How the SDI Was Created: LaRouche's Method and 'New Physical Principles'

by Jonathan Tennenbaum

This speech was given at a conference of the National Caucus of Labor Committees and the Schiller Institute in Reston, Va., March 21, 1993, on the tenth anniversary the announcement of the Strategic Defense Initiative. Tennenbaum was the head of the Germany-based Fusion Energie Forum.

There is no doubt that the process leading to and from the adoption by the United States government of Lyndon LaRouche's policy for strategic defense based on new physical principles—as announced by President Reagan on March 23, 1983—constitutes a turning point in world history. The laws which had *seemed* to govern the world up to that point, suddenly changed. March 23, 1983 signalled that the entire system of ideas and institutions, which had governed the world increasingly during the 20th Century, were being swept away. For a certain time, the policies of Lyn, our policies, had moved into the White House, and were governing the United States. Yes, we suffered a serious defeat—humanity suffered a defeat—in the subsequent period. But no one can turn the clock back to before March 23, 1983. I think it is not incorrect to say that the *punctum saliens,* the historical turning-point which began then, is still ongoing. We are still in the middle of it. The outcome will be determined by what we are able to accomplish over the coming weeks and months.

That poses the question: *How* do we change history? By being rich and famous? Like David Rockefeller, with his beetle collection? No, David Rockefeller hasn't changed anything; he is just a menial slave, a slave of the Whore of Babylon! Do we change history by occupying positions of great nominal power, like members of the Soviet Politburo, standing like a row of vodka bottles on top of Lenin's tomb? No, history swept them away. Lyn *gave* them a chance to change history, by accepting the offer to share the SDI, but they refused. They proved themselves impotent.

So, how do you change history? The lesson of March 23, 1983, which I want to elaborate for you now, is this:

You change history by making *fundamental scientific discoveries*—above all—and otherwise by applying and radiating the same Socratic method, which is the essence of fundamental scientific discovery. That's how Cusa did it. That's how Leibniz did it, and that's how Lyn did it.

Through examining the true story of the SDI, we can grasp and learn from Lyn's unique personal role in this ongoing period of history. That role is inseparably connected with the fact that Lyn accomplished, back in 1946-52, a fundamental scientific discovery. And everything he has done since then, his rise to predominance as a maker of world history, has been based on nothing but that original discovery, and on his own, constantly improving mastery of the *method* by which he was able to make that discovery.

To show this, I want to single out two specific contributions by Lyn—contributions that could only have been made by him—which were absolutely essential to the U.S. government's adoption of the SDI policy. They may not have been adequately expressed in the U.S. government's public formulation of that policy per se, but they were implicitly the basis for everything.

First was Lyn's rigorous demonstration—which he and the organization forcefully brought to the attention of all relevant individuals—that the defense and economic policies adopted by the so-called Liberal Establishment for the United States and the rest of the world, were leading inexorably toward World War III. The problem was not this or that detail of policy, not some specific issue per se, but was located in the underlying axiomatic assumptions of Anglo-American policymaking, such that each new reaction of the Anglo-American elite to the ongoing crises was bound—as long as they

clung to those assumptions—to merely accelerate the plunge into disaster.

The second crucial point, was the way Lyn designed a complete set of alternative strategic, military, and economic policies around the crucial principle of "rapid technological attrition" applied to "new physical principles." What this means, in a nutshell, is not to think of a single, hypothetically perfect defense system—that could never exist—but instead to *drive* development of anti-missile technology as rapidly as possible through an evolutionary series of breakthroughs based on the most advanced scientific research, while at the same time ensuring a continual "spillover" of the new technologies so developed, into the entire civilian economy. Lyn, and only Lyn, was in a position to specify *how* to organize that process, in such a way that a crash-program development of defensive systems would not only not be a burden to the economy, but would be the locomotive for a broad economic recovery.

Exactly this feature—the prospect of an SDI-led economic boom which, in the event of shared development, could also solve the devastating problems of the Soviet economy—was key to Lyn's design of the offer he made to the Soviet leadership on behalf of the U.S. government.

LaRouche vs. Wiener

Now, before I elaborate these points, I want to briefly identify Lyn's original scientific discovery, or group of discoveries, made over the period from 1946 to 1952.

As Lyn reports, what provoked him to embark on the essential phase of his discovery was an encounter with the famous book by Norbert Wiener on cybernetics. One thing in Wiener's book infuriated Lyn to the point of having an angry impulse to throw the book against the wall. Wiener had attempted to characterize what we call *living processes,* by methods borrowed from Ludwig Boltzmann's statistical thermodynamics. And Wiener tried to do the same thing for human intelligence, developing the now-famous approach of "information theory."

