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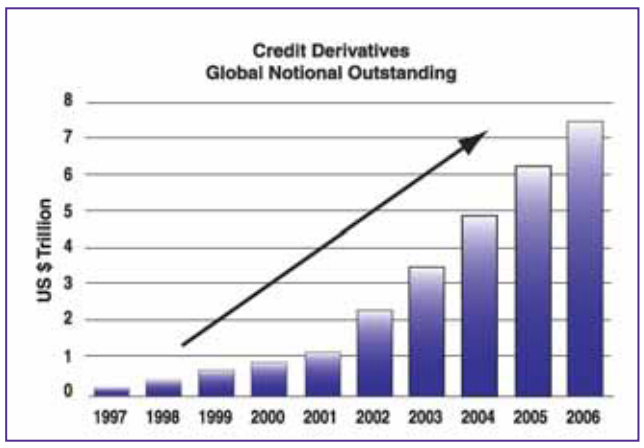
Australia Must Enter the Nuclear Age!

Over the past several months, the American statesman and physical economist Lyndon H. LaRouche, Jr. has held a series of international webcasts from Berlin, Germany and Washington, D.C., with participation from government officials and political leaders from numerous countries, among them China, Russia, Germany, Italy, France, and the nations of Central and South America, in addition to the U.S. itself. In his presentations, LaRouche has outlined the stark reality now facing the entire planet: that we are presently in the midst of the greatest economic/financial collapse in history, which will usher in a New Dark Age like that which depopulated Europe in the 14th Century; or, we can apply the "American System" methods of national banking, great infrastructure projects and the utilisation of the most advanced science and technology to overcome this systemic crisis, very much as U.S. President Franklin Delano Roosevelt overcame the Great Depression of the 1930s, and defeated fascism.

The Greatest Bubble in History

On October 19, 1987, "Black Monday", the U.S. stock market crashed by 508 points (22.4%), the single largest one-day collapse ever. This crash, which LaRouche had forecast in June of that year, would have ushered in a new depression, just as did the stock market crash of October 1929. However, the incoming chairman of the U.S. Federal Reserve Board, Alan Greenspan, legalised the gambling bets known as derivatives, and so built up the biggest financial bubble in history, with hundreds of trillions of dollars in derivatives. Through such methods, Greenspan temporarily avoided a collapse then, and in following crises, such as the "Asian Crisis" of 1997-98, but only at the expense of making the inevitable crash far more devastating, and that final crash is clearly on the horizon. Meanwhile, the actual physical economy has been looted in favour of the bubble, producing a profusion of multi-millionaires and billionaires alongside growing poverty for most of the "lower 80%" of the population, as in Australia. So, the only thing worth discussing now is, how do we get out of this disaster?

This issue of the *New Citizen* features excerpts from LaRouche's October 31st webcast from Berlin, in which he outlines the depth of the crisis and the general pathway out of it, including cancelling all derivatives contracts and reorganising the world financial system. It also features a study he commissioned from his scientific advisor, Dr. Jonathan Tennenbaum, "The Isotope Economy", on the remarkable vistas of nuclear science available to mankind to overcome this crisis.



The financial oligarchy has "recovered" from recent financial crises only by building up bigger bubbles than ever, as in the derivatives-led "recovery" from the 1997-98 "Asian crisis"/LTCM hedge fund collapse, shown here.

Australia's small-scale nuclear reactor, at Lucas Heights—our only one—which produces isotopes for medical and other purposes. We need dozens and dozens of larger nuclear reactors to solve our power and water problems.

Australia's Future: Fission/ Fusion power

In response to a recent question from an Australian member of his youth movement, on how to approach the present crisis in our country, LaRouche replied:

"Australia is, after all, a part of a world in which 'interesting times' prevail. In my view, there are two leading implications in that fact: First, once Australia comes out of the current state of its affairs, there are wonderful opportunities for development of undertakings of both national and world importance to be launched in there, and from there. Second, preparing as many Australians as possible for the launching of those national perspectives, to help keep their spirits up for the dark ages which we may reasonably hope will be passing on in due course, although, admittedly, none too soon.

"The problem lies not within the confines of Australia, but from the same danger to civilization as a whole, which not only presently confines, but actually menaces the people Australia.

"The world in which an Australia, in particular, might survive the threat of being transformed into a special kind of zoo for its hapless captives of the day after tomorrow, is a world based on the universal moral principle of the modern sovereign nation-state republic, a world in which nuclear-fission and thermonuclear fusion are the bedrock of both production within Australia, but in its relations with the world at large. Of what Earthly, or spiritual use to the rest of the world could Australia and New Zealand be, without productive relations premised on contributing to, especially, the future of Asia, across that deep oceanic ditch which separates the subcontinent from the island and other territories and peoples to the north?

"Australia's existence as a nation depends upon such pivotal assets as the combined development and use of fissionable ore-stuffs and the development of thermonuclear fusion. Within its own borders, the key to the future of the nation's population is the production of vast amounts of desalinated water from the ocean about it. This means correcting a bad, downward change in direction of policy, from modern European civilization's progress, to life among the marsupials and monotremes.

"Since there is an inevitable, awful failure written into the drive toward a new Venetian empire of 'globalization' under the futile ambitions of the present crop of virtually quite useless Anglo-Dutch financier elite, what we propose is the only alternative to turning the premises back to the dingoes, either actual dingoes, or those transformed from human into virtual dingoes according to the prescription of H.G. Wells' *The Island of Dr. Moreau*."

This issue of the *New Citizen*, particularly Dr. Tennenbaum's truly beautiful work, "The Isotope Economy", shows the glorious future available to us, if we fight for it.

Cheney/Bush/Howard Smashed in U.S. Elections

November 8—This newspaper went to press barely 24 hours after the close of the U.S. elections on November 7. Although not all votes have been tallied, it is clear that the U.S. population has decisively rejected the globalisation-and-war policies of the Cheney/Bush cabal dominating the Republican Party: the Democratic Party won some 30 seats to take control of the 435-seat House of Representatives, and has won six seats in the 100-member Senate, giving it a 51-49 control.

The victory is crucial, but it had little to do with the Democratic Party. In fact, according to pollsters, the victory should have been much greater, given voters' disgust with the disastrous war in Iraq, and with the collapsing U.S. economy. Throughout 2006, the nominal Democratic Party leadership sucked up to the Synarchy (the financial oligarchy) in order to secure hundreds of millions of dollars in campaign contributions, rather than mobilising the "forgotten men and women" of the lower 80% of the population by attacking the Cheney/Bush cabal head-on and by providing alternative policies, as LaRouche had advocated, which would have secured their truly crushing defeat.

LaRouche with members of his youth movement, which played a decisive role in the Nov. 7 U.S. elections.

The Voter Turn-out

Two elements secured the high voter turn-out which defeated Bush et. al: a "revolt of the generals" unprecedented in American history, in which leading retired and even still-serving generals ruthlessly attacked Cheney/Bush over the debacle in Iraq, which helped unleash voter anger with the war; and the mobilisation by the LaRouche wing of the Democratic Party, particularly the LaRouche Youth Movement (LYM), which helped secure a much higher voter turnout than expected, particularly among 18-30 year olds. Over the past couple of months, LaRouche deployed his youth—the single most effective organising force in the Democratic Party—onto the university campuses, to break up a fascist "thought-control" apparatus being run there by Lynne Cheney, the wife of Vice President Dick Cheney, through her neoconservative American Council of Trustees and Alumni (ACTA) organisation. By sparking a fighting spirit among student populations previously demoralised by ACTA's campus Gestapos, the LYM played the decisive role in turning out two million more youth in this election than expected, who voted overwhelmingly Democratic.

More Dangerous Than Ever

Notwithstanding this victory, LaRouche has emphasised, the strategic situation now "is far more deadly after the

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WATCH
LaRouche International Webcast from U.S.A
Live Friday Nov. 17th, 5.00am EST
Website: www.larouchepac.com (Archived soon thereafter)

The World Crisis On The Eve of the U.S. General Election

From Berlin, Germany on October 31, U.S. statesman and physical economist Lyndon LaRouche gave the latest in a series of webcasts on the world economic and strategic crisis, excerpts of which follow. In addition to Berlin and Washington D.C., dozens of audiences around the world viewed the webcast, including on many university campuses. The full webcast may be viewed on the website of the LaRouche Political Action Committee (LPAC) at www.larouchepac.com, where his next webcast, on November 16, will also be posted.

You know the worst and best moments in history come to most people, most of the time, as a surprise. And that is going to be the case with what's happening in the world now. We are now at the end of an entire period of history. During the middle of September, in the U.S. and other parts of the world affected directly by the U.S., there was the beginning of a new downturn in the world economy. This is somewhat complicated by the fact that there is an election campaign, so-called midterm election, now occurring inside the United States. The party in power is losing power, that is, losing power in terms of support from the people. It is preparing to commit great electoral fraud in the United States, to try to keep some of that power. It is prepared to *go to war*, to try to preempt the situation, the political situation, to retain power. But it also has long-term intentions to establish world dictatorship, called globalization, which would mean a disaster for all humanity.

Now, these events are coming rapidly. There are some good things happening in the world, as well as these bad things: but they're coming together, as often, at the same time. As in war: A terrible war breaks out, and people are prepared for war, but they don't know what war is. Then suddenly, they get a taste of it, and it wasn't what they expected. And sometimes the war goes against the offender, and that's a good thing. That also comes suddenly, as surprising developments and mobilization of people and institutions, mobilizes people to resist evil. The same is true of great economic depressions. Everybody is surprised by a great economic depression, even those who predicted it. Because it doesn't come exactly as they thought it would, when it comes.

So that, in terms of governments around the world today, as I know of them and know what they're saying, most governments of the world, including the governments we've referred to principally today here, in Eurasia, will be taken by surprise: In China, in Japan, in India, in Russia, they do not yet have *any sense*, of what is about to happen. They have a sense of a crisis occurring, but they have dreams, they have beliefs that they believe they can control their situation by certain beliefs they're operating on now; and they won't be able to. Demands will be made upon them, which will catch them by surprise.

The Basis for Optimism

I'm not particularly surprised. I've got a pretty good idea of what's going to happen. And I'm also more *optimistic*, because I know that the good thing about this crisis—and there are many bad things, as well—the good thing is that what most people *believe* is going to be discredited. What most believed yesterday, they're going to find tomorrow, they no longer believe. It is going to seem to them, that everything they believed, is suddenly become untrue.

They believe they know how to manage an economy. Governments believe they can cope with the economy. They're trying to postpone the crash, which is already coming on. They can't postpone it. They may delay it for a short period of time, by another hyperinflationary inflection. Like in the United States: The United States' economy is disintegrating! It's not collapsing, it's disintegrating. The loss of the automobile industry, in the course of the last year, continued this year; the United States no longer has an automobile industry. It has some automobile plants in the United States, but they're no longer a U.S. automobile industry. They're foreign owned, and foreign controlled. The same thing is true of steel production in many parts of the world: All the essentials, are no longer controlled by nation-states and the people of nation-states.

And so, people have illusions: "Everything will be all right—our government will handle it." The government of France; the government of Italy is not a government. It's death, waiting to be buried. And this is characteristic of many parts of the world.

So that's what's coming upon us. Now, the turn came, as I indicated earlier, in the middle of September, with the onrushing, longstanding decline in the world economy, which has been in the process of decline since about 1971-72, actually. Some people were becoming rich, but at the expense of other people. Economies were collapsing. Look at the United States, every county by county around the United States. In virtually all counties where there used to be production, there is no longer production. People are no longer living by a high degree of skill. They're living as waitresses or waiters, or other kinds of things—so-called "service employment," largely make-work, which is not even necessary. You don't cook a hamburger at home, you go out to a hamburger stand. You don't need that.

So the economy has been disintegrating. But the upper 20%, particularly the upper 20% which is now in positions of power—people generally between 50 years and 65 years of age—that generation lives largely in an illusion. They think their world has come. They think this is a post-industrial society—they think that's good. They think globalization is good! Globalization is a disease that will destroy the entire planet, and kill off most levels of population today. It's an empire! It's imperialism! It's a return to a caricature of what happened in Europe in the Middle Ages. …

The United States Is Destroying Itself

And many people believe, for example, that the evil is coming from the United States. But it really isn't. The United States is not the source of this problem. The source of this problem is right here in Europe. It's in the Anglo-Dutch Liberal establishment of Europe. And what we have in the United States is an extension of that—and we can discuss that—but an extension of that. And what the United States is doing is not trying to conquer the world. What the United States is doing, is destroying the United States. To destroy a powerful nation, how do you do it? You induce that nation to discredit itself. You corrupt it. You lead it to discredit itself. It loses the confidence of its own people. It loses confidence abroad. It becomes desperate in trying to keep power, it makes mistakes, as the United States has.

Look for example, at Southwest Asia. Look at this war in Afghanistan. Look at this war in Iraq. Look at the spread of this same kind of warfare into other areas, the aim at Iran! The aim to break up Turkey—which is also on the agenda, as well as all of Southwest Asia. The intention to break up Pakistan. The intention to break up India. The intention to disrupt China. The intention to start a conflict with Russia, as in Transcaucasia.

The United States is key in doing these things. It's not the sole author of this mess, but it's leading in doing it. What is the United States doing? The United States which, six years ago, was still admired by many in Europe and elsewhere, is no longer admired. The Bush-Cheney Administration has destroyed the influence of the United States, its credibility throughout the world! The United States has destroyed whole sections of the world, and is spreading that to other parts of the world. What is happening in the process, as leading military figures in the United States, leading intelligence figures, leading political figures, who understand these things, see the United States under Bush and Cheney *destroying itself!*

US statesman and physical economist Lyndon H. LaRouche, Jnr.

Globalization Means Empire

Then, who benefits from the destruction of the United States? Well, who put this Bush-Cheney Administration into power? Ask the gentlemen in London, how this was done. Because the goal is a name you know! You've heard! It's the name for a poison, but you don't think of it as a poison. You think of it as the inevitable. The word is "*globalization is inevitable!* You can not go back from globalization to the nation-state! It's inevitable."

But globalization is empire. Globalization is the lowering of the standard of living throughout the world. …

It's the elimination of the nation-state, the elimination of the protection, the standard of living, the health-care, the educational systems. All these things are being destroyed. You have—what?—10% of the labor force of Germany has no hope, no future. Germany is being destroyed. Italy is being destroyed. Some jobs are going to China.

What If the U.S. Dollar Collapses?

All right, but let's look at this thing, this American empire myth: What happens if the United States collapses? Let's suppose that a collapse occurs as a 20%, 30% collapse in the valuation of the dollar. Does that mean that other parts of the world suddenly become better? Because they take over from the United States? No.

If the United States goes under, the rest of the world goes under,

The remains of the Lansing Car Assembly Plant #1, in Lansing, Michigan. This plant, formerly one of GM's top producers, is typical of the present state of the American auto industry. Lyndon LaRouche warned the U.S. Congress in Feb 2005 that the financial oligarchy intended to destroy the U.S. auto industry, the guts of the U.S. machine-tool industry. The Congress did nothing.

The night-bombing of Baghdad in 2004. The Cheney/Bush gang, with support from John Howard, has started, or tried to start, wars all over the globe.

Cheney/Bush/Howard Smashed in U.S. Elections

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Democratic Party's victories, than before." Although they won on November 7, the Democrats do not actually assume office until January. With Cheney/Bush facing numerous investigations by a Democratic-controlled Congress over the lies used to launch the Iraq war; over torture conducted at Guantanamo Bay and elsewhere; over illegal surveillance of American citizens, and numerous other crimes, the desperate Synarchy which owns Cheney/Bush will escalate their drive for new wars while they still can, such as their planned nuclear strike against Iran, or perhaps North Korea, to unleash global chaos in order to maintain power.

Even after their victory, some Democratic leaders are trumpetting their intent to "work with" Cheney/Bush. LaRouche, by contrast, is organising to immediately impeach both of them, because "The greatest monetary-financial crash in modern history is onrushing now. Drastic reforms made, largely, in concert with the willing among leading nations, now, will determine the future of the U.S.A., and all humanity for a generation or more to come." Only an idiot, LaRouche admonished leading Democrats, would propose to let Cheney/Bush remain in office until their terms expire in January 2009.

