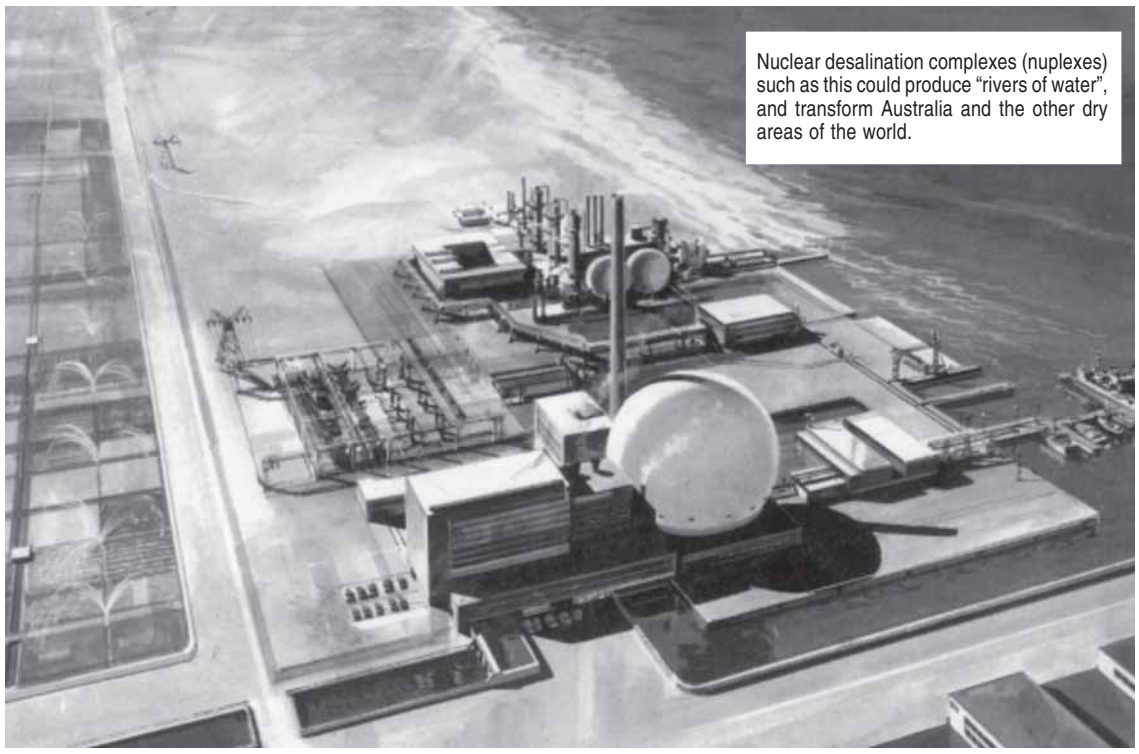
There are three main desalination technologies: reverse osmosis, or RO, which is used in nearly half of today's desalination plants; multi-effect distillation (MED); and multi-stage flash distillation (MSF). All three technologies are still undergoing research to improve efficiency and cost.

Nuclear Desalination Most Attractive

Any power plant—even a small diesel engine—can be coupled to a desalination facility. But nuclear plants are the most attractive power source for desalination, because they are more energy-intensive than plants fired by conventional fuels, and cleaner. Although almost any kind of nuclear plant could be used to power a desalination facility, the fourth-generation high-temperature nuclear reactors which are 50% more efficient, modular, mass-producible, and super-safe-are ideal for the job. Because of its passive safety characteristics and smaller design, the new high temperature reactors (either the South African Pebble Bed or the prismatic core model of General Atomics), can be easily sited near the water-distribution systems.

Especially for developing-sector countries, which do not have large power grids, the small to medium-size, fourth-generation reactors are economical, because they can be added to the grid module by module, as demand increases.

For industrialised countries, larger nuclear plants are appropriate. In fact, in the 1980s, the Metropolitan Water District of Southern California, which serves the large desert population of more than 15 million people, proposed building a large desalination facility powered by a high-temperature gas-cooled reactor of the General Atomics design. The desalination process was designed to directly use exhaust heat from the reactor. Although economically and technologically feasible, the project was killed by the environmental Malthusians.



Nuclear desalination complexes (nuplexes) such as this could produce "rivers of water", and transform Australia and the other dry areas of the world.

The International Atomic Energy Agency has conducted research and feasibility studies on nuclear desalination since the Atoms for Peace days. In its recent studies, the IAEA has stressed that nuclear desalination is cost competitive against other energy sources; it has inherent advantages, such as no pollution, continuous operation, and a secured fuel supply; and that both the heat and/or the electricity produced by a nuclear reactor can be used for desalination, permitting flexible design concepts.

—Marjorie Mazel Hecht

The Infrastructure Road to Recovery

Go Nuclear!

Super-Safe Nuclear Power: the Meltdown-Proof Pebble Bed Reactor

This diagram, a cutaway of Fig. 1 (p.27), illustrates the breathtakingly simple function of a Pebble Bed Modular Reactor (PBMR), as designed by South Africa's Eskom company. The steel pressure reactor vessel of the PBMR is six metres in diameter and 20 metres high, inside a building that is 21 metres below ground. The walls of the reactor vessel are lined with one- metre thick graphite bricks. Inside the reactor vessel are 310,000 fuel "pebbles" which are the size of tennis balls, plus 130,000 graphite balls, which moderate the reaction. The fuel pebbles contain uranium, which releases the neutrons that cause fissioning in other uranium, thereby releasing even more neutrons that expand the process in what is known as a *chain reaction*, while the moderator pebbles slow the neutrons down enough to ensure a *controlled* chain reaction.

The fuel pebbles consist of about 15,000 tiny particles of uranium oxide, each coated with layers of ceramics and silicon carbide, forming an impenetrable barrier which contains the fuel. These particles are then mixed with graphite and moulded into pebbles. These pebbles can operate even at very high temperatures of nearly 900ºC, and in fact can withstand temperatures at which normal fuel rods in conventional reactors would fail. A further safety aspect of these pebbles is that the radioactive fission products of the spent fuel are locked inside the fuel particles, thanks to their silicon carbide coating. Therefore, even in the worst conceivable emergency, the radiation is safely contained, and after use, the pebbles can be safely stored, very cheaply.

To produce electricity in a PBMR, helium gas at 500ºC is inserted at the top of the reactor, and passes among the fissioning fuel pebbles, leaving the reactor core at 900ºC. From there it passes through three turbines, the first two driving compressors, and the third the generator. There the natural thermal expansion of the helium is transformed into the rotational motion to generate electricity. The expanded helium is then recycled into the reactor core by two turbocompressors. The helium leaves the recuperator at about 140ºC, and its temperature is lowered further to about 30ºC in a water-cooled pre-cooler. The helium is then repressurised, and moves back to the heat exchanger to pick up heat before going back to the reactor core. This direct cycle helium turbine simplifies the normal reactor operations, and makes many standard aspects of conventional reactors unnecessary. The outlet temperature of 900ºC is also far higher than the 280º –330º of conventional reactors, and gives this type of reactor its name: high temperature reactor.

How the PBMR works. A cutaway of the PBMR, right, and below, the interior of the fuel pebbles that contain the nuclear reaction and by-products, and make PBMRs "meltdown proof".

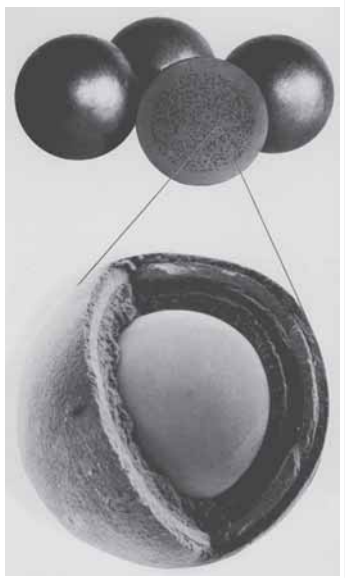
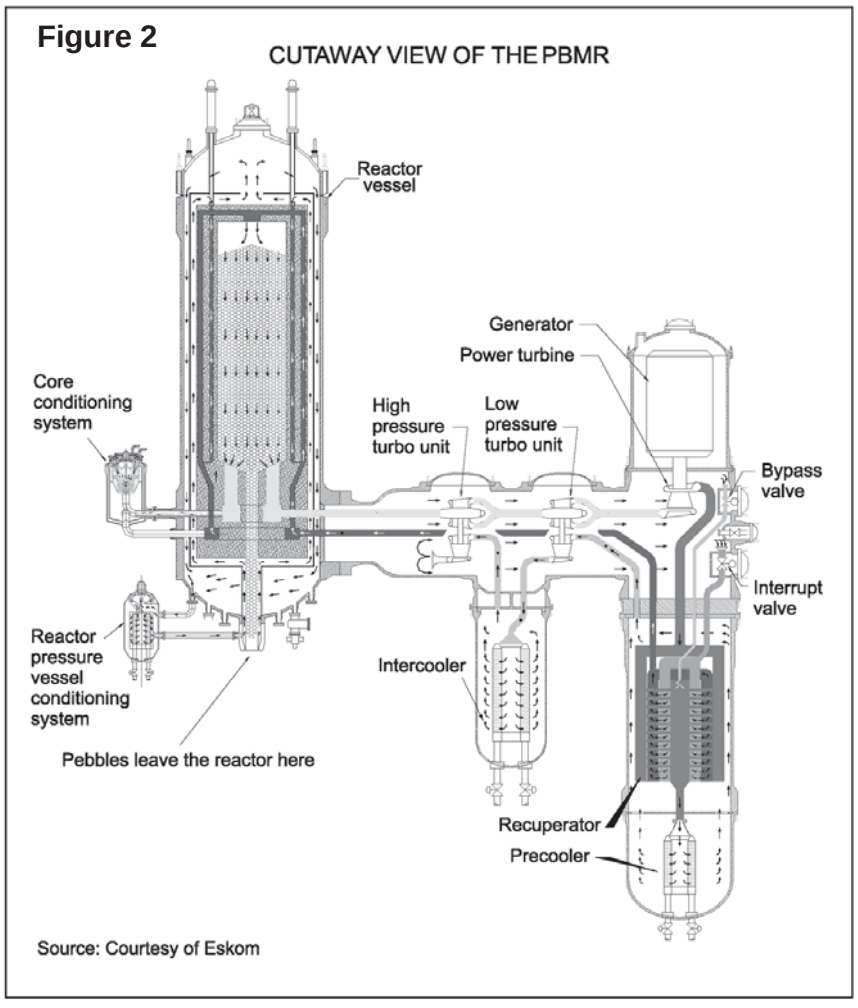


Figure 2

CUTAWAY VIEW OF THE PBMR



Source: Courtesy of Eskom

The inherent and passive safety systems of the PBMR make it "meltdown proof". In any imaginable accident scenario, the reactor shuts itself down, without any additional safety systems. Further, there is a self-stabilising temperature effect in the reactor core: if the temperature rises, it slows down the neutron production that is central to the chain reaction fissioning process, and fission decreases, because of the large amount of unfissionable uranium-238 in the fuel particles which capture the neutrons.

Hot Air Over Wind Energy

by Greg Murphy (Reprinted from the Fall 2001 21st Century Science and Technology *magazine.)*

In the Midwest and other parts of the country, near-bankrupt farmers are being sold a bill of goods by the Department of Energy about how they should rent (or lease) their land to be used as "wind farms," where "high tech" windmill turbines will allegedly make them money by selling electricity to the power grid. In fact, the only way wind power can make money, is with huge government subsidies, tax breaks, and phoney accounting.

Here's what the wind-power windbags are doing, and why it won't work.

The push for "alternative energy sources" goes back to the post-John F. Kennedy paradigm shift, when the ruling elites decided to shift America from an agro-industrial economy to a post-industrial service society. The widescale promotion of anti-technology ecologism—and fears about the most efficient available energy source, nuclear power—were part of that game plan. This insanity mushroomed during Jimmy Carter's Administration, and has been getting worse ever since. To increase the use and development of wind energy and other renewable sources, the Clinton Administration modified its proposed Federal utility restructuring legislation, mandating an increase in the percentage of electricity produced by renewable sources from 2% today, to 7.5% by the year 2010. (Sen. James Jeffords (I-Vt.), has proposed to increase the percentage of electricity produced by wind to 20%.)

In 1999, Energy Secretary Bill Richardson, announced the Wind Powering America Initiative which set the goal of producing 80,000 megawatts of electricity from wind power by the year 2020.

To help make wind power more competitive, the Federal government provides a 1.5-cent per kilowatt-hour (kwh) Production Tax Credit for all electricity generated by new wind plants for the first 10 years of operation. This Production Tax Credit will expire on December 31, 2001, and the American Wind Energy Association is currently lobbying Congress to extend the tax credit for at least five more years.

Several states are pushing for legislation, known as Renewable Portfolio Standards (RPS), which mandates that a certain percentage of electrical power must come from so-called renewable sources, like wind power, and that these wind percentages increase year after year. Some of the states are giving tax incentives or rebates for the purchase of small wind turbines, as in the case of California, which currently offers a tax rebate of up to 50% of the purchase price of the wind turbine.

Phoney Cost Accounting

The truth that the wind energy windbags don't want to tell the public, is the real cost of production of wind power! They claim it is presently around three to six cents per kilowatt hour—not quite competitive with other sources, but in the ballpark. In truth, even with government subsidies, tax breaks, and phoney accounting, the cost is many times that.

In the 1980s, the cost of generating wind power was about 38 cents per kwh, according to the November 1998 Renewable Energy Policy Program report, titled "Expanding Wind Energy: Can Americans Afford It?" There have been improvements in efficiency of wind turbines, which have come out of materials and design research in the aerospace industry. However, this has been nowhere near enough to drop generation cost to the level being claimed. The three to six cents per kwh claimed by the industry for wind power is not a true cost, but an accounting fiction, called a *levelized* cost.

Technically, the levelized cost of energy, is the cost in current dollars of all fuel, capital, and operating and maintenance expenses during the lifetime of the power plant, divided by the estimated output in kilowatt-hours over the lifetime of the power plant. In the case of a wind farm, there is no cost for fuel, but the wind turbine is dependent on nature to provide the necessary wind. The problem with considering the levelized cost in the case of wind energy is that this cost is figured on the assumption of a *constant maximium* wind for a given area.

In other words, levelized cost assumes a constant wind, every day for 20 to 30 years! There is no place on the Earth that the wind blows at a constant maximum average speed all the time.

Further, these calculations are dishonest about the maintenance cost, keeping them unrealistically low. They figure for a wind farm, which might consist of 100 to 250 windmills, a maintenance crew of three men and a truck. They also assume a yearly repair cost at a ridiculously low total of about $750 a year.

In reality, wind turbines have considerable down time for repairs and cleaning. One recent study found that flying insects—such as bees, locusts, gnats, and butterflies—cut the efficiency of turbines by as much as 25%. Thousands of insects fly into the turbine blades and die, forming a ragged crust on the blades leading edge. Even a millimetre of this crust generates drag that can ruin the turbine's efficiency.

Great swathes of land are tied up in the grossly inefficient production of electricity, using windmills.
Photo: AFP/lee Celano/ljc

Another consideration is the power transmission cost. Even if, after the 1.5 cents Federal subsidy, windmills could sell electricity at six cents per kwh, the power still has to move along the transmission grid to the consumer. Because wind power is an intermittent power source, rates for access to the transmission grid are higher. To counter this, the American Wind Energy Association is lobbying for what they call "fair access" to the transmission grid.

Windmill power will never be competitive with more modern forms of energy production. For one thing, the same improvements in technology that might make the wind turbine more efficient would also improve the efficiency of turbines turned by coal, oil, gas, and nuclear. But, even if technological improvement could miraculously make the cost of wind power competitive with modern forms such as nuclear, would we want it?

Wind Fails Energy Density Test

The fact is that there is a more important factor than cost-in-the-small to be considered in evaluating an energy source. If you look at the overall demands for electrical energy and industrial process heat in a growing industrial economy, wind energy could never begin to provide even a tiny percentage of what is needed. First, you must look at the concentration of energy per area of work, which is shown as kwh per square kilometre. Next, you look at what levels of energy flux density will foster the increase of the population density. The energy density of wind is intrinsically too low to maintain the population at current levels, and will lead to population decrease over time—which is exactly what the Malthusian environmentalist movement wants to accomplish.

In order for all mankind to progress, we have to develop sources of energy with higher flux density and develop the technology that can make use of these sources.

The Infrastructure Road to Recovery

Go Nuclear!

Thorium: The Preferred Nuclear Fuel of the Future

Nuclear engineer Ramtanu Maitra explains how the development of thorium fuel cycles will enhance the efficiency and economy of nuclear power plants. This article is excerpted from the Fall 2005 issue of 21st Century Science & Technology *magazine. Australia has the world's largest extractable reserves of thorium, so it would be crazy for us not to be world leaders in developing thorium-fuelled reactors.*

Thorium is an abundant element in nature with multiple advantages as a nuclear fuel for future reactors of all types. Thorium ore, or monazite, exists in vast amounts in the dark beach sand of India, Australia, and Brazil. It is also found in large amounts in Norway, the United States, Canada, and South Africa. Thorium-based fuel cycles have been studied for about 30 years, but on a much smaller scale than uranium or uranium/plutonium cycles. Germany, India, Japan, Russia, the United Kingdom, and the United States have conducted research and development, including irradiating thorium fuel in test reactors to high burn-ups. Several reactors have used thorium-based fuel.

India is by far the nation most committed to study and use of thorium fuel; no other country has done as much neutron physics work on thorium as have Indian nuclear scientists. The positive results obtained in this neutron physics work have motivated the Indian nuclear engineers to use thorium-based fuels in their current plans for the more advanced reactors that are now under construction.

India decided on a three-stage nuclear program back in the 1950s, when its nuclear power generation program was set up. In the first stage, natural uranium (U-238) was used in pressurized heavy water reactors (PHWRs), of which there are now 12. In the second stage, the plutonium extracted from the spent fuel of the PHWRs was scheduled to be used to run fast breeder reactors. The fast breeders would burn a 70-percent mixed oxide (MOX) fuel to breed fissile uranium-233 (U-233) in a thorium-232 (Th-232) blanket around the core. In the final stage, the fast breeders would use Th-232 and produce U-233 for use in new reactors. One main advantage of using a combination of thorium and uranium is related to the proliferation question: There is a significant reduction in the plutonium content of the spent fuel, compared with what comes out of a conventional uranium-fueled reactor. Just how much less plutonium is made? The answer depends on exactly how the uranium and thorium are combined. For example, uranium and thorium can be mixed homogeneously within each fuel rod, and in this case the amount of plutonium produced is roughly halved. But mixing them uniformly is not the only way to combine the two elements, and the mix determines the plutonium production.

India has completed the first phase of its program, and moved into the second phase with a small experimental fast breeder reactor, and, in 2004, began the construction of a 300 MW Advanced Heavy Water Reactor (AWHR), as a prototype for the third phase. The innovative design of the AHWR is characterized by extensive passive safety features, making it very safe.

Abundance of Thorium

The thorium fuel cycle has many attractive features. To begin with, thorium is much more abundant in nature than uranium. Soil commonly contains an average of around six parts per million (ppm) of thorium, three times as much as uranium. Thorium occurs in several minerals, the most common being the rare earth thorium-phosphate mineral, monazite, which usually contains from 3 to 9 percent, and sometimes up to 12 percent thorium oxide. In India, the monazite is found in its southern beach sands.

Th-232 decays very slowly (its half-life is about three times the age of the Earth). Most other thorium isotopes are short-lived and thus much more radioactive than Th-232, but of negligible quantity.

In addition to thorium's abundance, all of the mined thorium is potentially usable in a reactor, compared with only 0.7 percent of natural uranium. In other words, thorium has some 40 times the amount of energy per unit mass that could be made available, compared with uranium.

From the technological angle, one reason that thorium is preferred over enriched uranium is that the breeding of U-233 from thorium is more efficient than the breeding of plutonium from U-238. This is so because the thorium fuel creates fewer non-fissile isotopes. Fuel-cycle designers can take advantage of this efficiency to decrease the amount of spent fuel per unit of energy generated, which reduces the amount of waste to be disposed of.

There are some other benefits. For example, thorium oxide, the form of thorium used for nuclear power, is a highly stable compound—more so than the uranium dioxide that is usually employed in today's conventional nuclear fuel. Also, the thermal conductivity of thorium oxide is 10 to 15 percent higher than that of uranium dioxide, making it easier for heat to flow out of the fuel rods used inside a reactor.

In addition, the melting point of thorium oxide is about 500 degrees Celsius *higher* than that of uranium dioxide, which gives the reactor an additional safety margin, if there is a temporary loss of coolant.

The one challenge in using thorium as a fuel is that it requires neutrons to start off its fission process. These neutrons can be provided by the conventional fissioning of uranium or plutonium fuel mixed into the thorium, or by a particle accelerator. Most of the past thorium research has involved combining thorium with conventional nuclear fuels to provide the neutrons to trigger the fission process.

The approach undergoing the most investigation now is a combination that keeps a uranium-rich "seed" in the core, separate from a thorium-rich "blanket." The chief proponent of this concept was the late Alvin Radkowsky, a nuclear pioneer who, under the direction of Admiral Hyman Rickover, helped to launch America's Nuclear Navy during the 1950s, when he was chief scientist of the U.S. Naval Reactors Program. Radkowsky, who died in 2002 at age 86, headed up the design team that built the first U.S. civilian nuclear reactor at Shippingport, Pennsylvania, and made significant contributions to the commercial nuclear industry during the 1960s and 1970s.

Although thorium is not fissile like U-235, Th-232 absorbs slow neutrons to produce U-233, which is fissile. In other words, Th-232 is fertile, like U-238. The Th-232 absorbs a neutron to become Th-233, which decays to protactinium-233 (Pa-233) and then to fissionable U-233. When the irradiated fuel is unloaded from the reactor, the U-233 can be separated from the thorium, and then used as fuel in another nuclear reactor. Uranium-233 is superior to the conventional nuclear fuels, U-235 and Pu-239, because it has a higher neutron yield per neutron absorbed. This means that once it is activated by neutrons from fissile U-235 or Pu-239, thorium's breeding cycle is more efficient than that using U-238 and plutonium.