The basic assumption of Boltzmann, which Wiener took over, was that all processes of nature could be described mathematically as systems of particle-like entities interacting according to fixed laws. And Boltzmann demonstrated what already Newton had remarked, that such mathematical systems are afflicted with the inevitable tendency to "run down" toward states of increasing chaos. Out of this came Boltzmann's claimed proof of a purported law of *universal entropy.*

Wiener noted that living processes, and the effects of human intelligence, show exactly the *opposite* tendency. But rather than understanding this fact as a devastating refutation of Boltzmann's statistical approach, which it implicitly is, Wiener chose to define the manifest *neg*entropy of living processes in terms of a progress toward what statistics regards as more orderly arrangements of particles. Similarly, Wiener implied that human intelligence could be defined essentially as the ability to arrange objects in an orderly manner—one of the few definitions according to which beetle-collector David Rockefeller might be considered to be "intelligent"!

Lyn immediately saw the folly of this whole approach, recognizing in it the same devastating flaws of assumption that Leibniz had pointed out earlier in Newton's work, in the Leibniz-Clarke correspondence Lyn had studied as a teenager.

In his 1988 autobiography, Lyn emphasizes: "My understanding of this error of Wiener's is the key to my original discoveries in economic science, and is therefore the key to everything which has made me an influential international figure today."

Contrary to the absurd assumption of Wiener, Boltzmann, and Newton, we have conclusive evidence—featured in Plato's *Timaeus,* in the works of Leonardo da Vinci, Kepler, and others—that *living processes are governed as a whole by a universal geometrical principle*. This principle is manifested to us by the harmonic characteristics of the visible forms of living organisms, characteristics associated with what Leonardo da Vinci and Luca Pacioli called the Divine Proportion, otherwise known as the Golden Section. Thus, life has nothing to do with assumed pairwise interactions of particles, nothing to do with the statistician's tabulations of arrangements of objects. Living processes are governed by a *principle of development* which drives them through ever more dense series of changes or singularities, while remaining everywhere similar to itself.

Carrying the refutation of Wiener further, how might we adequately define the nature of human intelligence, and particularly what we call creative mental activity?

Well, Lyn proposed, let us look at the physical effect of such activity, in terms of human existence, in terms of the growth of economies. For creative mental activ-

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The harmonic characteristics of the visible forms of living organisms are characteristics associated with what Leonardo da Vinci and Luca Pacioli called the Divine Proportion, otherwise known as the Golden Section. Shown here are the logarithmic spirals of the nautilus shell and the arrangement of parts of the sunflower.

ity of individuals is the unique cause of technological progress, and technological progress is the unique cause of sustained economic growth, properly defined. If we can demonstrate that healthy economic growth is governed by the same Golden Section geometrical principle as living processes generally, then the same must be true for creative mental activity, which is the cause of such growth!

A precondition for this proof, of course, is to clear away all the intellectual garbage surrounding the concept of "economic growth," the insanity of monetary accounting procedures like the so-called Gross National Product, which count drugs and gambling profits as forms of wealth.

What Is Economic Value?

The only sane measure of growth of economies is in terms of the ability to sustain a growing human population at increasing levels of per-capita consumption and physical productivity. In other words, to provide for an increasing density of human individuals, each one of whom is able to contribute at a higher level to the further growth of the economy so defined. Once economic growth is defined in terms of this self-reflexive concept of *increase of relative potential population density*, as Lyn did, the identity of the law of economic growth with that of living organisms generally becomes readily apparent.

But that growth depends on the creative powers of the mind to continually generate and apply scientific and technological progress. Each level of technology defines a relative upper limit on the population which could sustain itself in that way. If we freeze technology at some level, society will eventually exhaust the accessible base of resources in that mode, and collapse. Therefore, even the maintenance of a constant level of potential population density requires a certain minimum rate of technological progress.

This raises two crucial questions: First, what is the internal ordering of technological progress, as a process of development of conceptions in the human mind? Second, what is the precise functional relationship between technological progress and the resulting increases in the productive powers of labor, as measured by increases in population potential of human societies? This includes the question, crucial to Lyn's design of the SDI policy, of how an economy must be organized in order to realize a maximum rate of technological progress.

Lyn saw that, as a *mental process,* technological progress is implicitly measurable. That is already implied by the indicated geometrical ordering of economic growth which is the effect of such progress. But we can characterize the internal geometry of that mental process also in the following way.

Technological progress is a function of the development of science. That development involves the generation, in increasing densities, of formally unbridgeable mathematical discontinuities or singularities. To identify the essential point of the matter as briefly as possible: Continued scientific progress occurs as a succession of what we could call scientific revolutions, in which the fundamental assumptions that underlie an entire period of scientific and technological development are challenged, disproved, and superseded by the invention of a crucial experiment and an accompanying new set of improved hypotheses. If we call the state of knowledge before such a revolution *A*, and after it *B*, we see that there is no *logical* way to get from *A* to *B*; they are formally inconsistent on account of the change of fundamental assumptions. That gap between *A* and *B* represents a singularity generated by the creative action

of (ultimately) a single human mind, inventing and proving a crucial experimental hypothesis.