The Implications for Australia

John Howard has been a notorious toady and "deputy sheriff" for the Cheney/Bush cabal ever since they took office in January 2001, signing onto every lie, every police state measure, every act of torture, and every one of their actual or proposed wars. This kick in the teeth to them therefore weakens him substantially. However, only a fool would imagine that the policies of the ALP, particularly under Tony Blair intimate Kim Beasley, would be much different. There is no political force in Australia (including the pathetic Greens) except LaRouche's associates in the Citizens Electoral Council which has the slightest intention to break with the policies which have brought Australia and the world to the brink of disaster, nor has the vaguest clue of what to do, even if they did. If you want a country, then you will get off your butt and work with LaRouche and the CEC, beginning with ordering more copies of this paper and distributing them everywhere.

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New CEC National Chairman

At a recent national conference of the Citizens Electoral Council, Brian McCarthy of Mandurah, Western Australia was elected as the party's new national chairman, replacing Mrs. Noelene Isherwood. A veteran activist and pillar of the CEC from its early days, Brian until his recent retirement, worked as a powerhouse operator with Alcoa for more than 30 years. He served as a CFMEU convenor for almost 10 years.

Congratulations, Brian!

Brian McCarthy

U.S. President Richard Nixon (1969-74) floated the U.S. dollar in 1971, at the behest of then-U.S. government officials George Shultz (2nd from left) and Henry Kissinger (3rd from left), thus destroying the postwar, fixed-rate Bretton Woods monetary system. Shultz, Kissinger and Lazard Freres financier Felix Rohatyn (far right) simultaneously installed the fascist mass-murderer Gen. Pinochet in power in Chile, a crime less murderous than the destruction of the protectionist Bretton Woods system.

Derivatives traders in Brazil. In October 1987 the U.S. stock market suffered its biggest collapse since "black Friday" in 1929. Federal Reserve chairman Alan Greenspan temporarily papered over the crash by legalising derivatives—financial gambling debts with no value, hundreds of trillions of dollars of which are now traded every year in the biggest bubble in history.

immediately and automatically. Why?

In 1971, in August of 1971, the administration of that time, the Nixon Administration, through an individual called George P. Shultz—the man who later put the dictator Pinochet into power in Chile, together with Henry Kissinger and Felix Rohatyn—floated the dollar! That is, up to that time, the U.S. dollar had been a regulated currency, within a fixed-parity system among currencies internationally. The dollar was still, essentially, as good as gold. It was the dollar which was the only world currency at the end of World War II. The power of the dollar, the stability of the dollar, through things like the Marshall Plan, and similar arrangements, and the fixed-exchange-rate system, enabled a recovery of Western Europe, enabled a recovery in other parts of the world, through things like the Kreditanstalt für Wiederaufbau in Germany; as vehicles for mobilizing credit to reconstruct the economy of war-torn Germany, to reconstruct the economy of France, to build up the economy of Italy, which continued into the late 1960s.

Now, in 1971, the dollar is turned into toilet paper, by an act of an administration. It is backed up in 1972, by a meeting of the International Monetary Fund. Again, George Shultz was there: They had a floating-exchange-rate system—what backed up the dollar? Well, the dollar was no longer a U.S. dollar. *It was an IMF dollar*: a U.S. dollar denominated in IMF conditions. With nothing underneath it—just good faith and trust that everything would be all right.

Now, everything in the world today, is related to this dollar. China has vast claims denominated in dollars. All parts of the world have vast claims denominated in dollars, assets denominated in dollars. What happens if the dollar collapses by 30%?

Then China collapses. Then India collapses. Because not only is the dollar worth less, in their so-called asset list, *but* the collapse of the U.S. market, and the chain-reaction collapse of the U.S. market, its effects on other parts of the world, mean a collapse of the economy of India, China, and so forth. And also Europe. So, a collapse of the U.S. dollar *is a disaster for every part of the world*. …

And therefore, this is typical of what happens on the day of crisis: Suddenly, you're faced with a point, a collapse of the dollar is about to occur. You say, "Well, the dollar's going to collapse, the rest of us will get by, China will do well, India will do well, Europe will find a way to manage, Russia will do all right..." *No*. No: The world will go into chaos. As one of those things that happened in a time of crisis, when people are taken by surprise, and things they kept telling themselves were true, are shown suddenly not to be true. And the survivors are those who wise up quickly, and recognize that what they believed was a fraud, was a lie.

A beggar in Delhi, India. In China and India, the world's most populous nations, 70-80% of the population are impoverished, living almost as beasts. Photo: WHO/P Virot

A Culture of Sophistry

Because people live lies. This is also a sophist culture. The post-war world has become largely a sophist culture. Europe, the United States, in particular. We are sophists in the same kind of sophistry that led Pericles' Athens to destroy itself in the Peloponnesian War. That kind of sophistry: Words no longer have meaning. Truth no longer exists. Sophistry! "But, I don't know—you say it's true! But popular opinion says no. You say this is good, but popular opinion says no. Popular opinion says this is good, but you say no." What's your authority? "Popular opinion." Or what you perceive to be popular opinion, or some group's opinion. But a belief in something which is not proven, which is not true.

And that's the way civilizations are destroyed, especially European civilizations, ever since the fall of Athens under Pericles: "Golden Age of Athens"! The "golden age" proved to be something flushing, and Athens went down the toilet. "Golden Age"—this is the way this cuts.

How to Defend the Dollar

Now, let's look at the other side. That's the bad side. Not only are we in a period of war, we're on the edge of a threatened dark age, a collapse of the dollar, a collapse of the world. All of these things are now in process.

Well, I said, we have to defend the dollar. Let me explain that, again, as I have recently in some questions on this: First of all, the world is dominated—especially, the world denominated in dollars, it's denominated in a kind of pseudo-currency called financial derivatives, such as hedge funds. Now, what are hedge funds, what are financial derivatives? They represent gambling debts. There is *no product* in hedge funds. There is *no product* in financial derivatives. There's nothing physically worthwhile in them. What this is, *is a bet—it's a gambling bet!* And then it becomes gambling bets on gambling bets, where hedge funds compete in gambling against each other. The world has become one giant gambling casino, ever since 1987, since Volcker left office at the Federal Reserve System and Alan Greenspan came in—and legalized what should have been outlawed as criminal practice, called financial derivatives! And the world is now run and controlled by financial derivatives. And this is a bubble, which is about to collapse. Hmm?

So, what do we have to do? The first thing we have to do, is get rid of this paper: *Cancel all hedge funds, all financial derivatives.* Now, you'll get a big scream from some people when you say that, but you have to do it. You'll do it one way or the other: You will either do it in an orderly fashion, by actions of government and agreements among governments. Or, it will happen to you anyway! And if it happens to you anyway, it's going to come like a collision, not a decision by governments. Because, we could never pay, the world could never pay, to support the claims denominated in hedge funds, in financial derivatives generally. It couldn't be done. The debt is so much bigger than the entire annual product of the world, and particularly at today's interest rates, you could never pay it. …

Therefore, the first thing we have to do, is we have to put the world into bankruptcy reorganization. We have to agree, that the dollar must become, once again, a fixed-exchange unit. Why? Because it's worth that? No—because we're going to make it worth that. We're going to shift the world economy by putting it through bankruptcy reorganization, like any ordinary, orderly bankruptcy reorganization: We're going to put the world financial system into bankruptcy reorganization. We're going to convert short-term claims, if they're viable, into long-term claims. We're going to operate on a low interest rate, as we did in the 1930s, when the recovery was started in the United States. We're going to now re-create a banking system, because we have to save the banking system. We can't save many of the bankers, who are insane; but we can save the banking system. Because we need the banking system: The banking system is the method by which you handle deposits of people, by which you circulate credit, by which you build up long-term credit for investments, that sort of thing. …

Now therefore, that means we need a new supply of credit, long-term credit, for that purpose.

A Mission to Develop Eurasia

This all fits into a global picture: We have two parts of Eurasia. On the one side, you have European civilization, as it grew up in Eurasia since the time of ancient Greece, the time of Solon of Athens for example. That's European civilization. This has undergone, with all its problems in between, betwixt and before, with all kinds of developments; European civilization is a very solid institution. It may not be solid in the way it acts sometimes, but it's a *very good idea*. As a matter of fact, it's the most successful idea for the development and improvement of the conditions of life of populations. The nation-state as developed in Europe, is a form of institution which, when properly developed, is the most efficient institution we know for promoting the improvements of the welfare of humanity. That's the case today.

So therefore, on the other hand, we have Asian populations. And Asian populations, until recently, until a modernization development occurred, have been essentially treating the mass of humanity as cattle. Yes, some people are wealthy; some people have an impressive culture; some people have this, and so forth—but the masses of people, 80 to 90%, are impoverished and living almost as beasts. With the life expectancies of beasts, the standard of living of beasts, *enslaved*. With no real development of the mind of the individual, the thing which in the best instances in Europe and the United States, we had.

So therefore, the problem is, we now have come to the point, on this account alone, that we must think about the world: We have a growing population of Asia. A growth area of Asia. We have to think about re-cranking up European civilization, with a mission-orientation for the development of Eurasia as a whole over the coming two generations. Which means Europe must crank up, as a source again, of scientific and industrial output, in the form of long-term credit, long-term investment, in exchange with Asia, to build up countries, like the 70% or so of the poor of India, of the poor of China, of the poor of other countries, where these poor *have* no future to speak of.

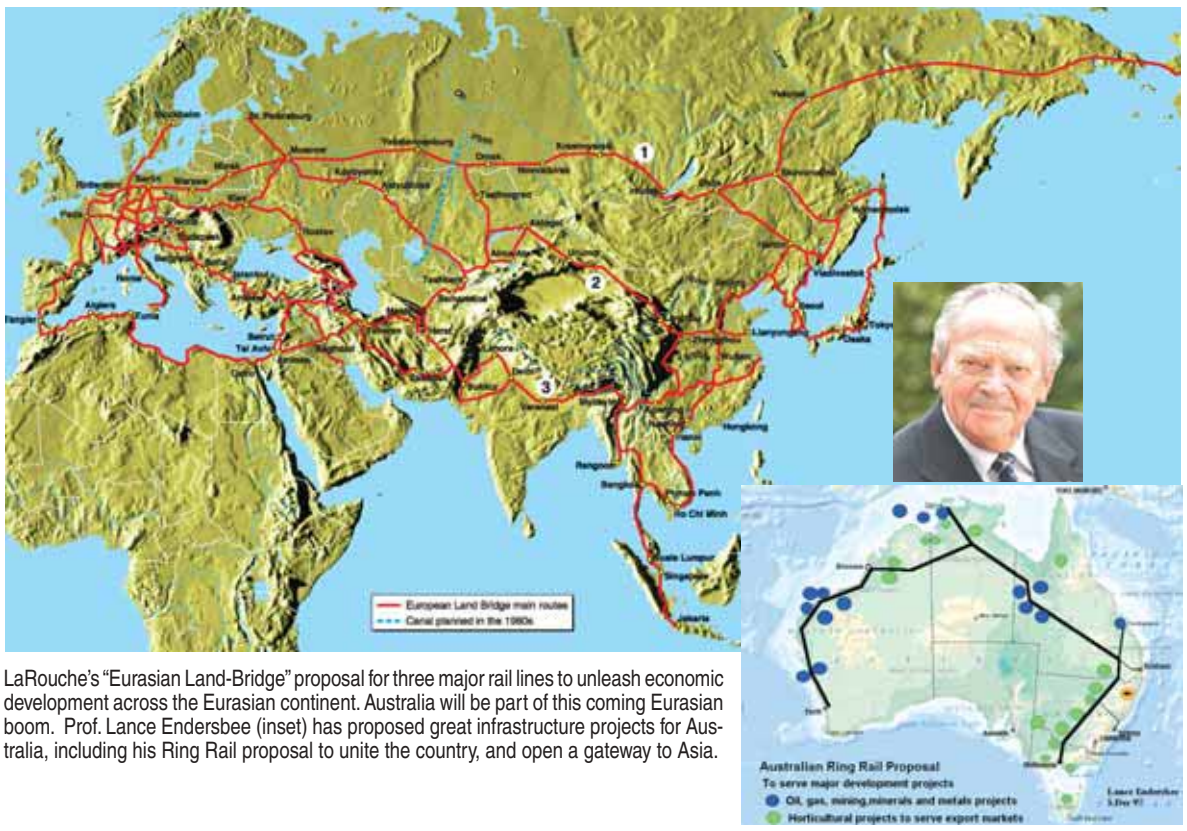
And we have to have a mission, of building up a just world, based upon cooperation among nation-states, with the Westphalian principle, [Treaty of Westphalia, 1648] that we must think, in all policies, we must think as the authors of Westphalia did: We must think about the *other* person, rather than our own demands, first. What are we doing for the *other*? What are we, as a nation, as a people, doing for the *other* people, the *other* nation? And to build bonds of cooperation, long-term cooperation among peoples and nations on that basis.

So we have to organize, in coming out of this depression, which is now hitting us, we have to organize on the basis of a long-term, 50-year approximately, perspective for *developing the Eurasian continent.*

Change the Relationship of Man to Nature

Now there's another aspect to this, which I referred to the last time I had a Berlin assembly here. And that is, we've come to the point where there's a fundamental change in the relationship of man to nature. The growth of population, and the increase of technology, improvement of technology, which is necessary for that growth of population, has created a situation where we are using up *prime quality* raw materials, more rapidly than the planet can regenerate them.

Now, we have entered also, a period, the period of fission and fusion processes, at which we can actually not only regenerate high-quality raw materials, that is, help the Biosphere recover from the damage of our consumption; we're also entering a period where we're going to create new conditions, and new kinds of materials on this planet which never existed before. Because we're going to go into the transuranic period of development of the planet, where we are developing new kinds of materials, with new purposes, new compounds, new things, we've never done before. We're going to have to, to meet the demands of the population, say, of China, over 1.3 billion; the population of India, over 1 billion people—70% poor! How are we going to produce enough from this planet to meet the demands, for power, for materials, for development and production of food, how are



LaRouche's "Eurasian Land-Bridge" proposal for three major rail lines to unleash economic development across the Eurasian continent. Australia will be part of this coming Eurasian boom. Prof. Lance Endersbee (inset) has proposed great infrastructure projects for Australia, including his Ring Rail proposal to unite the country, and open a gateway to Asia.

we going to do this, so that we provide the people, the children of the people now existing, in Asia, to provide them the opportunity of a standard of living which enables them to survive, and improve?

Therefore, we have entered a period, in which we no longer think about *taking over* and exploiting raw materials. We think of taking over and *developing* the planet's equivalent of raw materials, today. Which means an emphasis upon largely thermonuclear fusion and related technologies.

Return to Nuclear Energy

So the next 50 years will have to be that kind of transition. It means, now, a return to nuclear energy. For example, let's take the water crisis: We have on this planet, a freshwater crisis. This is particularly true in India. Look for example, at Southwest Asia: The essential crisis, apart from all the political problems, in Southwest Asia, is a lack of water, lack of potable water! Water for crop growth, water for drinking! The wars, like Israel's war with Syria, was over water! Israel had an expanding population; it had to steal the water from Syria; and grabbed the water from everybody around there, to meet their requirements. A water crisis. This is something we knew at the beginning of the last century. *Before* World War II began—we *knew* that you could have no stability in the Middle East *without development of freshwater supplies*. Without the change of climate, by the application of power and water management, to create an environment which would support a larger population, per capita, throughout that area.

We have, in India now, and other places, populations are living on what's called fossil water or semi-fossil water resources. You have water that's been stuck in the Earth, down in a hole someplace, for over the past 2 million years of glaciation. The melting glaciers and so forth, put water, deposited like some kind of metal, down there, deep under the soil. And people are now, as in Australia, they're drawing water up, that's fossil water. Or, they're drawing water, as in the United States, the Ogalalla Reservoir, withdrawing fresh water from reservoirs, more rapidly than they can be replenished, at present.