The Russian-U.S. Program

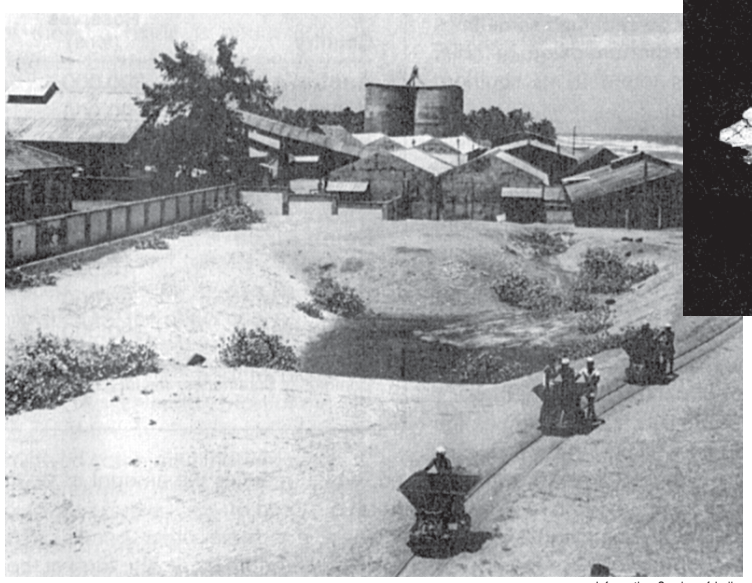
Since the early 1990s, Russia has had a program based at Moscow's Kurchatov Institute to develop a thorium-uranium fuel. The Russian program involves the U.S. company Thorium Power, Inc. (founded by Radkowsky), which has U.S. government and private funding to design fuel for the conventional Russian VVER-1000 reactors. Unlike the usual nuclear fuel, which uses enriched uranium oxide, the new fuel assembly design has the plutonium in the center as the "seed," in a demountable arrangement, with the thorium and uranium around it as a "blanket." ...

One study concludes:

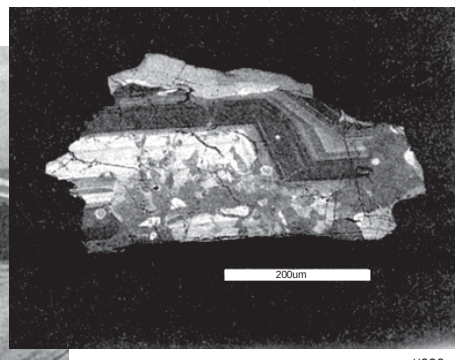
"Thorium fuel offers a promising means to dispose of excess weapons-grade plutonium in Russian VVER-1000 reactors. Using the thorium fuel technology, plutonium can be disposed of up to three times as fast as MOX at a significantly lower cost. Spent thorium fuel would be more proliferation-resistant than spent MOX (mixed oxide) fuel. ... [The thorium fuel technology] will not require significant and costly reactor modifications. Thorium fuel also offers additional benefits in terms of reduced weight and volume of spent fuel and therefore lower disposal costs."

Thorium Fuel Operating Experience

There have been four decades of research and development on thorium fuel cycles, including in the ultra-safe pebble-bed modular reactor (PBMR) now being built in South Africa and China.



Information Service of India



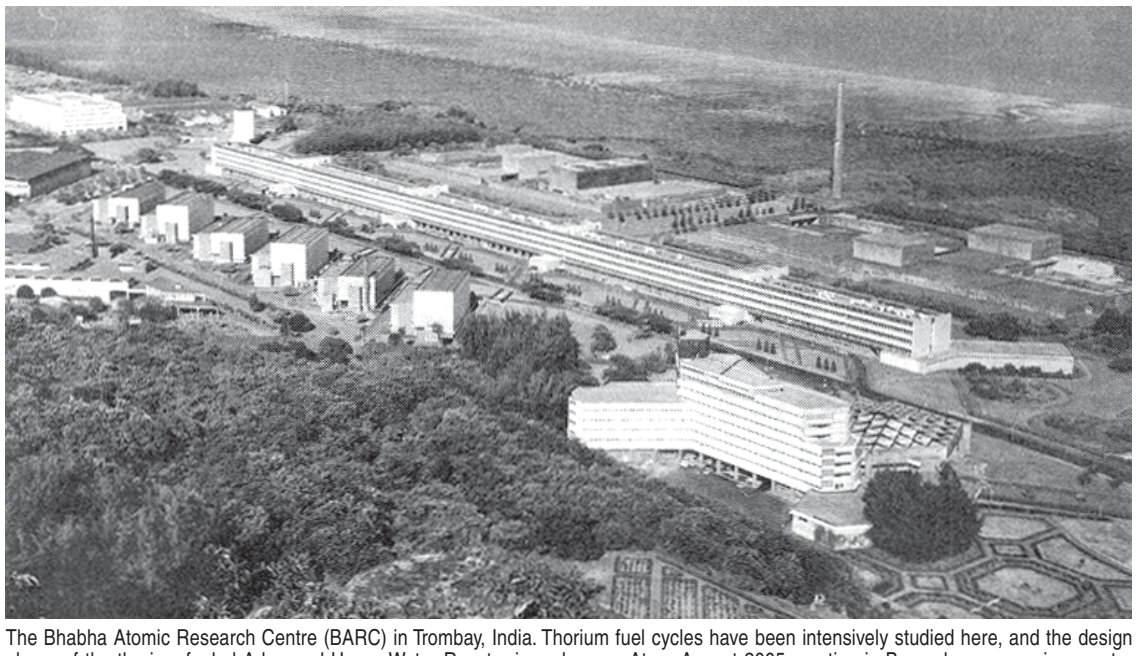
USGS

India has a plentiful supply of thorium in the rare earth monazite, found in its beach sands. At left, workers transport sand to the Rare Earth Processing Plant at Alwaye. Inset is a backscattered electron image of a monazite crystal. Pure thorium is silver in colour, but it becomes gray and then black as it oxidizes.

TABLE 1
World Thorium Resources
(economically extractable)

Country	Reserves (tons)
Australia	300,000
India	290,000
Norway	170,000
USA	160,000
Canada	100,000
South Africa	35,000
Brazil	16,000
Other countries	95,000
World total	1,200,000

Source: U.S. Geological Survey, Mineral Commodity Summaries, January 1999.



The Bhabha Atomic Research Centre (BARC) in Trombay, India. Thorium fuel cycles have been intensively studied here, and the design phase of the thorium-fueled Advanced Heavy Water Reactor is under way. At an August 2005 meeting in Brussels on emerging reactor designs, two BARC scientists unveiled their design for an Advanced Thorium Breeder Reactor (ATBR) that can produce 600 MW of electricity for two years, with no refueling.

The northern tip of Moreton Island, Queensland showing dark patches of mineral sands within the dunes along the beach. Australia, with its abundant mineral sands on the Eastern and South Western coasts, has the world's largest reserves of monazite.

The Infrastructure Road to Recovery

Go Nuclear!

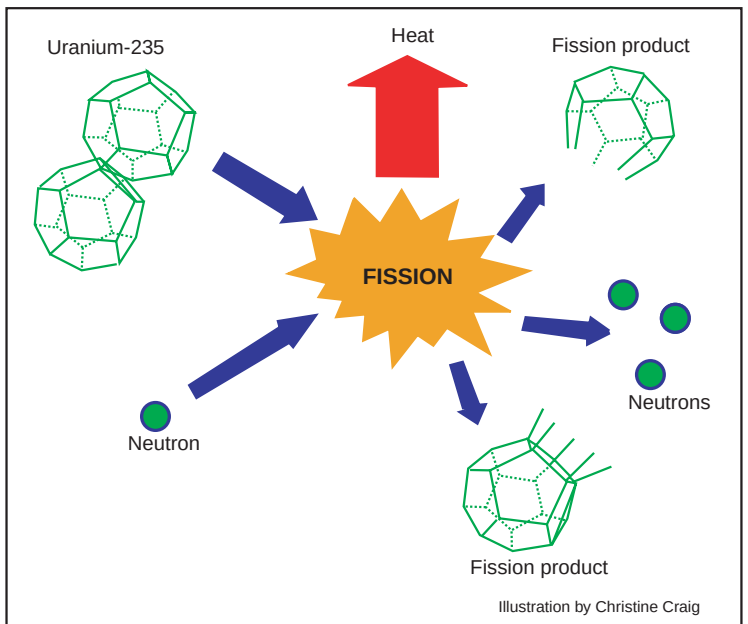
Between 1967 and 1988, the AVR (Arbeitsgemeinschaft Versuchsreaktor – "working group test reactor") experimental pebble bed reactor at Jülich, Germany (the basis for the South African and Chinese PBMRs), operated for more than 750 weeks at 15 megawatts-electric, about 95 percent of the time with thorium-based fuel. The fuel used consisted of about 100,000 billiard ball-size fuel elements. Overall, a total of 1,360 kilograms of thorium was used, mixed with highly enriched uranium (HEU). Maximum burn-ups of 150,000 megawatt-days were achieved. Thorium fuel elements with a 10:1 ratio of thorium to highly enriched uranium were irradiated in the 20-megawatts-thermal (MWt) Dragon reactor at Winfrith, United Kingdom, for 741 full-power days. Dragon was run as a cooperative project of the Organization of Economic Cooperation and Development and Euratom, involving Austria, Denmark, Sweden, Norway, and Switzerland, in addition to the United Kingdom, from 1964 to 1973. The thorium-uranium fuel was used to "breed and feed,'' so that the U-233 that was formed, replaced the U-235 at about the same rate, and fuel could be left in the reactor for about six years. The General Atomics Peach Bottom high-temperature, graphite-moderated, helium-cooled reactor (HTGR) in the United States operated between 1967 and 1974 at 110-MWt, using highly enriched uranium with thorium.

In India, the Kamini 30-kWt experimental neutron-source research reactor started up in 1996 near Kalpakkam, using U-233 which was recovered from thorium-dioxide fuel that had been irradiated in another reactor. The Kamini reactor is adjacent to the 40-MWt Fast Breeder Test Reactor, in which the thorium-dioxide is irradiated.

In the Netherlands, an aqueous homogenous suspension reactor has operated at 1 megawatt-thermal for three years. The highly enriched uranium/thorium fuel is circulated in solution, and reprocessing occurs continuously to remove fission products, resulting in a high conversion rate to U-233.

Thorium in Power Reactors

The 300-MWe Thorium High-Temperature Reactor (THTR) in Germany was developed from the Jülich, Germany AVR noted above, and operated between 1983 and 1989 with 674,000 pebbles, over half of them containing thorium/highly enriched uranium fuel (the rest of the pebbles were graphite moderator and some neutron absorbers). These pebbles were continuously recycled on load, and on average the fuel passed six times through the core. Fuel fabrication was on an industrial scale.



THE FISSION REACTION

In the fission reaction, the uranium isotope U-235 is hit by a neutron and splits apart, producing heat and releasing two or three new neutrons and fission products. The released neutrons then bombard other U-235 atoms, continuing the fission process. The MIT reactor is used primarily as a producer of neutrons for medical and industrial applications.

The Fort St. Vrain reactor in Colorado was the only commercial thorium-fueled nuclear plant in the United States. Also developed from the AVR in Germany, it operated from 1976 to 1989. It was a high-temperature (700EC), graphite-moderated, helium-cooled reactor with a thorium/highly enriched uranium fuel, which was designed to operate at 842 megawatts-thermal (330 MWe). The fuel was contained in microspheres of thorium carbide and Th/U-235 carbide, coated with silicon oxide and pyrolytic carbon to retain fission products.

Unlike the pebble bed design, the fuel was arranged in hexagonal columns ("prisms") in an annular configuration. Almost 25 tons of thorium were used in the reactor fuel, achieving a 170,000-megawatt-days burn-up.

Thorium-based fuel for Pressurized Water Reactors (PWRs) was investigated at the Shippingport reactor in the United States (the first U.S. commercial reactor, started up in 1957), using both U-235 and plutonium as the initial fissile material. The light water breeder reactor (LWBR) concept was also successfully tested at Shippingport, from 1977 to 1982, with thorium and U-233 fuel clad with zircaloy, using the "seed/blanket" concept.

Another reactor type, the 60-MWe Lingen Boiling Water Reactor (BWR) in Germany also utilized fuel test elements that were thorium-plutonium based.

Proliferation Issues

In the early days of the civilian nuclear program, the Acheson-Lilienthal Report in 1946 warned of the connection between civilian nuclear power and nuclear weapons, and concluded that the world could not rely on safeguards alone "to protect complying states against the hazards of violations and evasions"—illicit nuclear weapons. Acheson-Lilienthal proposed international controls over nuclear power, but also considered possible technical innovations that would make it harder to divert nuclear materials into bomb-making. The thorium fuel cycle is one such technical innovation—as yet untapped.

A 1998 paper by Radkowsky and Galparin describes the most advanced work in developing a practical nuclear power system that could be made more "proliferation resistant" than conventional reactors and fuel cycles. Based on a thorium fuel cycle, it has the potential to reduce the amount of plutonium generated per gigawatt-year by a factor of five, compared to conventional uranium-fueled reactors. It would also make the generated plutonium and uranium-233 much more difficult to use for producing bomb material.

Heightened current concerns about preventing the spread of bomb-making materials, have led to an increase in interest in developing thorium-based fuels. The U.S. Department of Energy has funded Radkowsky's company (Thorium Power) and its partners in their tests with Russian reactors, as well as three other efforts (two national laboratories, two fuel fabrication companies, and a consortium of three universities). This research is geared to designing a thorium fuel system that will fit with conventional reactors. There is also a new company, Novastar Resources, that is buying up thorium mines in anticipation of thorium-fueled reactors in the future. The proliferation potential of the light water reactor fuel cycle may be significantly reduced by using thorium as a fertile component of the nuclear fuel, as noted above. The main challenge of thorium utilization is to design a core and a fuel cycle that would be proliferation-resistant and economically feasible. This challenge is met by the Radkowsky Thorium Reactor concept. So far, the concept has been applied to a Russian design of a 1,000-MW pressurized water reactor VVER, designated as VVERT. The main results of the preliminary reference design are as follows: The amount of plutonium contained in the Radkowsky Thorium Reactor spent fuel stockpile is reduced by 80 percent, in comparison with a VVER of conventional design. The isotopic composition of the reactor's plutonium greatly increases the probability of pre-initiation and yield degradation of a nuclear explosion. An extremely large Pu-238 content causes correspondingly large heat emission, which would complicate the design of an explosive device based on plutonium from this reactor.

The economic incentive to reprocess and reuse the fissile component of the Radkowsky Thorium Reactor spent fuel is also decreased. The once-through cycle is economically optimal for its core and cycle.

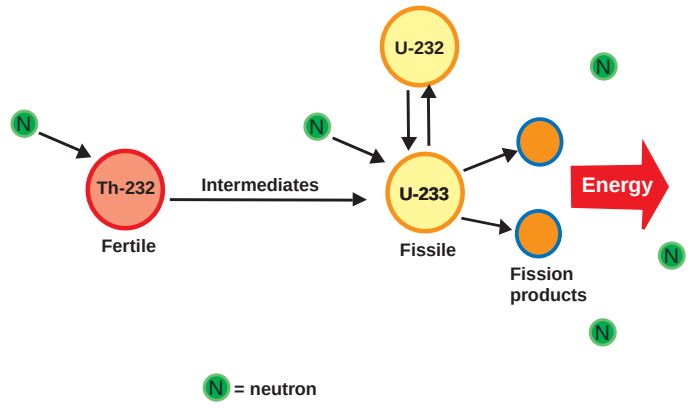
To reiterate the proliferation difficulties: the replacement of a standard (uranium-based) fuel for nuclear reactors of current generation by the Radkowsky Thorium Reactor fuel will provide a strong barrier for nuclear weapon proliferation. This barrier, in combination with existing safeguard measures and procedures, is adequate to unambiguously disassociate civilian nuclear power from military nuclear power.

Other scientists point out that even if a terrorist group wanted to use the blanket plutonium for making a bomb, the process of extracting it from thorium fuel would be more difficult than removing it from conventional spent fuel. This is because the spent blanket fuel from a thorium fuel cycle would contain uranium-232, which over time decays into isotopes that emit high-energy gamma rays. To extract the plutonium from this spent fuel would require significantly more radiation shielding plus additional remotely operated equipment in order to reprocess it for weapons use, making a daunting task even more difficult. It would also be more complicated to separate the fissionable U-233 from uranium-238, because of the highly radioactive products present.

Overall, the development of thorium fuel cycles makes sense for the future, for advancing the efficiency and economy of nuclear power plants, ease of recycling, and making it more difficult to divert radioactive materials for weapons.

Figure 1

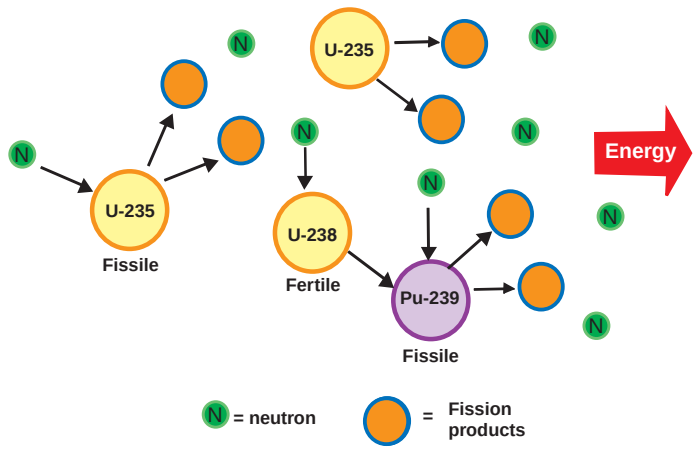
Simplified Diagram of the Thorium Fuel Cycle



The neutron trigger to start the thorium cycle can come from the fissioning of conventional nuclear fuels (uranium or plutonium) or an accelerator. When neutrons hit the fertile thorium-232 it decays to the fissile U-233 plus fission fragments (lighter elements) and more neutrons. (Not shown is the short-lived intermediate stage of protactinium-233)

Figure 2

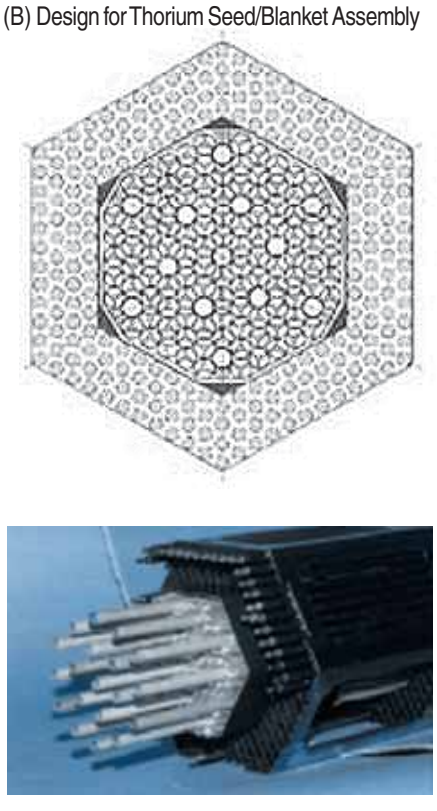
Simplified Diagram of the Uranium Fuel Cycle



In the conventional uranium fuel cycle, the fuel mix contains fissionable U-235 and fertile U-238. A few fast neutrons are released into the reactor core (for example, from a berryllium source), and when a neutron hits a U-235 nucleus, it splits apart, producing two fission fragments (lighter elements) and two or three new neutrons. Once the fission process is initiated, it can continue by itself in a chain reaction, as the neutrons from each fissioned uranium nucleus trigger new fissions in nearby nuclei. Some of the U-238, when hit by a neutron, decays to plutonium-239, which is also fissionable.

(A) VVER Fuel Rod Assembly

(B) Design for Thorium Seed/Blanket Assembly



Radkowsky design for the thorium seed/blanket assembly. The seed fuel is the inner part of the fuel rod (three-sectioned), and the blanket fuel is the outer part. The thorium fuel assembly is designed to replace the current fuel assembly, without requiring a major design rehaul.

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

A Great Railway Boom

Australia's rail sector must be revolutionised, both for the sake of transport within our country, and also to tie Australia into the rest of the world, in particular into the world's greatest population centres, at the eastern and southeastern Asian terminals of the Eurasian Land-Bridge. This revolution will have two axes: Prof. Endersbee's proposal for a Melbourne-Darwin Asian Express, and a vast upgrading and expansion of Australia's rail network centring upon the new magnetic levitation (mag-lev) rail technology pioneered in Germany, and which is now being built in China.

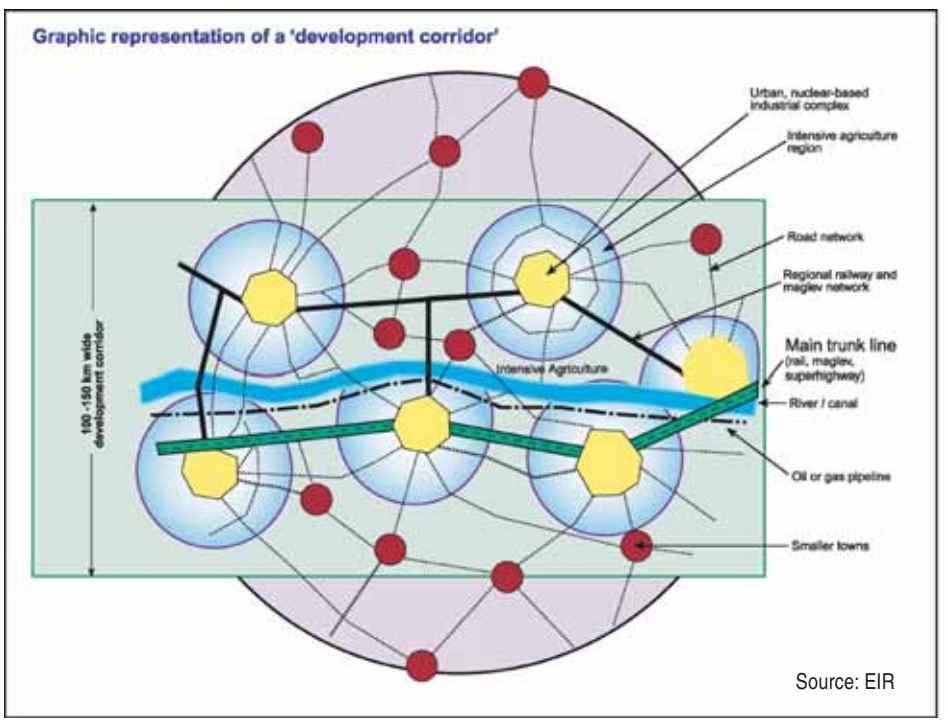
Our nation's rail sector at present is a pathetic shambles, so bad that the 2001 Australian Infrastructure Report Card prepared by the Institution of Engineers, Australia, a very conservative, understated body, rates it at D-, with the crucial Melbourne-Sydney-Brisbane rail corridor rating an F, due to "poor track co-ordination, steam age alignments and inadequate signalling and communications systems."