The technological progress upon which healthy economic growth depends, generates an unending series of such singularities, from *A* to *B, B* to *C, C* to *D*, and so on. It therefore becomes measurable in terms of varying densities of these and related species of singularities, as soon as we realize that the series of revolutions, *A, B, C, D, E*... must be lawfully ordered in a manner consistent with the Divine Proportion. How does that express itself?

Very simply: The internal history of science demonstrates that important discoveries are not isolated, chance events. In crossing the apparently unbridgeable gap between two stages of formal knowledge *A* and *B*, the discoverer is always energized and guided by a certain kind of idea, or "thought-object," to use Lyn's recent term, an idea of a mode of forward motion of discovery, referred to classically as a *higher hypothesis,* which carries society forward from *A* to *B* to *C* to *D*, and so on.

But by its very nature—the fact that it, effectively, bridges the gaps between mutually incompatible sets of formal assumptions—a higher hypothesis can never be described or communicated formally. It belongs to a higher level of conception whose relationship to the states of formal knowledge *A, B, C, D* is that of Cusa's circle to its inscribed polygons. And yet, the existence of economic growth over human history, proves that adequate higher hypotheses are actually generated and effectively communicated from generation to generation!

The Concept of Metaphor

And Lyn identified the crucial means by which that is done: the method of metaphor, the metaphorical communication of concepts. At this point, no later, Norbert Wiener's "information theory" doctrine bites the dust!

Exactly this is what comes to the fore in any period of rapid technological progress. Lyn and his collaborators demonstrated this in studies of such examples as the Italian Renaissance, the Ecole Polytechnique of Monge and Carnot, the Göttingen School of Gauss and Riemann—and also in connection with more recent technological crash projects such as the Peenemünde rocket project, the Manhattan Project, and Apollo Program.

To analyze the functional relationship between rates of technological progress and economic growth, Lyn studied the way in which new technologies are "injected" into the economy. Typically a crucial experiment, in the form of a laboratory apparatus invented by scientists, is transformed into a new type of machine tool, which then permits entire new classes of products to be produced, increases the productivity of labor generally. Lyn examined the propagation of successive waves of technology *A, B, C*... into the economy, through successive investment cycles, and in relation to shifts in the composition of the labor force, the market basket of goods, the shifting use of land, and particularly as a function of improvements in basic economic infrastructure—energy production and distribution, transport systems, water supply, communications, education and health services.

It was clear from the nature of the series *A, B, C*... that the functional relationship involved could not be described by a logical-deductive form of mathematics. Does that mean it cannot be rigorously described? Not at all! Lyn found the key to the solution, as he emphasizes, by looking back on the work of Bernhard Riemann, *On the Hypotheses that Underlie Geometry*, from the standpoint of having grasped the essential idea behind Georg Cantor's development of transfinite orderings, particularly his discovery of the so-called *Aleph* series.

On this basis, Lyn identified—among other things—the fundamental constraints which must be satisfied for healthy economic growth. Among them the point of most immediate relevance to the SDI is the role of energy-density functions: increase in potential population density correlates with the increase in useful energy available per capita and per square kilometer, subject to the condition that the technological quality of organization of the energy application is improving. That quality can be very roughly measured by increase of the power density of a machine, for example, at its cutting edge or equivalent area of application of power, or in the age of directed-energy technology by the frequency and wavelength of applied radiation.

But a closer look at this matter obliges us to recognize that the notion of "energy" commonly employed by physics today requires a rather profound revision.

Let me emphasize that Lyn's early work points directly to "new physical principles," uniquely appropriate to processes that are undergoing a rapid series of what physicists chemists call "phase changes." In fact, Lyn proposes to make the case of an economy undergoing successive technological phase changes associated with *A, B, C*..., viewed as a concrete physical process

occurring in space and time, as the paradigmatic case for developing a new form of truly relativistic physics. The form of lawfulness governing such processes is embodied in the variable higher hypotheses governing the succession of scientific revolutions in healthy economic growth. Such "laws" cannot be expressed by formal deductive methods preferred by present-day mathematical physicists, but require a different type of mathematics, whose basis Lyn found in the works of Bernhard Riemann and Georg Cantor.