So therefore, we have a water crisis. We have plenty of water. You know about the oceans! We have plenty of water. That's not the problem. But we need a quality of potable water, for the development of agriculture, for greening and improving the climate by simply trees—trees and grasses and so forth, improve the climate. The more life you have in the ground, in the form of plant life, the better off you are, especially the green growth. So have it. We need that. We need fresh, clean, potable water for people. We can not get that economically, without the massive use of nuclear power, nuclear fission.

India has a very poor population: 70%. It's a very poorly educated population, this 70%. Therefore, you have to find a lever, to raise the standard of living, when you don't have the educational base in the population for getting this through simply technology by people. So what do you do? You come in with nuclear power. You suddenly get an infusion of power and water, cheaply and efficiently, and you've changed the conditions of life in which people live, and you increase their productivity by improving their environment, as a productive environment. This is true in other parts of the world, as in the Middle East; we have to transform these areas to make them more liveable to meet the needs of their populations, today and tomorrow. And this must be the kind of mission we have over the next 25 and 50 years. …

The Yongwang nuclear power station in Korea. Only nuclear energy can solve Australia's critical water and power shortages, as well bringing us into the world's now-emerging "isotope economy".

The Purpose of Our Lives

We all die: What's our purpose in life if we all die? Our satisfaction while we're alive? Or is it what we're doing, while we're alive with our life, which is of continued value for the human race afterward, that makes our life having been lived, worthwhile for humanity? The thing that we can take pride in, in the eyes of our children and grandchildren, that we're doing for them, and for the world after us?

This is the passion which must grip us, if we are going to come out of this mess. And therefore, we have to think in global terms. Not in terms of globalization. We have to think of mission-orientation, for bringing nations together, to bring their own houses in order, to bring our relations among nations in order. To create a world system of financial and related cooperation, which is organized to meet these kinds of needs, and to give us, again, not the pride of arrogance, but the pride that we are necessary, each of us, and each nation, is necessary for the benefit of the world as a whole.

That's the point we've come to, and that's where we stand now. …

The Isotope Economy

by Dr. Jonathan Tennenbaum

The following article first appeared in the October 6, 2006 issue of Executive Intelligence Review. *It was commissioned by LaRouche "to assist governments of Eurasia and others" in the discussion process around LaRouche's series of international webcasts. The first half of the article appears here; for the full version, see www.cecaust.com.au.*

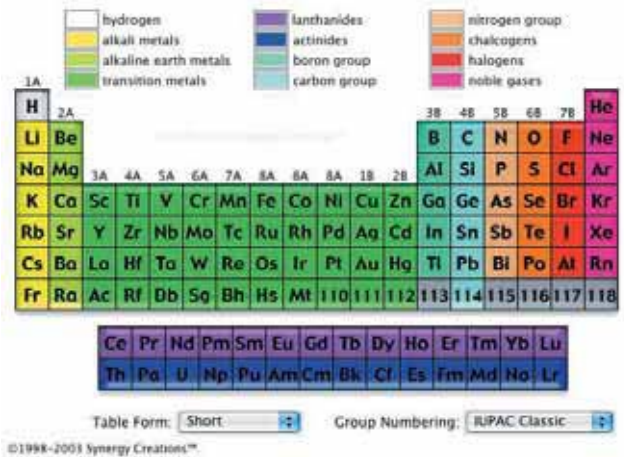
Prologue

The subject of this essay is a crucial component of the economic mobilization which must be launched in the immediate future, if the world is to be saved from a physical and socio-political collapse of a severity comparable only, on a global scale, to what occurred in Europe in the period leading to the outbreak of the "Black Death" of the 14th Century. The essential problem, addressed here, is how to overcome the effects of the savage destruction of in-depth industrial and scientific-technological capabilities, and of the educational level, skills, and cognitive powers of the labor force, which has occurred in the major industrial nations of both the East and West under recent decades' policies of globalization, deregulation, privatization, "shock therapy," and "the postindustrial society." Any serious program of economic mobilization and reconstruction, must take account of the fact, that the largest single, organically interconnected repository of highest-level scientific research, technological and advanced-technology manpower and industrial capability on this planet, is located in and around the nuclear energy sectors of the United States, Russia, Ukraine, Japan, Germany, France, India, China, South Africa, Argentina, Brazil, and some others; and in areas of astrophysics, space technology, geology, and biomedicine, most closely linked to research and applications of nuclear physics. By the very nature of nuclear science, its roots and history, and the needs of the world over the coming 50 years, a mobilization of the world's nuclear sector, as a vanguard and locomotive for a generalized economic mobilization of the world's leading nations, must take a specific form. After discussions with Lyndon LaRouche, with S. Subbotin of the Kurchatov Institute, and F. Gareev at the Joint Institute for Nuclear Research in Dubna, I have chosen to call it the "Isotope Economy."

* * *

Approximately a century ago, it was experimentally demonstrated, that the naturally occurring chemical elements, whose harmonic ordering Dmitri Mendeleyev embodied in his periodic system, were not homogenous bodies, but rather mixtures of distinct species of atoms—isotopes—having nearly identical chemical behavior, but profoundly different physical properties. The investigation of this "new dimensionality" of the periodic system, and of the processes of transformation of atoms, underlying it, led eventually to the discovery of fusion, fission, and other nuclear reactions, the realization of the first nuclear fission chain reaction, and the first atomic weapons, during World War II. The creation of those devices depended upon the separation of the pure isotope U-235 from naturally occurring uranium, and upon the artificial generation, in nuclear reactors, of the first several kilograms of plutonium-239: a species of atoms hitherto virtually absent from the Earth's natural environment.

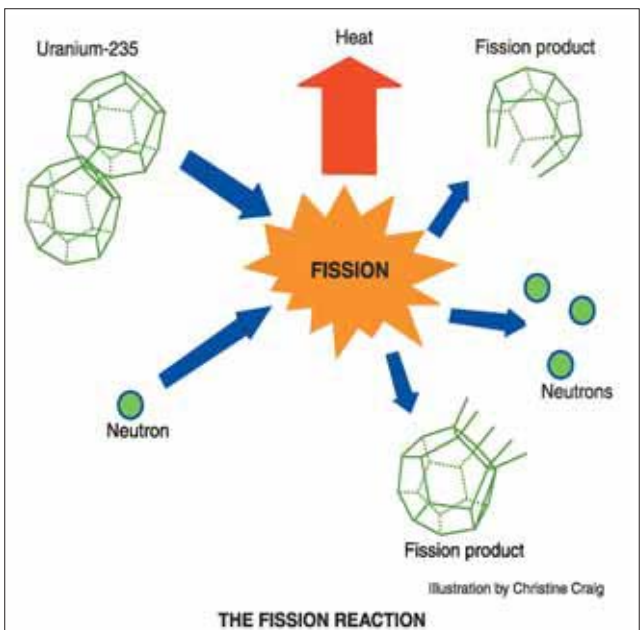
Dmitri Mendeleyev, (1834-1906), the great Russian chemist, first conceptualised the Periodic Table of Elements (right).



Today, 60-odd years after the first man-made nuclear chain-reaction, large-scale production of power from nuclear fission reactions has become a reality in 30 countries. Approximately 3,000 different isotopes are known, most of them artificially generated, and more than 200 are presently in commercial use. Modern medical care, and countless other vital activities of modern society, would be unthinkable without the daily use of a hundred-odd radioactive isotopes, produced in nuclear reactors and particle accelerators. Meanwhile, the creation of nuclear weapons profoundly changed the face of history, shaping the entire era of the "Cold War" and creating a situation, where the launching of large-scale warfare, in the form known up to the World War II, were practically tantamount to an act of suicide. Certainly, very few even among nominally highly educated persons today, are fully conscious of the extent to which our present-day world has been shaped by the implications of what initially appeared as "infinitesimal" nuances in the behavior of chemical elements.

And yet, the implications of what was set in motion by the discovery of radioactivity and the isotopes, growing out of Mendeleyev's "Keplerian" understanding of the periodic system, go far, far beyond anything the world has seen up to now.

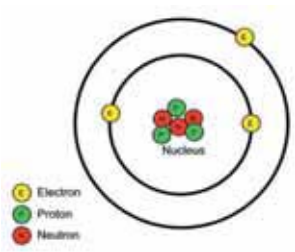
As Vladimir Vernadsky and others recognized already a century ago, the discovery of new dynamic principles, transcending the chemistry of the periodic system and closely bound up with the origins of our Solar System and the elements themselves, meant unleashing a fundamental revolution in all aspects of man's relationship to nature. Science had delivered into man's hands a new power: the power to generate a "fire" millions of times more concentrated than the chemical combustion processes, which had been a chief basis of human civilized existence since the legendary gift of Prometheus; a new power sufficient to send a large ship 20 times around the Earth on 55 kilograms of fuel; sufficient, in principle, to support a thriving human population many times larger than that existing today; but also a power



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.

What are "Isotopes"?

Bearing in mind that the standard physics depiction of an atom is in dire need of revision as Dr. Tennenbaum demonstrates in his article, that standard, highly-inadequate depiction (which you may have learned in school), is as follows:



Atoms are made up of a nucleus composed of protons (which have a positive electrical charge) and neutrons (with a neutral charge). Electrons (with a negative charge) travel around the nucleus in orbits, and most of the atom in between the electrons and the nucleus is "empty space". The "atomic number" is the number of protons characteristic of each element, which determines where it is on the Periodic Table. However, the same element (i.e. with the same number of protons) can have a varying number of neutrons, which are known as the "isotopes" of that element. The combined number of protons and neutrons in the nucleus is known as the atomic mass.

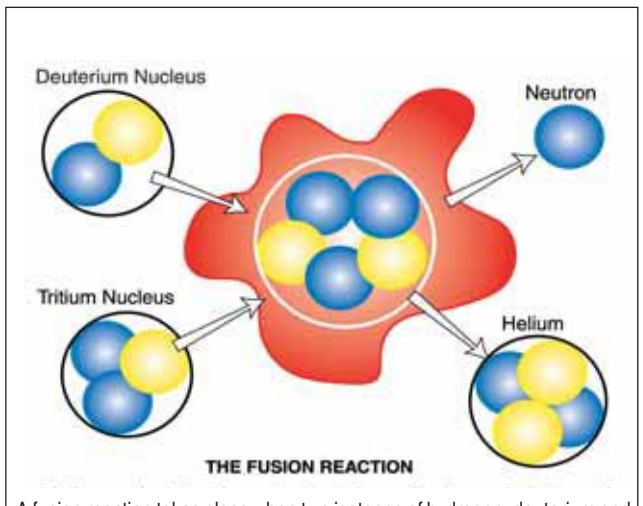
For instance, the atom of hydrogen, the most common element in the universe, has one proton (an atomic number of one), but can have one or two neutrons in its naturally occurring form (hydrogen-1 has one proton; hydrogen-2, known as "deuterium", has one proton and one neutron: and hydrogen-3, known as "tritium", has one proton and two neutrons), meaning that there are three isotopes of naturally-occurring hydrogen. Four more isotopes have been created in the laboratory, making seven isotopes of hydrogen in all.

The Isotope Economy

to create, on Earth, physical conditions found otherwise only in stars and centers of galaxies; a power that opens the way, in the not-too-distant future, for the expansion of human activity throughout the inner regions of the Solar System, and eventually beyond.

Man's beginning mastery of the power to transmute chemical elements, and to create new states of matter, not previously existing on the Earth and perhaps not even in the universe as a whole, demonstrates once more, that we are living in the universe of Plato, not of Aristotle. This is a universe in which *processes are primary*; in which "nothing is permanent, but change itself," and in which, in dealing with such things as atoms and so-called elementary particles, we must constantly speak, not of a "this" but of a "thus" (as Plato wrote in the *Timaeus*—see below). More than in any previous "phase state" of man's physical economy, the emergence of what I am calling the "Isotope Economy" signifies a condition, in which social practice must necessarily be oriented to *true ideas*: to the discoverable, universal principles that govern change and development of the universe, and not primarily to objects of the senses. This means the end of empiricism and materialism.

Such a revolution has profound political implications. Its realization is plainly incompatible with further toleration of an irrational, oligarchical organization of society, in which essential decisions, concerning the future of nations and the fate of humanity as a whole, are subject to the whims of a tiny number of influential families, while the vast majority of humanity lives in ignorance and servitude. The revolution, proclaimed by Vernadsky as the coming of the Noosphere, and which he saw as inseparable from a coming era of nuclear power, means a society living the Promethean self-conception of man; it means a society whose activity would revolve around the principle of creative scientific discovery, like the planets around our Sun. It means a highly educated population, capable of deliberative self-government, and organized on the basis of a scientific understanding of the dynamic relationship between the sovereign creative individual, the sovereign nation, and the interests of humanity as a whole. In a word, the image of society that Leibniz and the "American Prometheus" Benjamin Franklin had in mind, in the original design for a republic in the New World. This view of mankind's future inspired the enormous optimism that people all over the world attached to nuclear energy—"the atom in the service of man"—in East and West, North and South.



A fusion reaction takes place when two isotopes of hydrogen, deuterium and tritium, are combined to form a larger atom, Helium, releasing energy in the process. Fusion fuels the Sun and stars, but in the laboratory, atoms must be heated to at least 100 million degrees under sufficient pressure, to produce fusion. Other lighter elements can also be fused.

The Olympians' War Against Progress

The response to this challenge, from the oligarchical would-be "Gods of Olympus," was explicit and savage. From the mid-1960s on, an all-out psychological and political war was unleashed against the institutions of industrial society and against the very notion of scientific and technological progress. The assault, focussing on the United States, Britain, and western continental Europe, was loudly proclaimed in advance by Bertrand Russell and his circles, and executed by leading Anglo-American financial institutions and intelligence agencies close to the British monarchy and to oligarchical circles on the European continent. It lay at the origin of the orchestrated

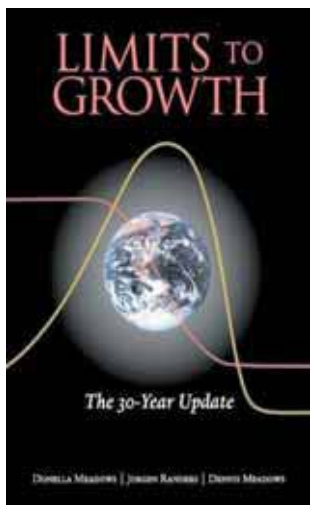
The oligarchy organised the 1960s rock-drug-sex youth "counterculture" as an attack against the very notion of scientific and technological progress, best typified by nuclear power. Those brainwashed, baby-boomer youth of the 1960s are today the political and other leaders of society.

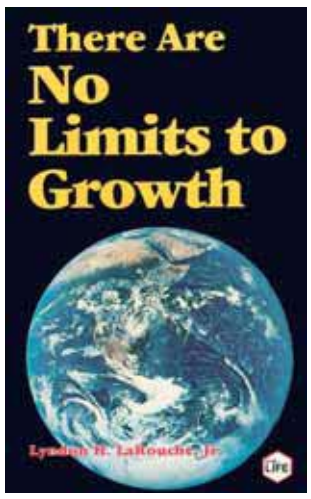
spread of rock-drug-sex youth "counterculture," the New Left movement, the 1968 student revolution, the malthusian propaganda of the Club of Rome's *Limits to Growth* and the "Green" environmentalist movement worldwide.