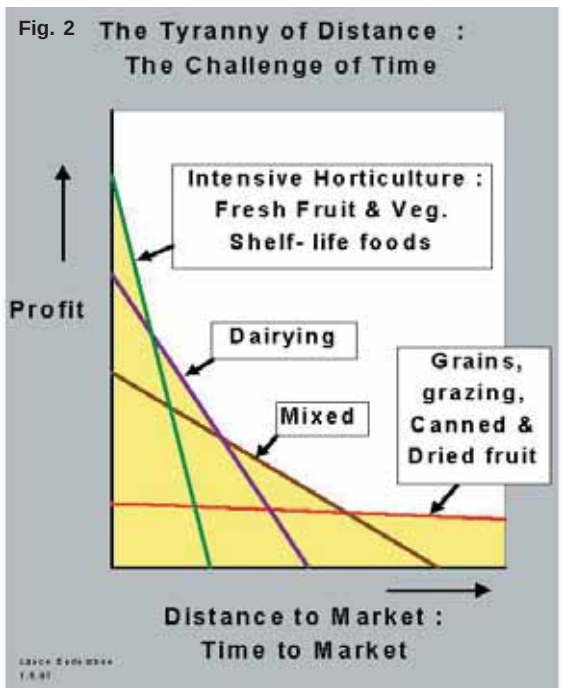
With the exception of rail lines built expressly to service mineral deposits, most of Australia's rail system was built at the turn of the 20th Century. The report of the federal Parliament's Standing Committee on Communications, Transport and Microeconomic Reform, *Tracking Australia* warned in 1998, "Without urgent and substantial investment in this infrastructure, major sections of the national rail network are likely to become irretrievable within ten years. In this context, the rationale for increased investment in rail infrastructure has to be about averting the potentially enormous costs of diminished or defunct rail services between major cities on the eastern seaboard, including increased road construction and maintenance, and the negative externalities associated with large and growing volumes of road traffic."

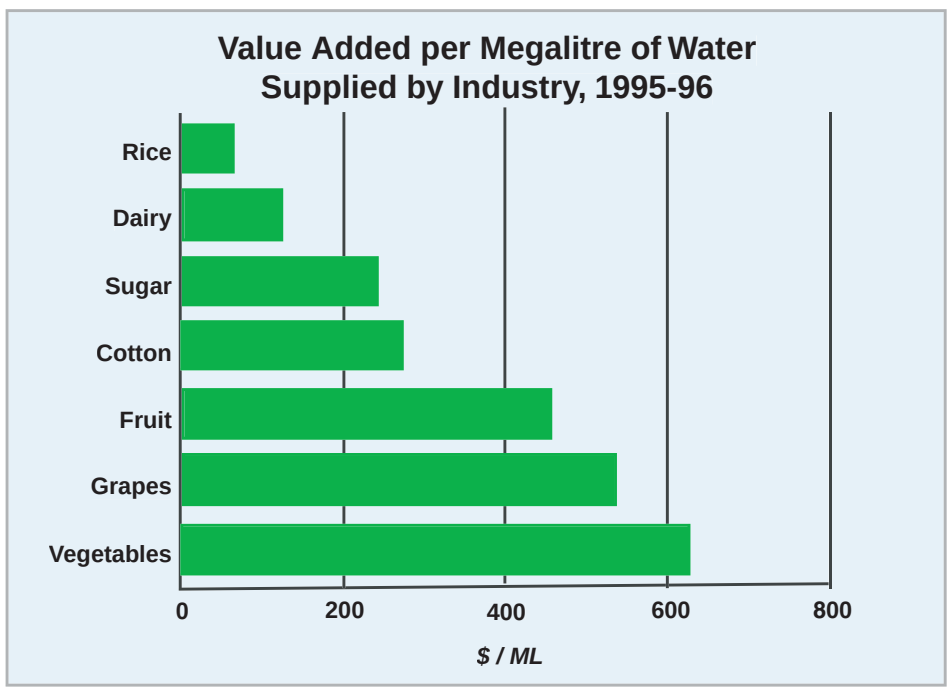
That report was three years ago, and, under privatisation and competition policy with the exception of the beginning construction of the Alice Springs-Darwin railroad, the rail system has not improved significantly since. The "negative externalities" in the report refer to the horrible figure of $15 billion per year lost in road accidents on overcrowded, deteriorating roads along with an estimated $13 billion annual loss due to congestion, which is expected to rise to $30 billion by 2015. Only a tiny fraction of the nation's passenger traffic moves by rail, and, since 1975, rail's share of interstate non-bulk freight has declined from 60% to 35%, even as the trucking industry is suffering record rates of bankruptcies and psychological and health problems associated with horrific working hours. Between 1975 and 2001 the Federal Government spent $43 billion on roads and a miniscule $2 billion on rail, even though for medium and long distance, rail is an inherently much more efficient mode of transport. Therefore, we must plan to spend some tens of billions on the industry over the next ten years, both in upgrading existing lines, but in particular in building the Asian Express and a mag-lev grid tying together all of our major population centres.

Prof. Endersbee's Asian Express, a high-speed train from Melbourne to Darwin, our gateway to Asia, would revolutionise Australia's export potentials.

The Asian Express







Top, Left and Right: The railroads of the Eurasian Land-Bridge will not merely be transport systems, but 100 km wide "development corridors", encompassing oil and gas pipelines, communications networks, superhighways, agro-industrial complexes and new cities—precisely the way Prof. Endersbee's Asian Express and Ring Rail proposals should function for Australia. Bottom Left: Australia's agricultural exports have been largely constrained to bulk products which are not time-sensitive, but which are often much less profitable, such as grains, cotton, wool, canned fruits, etc. Bottom Right: Through greatly expanding our irrigated acreage, in combination with high-speed rail and ship links to Asia, we can greatly increase the return to Australia's producers, as the combination of this graph and Fig. 2 demonstrate.

The Melbourne to Darwin Asian Express proposal, which Prof. Endersbee later expanded into the Ring Rail to go around the top end of the continent and terminate in Perth, is a beautiful idea, which would transform Australia's relations to Asia.

Australia's present transport system is a huge constraining factor on the nation's export capabilities, as Prof. Endersbee explained to the CEC National Conference on November 23, 1997,

"Our present system of shipping involves what are still effectively tramp steamers, that go through several ports.… If you have a look at the time tables of all the ships that come to Australia, you find that when a ship comes to Australia, they visit three or four ports in our waters and effectively, most shipping in Australia, circumnavigates the continent. This system would cut right through this, with a total new transport system. It is not just a railway line. *It's a new transport system*. Because of the fact that these ships have to call at several ports in Australia, the sort of ships that serve Australia also call at several ports around in the South West Pacific/ East Asia area. So they have a schedule of about six weeks, a turnaround time of about six weeks. So, for shippers shipping from Australia, it usually is a month plus, to get to anywhere in Asia."

With the Asian Express, however, three trains a day could be running between Melbourne and Darwin, and then, with high speed ferries, products could be in key Asian ports in another day or two. Said Prof. Endersbee, "The distance from Darwin to Singapore is the same distance as the length of the Mediterranean. The sea state is mostly fairly flat. In other words it is calm seas most of the time, so that means we can contemplate fast ferries servicing these areas, and so we can have daily ferry services from Darwin to Java, Darwin to Singapore, and so on." And these Asian ports are huge: Hong Kong and Singapore are close to tied for the world's largest, while the third largest port in the world is Kaohsiung in Taiwan, with four ports on the north coast of Java which handle as many containers combined as Europe's greatest port, Rotterdam.

The Asian Express should obviously be built immediately. But, explained, Prof. Endersbee,

"In proposing this project over the past five years, I have been totally opposed by every government in Australia, federal and state…. And nobody is really interested in my analysis of the economies of the project, all the detail I have done in terms of professional work. I have done at least five years solid professional work on this, and prior to that I was working in Southeast Asia, and I have been looking at these economies in Southeast Asia for the last 30 years, and so I had an awful lot of background behind me and

The Infrastructure Road to Recovery

A Railway Boom

A Mag-lev rail system

The future of world transportation—magnetically levitated trains capable of travelling at 550 km/hour.

Addressing a conference in Germany on May 5, 2001, Lyndon LaRouche sketched a bold vision of the role of mag-lev centred *development corridors* in transforming the Eurasian continent, a concept which is equally applicable to our own vast, undersettled and undeveloped country:

"This is not railroads, this is not Silk Roads, these are corridors of development, which run a range of, let's say, up to 100 kilometers in width, from the Atlantic to the Pacific, going in various directions. Along these routes, as we did in the United States with the transcontinental railroad, the area on either side of the transportation axis becomes immediately, in and of itself, a sustainable area of economic development. By that means, you can branch out from the main corridors into subsidiary corridors of development and capture the area. If we can make that kind of link, one interesting kind of change occurs immediately....

"Take transportation alone. People who don't think, think that ocean freight is the cheapest way to move freight. That is not true. The cheapest way is across land, but not by truck; trucks running up and down the highway tell you that the economy is being dismantled. It costs too much, it's intrinsically bad. Railways are much better. Integrated transport systems, featuring railways, especially magnetic levitation systems, are excellent. Magnetic levitation systems move passengers more rapidly, but those same systems for moving freight, that is really a wonder. That's where the payoff comes. If you can move freight from Rotterdam to Tokyo at an average rate of 300 kilometers per hour, without much stopping along the way, and if for every 100 km of motion across that route, you are generating the creation of wealth through production as a result of the existence of that corridor, then the cost of moving freight from Rotterdam to Tokyo is less than zero. What ocean freight can do that? Did you ever see a large supercargo ship producing wealth while travelling across the ocean? And at what speed?

"Therefore, we have come to a turning point in technology, where the development of the internal land-mass of the world and the great typical frontier is Central and North Asia. That is the greatest single opportunity before all mankind for development."

The mag-lev era has already begun. On January 23, 2001, China and Germany signed a contract to begin the construction, in Shanghai, of the first magnetic-levitation rail line in the world, which will begin commercial operations in February 2003. The implications of this first contract were summed up in a recent evaluation in *Executive Intelligence Review* of November 2, 2001:

"This revolutionary new technology is not only suited for passenger travel at velocities of up to 500 km/hour—for which the German maglev system Transrapid was optimized—but in the future will also allow the creation of fully automated systems of freight transport, with performance parameters which up to now are completely unattainable. Such future freight systems will automatically transport containers from one chosen spot on the network to another, like a computer-controlled industrial conveyor belt. At speeds of up to 250 km/hour, a single mag-lev container freight transport line could support as much freight daily, as 20 or more parallel conventional railroad lines.

"With the Transrapid, the ancient invention of the wheel is for the first time becoming obsolete. There is no longer mechanical contact between train and track; instead, the train is suspended and propelled forward by electronically steered magnetic fields alone, in a friction-free manner. As a result, magnetic levitation technology allows, in comparison with conventional wheel-track technology, a much greater rate of acceleration, steeper ascents, narrower curves, low noise volume, higher safety because of fully automatic operation, and greatly reduced wear-and-tear on the train and roadway.

"Studies of mag-lev routes in Europe have shown that not only is the technology quicker than air travel for relatively short routes, but that even for such longer routes, as from Berlin to Moscow or Kiev, mag-lev is more than competitive. Especially if one keeps in mind the transfer time between airports and city centers, and the lengthy checking-in and boarding procedures of air travel. At the same time, the Transrapid system has all the normal advantages of passenger railroads: above all, that not only the terminal points of a line, but rather an entire series of cities in between are serviced by the same train, with the unlimited possibility of stopovers for the passengers.

"The Transrapid thereby contributes to the general development of the entire corridor. Whereas for an airplane there is only uninhabited, empty air between takeoff and destination."

The Chinese are roaring ahead with their Shanghai-Pudong mag-lev project. "Commander" Wu Xiangming, the director of construction for the project, has organised the construction in a military-engineering style, which will allow the project to be completed in less than two years. The Chinese took only six months to build an entire new factory near Shanghai, which started producing the concrete and steel components of the line in November 2001, to the amazement of German journalists who have visited the site. As China extends the line to Beijing, the system's components would no longer be produced in Germany, but entirely in China, with a view to export to other Asian countries, just as we could establish our own mag-lev industry in Australia.

The Shanghai-Pudong project has provoked an explosion of interest and large-scale proposals in the Netherlands, Germany, Poland, the U.S. and other countries. In Australia, when examining options for a link from the city of Melbourne to the airport, Victorian Premier Steve Bracks expressed interest in a mag-lev line. An express trip would take eight minutes, while a trip with two stops, at Keilor Park and Sunshine, would take only 13 minutes, with speeds hitting 250 km/hour. In NSW, Transrapid also has a concept for a regional/orbital system to link Sydney, Wollongong and Newcastle.

For two decades now, Australian federal governments have been dithering and doddering over a Sydney to Canberra or a Sydney-Canberra-Melbourne high speed link, with one proposal after another being turned down as not cheap enough. But, in retrospect, perhaps all this stonewalling will prove to have been useful, since it prevented Australia from being stuck with a much slower, less effective technology than the mag-lev.

The most insightful recent evaluations of high speed trains for Australia in the past decade are found in two reports by former MP Peter Nixon, who in 1995 chaired a working group reporting to the Victorian State Government on rail strategy. His committee's report, "The High Speed Train Report" was updated by him in July 2000, in his 'High Speed Trains in Australia: Beyond 2000."

In the latter, he makes a couple of crucial points. First, that "Our country is similar in geographic area to continental United States and mainland China. A large proportion of our relatively small population live in coastal cities separated by significant distances. Almost half of that population live in and around our two largest cities, Sydney and Melbourne, separated by a distance of approximately 900 kilometres. Millions more live in the cities and major regional centres of the east coast corridor, and the aggregation of city and regional Australians along its path, that high speed trains will be required to effectively serve."

The benchmark for trains in this corridor, he notes, is an express trip between Sydney and Melbourne in three hours or less, to effectively compete with air travel. Some "wheel on track" technologies could conceivably do this. "However", Nixon observes, "in a world of rapid technological change, there are indications that conventional 'wheel on track' rail systems will in the very near future be succeeded by 'wheel-less' trains propelled by the principle of magnetic levitation (maglev). Over the past quarter century, such systems have moved from the development stage to operational readiness. Maglev, with its promise of a quantum increase in operating speeds, remains the 'new technology' seeking to challenge the established performance of 'wheel on track' systems…. [E]nough international experience has been gained to demand that the proper evaluation of a major east coast high speed rail network in Australia must include a thorough and objective assessment of the maglev option. At a time of generational change in the rail industry the technology equation remains paramount. The high speed option selected for Australia will be required to overcome the related tyrannies of distance and time for the next 100 years or more."

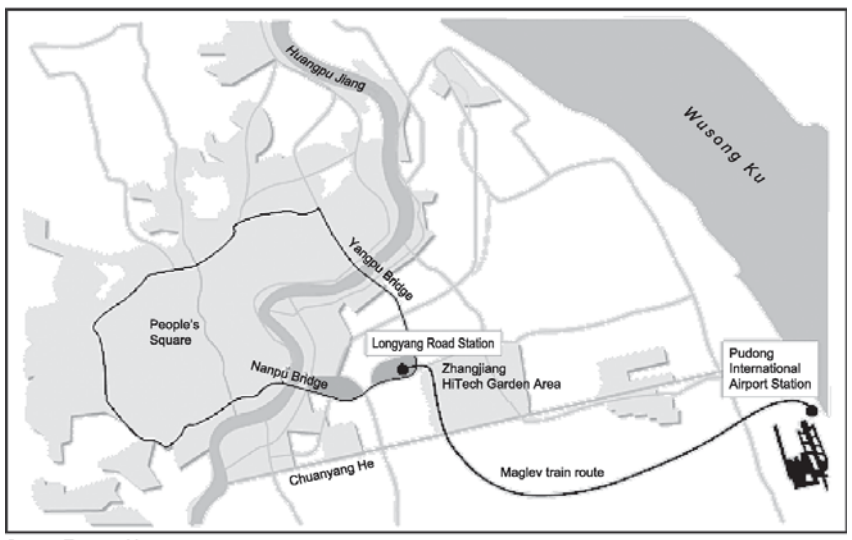
But, even more important than the technical aspects of mag-lev, is the call with which Nixon ends his report, which is an implicit call for a great mag-lev scheme, as part of a broader national purpose of nation-building:

"Nations need to build. Citizens and communities need, and overwhelmingly seek, to be a part of that embrace of a national purpose. The strength of a national high speed train project lies in the fact that such a project will deliver much more than an alternative transport mode to service existing travel needs. Such a project would provide an important national focus for the development of Australia into the 21st Century. Considerations of national vision and national purpose go to the very heart of our Australian character and psyche."

Well said. Now, let's get on with the job!

former Liberal party fundraiser and Howard friend Everell Compton. Aside from the fact that ATEC will mostly run along existing routes, which thus negates the essential point of the Asian Express, its high-speed aspect, and the fact that federal government backing for such a project was effectively let without a tender, under coming depression conditions, the privately-funded ATEC will never be built in the first place.

The Shanghai-Pudong Transrapid Maglev Project



Source: Transrapid.

Planned Maglev Projects in China

Source: Transrapid.

Above: The world's first commercial mag-lev rail line, from Shanghai to the Pudong Airport, is being build now and will open in Feb. 2003. Right: The 30 km Shanghai-Pudong mag-lev line is expected to be expanded rapidly to Beijing, a distance of 1,250 km.

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

A World Leader in High-Speed Shipping

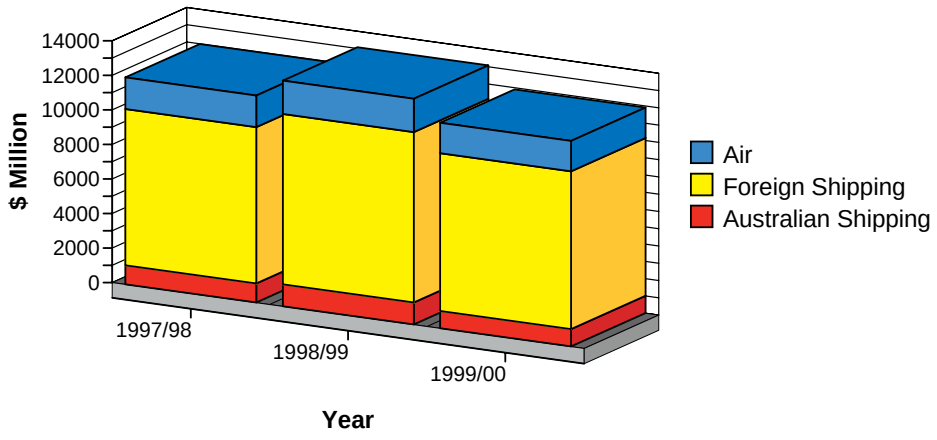
by Robert Barwick

Australia needs a shipping industry! We are an island-continent, with a coastline of 19,320 kilometres. In the year 2000, the Australian economy exported $101.295 billion worth of rural produce, resources and manufactured goods, and imported $112.445 billion worth of consumer, capital and other goods. The total sea freight bill on this external trade was $11.9 billion, $9 billion of which was spent on foreign ships operating in Australia. (See Fig. 1.) This added $3 billion to Australia's current account deficit, 9% of the total deficit. Yet, incredibly, Australia has virtually no shipping industry. Major shipbuilding in the area of cargo vessels and bulk carriers has been defunct for more than 20 years. Worse, the nation's ship-owning and ship-operating industry has been allowed to collapse to minuscule proportions: the fleet of commercial Australian flag ships is down to 59 vessels in total, out of a total world market of upwards of 30,000 vessels.

The Australian shipping industry has declined rapidly over the past 20 years, because Government policy has been purposely rigged to favour cheaper foreign shipping. As Captain William (Bill) Bolitho, a legendary Australian maritime figure who was chairman of the Australian National Line (ANL) from 1989 to 1994, and Chairman of the Australian Shipping Commission from 1984 to 1989, explained the decline to the *New Citizen* on January 21, "It's almost entirely because of government policy over the past fifteen years, that has favoured the importation of foreign vessels and foreign crews, untaxed and unregulated. The Australian government hasn't, for many years, put any support behind either its shipbuilding, or shipping industries."

Large steel cargo shipbuilding (known as "metal bashing") ceased in Australia in 1978, when BHP closed its Whyalla shipyard. Until then, Australia had produced a wide range of vessels, including bulk carriers up to 85,000 tonnes dead weight, roll-on, roll-off vessels and ships for the coastal and international trade.[1] But when the Government subsidy for shipbuilding, the Shipbuilding Bounty (a percentage of the construction cost paid for by the Government), was rolled back, Australia's high wages and living standards, like Europe's, became uncompetitive in shipbuilding, first with Japan, and then, in turn, with South Korea, Taiwan, China and the Philippines. As a "mature" technology, large bulk carrier shipbuilding isn't hard to replicate, Bolitho explained, and lower-wage nations have a competitive edge.

Figure 1



The carriers of Australia's international merchandise trade. Government policy dictates that nearly $10 billion out of $11 billion is paid to foreign shipping operators. Source: Australian Maritime Trasport 2000", prepared for the Australian Shipowners Association by the Apelbaum Consulting Group Pty. Ltd. January 2001.

While the decline in shipbuilding can be partially explained as a global phenomenon, Australian Government policy deliberately disadvantages Australia's shipping industry. The Australian Shipowners Association reports no less than ten pieces of federal legislation that, one way or another, impose costs on Australian ship operators that are not imposed on foreign operators. For instance, Australian flag ships (ships registered in Australia) are regulated under occupational health and safety and other laws that make ship operating safe. Foreign ships are predominantly unregulated and are issued special permits by the Australian Government to operate on Australian routes, without complying with Australian award wages and safety regulations. Furthermore, Australian operators and crew pay tax, whereas a very large proportion of foreign vessels either enjoy tax breaks that most major shipping countries provide (unlike Australia), or they operate out of tax havens like Panama and Liberia. Panamanian-registered vessels carried 37.5% of Australia's international maritime trade in 1999/2000, followed by Liberia at 8.5%. The lack of Government finance also disadvantages Australia's ship operators: like most international industries, the shipping industry is driven entirely by finance. Without cheap Government credits, Australian operators can't buy their vessels cheap enough to be competitive.

Deputy Prime Minister and Transport Minister John Anderson brazenly admitted to this policy of deliberately disadvantaging the nation's shipping industry in a speech to a Melbourne dinner in December 1999, when he announced that "Australia is a shipper nation [exporter] and not a shipping nation [carrier]," and that no incentives would be provided by the Coalition Government. In the words of Capt. Bolitho: "The Australian government has set out on a policy of using other countries' tax breaks to fund their own shipping industry. It's in terms of finance and government incentives that the heart of the problem lies. Australia doesn't want a shipping industry. It says, 'If we can get it cheaper somewhere else, let's do it'."