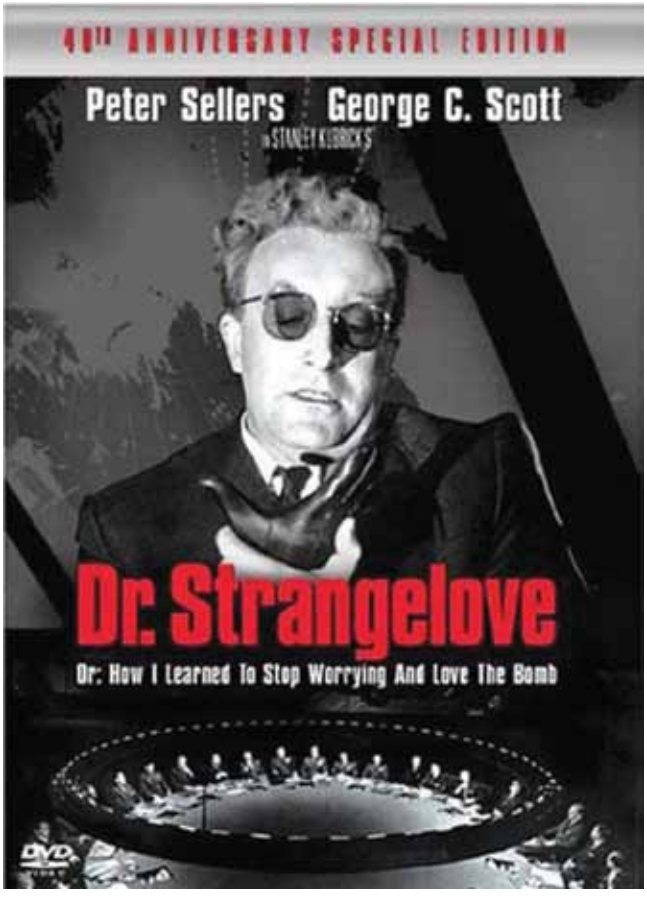
This already implies that the common textbook definition of "energy" as a scalar, linear magnitude is intrinsically fallacious. The shift in characteristics of action implied by a transformation of the form $A>B$ is seen to in effect *create* energy, in contradiction to the Helmholtz-Kelvin doctrine of "The First Law of Thermodynamics." In particular, a correct appreciation of this point already indicates the underlying reasons why it is possible to destroy a speeding missile with a nominally very small amount of electromagnetic radiation, provided that the latter is delivered in appropriately shaped pulses.

Ending the MAD 'Rules of the Game'

Keeping this fundamental work of Lyn in mind, let's now jump about three decades ahead, to the situation that confronted the world at the end of the Carter Administration.

Although most people didn't know it, that world was headed toward World War III on a very short fuse. The essential cause, as Lyn identified publicly with ever-increasing clarity, was the nature of the axiomatic assumptions underlying the way the Anglo-American Establishment thought it was running the world. The mind-set, the cultural outlook of that Establishment was such, that—to a certain extent wittingly, but also unwittingly—they were maneuvering the world step-by-step into a situation in which the only choice would be between total thermonuclear war with the Soviet Union, or submission to a virtual dictatorship from Moscow. In the latter case, a disintegration of the world into some sort of global Thirty Years' War was virtually guaranteed further down the line.

Central among these Anglo-American axioms was the idea that the world should be run through a "balance of power" between two empires—an Anglo-American empire (with England supplying the brains, the U.S.A. the muscle), and an Eastern empire centered in Moscow. These two empires would be adversaries, but there would also be an understanding between them, concerning the "rules of the game," about how the world would be ruled between them. This arrangement would crush any independent development of sovereign nation-states.



The 1964 film "Dr. Strangelove" became a metaphor for the military doctrine known as Mutually Assured Destruction (MAD). The SDI policy was intended to replace this with Soviet-American cooperation for Mutually Assured Survival.

Underlying the whole thing was malthusianism: the goal of establishing a perpetual, zero-growth, feudal-like state of mankind, in which a strictly regulated population of slaves would serve a tiny minority of oligarchical families. A worldwide Confederacy!

This utopian scheme was associated with a military doctrine which came to be known as MAD—Mutually Assured Destruction. Already set forth by Leo Szilard and Bertrand Russell in the 1950s, this doctrine declared the hydrogen bomb to be an "ultimate weapon"—the supposed "last word" in strategic offensive armaments, against which no effective defense is possible. Each of the two superpower empires was to build up an

enormous arsenal, so large, that even in the event one side would launch a surprise attack, the other side would still have enough missiles and warheads surviving to virtually annihilate the attacker. Under this condition of Mutually Assured Destruction, all-out nuclear war, had become impossible—or at least, so thought McNamara, Kissinger, Schlesinger et al.

No technological development was to be permitted to undermine this supposedly perfect system of balance of nuclear terror.

The problem was, as Lyn's discoveries proved in the most rigorous way, that no such scheme could possibly be stabilized. On the contrary, the very malthusian axioms, practically eliminating scientific and technological progress, meant imposing upon the world a regime of ratchet-like downward collapse toward virtual extinction of the human race through the combined effects of wars, famine, and pandemic disease, as the final, inevitable outcome unless those policies were stopped soon enough. With the Carter Administration, the utopian, malthusian policy had taken nearly complete control over the U.S. government.

But there was also a very specific, urgent danger of this policy, located in the diverging perception of the second "partner" of the "game." The Soviet rulers looked at things like the destruction of the quality of education in the United States, the spread of the rock-drug-sex counterculture encouraged by government policies and agencies, the cancellation of the long-term NASA space programs and so forth, and the Soviet rulers said: "What fools they are! They are destroying themselves. Let us help them to do so!" Soviet strategists were increasingly convinced that the West was collapsing from within and was losing the will and capability to fight. At the same time, the Soviet military leadership never accepted the "rules" of the MAD game. Instead they focussed on building up a war-winning capability, with emphasis on massive civil defense measures and anti-missile technology. An operational plan was developed for *winning* an all-out war with the West, known from the 1980s on as the "Ogarkov Plan."