These forces chose *nuclear power*, the clearest embodiment of scientific and technological progress and the single most crucial technology for world development in the post-war period, as a main focus of their assault. Parallel with the buildup of the anti-nuclear scare campaign, institutional measures were enacted to stop the spread and development of nuclear energy worldwide: The Administration of Jimmy Carter initiated a 180-degree reversal of President Eisenhower's wise "Atoms for Peace" policy. It attempted to impose a virtual moratorium on nuclear exports to developing countries under the pretext of "Nonproliferation," worked to dismantle the in-depth nuclear research capabilities of the United States itself, and to delay or halt, if possible, the realization of controlled fusion as a power source of the future. The ambitious nuclear power programs of developing countries such as Brazil, Argentina, Mexico, and others, and the kinds of North-South cooperation exemplified by the long-term German-Brazilian nuclear agreement, were crushed by the opposition of the Carter Administration and its successors. Amidst the mass-media-orchestrated anti-nuclear hysteria of the 1980s, the nuclear program of Germany, once world leader in export and technology-transfer of nuclear technology, was shut down, along with the smaller, but qualitatively significant programs of Sweden, Italy, and a number of other nations. With the collapse of the Soviet Union and the subsequent, savage looting and destruction of the scientific-technological and industrial capacities of that nation, the single largest nuclear sector in the world outside the United States nearly went out of existence, only to be partly revived in the most recent period.

All of this destruction, and more, was already promised to the world by Bertrand Russell in his vehemently anti-science tracts during the 1940s and 1950s. Russell went so far, in 1946, as to propose dropping nuclear bombs on the Soviet Union, in case the Soviets refused to submit to a world government having an absolute monopoly on nuclear technology. Russell's essential argument—that the existence of truly sovereign nations was "too dangerous" to be tolerated in an age of nuclear weapons—remains the basis for the use of so-called "nonproliferation" as a pretext for denying the right of all nations and peoples to full and unhindered use of the fruits of scientific and technological progress. It remains the basis for a de facto regime of "technological apartheid," directed above all against the majority of humanity living in the so-called Third World.

But the oligarchical attempts to snuff out the nuclear revolution began long before the discovery of fission in 1934-38. They revealed themselves in the orchestrated, anti-Semitism-tinged persecution of Polish Catholic-born Marie Curie in France, in the bitter opposition to Max Planck's discovery at the turn of the century, and in the mafiaso-like, bullying behavior of Niels Bohr and others toward Schrodinger and Einstein at the 1927 Solvay Conference. Bohr et al.



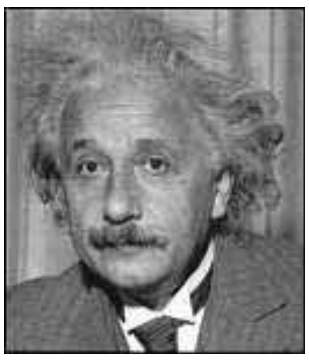


The 1972 book of the oligarchy's Club of Rome, *Limits to Growth* (shown above left, in new edition), was part of a drive to destroy science and eliminate much of the world's population, in particular by outlawing nuclear power. The LaRouche movement fought the "limits to growth" mumbo-jumbo, including with a book (right) by Lyndon H. LaRouche, Jr.

explicitly *forbad*e any kind of thinking which conflicted with the chosen occult-empiricist doctrine of "complementarity" and supposed intrinsically statistical-indeterminate character of microphysical processes.

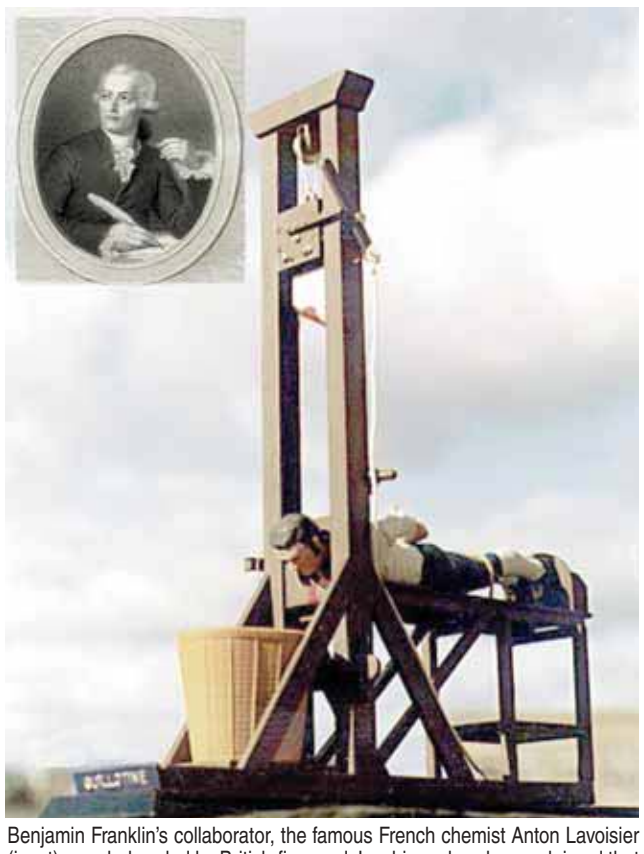
In opposition to Einstein, Schrodinger, and others, who sought to conceptualize the *higher principle* underlying the apparently *discontinuous character* of quantum phenomena, Bohr, Max Born, Wolfgang Pauli et al. arbitrarily asserted that reality on the microphysical scale is *intrinsically* beyond the conceptual powers of the human mind! This explicit, savage attack on the principle of scientific creativity, backed up by the growing oligarchical takeover of the *financing* of scientific research, especially in the wake of World War I, served the obvious underlying purpose, to break what remained of the Promethean spirit of physical science, reawakened during the Renaissance, and to enslave science to the oligarchical agenda. Insofar as the fruits of scientific research were needed, for military and other "practical" purposes, scientists would be allowed to work; but they must not be allowed to *think* in a truly creative way. This repeated the tactic that had once deployed Laplace et al. to crush the circles of Monge and Carnot, and convert the Promethean Ecole Polytechnique into a tool of Napoleon's imperial drive.

In the sequel, theoretical nuclear physics was elaborated, in the hands of a "kindergarten" of admittedly very brilliant and capable young scientists, into what it still largely remains today: a Ptolemaic mixture of mutually contradictory models, mathematical formalisms, and calculational procedures, that can be extremely useful and even indispensable in certain specific domains of application—such as building bombs!—but embody no intelligible conception of the universe. It is not surprising, that in the stormy developments leading to the discovery of nuclear fission, so-called "theory" lagged far behind the experimental work,

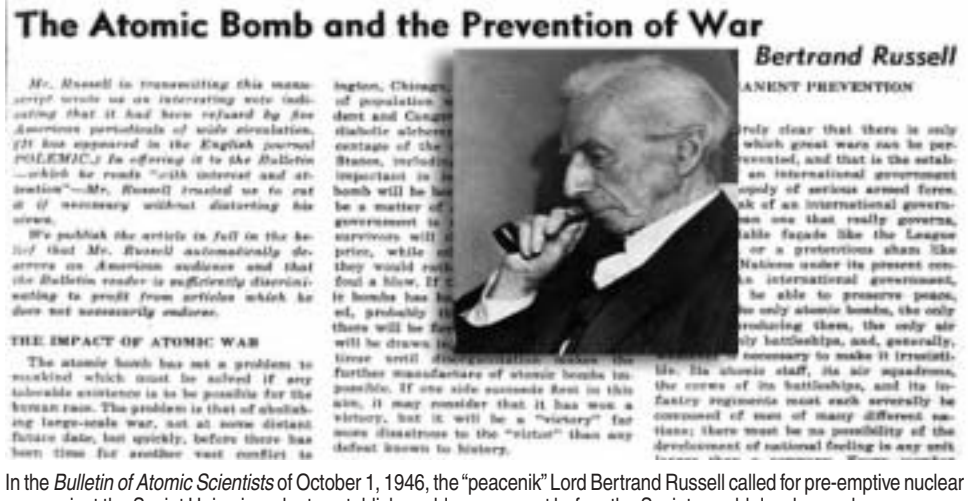


Albert Einstein. A true genius, who countered the materialist/empiricist "statistical" doctrines of science through his discoveries, and with his famous polemic in favour of knowable, universal laws: "God does not play dice."

which was the real "driver" of development. The discovery of fission was itself held back for four years, because this process was regarded by the theorists as "impossible." The subsequent rapid development of nuclear physics and technology, from the wartime bomb projects, up to and including the realization of civilian nuclear power and the vast complex of medical and other applications of isotopes, was driven forward largely by people who were trained in the tradition of physical chemistry, geochemistry, and related industrially oriented fields of natural science. These



Benjamin Franklin's collaborator, the famous French chemist Anton Lavoisier (inset), was beheaded by British-financed Jacobin mobs who proclaimed that "The Revolution has no need for men of science." The purpose of the tyrannical "French Revolution" was to make sure the American Revolution was not replicated in Europe.



The Atomic Bomb and the Prevention of War

Bertrand Russell

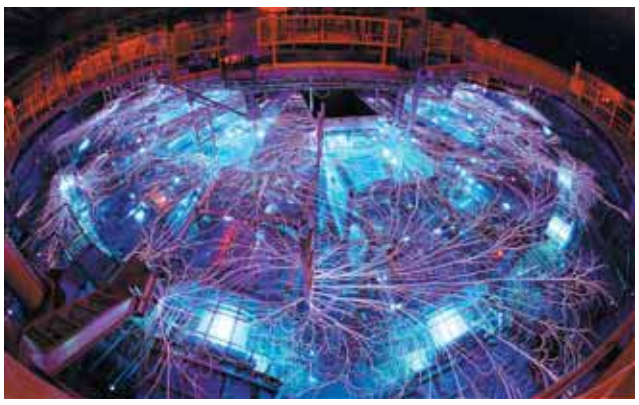
In the *Bulletin of Atomic Scientists* of October 1, 1946, the "peacenik" Lord Bertrand Russell called for pre-emptive nuclear war against the Soviet Union in order to establish world government before the Soviets could develop nuclear weapons. Even the peaceful use of nuclear power represents a mortal threat to the oligarchy's plans for world government.

The Isotope Economy

people, exemplified by William Harkins, the Noddacks, or Vernadsky, often despised the mathematical sophistry of theoreticians who had been elevated to the stature of "high priests of science."

But the state of nuclear physics today, is no less a product of the enormous external pressures imposed on science and on many of the most brilliant scientists in the context of the wartime atom bomb projects and the ensuing Cold War. The subservience to military aims, of some of the most revolutionary areas of fundamental research in the physical sciences, and the imposition of strict regimes of secrecy, both in the West and East, preventing the free exchange of scientific ideas and experimental results, were virtually unprecedented in the millennia-long history of science. These circumstances had a devastating effect upon the intellectual integrity of many among the most brilliant scientists, and upon the organic development of science as a whole. Although the military relevance of advanced scientific areas such as nuclear physics, caused enormous resources to be devoted to their pursuit, the managed environment within which many scientists worked, became a powerful barrier to fundamental scientific progress.

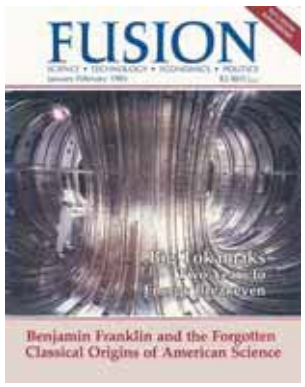
This was no mere incidental side-effect. Under the strategic policies promoted initially by Russell, Leo Szilard, and others, which later became known as the "balance of nuclear terror" and "Mutually Assured Destruction (MAD)," the *suppression of fundamental breakthroughs* became more and more a *deliberate feature* of the management of scientific research. The essential argument of the Russell faction was, that once the United States and Soviet Union possessed sufficient numbers of nuclear warheads and delivery systems to inflict catastrophic damage on the other side, even after having suffered a first strike, a certain "stability" in the form of mutual deterrence had been achieved, which should not be disturbed at any cost. Accordingly, both sides should agree, not to pursue certain directions of research and development that might overturn the rules of the game. This had as a necessary consequence, however, that *the very possibility of fundamental scientific revolutions, would be seen, increasingly, as a potential threat to the strategic balance, and thereby to national security!*



Sandia National Laboratories in New Mexico's "Z-machine" firing. This innovative fusion device has produced plasmas that exceed temperatures of 2 billion degrees Kelvin—hotter than the interior of stars—and a burst of X-ray power of about 290 million watts, some 80 times the entire world's output of electricity.

Chaining Prometheus

This view, that Prometheus had to be chained down in the interests of preserving strategic stability, was institutionalized in certain understandings reached between the U.S. and Soviet governments, through Bertrand Russell's Pugwash Conferences and other "back channels," going back to the post-1957 Khrushchov period, and later exemplified by the ABM Treaty negotiated under Henry Kissinger. Superpower competition was thereby supposed to be limited to a narrow range of "permitted" directions—with a certain amount of cheating on both sides, of course—while at the same time the two sides cooperated to prevent any third country from developing "dangerous" scientific and technological capabilities. The active suppression of fundamental scientific breakthroughs, through bureaucratic and other means, applied not only to nuclear physics and areas directly connected with nuclear weapons, their delivery systems, and possible means of defense against them, but also to revolutionary areas in biophysics (bioelectromagnetism) and many other fields of science.



In Aeschylus's famous play, Prometheus gave mankind the gift of fire (technology) for which Zeus, the boss of the gods of Olympus (the oligarchy) decreed he should be chained to a rock and tortured for eternity. The architect of the American Revolution, Benjamin Franklin, was known as the "modern Prometheus" for his groundbreaking work in electricity, while he was slandered as "Dr. Frankenstein" in the anti-science novel *Frankenstein* by Britain's Mary Shelley. Lyndon LaRouche designed the Strategic Defense Initiative, in which laser beam weapons (artist's depiction) would render nuclear warfare obsolete, for which he was thrown in jail, and his magazine, Fusion, with over 200,000 subscribers worldwide, was shut down by the U.S. government.

These U.S.-Soviet government understandings shaped world events for the entire period up to the collapse of the Soviet Union. Their effects even reached into school classrooms. They cleared the way, for example, for the 1960s liberal educational reforms in the United States and other NATO countries, which degraded the role of "hard physical science" in general education, in favor of the so-called social sciences, and for the subsequent assault upon the concept of scientific and technological progress. With the founding of the International Institute for Applied Systems Analysis (IIASA) as a joint project of top elements of the Anglo-American establishment and the Soviet *nomenklatura*, the oligarchical conception underlying the long-standing "condominium" arrangements between the two sides came out into the open: to manage the world by methods intrinsically opposed to the Promethean impulse of science. Many on the Soviet side failed to realize that the elimination of the Soviet Union, and especially of its advanced scientific-technological potentialities, was high on the list of priorities.

The only substantial attempt to break the world free from these policies, was Lyndon LaRouche's fight to cause a fundamental change in strategic relations between the two nuclear superpowers, centered on a jointly agreed commitment for both to develop and deploy antiballistic-missile defense systems based on "new physical principles" (sometimes called directed-energy or beam weapons). This would have eliminated the doctrine of "Mutually Assured Destruction" and thereby the whole game of Bertrand Russell and Szilard, and at the same time permitted both nations to move into a "science-driver" mode of economy, in which the revolutionary civilian spinoffs of research into "new physical principles" would pay back investment into defense systems many times over.

Unfortunately, Soviet General Secretary Yuri Andropov refused the proposal, which LaRouche had communicated and explored in "back-channel" discussions with the knowledge of the Reagan Administration. Six years later, the Soviet Union collapsed, as LaRouche had warned it would, if his proposal were rejected. The policy of destroying the U.S.S.R.'s in-depth scientific-industrial capability went into full gear. But with the end of the Cold War, the need to continue large-scale state investments into advanced science and technology in the United States and Western Europe, from an oligarchical standpoint, no longer existed. Nor was there any "need" to maintain an all-round industrial base. The floodgates were opened for savage deindustrialization and "outsourcing" of production to "cheap labor" nations, accompanied by the rise of a gigantic speculative bubble in the financial system. To most of the youth growing up in the formerly industrialized nations, true scientific and technological progress is at best a distant, secondhand memory.