Fast Boat to China: Australian-Made High-Speed Shipping

The one bright spot on the Australian shipping scene has been the development of a vigorous niche industry building small, specialised vessels, particularly high-speed catamarans. Two Australian companies, WA's Austal Ships, and Tasmania's Incat are world leaders in high-speed shipping technology, and have set the standard in the development and production of high-speed catamarans and other fast ferries for the international market. Incat has held the Hales Trophy for the fastest transatlantic crossing for the last three years, its *Cat-Link V* crossing in just 2 days, 20 hours and 9 minutes at an average speed of 41.284 knots (nautical miles per hour; 76.5 km/h or 47.5 mph).[2] Austal's *Villum Clausen* holds the record for the longest distance travelled by a commercial passenger ship in 24 hours—1063 nautical miles.

The export of these catamarans has been a successful business for both companies; however, a recent decline in the demand for larger fast ferries has effected the shipbuilding industry. For example, a vessel sold by Incat in January 2002 was its first sale for 14 months. In the face of the onrushing global economic depression, the risk is that the further development of these great Australian companies could be stifled. On the other hand, if LaRouche's New Bretton Woods/Eurasian Land-Bridge global economic recovery plan is adopted, and Australia in that context adopts a national development perspective, then Australia's export industries will soar, and along with them demand for these high-speed catamarans.

The immense potential for these high-speed catamarans is in fast freight to Asia, right on Australia's doorstep. Industry sources report that both the Northern Territory and Queensland governments have canvassed the possibilities of fast freight into Asia, and the concept is seen as strong and workable. The immediate application of that technology would rapidly accelerate the development of the "Top End" of Australia. According to Prof. Lance Endersbee, who has studied fast freight potential into Asia as part of his "Asian Express" high-speed rail concept, a fast freight service into Jakarta, Singapore and Kuala Lumpur would create a demand for high-value Australian produce, particularly in fresh fruit and vegetables. The fledgling exotic fruit industries around Darwin, of Kakadu plums, peanuts, mangoes, paw paws, and figs, that are being developed already using expensive air freight, would be able to expand into large industries for northern WA, the NT, and northern Queensland, supplying the massive Asian market.

Both Austal and Incat have developed their largely vehicle/passenger catamarans into fast freight carriers. Their existing fast freight designs could transport five to eight times the tonnage of a jumbo jet at a rate of around 40 knots. At that rate, freight would be shipped from Darwin to Singapore in just two and a half days!

The record-breaking *Cat Link V* holds the Hales Trophy for the fastest-ever trans-Atlantic crossing—2 days, 20 hours, 9 minutes.

Singapore is 1887 nautical miles from Darwin, and Jakarta is about 1400. Incat's *Evolution* series of high-speed freight catamarans, which are between 98 metres and 112 metres long, could make the Singapore trip in 53 hours at an average rate of 36 knots. These are 1100 tonne vessels that would have to carry 350 tonnes of fuel to make the trip non-stop, leaving between 400 tonnes and 600 tonnes for freight. At 600 tonnes of deadweight (i.e. the weight of the freight), they will operate at 40-45 knots. The vehicle deck provides a total of 3528 square metres of cargo space, or 589 truck lane metres, plus 698 square metres for palletised cargo forward. Adjustable mezzanine decks that can be raised and lowered have been developed which offer even more space, and which can be adjusted to transport cars and live cattle. Furthermore, the possibility exists for curtained-off chiller zones that can provide varying temperatures in different sections of the deck, to meet the varying requirements of the different produce, without the

Incat's Evolution series of fast freighters. *Evolution One 12*, above, carries passengers and trucks. *Evolution One 12f*, left, carries roll-on, roll-off freight. Both travel at up to 45 knots.

The Infrastructure Road to Recovery

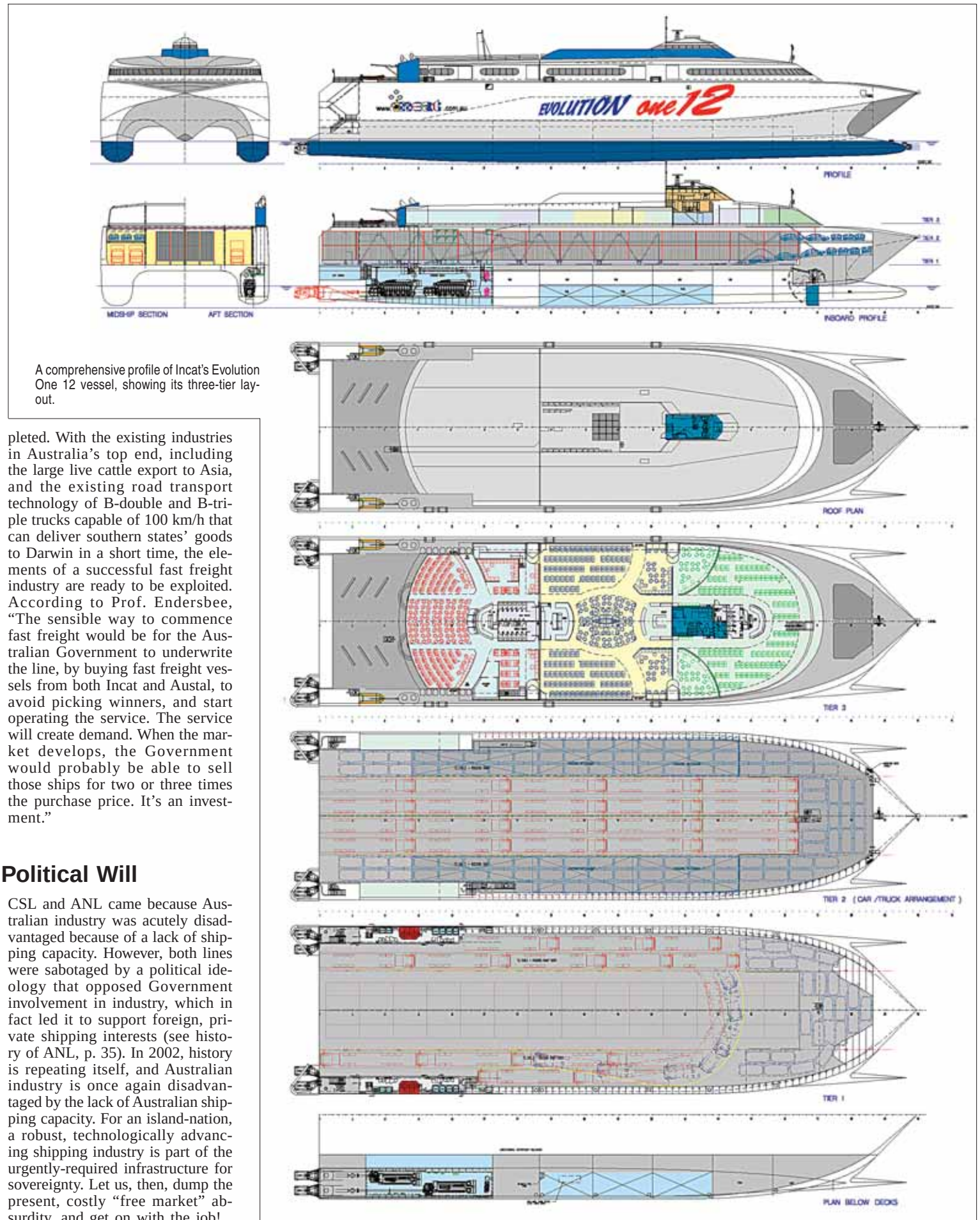
High-Speed Shipping

need for freezers.

Austal's range of fast freighters include 95m to 116m catamaran "platforms" that have been developed for high-speed transport of containers, trucks, trailers, pallets and aircraft containers. As with Incat's craft, the shallow draft and high manoeuvrability of these vessels means they require little in the way of port infrastructure. They offer double the speed and therefore half the travel time of conventional vessels, and their freight cost per kg is up to 80% lower than air freight. Pictured are the Ro-Con (roll-on and container, Ro-Ro (roll-on, roll-off), and Ro-Pax (roll-on and passenger) in Austal's *Auto Express* range.

In the future, when combined with Prof. Endersbee's Asian Express from Melbourne to Darwin that will be able to transport produce from the southern states to Darwin in just 24 hours, this fast freight technology could transform the present tyranny-of-distance industries of Victoria, South Australia and Tasmania (which are high-bulk and low-value) into high-value, profitable export industries of fresh fruit and vegetables. As these industries expand, they will drive a rapid expansion of the fleet of fast freight vessels. In the future, hundreds of fast freight ships could make daily runs from Darwin and other northern ports in Queensland and WA, to Jakarta and its sister ports in Indonesia, and Singapore and beyond, brimming with Australian-grown fruits, vegetables, meat, dairy products, and manufactured goods.

The Government holds the key. Prof. Endersbee insists that the establishment of fast freight runs from Darwin to Asia can begin immediately, and does not have to wait until the Asian Express is completed. With the existing industries in Australia's top end, including the large live cattle export to Asia, and the existing road transport technology of B-double and B-triple trucks capable of 100 km/h that can deliver southern states' goods to Darwin in a short time, the elements of a successful fast freight industry are ready to be exploited. According to Prof. Endersbee, "The sensible way to commence fast freight would be for the Australian Government to underwrite the line, by buying fast freight vessels from both Incat and Austal, to avoid picking winners, and start operating the service. The service will create demand. When the market develops, the Government would probably be able to sell those ships for two or three times the purchase price. It's an investment."



A comprehensive profile of Incat's Evolution One 12 vessel, showing its three-tier layout.

Economic Necessity, Political Will

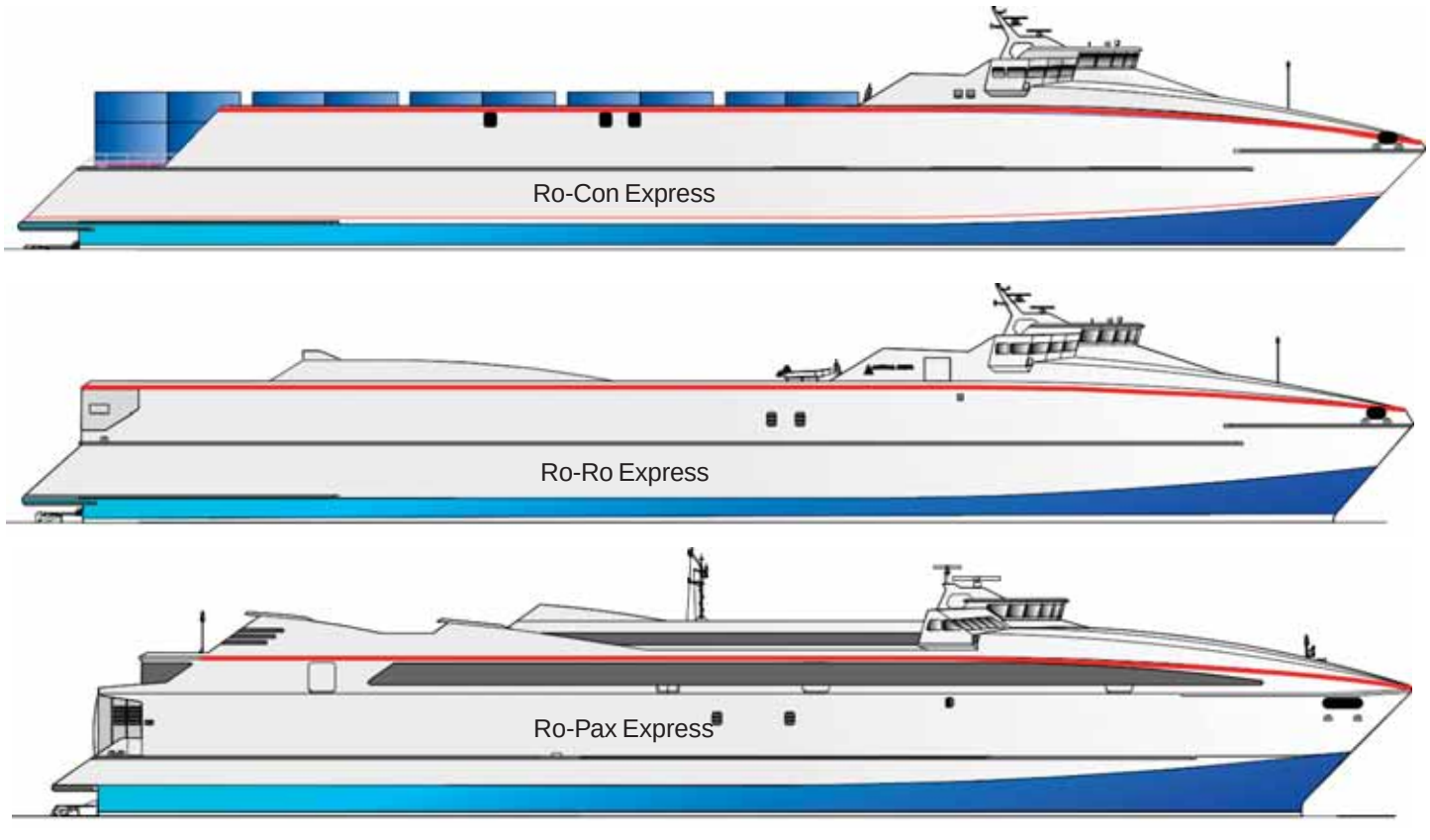
Australia's geographic location and economic plight both cry out for a strong Australian shipping industry. With Government support in the form of cheap financing and tax breaks, combined with regulation of foreign vessels, Australia can once again enjoy a booming shipping industry, saving itself the present $10 billion per year in freight costs, an amount which will soar as global economic recovery gets underway.

Australia has a successful track record in running Government shipping lines, through the experience of both the 1920s Commonwealth Shipping Line, and the 1957 to 1998 Australian National Line. The impetus to found both CSL and ANL came because Australian industry was acutely disadvantaged because of a lack of shipping capacity. However, both lines were sabotaged by a political ideology that opposed Government involvement in industry, which in fact led it to support foreign, private shipping interests (see history of ANL, p. 35). In 2002, history is repeating itself, and Australian industry is once again disadvantaged by the lack of Australian shipping capacity. For an island-nation, a robust, technologically advancing shipping industry is part of the urgently-required infrastructure for sovereignty. Let us, then, dump the present, costly "free market" absurdity, and get on with the job!

Footnotes

1. Roll-on roll-off is where cargo is driven up a ramp onto a boat and stored, usually by a forklift or a similarly manoeuvrable vehicle. When first developed in the 1950s, it was a revolution on conventional ship-loading, where cargo would be lifted up and put down in a hold, and then taken and stored. Roll-on roll-off was more capital intensive than conventional methods, because the ramps were expensive, but in terms of operating costs, and turnaround times, it was far more efficient. It was eventually largely replaced in bulk freight carrying by the container freight revolution, but it still has its applications.

2. The standard for a nautical mile is the Earth's equator. Each of the 360 degrees of the earth's equator can be further divided into 60 minutes. Each minute of arc is one nautical mile. Therefore the distance around the earth is 360 x 60, or 21,600 nautical miles. This is the standard measurement used by all nations for air and sea travel. Converted from standard measurements, a nautical mile is 1.852 kilometres, or 1.1508 miles.



Austal's Auto Express range of freight platforms: Ro-Con (roll-on, roll-off and container freight); Ro-Ro (roll-on, roll-off); and Ro-Pax (roll-on and passengers) Express vessels which offer 80% savings on air freight costs.

The Infrastructure Road to Recovery

High-Speed Shipping

"Can-do" Shipping—the Australian National Line

Once upon a time, Australia did have a Government-supported national shipping line, first with the Commonwealth Shipping Line in the 1920s, and then with the 1957-1998 Australian National Line (ANL). Both were established out of the bitter experience of getting caught in world wars without an adequate national shipping capacity.

Prior to World War I, colonial Australia was totally dependent upon Britain for shipping, and Britain was the destination for most of our exports. However, during World War I, Britain's fear of German u-boats caused it to stop shipping to Australia, and to take the much shorter and safer route to South America for trade instead. Then, in 1915, Australia raised a bumper wheat crop, but had no means to transport it anywhere. Prime Minister William Hughes travelled to London and purchased six steamers, which became Australia's first national shipping company, the Commonwealth Shipping Line (CSL). CSL continued until 1929, when Australia's Anglophile, treacherous Prime Minister, Lord Stanley Melbourne Bruce, sold it to a group of British shipowners. These private shipowners promptly shut CSL down, forcing Australia to once again rely on Britain for its shipping.

Ten years later, history repeated itself. Upon the declaration of World War II, Australia was unable to get its product to market (as it turned out it wasn't just freighters Britain was unable to provide—its oft-promised Navy wasn't sent to defend Singapore on Australia's behalf, either). The Government's response was to establish another national shipping company, the Australian Shipping Board (ASB).

In 1957. The ASB became ANL, and for the next 41 years, until it was sold off in 1998, transported freight for Australian industry. Furthermore, it did so very profitably, especially when supported by pro-industry political leaders.

ANL eventually fell victim to two ideological shifts in Australia: 1) the post-industrial society that emerged out of the 1960s rock-drug-sex counterculture, which saw many industries dismantled, including Australia's nuclear and machine-tool industries, beginning in the late 1960s, and 2) the Mont Pelerin Society "revolution" of economic rationalism and globalisation that accompanied Bob Hawke's rise to power, with his agenda of privatisation and deregulation. In its day, however, ANL served Australia admirably, and is a shining example of what Australia could achieve with a strong commitment to a shipping industry.

The story of the early, successful days of ANL is told in Chapter 14 of Capt. John Williams' fascinating autobiography, *So Ends This Day*. Capt. Williams was ANL's founding chairman, and led it for its first 15 years. Williams was a Welsh-born seafarer of many years experience, whom the Menzies Government's Minister for Shipping and Transport, Senator Shane Paltridge, approached to head up its new venture to establish a government-owned shipping line on a commercial basis.

Williams' recollection of Sen. Paltridge's opening directive for the operation of ANL perfectly captures the spirit in which ANL was launched: "Without further palaver, I was told the fleet was to be run as a private enterprise show: that we would be expected to provide an adequate and efficient service, including the less payable trades; that we need not look for any Government help or favour, the reverse in fact; that the written-down value of the ships was fifteen million pounds; that we would be given that sum to buy them from the Board plus £500,000 working capital and no more; and, that if we could not make a go of it, to Hell with the lot of us. Then, as a final shot, he said that he wanted me to run the Line as if I had my own funds at risk and that if we paid a dividend of 6% on its capital and kept anything extra to build up the business it would be alright with him—'But just give us the money, Mister'."

And they did. With a board comprised of experts in matters relating to shipping, industry and business, ANL began turning an immediate profit. In its first four and a half months' trading to June 30, 1957, ANL made a profit of £1,139,296, and paid a dividend of £433,064 to the Government. Williams wrote: "I had much pleasure in taking the cheque to Shane Paltridge with the remark, 'Sir, here is the money!'."

The timing of the establishment of ANL proved very fortunate, because at that time the price of secondhand ships was "astonishingly" high. The ANL board immediately sold all of the "dogs" of the old ASB fleet, and made sufficient money to buy newer and better ships. For example, they were able to sell one 10,000 ton vessel for £650,000, that a few years earlier had been worth just £200,000! ANL was able to procure a fleet of 10,000-ton vessels of the "Lake Class", that were mainly put into operation carrying iron ore for BHP between Whyalla and Port Kembla, for the lowest iron ore rates on a ton-mile basis of anywhere in the western world.

However, far from being the result of just good fortune, ANL's success must be mainly attributed to plain hard work and creativity. In 1959, faced with rising freight prices, Williams recruited an engineer and the chairman of the Victorian Grain Elevators Board to help him devise and patent a press-button wheat discharging system comprised of screw conveyors and a form of bulldozer blade that deposited wheat onto a belt and into a silo at a rate of 250 tons per hour. The invention never broke down, it turned the ship it was designed for into the best profit earner in the fleet, and it reduced the freight rate by 20%. But, when it was first tried out, there was an initial fault, that forced Williams, the chairman of the company, to personally shovel wheat all night to overcome it.

On June 30, 1959, ANL paid a dividend of £985,507, despite falling trade. In the two years since it had been founded, ANL had paid out £8,694,382 in company taxes plus £2,394,447 in dividends to the Treasury, "real money then," commented Williams. That's £11 million paid back to the Government on its initial investment of £15.5 million, in two and a half years! By 1962, ANL's annual report noted that funds invested in ships had increased by £12,170,722 upon the initial £15 million investment to £27,853,383 *without calling on the Government for additional funds*. This capital increase of nearly £13 million in five years was achieved despite ANL being denied the right to act as their own agents or handle their own stevedoring, both heavy outgoings when carried out externally. In addition, the entire ANL fleet was limited to no more than 300,000 tons to help protect the private sector against competition from a Government entity.

ANL pioneered roll-on, roll-off (ro-ro) freight in Australia, which was a big technological leap over the conventional cargo handling of the day. Whereas conventional cargo ships lifted the cargo up and lowered it into the hold of the ship, ro-ro loaded cargo on wheels, which was driven up a ramp into the ship; although more capital intensive, because the ramps were expensive, in terms of operating costs and turnaround times, ro-ro was a revolution in cargo handling in those days before container freight. Indeed, ANL's ro-ro capacity was so good it was competitive with the new container freight revolution in shipping in the 1960s, long after container freight was established. With this technological and commercial edge, ANL established a relationship with the Kawasaki company in Japan that allowed for a very profitable Japan-Australia freight route employing three ships.

Shipping in Australia. The government campaign against the ANL, and the Australian ship-operating generally, has pushed it almost entirely into foreign hands.

Based upon its profitable ro-ro technology, which allowed it to pay high wages to its union workforce, the ANL enjoyed productive, amicable relations with James Healy and his Waterside Workers Federation, "without an argument for twelve years," as Williams reported. And the peace in the docks was mirrored by the peace in the boardroom. Long after retiring, Williams was reminiscing with another board member from the period, Dudley Williams, about their 15 years together, and Dudley Williams reminded him that on not one occasion had any issue been the subject of a vote, "such was the cohesion and cooperation amongst us."

But, there was not always peace on the political front, with the Government. After Sen. Paltridge moved on to another portfolio, ANL came under the direction of first Sir Hubert Opperman and then Sir Gordon Freeth as Ministers for Transport and Shipping. Williams reports that both men were as helpful as Sen. Paltridge had been. Then, in 1968, Freeth was replaced by National Party MP Ian Sinclair, forebodingly nicknamed "Sinkers". Williams reports that Sinclair began a systematic campaign of "bureaucratic meddling" in the running of the company, and that he bluntly informed the ANL board that they should see themselves as what he called a "Political Instrument" and not an independent shipping company. This was a dramatic shift away from policy governing the previous twelve years of successful operation, and at one point the tension between ANL and Sinkers got so bad that National Party leader John "Black Jack" McEwen was forced to intervene on ANL's side. Williams reports that subsequently, the "Political Instrument" campaign faded into the background, but not long afterward Williams retired after 15 years of spectacular operational success as chairman of ANL. "We retired fully content," he wrote.