Meanwhile the effective decision-time in case of a surprise attack from either side, given forward-basing of submarines and medium-range missiles in Europe, plus the implications of the so-called EMP [electromagnetic pulse] "pin-down" effect, was reduced to five minutes or less. This meant that the world was running into a strategic military crisis compounded by the destabilizing and other effects of a deepening depression, plus growing insanity among the Western elites who were responsible for the malthusian policies in the first place. To this was added a monstrous factor of miscalculation: the growing discrepancy between commitment to the utopian MAD doctrine by the West, and commitment to a thermonuclear war-winning doctrine in the East.

As desperate as the situation had become, the work of LaRouche and his associates had generated major opportunities to change things in the United States. Lyn had already warned the American people of the disastrous policies that would be pursued by Carter, in a nation-wide television broadcast on election eve, November 1976. Lyn's characterization of the Carter Administration was proven right in the subsequent period. Through the terrible years of the Carter Administration, LaRouche built up a major grass-roots political movement, as the only coherent, visible opposition to the Administration's "deconstruction" of the United States. The *EIR Quarterly Economic Forecasts*, based on the LaRouche-Riemann method, proved uniquely accurate in projecting the industrial decline caused by the Carter-Volcker policies, and demonstrated Lyn's

A Strategic Defense of Humanity

Were the United States to eject Obama, and reciprocate Russia's offer for an SDE (Strategic Defense of Earth), we would not only avert the danger of thermonuclear war in the short term, but we would eliminate the reason for humanity to ever go to war again. Peace, is not the negation of conflict; it's an active commitment among all peoples to "the common aims of mankind."

An LPAC video presented by Natalie Lovegren (12 minutes).

http://www.larouchepac.com/node/20616

unique competence in economics against the manifest incompetence of leading private and governmental agencies, institutes, and think-tanks.

The Carter Administration was voted out in a landslide. People had had enough of Carter's green deconstructionism. Going into the Reagan Administration, there was a craving to get back to what America used to be, to get back to economic growth, to the atmosphere of scientific and technological progress associated with the memory of President John F. Kennedy's Moon landing program. The Europeans looked to the new Administration hoping there would be a return to sanity.

Devising a War-Avoidance Policy

As for the new Reagan Administration itself, it was a mixed bag, to put it mildly. But there was a certain openness. The better people inside the administration were open to suggestions. There was already a certain, perceptible leaning in the direction of LaRouche's policies.

The challenge was to design an improved policy, which would assure war avoidance in the short and medium term, and at the same time provide the world with a long-term pathway into the future.

At the time Lyn designed his strategic defense policy, the idea of laser- and particle-beam weapons to defend against nuclear missiles was not at all new. Shortly after the first successful demonstration of an optical laser, Soviet Marshal V.D. Sokolovsky announced in the 1962 edition of his book *Soviet Military Strategy*, that the Soviet Union had embarked on a long-term program to develop laser- and particle-beam weapons. He remarked that only beam-weapon technology "based on new physical principles" could overcome the inherent shortcomings of anti-missile missiles, which made the latter unsuitable for effective strategic defense—a point which was underlined, recently, by costly experience of the performance of Patriot missiles during the Gulf War.

Through the end of the 1970s, both superpowers had programs to develop beam weapons. There was, however, a characteristic difference: The Soviets were committed to developing an operational beam-weapon defense as soon as possible; they deployed many of their best scientists into the relevant areas and pushed the work forward in a hubristic manner from one breakthrough to the next. Whereas especially under Henry Kissinger's policies, the United States was not only not committed to developing beam-weapon defense, but officially regarded such development as undesirable, as a destabilization of the MAD doctrine. As a result, the U.S. beam-weapon program was kept on the back burner; it was relegated to the task of making sure that the United States would not be taken totally off guard in the event of major Soviet progress.

LaRouche was already familiar with many of the essentials of directed-energy technology through the work of the Fusion Energy Foundation (FEF), which he had played the major part in launching back in 1974. The focus of the FEF's work, of course, was to promote fundamental research, development, and application of controlled nuclear fusion as the major energy source for mankind in the future.

The crucial thing about fusion, clear at that time, is not that the supply of fuel is virtually unlimited (which is true), but rather the fact that fusion reactors can potentially deliver power in various forms, at an energy-flux density many orders of magnitude higher than conventional nuclear or fossil fuel plants. This implied that fusion technology is associated with intrinsically higher economic productivity as compared with other known forms of power production. For example, we can use energy-dense plasmas to process ores and other materials; we can process low-concentration ores, industrial waste, or even ordinary rocks and dirt, into high-quality materials and at a tiny fraction of the present cost per unit output.