We have come to the end of the cycle. The destruction of large parts of the total scientific-technological potentials of mankind, the loss of much of its best-qualified labor force, and the stupefication of the population in formerly industrialized countries, if not reversed soon, would doom the world economy to inevitable physical collapse. There is no way that the nations of the developing world, including China and India with their oceans of poor people, could generate the technologies they need for their long-term survival, without a revival of the kinds of scientific and industrial capabilities in the United States, the former Soviet Union, and Europe, that were typified by the first decades of development of nuclear energy. The world is faced with a simple choice: either to launch an economic mobilization, rejoining the track of development of the "nuclear age," which Vernadsky and others had foreseen, or to fall back into a murderous dark age. Prometheus must be set free! Human civilization cannot survive without scientific revolutions.

A Nuclear Revival

Presently, the world is witnessing the beginning stages of a revival of nuclear power, which encompasses not only major developing countries such as China, India, South Africa, Argentina, and Brazil, but also Russia and even advanced-sector Western nations such as the United States, which had virtually abandoned their once-ambitious nuclear energy programs, for foolish ideological reasons, some 30 years ago. If the world does not descend into a dark age of chaos and war, a period of large-scale construction of nuclear power plants is pre-programmed, if only by the sheer scale and rapidity of expansion of demand for electrical and other forms of power, and the need to renew large sections of the existing power-production capacity, which are coming to the end of their service lives.

However, the world we are living in now is not the same as it was at the point that nuclear power development was aborted, three decades ago. Even an all-out commitment to a nuclear power plant construction program now could not possibly compensate for the severe damage the world economy, and human civilization generally, has suffered as a consequence of the sabotage of nuclear power development, and the virtual war against industrial culture of which nuclear technology was a crucial vanguard element. Much of the science and engineering capabilities, that once existed in the United States, Germany, Russia, Italy, Sweden, and other countries is simply no longer there. It must be built up once again in a process that will require a generation or more.

In the meantime, huge challenges facing mankind, which the early architects of nuclear energy development had recognized 50 years ago on the horizon of the future, stand today at our doorstep: the need to produce large quantities of fresh water by desalination or other artificial means; the need to replace the burning of petroleum products by a combination of electric power and synthetic, hydrogen-based fuels; the need to apply much larger power densities to the extraction, processing, and recycling of basic materials, and more.

To meet all these requirements, a revolutionary *new phase* in the development of nuclear energy must be launched now. I christen it, the "Isotope Economy."

What Is the Isotope Economy?

The immediate context for the emergence of the Isotope Economy is the now-beginning transition-process of the global physical economy, from the present, still-dominant role of fossil fuels, to nuclear power as the chief basis for the world's power production systems, both with respect to the generation of electricity, as well as, increasingly, industrial process heat and the production of hydrogen-based synthetic fuels to cover a growing percentage of total consumption of chemical fuels. This first stage of this process relies on nuclear fission reactors, with increasing emphasis on high-temperature reactors (gas-cooled as well as liquid-metal-cooled, slow- and fast-neutron systems), and an integrated fuel cycle, with comprehensive reprocessing and recycling of fissible materials, and employing thorium as well as uranium and plutonium. The necessary inventory of fission reactors encompasses a large spectrum of different reactor designs, including small-sized, series-produced modular units, as well as standard large units; reactors optimized variously for use as electricity generators, as industrial heat sources, for desalination, for production of hydrogen and other synthetic fuels; for breeding of fission fuel and transmutation of nuclear waste products, for ship propulsion, etc. Reactors requiring little or no supervision and running for very long periods without refueling—the so-called "nuclear batteries"—may play a significant role in outlying and developing regions of the world.

This transition to nuclear energy as the basis for the world's power systems, necessitates a massive build-up of industrial capacities for isotope-separation and for the reprocessing of nuclear materials, with emphasis on use of revolutionary laser- and plasma-based technologies. The latter build-up, in turn, provides an immediate jumping-off-point for the emergence of the Isotope Economy.

The "Isotope Economy" is characterized by the combination of four main features:

Firstly, the Isotope Economy means incorporating the entire open-ended array of individual species of atoms known as "isotopes," of which today 3,000 are known, into the economy as fully differentiated instruments of human activity. Thereby, the familiar system of the 92-odd elements of Mendeleyev's Periodic Table, will be superseded, in broad economic practice, by an incomparably more complex and multifaceted System of Isotopes. At first, these developments will concentrate on a subset of 1,000 or so relatively longer-lived isotopes known today; later, however, this number will grow, as means are devised for extending the lifetimes of even very short-lived isotopes, modifying or even suppressing the radioactivity of unstable nuclei and rendering them economically usable, by "binding" them in suitable

The Isotope Economy

physical geometries.

At the same time, the Isotope Economy will systematically *expand* the array of isotopes, beyond those known today, deep into the range of superheavy (transuranic) new elements and "exotic" isotopes of existing elements. Each of those species constitutes a singular condition of the universe: Each possesses a bundle of unique characteristics and anomalies, relative to the others, enriching the spectrum of degrees of freedom in the development of mankind and the universe.

Secondly, the mode of economic utilization of isotopes themselves will change radically, extending far beyond presently dominant uses as sources of ionizing radiation, as tracers, and as tools of specialized scientific research, to focus on much larger-scale applications of the *exquisitely fine "tuning" of subatomic processes*, both in respect to the inorganic domain, and in respect to the specific role of isotopes in the domain of living processes. Of immediate significance, in the first phases of the Isotope Economy, are the differences in mass and above all in the magnetic properties of the nuclei of isotopes, which interact with each other and the electron structures in their environment, by processes referred to today as "hyperfine interactions" and "nuclear magnetic resonance." This development can be usefully compared to the introduction of the principle of well-tempering into vocal polyphony in music, whereby small shifts in intonation cause new "cross voices" to emerge between and among the voices, resulting in a vastly increased power in the communication of ideas.

By exploiting to the fullest extent the implications of the ambiguity, which arose in chemistry with the discovery of different isotopes of one and the same element, mankind opens up a "higher cardinality" of potentialities, incomparably greater than the mere numerical increase in the exploitable atomic species, mentioned above, would suggest. If, for example, we are synthesizing an organic molecule having four carbon atoms in non-symmetrical positions, then by choosing for each "carbon" either of the two stable isotopes of carbon, C-12 or C-13, we obtain 16 different molecules, having the same chemical structure, but different "fine-tuned" magnetic and other properties. If we include the long-lived isotope C-14, the number grows to 81. If, in addition, there are five hydrogen atoms in the molecule, then by choosing between ordinary hydrogen and the stable isotope deuterium, up to 2,592 different molecules result!

"Isotopically engineered materials," synthesized from pure isotopes or selected combinations of them and possessing novel "collective" physical properties, will begin to supplant the more primitive types of materials, employed today in human activity. Some of these are already under development today. In addition to their special thermal, magnetic, electrical, and mechanical characteristics, these materials will play an essential role in the realization of new forms of nuclear energy and in generation and application of coherent, ultra-short-wavelength radiation, such as the gamma-ray laser.

At the same time, mankind stands on the threshold of revolutionary developments in biology and medicine, connected with understanding *how the fundamental distinction between living and nonliving processes*, demonstrated most forcefully by Louis Pasteur and Vernadsky, *expresses itself on the subatomic level*. While we cannot today predict the exact forms this revolution will take, we know already that it will have much to do with the specific role of isotopes in living processes, and will lead to a qualitative and quantitative transformation in the uses of isotopes, not only in biology and medicine, but also in agriculture and the management of the biosphere as a whole. It is, for example, quite conceivable, that, by altering and controlling the isotopic composition of plant, animal, and human nutrition in certain ways, mankind could obtain a variety of beneficial effects; and that in the not-too-distant future, very large amounts of isotopically enriched substances will be produced for that purpose.

Thirdly, the Isotope Economy will employ artificial transmutation on a large scale, to generate various species of atoms as raw materials for industrial production. This means, to begin with, utilizing nuclear fission reactors, coupled with reprocessing of all fission products, more and more as *atom-generators and transmutation machines*, rather than simply sources of heat and electricity. By their very nature, fission reactions of heavy nuclei produce a wide spectrum of lighter isotopes, as well as a flux of neutrons which can induce further transmutations in surrounding material. A next step will be to add the potentialities of nuclear fusion, to create a combined "fission-fusion economy" mimicking the astrophysical generation of elements in certain respects.

Vladimir Vernadsky, the Ukrainian-Russian biogeochemist, who first developed the concepts of the "Biosphere", and of the higher-order "Noösphere". Most babbling about alleged threats to the "Biosphere" today, is anti-scientific kookery.

The large neutron fluxes generated by fusion (deuterium-tritium) reactions, permit much faster rates of "breeding" of fuels for fission reactors, and of transmutation generally. Production of neutrons through accelerator-driven spallation, provides a third method for large-scale atom-generation, probably starting with facilities for the transmutation of high-level nuclear "waste."

In the foreseeable future, more sophisticated methods will begin to emerge, based on the coherent control of nuclear processes by precisely tuned electromagnetic radiation and related means. Man will progressively develop the capacity to synthesize macroscopic amounts of atoms of any desired species, increasingly at will; and to do this on such a scale as to substantially supplement, and in some case even surpass, the quantities and qualities of raw materials available from "natural sources." Parallel with the artificial generation of elements, applications of high-temperature plasmas to the processing of ores, waste, and other materials—the so-called "fusion torch"—will vastly increase the range of economically exploitable natural resources, and permit a virtually 100% recycling of used materials in the economy.

Fourthly, the Isotope Economy is intrinsically "astrophysical" in nature and in cultural orientation. Its maintenance and development will depend upon extensive, ongoing astrophysical investigations, that cannot be carried out from only the Earth and near-Earth region, but require an expansion of human activity throughout the inner region of the Solar System. To master subatomic processes for the Isotope Economy on the Earth, we must learn how those processes operate on the galactic scales of space-time, and we must come to know, much better than present-day earthly speculations permit, the pre-history of our own Solar System and the origin of the elements we find in them today. These requirements translate into the need to build up large networks of space-based astronomical observatories in Solar orbits, able to carry out interferometric and related measurements of our galactic and extra-galactic environment on a length-scale of the orbit of Mars; plus a greatly expanded program of exploration of the Solar System itself.

All of this cannot be accomplished without establishing a large-scale logistical/production infrastructure in space, with emphasis on the Moon and Mars, capable of sustaining a large scientific-technical labour force living and working for long periods away from Earth, on a relatively self-sufficient basis.

Conversely, it is precisely the "quantum jump" in overall productivity, inherent in the technological developments of the Isotope Economy, which make feasible routine travel throughout the inner Solar System and the establishment of permanent manned colonies on Mars. Fusion propulsion systems, for example, can cut the journey times between near-Earth orbit and Mars down from many months, as are required with present chemical propulsion systems, to a couple of weeks or less.

Energy Density for Various Sources

(Megawatts per Square Meter)

Solar–biomass	.0000001
Solar–Earth surface	.0002
Solar–near-Earth orbit	.001
Fossil	10.0
Fission	50.0 to 200.0
Fusion	trillions

Solar energy has a pathetic energy density compared to nuclear fission and fusion, and fossil fuels are really not much better, when all costs are considered. The higher the energy density, the less the cost of producing the energy. .

The Chinese are building super-fast, super-quiet mag-lev trains, while we are stuck in endless traffic.

The Isotope Economy in the Process of Becoming

To readers not familiar with recent developments in nuclear-related technology, our characterization of the Isotope Economy might seem to be a very distant prospect, even smacking of "science fiction." In reality, the Isotope Economy is already in the *process of becoming*, and many of its features already exist, in more or less developed form, in laboratories and advanced production facilities around the world.

Isotope Separation

The technology of isotope separation, greatly hindered in its progress by efforts to monopolize its military applications, has undergone revolutionary developments over the last 20 years. Initial breakthroughs in laser and plasma-based methods (AVLIS, SILEX, plasma centrifuge, ion cyclotron resonance, etc.), promise enormous advantages relative to conventional methods. At the same time, conventional methods (centrifugation, diffusion processes, electromagnetic separation, gaseous and thermal diffusion) have been further refined and their range of industrial applications extended to an ever larger number of isotopes. Also, the end of the Cold War freed up for civilian use large capacities for isotope separation, formerly employed in the military sectors of the United States and the former Soviet Union. This, in turn, has greatly expanded the range of isotopes generally available, and reduced their cost, spurring the search for new applications in all fields.

TABLE 1

World Thorium Resources

(economically extractable)

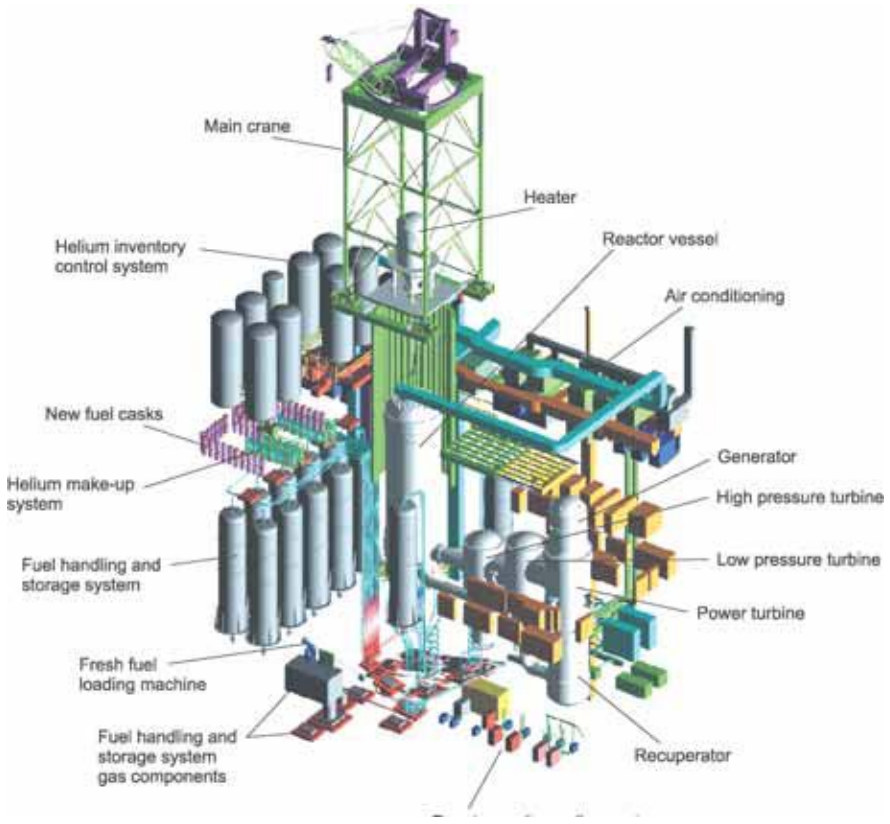
Country	Reserves (tons)
Australia	300,000
India	290,000
Norway	170,000
USA	160,000
Canada	100,000
South Africa	35,000
Brazil	16,000
Other countries	95,000
World total	1,200,000

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

Australia has the world's largest reserves of Thorium, which has more energy per kilogram than Uranium, and does not produce plutonium. We are crazy not to develop Thorium reactors.

Qualitative Transformation in the Uses of Isotopes

The demand and production of isotopes are presently growing at an exponential



Only large-scale construction of nuclear reactors, such as the ultra-safe pebble bed reactor pictured above, can solve our severe power and water shortages. Any other proposal is just hot air.

The Isotope Economy

rate, led particularly by the medical uses of radioisotopes. At present, in the United States alone, more than 10 million diagnostic procedures are carried out each year using radioisotopes. At the same time, a *qualitative jump* is occurring in the *range* of applications of pure and enriched isotopes in the economy, as exemplified by the greatly expanded role of stable isotopes, and the beginning emergence of a new industrial sector producing "isotopically engineered materials" for the fabrication of semiconductor devices and specialized mechanical components such as cutting tools in metalworking machines. But this is just the beginning of a vast development, comparable in relative economic importance to the explosive development of the chemical industry in the hundred years beginning in the middle of the 19th Century.

The Experimental Advanced Superconducting Tokamak (EAST), at the Institute of Plasma Physics of the Chinese Academy of Sciences in Hefei. On Sept. 28, 2006, scientists at EAST conducted the world's most successful test of an experimental fusion reactor.