In 1994, PM Paul Keating's federal Transport Minister Laurie Brereton lambasted ANL as a "basket case with negative net worth" that "could not be given away". The facts of this were hotly disputed at the time by Capt. Bolitho, and the attempted privatisation didn't proceed. However, in 1998, the line that "could not be given away" was indeed sold, by Keating's fellow privatisers, the Liberal/National Coalition. The parts of ANL were sold for $200 million, proving Bolitho correct, and exposing Brereton's and the ALP's claims as lies.

Talking to the *New Citizen*, Capt. Bolitho predicted that the wheel will turn, and that once again Australia will have no choice but to re-establish a Government shipping line. "It's been my view for many years that you can't leave yourself entirely at the mercy of the market," he warned. "The free market will always cut your throat in the end if it can. You really need some form of counterbalance yourself, even if only to keep them honest. So Australia really does need its own shipping line—there's no question about it. It's an island nation."

Globalisation, Depression, and a New Dark Age, Or Sovereign Nations and an Agro-Industrial Renaissance?

Read LaRouche's EIR —The magazine that makes history!

"The finest private intelligence service in the world."
—U.S National Security Council Official

For a free copy of EIR telephone 1-800-636-432

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Conquering Space

by Marsha Freeman

For the past year, the most challenging and promising international science and engineering project ever attempted has been orbiting 250 miles above our heads. With the participation of 16 nations, the International Space Station is becoming the first world-class science and technology laboratory in space. Crews made up of astronauts and cosmonauts have been living aboard the station since November 2000, and have opened the era of permanent manned presence in space.

Armadas of unmanned spacecraft are already at, or will be heading toward, Mars, for the rest of the decade, paving the way for manned missions in the decades to come. Other unmanned probes are exploring the mysterious outer planets of the Solar System.

New, revolutionary space launch vehicles, including hypersonic planes, are under development, to make access to space safer and cheaper than it is today. If the cost of launching a kilogram of payload into Earth orbit can be lowered by an order of magnitude, it will be possible for non-astronaut scientists and citizens to fly in space, for industry to develop new materials and processes, and for universities and scientific institutions to test basic theories of physical principles, in this unique environment.

It is time for Australia to get into space!

Australia was one of the first nations in the world to be involved in space technology, with the establishment of the Woomera test range launch facility soon after the end of the Second World War. British and American rockets, for the military development of ballistic missiles, to evolve commercial launch vehicles, and for science experiments above the Earth's atmosphere, were test flown up through the 1970s at this expansive facility.

But throughout that time, and since, Australia has failed to take advantage of its excellent geographic location, scientific and engineering talent, its industrial base, and political affinity with other space-faring nations, to make its contribution to space exploration.

The political disease of globalisation, with its founding principle that only activities that are "commercially" viable (that is, make a short-term profit) should be pursued, has meant that Australia has made little investment in space infrastructure, leaving such to the "free market."

Now, with Australia, and most of the rest of the world, finally facing the end of the era of a zero-growth, anti-technology, speculation-based monetary system, there is the opportunity, and necessity, to turn to an economic policy of investment in the great infrastructure projects of the 21st century. And the greatest great project facing mankind is the exploration, and colonisation, of space.

This artist's rendering shows the HyShot hypersonic test payload, attached to its booster rocket, leaving the Earth's atmopshere. Photo: University of Queensland

An Abandoned Early Start in Space

During the 1960s and 1970s, more than 2,000 American, British, and European rockets were launched from the Woomera Prohibited Area. It was established in 1948 as a military test range, encompassing 127,000 square kilometers in the northwest part of the state of South Australia, 500 kilometres from Adelaide. Woomera occupies 13% of the land area of the whole state.

The British government tested its Black Knight and Blue Streak rockets at Woomera, and the U.S. Redstone rocket was used to test reentry phenomena from the range. During the 1960s, suborbital sounding rockets, including the UK's Skylark, and NASA's Aerobee, conducted early launch tests and experiments. The tenth Redstone launch, on November 1967, put the first Australian-built satellite into orbit, the Weapons Research Establishment Satellite, (Wresat), which had been built at the University of Adelaide.

In 1962, leading European nations formed the European Launcher Development Organisation (ELDO). Australia was a full member, and ten ELDO Europa rockets were test flown from Woomera, from 1964, with the last one in June 1970.

But Australia did not join in when Europe created the European Space Agency in 1974 which replaced ELDO, to carry out a broad range of space programs, and France, then and still dominant in ESA's rocket development efforts, preferred a launch site in French Guyana at Kourou, to the existing facility in Australia.

Woomera, far from the equator, was not the optimal launch site for commercial satellites. In addition, for satellites that had to reach geostationary orbit, launching from Woomera would have meant flying over populated areas of eastern Australia. In 1976, Britain finally announced its withdrawal from the test range, and operations at Woomera basically came to an end.

It would have been quite possible for Australia, in the mid-1970s, to develop a second launch facility at Cape York, in Queensland, which is near the equator, at 12 degrees South latitude, and is well-suited for launching commercial geostationary satellites. But this was not pursued aggressively by the government.

In terms of significant government investment in space projects, Australia has suffered an hiatus of more than two decades. Except for the relatively short period between 1987 and 1996, Australia has not had a central, federal government agency for developing and carrying out a national, long-term space program, comparable to America's NASA.

Instead, since the mid-1980s, the government has only focused its effort on trying to bring other nations to use its potential launch sites as paying customers, at Woomera, Cape York, and nearby Christmas Island. The commercial space market was flourishing in that period, and with the 1986 loss of the Space Shuttle *Challenger*, it was clear more expendable launch vehicles would be needed, worldwide, to meet the need for satellite communications.

Above Left: The blockhouse at the Woomera test range, where Australia first joined the space age. Engineers and launch directors took shelter inside the blockhouse during a test or launch, and watched the pad from a periscope inside. Photo: Australian Space Research Institute

But two commercially-sponsored attempts in 1989, and 1991, to establish launch services to low Earth orbit at Woomera, failed. An attempt to create a commercial launch site at Cape York went bankrupt.

In 1994, the Australian Space Council was established, to promulgate a five-year plan. Its major goal was to develop and launch two rockets for small satellites, and two payloads. But the funding allocated was only A$9.3 million, and the proviso was that the projects had to be commercially justified. The program was never implemented.

With great fanfare, in 1998 the Space Activities Bill was passed by the Parliament, but this was strictly to establish a regulatory framework for commercial space activities, dealing with safety, licensing, and liaibility issues, for using foreign rockets to launch satellites.

Current agreements, with U.S. and Russian rocket companies to launch satellites from Australia, may or may not succeed, especially since the past year's collapse in the telecommunications, Internet, and other "new economy" sectors have greatly reduced the need for new satellite systems.

But Australia does have developed capabilitites in rocket development, Earth remote sensing, and participation in international space science programs, which is a foundation from which it can move ahead to join the world space community.

Where Australia Stands Today

Over the past 20 years, Australia has developed capabilities in remote sensing of the Earth, ground-based astronomy, telecommunications, space biology and science, and hypersonic flight, along with a fledgling space industry, that could, with the proper government investment, lay the basis for an impressive contribution to international space exploration projects.

As a large nation, with much undeveloped land, surrounded by oceans, Australia has cultivated capabilities in the development of sensors and data processing for Earth observation. The Australian Centre for Remote Sensing receives images at its Alice Springs station from a multitude of satellites, and processed images are provided for mapping agencies in all capital cities.

Australian scientists and engineers have been involved in the development of remote sensing scanners since the 1980s, and contributed the Digital Electronics Unit for one of the instruments aboard the European ERS-1 satellite, which was launched in 1991.

An Australian-designed supercomputer, the Fast Delivery Processor, allows images to be produced from the ERS-1 radar data in just two minutes, rather than hours. This capability is especially important for military surveillance, and in disaster relief situations.

While the Australian government has made only false starts at developing an Australian rocket launch capability, enterprising engineering students at Monash University in Melbourne have developed, and flight tested, the AUSROC series of suborbital sounding rockets. In 1999, the non-profit Australian Space Research Institute in Adelaide proposed a 10-university AUSROC IV launcher, and all of these amateur projects have helped create the technical expertise and experience for more ambitious ones.

By the mid-1980s, experts in the Australian scientific community were anxious to take advantage of the new manned, U.S. Space Shuttle capability, and began to design experiments, and lobby the government for the funding, to participate.

Early on, Australian scientist Ken McCracken had designed one of the cosmic ray detectors that flew on the American Pioneer-6 and 7 spacecraft, and in 1980, Australia decided to develop a photon-counting detector for the Canadian-U.S. STARLAB ultraviolet astronomy satellite. Although STARLAB was cancelled by the Canadian government, it was decided to continue to develop the Australian Endeavour ultraviolet space telescope. Endeavour is the most sophisticated space payload ever built in Australia, and was flight-qualified during its 1992 Shuttle mission.

Two groups at the University of Sydney have also flown biomedical experiments on board NASA's Shuttle and the Russian Mir spacecraft. One, led by Dr. Leopold Distenfass, was the Aggregation of Red Cells experiment, which flew on a January 1985 Shuttle mission. The results, which allowed discrimination between healthy and diseased blood, was considered so important by NASA, that the experiment flew again in 1988.

Australia has also been a leader in hypersonic flight research, dating back to the days at the Woomera test range. Unique hypersonic wind tunnels, with airflows between 10 to 25 times the speed of sound, have been developed for this research.

Recently, the University of Queensland has led the HyShot program, to test a scramjet in flight, as a payload on a rocket. While a recent test was not successful, as a result of a failure in the rocket launch and not the scramjet, the work is continuing. It will contribute to NASA's Hyper-X program, and similar international hypersonic flight research projects.

There is also movement afoot to finally establish at least one of the commercial space launch facilities that Australia has been so well-suited for since the beginning of the Space Age.

After all of the false starts, at Woomera and Cape York, the commitment by the Russian government, through its Aviation and Space Agency and its rocket-building industrial enterprises, may indeed finally result in a launch site on Christmas Island.

An international consortium, termed the Asia Pacific Space Centre, which includes participation from Australian and South Korean private investors, garnered a commitment from the Australian government in June 2000 to contribute $52 million to the project, to upgrade the transport and infrastructure on the island.

The Russian government is interested in Christmas Island due to its proximity to the equator, which allows heavier payloads to be launched into geostationary orbit. It plans to launch its new Aurora vehicle from the Australian spaceport. The only crimp in this plan is the contraction of commercial satellite launches over the past year, due to the overall collapse of economies, in both the developing and industrialised nations.

While the Australian government has never made a serious commitment to implement a long-range, and wide-ranging space program, which would help develop the educational, industrial, and scientific capabilities of the nation, there is a lot to build on.

In his Foreword to a 1993 book titled, *Space Australia*, Dr. Paul Scully-Power, the first Australian-born person to fly in space, stated that Australia has a great space heritage. "The challenge now," he wrote, "is to take the next step. Let it not be another lost opportunity."

The Infrastructure Road to Recovery

Conquering Space

Interview with Andy Thomas

Australian-born astronaut Andy Thomas has made two flights on the Space Shuttle, and spent 130 days on the Russian Mir station. Dr. Thomas, a PhD. in mechanical engineering from the University of Adelaide, has given many public lectures in Australia, and has been an outspoken advocate for Australia to join the international community in its manned space programs.

Dr. Thomas was asked to provide his ideas on the future opportunities for Australia in space before the International Space Advisory Group, in the Summer of 2001. The Group is chaired by Australian-born former Space Shuttle payload specialist Dr. Paul Scully-Power.

Dr. Thomas was interviewed in the United States by Marsha Freeman on November 7, 2001.

Q: What were your recommendations to the International Space Advisory Group?

Thomas: My role was to give them some ideas, particularly about possible involvement in the International Space Station. We were talking about a potential landing site for the X-38 vehicle, and a landing site for a crew return vehicle for the space station, should it evolve from the experimental X-38, because Australia is a big, wide open space that is easy to hit with a crew return vehicle. It is very attractive for a landing site.

Q: Which areas of Australia would be considered to be appropriate for such a landing site?

Thomas: There are actually a number of possible landing sites, but the most probable is a test range in the northern part of South Australia called Woomera.

I think it would certainly be very much in the Australian Government's interest to do that, to support the infrastructure, because it is a very unique test range.

Q: In what way?

Thomas: It's got good geography, good topography, the climate is very stable and usually, very good. It's very isolated and it's very large. It's not overflown by a lot of commercial aircraft, it's not on the jet routes, and that makes it very desirable. There are not many places in the western world that offer that kind of resource.

Q: Australia already has a large program in Earth remote sensing, being one of the large, somewhat undeveloped countries. Could that expertise be applied to research on the International Space Station?

Thomas: That was one of the things I also suggested. That is an area where Australia could do something with the space station which would provide a capability that would be unique for Australia, in resource management, sensing of geography of the land, sensing of the surrounding oceans, for ecological and resource management, and environmental management. I think that would be very useful for Australia to do that. The question you have to address is, are you best off doing that on a space station, on a human-tended vehicle, or a free-flyer?

The conventional answer is that a free-flyer is the best way to go, but I made the point that that doesn't account for the fact that if you do it on a space station, you have a person in the loop and can make real-time decisions, you can modify your instrument, you can fix your instrument if there is a problem with it, and you can bring your instrument back to the ground and refurbish it. On a satellite it stays up there if it works or not. If it doesn't work on a space station, you bring it back and fix it. Those are decided advantages for doing remote sensing, not just for Australia, but for anybody, on the space station.

If Australia was to do it, they would have a device that would be applicable not just to Australia, and they would be able to do collaborative ventures with other countries, to use the same data sources that they generate.

Q: Beside remote sensing, what other areas could Australia participate in?

Thomas: In all of the areas of research that goes on on the space station, which are life sciences, microgravity science, and basic physics and so on, Australia has the educational capacity to contribute to *any* of those. There are investigators that have the skills and knowledge to be active principal investigators in any of those fields.

Life sciences is one that comes to mind, because Australia does have a very strong medical community and there is a lot of interest in medical issues that you face in long-duration space flight as it applies to people on the ground, so Australia could certainly help out there.

I believe they did have a miniworkshop in August 2001 to address that issue, which had some participation from people at NASA. They were looking at life sciences issues, and defining areas where Australia could be involved.

In microgravity sciences there are the basic skills in the universities. There are the skills in basic physics, in remote sensing. In any of those areas, Australia could do collaborative science, and I made a big push for them to do that. I think it would be very much in the country's best interest because you leverage the resources and start getting a community of educated people building up in the society.

You develop very unique advanced skills. They may not stay in the space program, but those skills diffuse into the community and after 10 years you start to see them paying dividends in other areas, in other innovative technologies, start-up companies, and venture funds and all kinds of things. That's where the big payoff would be for Australia, aside from the fact that doing these things enriches the community just in its own right. People find it exciting and that's enough justification in its own right to do it.

Q: It would seem that Australia could also develop modest pieces of hardware for the space station, as any even small involvement is a foot in the door into this international effort.

Thomas: I suggested developing flight hardware of some kind to support the space station. I don't think Australia is fiscally in a position to develop a module. However, it could easily develop components of modules for another agency, such as the European Space Agency or the Canadians. There are a lot of collaborative opportunities, where Australia has the technology skills to do it.

When I suggest that, the question I get is, "Why should Australia develop something to support a space station module? What does Australia get out of it?"

Australia would actually get a lot. For example, if Australia developed a life support system for a space station module, Australia would get all that technology,

Above: Australian-born astronaut Dr. Andy Thomas has been an outspoken promoter of Australia to join the International Space Station. He has flown on two Space Shuttle missions, and spent 130 days on the Russian Mir space station. Photo: NASA

Above Right: In this photograph, taken aboard Mir, Andy Thomas is taking a sample for the Microbial Collection Device which monitors the safety of the water on the station. Photo: NASA

Below Right: When 600 million people watched Neil Armstrong and Buzz Aldrin walk on the Moon in July 1969, the images they were seeing were received by this radio telescope at the Parkes Observatory, relayed to NASA, and televised all over the world. Photo: Parkes Observatory

which has applications, for example, to submarines. Well, Australia is building a fleet of submarines for itself, and that life support technology has immediate application there. It also has application in the refurbishment and maintenance of commercial aircraft, which is a big business in Australia because it's attractive, financially.

If Australia provided communications systems for a station module, that would also have applications to systems for military vehicles, as well as commercial vehicles on the ground.

If Australia had a full-time support capability for an emergency landing site for the space station crew return vehicle, which is another option, Australia would require search and rescue capability and special medical vehicles, and things like that, to be deployed in the event of an emergency on the space station.

But those resources would be available to Australia in times of national need. It wouldn't be something that would be sitting there gathering dust, it could be functioning, supporting the communities in the remote areas of Australia, at the same time that it is on call to support the space station. That's the approach that I took in my briefing. I said that all of these things are not something that are done in isolation, just to support the space program. They all have application to the needs of the country. In that sense, you are enriching the capabilities of the country by doing these things because you are gaining access to the technologies and capabilities that you would not otherwise have.

Q: Is it correct that at this point, there is no Australian space office, or agency comparable to NASA?

Thomas: That is correct. I made a push for that. I thought that with the various activities that Australia could participate in, either through ISS or through the Woomera test range, or the work going on at Christmas Island [launch site], that Australia did need to have a focused, centralised space office which would report to a cabinet minister at a high level, and have a clearly defined mandate and budget and goals.

That would avoid some of the turf battles you get when you have multiple organisations trying to do things. You'd have someone clearly in charge, and I think that is very important.

Q: Why has it been so difficult to establish a centralised space agency?

Thomas: There have been attempts to do that in the past, but space and those really long-term investments in research are not part of the Australian culture. Traditionally, Australia doesn't do that. They fund more near-term things.

Australia has had, in fairness to the political leaders, some economic problems that required pretty immediate action, so there hasn't been the sources to do this. I am of the opinion that the world is changing and the 21st Century will be a world of very sophisticated technologies, and certainly remote sensing has suddenly become of a whole new importance since September 11.

I think you have to look and see what will be the values of the 21st Century world. They're going to be in high technology systems, research and development, of which one element is space-based activities.

I think if any country is going to be a player on the world stage, an active participant on the world stage, and therefore, an active player in the world economy, then that country needs to embrace those values, and that is the message I try to give to Australia when I make my speeches. That is something Australian political leaders need to do.

Q: There is, very often, a disconnect between the political leadership of a country and the kinds of programs that would be supported by the citizens of that country. What kind of response do you get when you give talks about space in Australia?

Thomas: I've generally found the reception from the people I talk to, the man in the street, so to speak, as well as educated lay persons, has been extremely positive about human space flight and being involved. There's great excitement there. For young people, of course, that's undeniably true, but it's not just young people, it's also the people at large. I think some of that has been picked up on by the political leaders, too.

I had the great privilege to address the Australian Federal Cabinet in July [made up of] the various ministers who report to the Prime Minister. That was a great honour. I briefed them about the space station and about Australia's unique capabilities by virtue of its geography, which includes Christmas Island and Woomera, and I made a big push for Australia to get involved in these activities, because I think there will be a significant economic benefit to the country in years to come.

It won't be a near-term economic gain; these things never are, they are a long-term economic gain. But I think Australia is well positioned to be a participant in those because it has a good technology infrastructure, it has a good education system, it has a good R&D base, it's very stable politically, and it is an English-

The Infrastructure Road to Recovery

Conquering Space

speaking country, and these are all definite advantages, and pluses in why Australia should get involved in some of these things.

Q: One would think that there is great interest in manned space programs in Australia, since it has had two astronauts that have flown in space.

Thomas: That does need to be clarified a bit. [The two of us] got our start in Australia, but we do not represent Australia in any way.

Paul Scully-Power was a payload specialist as an oceanographer. In fact, he was not an astronaut. He was an oceanographer who did not represent Australia, but flew as a U.S. citizen. I flew as a U.S. citizen on my first flight. I subsequently had my Australian citizenship re-activated because they changed the laws there, so I also do fly as an Australian citizen, but I don't represent Australia formally. It's an informal representation by virtue of my heritage.

That's a point I make when I'm in Australia, because a lot of people say, "Why should we get involved in space? We've had Andy Thomas as an astronaut, we've gotten an Australian citizen into space, we've had Scully-Power as a payload specialist, what more should we do?"

The fact of the matter is none of these was formally linked with Australia. Australia does not have a formal role in human space flight.

Q: This is similar to the case of Costa-Rican-born Franklin-Chang Diaz, who is an American astronaut, but has played an important role in trying to promote more involvement in space exploration in Central and South America, and in Costa Rica he is one of the best known people in the country.

Thomas: Yes, you don't have a formal role, but there is an informal role and that is undeniable. The reception that my flights have gotten in Australia has certainly been consistent with that, and it has been extremely complimentary to have people there be so excited by what I've done. But I do have to reaffirm that Australia is not actually formally involved.

Q: To accomplish the kinds of goals you are recommending for Australia, there would have to be a government policy to do so. Would that be part of a larger orientation of the government towards research and development programs?

Thomas: That is the big issue. The big push I've tried to make is to get the government to think about these kinds of activities, that are really part of a bigger research, development, and technology plan that I think governments do need to follow through with. You have to make an investment in the future, in research and development. You have to make an investment for your grandchildren.

You can't run an economy just looking at what is going to be the return in the next election cycle, because some things take longer to develop than that.

If the United States had worked on just trying to get a return before the next election, we would not have all the computers and the Internet, and all the capabilities we have, because they have taken many, many years to develop. They take a stable policy of research and development that is bipartisan in support and is agreed upon by everyone as being in the country's national interest.

Politicians tend not to be focused on something that's beyond their own election horizon. That is something that political leaders need to get away from.

Q: One very important long-term benefit from investment in research and development, and space exploration, in particular, is in advancing the quality of education in society.

Thomas: That's true, and if you look at what NASA has done over many years, there's been a huge contribution that NASA spending has made within the university system of this country. It's just huge.

An unbelievable amount of the work that goes on in flying the Shuttle, in developing the payloads and the systems, believe it or not, a large part is done by graduate students earning their degrees. Those graduate students may not stay in the space program, but they get a specialised skill which they take out into the community and that enriches the community in other areas.

That was one of the pushes I made with the Australian government, that if you do these things, you put value-added into the community which, I think, is impossible to quantify, but is profound. You change the nature of your society in a very positive way for the next 20 years. It's an unbelievable effect these things have. That's the intangible part.

It's a very hard sell to political leaders because they have to justify the return to their constituency, and it's hard when people are unemployed, and so on, to get them to think that they need to worry about the legacy they are going to leave for their grandchildren.

That's been the fundamental issue within Australian social structures; that its been very hard to get people to think because there are more near-term issues that have to be addressed, but I think that's changing.