Furthermore, the energy-dense plasmas required for fusion confront us with varieties of singularities, in the form of solitons of various sorts and rapid successions of phase changes, pointing to a vast domain of fundamental research for which the LaRouche-Cantor-Riemann form of physics is uniquely appropriate. And, incidentally: 99% of the universe is in a plasma state!

From the standpoint of his science of physical economy, LaRouche knew that fusion would have to be at the center of any policy for healthy, capital-intensive growth of the world economy from the late 1990s into the 21st Century. This evaluation brought LaRouche into a somewhat heated debate with Dr. Edward Teller and other leaders of the U.S. scientific community, who generally supported controlled fusion research but failed to recognize the need for a broad-based "crash program." They tended to see fusion mainly from the standpoint of long-term supplies of energy, not as the locomotive of an economy undergoing rapid technological progress.

Now, it is clear, that if we can master the means to

generate and control the kinds of energy densities associated with "hot" fusion, and if in connection with this we learn how to focus and "tune" such flows of energy, to propagate them efficiently through space and through various media, then we can come up with weapons vastly more powerful than anything known up to now.

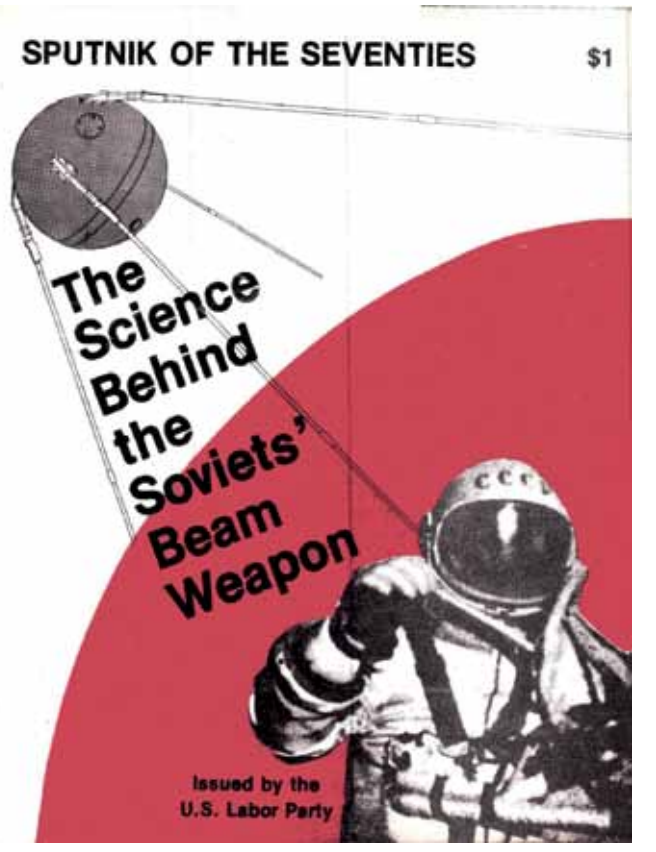
In a certain sense, the internal features of H-bomb design themselves announced the onset of an era of directed energy which would make the bomb ultimately obsolete. This simple observation refuted the whole MAD doctrine, of course, and was accordingly made into a "top secret" by U.S. classification policies. Hence a tumultuous response in some government laboratories, when an article was published in the newspaper *New Solidarity* in October 1976 on the basic physical principles of the H-bomb. The simple fact is, that if we study how the fusion process is actually generated in such a device, we confront a whole set of energy-enhancing processes—nonlinear focussing of shock waves, laser-like transformation and "tuning" of radiation, isentropic compression, and so forth—which are in turn crucial to the functioning of beam weapons. If we turn an H-bomb "inside-out" in this sense, we already have a rudimentary precursor to directed-energy weapons.

LaRouche was not at all surprised when U.S. Air Force's Gen. George Keegan publicized his warnings on the existence of a large Soviet program for beam weapons. Lyn was familiar with the quality of Soviet work in related areas of plasma physics. One of his collaborators discussed this with Keegan, and the FEF made an independent evaluation, published in 1978 in *New Solidarity,* and in a celebrated pamphlet entitled "Sputnik of the 70s—the Science Behind the Soviets' Beam Weapon."

By the middle to the late 1970s, scientific proof of principle had been established for a wide range of beam weapons suitable to destroy missiles and thermonuclear warheads in flight. But this mere scientific feasibility in principle did not by itself dictate an entirely new strategic doctrine. All kinds of doubts and objections could be raised, and were, even by those who did not support the MAD doctrine: Wouldn't the costs of an effective system be astronomical? Can't any defensive system be defeated by countermeasures? And so forth.

Economics and the SDI

The most essential thing Lyn contributed here, was his solution, based on the economic discoveries I referred to earlier, to the problem of how to organize the economy for an unprecedented rate of technological attrition in the relevant fields. This implicitly solves every problem connected with the design of a viable SDI.