Isotopically Tuned Materials

In this process, the preeminent role of *radioactivity* in most present-day uses of isotopes, is gradually being supplemented by other characteristics, connected with the *exquisitely fine "tuning"* of nuclear interactions and with the *collective properties* of materials, crafted from specifically chosen combinations of isotopes. The differentiation between isotopes of one and the same element is thus becoming more and more important in applications that have nothing directly to do with radioactivity or even, apparently, with so-called "nuclear properties" of the isotope. When embedded in crystal lattices or other molecular structures, the nuclei of different isotopes, having differing masses, oscillate at different frequencies. For these reasons, among others, materials made using only a single, carefully separated isotope of a given element have a different and more coherent internal "tuning," than materials made with a mixture of isotopes; they display significantly different behavior. At present, for example, laboratories worldwide are researching the possibility of overcoming existing limitations on the power-densities, and therefore the computing power, of semiconductor chips, by utilizing a pure isotope of silicon. "Isotopically pure" structures of silicon, as well as of carbon and a number of other elements, have been found to possess a significantly higher thermal conductivity than the corresponding "natural" materials. A higher thermal conductivity accelerates the potential rate of heat-removal from semiconductor chips, permitting them to operate at a higher power without overheating. A similar effect has been demonstrated in "isotopically pure" diamonds, opening up the possibility of increasing the productivity of various machining operations. It has been established that diamonds made of pure carbon-13, are significantly harder than diamonds composed of the naturally occurring mixture of isotopes.

Hyperfine Interactions and Magnetic Isotope Effects

The applications just mentioned, however, make use of effects of differences of *mass* between isotopes, while not yet taking into account what is really a much more essential differentiating characteristic: their *magnetic properties*, which are crucial to the phenomenon of *nuclear magnetic resonance*. As I shall point out in the following section, a new field of chemistry and biology has opened up in recent years, in connection with the experimental demonstration that so-called "hyperfine interactions," involving nuclei, play a fundamental role in all living cells. Isotope-dependent nuclear magnetic effects will become ever more important, also, in determining the behavior of man-made nonliving materials, including most probably new types of "room-temperature superconductors."

Fission Reactors as Atom Factories

Meanwhile, the economic importance of the isotopes generated by nuclear fission reactors and accelerators, in many ways already exceeds that of the electrical power produced by those same reactors! In the foreseeable future, fission reactors, instead of being seen chiefly as electric power sources, generating isotopes as a by-product, will operate more and more as *atom-producers, generating electricity as a by-product*. Fission reactions have the peculiarity, that starting from a single heavy isotope (U-235, Pu-239, or Th-232), they generate an extensive spectrum of different isotopes, encompassing nearly all the elements of the Periodic Table. It is already today possible, by "tuning" the neutron spectrum and fuel composition in a reactor, to influence the distribution of fission products to a significant extent.

Nuclear Waste as a Valuable "Ore" for the Extraction of Precious Metals

Already today, in addition to large amounts of useful radioisotopes and recyclable fission fuels, nuclear fission reactors have generated large amounts of industrially important precious metals, such as palladium, rhodium, and ruthenium. The extraction of these metals from so-called "nuclear waste," for economic use as catalysts, in special alloys, and corrosion-resistant materials, has already been proven feasible. The amounts of these metals, synthesized every year as reaction products in the world's presently operating nuclear power reactors, if they were to be extracted from the spent fuel during reprocessing, would already amount to significant percentages of the total yearly amounts extracted from the Earth by mining. Noting that the relative concentrations of many rare metals contained in the spent fuel of nuclear breeder reactors, is tens of thousands to millions of times higher than their average content in the Earth's crust, Japanese researchers recently declared such spent fuel to be one of the most valuable "ores" known today.

Complete Reprocessing

The full exploitation of fission's potential as an atom-producer, will begin with the "closing" of the nuclear fuel cycle, by the complete chemical reprocessing of spent fuel, separation of useful isotopes, recycling of fissionable materials, and transmutation of undesired species through bombardment with accelerator-generated neutrons, or in specially designed "nuclear waste-burning" reactors. All of this has been worked out in detail by nuclear laboratories around the world, and the essential technological base already exists.

Large-scale Transmutation by Particle Accelerators

The technology of high-current particle accelerators has advanced to the point, that the transmutation of macroscopic amounts of isotopes by irradiation with neutrons from an accelerator-driven neutron source is already a technological possibility. Numerous laboratories around the world are presently working on designs for Accelerator Driven Transmutation Systems (ADS), as a means to deal with the problem of long-lived radioactive isotopes from "nuclear waste." A single ADS system with a beam power of 20 megawatts, could transmute the long-lived isotopes from 10 standard nuclear power plants into short-lived and stable isotopes, producing 800 megawatts of thermal power at the same time. Similar technology could be used for other transmutation applications, as well as for driving "sub-critical" nuclear reactors of various types.

The Advent of Nuclear Fusion

The next step toward a full-scale Isotope Economy will be to combine the potentials of fusion—which in many respects are complementary to those of fission—with fission processes and accelerator-based transmutation, while at the same time phasing in new methods of controlled transmutation, now under experimental development (see p.9). Over the last ten years, nuclear fusion technology has progressed steadily, on multiple fronts. In 1997, the experimental fusion reactor JET (Joint European Torus) in Culham, England, produced over 16 megawatts of power through fusion reactions, sustained over several seconds, at temperatures of 100 million degrees C. The International Thermonuclear Experimental Reactor (ITER), now under construction in Cadarache, France, will produce 500 megawatts of fusion power, in pulses of over six minutes, with the next step being a prototype power station. Parallel with the standard tokamak design, there has been significant progress across the board in fusion experiments, including fast liner, plasma focus, "inertial confinement" by lasers, ion beams, and others.

The "Brute Force" Approach to Fusion: Not the Best, but Approaching Success

Contrary to often-repeated myths, the possibility of generating large amounts of power by fusion reactions has long since been demonstrated—namely, in the explosion of the first hydrogen bomb, over a half century ago. The hydrogen bomb, however, requires a smaller, fission chain-reaction detonator (a small atomic bomb) in order to bring a mixture of hydrogen isotopes to the necessary high densities and temperatures, for large quantities of fusion reactions to occur. The essential difficulty of tapping fusion as a power source for civilian purposes, lies in the challenge of generating large amounts of fusion reactions in an efficient, controlled way, without using an atomic bomb as a trigger. Over the last 30 years, progress in controlled nuclear fusion has been greatly retarded by lack of political will, orientation toward a merely engineering or "applied science" approach, rather than going for fundamental discoveries; restriction of pursuit of experimental hypotheses to a few chosen directions; the stifling atmosphere of bureaucratically managed "Big Science," etc. Nevertheless, the accumulation of hard, "brute force" applied physics and engineering work, has brought a first-generation fusion power reactor into technological reach.

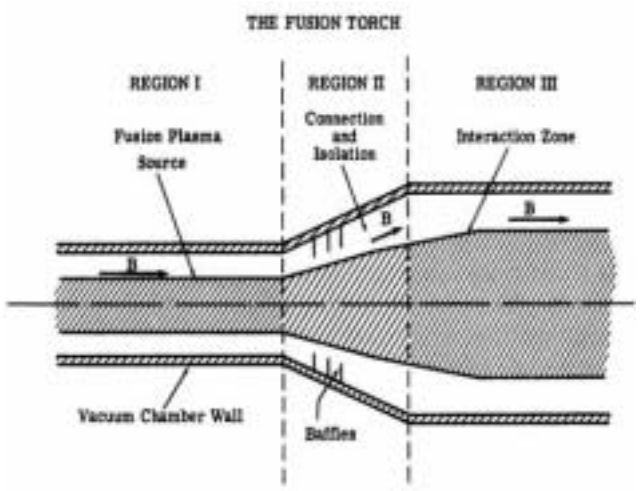
At present, work is beginning on the construction of a giant fusion test reactor, the ITER. The core of the ITER reactor is a toroidal chamber, filled at the start with extremely thin gas, which an electrical discharge, induced by huge transformer coils surrounding the chamber, transforms into the initial plasma. The plasma is subsequently heated by microwaves and neutral particle beams to a temperature the equivalent of over 100 million degrees C, and additional deuterium-tritium fuel mixture is injected. The reactor employs a combination of currents generated inside the plasma, and magnetic fields imposed from the outside, creating a kind of "magnetic bottle" holding the plasma suspended in the chamber's central region, and keeping it insulated from the chamber's walls by a high vacuum. When in operation, this reactor is projected to be able to generate a gross power output of 500 megawatts from fusion reactions between nuclei of the hydrogen isotopes deuterium and tritium, at temperatures in excess of 100 million degrees C, during periods of approximately six and a half minutes at a time. (The device will be able to produce a pulse about once every 30 minutes.) Due to this pulsed mode of operation and the high power consumption of its magnetic and plasma heating systems, ITER cannot be regarded as a full prototype of a future fusion power plant; nevertheless, it is expected to finally establish the practical feasibility of such a power plant, while at the same time bringing a large number of technologies, required for a future power reactor, to a relatively high degree of perfection.

The Fusion-Fission Hybrid

The distribution of atomic species found in the Solar System today, bears strong evidence to the effect, that the isotopes we find around us today were generated by a combination of fission and fusion processes. So also, the coming Isotope Economy will base itself on a synergy of these complementary nuclear processes. The first, near-term embodiments of this principle are known as the "fusion hybrid" or "fusion-fission hybrid" reactors.

The hybrid technology takes advantage of the fact, that "fission reactions are neutron-poor, but energy-rich, while fusion reactions are neutron-

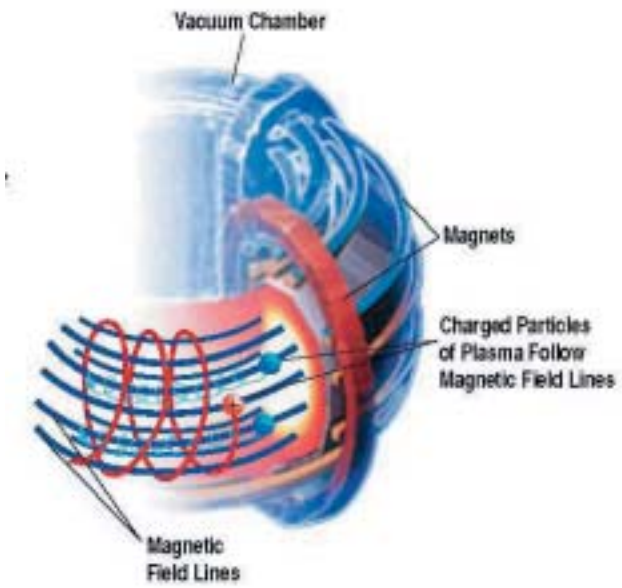
Schematic of a Fusion Torch



Source: Bernard J. Eastlund and William C. Gough, "The Fusion Torch: Closing the Cycle from Use to Reuse," Washington, D.C.: Atomic Energy Commission, May 15, 1969 (WASH-1132).

With fusion torches (also called high-temperature plasma torches), we will be able to process and separate any material—low-grade ores, waste, sea water, or anything else—into its component atomic species, obtaining pure isotopes from an arbitrary feedstock, making possible almost 100% recycling of materials. For more on the fusion torch, see www.cecaust.com.au.

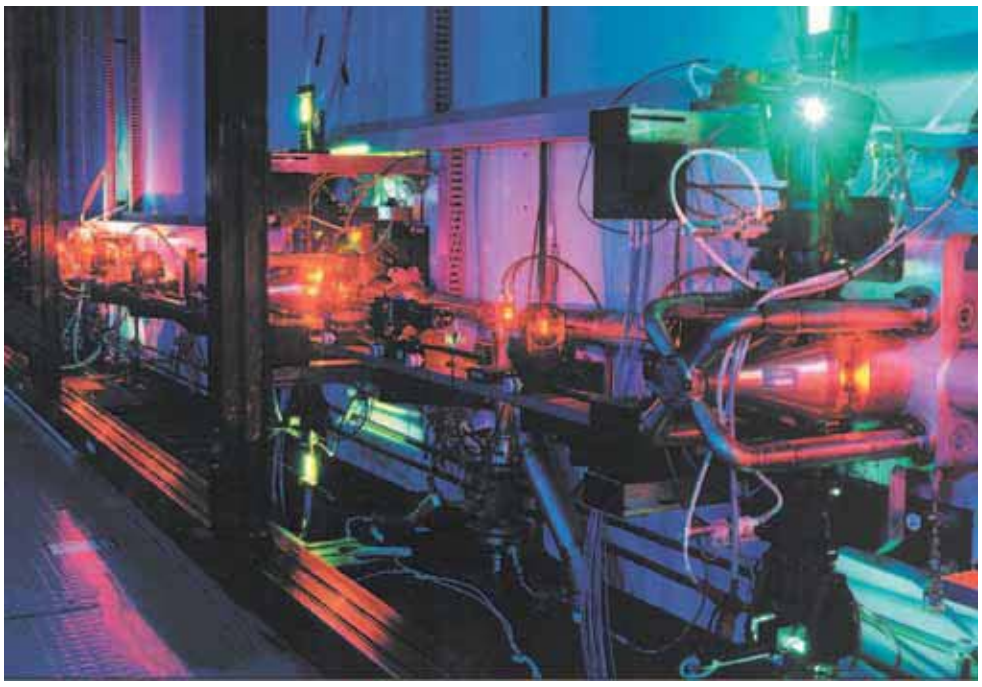
Magnetic Confinement Fusion



Source: "The Surprising Benefits of Creating a Star." U.S. Department of Energy, 2001.

This diagram of a fusion tokamak reactor shows the magnets, the magnetic field lines, and the charged particles of plasma that follow the magnetic field lines, spiralling around the tokamak. The magnetic field "contains" the plasma where the fusion takes place, at temperatures of 100 million degrees C. or more.

The Isotope Economy



The Atomic Vapour Laser Isotope Separation (AVLIS) pilot plant was built at Lawrence Livermore National Laboratory in the U.S. in the 1970s, which successfully demonstrated uranium enrichment and other potential isotope uses. But the AVLIS, a one-of-its-kind technology, was shut down and dismantled soon after the U.S. Congress privatised it in 1992, in a lunatic display of "shareholder value".

rich, but energetically poor." Although each fission reaction of uranium releases about three neutrons on average, in fission reactors the bulk of those neutrons are immediate consumed again, partly to maintain the fission chain-reaction process, and partly by absorption in the complex mixture of isotopes present in a fission reactor core, plus losses to the outside. For this reason, nuclear fission reactors operate with a relatively strict neutron balance. In a fusion reactor, however, neutrons produced from the fusion of deuterium and tritium, are not needed to maintain the process, nor does the fusion plasma contain large amounts of neutron-absorbing substances; hence, these neutrons are available to do useful work elsewhere. On the other hand, D-T fusion releases ten times less energy per reaction, than the fission of a U-235 nucleus.

Accordingly, the principle of the "hybrids," is to *use fusion reactions to produce neutrons, and fission reactions to produce power*. The synergy works as follows: We utilize the neutron flux, generated by a fusion plasma 1) to breed nuclear fuel for fission reactors, from U-238 or thorium; 2) to transmute radioactive products from fission reactors; or 3) to drive a fission reactor operating in a sub-critical mode. These applications do not require that the fusion reactor itself produce an excess of power. The overall power benefit comes from the fission side of the equation, so to speak: in the "burning" of fission fuel, produced by the hybrid, in separate fission reactors; in the fission reactions occurring in an appended "sub-critical" blanket; or, in the case of transmutation of waste, from the release of energy stored in the radioactive fission products.

Dropping the requirement of "energy breakeven" greatly reduces the demands on the fusion reactor, putting them within the reach of the type of design and parameters that were already demonstrated by the European JET reactor in Culham, and will be greatly improved in the ITER reactor being constructed in France. These reactors, while still operating far below the breakeven levels for power generation, have already achieved parameters that are sufficient, in principle, for the construction of hybrid systems for the production (breeding) of nuclear fission fuels, for large-scale transmutation of nuclear waste, and for power production using neutrons, generated in fusion reactions, to drive a "sub-critical" nuclear fission reactor.