When I briefed the Federal Cabinet about the space station, they were of the opinion they could only be involved in it if they committed hundreds of millions of dollars. That's true, if you want be a full-up active partner.

However, you don't have to do that. You can be a participant in the science programs, for example, by just spending some millions of dollars in research and development programs that would, for example, be done collaboratively with investigators here. By doing that, you access all the other research and development that's going, so you lever your small investment. You get a lot more for it than you might otherwise.

Q: When you discuss Australian participation in the International Space Station, does anyone bring up the fact that Brazil is making a significant contribution to the space station program?

Thomas: I bring that up all the time. I use Brazil as an example. I point out, as I've done with the Prime Minister's Chief Scientist, that Brazil is spending this money on the space station and has got an astronaut here [at NASA's Johnson Space Centre in Houston].

They are trying to show the world that they have these capabilities, and that they are a player on the world stage. They want countries to come to them to launch vehicles because they have a geography that's ideally suited for launching vehicles. By being a player in this activity they are bringing that business, potentially, into their country.

I make the point that Australia is exactly the same. It has the same kind of geography for launch vehicles, and it would be very much in Australia's interest to follow the Brazilian paradigm and start getting involved.

I think there's a large school of thought there that this is a valid message.

This year [2001] is an election year. I think neither of the political parties were willing to step up to this kind of high-risk vision, during an election campaign.

Above Left: The first Australian-built satellite, Wresat, was launched from Woomera in 1967. (Photo: Australian Space Research Institute)
Above Right: The AUSROC-1 project was started in 1988 by undergraduate students in Mechanical Engineering at Monash University. Here they are readying the rocket on a rail. AUSROC-1 was successfully launched on Feb. 9, 1989, and reached 3 kilometres in a one-minute flight. (Photo: Australia Space Research Institute.)
Right: The HyShot payload is set to undergo shake testing, in this photograph, to make sure it can withstand the rigors of launch. Left to right are Dr. Susan Anderson, Joe Gisa, Dr. Hans Alesi, and Dr. Allan Paull. (Photo: University of Queensland)

However, I'm hoping that after the election campaign we will see steps in this direction.

A thrust for both political parties for this election has been on improving education and research and development. I think it is generally being recognised that Australia has languished in those areas in the last 20-odd years, that the quality of education in universities has fallen, and there is no doubt that it has, unfortunately.

Class size is bigger, teaching loads have become larger, pupil-teacher ratios have gone up, with fewer and fewer teachers in universities. It is generally recognised that Australia is paying a price for this, by virtue of the fact that right now the Australian dollar is about 51 U.S. cents.

It was nearly on a par with the U.S. dollar 20 years ago, but that's changed now. To a very large extent Australia's economy, which is a service economy, it serves the economies of the rest of the world, doesn't do a lot of value added in its own right. When you don't have research, and you don't have education, that's the inevitable outcome. You have a 50-cent-on-the-dollar economy.

If you want to change that, you're not going to do that overnight with some political policy. It's going to take a huge shift in the values of the society, and the promotion of innovation. The way you do that is through education and research and development.

Q: There are certainly many avenues Australia can take to participate in the space station. What pathway would you recommend?

Thomas: I think Australia could get to the point where it flies an experiment on the space station. I don't think it would be right to just, overnight, spend hundreds of millions of dollars. The plans I've proposed to the chief defence scientist were to move cautiously on this.

Start with a modest investment in research and development and some collaborative science. Slowly build up that capabilitiy. Start developing, perhaps, flight hardware as a collaborative venture with the major [space] agencies, to develop your credibility and capability, and then slowly build up to the point where you can build flight hardware that specifically serves Australia's needs and can be funded at a level that is appropriate for Australia. That's the way you do it.

Brazil's doing that. I think Australia should, too. Look at Canada. That's an example of a British Commonwealth country. It's larger than Australia, in population, but it is a big, wide open space. Canada, of course, has the great advantage of being next door to the main customer, and Australia's not.

But I don't think in this 21st Century that we can argue that distance is an issue any more, because it's not. I think collaborative ventures are now very viable. I would certainly like to see it happen.

Q: There is a tremendous economic reorientation now throughout Asia as a whole, with a series of very large infrastructure projects underway, including the building of new rail connections to form a Eurasian landbridge, creating development corridors throughout Asia. Over the last year, many Asian countries have realised that their dependence upon the United States to import their goods is on shaky ground.

These countries are looking at what large-scale infrastructure projects must be implemented, and Australia is sitting nearby with industrial and other capabilities.

Thomas: I agree with that. I think that's the big cultural shift that Australia is facing, and has been facing over the last 20 years or so, which is to come to recognise that Australia is in fact part of the Pacific nations. Australia traditionally was part of the British Commonwealth, but really Australia's role in the world today doesn't lie with Europe or even, for that matter, with the United States.

It's going to lie primarily with Southeast Asia, and especially Indonesia, and that's the big cultural paradigm that is changing in Australia. I think that's all the more reason why Australia should be involved in these space activities, because those nations are going to be looking for representation in human space flight and in launch capability, and Australia can do that.

Q: What do you see for Australia's role in space, further in the future?

Thomas: There is going to be a great human adventure of the 21st century, and that is going to be a trip to Mars. I think one hundred years from now, historians will look back and say that *the* big exploration of the 21st Century was a human exploration of Mars. I would love to see some part of that mission have an Australian contribution.

It's probably not realistic to have an Australian crew person fly on that mission, unless there was a huge investment, which probably is not viable. But Australia could certainly develop some of the hardware for that mission and when that mission goes, just imagine how excited the people of Australia would be to say, "That mission is happening because we've got this device that we built. We actually contributed to that mission."

Marsha Freeman is currently Associate Editor of *21st Century Science & Technology magazine*. She has been a science writer for twenty years, specialising in space exploration, advanced energy technology, and science policy. She has testified before the U.S. Congress on issues in science and technology, has been an invited lecturer at NASA and international conferences, and is cited in *Who's Who in American Women*.

Freeman is the author of *How We Got to the Moon: The Story of the German Space Pioneers*, published by 21st Century in 1993; and *Challenges of Human Space Exploration*, published by Praxis-Springer in 2000.

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

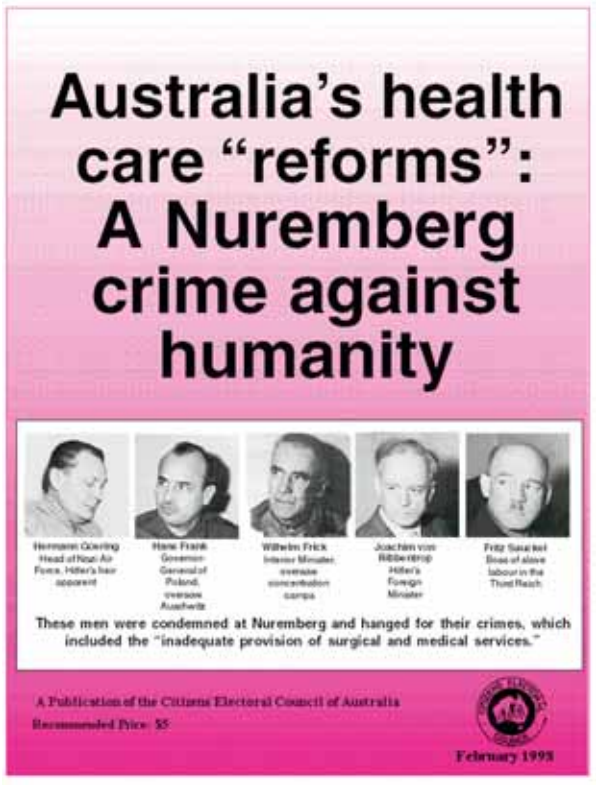
Rebuild the Health System!

by Noelene Isherwood

On October 31, 2001, 91-year-old Mary Wilkinson died from an assault she suffered while in a federally accredited aged care institution in Victoria. In the months before, she had been sexually assaulted, and, like others at the institution, lived with the constant fear of violence from other residents suffering from dementia. Throughout 2000-2001, Mary's daughter Val Wilkinson wrote repeated letters and made numerous complaints to the nursing home CEO and nursing authorities, about the conditions at the institution. Concerned nurses gave her names of relevant officials to write to, as well. Then, one night in October 2001, an aggressive, physically fit male dementia patient who was trying to enter Mary's room, threw her to the floor as she attempted to leave her room. The nurses heard Mary's head crack on the floor from the other end of the corridor. Three nurses and one trainee—all the help available in the understaffed facility—could not move the male patient, and it was only when the ambulance driver arrived, that they could begin to assist Mary. Mary and Val then spent five hours of hell in a hospital emergency ward, with Mary screaming and tearing the bandages off her head, and Val yelling for help. Mary died six agonising days later.

On November 8, Val spent much of her inheritance from her beloved mother to place an advertisement in *The Age*, to send a public message to Prime Minister John Howard. The ad by "Mary's daughter" called upon all political leaders to pledge that all Australia's elderly would get the care, protection and dignified departure they deserve. Mary's nursing home, after all, was one of the "better" Victorian nursing homes, not one of the 46 aged care homes which had been rated as being in a critical or unacceptable condition during the previous 13 months. Val wrote, "For one of Australia's Wise Elders to end their life as my mum did, prematurely, in terror and pain, shames us all.… It shames every politician and every Australian, all of us who have cared too little about how those who gallantly gave us our safety, who toiled to give us our wealth and who generously gave us their wisdom—our Wise Elders—are cared for, loved, respected and honoured at the end of their lives."

Just four days earlier across the nation in Perth, a senior medical official at Sir Charles Gairdner Hospital expressed profound anguish over a similar tragedy. As reported in *The Sunday Times* of Western Australia of November 4, 2001, he had just apologised to the family of an elderly woman who died alone after spending 16 hours in a corridor on a hospital trolley. He asked: "Do people die on trolleys waiting for beds? Of course it happens. You can't avoid it when there are that number of people who are waiting that length of time when they come in for an emergency…. The position we are in is a completely unresolvable position morally. Initially, you get angry about it. You move heaven and earth to get these people out. You fight with people. You complain and you send letters. Then you start accepting that it's normal, but it's not normal. It's wrong and it's really difficult to live with yourself—to compromise to the extent that you put up with it even though you know it's wrong…. It's like the third world.… We struggle to deal with an extra five patients, let alone another 150 from a train crash. A number of people have said around the lunch table that if there was a major disaster in Perth we would melt down."



The CEC has long fought against the Nazi-style denial of health care which has become commonplace in our nation today.

The meltdown is already underway, as also reported by the November 4, *Sunday Times*, "Unofficially, plans have been discussed to erect tents for times when all three major Perth hospitals are forced to turn ambulances away."

A Collapsing System

The equitable provision of quality health care is truly the measure of any nation. If we are to take up the extraordinary nation-building challenges outlined in this report, we must have a healthy, happy, optimistic population, with a government committed to the common good of all. Neither the former, nor the latter, is now the case.

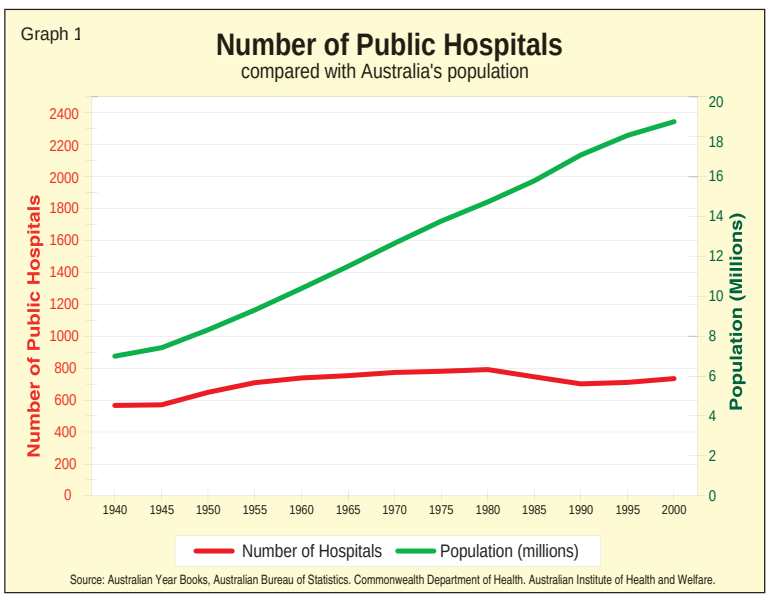
As anyone can attest who has visited a public (or private) hospital recently, particularly its emergency department, our hospitals are in a desperate state of crisis, as the following series of graphs illustrate.

The crisis runs across all sectors of the health care industry, striking those who provide the care, as well as those who need it. You have only to pick up the newspaper in almost any city on any given day, to see its manifestations: soaring waiting lists; emergency wards on near-constant ambulance bypass; exhausted doctors and nurses quitting the system altogether; a rural sector where avoidable deaths are 40% higher even than in the cities, because there are so few medical facilities and medical personnel; an utterly inadequate aged care system which is forced to treat its patients in an inhuman fashion; and patients—as well as medical personnel—dying needlessly, murdered by a grossly-underfunded, understaffed system.

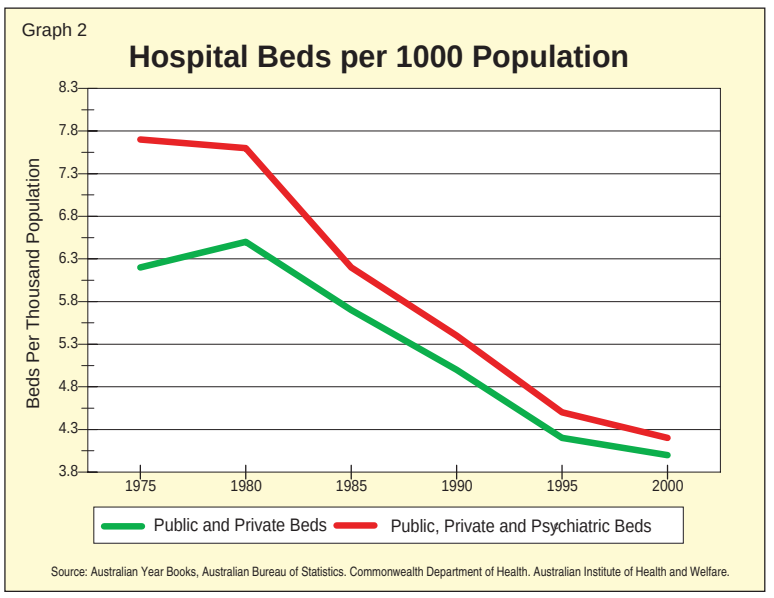
Already in 1997, the largest gathering of general practitioners in Australian history, meeting in Sydney, called for a royal commission into the state of health care. Cuts to medical care were killing people, Dr. Lindsay Gazal told the conference, and the general situation has since deteriorated even more.

A marker for just how inhuman the system had become, even by then, was the case of Dr. James McIntosh of Hornsby Hospital, NSW, who killed himself at age 33, by running barefoot into the path of a train near his home. Said his mother, Beris, a GP, her son would frequently work 36 hours, have four hours off, and go back on duty again. His father, Ted, said that his son, a talented musician and athlete, had begun to question why he had gone into medicine. "In the week he died, he rang and said he was wondering what he would do in 10 years time," Ted said. "He'd had to sack some doctors and said it wouldn't be long before it was someone else sacking him. He was obviously depressed." Said his wife, "He was suffering from absolute exhaustion—he didn't have time to play his music, to relax, to exercise, or even to eat. It was too much. I still can't believe it happened." According to a government-sponsored report released in May 1997, over the previous five years at least 21 doctors killed themselves in NSW, due to extreme working hours, pressure of emergency medicine, and poor morale—all deriving from budget cuts.

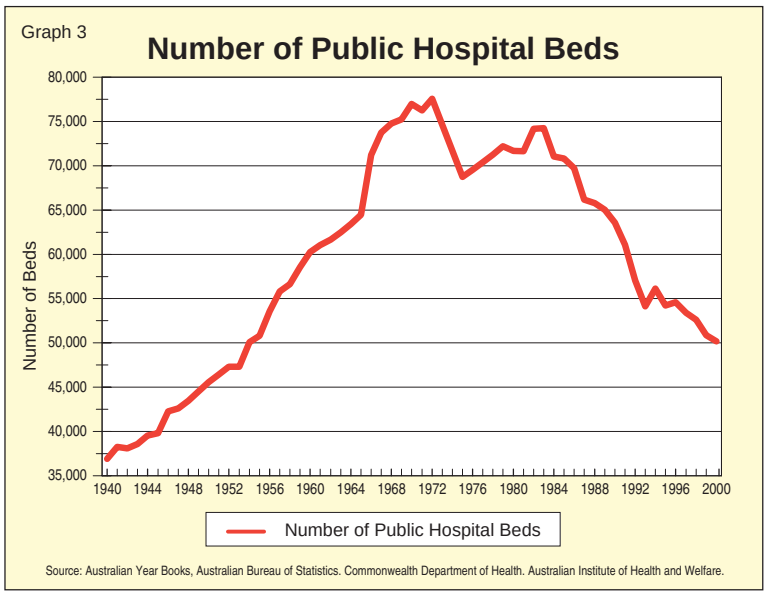
Even Blind Freddie can see that there is a devastating crisis in health care. The question is, "How did it get this way, and how do we fix it?"



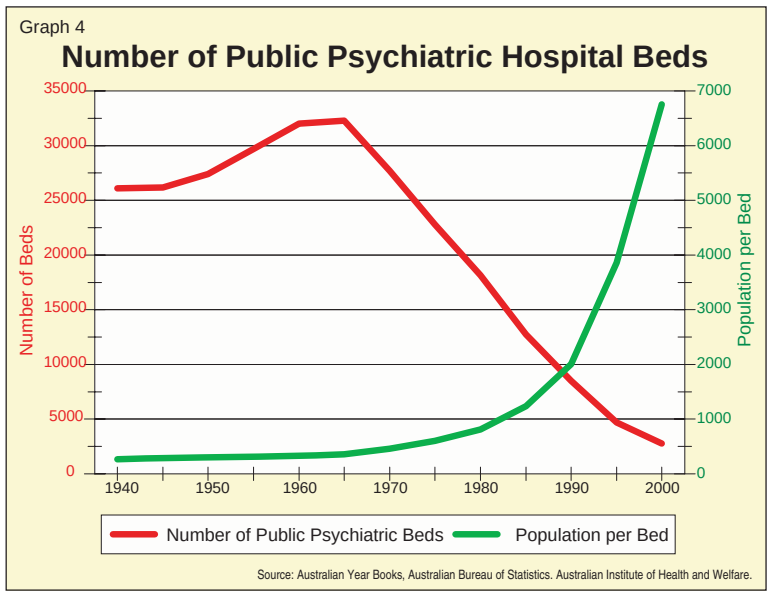
The number of public hospitals is now the same as what Australia had in 1960, and is therefore grossly inadequate for the size of our population, which has almost doubled since then.



The basic measure of public health adequacy, the number of hospital beds per 1000 population, has plummeted under the last two decades of economic rationalism.



Australia now has the same number of public hospital beds as it had in 1955. The real collapse in beds began with the economic rationalist Hawke-Keating regime beginning 1983, policies continued by the Coalition



While Australia's mental health has declined precipitously since the 1960s, which would require more psychiatric hospitals and beds, the number of psychiatric beds has collapsed, down from 2.8 per 1000 in 1965, to less than 0.2 per 1000 today.

The Infrastructure Road to Recovery

Health Care

Health Care and the Common Good

High quality health care is a universal right, which is inherent in the notion of the "common good", the purpose for which nation-states were founded. The commitment to the common good was the underlying philosophy of the old Labor Party in Australia, as stated by one of its founders, Australia's greatest trade union organiser, William Guthrie Spence:

"The welfare of the people must be raised to the first place—must be the uppermost and foremost consideration. How best to secure the good of all without injury to any should be the aim—not commercial supremacy, not cheap production regardless of the human misery following, but rather the broadest justice, the widest extension of human happiness, and the attainment of the highest intellectual and moral standard of civilised nations should be our aim."

This "welfare of the people" for old Labor self-evidently included quality health care for all. One of the first acts of a Federal Labor government around 1910 was the introduction of the invalid pension scheme, coupled with the old age pension program. At the same time, the Minister of Health of NSW's Labor government, Fred Flowers, told the *Sydney Morning Herald* of March 11, 1911, "Any ideas that the hospitals are to be regarded as charitable institutions is altogether erroneous. Hospitals are a necessity of civilisation and the government should see to their upkeep and control. Hospitals should be as free as the Art Gallery and Public Library … and there should be no taint of pauperism."

It was with the election of John Curtin as Labor Prime Minister in 1941, though, that progress was made towards a national system of universal health care. Curtin was committed to a national health service which, like education, would be free to all members of the community. Faced with opposition from the conservative parties and the medical profession, he called and won a referendum in order to obtain the necessary powers over social welfare matters—one of the few times a referendum has been successful in this country. This referendum later gave the Whitlam Labor Government in 1974 the power to finally introduce a truly national universal health scheme, Medibank.

Although Curtin's referendum was successful, progress was slow. In 1945, after Ben Chifley became Prime Minister, the federal government passed the *Commonwealth Hospital Benefits Act* and began funding the states for each patient occupying a bed in a public or private hospital. In 1948, Chifley introduced a comprehensive *National Health Act*, which he described as "a charter of national health for the future." The legislation envisaged the possible nationalisation of hospitals, along with government provision of laboratories, health centres and clinics, as well as a Medical Benefit Scheme under which the Government would pay direct to doctors one half of the patients' medical fees, subject to fee limitation by participating doctors. Before it could pass the bill, Chifley's government fell.

Labor had greater success in Queensland, when in 1944, the state government took complete control over the hospitals, the public health and mental health, and became the first and only state to provide completely free, government funded universal health care.

In the twenty-three years of Liberal/Country Party federal government which followed Chifley, despite a general shift away from Government funding, some progress in health care was still made, particularly under Minister of Health and Country Party leader Sir Earle Page, a surgeon-turned-politician. He introduced the free school milk scheme to improve nutrition, as well as a Pensioner Medical Service which gave aged, invalid, widows and service pensioners and their dependents free medical treatment by a general practitioner. The Coalition also

passed the *Aged Persons' Homes Act* in 1954 to expand aged care. Within less than a decade there were 2.3 nursing home beds per 1000 of population, and by 1971 there were 3.7 per 1000, giving Australia the greatest number of nursing home beds per head of population in the world. In addition the anti-polio vaccine first trialed in America was being locally produced in Australia by the end of 1955 and supplied to the States free of charge for a nation-wide vaccination program. Australia also had one of the highest ratios of public hospital beds per 1000 population in the world (6.5 as of 1980), higher even than the United States, whose postwar *Hill-Burton Act* mandated a ratio of at least 5.0 to 1000.