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This 1978 pamphlet issued by the LaRouche movement was the first major salvo in what became LaRouche's campaign for beam-weapon defense.

First, it was clear that the idea of an ultimate, invincible beam-weapon defense system was as silly as that of an invincible offensive system. Every development might *eventually* be countered by countermeasures. But, Lyn pointed out, provided a high rate of technological development is maintained, beam weapons and related systems, as a family, embody an intrinsically greater firepower than the slow, nuclear-carrying missiles. In his original design, Lyn demanded a crash program leading to the construction and deployment of a first-generation defense system (Mark I) within a few years, to be followed rapidly by successive, improved generations, Mark II, Mark III, and so forth.

In doing so, Lyn emphasized the close relationship between increase in firepower in military terms, and the energy-flux density and related parameters used by eco-

nomic science for the measurement of technology. The conclusion was that under conditions of technological attrition, defensive systems based on the indicated "new physical principles" would rapidly gain the advantage, leading "asymptotically" to a situation in which the nuclear-tipped missiles would be virtually obsolete.

In particular, Lyn showed that the higher firepower embodied in beam-weapon technologies as a family meant that it would become far cheaper to destroy one missile with a defensive system, than to produce and launch the missile. Thus, the defense becomes the superior investment compared to the offense.

But the most crucial point is the *economic impact* of technological attrition. If we think not of a single technological level of defense *A*, but instead of a process of driving defensive technologies through a series of evolutionary stages *A, B, C, D*..., embodying breakthroughs in advanced science, and if we organize the economy in such a way as to rapidly integrate the technological spillovers into the civilian economy, then the increased rate of growth of productivity of the overall economy pays back the investment into the SDI many times over. This was already demonstrated, to a limited extent, by President Kennedy's Apollo Program, which returned an estimated $5-10 to the economy for every dollar spent to land men on the Moon. However, as Lyn pointed out, the unique characteristics of beam-weapon technologies as a family, in terms of the vast increases in controlled energy-flux-densities embodied in first and later generations of such weapons, point to a potentially far larger spillover effect. The growing use of high-power lasers for machining and treatment of materials, marks the beginning of a new industrial revolution in which, ultimately, a single industrial operative might achieve a greater productive power than the entire industrial labor force in former centuries.

Cultural Implications of LaRouche's Policy

Lyn underlined this point with his proposal, initially placed before the public at a 1985 conference in Washington, for a 40-year project to establish a permanent manned colony on Mars. The first steps would involve creating new space transport systems, with emphasis on the goal of fusion propulsion, and setting up mining and manufacturing operations on the Moon as a base and "stepping-stone" to the planets. This Moon-Mars project constitutes, as Lyn demonstrated, a necessary complement to the SDI itself. The technologies required to install and economically sustain a human population in the hostile environment of that distant planet, are so closely related to those needed for an effective SDI, that research and development in the one area is at the same time development of the other area.

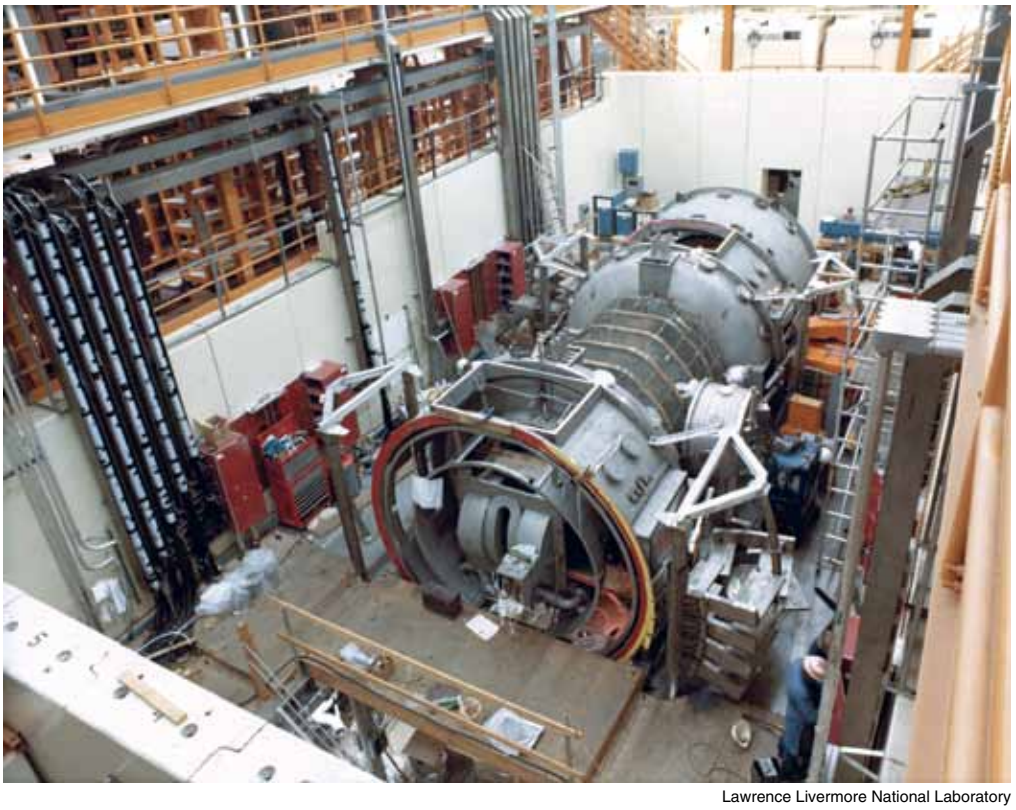
But there is a deeper, *cultural* implication of a properly organized crash program for beam-weapon technology, which was key to Lyn's design of the offer he made to the Soviet leadership on behalf of the United States. In effect, Lyn was offering to the Russians a profound transformation of their society—a transformation radically different, however, from the disastrous IMF "shock therapy" promoted by Jeffrey Sachs and others.