The Fusion Torch and Plasma Mass Separation

The level of technological mastery of energy-dense plasmas, achieved in the course of fusion reactor development so far, also makes it possible to, in principle, realize "first approximations" of the so-called *fusion torch (or high-temperature plasma torch)* concept invented by the American fusion scientists Bernard Eastlund and William Gough. Utilizing magnetically confined plasmas fusion torches, either alone or in combination with the so-called plasma centrifuge, we will ultimately be able to process and separate any material—low-grade ores, waste, sea water, or anything else—into its component atomic species, obtaining pure isotopes from an arbitrary feedstock. In the limit, this technology will permit a nearly 100% effective recycling of materials, and expand the exploitable range of natural resources by many orders of magnitude.

Thanks to the fact that plasmas can have almost unlimited power densities, and at the same time be readily manipulated by applied currents, magnetic fields, and microwaves, plasmas have become an ever more important working medium for the processing of materials. Today's industrial applications include plasma steel-making, plasma chemistry, plasma surface treatments, plasma ion deposition, and many others. But in the future, the most important large-scale use of energy-dense plasmas, apart from fusion power generation, will almost certainly be the "fusion torch."

The original inventors, Eastlund and Gough, realized that fusion plasmas, with their high temperatures and power densities, constitute a kind of "universal solvent": Any known material, injected into such a plasma, is instantly dissociated into electrons and ions of the component atoms. Once that dissociation has taken place, the different component species of ions, making up the resulting mixed plasma, can be separated by a variety of methods, either in the original region, or by drawing the mixed plasma off into a separation chamber.

The most familiar method of isotope separation is by centrifugal action, as exemplified by the classical gas centrifuges used today for enrichment of uranium isotopes, on the basis of their slightly different masses. Plasmas can in principle sustain rotation at orders-of-magnitude higher speeds than can mechanical devices. Experimental plasma centrifuges for isotope separation are already in operation today. In practice, future plasma mass separation devices may employ combinations of electric, magnetic, and electromagnetic fields, as well as induced waves and high-speed rotational motion in the plasma itself, to accomplish the desired results. Also, a variety of different devices may be operated in a cascade, as is already done today.

The International Thermonuclear Experimental Reactor (ITER) is now under construction in Caldarche, France. It will be the next step toward a prototype power station, producing 500 megawatts of fusion power.

Most likely, in large-scale practice, dissociation and element separation/isotope separation operations will not be carried out directly in a fusion reaction plasma, but either in plasma diverted from a fusion reactor into auxiliary chambers, or in a freshly created plasma, powered by an outside source.

First applications of the "fusion torch" principle are presently being studied in the United States as a possible method of dealing with the huge accumulation of radioactive materials, left over from 50 years of nuclear weapons production at Hanford and other locations. The first torch plasmas will be externally powered.

Laser-Controlled Nuclear Transmutation

The last five years' breakthroughs in the construction of powerful ultra-short-pulse lasers (femtosecond lasers) and of lasers operating in the X-ray range, now make it possible to trigger nuclear transmutation processes directly with lasers. So-called "tabletop femtosecond lasers," compact devices which are now available commercially and are becoming standard equipment at major physics departments and laboratories, use novel methods of "pulse compression" and amplification to produce extremely short light pulses—of the order of 10^{-13} to 10^{-15} seconds in length. Some of these lasers can now reach power densities of up to 10^{19} watts per square centimeter, sufficient to trigger nuclear reactions, on a routine basis, through the action of gamma-rays generated in a material irradiated by the laser. Also, the electromagnetic fields generated by these lasers can be used to accelerate charged particles to energies sufficient to trigger nuclear reactions. Thereby, small laboratories can today carry out experimental work which in the past required gigantic cyclotrons and other particle-accelerator machines.

The "tabletop lasers" are replicating, with much simpler means, results obtained earlier by giant lasers such as the VULCAN laser at Rutherford Appleton Laboratory in England and the Petawatt laser at Lawrence Livermore Laboratory in California. In 1999, for example, Livermore induced the fission of nuclei of U-238 by laser pulses. Soon, a laboratory at the Friedrich Schiller University in Jena did the same thing with a tabletop laser. Other experiments on VULCAN demonstrated the use of laser pulses to transmute long-lived radioactive isotopes, such as iodine-129 (half-life 15 million years), into short-lived isotopes (in this case, I-128 with a half-life of only 25 minutes). Such methods, once perfected, may provide an effective means to "deactivate" radioactive waste produced in nuclear fission power plants, transforming it into stable, non-radioactive elements.

Laboratories around the world are today striving to develop laser sources of ever shorter wavelengths, moving ever further in the direction of "harder" X-rays. Every decrease in the wavelength expands the range and efficiency of nuclear processes that can be generated directly (photonuclear reactions). The realization of gamma-ray lasers, not yet within immediate reach, would revolutionize the experimental methods of nuclear physics.

Changing the "Constants" of Radioactivity

The teaching and practice of nuclear physics continue to be encumbered by prejudices and misconceptions that were introduced very early into the field. Among the most crippling is the preconceived idea, that the processes "inside" the atomic nucleus constitute a categorically separate world, governed by mysterious entities called "strong forces," and basically not interacting with their surroundings except through violent, "high-energy" events, considered to be essentially statistical in character. The term "atom smasher," used to denote high-energy particle accelerators in the early days, reflects a simplistic, Rambo-like quality of conception which persists, despite massive evidence of the exquisitely "fine" tuning of nuclear processes. The prejudice remains, even among professionals today, that such processes as radioactive decay of nuclei are practically beyond human control, except by subjecting the nuclei to gigantic forces, or bombarding them with particles from high-energy accelerators or nuclear reactors. The rate of radioactive decay of a nucleus, is still wrongly regarded as a kind of natural constant, rather than a function of the physical geometry, within which that nucleus is embedded.

This dogmatic attitude among professionals led to the silly misconception, adopted as a "fact" of public policy for decades, that the long-lived isotopes contained in "nuclear waste," could only be dealt with by storing them underground for tens or hundreds of thousands of years! This notion continues to dominate public discussions today, even though the professional world has long since acknowledged the option of large-scale transmutation through particle accelerators or in fusion devices, as mentioned above. These methods will work, but they represent a primitive, "brute force" method, to be replaced by much more intelligent approaches, as soon as they become available.

In the meantime, overwhelming experimental evidence has accumulated for the existence of finely tuned, "low-energy" nuclear processes, very different from those upon which nuclear technology has been based until now, and whose future mastery defines a revolutionary pathway for development of the Isotope Economy.

It is now well established, for example, that the stability or lifetimes of many nuclei can change by many orders of magnitude, depending on the electronic environment of the nucleus. Thus, for example, the isotope dysprosium-163 is stable in normal atomic form, but when ionized (stripped of its electrons) the Dy-163 nucleus becomes unstable. The rhenium isotope Re-187 has a half-life of over 40 billion years in atomic form, but when ionized, the half-life is reduced over a billion times, to less than 33 years. The complete ionization of a free atom is a very energy-intensive process. Smaller, but still easily measurable decreases in radioactive half-lives, have been obtained by much "softer" means: by embedding beryllium-7 atoms in so-called fullerines ("bucky-ball" complexes of atoms), and just recently again, by embedding sodium-22 in palladium metal, afterward cooled to a temperature of 12°K. The effects in these experiments were only on the order of 1%, but 1) they refute the dogma that nuclear processes are "oblivious" to their environment, except under "high-energy" conditions; 2) they broadly cohere with the results of many "cold fusion" experiments, which are more difficult to interpret, but show a multitude of transmutation effects—sometimes very spectacular ones—that demonstrably do not come from usual "high-energy" sorts of nuclear reactions.

The nuclear "waste" storage facility at Yucca Mountain, Nevada. Though the subject of enormous hysteria, spent fuel is one of the most valuable "ores" known, containing large amounts of useful radioisotopes and recyclable fission fuels, along with industrially important precious metals such as palladium, rhodium, and ruthenium, in concentrations tens of thousands to millions of times higher than their average content in the Earth's crust.

The Role of Isotopes in Living Processes

[The rest of the article may be obtained from the CEC, or on the Internet at www.cecaust.com.au.]

Australia's Water Problems

This map and its companion on the next page first appeared in the *New Citizen* of **February, 2002**. Since then the crisis has escalated dramatically in almost every region.

WA Wheat Belt. The WA Wheat Belt was hit by floods, as well as the worst drought in decades, in 2000-2001. This savaged the agricultural sector, which had huge numbers of farm foreclosures and a high rate of suicides in 2000-2001, though yields and prices were better for 2001-2002. WA produces one-third to one-half of Australia's wheat crop.

Perth. As of August 2001, water storage levels were at their lowest since 1962, with Perth's seven main dams filled only to 26.3% of capacity. Water restrictions are an increasing reality in Perth and some regional areas. Perth's water supply comes from dams in the Darling Range east of the city, and from an increasing reliance on ground water, which provided 52% of the supply in 2000, as opposed to only 40% just three years earlier; a still higher percentage is planned for the future. Many ground water supplies (such as artesian basins) are not inexhaustible, as once believed.

Kalgoorlie-Boulder Area. In the Kalgoorlie-Boulder area, the shortage of water (most of which comes through the Mundaring-Kalgoorlie pipeline) is already restricting development. Severe shortfalls are predicted over the next decade for this area, which is home to over 70 mining companies. ***The Australian*** of August 18, 2000 noted, "Proposed projects would dwarf the supply that flows from the century-old pipeline from the coast."

Adelaide. In normal years, Adelaide relies on the Murray River for 40% of its water, and on local catchments for 60%; however, in dry years, the latter may supply little or no water, so the city is almost entirely dependent on the Murray, which, before the Snowy Scheme was built, sometimes ran dry before reaching Adelaide. Much of the rest of South Australia is extremely dry, with 83% classed as arid, 14% as semi-arid, and only 3-4% receiving an average rainfall exceeding 508mm per year.

Northwest Victoria. Victoria in 2001 entered its fifth year of drought. Conditions in the northwest part of the state were the worst recorded in over 50 years. As of August, the Wimmera-Mallee catchment system held just 11% of capacity, and 55 of the area's 74 towns were on water restrictions. Wimmera-Mallee Catchment Authority system controller John Martin told the ***Herald Sun*** on Aug. 2, "Four of our reservoirs are completely dry…We're talking puddles in the bottom of our largest dams…Certainly it's the worst drought since 1944." Additionally, due to water "reforms", hundreds of farmers have been hit with price rises for water of up to $1700 per year.

Melbourne. The city was placed under water restrictions in 2001, with demand expected to overtake presently available supplies by 2012, according to a June 2001 joint discussion paper issued by Melbourne Water and the Victorian Government. The paper warned of escalating restrictions and higher water prices over the years ahead, especially given that Melbourne Water and the state of Victoria have "no current plans for seeking new water resources." As of late 2001, Melbourne's water storage was less than 50% of capacity.

Victoria. In a mid-2001 report, the Auditor-General of Victoria "discovered 23 dams in need of urgent repair to meet national safety guidelines", and that "repair works on some of the largest country dams in Victoria would not be completed until 2007," reported ***The Age*** of June 2, 2001. Many of the dams are over 100 years old.

Tasmania. Tasmania suffered from severe drought into late 2001, which necessitated water restrictions in some areas.

Queensland. A severe drought gripped northern NSW and most of Qld. from 1991 until 1995, and parts of central Qld. until 1996. Several major reservoirs in both states went entirely dry. Losses were a staggering $5 billion in 1997 prices. Drought also afflicted many producers in SE Qld. in 2000-2001, particularly on the Darling Downs, one of the state's richest agricultural areas.

Bundaberg/Hervey Bay. The Bundaberg/Hervey Bay area has been subject to chronic water shortages.

Brisbane. As of 1996, southeastern Queensland, including Brisbane, was expected to run short of water by 2015, according to Brisbane's water and sewerage department. Instead of planning to expand supplies, a shift was made to "full user pays and full cost pricing" (i.e. gouging the consumer) which is expected to stretch supplies to 2030. In November 2001, the Queensland state government slapped a cap on water extraction from dams, rivers and springs between Brisbane and the NSW border until early 2003. The ***Courier Mail*** of Nov. 21, 2001 reported that "Four dams, approved by government 10 years ago, remain on the drawing board amid concerns that the Gold Coast and Beaudesert would run short of water after 2010."

Murray-Darling Basin. The Murray-Darling Basin covers one-seventh of Australia. It produces 40% of all Australia's agriculture, and comprises 75% of its irrigated acreage, with an estimated worth of at least $16 billion in both direct and processed output. Much of the water infrastructure of the Basin, such as dams, weirs, irrigation channels, etc. dates back to the 1920s and 1930s, and needs major maintenance, or even replacement. In June 1995, the Murray-Darling Commission suddenly set a cap on water usage at a lower level than existing usage, while NSW cut back by up to an additional 10%; these "reforms" devastated many agricultural producers.

Sydney. For six weeks in 1998, terrified Sydney residents had to boil their tap water, or drink potentially deadly doses of cryptosporidium and giardia, widely believed to have been unleashed by the corporatisation and consequent cost-cutting of Sydney Water. Even though the Sydney region is subject to extended periods of drought with periodic water restriction, and Sydney is expected to grow by 700,000 people over the next 20 years, Sydney Water has no plans to build any new dams.

New South Wales. Horrific flooding covered over one-third of NSW from Nov. 2000 to March 2001, causing over $1.25 billion in losses, and a near-disaster in Grafton (near where the Clarence River empties into the Pacific Ocean), where 12,000 people were evacuated. The 2000-2001 floods followed serious urban flooding in Nyngan (1990), Inverell (1991), Coffs Harbour (1996), Bathurst and Wollongong (1998), and severe, widespread flooding in the northwest (1990, 1998), along the Murray (1993), and on the north coast (1996). A severe drought gripped northern NSW from 1991-95.

Australia is one of the Earth's driest places, with the largest desert area outside of the Sahara Desert in Africa. Because of the rainfall patterns the population has been mainly confined to narrow strips along portions of the coast leaving much of our vast continent almost uninhabited. However, as the *Macquarie Illustrated World Atlas* points out, "On a per capita basis, few countries in the world are so favourably endowed", if we just decide to use our enormous, but ill-distributed, water supplies. (See Map "New Great Water Projects")

Most of our water problems are man-made, resulting from lack of development, failure to maintain such water infrastructure as we have (including measures to deal with salinity problems), or the suicidal lunacy known as "competition policy" and its associated "water reforms".