The last effort by government to uphold the old Labor ideal of health care as an inalienable part of the "common good", however, came and went with Gough Whitlam (1972-1975). One of Whitlam's most controversial policies, second only to his determination to "buy back the farm", was his plan to introduce Medibank, the first truly universal health care system. This legislation was cited as one of the grounds for the double dissolution of Parliament on April 10, 1974.

Medibank was anathema to the free-traders. It eliminated the means test for hospital treatment and provided standard ward accommodation for free; provided free outpatient treatment; provided salaries for all doctors providing care to public patients (ending the earlier honorary system, where doctors received fees from private patients, and donated their services to the public system); and covered 85% of all medical bills by the government, with the 15% balance insurable. Fees were collected either by bulk billing (the preferred option), or the patient paid the doctor and then collected 85% of the fee from the Medibank offices.

The Medibank legislation was eventually passed in August 1974 after Labor's reelection, but barely had time to become operational before Whitlam was dumped by the Crown, through Governor-General Sir John Kerr, on November 11, 1975.[1]

Under the next government, headed up by Malcolm Fraser, health policy was dictated by economic considerations and a desire to shift health expenditure back to the private sector. Fraser's Jamison Inquiry into "hospital efficiency" helped to introduce the use of "business methods" in the health care industry. Under economic rationalists Hawke and Keating, it soon got much worse.

The Queen of Economic Rationalism—the Mont Pelerin Society

In a speech at the University of New South Wales on March 19, 1999, former Labor Prime Minister Paul Keating bragged that, "Some of us in the Labor Government, including Bob Hawke and me, came to office with a greater belief in markets than our conservative counterparts." Keating acknowledged that the extensive "reforms" which he and his predecessor Bob Hawke had initiated, "went against the grain of ingrained beliefs and philosophy" of old Labor. "Moreover," Keating boasted, "we did this in spades, in areas like abandoning control over the exchange rate for the long term good; giving banks the power to create credit at the expense of building societies and credit unions; letting foreign banks take market share from our own banking system; cutting the top personal rate of tax; putting an assets test on the age pension; setting up competition to Telstra; selling the Commonwealth Bank and Qantas; reforming the waterfront." By the time Keating left office, he was openly promoting the disastrous American model of Managed Health Care as desirable for Australia.

Hawke and Keating quickly replaced Medibank with the health insurance scheme, Medicare, on February 1, 1984. Unlike Medibank, which was funded entirely from general revenue, Medicare was financed by a general tax/levy. This change, in the context of Hawke/Keating policies which destroyed the economy, began the slide downhill toward private "user pays" healthcare, health insurance for those who can afford it (which supposedly provides better health care, but often doesn't), and a decrepit public health system for everyone else. What had happened to "old Labor's" precious notion of the common good?

In 1975, the same year Whitlam was dumped, apostles of the London-headquartered Mont Pelerin Society (MPS), such as the notorious right-wing ideologue Milton Friedman, began arriving in Australia. The MPS had been set up at a meeting in 1947 on the slopes of Mont Pelerin Switzerland, attended by members and retainers of the old European oligarchical families. Its purpose was to initiate a conservative revolution, to "roll back the clock" to the era before nation-states, when the oligarchy reigned supreme. The MPS shortly thereafter moved to the City of London, to become the chief economic warfare unit of the British Crown, in the same way that the British Empire had always used "free trade" to decimate its enemies. As its members have frequently bragged, the MPS was the author of "Thatcherism", and such Thatcherite experiments as that inflicted on hapless, now-ruined New Zealand beginning in the 1980s.[2]

In both Australia and in New Zealand, the MPS set up or took over a series of right-wing think tanks, such as the Centre for Independent Studies (CIS), the Institute for Public Affairs (IPA), the H.R. Nicholls Society and the Tasman Institute, all of which enjoyed lavish corporate funding. Mont Pelerin's intent was to loot ("privatise") and ultimately to destroy the nation-state

The three stooges of economic rationalism. (AAP Image/Julian Smith)

and everything to which it had given rise, such as universal public education, universal health care, trade unions, publicly-owned infrastructure, etc. Through a process which we have detailed elsewhere, after the sacking of Whitlam the MPS fronts took over both major parties, the Liberals and Labor. Thus, when Labor came to power under Hawke-Keating in 1983, it espoused values directly opposite to those upon which it had been founded.[3]

A revolution took place in the Liberal Party as well, in which any Liberals (or Nationals) maintaining a concern for the role of government in fostering the common good were disparaged as "wets", and were purged in favour of the fiscally-conservative ("dry"), economic rationalist gang of John Howard and his cronies. Thus, when the Liberal Party came to power in 1996 under John Howard, they took up where Hawke and Keating had left off. Led by Howard himself, the Coalition Cabinet was a nest of members and co-thinkers of Mont Pelerin fronts, including H.R. Nicholls Society members, Treasurer Peter Costello, Minister of Defence Ian McLachlan, and Industrial Relations Minister, Peter Reith, and IPA members, Deputy Treasurer Rod Kemp and Education and Employment Minister Dr. David Kemp.

Sure enough, this crowd went after health care. In Costello's first budget he slashed health care by $3.4 billion. He got the ball rolling on expanded private health insurance by arranging a "rebate" for his friends in the industry of $1.7 billion, and then slashed almost another $1 billion in his second budget. At the 1996 Premiers' Conference, he forced the states to take a $1.5 billion overall funding cut, which cut an estimated half a billion dollars in state health care funding.

In their obsessive drive to offload the responsibility of health care, and to leave it to the "magic" market place, the Howard government went all out to force people into lifetime private health insurance cover, culminating in the 1999 introduction of a 30 per cent rebate of premiums for all members.

In a media release from June 9, 1999, Prof. Fran Baum, President of the Public Health Association noted, "That's about enough to cover the state government funding of a medium size public hospital like the New Children's Hospital in Sydney for a year. The government is effectively handing the private funds a book of blank cheques underwritten by the taxpayer." The $1.6 billion a year going to the private health insurance industry is equal to 15% of the total spent by federal and state governments on our public hospitals and health care systems annually while profits of private health insurance funds rose 172% to a record $343 million for 2000.

In a collapsing system, even private health insurance is no guarantee of actually receiving prompt treatment, as a journalist for *The Age*, Carolyn Jones, bitterly commented in a column on August 30, 2001, after her mother, whose ambulance had been put on hospital by-pass, then spent 48 hours in the emergency department of a private hospital before being eventually moved to a four-bed ward. [4]

But, for a real insight into the axe-murderers of the Mont Pelerin Society, consider the case of Victorian Premier Jeff Kennett.

The Infrastructure Road to Recovery

Health Care

Mayhem and Murder—the Kennett "Reforms"

The clearest case of Mont Pelerin's savage attack on the population, was seen in Victoria, beginning with the 1992 election of Liberal Premier Jeff Kennett. Kennett was the protégé of Mont Pelerin heavyweight John Gough, OBE, a longtime chairman of the ANZ Bank, and a power in the Institute for Public Affairs. Kennett's entire program, in particular his brutal dismantling of the health sector, was outlined for him in a series of "studies" by MPS fronts, notably the 1991 *Project Victoria: An Agenda for Change*, co-written by the Tasman Institute and the IPA, and the 1992 *Towards a Healthier State: The restructuring of Victoria's Public Health Services*. IPA ideologue and former Treasury official Des Moore co-authored both reports, and publicly demanded a "major down-sizing in the Victorian health Department," together with "a move to a competitive market situation."

Kennett dutifully complied. Immediately upon his election, he started dismantling the state's health care system, as per the Tasman/IPA reports, which called for: the privatisation of 3,130 of the 5,360 state nursing home beds; "making better use" of private hospitals by closing 1,300 public hospital beds; slashing salaries and staffing rates for the remaining public hospitals; reducing administrative staffing levels to those of 1987-88; busting unions and replacing them with "enterprise bargaining"; cutting non-medical staff drastically; corporatising hospitals; and "contracting out" services.

Kennett closed and downgraded dozens of public hospitals; corporatised and privatised health facilities; cut capital funding by 49% in 1996 alone and slashed more than 40,000 nursing and other health sector jobs; increased surgical waiting lists by at least 22% from pre-1992 levels; degraded ambulance services; and demoralised doctors and other health professionals who repeatedly warned that people were dying as a direct consequence of the "reforms".

One notable public outcry came from Dr. Graeme Brazenor, the Victorian chairman of the Australian Association of Surgeons who summed up the situation by saying that if the state public hospital system "was a dog, you'd shoot it". He spoke out after six patients in a main surgical unit at the Austin and Repatriation Medical Centre were infected with golden staph while undergoing surgery in March 1997, because cleaning staff had been cut back so drastically. Dr. Brazenor ultimately quit because there was no "major restoration of

Mont Pelerin Premier Jeff Kennett. Photo: AAP/ Julian Smith

standards". However, it was not just a matter of increasing infections. As the CEC documented through several case studies reported in its 1998 pamphlet, *Australia's health care "reforms": A Nuremberg crime against humanity*, Kennett's dismantling of Victoria's hospital system was *systematically killing people*.

But the reforms continued, including the introduction of "casemix funding", which is another way of slashing hospital costs and eliminating medical services, just like America's HMOs [Health Management Organisations]. In this process, the government sets strict guidelines for hospitals where each medical condition is allocated a hospitalisation period, a specified number of treatment and nursing hours and an allowable cost. If the patient does not recover by the time his hours are up, one of two things happens: he is simply kicked out, or the hospital is fined heavily, and forced to pay for the cost of the patient's extended hospitalisation out of its own slashed funding.

There is a clear precedent for denying human beings needed health care—Nazi Germany.

The Preston & Northcote Community Hospital, only built in the 60s, was one of the hospitals in Melbourne's northern suburbs which was axed by Kennett.

The Nuremberg Precedent—Denial of Medical Care

In the Nuremberg Trials following World War II, the United States, the Soviet Union, Great Britain and France tried 23 doctors and Nazi officials who had carried out war crimes and crimes against humanity.

U.S. Chief of Counsel Justice Robert H. Jackson stressed that the prosecution targeted the men who were responsible for criminal policies, "men of station", "the planners and designers". It was implicit in this prosecution that the guilty could not have known every individual who would die by his order; but it was made crystal clear, that the individual who ordered the policy, held individual responsibility for the murderous result—they "knew or should have known".

One of the ways in which the Nazis freed up resources to be used for their war, was by denying medical care to those who needed it—what the Nuremberg Trials referred to as "inadequate provision of surgical and medical services". Ten defendants were condemned for murder and ill-treatment of civilian populations, which was carried out by diverse means, including "shooting, hanging, gassing, starvation, gross overcrowding, systematic under-nutrition, systematic imposition of labor tasks beyond the strength of those ordered to carry them out, [and] *inadequate provision of surgical and medical services…*" (emphasis added)

The key to these horrible crimes was the policy of dehumanisation, which began with deciding that some lives were not worthy to be lived. Hitler coined this phrase when he ordered the expansion of the euthanasia program in 1939, but the concept was embedded in the fascist economic system much earlier. His general order for killing off the insane and others began when resources became scarce. He stated that he "considered it to be proper that the 'life unworthy of life' of severely mentally ill persons be eliminated by actions that bring about death." In this way, "a certain saving in hospitals, doctors, and nursing personnel could be brought about."

While Hitler killed to save money for his war effort, other modern-day ideologues not only advocate killing to save what they deem to be "scarce resources"—money for their banking and corporate sponsors—but because they intend to savagely reduce the world's population, as documented in the "Populate or Perish—Australia Needs 50 Million People" section of this special report.

Nazis in the dock at Nuremberg. Some were found guilty and hung for crimes against humanity, including "the inadequate provision of surgical and medical service".

Now, Let's Rebuild!

The Mont Pelerin-directed slashing of our health care system would be bad enough in "ordinary" times. However, it is taking place at a moment when HIV-AIDS is exploding throughout our Asian region, and when old and new diseases are spreading around the world. Hepatitis C, for instance, has reached epidemic proportions, being contracted by 10 times more people than the HIV-AIDS virus and in only half the time. Infectious diseases specialist, Prof. Graham Cooksley told the *Herald Sun* September 2, 2001 that Hepatitis C "has become a plague." Add to that the fact that the virtually-untreatable VRE (Vancomycin resistant enterococci), one of the newly dubbed "superbugs", has been isolated in 20 hospitals around Australia, and that more than 20 per cent of pneumonia cases are now resistant to penicillin and other antibiotics. Now comes the threat of large-scale terrorism on the model of the World Trade Centre or something potentially even more deadly, such as bioterrorism, and there is no way in the world that our ravaged, crisis-ridden healthcare system could even dream of dealing with the thousands or tens of thousands of casualties which such attacks might cause.

In the wake of September 11, Howard and company claim to be fighting terrorism. Obviously, a crucial component of such a fight must be a drastically-upgraded health care system, capable of dealing with September 11/anthrax-style incidents, as well as with daily life. *This means pouring billions of dollars into the system, immediately.* A real marker for whether this government, or any other, actually intends to fight terror, or just use "terrorism" as an excuse to introduce a fascist police state, will be seen in its commitment to health care. So far, were he alive to see Australia's health care system today, Adolf Hitler would be smiling.

Footnotes

1. Contrary to the fairy stories believed by little children and some others, Gough Whitlam was dumped by the British Crown itself, not merely its lapdog, Sir John Curr. That fact is amply documented in the CEC's 1998 96-page pamphlet, *Stop the British Crown plot to crush Australia's Unions.*

2. A key role was played in the early financing of the Mont Pelerin's flagship London think tank, the Institute for Economic Affairs, and related networks in the 1950s by the Queen's private money manager, London financier Harley Drayton. And, as longtime MPS director Lord Harris of High Cross bragged in a 1996 interview, the Queen had showered knightly and even higher honours upon both himself and most of his MPS co-workers, in appreciation of the MPS' efforts.

While the rest of the world's media was still cheering New Zealand as the global "poster boy" for economic rationalism, the *New Citizen* published a 20-page special expose on the New Zealand "reforms" in its Jan.-Mar. 1997 issue. Entitled, "Nazi 'reforms' rip New Zealand—Australia next", the report documented, sector by sector, how the reforms had looted and crushed New Zealand's physical economy, including the nation's once-proud health system. That reality is now generally admitted by all but the most lunatic economic rationalists, including those Mont Pelerin hacks who run the New Zealand Business Roundtable.

3. On how the MPS and its local fronts took over both of Australia's major parties during the post-Whitlam 1970s, see the CEC's *Stop the British Crown plot to crush Australia's Unions*.

4. Wrote Carolyn Jones, "My mother's experience has not only left me alarmed about the state of our public and private hospital systems but has also led me to question the purpose of taking out private health insurance. I would have thought that health insurance, like any other form of insurance—whether it's for the car or the house—is effectively a guarantee that you get access when needed. But my mother, a pensioner, is paying nearly $100 a month for the privilege of entering a lottery...."

Worried about the economy, and your future?

WHAT AUSTRALIA MUST DO to Survive the Depression

Citizens Electoral Council of Australia

READ
The book the Establishment does not want you to have!

$20 (inc GST)

Or write to CEC Australia
PO Box 376
Coburg Vic 3058
or Free Call 1-800-636-432
(Please include $4 for postage and handling if ordering by post or phone.
We accept all major credit cards.)

The Infrastructure Road to Recovery— Let's Build Our Way Out of the Depression!

Education: Dummies Won't Develop Australia

Like all other essential national infrastructure, education has been looted and run down over the past two decades of economic rationalism. And, as in the health care crisis, it would be difficult to overexaggerate the degree of crisis caused by the decades of savage looting. As the *Sydney Morning Herald* of July 8, 2000 noted, "all sides of the political debate agree that Australia's 37 public universities teeter on the precipice." Alan Gilbert, the Vice-Chancellor of the University of Melbourne, was more stark: "The very idea of a university seems fragile. The 900-year-old monopoly that traditional universities have exercised in the provision and certification of higher education is under irresistible pressure. It will not survive, and its passing will represent the greatest single revolution that has faced universities in 900 years."

In December 2000, the Group of Eight, the eight premier research universities, called for a $13 billion dollar funding boost over the next five years for research and development, because Australia had collapsed to well behind most other Western nations in R&D.

Savage funding cuts are at the root of the crisis, with funding slashed by a staggering $2100 per student since 1983, according to a recent federal Senate committee's report, "Universities in Crisis"; the committee also found that Australian university students were getting a poorer quality education than did their parents. Increasingly, universal public education—which is the cornerstone of the sovereign nation-state—is being done away with, in favour of the typical "user-pays" insanity which is typical of economic rationalism, and of the Howard Government in particular. Whereas some years ago, a typical higher education might have cost $200 per year in union fees, today $20,000 per year in fees is not uncommon. According to a survey of 30,000 undergraduates taken recently by the Australian Vice-Chancellors' Committee, "Paying Their Way", seven in ten students work, many facing at least 70 hours per week in combined work and study. Reported Stuart Rosewarne, an executive member of the National Tertiary Education Union, "One of the biggest changes we have noticed is how many students are working. A few years ago 20% worked full-time, and the remainder would work around 10-12 hours a week. Now, I'd say those proportions are reversed. What that then causes is further dumbing down of courses, because their teachers take account of the stresses the students are under." The President of the National Tertiary Education Union, Dr. Carolyn Allport, said that the increase in the number of fee-paying students was a worrying trend, because "It opens up a real distinction between the people who can get into the courses on the fact that they can pay fees rather than merit." Students were paying up to $80,000 in fees, she said, and in future, "all doctors, lawyers and media people will be people who have paid for their courses rather than people who have aptitude for it." A recent Australian Institute survey of 1000 academics reported that full fee-paying students were routinely being given "preferential treatment" by universities desperate for cash, and that there was considerable pressure to pass them, even if they flunked the course.

Under financial pressure, many students are forced to drop out, while the rest get a shadow of the education which they should be receiving. The funding cuts have caused a near-disintegration of not only the universities, but of the education system as a whole, of which the following are merely some highlights:

*Large class sizes, of 27-28 pupils and even more, are becoming the norm, which make real education almost impossible, especially when combined with increasing violence in the classrooms, and an increasing number of teachers teaching subjects for which they have not been trained.

*There is a "critical teacher shortage" looming by 2005, according to an early 2001 study commissioned by the Australian Council of Deans. For Victoria, the study forecast that the state would have only 69% of its required primary teachers and only 59% of its secondary teachers. The crisis is particularly bad in Victoria, which suffered the most savage economic rationalist onslaught of any state under the Kennett regime, where10,000 teachers left the system from 1991-98. There, the number of students preparing to become teachers has collapsed by 50%, and nationally by 33%. The destruction of education is continuing under the Bracks government. The president of the Victorian Association of State Secondary School Principals Ted Brierley charged in June 2001 that highly experienced teachers—precisely those most urgently needed—were being forced out of the system by the Bracks government giving an average teacher salary for each teacher they employ, when teachers with higher seniority obviously "cost" more. Brierley charged, "This is a deliberate policy of getting rid of experienced teachers. Kids will be shortchanged, and I fear for the system."

*In New South Wales, education is increasingly taking on the flavour of "McEducation", as desperately cash-short schools allow McDonald's into their schools to promote their products, in return for cash payments. Meanwhile, according to the *Sydney Morning Herald* of July 30, 2001, "Parents of primary school pupils are paying millions of dollars to meet their basic educational needs, including teachers' salaries, new school buildings, sports courts, and computers. A survey by the Herald of Parents & Citizens Associations at 90 schools shows that parents are even paying for basics such as gas and electricity, which are not covered by Government funding." Said the president of the NSW Primary Principals' Association, Mr. John McMillan, "Governments are getting away with the amount they are spending because parents are making up the deficit."

*Indicative of the typical economic rationalist policy of aiding the rich and penalising the poor, Howard in his most recent budget gave the nation's richest private schools, such as Caulfield, Melbourne and Geelong Grammars, almost $1 million per year each for the next four years, while public schools were to be granted a paltry $4000 per year, this after education budget cuts of billions of dollars in the 1996 budget. The Australian Secondary Principals Association, representing more than 2000 principals nationwide, denounced the federal government's approach to education funding as "appalling". Said Association President Terry Woolley in September 2001, "We are deeply concerned about the deliberate shift of resources away from the public sector", where at least 70% of Australians are still educated. "We are extremely concerned about the overall funding of secondary schools," he said.

The first thing which must be done about the education crisis, as in the case of the breakdown in health care, is to "throw a wall of money at it." However, while that is a necessary start, it is not sufficient to really solve the problem. Because the real problem is to equip young Australians with actual cognitive abilities to innovate and problem-solve for the sort of rapidly developing physical economy which we have sketched elsewhere in this special report on infrastructure. The necessary approach to such a real education, and the roles of universities as "science drivers" for the economy as a whole, was outlined recently by Lyndon LaRouche in an article in *Executive Intelligence Review* of October 12, 2001, "A New Guide for the Perplexed: How the Clone Prince Went Mad!"

Man's power in and over the universe, stems entirely from those cognitive processes by means of which discoveries of universal physical principle are transmitted, from past to present, and future. Here children discover the properties of the Platonic Solids.

A Science-Driver Economy

by Lyndon H. LaRouche Jr.

I have emphasised two points of policy which must be emphasized in defining a future recovery from the presently ongoing, global economic catastrophe. These are, a shift to a Classical humanist mode of education, at all levels of education, and a new quality of emphasis on universities as the focal point of science-driver policy for direction of the economy as a whole....

To that purpose, I turn now to the subject of my educational policy, and, after that, the way in which such an educational policy flows, naturally, into my conception of introducing a science-driver form of economy as a natural next step in the development of what Hamilton, the Careys, and List named "The American System of political-economy."

In earlier locations, I have used the image of a contemporary child re-experiencing an act of original discovery of a universal physical principle by the ancient Archimedes. I have emphasized, that every child should be educated in that way, and no other. The object of education must be, primarily, that the pupil should accumulate a memory of having re-experienced the actual cognitive act of original discovery of a universal physical principle made by persons who, for example, are today, chiefly, long deceased, even back many thousands of years.

In the act of re-experiencing such an original discovery of universal principle, there is a wonderful change from the effects produced by standard instruction in learning in general and higher education today. The change makes education *human*, for a change.

The keys to understanding this difference, are, in summary, the following.

First, the act of cognition through which a successful hypothesis is generated, is a mental process which is perfectly opaque to the sense-perceptual apparatus of the external observer. Therefore, the most important of all social acts, are those transactions through which a valid hypothesis and its validation as a universal physical principle, is replicated as a cognitive act provoked in the sovereign cognitive powers of another person. It is the power to generate and transmit, so, verifiable discoveries of universal physical principle, which is the absolute difference between a human being and all other living creatures. Therefore, we should educate our children for what they are, human beings, rather than the monkeys, which programs in mere learning imply those children to be.