A shared "crash program" development of SDI technology, provided it were organized in accordance with Lyn's principles of physical economy, would have effectively solved the most essential problems of the Soviet economy. There was however a price the Soviets would have to pay for this solution, a price linked inseparably to the solution itself. This price was to permit a shift in the prevailing matrix of cultural values *away* from that associated with the dream of Moscow as the "Third and Final Rome" of a world empire, and instead *toward* an ecumenical form of agreement with the principles of Western Judeo-Christian civilization, as embodied, for example, in the work of Nicholas of Cusa.

A brief example identifies, in microcosm, the point at which the relevant issues of culture and economics intersect.

The best traditions of investment practice in Western industrial societies are associated with what is sometimes called "technological depreciation." Typically, an owner or manager of a small or medium-sized industry—Germany's famous *Mittelstand* exemplifies this—will often replace a machine or related piece of production equipment long before the useful technical life of the machine has expired. Under conditions of rapid technological advance, it commonly happens that a new machine soon becomes available, which incorporates major improvements and promises a much higher productivity than the original piece of equipment. In the typical case, the *Mittelstand* entrepreneur decides to discard the old machine and install the new one in its place. The nominal loss of remaining service life on the old machine is more than compensated by the increased productivity of the new one.

The typical *Mittelstand* farmer or industrialist in



Lawrence Livermore National Laboratory

The crucial thing about fusion is not that the supply of fuel is virtually unlimited, but that fusion reactors can potentially deliver power at an energy-flux density many orders of magnitude higher than conventional nuclear or fossil fuel plants. Shown is the Tandem Mirror Experiment at Lawrence Livermore Lab in 1979, which was being used to create and maintain a high-density plasma.

Western culture sees this practice not merely as a means to earn profits; rather, progress in this sense *is a way of life*. Rapid technological depreciation provides the chief context in which entrepreneurs and workers, engaged in daily process of production, exercise the creative mental potentials expressed in the Cusan concept of *imago viva Dei* [the living image of God]. In this and related ways, Western culture at its best has fostered the relatively highest rates of technological progress achieved in history to date.

Contrast this now to the proverbial, monstrous inertia displayed by the civilian sectors of the Soviet economy, an inertia associated with what Soviet commentators sometimes referred to as "the peasant problem." The rampant backwardness, the fact that obsolete equipment was often kept running virtually indefinitely, reflected not only organizational defects in the so-called socialist system. Rather, it chiefly stemmed from a deep-seated cultural resistance, from the bureaucracy down to the individual worker, against introducing new technologies and new ways of doing things. Implicitly, the underlying idea of "value" governing such resistance was the notion that wealth is located in objects—e.g., a machine, a deposit of raw materials, or some country or population which could be looted—and not in the individual human being's creative role in *generating new wealth through technological progress*. This problem predates the Soviet period; it is an expression of the same deeply imbedded cultural axioms which fueled the centuries-old dream of Moscow as the "Third and Final Rome" of a world empire.

It was that underlying cultural problem which Lyn addressed with his design of the SDI and the 40-year program to colonize Mars—a design which offered a real pathway of solution. The rapid proliferation of SDI-related technologies into the civilian sectors of the Soviet economy would have provided powerful proof, in everyday life, of the efficiency of the creative powers of the mind. Instead of the dangerous demoralization we have now, the population would have been inspired by the ability to change things for the better. The most favorable context would have been provided for a broad cultural transformation.

It is to that, more than anything else, that the Soviet nomenklatura answered "*Nyet!*" From that tragic refusal, Russia and the whole world have suffered disastrously.

So, instead of joyfully exploring the universe together, hopping from planet to planet out to the stars, we have a humanity descending into a holocaust of famine, disease, and genocidal wars. How tragic, how unnecessary! It's time to change history again, as Lyn did in the period leading to March 23, 1983. If we master Lyn's method, we shall surely be successful.