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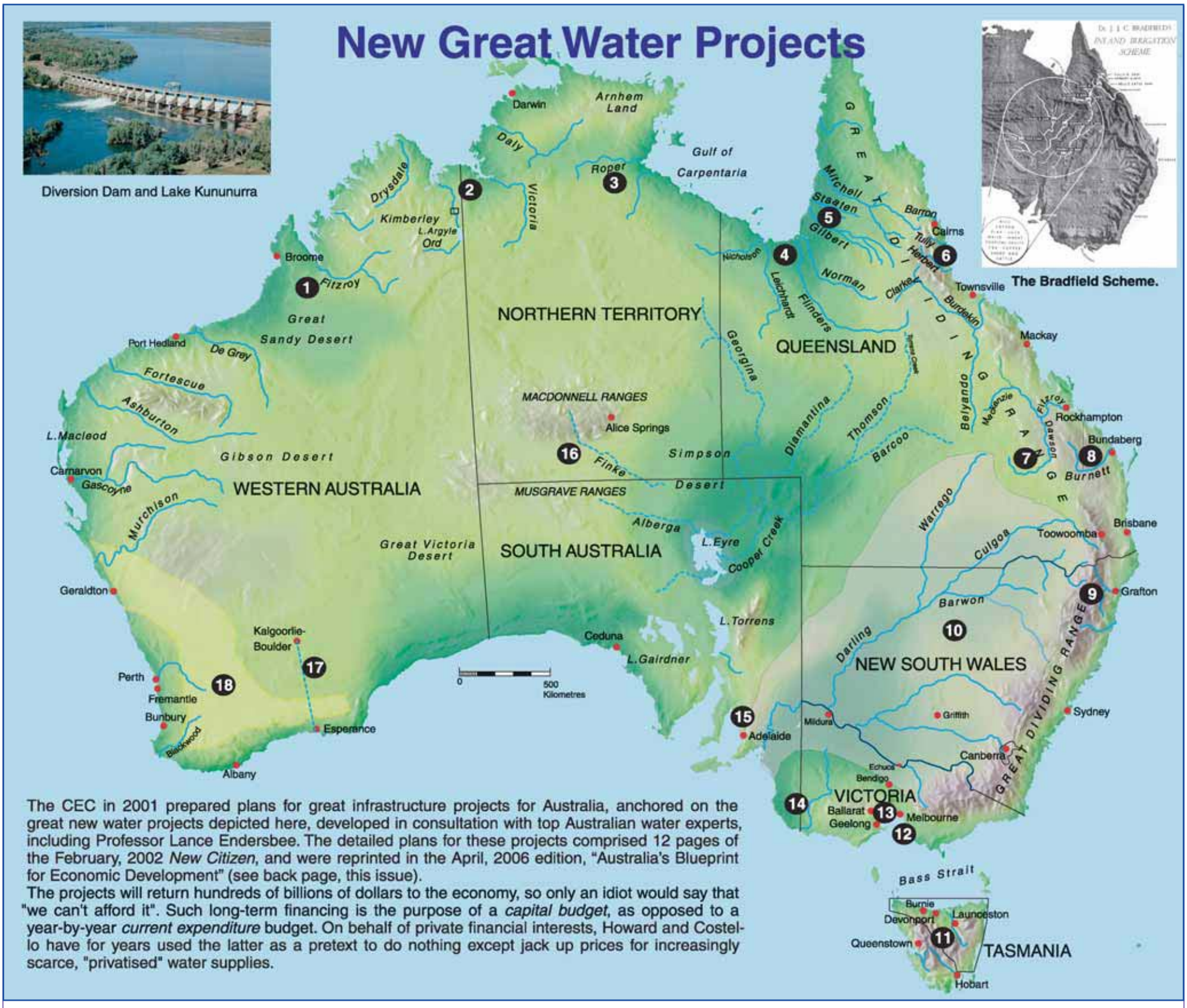


The CEC in 2001 prepared plans for great infrastructure projects for Australia, anchored on the great new water projects depicted here, developed in consultation with top Australian water experts, including Professor Lance Endersbee. The detailed plans for these projects comprised 12 pages of the February, 2002 *New Citizen*, and were reprinted in the April, 2006 edition, "Australia's Blueprint for Economic Development" (see back page, this issue).

The projects will return hundreds of billions of dollars to the economy, so only an idiot would say that "we can't afford it". Such long-term financing is the purpose of a *capital budget*, as opposed to a year-by-year *current expenditure* budget. On behalf of private financial interests, Howard and Costello have for years used the latter as a pretext to do nothing except jack up prices for increasingly scarce, "privatised" water supplies.

1. Fitzroy River.
The Fitzroy has an annual runoff of 8 million megalitres, compared to greater Sydney's annual use of one-half million megalitres.
2. Ord, Victoria, Daly Rivers.
Potentially one of the greatest irrigation projects in the world.
3. The Roper River has significant development potential.
4. The Flinders River would be key in the revised Bradfield Scheme, with the Nicholson and Leichhardt Rivers.
5. The Reid Scheme, and the Mitchell, Staaten, Gilbert and Norman Rivers. Brisbane engineer L.B.S. Reid in the 1940s proposed a Snowy-scale scheme to channel the floodwaters of the Walsh, Tate, Lynd, Einasleigh and Gilbert Rivers into the Diamantina. The Mitchell, Staaten, Gilbert and Norman Rivers also have development potential.
6. The Bradfield Scheme.
In the 1940s and 1950s, the Bradfield Scheme was the next great project to follow the Snowy Scheme.
7. The Dawson Scheme.
A dam on the Dawson could support a $3 billion development project.
8. The Burnett River Scheme.
A dam and weirs on the Burnett River could alleviate the Bundaberg/Hervey Bay region shortages.
9. The Clarence Scheme.
Diverting the upper Clarence and Nimboida, (and also the Macleay River) over the Dividing Range into the Murray-Darling Basin would open up great new irrigation projects.
10. The Murray-Darling Basin.
The Murray-Darling Basin needs completely new irrigation systems. The Basin comprises 75% of Australia's irrigated agricultural acreage, and could double its existing $16 billion output.
11. The Franklin Dam and the Summer Rains Project.
The Franklin Dam is still needed. In 1998, Bosch Engineering Pty Ltd. proposed the Summer Rains Project, 48 projects which would double Tasmania's irrigated acreage.
12. Melbourne.
Melbourne's chronic water shortages could easily be solved in the very short-term by treating and using stormwater run-off, until nuclear desalination plants can be brought on line.
13. Melbourne storm water diversion.
As an alternative use of Melbourne's huge stormwater run-off, Prof. Endersbee proposes to treat it and pump it over the Great Dividing Range into the Murray-Darling Basin, for large-scale irrigation.
14. Northwest Victoria.
Dozens of dams in Victoria need urgent maintenance or upgrading; the Wimmera-Mallee's open channel irrigation system should be converted to pipes to prevent water wastage; and the Victorian government in 1998 proposed to double the size of the irrigation system in the north-west, to help boost the state's food exports from $4 billion per annum to $20 billion by 2010.
15. Adelaide.
Adelaide's chronic water problems cry out for nuclear desalination.
16. The Finke River.
Dr. J.J.C. Bradfield also proposed a Central Australia scheme, based upon a series of dams at gaps on the Finke and its tributaries in the McDonnell-Musgrave Ranges.
17. Esperance to Kalgoorlie.
United Utilities Australia has proposed desalinating seawater off Esperance and piping it to ultra-dry Kalgoorlie-Boulder.
18. Perth/Wheat Belt.
If desalinated seawater were pumped from Esperance to Kalgoorlie, the water now pumped to Kalgoorlie in the Mundaring-Kalgoorlie pipeline could stay in the Perth area. Ultimately, Perth needs nuclear desalination.

The Drought is Man-Made! (cont. from p.12)

And, despite his posturing, he is also opposed to the nuclear power which should power desalination plants, as his choice of the anti-nuclear Ziggy Switkowski to chair the federal government's inquiry into nuclear energy demonstrates.

The state premiers are almost equally pathetic. Take Victoria, for instance, where farmers are now regularly committing suicide, and which the state's Water Minister, John Thwaites, proclaims "is leading Australia in water management." Victoria Premier Steve Bracks proposes to tap more of the fast-dwindling groundwater; jack up prices and cut water supplies, particularly for large farmers or large businesses (the "top 200"), which will naturally help drive them out of business; recycle human waste; investigate drinking from the murky Yarra River, the quality of which "came under criticism this year after two kayakers became sick and several eels died", as the Melbourne *Herald Sun* drily observed late last year; and run a pipeline (the "Superpipe") into urban areas like Ballarat or Geelong from rural Victoria (i.e. steal it from the farmers in the few parts of Victoria which are not drought-stricken), all the while forcing farmers to pay as much as $100,000 per annum for their allocation, *even if they have not received it in years.* Meanwhile, Melbourne is expected to grow by another 1,000,000 people within a couple decades, and Ballarat and Geelong are expected to face shortages of 10 billion litres a year by 2015, so these penny-ante "solutions" are beyond pathetic. Bracks is fiercely opposed to any solutions which would *actually* work, such as nuclear-powered desalination or building new dams and upgrading old ones, and the additional proposals in the "New Great Water Projects" reprinted in this edition of the *New Citizen*.

The other state premiers are little or no better. Typical is Queensland's Peter Beattie, who recommends that everyone "take a shower with a partner" in order to cut down on water usage. Presumably, the 1,000,000 more people expected to live in Brisbane within the next couple of decades will all be showering with their neighbours. This certainly might increase the population, but it won't increase the water supplies.

All in all, the approach of our political leaders to this life-and-death crisis, is that of the scientists on the mythical island of Laputa portrayed by Jonathan Swift in *Gulliver's Travels*, who spent their time researching how to extract sunlight from cucumbers, and nutritious food from dung. One might argue that many of our politicians, at least, have an excuse for their ridiculous proposals: they are owned fair-and-square by the financial elite. But what about you? What's your excuse for letting them get away with it? After all, you and your children are the ones who will have to live—or not—with these proposals.

The Drought is Man-Made!

Australia is in the midst of its worst drought ever, as Michael Coughlan, head of the Bureau of Meteorology's National Climate Centre proclaimed in mid-October. Yet even Blind Freddie could see that the nation was in a severe crisis already over five years ago, a reality the CEC documented in its "Australia's Water Problems" map in the February 2002 *New Citizen*, reprinted in this edition.

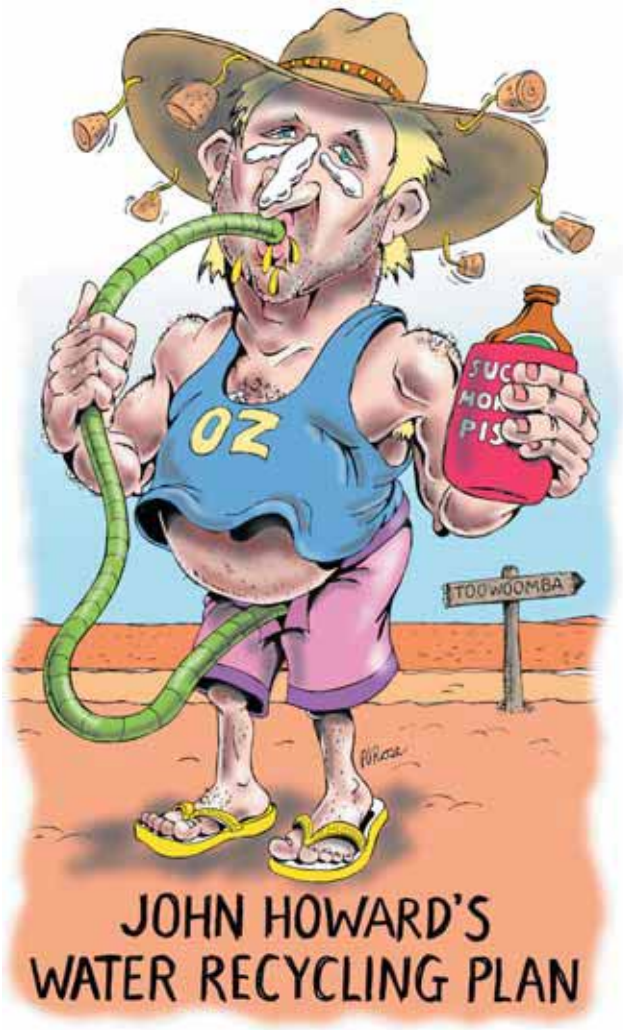
Hundreds of thousands of copies of that paper were circulated across the country, including to every state and federal MP. Reading merely the text on that map, and the easily-feasible solutions proposed on its opposite side, "New Great Water Projects", one would be sorely tempted to charge our political leaders with gross incompetence, criminal malfeasance, or, perhaps, with what is also certainly true of many of them, beginning with John Howard himself: that they are simply bought-and-paid for by the synarchist corporate and banking interests who desire large-scale water shortages, the better to buy up the increasingly-scarce water supplies, in order to make a fortune, and to better dominate the population.

Macquarie Bank's recent $20 billion purchase of Britain's largest waterworks, Thames Water Ltd., is indicative of the process: vital public infrastructure—now to include water—is sold off for a song to synarchist companies like Macquarie Bank, who then jack up the prices through the roof. Companies such as Macquarie often boast dozens of former top politicos or their relatives among their ranks, in this case, Howard's former chief of staff, Max Moore-Wilton; his Secretary to the Cabinet, Paul McClintock; his Cabinet minister Warwick Smith; and his older brother, Stan Howard. Other well-connected Macquarie executives include Ann Keating, Paul Keating's younger sister, and former Victorian Premier Jeff Kennett's chief of privatisation, Alan Stockdale, who sold off tens of billions in public infrastructure cheap, before taking up his Macquarie post. Macquarie is no doubt looking for opportunities to buy up Australia's scarce water supplies, as it has done in Britain. And as the drought, skyrocketting water prices, or suicides (reports of which are flooding into the CEC's Melbourne national office), clear farmers off the land, Macquarie can move in and snap it up. Macquarie's Diversified Rural Property Fund is already involved in the large-scale purchase of farmland: he who owns the water, also controls the food supply.

As easy as it is to blame companies such as Macquarie, or their stooges such as Howard, the truth is more ugly: it is you, the average Australian citizen, who is to blame for allowing this disaster to develop. Where was your outcry about the water crisis five or six years ago, when it was already severe? What did you do then, when it was clear that the politicians had not the slightest intent to do anything serious about it? Did you force them to face the issue, to actually do something? And what are you doing *now*, when it is utterly obvious that the Lib/Lab coalition has not the slightest plans to solve the problem, which will therefore be far worse a few years hence, even assuming that the drought finally does break?

As anyone who even glances at the newspapers should be well aware, Howard is fanatically opposed to great new water projects, including the desalination plant proposed last year for Sydney, in favour of simply jacking up water prices ("letting the market decide optimal allocation"); drinking "renewed water" (aka pee-and-pooh); and perhaps digging a few new bores, which will further deplete our rapidly-disappearing, finite supplies of groundwater.

Continued Page 11



Vic. Senator Kim Carr's Condom Slips

The "hard man of the Victorian left", Senator Kim Carr, seems to have gone limp. In a recent copy of his *Socialist Objective* magazine, issued by his own electoral office, Carr had one Michael Condom pen a most-revealing attempt at slander.

Condom charged that "the CEC seeks to resurrect the old fears of 'money power' from the early years of the twentieth century." Yes, Mr. Condom, guilty as charged, particularly since "old Labor", including John Curtin and Ben Chifley, fought heroically against those whom they called the "money power", and for a national bank. That same financial oligarchy, known from the 1920s as the Synarchy, installed Mussolini and Hitler in power. Given your article, Mr. Condom, we presume that your boss is in bed with them, and thus the need for your own services to cover for him.

Condom also defends the Queen and John Howard from the CEC's attacks, a rather strange position for his ostensibly hard-left boss, the master-debater who himself recently attacked the CEC in Parliament.

A footnote: Condom styles himself "a Ballarat writer" and claims that his real name is "Condell". But does a Michael Condell even exist on the electoral roll for Victoria? Of course, Melbourne's Kim Carr could have branch-stacked him anyway, even though Ballarat is a bit far afield. However, since judging by his journalism Condom is such a slippery character, we think the name is accurate. And so the question for "Kim il-Carr" (as he is known in Victoria), vis a vis Mr. Condom, is, "Is this true love, Kim, or have you just used him (or tried to) and thrown him away?"

Hungry? Have Some E. Coli With Your Spinach!

John Howard is pouring $2 billion into his National Water Initiative in order to come up with the brilliant idea that the chief new source of water for a parched Australia should be the contents of millions of toilets. Actually, this has been tried recently in the U.S., in the fertile Salinas Valley in the state of California. There, recycled sewage was sprayed on spinach, lettuce and other crops for irrigation. As a result, hundreds of people got sick across the U.S., and a number died.

The math is very simple. Imagine that recycled water is "cleansed" of 99.9% of its E. coli bacteria, and then allowed to sit for awhile. If the water contains plenty of nutrient, as would be expected of—ahem—"ex-waste water", the 0.1% of E. coli left will begin to feast and reproduce, doubling itself as fast as every 20 minutes under optimal conditions. Then, when sprayed onto plants as irrigation, it can survive up to 20 days, and even produce later washed with chlorine cannot kill all of the contaminant.

But don't let this disturb you. As Howard might say, "Bottoms up!"

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