This cognitive form of social relationship is not limited to relations with living persons. In the case of the actual reenactment of an original discovery of a universal physical principle, originally made by a long-deceased discoverer, the student has established an active relationship with that deceased person which is of the same degree of social intimacy, and distinctively human character, as with any living person. The reenactment of a cognitive act of discovery performed by a long-deceased person, produces a living memory of that reenactment within the mind of the (for example) student.

"The School of Athens" by the great Renaissance painter, Raphael, depicts great thinkers who lived as much as 2000 years apart, in living dialogue with one another. In the same way, a child must come to know the great minds of all human civilisation.

Indeed, I have reminded my readers many times, Raphael Sanzio portrays a crucial principle of the human education of human beings, in his famous *The School of Athens*. The mind of the person who has acquired knowledge through a cognitive relationship with persons both living and deceased, has the living memory of that person, as represented by the relevant cognitive act or acts of discovery, present as a virtual living personality within his or her own mind. All even approximately competent education produces precisely that sort of effect, or a fair approximation of it in the mind of the student.

Within the conscience of the person so educated, the voices of many from among the greatest known scientists, artists, and statesmen of the past are heard as living voices in the mind. This is the jury to which the discoverer appeals, even when he disagrees with many among those authorities from the past. He is self-obliged to present them compelling arguments, which should win them to accept the discoverer's overturning of what they had adopted and defended in their time.

For that and related reasons, a truly human relationship is based upon that quality of cognitive relationship. This point is the pervasive burden of Plato's Socratic dialogues, for example.

This cognitive quality of relationship, is also the proper definition of *sanity*, in contrast to the insanity represented by ideologies

The Infrastructure Road to Recovery

Education

FIGURE 1. *The four steps of cognition*

Step 1	Pose an ontological paradox (metaphor). *This is representable.*
Step 2	Discover a validatable solution. *This is not representable.*
Step 3	Identify the principle of solution. *This is representable.*
Step 4	Design a proof-of-principle experiment. *This is representable.*

such as "free trade" and "shareholder value." The habit of thinking cognitively, of seeking out and challenging the paradoxes lurking within popular opinion, for example, is the standard of sanity of both individuals and societies.

Therefore, the policy must be that a truth-seeking Classical humanist mode of public and higher education, as so indicated, must be the only tolerated standard of education ... from henceforth.

Examine an additional implication of what I have just stated.

Man's power in and over the universe, stems entirely from those cognitive processes by means of which discoveries of universal physical principle are transmitted, from past to present, and future. Therefore, if we define the university as the pinnacle of a system of universal education premised upon Classical humanist principles, the advanced and other research functions properly situated in such a university system, provide the most appropriate driver for both the world's economy and for the crafting of those long-range objectives around which today's physical-economic policies are defined.

The notable benefits of such a policy, are not merely technical, but also moral and psychotherapeutic. The development of a person's sense of a close personal sort of cognitive relationship, to not only some of the greatest intellects of humanity's past, but an impassioned regard for those past contributions which have yet to be fully realized, if realized at all, motivates us to see in ourselves the opportunity to change the outcome of past history, by rescuing for the present and future, that which might have been lost forever without our current intervention.

That view of our cognitive relationship to great personalities of the past, informs our view of ourselves, as the image of our living self might be reflected back to us today, from those observing us in the future. Similarly, in a related way, we must be impassioned to ensure that the future does not make the terrible mistakes we know of the past and our present time.

In our minds, so informed and developed, the past, present, and future have an historic order in respect to each other, but, in our minds, those whose acts of cognitive discovery we have relived live within us, as if they were our moral contemporaries. Thus, it is said, we become privileged, through the redemptive process of cognition, to live forever, with such companions, within an eternal moment, called sometimes "the simultaneity of eternity"....

The crucial principle of physical economy which defines a science-driver economy, is that the increase of mankind's potential relative population-density within the universe, depends essentially on the discovery and socialization of universal physical principles. The university-led Classical humanist form of educational system, thus typifies the form of practice by a society which realizes both aspects of the principle of universal human progress. The Classical humanist method develops the ability of the individual mind to recognize ontological paradoxes and effect relevant, verifiable discoveries of universal physical principle. The same method socializes both the process of discovery, and the discoverer as both student and scientist.

The universities of educational systems of that intention, each and all modelled implicitly on the method of knowledge exhibited in Plato's Socratic dialogues, should serve as the pinnacle of science. That should drive the economy. In brief, that proceeds by the following steps.

In competent programs of education in what is conventionally termed "physical science," in schools and universities, there is great emphasis on two sets of experiments. The first, are called pedagogical experiments, through aid of which the student reenacts the crucial and other discoveries of the past, in a Classical humanist, which is to say, "Socratic" way. This accumulation of pedagogical experimental work, prepares the student's mind for discovering and testing hypotheses.

All of the historical knowledge and skills represented by pedagogical instruction and experiments, is then marshalled to serve as a point of departure into the previously unknown. The pivot on which the success of a science-driver program hangs, is fundamental, experimentally oriented research into discovery of new universal physical principles. This success requires intense concentration on a crucial feature of the design of proof-of-principle experiments, a feature to which I have already referred, above.

In any successful proof-of-principle experiment, there are elements of the design of the experiment which are in specific correspondence to the principle at issue in the test in the chosen medium. Thus, the success of that experiment identifies those distinctive elements of the experimental design as the appropriate keys to the application of that principle in the designs of products and productive processes.

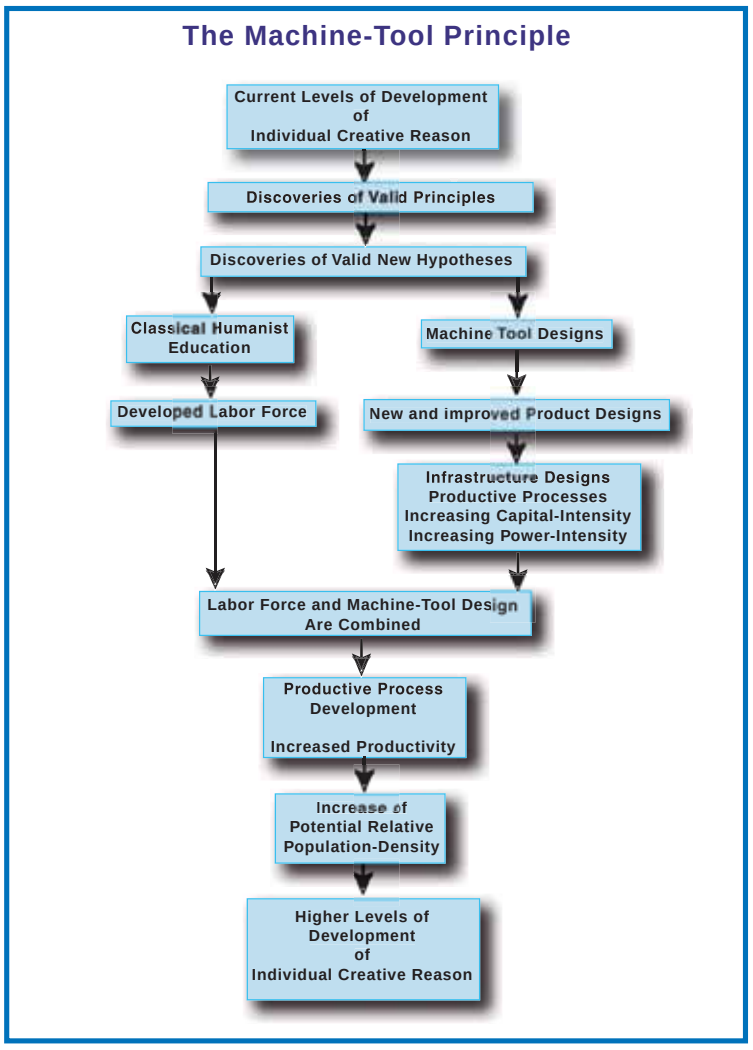
The bridge between the university-centered programs of fundamental research and the productive economy, is provided, usually, by the very type of machine-tool-design engineering which the current fad of "benchmarking" has proposed to eradicate, *that in the interest of promoting both the evils of out-sourcing, and product-quality failures in performance!* The type of machine-tool-design practice consistent with proof-of-principle experiment, is the bridge between so-called "pure science" and production of qualitatively improved kinds of products and processes.

On the condition, that the indicated principles of educational policy are in force, then society's priority ought to be that of increasing the ration of the total population being so educated, and employed in the indicated categories of research and of product and process design. This should be reflected in the ratios of composition of the labor-force in each agro-industrial category of production and science-based services.

The best medical system, which the United States was working toward improving under the post-World War II Hill-Burton law, was the emphasis on full-service public teaching hospitals, including those associated with universities. These were but one aspect of the total capacity for developing and delivering medical and related benefits, but they were exemplary, and crucial in the respect that their patients were selected on the basis of the patients' needs, rather than any different consideration. Such hospitals typify the principle of the science-driver approach I have summarized immediately above.

For related reasons, I continue to propose mission-oriented, pioneering, science-driver programs, as typified by the Manhattan Project, by the development of the space program, and by my own design for what President Reagan named a "Strategic Defense Initiative." A large-scale, long-term mission, assigned the task of making the seemingly impossible real, expresses the principle of science, and of human progress generally, in a way nothing else could do.

The revolutionary impact of wartime and related science-driver programs, and their expression in new qualities of technologies, products, and processes, happened to lie largely in the military or related functions of government, because such scientific and technological achievements were unlikely to occur in any other way. The massive concentration of power, by government, on areas of breakthrough beyond the capacity of any private enterprise, is the only way in which the transition to a science-driver economy is likely to emerge.



Join the Citizens Electoral Council to change the economic and political course of our Nation.

Membership Form - Citizens Electoral Council of Australia

As a CEC member you will receive regular copies of the CEC's *Australian Alert Service Membership Edition* published monthly by the Citizens Electoral Council, as well as copies of any *New Citizens* published during the membership year. The *Alert* provides all members with the breaking international and Australian news they need to know about, as well as reports on the CEC.

To become a CEC member please fill out this form and return it with $20 payable to CEC Australia PO Box 376 Coburg Vic 3058

First Name: _____ Surname: _____

Residential Address (as shown on Electoral Roll):

Street: _____ City/Town: _____

State: _____ Postcode: _____

Mailing address (if different to above):

Street: _____ City/Town: _____

State: _____ Postcode: _____ Date of Birth: _____

Phone (H): _____ (W): _____ Fax: _____

Email: _____ Affiliation/Occupation: _____

Your State electorate: _____ Federal electorate: _____

Declaration (for Australian Electoral Commission registration purposes only)
I wish to become a member of the Citizens Electoral Council
I am eligible to enrol for Federal elections. (You are eligible to enrol for Federal elections if:
- you are 17 years of age or older; and
- you are an Australian citizen; and
- you have lived at your present address for at least the last month.)

(British subjects who are not Australian citizens are eligible to enrol for Federal elections if they were on a Commonwealth of Australia electoral roll on 25 January, 1984.)
* I consent to this form being forwarded to the Australian Electoral Commission in support of the Party's application for registration. *(Strike out if not applicable.)*
I declare that all the information I have given on this form is true and complete.

***X* Signature:** _____ **Date** / /

Credit Card Payment
Please charge $20 on my Credit Card. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Name on Card: _____ *Exp. Date* _____ *Signature:* _____

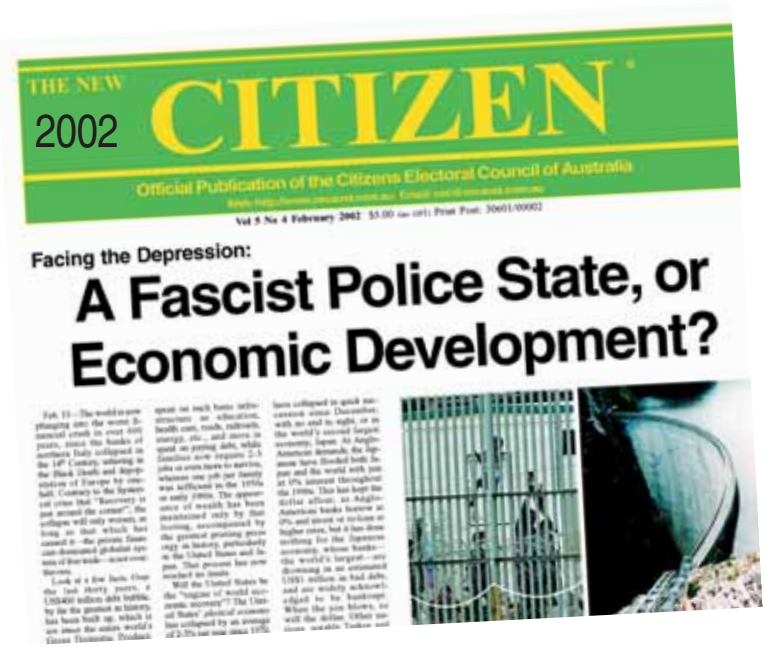
OFFICE USE ONLY

This is the annexure marked.....referred to in the statutory declaration of.....
(annexure number)
.....sworn the .....day of..... .
(month and year)

Signed:.....BEFORE ME:.....
(signature of the person making the declaration) (signature of the person before whom the declaration is made)

The choice today is the same as it was in 2002:

A Fascist Police State, or Economic Development!


THE NEW 2002 CITIZEN

Official Publication of the Citizens Electoral Council of Australia

Vol 5 No 4 February 2002 $5.00 (inc GST) Print Post: 30601/00002

Facing the Depression:

A Fascist Police State, or Economic Development?


THE NEW 2004 CITIZEN

FEDERAL ELECTION CITIZENS ELECTORAL COUNCIL EDITION

Official Publication of the Citizens Electoral Council of Australia

Web: http://www.cecaust.com.au Email: cec@cecaust.com.au

Vol 5 No 5 April 2004 $5.00 (inc GST) Print Post: 30601/00002

On the eve of the Crash:

Defeat the Synarchy— Fight for a National Bank

Our Mission for 2006

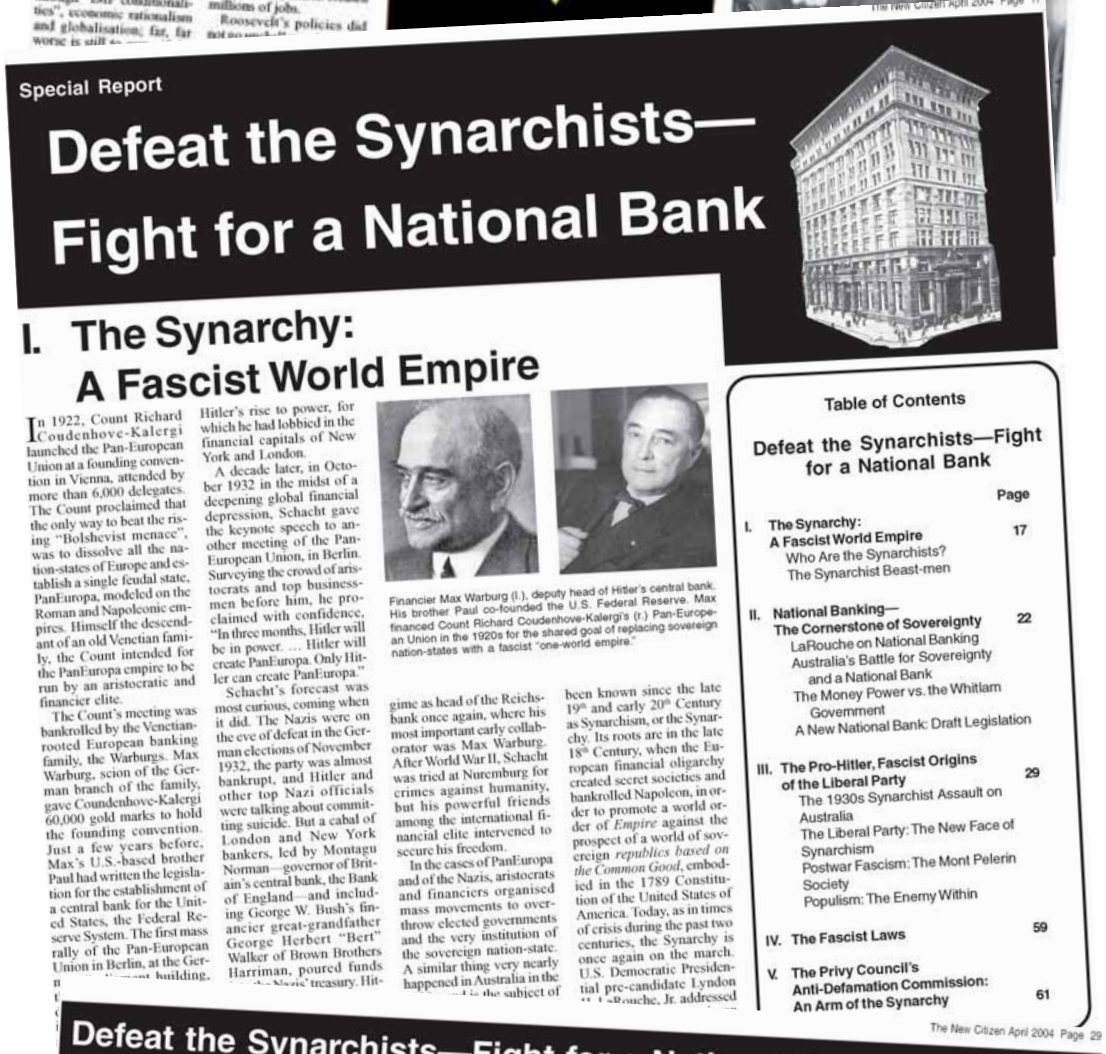
The *Infrastructure Special Report* featured in this March 2006 *New Citizen* first appeared (in a condensed form) in the February 2002 *New Citizen* pictured above. The 9/11 attack had taken place shortly before, an event which had been forecast by U.S. economist and statesman Lyndon LaRouche already in January, 2001, just as Cheney/Bush were taking office.

Be warned, LaRouche said, that the ongoing disintegration of the international "globalist" monetary system would lead the Synarchy, the financial oligarchy, to stage a "Reichstag Fire"-like "terrorist incident" as a pretext to implement police states in the U.S. and worldwide, in order to maintain their political control during a world financial collapse. On February 28, 1933, the Synarchist-sponsored Nazis had burned down the German Parliament (Reichstag) building and blamed it on "Communist terrorism", the excuse Hitler used to seize dictatorial powers.

Already in 2002, it was clear that Howard was following in the footsteps of Cheney/Bush – and Hitler. Often with Labor's help, he has rammed through ever-more draconian laws, many no different than what the Nazis proclaimed in 1933-34. In 2004, as the fascist laws kept coming, the CEC published the extraordinary *New Citizen* shown at top right. Based upon archival and other buried sources, the paper showed that the leading banks and corporations in Australia had organized mass fascist armies in preparation for a coup in 1931, had the Scullin Labor Government moved to implement a national banking-centred economic recovery, as President Franklin Delano Roosevelt was to do in the U.S. when he took office in 1933. Indeed, John Howard's own father, Lyle, was a member of the fascist New Guard in Sydney.

The global financial bubble will soon pop, which leaves only one of two options: either we re-establish the national banking-centred powers of sovereign nation-states above those of the globalist Synarchy, for which LaRouche is leading the battle; or the Synarchy triumphs and the entire world plunges into a New Dark Age more hideous than that of the Fourteenth Century, when the usurious international banks of the day collapsed and almost one-half of Europe's population perished in the resulting mayhem and Black Death.

Thus, the projects presented in this *New Citizen* are not merely "nice ideas": they are the very essence of the battle.


Special Report

Defeat the Synarchists— Fight for a National Bank

I. The Synarchy: A Fascist World Empire

Financier Max Warburg (l.), deputy head of Hitler's central bank. His brother Paul co-founded the U.S. Federal Reserve. Max financed Count Richard Coudenhove-Kalergi's (r.) Pan-European Union in the 1920s for the shared goal of replacing sovereign nation-states with a fascist "one-world empire."

Table of Contents

Defeat the Synarchists—Fight for a National Bank

Page

I. The Synarchy: A Fascist World Empire 17
Who Are the Synarchists?
The Synarchist Beast-men

II. National Banking— The Cornerstone of Sovereignty 22
LaRouche on National Banking
Australia's Battle for Sovereignty and a National Bank
The Money Power vs. the Whitlam Government
A New National Bank: Draft Legislation

III. The Pro-Hitler, Fascist Origins of the Liberal Party 29
The 1930s Synarchist Assault on Australia
The Liberal Party: The New Face of Synarchism
Postwar Fascism: The Mont Pelerin Society
Populism: The Enemy Within

IV. The Fascist Laws 59

V. The Privy Council's Anti-Defamation Commission: An Arm of the Synarchy 61

The New Citizen April 2004 Page 29

Defeat the Synarchists—Fight for a National Bank

III. The Pro-Hitler, Fascist Origins of the Liberal Party

THE 1930's SYNARCHIST ASSAULT ON AUSTRALIA

In this section

The 1930s Synarchist Assault on Australia
Jack Lang and Frank Anstey on the Synarchy
The "Red Menace" and the Fascist "Citizens Leagues"
The Stormtroopers—I: The League for National Security
The Collins House Group
Herbert Brookes and the Secret Armies
The Stormtroopers—II: The Old Guard and the New Guard

The Liberal Party: The New Face of Synarchism
The Synarchy's Political Parties
The Lying Mass Media
Robert Gordon Menzies: Would-be Petain of Britain
The "New Liberalism": The Old Fascism
Friedrich von Hayek, Founding Father of the Liberal Party
"The Association": Old Guard and LNS Regroup

Postwar Fascism: The Mont Pelerin Society
Mont Pelerin's Puppets: Liberal and Labor
The Macquarie Bank
The MPS Think Tanks
Liberal Party Funding

Populism: The Enemy Within
Hanson, Costello: One Coward, One Liar
The Politics of Fear

"And therefore, the essential conflict is between the national interest and the financiers. Hitler was not a creation of a bunch of dummies in brown uniforms. Hitler was the creation of bankers...

"The bankers of this type, the private bankers, created Hitler, because there was a financial crisis, and under conditions of financial crisis, if the government is accountable to the people, it is the bankers that will pay, not the people. And therefore, the bankers say, "It's the people, it's the government, that has to go."

–Lyndon H. LaRouche, Jr., December 16, 2003


March 19, 1932. Fascist New Guardsman Col. Francis de Groot preempts NSW Premier Jack Lang to cut the ribbon at the new Sydney Harbour Bridge.

FREE New Citizen

For a free copy of the April 2004 "Defeat the Synarchy—Fight for a National Bank", *New Citizen* call toll-free **1800 636 432** or send in this coupon to CEC PO Box 376 Coburg Vic 3058, and leave ALL your details below.

Name: _____

Address: _____

_____

Phone: _____

Email: _____